Rosebud Mine Area F Final Supplemental Environmental Impact Statement

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Office of Surface Mining Reclamation and Enforcement

Rosebud Mine Area F
Final Supplemental
Environmental Impact Statement

Office of Surface Mining Reclamation and Enforcement

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Certification: OSMRE has considered the potential environmental impacts of this proposed action in compliance with the National Environmental Policy Act (NEPA), and this Supplemental Environmental Impact Statement (SEIS) represents OSMRE's good-faith effort to prioritize documentation of the most important considerations required by NEPA within congressional and judicial requirements. This prioritization reflects OSMRE's expert judgment, and any considerations addressed briefly or left unaddressed were, in OSMRE's judgment, comparatively not of a substantive nature that meaningfully informs the consideration of potential environmental effects and the resulting decisions on how to proceed. In 2024, OSMRE determined that this analysis was extraordinarily complex, requiring up to 300 pages. OSMRE has ensured that this SEIS conforms to that page limit, as defined in the Council on Environmental Quality regulations that were in place during the majority of the time this SEIS was drafted.

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Abstract: The U.S. Department of the Interior, Office of Surface Mining Reclamation and Enforcement (OSMRE) prepared this Rosebud Mine Area F Final Supplemental Environmental Impact Statement (SEIS) to address the deficiencies identified by the United States District Court for the District of Montana (*Montana Env't Info. Ctr. v. Haaland*, No. CV 19-130-BLG-SPW, 2022 U.S. Dist. LEXIS 179417) in the 2018 *Western Energy Area F Final Environmental Impact Statement* (2018 Final EIS). This SEIS supplements the 2018 Final EIS, which was prepared by OSMRE and the Montana Department of Environmental Quality (DEQ). Three new alternatives are analyzed in this SEIS: Alternative 1 – No Action, Alternative 4 – Proposed Action (Current Federal Mining Plan), and Alternative 5 – Partial Mining Alternative. For all three new alternatives, the mining method, means of protecting the hydrologic balance, monitoring plans, mitigation plans, and reclamation plan would be essentially the same; all of these elements were described in full in the 2018 Final EIS for Alternative 2 – Proposed Action (pursuant to the mine permit application package). Since 2018, some modifications to these elements have been approved by DEQ through minor revisions to state operating permit C2011003F and are described in this SEIS. Changed conditions and updates to the affected environment considered in impacts analyses are described in the SEIS along with updated impacts analyses.

Executive Summary

The Rosebud Mine (mine) is an existing coal mine in Colstrip (Treasure and Rosebud Counties), Montana (**Figure 1.1-1** in **Chapter 1**). The 6,773-acre Area F permit area (project area) is a portion of the mine located in Township 2 North, Range 38 and 39 East, and Township 1 North, Range 39 East, adjacent to the western boundary of Area C of the mine (**Figure 1.1-2** in **Chapter 1**). The U.S. Department of the Interior (DOI), Office of Surface Mining Reclamation and Enforcement (OSMRE) issued a Record of Decision on June 28, 2019 (OSMRE 2019a), pursuant to the National Environmental Policy Act (NEPA), selecting Alternative 2 – Proposed Action but prohibiting mining in 74 acres of Federal coal in the northwestern part (T2N, R38E, Section 12) of the Area F permit area (in the Trail Creek drainage) to prevent material damage to the hydrologic balance outside the permit area (see **Section 1.1, Introduction**). The Mining Plan Decision Document was approved by the DOI Assistant Secretary for Land and Minerals Management (ASLM) on July 15, 2019 (DOI 2019), authorizing the Federal mining plan for Federal Coal Lease MTM 082186, which encompasses 947.6 acres in Area F (**Figure 1.1-3** in **Chapter 1**).

OSMRE's purpose for preparing this Rosebud Mine Area F Final Supplemental Environmental Impact Statement (SEIS) is to address deficiencies identified by the United States District Court for the District of Montana (the Court) (*Montana Env't Info. Ctr. v. Haaland*, No. CV 19-130-BLG-SPW, 2022 U.S. Dist. LEXIS 179417 [D. Mont. Sept. 30, 2022]) in the 2018 Western Energy Area F Final Environmental Impact Statement (2018 Final EIS) and to supplement the 2018 Final EIS. In particular, the Court held that the 2018 Final EIS did not adequately address: (1) cumulative surface water impacts; (2) the climate change effects related to greenhouse gas (GHG) emissions from combusting the Area F coal; (3) effects of Yellowstone River water withdrawals by the Rosebud Power Plant where most Area F coal will be burned; and (4) a middle-ground alternative. In compliance with the Court's order, the SEIS addresses each of these issues in detail. However, the U.S. Supreme Court's recent decision in *Seven County Infrastructure Coalition v. Eagle County*, No. 23-975 (May 29, 2025) (*Seven County*) calls into question the validity of the Montana District Court's ruling by expressly limiting the agency's NEPA obligation to the environmental effects of the proposed action to the exclusion of impacts of downstream actions over which the agency lacks jurisdiction or control. For purposes of the Area F mining plan approval, OSMRE's analysis should be limited to the effects of the proposed action – mining the Federal coal – and need not extend to the effects of operating a power plant owned and operated by a third party, regulated by other state and federal agencies, and over which OSMRE has no jurisdiction or control. In other words, while the SEIS includes a detailed analysis of Rosebud Power Plant GHG emissions (and their climate change effects) and power plant water withdrawals from the Yellowstone River, those impacts are outside OSMRE's jurisdiction, are extraneous, and are not required to demonstrate NEPA's "hard look" at the impacts of mining in Area F. Given that the SEIS was in final review for publication at the time *Seven County* was decided, OSMRE has chosen not to excise portions of the SEIS, but takes the position that those analyses are no longer legally required.

Additionally, after the close of the public comment period, Executive Orders (EOs) and changes to the NEPA implementing regulations further changed how agencies should conduct NEPA analyses. For example, EO 14154, "Unleashing American Energy" (January 20, 2025) and a Presidential Memorandum, "Ending Illegal Discrimination and Restoring Merit-Based Opportunity" (January 21, 2025) require the DOI to strictly adhere to NEPA, 42 United States Code (U.S.C.) §§ 4321 *et seq*. Consistent with EO 14154, the Council on Environmental Quality (CEQ) repealed its NEPA regulations (90 *Federal Register* 10610 [February 25, 2025]) and directed that, while agencies review their own NEPA-implementing regulations for consistency with EO 14154, agencies could voluntarily consider CEQ's 2020 NEPA regulations as guidance. Finally, on July 3, 2025, DOI partially rescinded its regulations implementing

NEPA and published a separate *NEPA Handbook* containing DOI's revised NEPA procedures that apply to the internal processing of NEPA analyses.

In light of these changes, OSMRE determined that this NEPA analysis contains significantly more analysis and information on environmental effects than is required under NEPA because of DOI's new regulations and *NEPA Handbook* and the United States Supreme Court's decision in *Seven County*. For example, the effects analysis in this SEIS contains information on effects of activities that OSMRE considers to be too far in time or place removed from the proposed action to reasonably be included in a NEPA analysis, and *Seven County* makes it clear that the agency has discretion to determine "where to draw the line" in considering indirect impacts and whether to include other projects separate in time and place. Nonetheless, OSMRE decided to not substantially revise this SEIS because a draft of this NEPA analysis containing this unnecessary and excessive information was already published for public comment, this SEIS ensures compliance with the Court's order in *Montana Environmental Information Center* (even though that order preceded *Seven County*), and removal of the unnecessary material would be an inefficient use of agency resources and cause unnecessary delay given the complexity of the analysis, especially in light of the need to quickly address the Nation's energy supply (see, e.g., EO 14156, "Declaring a National Energy Emergency"). However, OSMRE maintains that under *Seven County*, no such analysis of these effects, such as the analysis of water withdrawals from the power plant or the cumulative effects analysis, is required because DOI has no control over these effects and no law, including NEPA, the Surface Mining Control and Reclamation Act of 1977, or the Mineral Leasing Act of 1920, requires this analysis.

Moreover, the Court ordered OSMRE to "remedy its inadequate [greenhouse gas (GHG)] emissions analysis," which did not quantify those emissions. **Section 4.4.7** of this SEIS includes an unnecessary discussion of the effects related to the social cost of GHG emissions. As *Seven County* makes clear, NEPA requires an agency neither to consider such impacts nor to quantify project impacts through a specific methodology. As further explained in **Section 4.4.7**, the social cost of GHG protocol is flawed, and it is only included here to ensure compliance with the Court's order and because removal of the GHG discussion would be an inefficient use of agency resources and cause unnecessary delay given the complexity of the analysis, especially in light of the need to quickly address the Nation's energy supply.

Table 1.1-1 in **Chapter 1** provides a brief overview of the updates this SEIS makes to the 2018 Final EIS. OSMRE has determined that this is an extraordinarily complex EIS, warranting preparation of a SEIS of up to 300 pages. This Final SEIS is currently within that page limit as calculated using the definition of "page" in 40 C.F.R. part 1508.1(bb) (2022), the CEQ regulations in effect when this SEIS was prepared.

OSMRE's need for the action is to provide Westmoreland Rosebud the opportunity to exercise its rights under Federal coal lease MTM 082186 (**Appendix 6**), granted by the Bureau of Land Management (BLM), to access and mine undeveloped Federal coal resources located in the project area. In 2019, Westmoreland Rosebud began developing the project area, according to state operating permit C2011003F issued by the Montana Department of Environmental Quality (DEQ) in 2019, and the Federal mining plan approved by the DOI ASLM. As of December 2023, Westmoreland Rosebud has disturbed 582 acres in the project area; 494 acres of that disturbance is due to active mining, and the remainder is due to site development, such as roads and soil and/or spoil stockpiles (see **Figure 2.2-1** in **Chapter 2**; Westmoreland Rosebud 2024a). About 8.5 million tons of coal have been produced in the project area within this timeframe (Westmoreland Rosebud 2024a) and sold to the Colstrip Power Plant and the Rosebud Power Plant. Ongoing mining in the project area and other approved permit areas of the Rosebud Mine is described in **Section 2.2, Description of Past and Existing Mine and Reclamation Operations.**

The project area is situated in the northern Powder River Basin generally east and north of the Little Wolf Mountains. Tributaries of Horse Creek and West Fork Armells Creek, including Black Hank Creek, Donley Creek, Robbie Creek, and McClure Creek (all of which lie within the drainage of the Yellowstone River), drain the project area. A ridge in the western portion of the project area divides the Horse Creek and West Fork Armells Creek drainages. The surface of the project area is entirely privately owned, but the subsurface mineral estate is both privately (3,479 acres) and federally (3,294 acres) owned. Westmoreland Rosebud holds leases for the Federal (MTM 082186) and private coal (1001 and 1001-A)[1] in the project area (**Figure 1.1-3**). The resource-specific analysis areas and the affected environment considered in this SEIS are described in **Chapter 3**.

Three alternatives are analyzed in this SEIS and described in **Chapter 2**: Alternative 1 – No Action, Alternative 4 – Proposed Action (Current Federal Mining Plan), and Alternative 5 – Partial Mining Alternative. The three alternatives are introduced in **Section 2.3, Summary of SEIS Alternatives**; in that section, **Table 2.3-1** provides a comparison of the components of each alternative, and **Table 2.3-2** compares annual production and associated disturbance across alternatives. The alternatives are described in more detail in **Chapter 2** (see **Sections 2.4** through **2.6**); descriptions include the underlying assumptions used in the analysis for each alternative. Shortly before publication of this SEIS, the President signed into law, Public Law No. 119-21, commonly referred to as the One Big Beautiful Bill (OBBB). The OBBB may impact whether the alternatives analyzed in this SEIS continue to be reasonable alternatives, meaning that they are legally, technically, and economically feasible; meet the purpose and need of the proposed action; and are within the jurisdiction of OSMRE. Furthermore, the OBBB directs the Secretary to make available for lease at least 4 million acres of known recoverable coal resources, which may impact recovery of Federal coal in and around the Rosebud Mine area, but the location of any future Federal coal leases as a result of the OBBB are unknown at this time and too speculative to analyze in this SEIS. However, the passage of the OBBB does not change the environmental analysis for the various alternatives and, therefore, they were retained in this SEIS. Because of the speculative nature of the future OBBB-related lease actions, the cumulative effects analysis in this SEIS has not been modified.

For all three alternatives analyzed in this SEIS, the mining method, reclamation plan, means of protecting the hydrologic balance, monitoring plans, and mitigation plans would be essentially the same; all of these elements were described in full in the 2018 Final EIS for Alternative 2 (see **Section 2.4, Alternative 2 – Proposed Action** in the 2018 Final EIS). Modifications made to these elements since 2018 due to changed conditions are described in **Section 2.2.2.2, Area F Operations and Development**. The primary differences among the three SEIS alternatives are (1) total disturbance, (2) tons of coal mined, and (3) the duration of mining in the project area (see **Table 2.3-2**). Under Alternative 1, mining would end in 2025; during the 6-year mine life, about 17.1 million tons of coal would be mined, and approximately 1,021 acres would be disturbed in the project area. Under Alternative 4, mining would end in 2039; during the 20-year mine life, about 71.3 million tons of coal would be mined, and approximately 4,288 acres would be disturbed in the project area. Under Alternative 5, mining would end in 2030; during the 11-year mine life, about 37.1 million tons of coal would be mined, and approximately 2,495 acres would be disturbed in the project area.

Impacts (direct and indirect) of the three SEIS alternatives are described in **Chapter 4** and summarized in **Chapter 2** (**Table 2.8-1)**. Assumptions for each alternative, which informed the scope of the effects analyses in this SEIS, are presented in **Section 2.4, Alternative 1 – No Action**, **Section 2.5, Alternative 4 – Proposed Action (Current Federal Mining Plan)**, and **Section 2.6, Alternative 5 – Partial Mining Alternative**.

[1] These leases were referred to as G-002 and G-002A in the 2018 Final EIS.

Past, present, and reasonably foreseeable future actions have been updated in this SEIS and are provided in **Chapter 5** (**Table 5.2-1**) along with updated cumulative impacts analyses.

Supporting analyses, including an analysis of the social costs of GHG emissions, updated water quality tables, and an updated analysis of socioeconomic effects (IMPLAN), are provided in Appendices to this SEIS along with analysis definitions, acronyms, and a glossary. Acronyms are defined at their first use in each chapter.

Contents

Chapter 1. Purpose and Need 1-1
1.1 Introduction 1-1
1.1.1 Document Structure 1-2
1.1.2 Terms Used in This SEIS 1-6
1.2 Background and Overview 1-13
1.2.1 History of Mine Operations at Colstrip 1-13
1.2.2 Coal Combustion 1-14
1.3 Purpose and Need 1-16
1.4 Agency Authority and Actions 1-16
1.4.1 Lead Agency 1-17
1.5 Public Outreach 1-20
1.5.1 Scoping 1-20
1.5.2 Public Comment Period for the Draft SEIS 1-20

Chapter 2. Proposed Action and Alternatives 2-1
2.1 Introduction 2-1
2.1.1 Alternatives Development 2-1
2.2 Description of Past and Existing Mine and Reclamation Operations 2-2
2.2.1 Past and Existing Production 2-2
2.2.2 Existing Disturbance and Reclamation 2-3
2.2.3 Other Existing Permits 2-31
2.2.4 Existing Rosebud Mine Support Facilities 2-32
2.2.5 General Sequence of Operations 2-32
2.2.6 Life of Operations 2-33
2.3 Summary of SEIS Alternatives 2-34
2.3.1 Elements Common to All Alternatives 2-34
2.3.2 Key Differences Among Alternatives 2-35
2.4 Alternative 1 – No Action 2-38
2.4.1 Area F Mine Operations and Reclamation 2-38
2.4.2 State Operating Permit C2011003F 2-39
2.4.3 Power Plants 2-39
2.4.4 Other Rosebud Mine Permit Areas 2-40
2.5 Alternative 4 – Proposed Action (Current Federal Mining Plan) 2-43
2.5.1 Area F Mine Operations and Reclamation 2-43
2.5.2 State Operating Permit C2011003F 2-43
2.5.3 Power Plants 2-43
2.5.4 Other Rosebud Mine Permit Areas 2-44
2.6 Alternative 5 – Partial Mining Alternative 2-47
2.6.1 Area F Mine Operations and Reclamation 2-47
2.6.2 State Operating Permit C2011003F 2-48
2.6.3 Power Plants 2-48
2.6.4 Other Rosebud Mine Permit Areas 2-48
2.7 Alternatives Considered but Eliminated from Further Analysis 2-53
2.7.1 Alternative 2 – 2018 Final EIS Proposed Action 2-53
2.7.2 Alternative 3 – Proposed Action Plus Environmental Protection Measures from the 2018 EIS 2-53
2.8 Summary of Impacts and Identification of the Preferred Alternative 2-54
2.8.1 Preferred Alternative 2-61

Chapter 3. Affected Environment 3-1

3.1 Resources Analyzed and General Setting 3-1
3.1.1 Resources Analyzed 3-1
3.1.2 General Setting 3-2
3.2 Topography 3-4
3.2.1 Introduction 3-4
3.2.2 Pre-mine Topography 3-4
3.3 Air Quality 3-5
3.3.1 Introduction 3-5
3.3.2 Local and Regional Meteorological Patterns 3-7
3.3.3 Air Quality Monitoring at Rosebud Mine 3-7
3.3.4 Existing Regional Air Pollutant Sources and Emissions 3-7
3.3.5 Regional Air Quality 3-15
3.4 Climate and Climate Change 3-16
3.4.1 Introduction 3-16
3.4.2 Climate Conditions 3-17
3.5 Public Health and Safety 3-25
3.5.1 Introduction 3-25
3.5.2 Environmental Health 3-26
3.5.3 Socioeconomic Environment and Health 3-26
3.5.4 Public Safety 3-27
3.6 Geology 3-28
3.6.1 Introduction 3-28
3.6.2 Analysis Area Geology 3-28
3.6.3 Regional Geology 3-28
3.7 Water Resources – Surface Water 3-29
3.7.1 Introduction 3-29
3.7.2 Climate 3-45
3.7.3 Floodplains 3-45
3.7.4 Hydrologic Balance 3-45
3.7.5 Surface Water Hydrology 3-46
3.7.6 Surface Water Quality 3-54
3.8 Water Resources – Groundwater 3-63
3.8.1 Introduction 3-63
3.8.2 Site Hydrogeology 3-64
3.8.3 Conceptual Hydrogeological Model 3-64
3.8.4 Groundwater Use 3-65
3.8.5 Groundwater Quality 3-65
3.9 Water Resources – Water Rights 3-66
3.9.1 Introduction 3-66
3.9.2 Existing Water Rights 3-66
3.10 Vegetation 3-68
3.10.1 Introduction 3-68
3.10.2 Vegetation Communities 3-69
3.10.3 Vegetation Communities in the Indirect Effects Analysis Area 3-69
3.10.4 Noxious Weeds 3-69
3.11 Wetlands and Riparian Zones 3-70
3.11.1 Introduction 3-70
3.11.2 Wetlands in the Direct Effects Analysis Area 3-70
3.11.3 Other Waters of the U.S. in the Direct Effects Analysis Area 3-70
3.11.4 Springs and Seeps in the Direct Effects Analysis Area 3-71
3.11.5 Wetlands in the Indirect Effects Analysis Area 3-71

3.12 Fish and Wildlife Resources 3-72
3.12.1 Introduction 3-72
3.12.2 Mammals 3-74
3.12.3 Big Game Animals 3-74
3.12.4 Birds 3-74
3.12.5 Reptiles, Amphibians, and Invertebrates 3-74
3.12.6 Aquatic Species 3-74
3.13 Special Status Species 3-75
3.13.1 Introduction 3-75
3.13.2 Federally Listed Threatened, Endangered, and Candidate Species 3-79
3.13.3 MNHP Species of Concern 3-84
3.13.4 Special Status Plant Species 3-94
3.14 Cultural and Historic Resources 3-96
3.14.1 Introduction 3-96
3.14.2 Cultural Context 3-96
3.14.3 Documented Cultural Resources 3-96
3.14.4 Tribal Consultation 3-97
3.15 Socioeconomic Conditions 3-98
3.15.1 Introduction 3-98
3.15.2 Population and Demographics 3-101
3.15.3 Incorporated Population Centers 3-101
3.15.4 Public Services and Infrastructure 3-102
3.16 RESERVED [Note: numbering sequence retained for continuity with the Draft SEIS and 2018 Final EIS] 3-103
3.17 Visual Resources 3-104
3.17.1 Introduction 3-104
3.17.2 Visual Character 3-105
3.18 Recreation 3-106
3.18.1 Introduction 3-106
3.18.2 Recreation Opportunities 3-106
3.19 Paleontology 3-107
3.19.1 Introduction 3-107
3.19.2 Affected Environment 3-107
3.20 Access and Transportation 3-108
3.20.1 Introduction 3-108
3.20.2 Mine Access and Internal Road System 3-108
3.20.3 Regional Transportation System 3-108
3.21 Solid and Hazardous Waste 3-109
3.21.1 Introduction 3-109
3.21.2 Waste Disposal Practices 3-109
3.22 Noise 3-110
3.22.1 Introduction 3-110
3.22.2 Existing Noise Sources 3-110
3.23 Land Use 3-111
3.23.1 Introduction 3-111
3.23.2 Land Ownership 3-112
3.23.3 Primary Pre-mining Land Uses (Direct Effects Analysis Area) 3-112
3.23.4 Other Pre-mining Land Uses (Direct Effects Analysis Area) 3-113
3.23.5 Land Use in the Indirect Effects Analysis Area 3-113
3.24 Soil 3-114
3.24.1 Introduction 3-114

3.24.2 Soil Map Units and Descriptions 3-114
3.24.3 Suitability for Reclamation 3-114
3.25 Resources Considered but Dismissed 3-115

Chapter 4. Environmental Consequences (Direct and Indirect Impacts) 4-1
4.1 Introduction 4-1
4.2 Topography 4-3
4.2.1 Analysis Methods and Impact and Intensity Thresholds 4-3
4.2.2 Alternative 1 – No Action 4-3
4.2.3 Alternative 4 – Proposed Action (Current Federal Mining Plan) 4-4
4.2.4 Alternative 5 – Partial Mining Alternative 4-5
4.2.5 Irreversible and Irretrievable Commitment of Resources 4-6
4.3 Air Quality 4-7
4.3.1 Analysis Methods and Impact and Intensity Thresholds 4-7
4.3.2 Alternative 1 – No Action 4-7
4.3.3 Alternative 4 – Proposed Action (Current Federal Mining Plan) 4-8
4.3.4 Alternative 5 – Partial Mining Alternative 4-22
4.3.5 Irreversible and Irretrievable Commitment of Resources 4-22
4.4 Climate and Climate Change 4-23
4.4.1 Analysis Methods and Impact and Intensity Thresholds 4-23
4.4.2 Alternative 1 – No Action 4-23
4.4.3 Alternative 4 – Proposed Action (Current Federal Mining Plan) 4-24
4.4.4 Alternative 5 – Partial Mining Alternative 4-27
4.4.5 Comparison Across Alternatives 4-28
4.4.6 Impact of the Proposed Action on Trends in Global, United States, and Montana Greenhouse Gas Emissions 4-29
4.4.7 Social Cost of GHGs 4-30
4.4.8 Unavoidable Adverse, Irretrievable, and Irreversible Effects 4-35
4.4.9 Conclusion 4-35
4.5 Public Health and Safety 4-36
4.5.1 Analysis Methods and Impact and Intensity Thresholds 4-36
4.5.2 Alternative 1 – No Action 4-36
4.5.3 Alternative 4 – Proposed Action (Current Federal Mining Plan) 4-37
4.5.4 Alternative 5 – Partial Mining Alternative 4-47
4.5.5 Irreversible and Irretrievable Commitment of Resources 4-49
4.6 Geology 4-50
4.6.1 Analysis Methods and Impact and Intensity Thresholds 4-50
4.6.2 Alternative 1 – No Action 4-50
4.6.3 Alternative 4 – Proposed Action (Current Federal Mining Plan) 4-51
4.6.4 Alternative 5 – Partial Mining Alternative 4-52
4.6.5 Irreversible and Irretrievable Commitment of Resources 4-53
4.7 Water Resources – Surface Water 4-54
4.7.1 Analysis Methods and Impact and Intensity Thresholds 4-54
4.7.2 Alternative 1 – No Action 4-56
4.7.3 Alternative 4 – Proposed Action (Current Federal Mining Plan) 4-58
4.7.4 Alternative 5 – Partial Mining Alternative 4-81
4.7.5 Irreversible and Irretrievable Commitment of Resources 4-83
4.8 Water Resources – Groundwater 4-84
4.8.1 Analysis Methods and Impact and Intensity Thresholds 4-84
4.8.2 Alternative 1 – No Action 4-85
4.8.3 Alternative 4 – Proposed Action (Current Federal Mining Plan) 4-86

4.8.4 Alternative 5 – Partial Mining Alternative 4-96
4.8.5 Irreversible and Irretrievable Commitment of Resources 4-97
4.9 Water Resources – Water Rights 4-98
4.9.1 Analysis Methods and Impact and Intensity Thresholds 4-98
4.9.2 Alternative 1 – No Action 4-99
4.9.3 Alternative 4 – Proposed Action (Current Federal Mining Plan) 4-100
4.9.4 Alternative 5 – Partial Mining Alternative 4-106
4.9.5 Irreversible and Irretrievable Commitment of Resources 4-107
4.10 Vegetation 4-108
4.10.1 Analysis Methods and Impact and Intensity Thresholds 4-108
4.10.2 Alternative 1 – No Action 4-108
4.10.3 Alternative 4 – Proposed Action (Current Federal Mining Plan) 4-109
4.10.4 Alternative 5 – Partial Mining Alternative 4-113
4.10.5 Irreversible and Irretrievable Commitment of Resources 4-113
4.11 Wetlands and Riparian Zones 4-114
4.11.1 Analysis Methods and Impact and Intensity Thresholds 4-114
4.11.2 Alternative 1 – No Action 4-114
4.11.3 Alternative 4 – Proposed Action (Current Federal Mining Plan) 4-114
4.11.4 Alternative 5 – Partial Mining Alternative 4-121
4.11.5 Irreversible and Irretrievable Commitment of Resources 4-121
4.12 Fish and Wildlife Resources 4-122
4.12.1 Analysis Methods and Impact and Intensity Thresholds 4-122
4.12.2 Alternative 1 – No Action 4-122
4.12.3 Alternative 4 – Proposed Action (Current Federal Mining Plan) 4-123
4.12.4 Alternative 5 – Partial Mining Alternative 4-134
4.12.5 Irreversible and Irretrievable Commitment of Resources 4-135
4.13 Special Status Species 4-136
4.13.1 Analysis Methods and Impact and Intensity Thresholds 4-136
4.13.2 Alternative 1 – No Action 4-137
4.13.3 Alternative 4 – Proposed Action (Current Federal Mining Plan) 4-138
4.13.4 Alternative 5 – Partial Mining Alternative 4-147
4.13.5 Irreversible and Irretrievable Commitment of Resources 4-148
4.14 Cultural and Historic Resources 4-149
4.14.1 Analysis Methods and Impact and Intensity Thresholds 4-149
4.14.2 Alternative 1 – No Action 4-149
4.14.3 Alternative 4 – Proposed Action (Current Federal Mining Plan) 4-150
4.14.4 Alternative 5 – Partial Mining Alternative 4-150
4.14.5 Irreversible and Irretrievable Commitment of Resources 4-151
4.15 Socioeconomic Conditions 4-152
4.15.1 Analysis Methods and Impact and Intensity Thresholds 4-152
4.15.2 All Alternatives 4-153
4.16 RESERVED [Note: numbering sequence retained for continuity with the Draft SEIS and 2018 Final EIS] 4-157
4.17 Visual Resources 4-158
4.17.1 Analysis Methods and Impact and Intensity Thresholds 4-158
4.17.2 Alternative 1 – No Action 4-158
4.17.3 Alternative 4 – Proposed Action (Current Federal Mining Plan) 4-159
4.17.4 Alternative 5 – Partial Mining Alternative 4-161
4.17.5 Irreversible and Irretrievable Commitment of Resources 4-161
4.18 Recreation 4-162
4.18.1 Analysis Methods and Impact and Intensity Thresholds 4-162

4.18.2 Alternative 1 – No Action Alternative....4-162
4.18.3 Alternative 4 – Proposed Action (Current Federal Mining Plan)....4-163
4.18.4 Alternative 5 – Partial Mining Alternative....4-164
4.18.5 Irreversible and Irretrievable Commitment of Resources....4-164
4.19 Paleontology....4-165
4.19.1 Analysis Methods and Impact and Intensity Thresholds....4-165
4.19.2 Alternative 1 – No Action....4-165
4.19.3 Alternative 4 – Proposed Action (Current Federal Mining Plan)....4-165
4.19.4 Alternative 5 – Partial Mining Alternative....4-166
4.19.5 Irreversible and Irretrievable Commitment of Resources....4-167
4.20 Access and Transportation....4-168
4.20.1 Analysis Methods and Impact and Intensity Thresholds....4-168
4.20.2 Alternative 1 – No Action....4-168
4.20.3 Alternative 4 – Proposed Action (Current Federal Mining Plan)....4-169
4.20.4 Alternative 5 – Partial Mining Alternative....4-170
4.20.5 Irreversible and Irretrievable Commitment of Resources....4-171
4.21 Solid and Hazardous Waste....4-172
4.21.1 Analysis Methods and Impact and Intensity Thresholds....4-172
4.21.2 Alternative 1 – No Action....4-172
4.21.3 Alternative 4 – Proposed Action (Current Federal Mining Plan)....4-173
4.21.4 Alternative 5 – Partial Mining Alternative....4-174
4.21.5 Irreversible and Irretrievable Commitment of Resources....4-174
4.22 Noise....4-175
4.22.1 Analysis Methods and Impact and Intensity Thresholds....4-175
4.22.2 Alternative 1 – No Action....4-175
4.22.3 Alternative 4 – Proposed Action (Current Federal Mining Plan)....4-175
4.22.4 Alternative 5 – Partial Mining Alternative....4-177
4.22.5 Irreversible and Irretrievable Commitment of Resources....4-178
4.23 Land Use....4-179
4.23.1 Analysis Methods and Impact and Intensity Thresholds....4-179
4.23.2 Alternative 1 – No Action Alternative....4-179
4.23.3 Alternative 4 – Proposed Action (Current Federal Mining Plan)....4-180
4.23.4 Alternative 5 – Partial Mining Alternative....4-181
4.23.5 Irreversible and Irretrievable Commitment of Resources....4-182
4.24 Soil....4-183
4.24.1 Analysis Methods and Impact and Intensity Thresholds....4-183
4.24.2 Alternative 1 – No Action....4-183
4.24.3 Alternative 4 – Proposed Action (Current Federal Mining Plan)....4-184
4.24.4 Alternative 5 – Partial Mining Alternative....4-188
4.24.5 Irreversible and Irretrievable Commitment of Resources....4-189

Chapter 5. Cumulative Impacts....5-1
5.1 Introduction....5-1
5.2 Related Past, Present, and Reasonably Foreseeable Future Actions....5-1
5.3 Resources....5-11
5.3.1 Topography....5-11
5.3.2 Air Quality....5-12
5.3.3 Climate and Climate Change....5-15
5.3.4 Public Health and Safety....5-17
5.3.5 Geology....5-20
5.3.6 Water Resources – Surface Water....5-21

5.3.7 Water Resources – Groundwater 5-33
5.3.8 Water Resources – Water Rights 5-35
5.3.9 Vegetation 5-38
5.3.10 Wetlands and Riparian Zones 5-40
5.3.11 Fish and Wildlife Resources 5-42
5.3.12 Special Status Species 5-45
5.3.13 Cultural and Historic Resources 5-49
5.3.14 Socioeconomic Conditions 5-50
5.3.15 Reserved [Note: numbering sequence retained for continuity with the Draft SEIS and 2018 Final EIS] 5-52
5.3.16 Visual Resources 5-53
5.3.17 Recreation 5-54
5.3.18 Paleontology 5-55
5.3.19 Access and Transportation 5-56
5.3.20 Solid and Hazardous Waste 5-57
5.3.21 Noise 5-58
5.3.22 Land Use 5-59
5.3.23 Soil 5-60

Chapter 6. Coordination and Consultation 6-1
6.1 Consultation Processes 6-1
6.1.1 Public Comment Process 6-1
6.1.2 Section 7 Consultation Process with the U.S. Fish and Wildlife Service 6-1
6.1.3 Section 106 and Tribal Consultation Processes 6-3
6.1.4 Federal, State, and Local Agencies 6-4
6.2 Preparers and Contributors 6-5
6.2.1 Montana Department of Environmental Quality 6-5
6.2.2 Office of Surface Mining Reclamation and Enforcement 6-5
6.2.3 Bureau of Land Management 6-5
6.2.4 EIS Consultant Team 6-6
6.3 List of Agencies, Organizations, and Persons to Whom Copies of this SEIS Have Been Distributed 6-7

Chapter 7. References 7-1

Appendices

Appendix 1 – Acronyms, Abbreviations, Analysis Definitions, and Glossary
Appendix 2 – Social Cost of Greenhouse Gases (BBC analysis)
Appendix 3 – Water Quality Tables
Appendix 4 – BBC IMPLAN Analysis
Appendix 5 – Responses to Public Comments
Appendix 6 – Federal Coal Lease MTM 082186 Documentation
Appendix 7 – ESA Section 7 Consultation Documentation

Tables

Table 1.1-1. Sections Updated Between the 2018 Final EIS and the 2024 Draft SEIS. 1-3
Table 1.1-2. Key Differences Between the 2024 Draft SEIS and the 2025 Final SEIS. 1-5
Table 1.4-1. Federal Permits, Consultations, Licenses, and Approvals. 1-17
Table 1.4-2. State Permits, Licenses, and Approvals. 1-18
Table 2.2-1. Total Coal Produced by the Rosebud Mine between 1975 and 2023 2-3
Table 2.2-2. Coal Produced by the Rosebud Mine in 2023 (January 1–December 31). 2-3
Table 2.2-3. Rosebud Mine Permitted and Disturbed Acreage as of December 2023. 2-4
Table 2.2-4. Reclamation Bond Amount and Phased Bond Release by Area of the Rosebud Mine as of December 2023. 2-4
Table 2.2-5. DEQ and OSMRE ROD conditions. 2-5
Table 2.2-6. Minor Revisions to DEQ-Approved State Operating Permit C2011003F (Area F). 2-7
Table 2.2-7. Comparison of Area F Permit Area Surface Disturbance Estimates. 2-8
Table 2.2-8. Comparison of Area F Estimated Coal Reserve Volumes (Tons).[1] 2-9
Table 2.2-9. Comparison of Estimated and Actual Annual Production by Year and Acres Disturbed. 2-11
Table 2.2-10. Overview of Parameters Monitored in the Project Area. 2-30
Table 2.3-1. Comparison of SEIS Alternatives by Components. 2-36
Table 2.3-2. Comparison of SEIS Alternatives by Estimated Annual Production and Acres Disturbed. 2-37
Table 2.8-1. Summary of Direct and Indirect Environmental Impacts. 2-55
Table 3.1-1. Resources Analyzed. 3-2
Table 3.3-1. Air Quality: Changed Conditions Since the 2018 Final EIS. 3-5
Table 3.3-2. Historic CAP Emissions Reported from Rosebud Mine (All Permit Areas). 3-9
Table 3.3-3. CAP Emissions from the Colstrip and Rosebud Power Plants (2010–2023). 3-11
Table 3.3-4. Historic Mercury Emissions from the Colstrip and Rosebud Power Plants. 3-12
Table 3.3-5. Historic Metal HAP Emissions from the Colstrip Power Plant.[1] 3-12
Table 3.3-6. 2014 Existing Non-Metal HAP Emissions from the Colstrip Power Plant 3-13
Table 3.3-7. Regional Non-Point Source Emission Sources. 3-14
Table 3.4-1. Climate Change: Changed Conditions Since 2018 Final EIS. 3-16
Table 3.4-2. Montana Coal Production in 2015 versus 2022. 3-21
Table 3.4-3. Historic GHG Emissions Summary from the Rosebud Mine (All Permit Areas) ... 3-22
Table 3.4-4. Historic GHG Emissions Summary from the Colstrip and Rosebud Power Plants. 3-23
Table 3.4-5. Data Used to Calculate Worker Commute GHG Emissions. 3-24
Table 3.4-6. Worker Commute GHG Emissions. 3-24
Table 3.7-1. Surface Water and Groundwater: Changed Conditions Since the 2018 Final EIS. 3-30
Table 3.7-2. Effluent Limit Guidelines for New Coal Mine Point Source Discharges. 3-31
Table 3.7-3. Impaired Waters in the Analysis Area. 3-34
Table 3.7-4. Montana Surface Water Quality Standards for C-3 Waters. 3-36
Table 3.7-5. Recommended Water Quality Concentration Limits for Livestock (mg/L) 3-38

Table 3.7-6. Yellowstone River Flow Data. 3-54
Table 3.7-7. Summary of Mercury, Selenium, Copper, Nitrate+Nitrite, and Total Nitrogen Water Quality Data for Indirect Effects Analysis Area Streams. 3-61
Table 3.8-1. Source of Groundwater to Monitored Springs. 3-64
Table 3.10-1. Vegetation: Changed Conditions Since the 2018 Final EIS. 3-68
Table 3.12-1. Fish and Wildlife Resources: Changed Conditions Since the 2018 Final EIS. 3-73
Table 3.13-1. Special Status Species: Changed Conditions Since the 2018 Final EIS. 3-76
Table 3.13-2. Federally Endangered Species Potentially Occurring in the Analysis Area. 3-80
Table 3.13-3. MNHP Species of Concern Documented in the Direct Effects Analysis Area.[1] 3-84
Table 3.13-4. MNHP Plant Species of Concern in Rosebud, Treasure, Big Horn, and Powder River Counties, and Montana's Federally Listed Plant Species. 3-95
Table 3.14-1. Cultural Resources: Changed Conditions Since the 2018 Final EIS. 3-96
Table 3.15-1. Socioeconomic Conditions: Changed Conditions Since 2018 Final EIS 3-98
Table 3.15-2. Rosebud, Treasure, and Big Horn Counties Population (1970–2022). 3-101
Table 3.17-1. Visual Resources: Changed Conditions Since the 2018 Final EIS. 3-104
Table 3.18-1. Recreation Resources: Changed Conditions Since the 2018 Final EIS. 3-106
Table 3.20-1. Access and Transportation: Changed Conditions Since the 2018 Final EIS. 3-108
Table 3.21-1. Solid and Hazardous Waste: Changed Conditions Since the 2018 Final EIS. 3-109
Table 3.22-1. Noise: Changed Conditions Since the 2018 Final EIS. 3-110
Table 3.23-1. Land Use: Changed Conditions Since the 2018 Final EIS. 3-111
Table 3.24-1. Soil: Changed Conditions Since the 2018 Final EIS. 3-114
Table 4.3-1. Projected Annual Coal Production for Rosebud Mine by Area. 4-10
Table 4.3-2. Estimated Emissions Due to Project Area. 4-11
Table 4.3-3. Project Area Trace Metal HAP Emissions from Fugitive Coal Dust. 4-12
Table 4.3-4. Potential Project Area DPM Emissions. 4-12
Table 4.3-5. Modeled Annual Nitrogen and Sulfur Deposition due to Direct Impacts at Class I Areas. 4-15
Table 4.3-6. Visibility Impacts from Direct Emissions at Class I Areas. 4-15
Table 4.3-7. Maximum Annual Average Air Concentration and Annual Deposition of HAPs from Project Area Fugitive Coal Dust Emissions. 4-16
Table 4.3-8. CAP Emissions from Colstrip Units 3 and 4 and the Rosebud Power Plant.[1] 4-17
Table 4.3-9. Selected Metal HAP Emission Rates for Colstrip Units 3 and 4 and the Rosebud Power Plant. 4-18
Table 4.3-10. Mercury Emission Rates from Colstrip Units 3 and 4 and the Rosebud Power Plant. 4-18
Table 4.3-11. Modeled Annual Nitrogen and Sulfur Deposition Due to Indirect Impacts at Class I Areas. 4-20
Table 4.3-12. Visibility Impacts from Indirect Emissions at Class I Areas. 4-21
Table 4.3-13. Modeled Maximum Total Deposition of Trace Metals. 4-21
Table 4.4-1. Total Annual GHG Emissions from Mining and Development of Area F and Associated Activities in other Permit Areas (Alternative 1). 4-24
Table 4.4-2. Total Annual GHG Emissions from Mining and Development of Area F and Associated Activities in Other Permit Areas (Alternative 4). 4-26
Table 4.4-3. Annual Indirect GHG Emissions from Combustion of Area F Coal in Colstrip Units 3 and 4 and the Rosebud Power Plant. 4-27
Table 4.4-4. Total Annual GHG Emissions from Mining and Development of Area F and Associated Activities in Other Permit Areas (Alternative 5). 4-28
Table 4.4-5. Summary of Potential Annual GHG Emissions from the Project by Alternative. 4-29
Table 4.4-6. Summary of GHG Emissions Trends. 4-29
Table 4.4-7. Annual Direct Social Costs of GHGs from Mining and Development of Area F and Associated Activities in other Permit Areas (2020-2039). 4-32

Table 4.4-8. Direct Social Costs of GHGs from Mining in Area F by Alternative. 4-32
Table 4.4-9. Annual Indirect Social Costs of GHGs Due to Combustion of Area F Coal (2020-2039). 4-33
Table 4.4-10. Total Social Costs of GHGs Due to Combustion of Area F Coal by Alternative. 4-33
Table 4.4-11. Annual Indirect Social Costs of GHGs Due to Worker Commutes (2020-2039). 4-34
Table 4.4-12. Total Social Costs of GHGs Due to Worker Commutes by Alternative. 4-34
Table 4.4-13. Total Social Costs of GHGs Across Alternatives. 4-35
Table 4.5-1. Potential Effects on Public Health from Alternative 4. 4-39
Table 4.7-1. Surface Water Impact and Intensity Thresholds. 4-56
Table 4.7-2. Estimated Peak Flows for Streams in the Project Area Before Mining and at Full Mine Development. 4-62
Table 4.7-3. Estimated Peak Flows for West Fork Armells Creek Before Mining and at Full Mine Development. 4-74
Table 4.8-1 Groundwater Impact and Intensity Thresholds. 4-84
Table 4.8-2. Alternative 4 Impacts on Identified Springs in the Analysis Area. 4-89
Table 4.8-3. Water Quality of Spoil Groundwater in Areas A, B, and C. 4-94
Table 4.9-1. Water Rights Impact and Intensity Thresholds. 4-98
Table 4.9-2. Spring Water Rights in the Direct Effects Analysis Area. 4-101
Table 4.10-1. Vegetation Impacts and Proposed Revegetation Acreages. 4-110
Table 4.10-2. Trace Metal Background, Potential Soil Impact Distance, and Ecological Screening Values for Plants. 4-112
Table 4.11-1. Alternative 4 Wetland Impacts. 4-116
Table 4.12-1. Trace Metal Background, Potential Soil Impact Distance, and Eco-SSLs for Soil Invertebrates. 4-130
Table 4.12-2. Trace Metal Background, Potential Soil Impact Distance, and Eco-SSLs for Birds. 4-131
Table 4.12-3. Trace Metal Background, Potential Soil Impact Distance, and Eco-SSLs for Mammals. 4-133
Table 4.13-1. Trace Metal Background, Potential Soil Impact Distance, and Ecological Screening Levels for Soil Invertebrates, Birds, and Mammals. 4-144
Table 4.15-1. Socioeconomic Impact and Intensity Thresholds. 4-152
Table 4.15-2. Annual Direct Effects by Location from the Rosebud Mine. 4-154
Table 4.15-3. Indirect Effects by Location from the Rosebud Mine. 4-154
Table 4.15-4. Induced Effects by Location from the Rosebud Mine. 4-155
Table 4.15-5. Total Annual Economic Effects from the Rosebud Mine. 4-155
Table 4.15-6. Direct Governmental Revenues from the Rosebud Mine. 4-155
Table 4.15-7. Total Annual Governmental Revenues from the Rosebud Mine. 4-156
Table 4.17-1. Approximate Distances from Residences to Mining Areas. 4-160
Table 4.22-1. Predicted Noise Levels from Mining in the Project Area. 4-176
Table 4.22-2. Predicted Noise Levels from the Rosebud Power Plant. 4-177
Table 4.24-1. Alternative 2 Modeling for Trace Metal Background, Total Concentrations, and Eco-SSLs for Plants. 4-187
Table 4.24-2. Alternative 2 Trace Metal Background, Total Concentrations, and Eco-SSLs for Soil Invertebrates. 4-187
Table 5.2-1. Key Past, Present, and Reasonably Foreseeable Future Actions. 5-5
Table 5.3-1. Topography: Summary of Cumulative Effects. 5-11
Table 5.3-2. Air Quality: Summary of Cumulative Effects. 5-12
Table 5.3-3. Climate Change: Summary of Cumulative Effects. 5-15
Table 5.3-4. Public Health and Safety: Summary of Cumulative Effects. 5-17
Table 5.3-5. Geology: Summary of Cumulative Effects. 5-20
Table 5.3-6. Water Resources – Surface Water: Summary of Cumulative Effects. 5-22

Table 5.3-7. Water Resources – Surface Water Rights: Summary of Cumulative Effects. 5-35
Table 5.3-8. Vegetation: Summary of Cumulative Effects. 5-38
Table 5.3-9. Wetlands: Summary of Cumulative Effects. 5-40
Table 5.3-10. Fish and Wildlife: Summary of Cumulative Effects. 5-42
Table 5.3-11. Special Status Species: Summary of Cumulative Effects. 5-45
Table 5.3-12. Cultural and Historic Resources: Summary of Cumulative Effects. 5-49
Table 5.3-13. Socioeconomics: Summary of Cumulative Effects. 5-50
Table 5.3-14. Visual Resources: Summary of Cumulative Effects. 5-53
Table 5.3-15. Recreation: Summary of Cumulative Effects. 5-54
Table 5.3-16. Paleontology: Summary of Cumulative Effects. 5-55
Table 5.3-17. Access and Transportation: Summary of Cumulative Effects. 5-56
Table 5.3-18. Solid and Hazardous Waste: Summary of Cumulative Effects. 5-57
Table 5.3-19. Noise: Summary of Cumulative Effects. 5-58
Table 5.3-20. Land Use: Summary of Cumulative Effects. 5-59
Table 5.3-21. Soil: Summary of Cumulative Effects. 5-60
Table 6.1-1. Federally Endangered Species Potentially Occurring in the Analysis Area. 6-2

Figures

Figure 1.1-1. Project Location. 1-7
Figure 1.1-2. Location of Mine Facilities and Permit Areas. 1-9
Figure 1.1-3. Coal Ownership and Leases with Extent of Mining in Project Area as of December 31, 2023. 1-11
Figure 2.2-1. State Operating Permit C2011003F Features and Extent of Mining in Project Area as of December 31, 2023. 2-13
Figure 2.2-2. Alternative 2 Project Area from the 2018 Final EIS. 2-15
Figure 2.2-3. Roads in the Project Area. 2-17
Figure 2.2-4. MPDES Outfalls (MT-0031828) and Sediment Ponds and Traps (MR15). 2-21
Figure 2.2-5. Currently Approved Reclamation Plan (MR12 and MR17). 2-23
Figure 2.2-6. Currently Approved Postmining Topography (MR15). 2-25
Figure 2.2-7. Surface Water and Groundwater Monitoring Locations. 2-27
Figure 2.4-1. Alternative 1 – No Action Mining Plan and Project Area. 2-41
Figure 2.5-1. Alternative 4 – Proposed Action (Current Federal Mining Plan) and Project Area. 2-45
Figure 2.6-1. Alternative 5 – Partial Mining Alternative Mining Plan and Project Area. 2-51
Figure 3.7-1. Surface Water Direct Effects Analysis Area. 3-41
Figure 3.7-2. Surface Water Indirect Effects and Cumulative Effects Analysis Area. 3-43
Figure 3.13-1. Bird and Mammal Species of Concern, Locations in the Direct Effects Analysis Area. 3-87
Figure 3.13-2. Reptile and Amphibian Species of Concern, Locations in the Direct Effects Analysis Area. 3-89
Figure 3.13-3. Special Status Species Documented in the Indirect Effects Analysis Area. 3-91
Figure 3.13-4. Fringed Myotis. 3-93
Figure 3.13-5. Greater Sage-Grouse. 3-93
Figure 3.13-6. Northern Leopard Frog. 3-94
Figure 3.15-1. Socioeconomic Analysis Area. 3-100
Figure 4.7-1. Proposed Project Area Mining Footprint, Haul Roads, and Sediment Ponds and Traps (2018 Final EIS Figure 107). 4-65
Figure 4.11-1. Alternative 4 Wetland Impacts. 4-119
Figure 4.12-1. Sharp-Tailed Grouse. 4-126
Figure 5.2-1. General Area of Cumulative Impacts and Contributing Actions. 5-3

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CHAPTER 1. PURPOSE AND NEED

1.1 INTRODUCTION

The U.S. Department of the Interior (DOI), Office of Surface Mining Reclamation and Enforcement (OSMRE), has prepared the Rosebud Mine Area F Supplemental Environmental Impact Statement (SEIS) to address the deficiencies in the 2018 *Western Energy Area F Final Environmental Impact Statement* (2018 Final EIS) identified by the United States District Court for the District of Montana (*Montana Env't Info. Ctr. v. Haaland,* No. CV 19-130-BLG-SPW, 2022 U.S. Dist. LEXIS 179417 [D. Mont. Sept. 30, 2022]). This SEIS supplements the 2018 Final EIS prepared by OSMRE and the Montana Department of Environmental Quality (DEQ) (OSMRE and DEQ 2018).

On November 2, 2011, Western Energy (now Westmoreland Rosebud Mining, LLC, a subsidiary of Westmoreland Mining, LLC) submitted a mine permit application package (PAP) to the DEQ for a new permit area (C2011003F), known as Area F (project), at the Rosebud Mine, an existing surface coal mine that surrounds the city of Colstrip and the Colstrip Steam Electric Station (Colstrip Power Plant) in Rosebud and Treasure Counties, Montana (**Figure 1.1-1** and **Figure 1.1-2**)[2].

In compliance with the National Environmental Policy Act (NEPA) and the Montana Environmental Policy Act, OSMRE and DEQ (collectively, the agencies) prepared an Environmental Impact Statement (EIS) to analyze potential environmental effects of the proposed new Area F permit area (C2011003F). After issuance of a Draft EIS (January 2018) and consideration of public comments, the agencies issued the Final EIS in November 2018 (OSMRE and DEQ 2018). Each agency subsequently issued a Record of Decision (ROD), selecting the Proposed Action (Alternative 2). DEQ issued its ROD and Written Findings on April 18, 2019 (DEQ 2019a), pursuant to the Montana Strip and Underground Mine Reclamation Act (MSUMRA) (Administrative Rules of Montana [ARM] 17.24.404(3)), and, after Westmoreland Rosebud Mining, LLC (Westmoreland Rosebud) posted the required reclamation bond, issued a state operating permit for Area F (C2011003F). OSMRE issued its ROD on June 28, 2019 (OSMRE 2019a), for the Federal mining plan required under the Mineral Leasing Act of 1920, as amended (MLA). The Mining Plan Decision Document (MPDD) was signed by the DOI Assistant Secretary for Land and Minerals Management (ASLM) on July 15, 2019 (DOI 2019), authorizing the Federal mining plan for Federal Coal Lease MTM 082186, which encompasses 947.6 acres in Area F (**Figure 1.1-3**). To comply with MSUMRA and the Surface Mining Control and Reclamation Act of 1977 (SMCRA), neither ROD authorized surface-disturbing activity in 74 acres of Federal coal in the northwestern part (T2N, R38E, Section 12) of the Area F permit area in the Trail Creek drainage: both agencies removed this acreage from the authorized mining area to prevent material damage[3] to the

[2] To move forward with SEIS analyses, a data cutoff date of December 31, 2023, was implemented to provide a snapshot in time of Rosebud Mine operations that would be consistent throughout the environmental review process. Westmoreland Rosebud prepares annual mine reports for each permit area of the mine. The most recent annual reports were issued in 2024 and cover the January 1, 2023, through December 31, 2023, reporting period. Data from Westmoreland's annual reports were used for figures and acreages presented in the SEIS. Please note that reclamation and final bond release has occurred since the SEIS was prepared, and the permit area boundaries (and associated acreages) now may be different than those shown on **Figure 1.1-2**. This approach is consistent with guidance in CEQ 2025: "Agencies must prioritize efficiency and certainty over any other policy objectives that could add delays and ambiguity to the permitting process."

[3] Material damage is defined in Section 82-4-203, Montana Code Annotated, as "with respect to protection of the hydrologic balance, degradation or reduction by coal mining and reclamation operations of the quality or quantity of water outside of the permit area in a manner or to an extent that land uses or beneficial uses of water are adversely affected, water quality standards are violated, or water rights are impacted. Violation of a water quality standard, whether or not an existing water use is affected, is material damage."

hydrologic balance outside the permit area.[4] Westmoreland Rosebud began developing Area F in 2019 according to its state operating permit (C2011003F) and Federal mining plan (see **Section 2.2.2.2, Area F Operations and Development**).

On November 18, 2019, a group of plaintiffs led by the Montana Environmental Information Center filed a lawsuit against DOI in the United States District Court for the District of Montana (the Court), arguing that the MPDD and OSMRE's ROD violated NEPA and the Endangered Species Act (ESA). On September 30, 2022, the Court held that the 2018 Final EIS was deficient in several analyses. Specifically, the Court remanded the 2018 Final EIS to OSMRE and ordered it to remedy the following: (1) inadequate surface water cumulative impacts analysis, (2) inadequate greenhouse gas emissions analysis, (3) inadequate analysis of indirect effects of mine expansion on water withdrawals from the Yellowstone River, and (4) failure to analyze a reasonable range of alternatives in violation of NEPA.

OSMRE has prepared this SEIS to address the deficiencies identified in the 2022 Court order. This SEIS also updates and supplements analyses related to potential impacts on other resources as determined necessary by OSMRE, pursuant to NEPA[5]; see discussion in **Section 1.4, Agency Authority and Actions**.

1.1.1 Document Structure

This SEIS is organized similarly to the 2018 Final EIS: in most cases, the resource headings and numbering match the 2018 Final EIS. In some cases, such as this section, new headings are included to provide new information. **Table 1.1-1** provides an overview of changes made between the 2018 Final EIS and this SEIS.

Acronyms are defined at their first use in each chapter. Tables and figures in the SEIS are labeled to distinguish them from 2018 Final EIS figures and tables: each table and figure in the SEIS has a two-part number indicating the section (Heading Level 2) that they appear in and the sequential order within that section. For example, **Table 1.1-1** is in **Section 1.1** and is the first table presented in that section. Similarly, Appendices to the SEIS are numbered to distinguish them from 2018 Final EIS appendices, which are assigned letters of the alphabet. OSMRE has determined that this is an extraordinarily complex EIS, warranting preparation of an EIS of up to 300 pages.

[4] Pursuant to ARM 17.24.405(6)(c), DEQ cannot approve a permit application if the hydrologic consequences and cumulative hydrologic impacts would result in material damage to the hydrologic balance outside of the permit area. As described in Section 9.6.5 of the *Cumulative Hydrologic Impact Analysis for Area F* (DEQ 2019b), which is also referred to as the CHIA in this SEIS, DEQ determined that the proposed mining plan (Alternative 2), if implemented in T2N, R38E, Section 12, would likely result in a change in water quality in the Rosebud Coal outside the permit boundary, which could result in material damage. To remove the potential for material damage, DEQ did not approve mine passes in that area (DEQ 2019a). The surface acreage remained in the permit and disturbance boundary and may still be disturbed for stockpiles and project-related surface disturbances. Westmoreland Rosebud may at any time reapply to mine the excluded coal provided they affirmatively demonstrate no material damage would occur.

[5] EO 14154, *Unleashing American Energy* (January 20, 2025) and a Presidential Memorandum, *Ending Illegal Discrimination and Restoring Merit-Based Opportunity* (January 21, 2025) require DOI to strictly adhere to NEPA 42 U.S.C. §§ 4321 *et seq*. Further, such Order and Memorandum repeal Executive Orders 12898 (February 11, 1994) and 14096 (April 21, 2023). Because EOs 12898 and 14096 have been repealed, complying with such orders is a legal impossibility. OSMRE verifies that it has complied with the requirements of NEPA, 42 U.S.C. §§ 4321 *et seq*. OSMRE also verifies that it followed applicable DOI regulations and procedures implementing NEPA at 43 Code of Federal Regulations (C.F.R.) part 46. As noted above, regulatory requirements changed over the course of this NEPA analysis, and OSMRE used its discretion to follow DOI's NEPA regulations at 43 C.F.R. part 46, as amended on July 3, 2025, and the newly finalized DOI *NEPA Handbook*, 516 Departmental Manual 1, effective June 30, 2035, and other applicable guidance and policy documents, in a manner that is consistent with NEPA but does not unnecessarily delay this NEPA process.

After the public comment period on the Draft SEIS, several small changes were made throughout the Final SEIS. These changes were made to address public comments on the Draft SEIS, correct errors or omissions, and be consistent with the consultation processes described in **Section 6.1**. Key differences between the Draft and Final SEIS are listed in **Table 1.1-2**.

Table 1.1-1. Sections Updated Between the 2018 Final EIS and the 2024 Draft SEIS.

Chapter or Appendix	Content and Overview of Changes Made
Executive Summary	Updated from the 2018 Final EIS. Provides a brief overview of the proposed project, alternatives, and effects and includes the table of contents and lists of SEIS figures, tables, and appendices.
Chapter 1	Updated from the 2018 Final EIS to update background and project information, and to clarify the agency decisions to be made. Includes the following: background and overview of the proposed project; the purpose of and need for the proposed project; agencies' roles, responsibilities, and decisions; and an overview of public notice and participation.
Chapter 2	Updated from the 2018 Final EIS. Describes existing operations at the Rosebud Mine and provides a detailed description of three updated and/or new alternatives: Alternative 1 – No Action, Alternative 4 – Proposed Action (Current Federal Mining Plan), and Alternative 5 – Partial Mining Alternative. Also describes alternatives considered but eliminated from further analysis in the SEIS.
Chapter 3	Updated from the 2018 Final EIS (primarily minor updates and clarifications). Describes the existing conditions and the direct and indirect effects analysis areas used for the resource-specific analyses in **Chapter 4**. For most resources, the entire **Chapter 3** and **4** resource sections from the 2018 Final EIS are not included in the SEIS; for these, OSMRE identified any new information and clearly cited the subsections and page numbers in the 2018 Final EIS where applicable resource information can be found. The following resource sections have been entirely updated in the SEIS **Chapters 3 and 4**: **Climate and Climate Change**; **Water Resources – Surface Water**; **Special Status Species**; and **Socioeconomics**.
Chapter 4	Updated from the 2018 Final EIS. Describes and discloses the direct and indirect environmental impacts of implementing the three alternatives analyzed in the SEIS. For most resources, the entire **Chapter 3** and **4** resource sections from the 2018 Final EIS are not included in the SEIS; for these, OSMRE identified any new information and clearly cited the subsections and page numbers in the 2018 Final EIS where applicable resource information can be found. The following resource sections have been entirely updated in the SEIS **Chapters 3 and 4**: **Climate and Climate Change**; **Water Resources – Surface Water**; **Special Status Species**; and **Socioeconomics**.
Chapter 5	Updated from the 2018 Final EIS. Describes and discloses the cumulative environmental impacts of implementing the three alternatives analyzed in the SEIS, as well as irreversible and irretrievable commitments of resources. Includes an updated list of past, present, and reasonably foreseeable actions since the issuance of the 2018 Final EIS
Chapter 6	Updated from the 2018 Final EIS. Provides a list of preparers and agencies consulted, describes formal consultation with Native American tribes, and describes consultation conducted with the U.S. Fish and Wildlife Service (USFWS) regarding special status species.
Chapter 7	Updated from the 2018 Final EIS. Only references used in the preparation of the SEIS are provided in this chapter. Please refer to **Chapter 7** of the 2018 Final EIS for the references used in preparation of that document.
Appendices A - H	These appendices have not been updated but are cited as needed in the SEIS.
Appendix 1	New appendix. To streamline this SEIS, acronyms, abbreviations, and analysis definitions were moved to an appendix.
Appendix 2	New appendix. The social costs of greenhouse gas (GHG) emissions were calculated by BBC Research & Consulting (BBC) for the SEIS alternatives (BBC 2024a). **Appendix 2** contains methods and results. **Appendix 2** was updated in the Final SEIS to address errors noted in public comments on the Draft SEIS (see **Appendix 5**).
Appendix 3	New appendix. To streamline this SEIS, water quality tables were moved to an appendix. DEQ's water quality standards in Circular 7 were updated in 2019 after the issuance of the 2018 Final EIS. The tables have been updated using the new standards.
Appendix 4	New appendix. A new IMPLAN analysis was completed by BBC for the SEIS due to changed economic conditions (BBC 2024b). **Appendix 4** contains methods and results.

Chapter or Appendix	Content and Overview of Changes Made
Appendix 5	New appendix. Substantive comments received during the Draft SEIS public comment period are summarized in this appendix with OSMRE responses.
Appendix 6	New appendix. **Appendix 6** includes documentation for Federal coal lease MTM 082186.
Appendix 7	New appendix. **Appendix 7** includes the Final Biological Assessment (OSMRE 2025a) and USFWS concurrence letter (USFWS 2025b).

Table 1.1-2. Key Differences Between the 2024 Draft SEIS and the 2025 Final SEIS.

Chapter or Appendix	Content and Overview of Changes Made
Chapters 2, 4, and 5; Appendix 5	To address public comments, clarifications were made to more clearly identify and disclose uncertainty or missing information associated with each of the assumptions used in the SEIS alternatives (**Chapter 2**) and impacts analyses (**Chapters 4** and **5**). These changes did not result in major changes to the analyses (see also **Appendix 5**).
Chapters 1 and 3	Based on updates to the regulatory environment (e.g., new Executive Orders [EOs] and court rulings) that occurred after preparation of the Draft SEIS, updates were made to NEPA regulation citations (primarily in **Chapter 1**) pursuant to updated guidance from the White House Council on Environmental Quality (CEQ 2025) and CEQ's removal of its NEPA regulations from the C.F.R. Updates were also made to **Chapter 3** introductions for each analysis resource, including changed conditions tables and regulatory frameworks sections.
Chapter 2	Based on CEQ's removal of its NEPA regulations from the C.F.R., the environmentally preferred alternative is no longer identified in **Chapter 2** of the Final SEIS because it is no longer required (see **Section 2.8**).
Throughout SEIS	EO 14148, *Initial Rescissions of Harmful Executive Orders and Actions*, signed on January 20, 2025, rescinded a number of EOs discussed in the Draft SEIS, including the following: EO 12898, EO 13985, EO 13990, EO 14008, EO 14057, and EO 14096. References to these EOs have been removed. In some instances (e.g., climate change), references to rescinded EOs were left for context and it was disclosed that they had been rescinded.
Chapters 3, 4, and 5	Pursuant to EO 14154, *Unleashing American Energy* (January 20, 2025) and a Presidential Memorandum, *Ending Illegal Discrimination and Restoring Merit-Based Opportunity* (January 21, 2025), the discussions and analyses related to environmental justice (**Sections 3.16, 4.16,** and **5.3.15)** were removed from the Final SEIS. The President's January 2025 Order and Memorandum require DOI to strictly adhere to NEPA, 42 U.S.C. §§ 4321 *et seq*., and no longer comply with EO 12898 (February 11, 1994) and EO 14096 (April 21, 2023), which were repealed by this same order. OSMRE verifies that it has complied with the requirements of NEPA, including DOI regulations and procedures implementing NEPA at 43 C.F.R. part 46 and the Departmental Manual (DM), consistent with the President's January 2025 Order and Memorandum.
Chapter 4	To address comments from the U.S. Environmental Protection Agency (EPA), the impact and intensity threshold tables for the five analysis resources that were substantially updated in the Draft SEIS (see the list in **Table 3.1-1)** are included in the Final SEIS in **Chapter 4**. These tables were provided in the 2018 Final EIS but were only cited in the Draft SEIS.
Chapters 3, 4, and 5	To address public comments on the Draft SEIS, a discussion of black lung has been included in the public health and safety sections (**Sections 3.5**, **4.5**, and **5.3.4**).
Chapters 3 and 4	To address comments raised by the USFWS during consultation pursuant to Section 7 of the ESA, the indirect effects analysis areas for surface water and for aquatic special status species were enlarged. Between the Draft and Final SEIS, the stretch of the Yellowstone River between the Colstrip Power Plant's point of diversion and the Cartersville Dam was added to the analysis areas (see **Sections 3.7.1.2, Surface Water** and **3.13.1.2**, **Special Status Species**, respectively). The **Chapter 4** effects analyses were subsequently updated as well (see **Sections 4.7, Water Resources – Surface Water** and **4.13, Special Status Species**).
Chapters 3 and 4	Based on new and changed listing statuses that occurred after preparation of the Draft SEIS, additional species were added to the special status species discussions in **Chapter 3** and **Chapter 4** (**Sections 3.13** and **4.13**, respectively).
Appendices	**Appendix 5**, which provides substantive comments on the Draft SEIS and OSMRE responses, has been added to the Final SEIS.
Appendices	**Appendix 6**, which includes documentation related to Federal coal lease MTM 082186, has been added to the Final SEIS in response to public comments (see also **Appendix 5**).
Appendices	**Appendix 7**, which includes the Final Biological Assessment (OSMRE 2025) and USFWS concurrence letter (USFWS 2025b), has been added to the Final SEIS in response to public comments.

1.1.2 Terms Used in This SEIS

Terms used in this SEIS are defined in the **Analysis Definitions**, which can be found in **Appendix 1**. In this SEIS, the terms "effect" and "impact" are used interchangeably and synonymously. An environmental impact or effect is any change from the present condition of any resource or issue that may result from the decision by OSMRE to implement the Proposed Action or an alternative to the Proposed Action. An environmental impact may be adverse, beneficial, or both. A glossary of technical terms is in the 2018 Final EIS, beginning on page xxii.

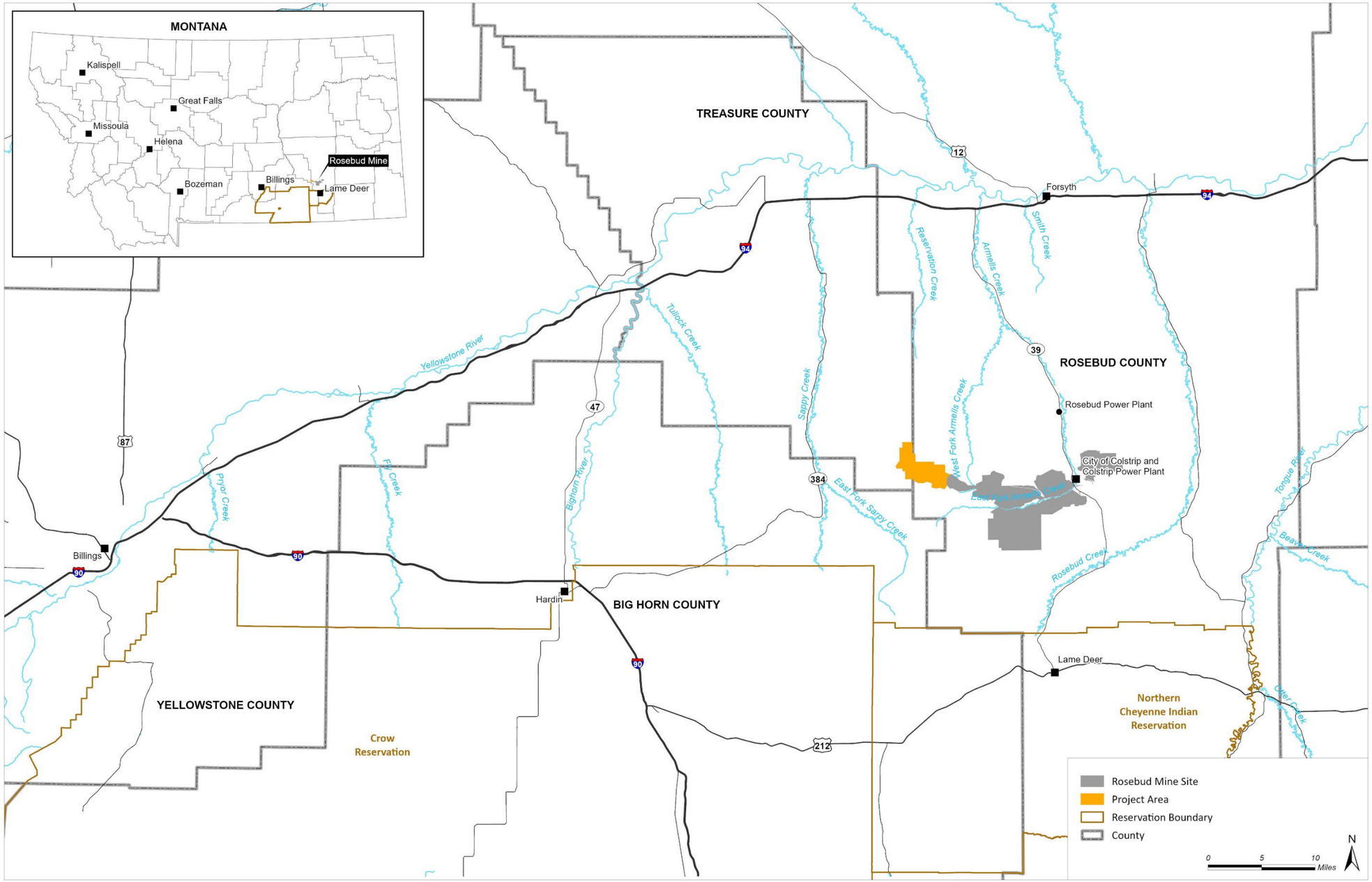

Figure 1.1-1. Project Location.

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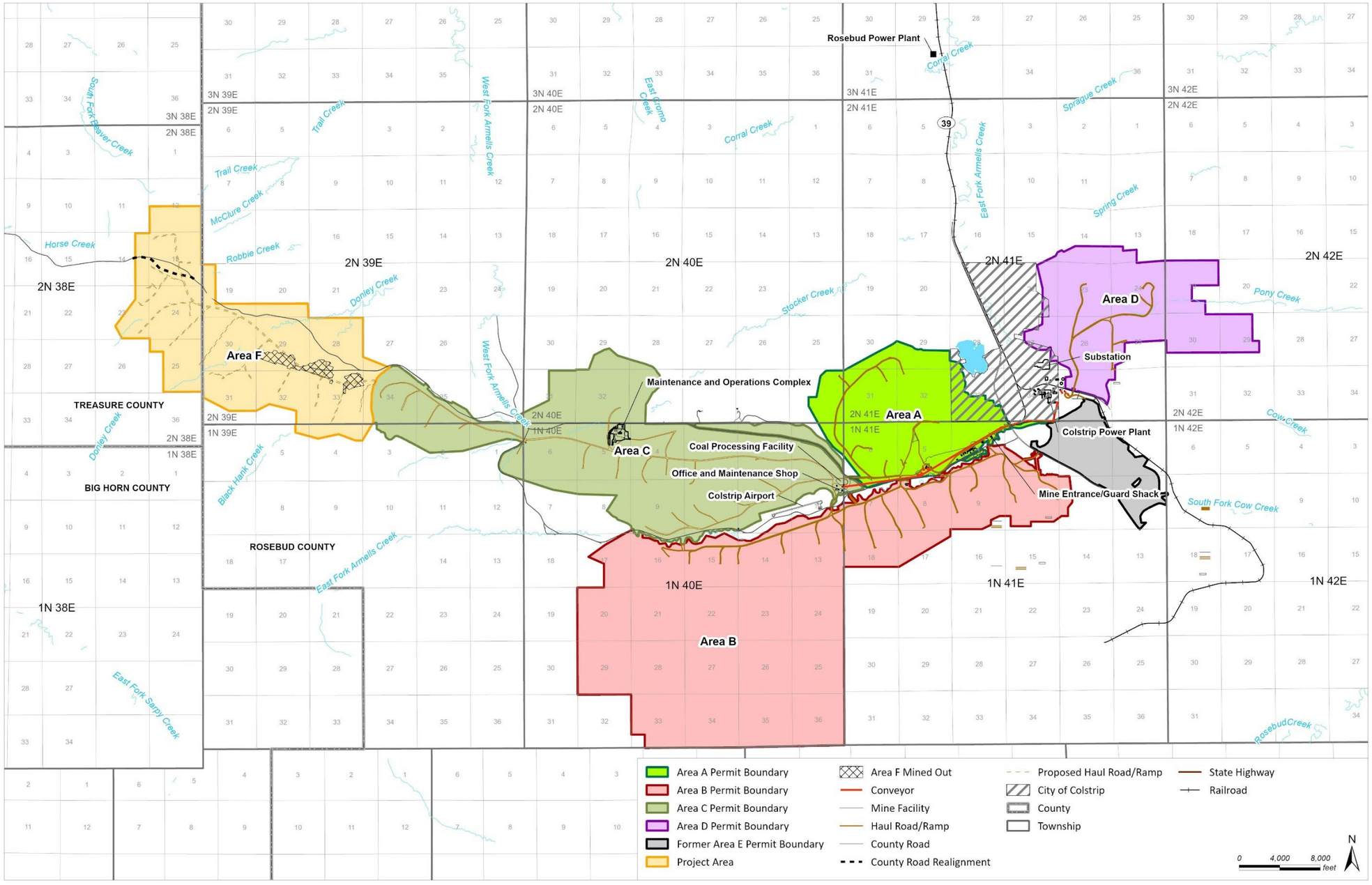

Figure 1.1-2. Location of Mine Facilities and Permit Areas.

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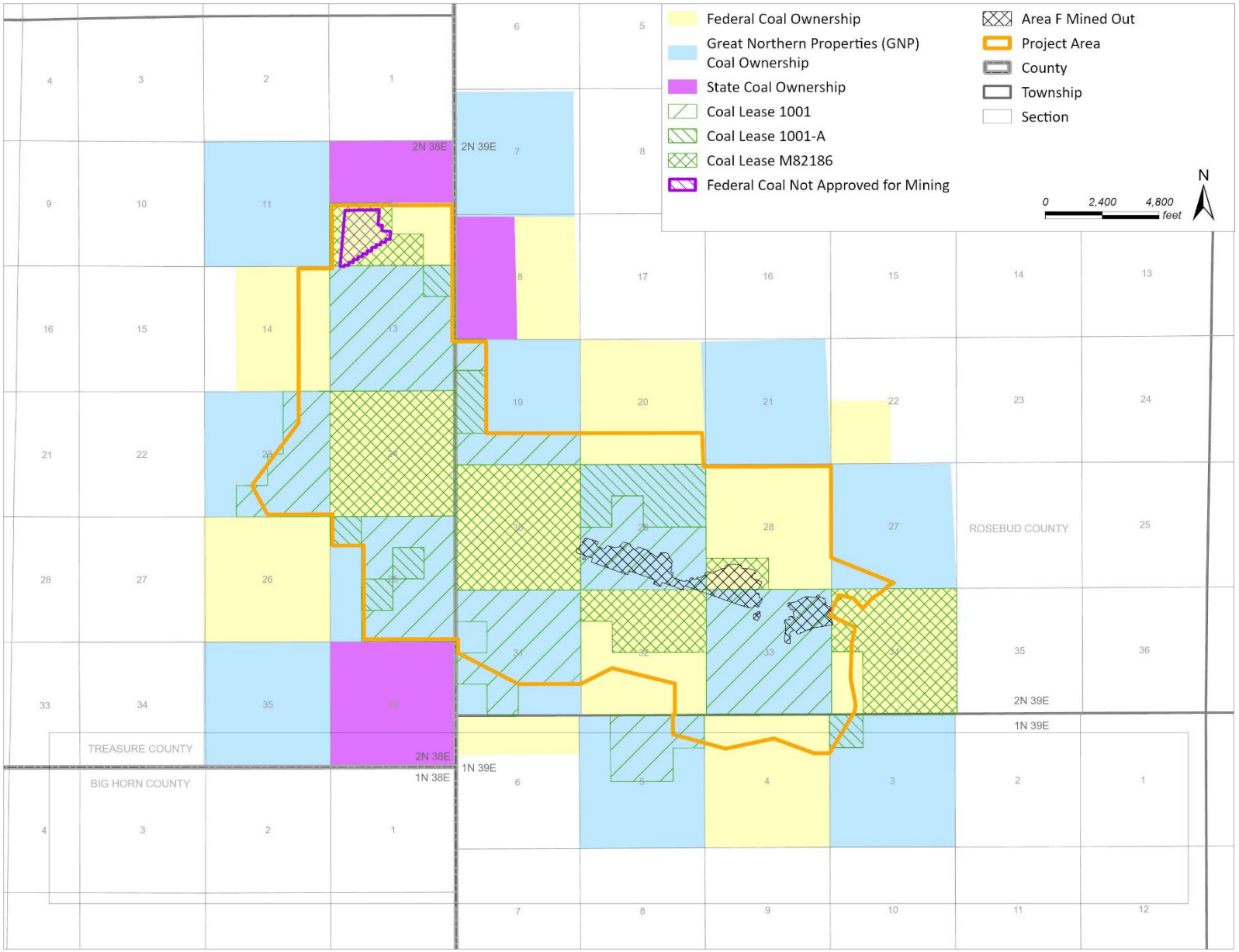

Figure 1.1-3. Coal Ownership and Leases with Extent of Mining in Project Area as of December 31, 2023.

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1.2 BACKGROUND AND OVERVIEW

1.2.1 History of Mine Operations at Colstrip

Colstrip, Montana, is situated in the northern Powder River Basin, generally east and north of the Little Wolf Mountains. Coal has been mined in the vicinity of Colstrip for more than 90 years. The Northern Pacific Railway established the city of Colstrip and its associated mine in the 1920s to access coal from the Fort Union Formation.

In 1968, the Montana Power Company began production at the Rosebud Mine (mine) to serve the Colstrip Power Plant (described in **Section 1.2.2.1**). In 2001, Westmoreland Coal Company purchased the mine, and its subsidiary, Western Energy, began operating the mine. In 2019, Westmoreland Coal Company sold the Rosebud Mine to its creditors (organized as Westmoreland Mining LLC) as part of bankruptcy proceedings. The mine is now operated by Westmoreland Rosebud Mining, LLC (previously defined as Westmoreland Rosebud), a subsidiary of Westmoreland Mining LLC. Currently, Westmoreland Rosebud holds four active permits issued by DEQ for the mine: Area A (permit C1986003A), Area B (permit C1984003B), Area C (permit C1985003C), and Area F (permit C2011003F, which is analyzed in this SEIS). Coal removal is finished in Area D (permit C1986003D), and the area is being reclaimed. Area E (permit C1981003E), a former permit area, has received full bond release and is no longer a permitted coal mine. Current mine operations are described in detail in **Section 2.2.2, Existing Disturbance and Reclamation** and briefly summarized below.

Although the Rosebud Mine has shipped coal by rail as recently as 2010, all coal produced by the mine is currently consumed locally at the Colstrip Power Plant and the Rosebud Power Plant under contracts that Westmoreland Rosebud has with the power plant operators (see **Section 1.2.2, Coal Combustion**). To meet operators' coal requirements, such as sulfur and other qualities (e.g., sodium, mercury, etc.), Westmoreland Rosebud often mixes coal from two or more permit areas; for example, Area F coal may be mixed with Area B coal to meet the right value of sulfur needed for the Colstrip Power Plant. Whether mixed or not, low-sulfur (0.64 percent) subbituminous coal mined in the project area currently is being burned in Units 3 and 4 of the Colstrip Power Plant, and high-sulfur "waste coal" from the project area is being burned in the Rosebud Power Plant.

Between 1975 and 2023, just under 514 million tons of coal were recovered from the mine's Permit Areas A, B, C, D, E, and F (Westmoreland Rosebud 2024a). Production from the Rosebud Mine is limited by the conditions of its DEQ-issued air quality permits, but actual production rarely reaches the limits set by the air quality permits. Montana Air Quality Permit (MAQP) #1483-09 limits annual combined coal production from Areas A, B, and D to 13 million tons per year. Combined coal production from Areas C and F is limited to 8 million tons per year per MAQP #1570-09, with an Area F–specific production cap of 4 million tons per year.[6] In recent years, total mine production has ranged from a low of about 5.4 million tons (Peterson 2022) to a high of about 7.1 million tons in 2023 (Westmoreland Rosebud 2024a). Future production from the Rosebud Mine will depend on a number of factors, including market conditions (see additional discussion in **Section 2.2.6, Life of Operations** and in **Section 4.3.3.1, Direct Impacts (Air Quality)**.

[6.] Note that 2023 production in Area F (about 4.6 million tons as shown in **Table 2.2-2**) was greater than the production limit (4 million tons) in MAQP #1570-09. Westmoreland Rosebud is working with DEQ to prevent future exceedances. Overall production was still below the combined limit for Areas C and F.

1.2.2 Coal Combustion

Since 2010, all coal produced by the mine has been consumed locally at the Colstrip Power Plant and the Rosebud Power Plant (**Figure 1.1-2**). The 2018 Final EIS **Section 1.2.2, Coal Combustion** provides a detailed history of the two power plants' operations. The sections below provide brief summaries of these operations and update relevant details that have changed since 2018. Where relevant, more detailed information is also provided in the resource sections of **Chapter 3, Affected Environment**; **Chapter 4, Environmental Consequences**; and **Chapter 5, Cumulative Impacts** in this SEIS.

1.2.2.1 Colstrip Power Plant

The Colstrip Power Plant, a coal-fired facility consisting of two active units (Units 3 and 4), is located in the city of Colstrip. It is currently operated by Talen Montana, a subsidiary of Talen Energy (Talen Energy 2024). Talen Energy declared bankruptcy on May 9, 2022, and the U.S. Bankruptcy Court in Houston, Texas, approved a Chapter 11 plan of reorganization on December 15, 2022. Talen Montana now has a 15 percent ownership stake in Units 3 and 4 (Criswell 2024), consisting of a 30 percent ownership stake in Unit 3 and none in Unit 4 (Talen Energy 2024); the remaining ownership stake in both units is currently held by five other owners: Puget Sound Energy Inc., Portland General Electric Company, Avista Corporation, PacifiCorp, and NorthWestern Energy. None of the six co-owners has a majority stake in the Colstrip Power Plant. Power generated by the Colstrip Power Plant currently serves the owners' customers in Montana (NorthWestern Energy), Washington (Avista and Puget Sound Energy Inc.), and Oregon (Portland General Electric and PacificCorp).[7]

Historically, the Colstrip Power Plant consisted of four units. Colstrip Units 1 and 2, which each had 307 megawatts (MW) of generating capacity, were constructed in 1972. These units began operating in 1975 and 1976, respectively, and were retired from use on January 2, 2020, and January 3, 2020, respectively.[8] Colstrip Units 3 and 4, which each have about 740 MW of generating capacity, started operating in 1984 and 1986, respectively, and are currently generating power by combusting low-sulfur coal from the Rosebud Mine, including coal from the project area. At least one owner, NorthWestern Energy, has indicated that Units 3 and 4 would operate through at least 2042 (Ernst 2024). As discussed in **Appendix 4**, the Colstrip Power Plant employs 250 to 260 workers, of which 22 are Native American (Criswell 2024; see the discussion of tribal employment in the energy sector in **Section 3.5.3.1, Demographics**). The Colstrip Power Plant currently supports about $545 million in total annual economic output across the analysis area (includes direct, indirect, and induced impacts; see definitions in **Section 4.15**, **Socioeconomic Conditions**). Most power plant workers (maintenance crews and non-union support personnel) work in 4-day/10-hour shifts, although some non-union workers work a 5-day/10-hour shift (Olsen 2024).

7. As noted in **Section 1.2.2.1** of the 2018 Final EIS, Washington and Oregon passed laws in 2016 that require suppliers of power to these states (Avista, Puget Sound Energy, Inc., and PacificCorp) to eliminate coal as a power source and to stop making investments that would increase the lifespan of a coal-fired facility. Puget Sound Energy, Inc. currently owns approximately 25 percent of Units 3 and 4 (Ernst 2024). The company attempted to sell all of its shares in Unit 4 to NorthWestern Energy in 2019 but the deal fell through in 2020. Similarly, Talen Energy attempted to acquire Puget Sound Energy's shares in Units 3 and 4 but the deal fell through in early 2024 (Ernst 2024). Portland General Electric holds 296 MW worth of shares in Units 3 and 4 but plans to divest these no later than 2035 (Portland General Electric Company 2024). PacificCorp intends to end its ownership of Unit 3 (74 MW) by 2025 and of Unit 4 (74 MW) by 2029 (PacificCorp 2023). NorthWestern Energy will acquire Avista's ownership of Colstrip Units 3 and 4 (a total of 222 MW), with no purchase price, effective on January 1, 2026. NorthWestern Energy will be responsible for operational costs for the 15 percent shares of Colstrip Units 3 and 4 when Avista's ownership is transferred (NorthWestern Energy 2024).

8. Impacts analyses in the 2018 Final EIS assumed that Units 1 and 2 would cease operations in 2022 based on information available at that time (see **Section 1.2.2.1** of the 2018 Final EIS). Instead, the units were retired in early 2020.

The Colstrip Power Plant and the operations of its associated facilities (such as a paste plant and ponds) are governed by a certificate issued by DEQ under the Major Facility Siting Act (MFSA), 75-20-101, Montana Code Annotated (MCA) *et seq.* (Certificate). As noted in the 2018 Final EIS **Section 1.2.2.1**, Colstrip Power Plant Units 3 and 4 were originally limited to burning coal from Areas C, D, and E. A statutory amendment to MFSA in 2021, however, now allows operators (in this case, Talen Montana) to change their fuel source without amending the MFSA Certificate (Section 75-20-228, MCA). Currently, the Colstrip Power Plant exclusively uses coal from the Rosebud Mine; coal is processed primarily in Area C but also in Area A. After being processed in the Area C crusher, crushed coal is sent from the Rosebud Mine to the Colstrip Power Plant via an existing 4.2-mile electrically powered conveyor. If processed in the Area A crusher, which is adjacent to the Colstrip Power Plant, coal is sent on an existing electrically powered short conveyor.

Emissions from the Colstrip Power Plant, which is a major source pursuant to Title V of the Clean Air Act, are regulated by the applicable requirements outlined in Title V operating permit OP0513-18 and MAQP #0513-16[9]; see more discussion of emissions in the Air Quality sections of **Chapters 3 through 5**.

Water piped from the Yellowstone River is the source of water to the Colstrip Power Plant; process water is contained in ponds on the plant site. Additional detail on current use of Yellowstone River water at the Colstrip Power Plant is provided in **Section 3.7, Water Resources – Surface Water**, and indirect effects of the project from water withdrawals from the Yellowstone River and seepage from coal-ash ponds at the Colstrip Power Plant are analyzed in **Section 4.7, Water Resources – Surface Water**.

In August 2012, DEQ and PPL Montana (now Talen Energy) entered into an Administrative Order of Consent to address seepage from coal-ash ponds at the Colstrip Power Plant. Water seeping out of the ponds has impacted groundwater with boron, chloride, and sulfate, as well as other constituents (see discussion in 2018 Final EIS **Section 3.8, Water Resources – Groundwater**). Talen Montana uses an extensive well network to monitor the impacts and to capture and return impacted water to the ponds. Because project coal is combusted in Units 3 and 4, seepage from the coal-ash ponds is analyzed as an indirect effect in **Section 4.8, Water Resources – Groundwater**.

1.2.2.2 Rosebud Power Plant

The Rosebud Power Plant is a 38-MW coal-fired power plant located about 6 miles north of the city of Colstrip in Rosebud County. Colstrip Energy Limited Partnership (CELP) has owned and operated the plant since May 1990 (the original MAQP #2035 for the facility was issued in 1985). The Rosebud Power Plant was designed to burn low-Btu (British thermal unit) "waste coal" or "culm" from the Rosebud Mine (and other nearby mines). This waste coal is coal not suitable for use at the Colstrip Power Plant due to the high sulfur content and low calorific value; at the Rosebud Mine, waste coal is typically found in the first 1-foot layer and the very bottom of the Rosebud Coal deposit. Currently, the Rosebud Power Plant exclusively uses coal from the Rosebud Mine. Waste coal from permit areas A, B, C, and F is currently used in the plant. Pursuant to MAQP #2035, up to 364,000 tons per year can be burned in the power plant. The Rosebud Mine sends 300,000 tons of coal via covered trucks annually to the Rosebud Power Plant using a fleet of five covered haul trucks. Three of the five trucks operate daily, with each truck delivering an average of 6.5 loads, for an average total of 19.5 loads daily. The power plant is estimated to employ about 100 workers (**Appendix 4**).

[9] Current air quality permits for the Colstrip Power Plant are available on DEQ's website: https://deq.mt.gov/air/assistance.

Emissions from the Rosebud Power Plant, which is a major source pursuant to Title V of the Clean Air Act, are regulated by the applicable requirements outlined in Title V OP2035-05 and MAQP #2035-08[10] (see emissions discussion in the Air Quality sections of **Chapters 3** through **5**).

Deep groundwater wells provide water to the Rosebud Power Plant. Colstrip Energy Limited Partnership is permitted under Montana Pollutant Discharge Elimination System (MPDES) Permit MT-0031780 (renewed in 2022 until December 31, 2026)[11] to discharge water from a storm-water control pond to an unnamed ephemeral tributary to East Fork Armells Creek. The discharge must meet effluent limitations and conditions.

1.3 PURPOSE AND NEED

As described above, the Court identified several deficiencies in the NEPA analysis completed in 2018 and deferred vacatur of the EIS for a limited period of time to allow OSMRE to remedy the identified deficiencies. OSMRE's purpose in preparing this SEIS is to address the deficiencies identified by the United States District Court for the District of Montana and update other relevant information and analysis so that OSMRE can make an informed recommendation to the ASLM (in the form of a MPDD) to do one of the following: (1) disapprove the proposed Federal mining plan modification (as described in **Section 2.4, Alternative 1 – No Action**), (2) approve the Proposed Action (as described in **Section 2.5, Alternative 4 – Proposed Action (Current Federal Mining Plan)**, or (3) conditionally approve the mining plan modification for the project area, informed by the alternatives analysis in this SEIS. The ASLM will decide whether the mining plan is disapproved, approved, or approved with conditions.

Westmoreland Rosebud's need for the action is to exercise its valid existing rights granted by the Bureau of Land Management (BLM) under Federal coal lease MTM 082186 (**Appendix 6**) to access and mine undeveloped Federal coal resources located in the project area. For Westmoreland Rosebud to access private and Federal coal within the project area, Westmoreland Rosebud is required to (1) obtain a surface-mine operating permit (pursuant to MSUMRA) from DEQ (issued in 2019) and (2) obtain approval of a Federal mining plan (30 C.F.R. part 746) to access Federal coal reserves in the project area. In addition, to comply with 30 U.S.C. § 207 Conditions of Lease, coal must be actively mined from a coal lease, since "any lease which is not producing in commercial quantities at the end of ten years shall be terminated."

1.4 AGENCY AUTHORITY AND ACTIONS

OSMRE's roles and regulatory responsibilities are discussed in the following sections. Decisions by other agencies also are described below in agency-specific sections. **Table 1.4-1** provides a summary of the required Federal permits, licenses, and approvals, and **Table 1.4-2** provides a summary of state requirements. Agency decision making is governed by each agency's laws, including statutes, rules, and regulations that form the legal basis for the conditions that the project must meet to obtain necessary permits, approvals, or licenses. Tribal consultation and consultation under Section 106 of the National Historic Preservation Act (NHPA) with the Montana State Historic Preservation Office (SHPO) is discussed in **Chapter 6, Coordination and Consultation**.

[10.] Rosebud Power Plant's air quality permits are available on DEQ's website: MAQP permits (https://deq.mt.gov/air/assistance).
[11.] Rosebud Power Plant's MPDES Permits are available on DEQ's website: https://deq.mt.gov/water/assistance.

1.4.1 Lead Agency

For this SEIS, OSMRE is the sole lead agency and is responsible for the analysis of the project. The BLM is acting as a cooperating agency as it did for the 2018 Final EIS. Other Federal agencies that are not cooperating agencies in the preparation of this SEIS but have review roles relevant to this SEIS include the USFWS, U.S. Army Corps of Engineers (USACE), and EPA.

Table 1.4-1. Federal Permits, Consultations, Licenses, and Approvals.

Permit, License, or Approval	Purpose
U.S. Department of the Interior (ASLM/OSMRE)	
Federal Mining Plan (30 C.F.R. Part 746)	To approve, disapprove, or conditionally approve Westmoreland Rosebud's plan for mining Federal coal lease MTM 082186. A review of the proposed plan is coordinated with DEQ and Federal agencies such as BLM. OSMRE recommends approval, disapproval, or conditional approval of the mining plan to the DOI ASLM.
U.S. Department of the Interior (BLM)	
Resource Recovery and Protection Plan (30 C.F.R. Part 746.13)	To allow Westmoreland Rosebud to mine Federal coal lease MTM 082186. BLM makes a finding and recommendation to OSMRE with respect to Westmoreland Rosebud's Resource Recovery and Protection Plan and other requirements of Westmoreland Rosebud's lease. BLM submits a recommendation regarding the Federal mining plan. BLM regulations (43 C.F.R. part 3480) require maximum economic recovery and diligent development of leased Federal coal.
U.S. Fish and Wildlife Service	
ESA Section 7 Consultation (16 U.S.C. § 1536)	OSMRE consults with USFWS to ensure protection of threatened and endangered species and any designated critical habitat.
U.S. Army Corps of Engineers	
Federal Water Pollution Control Act (Clean Water Act [CWA]) Section 404 Permit (33 U.S.C. § 1344)	To allow discharge of dredged or fill material into wetlands and waters of the U.S., OSMRE consults with the USACE regarding Section 404 permits to prevent loss of or damage to fish or wildlife resources. Subject to review by the EPA, USFWS, OSMRE, and DEQ.

Table 1.4-2. State Permits, Licenses, and Approvals.

Permit, License, or Approval	Purpose
Montana Department of Environmental Quality	
MSUMRA (Section 82-4-201 *et seq*., MCA) Surface Mine Operating Permit	A state operating permit allows surface coal mining and reclamation operations consistent with the Montana regulatory program, approved by OSMRE under SMCRA. The project area is covered by Westmoreland Rosebud's state operating permit (C2011003F). Depending on the alternative selected, revision of C2011003F may be needed. Any revisions needed would be determined by DEQ after review of the MPDD. Proposed activities must comply with state environmental standards and criteria. Approval may include stipulations for final design of facilities and monitoring plans. A sufficient reclamation bond must be posted with DEQ before implementing an operating permit modification.
Clean Air Act of Montana (Section 75-2-102 *et seq*., MCA) Air Quality Permit	To control particulate emissions of more than 25 tons per year.
Montana Water Quality Act (Section 75-5-201 *et seq*., MCA) MPDES Permit	To establish effluent limits, treatment standards, and other requirements for point source discharges, which includes storm-water discharges to state waters including groundwater. Coordinate with EPA.
CWA 401 Certification (33 U.S.C. § 1341)	To ensure that any activity that requires a Federal license or permit (such as the Section 404 permit from the USACE) complies with Montana water quality standards.
Hazardous Waste and Solid Waste Registration (various laws)	To ensure safe storage and transport of hazardous materials to and from the site and proper storage, transport, and disposal of solid wastes.
Montana State Historic Preservation Office	
National Historic Preservation Act of 1966 Cultural Resource Clearance (Section 106 Review) (16 U.S.C. § 470)	To review and comment on Federal compliance with the National Historic Preservation Act. Consult with Montana SHPO. See discussion in **Section 6.1.3** regarding the programmatic agreement, which covers Section 106 compliance for the project.

1.4.1.1 Office of Surface Mining Reclamation and Enforcement

Applicable Statutes and Regulations

National Environmental Policy Act

As described in **Section 1.1, Introduction**, OSMRE has prepared this SEIS to address the deficiencies identified in the 2022 Court order. This SEIS also updates analyses related to potential impacts on other resources as determined necessary by OSMRE.

This SEIS has been prepared in compliance with NEPA, 42 U.S.C. §§ 4321 *et seq*.; DOI NEPA regulations and *NEPA Handbook* (516 DM 1); and other guidance and policy documents.

Pursuant to the DOI *NEPA Handbook* Section 3.6 Supplements to Environmental Impact Statements, OSMRE must prepare a SEIS only if a major Federal action remains to occur, and:

- The bureau makes substantial changes to the proposed action that are relevant to environmental concerns; or
- The bureau determines, in its discretion, that there are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its effects.

Connected Actions

OSMRE evaluated the proposed project and the Colstrip Power Plant to determine if they are potentially connected actions and, in a letter dated April 24, 2014, determined that the project and the Colstrip Power Plant are not connected actions by applying guidance from the OSMRE *NEPA Handbook* (OSMRE 2019b).[12] In the 2014 letter, OSMRE concluded that "Area F and the power plants are not connected actions because the power plant[s] are existing operational facilities, and no pending actions or reasonably foreseeable future actions are currently proposed for the power plant[s]. The DOI *NEPA Handbook* contains the same criteria for connected actions that was analyzed by OSMRE in 2014 (516 DM 1, Sec. 6.1(g)). Therefore, Area F is the only proposed action and, as such, is not connected to a currently existing and operational power plant facility, regardless of the power plant facility's physical location" (OSMRE 2014; 516 DM 1, Sec. 6.1(g)). A similar argument would also apply to the Rosebud Power Plant. Effects of combustion of project area (Area F) coal in the two power plants were considered indirect effects in this analysis; see **Chapter 4**. Combustion of coal from all other permit areas of the Rosebud Mine (e.g., Area B) in the two power plants were considered cumulative effects; see **Chapter 5**.

State-Federal Cooperative Agreement

Under Section 1273(c) of SMCRA, a state with a permanent regulatory program approved by the DOI Secretary, such as DEQ, can elect to enter into a cooperative agreement for state regulation of surface coal mining and reclamation operations on Federal lands within the state. OSMRE granted DEQ this authority, and DEQ regulates permitting and operation of surface coal mines on Federal lands within Montana under the authority of MSUMRA, Section 82-4-221, MCA (see **Section 1.4.1.2, Montana Department of Environmental Quality** of the 2018 Final EIS). The state-Federal Cooperative Agreement (Agreement) between DEQ and OSMRE is codified in 30 C.F.R. part 926.30. Under the Agreement, DEQ reviews an operator's (in this case, Westmoreland Rosebud's) PAP to ensure the permit application for the proposed action complies with the permitting requirements and that the coal-mining operation would meet the performance standards of the approved Montana program (see **Section 1.4.1.2, Montana Department of Environmental Quality** of the 2018 Final EIS for a description of this process). OSMRE, BLM, and other Federal agencies such as the USFWS review the proposed action to ensure it complies with the terms of the coal lease, the MLA, NEPA, and other Federal laws and regulations. DEQ makes a decision to approve or disapprove, in whole or in part, the permit application component of the PAP in accordance with MSUMRA's implementing rules, ARM 17.24.405 (DEQ approved the Proposed Action, minus the 74 acres of Federal coal in T2N, R38E, Section 12, in its 2019 ROD and Written Findings).

Decision

Pursuant to 30 C.F.R. part 746.13, OSMRE will prepare and submit to the DOI ASLM a MPDD recommending approval, disapproval, or conditional approval of the mining plan modification. The ASLM will approve, disapprove, or conditionally approve the mining plan modification, as required

[12] Pursuant to Section 8.5.2.1 Connected Actions of the OSMRE *NEPA Handbook* (OSMRE 2019b), "Actions are connected if they automatically trigger other actions that may require and EIS; cannot or will not proceed unless other action are taken previously or simultaneously; or if the actions are interdependent parts of a larger action and depend upon the larger action for their justification."
Although not in effect, the 2020 CEQ NEPA regulations at 40 C.F.R. part 1501.9(e)(1) similarly defined connected actions as those that "are closely related" and notes they should be considered "if they: (i) Automatically trigger other actions that may require environmental impact statements;(ii) Cannot or will not proceed unless other actions are taken previously or simultaneously; or (iii) Are interdependent parts of a larger action and depend on the larger action for their justification."

under the MLA. OSMRE will base its recommendation to the DOI ASLM on, at a minimum, the following factors:

- Westmoreland Rosebud's PAP, including the Resource Recovery and Protection Plan, and the DEQ-approved state operating permit C2011003F;
- Information in the 2018 Final EIS and in this SEIS prepared in compliance with NEPA;
- Documentation ensuring compliance with the applicable requirements of other Federal laws, regulations, and executive orders;
- Comments and recommendations or concurrence of other Federal agencies, as applicable, and the public;
- The findings and recommendations of BLM with respect to the Resource Recovery and Protection Plan (approved by BLM on September 1, 2017) and other requirements of Westmoreland Rosebud's lease and the MLA;
- The findings and recommendations of DEQ with respect to the permit application (documented in DEQ's April 2019 ROD and Written Findings, including the *Cumulative Hydrologic Impact Analysis for Area F*); and
- The findings and recommendations of OSMRE with respect to the additional requirements of 30 C.F.R. part 746.

The ASLM will document the decision regarding OSMRE's recommendations in a new MPDD, which will be issued along with the OSMRE ROD.

1.5 PUBLIC OUTREACH

1.5.1 Scoping

Scoping completed for the original NEPA process is described in the 2018 Final EIS in **Section 1.5**. A new scoping process for this SEIS is not required by NEPA.

1.5.2 Public Comment Period for the Draft SEIS

OSMRE accepted public comments on the Draft SEIS for a 46-day comment period beginning on December 6, 2024, which was the date that the EPA's Notice of Availability (NOA) was published in the *Federal Register*, and ending on January 21, 2025. Notice of the comment period was also provided in a separate OSMRE NOA that was also published in the *Federal Register* as well as on the OSMRE website (https://www.osmre.gov/laws-and-regulations/nepa/projects) and in a press release. Details on how to submit comments and attend the public comment meeting were included in both NOAs, in legal advertisements published in the *Billings Gazette* and the *Forsythe Independent Press*, and in letters sent to interested persons and elected officials on December 6, 2024.[13] A separate letter also was sent by OSMRE to members of the Senate Committee on Energy and Natural Resources, the House of Representatives Subcommittee on Energy and Mineral Resources (Committee on Natural Resources), and the Montana Congressional Delegation on December 9, 2024. As part of its obligation to consult with impacted tribes, OSMRE sent letters to tribes to invite them to participate in government-to-government consultation on December 6, 2024 (see **Section 6.1.3, Section 106 and Tribal Consultation Processes**).

[13.] The mailing list of interested persons was based on the original mailing list used for the 2018 Final EIS and updated as needed. It was comprised of elected officials, state and federal agencies, businesses, organizations, and interested individuals, including those that has submitted comments during prior public comment periods for this project.

A public meeting (open-house format) was held at the Colstrip City Hall on January 8, 2025. OSMRE staff and representatives from the third-party consultant team were available during the open house to provide project information and address questions from members of the public. Twenty-three people attended the open house.

During the Draft SEIS public comment period, 39 correspondences[14] were received from interested individuals, nongovernmental organizations (NGOs), businesses, federal and state agencies, elected officials, one tribe, and the project proponent. Of the 39 correspondences, 35 were unique letters and 4 were a pro-Rosebud Mine form letter. In total, 361 comments were coded from the 35 unique correspondences, and 10 comments were coded from the form letter. The most common issue topics raised in comments included the following: surface water, groundwater, water rights, socioeconomic conditions, climate change, special status species, and agency authority. Many comments also expressed support for or opposition to an alternative. A handful of commenters recommended changes to the assumptions used in one or more of the alternatives, recommended a new alternative, or recommended a new analysis issue. Substantive comments and OSMRE responses are provided in **Appendix 5**.

[14] In total, 47 correspondences were received, but 5 were duplicates of another correspondence (e.g., commenter sent identical correspondence via email and postal mail). After the close of the comment period, three correspondences were withdrawn by the commenter(s).

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CHAPTER 2. PROPOSED ACTION AND ALTERNATIVES

2.1 INTRODUCTION

This chapter provides detailed information on Westmoreland Rosebud's existing operations at the Rosebud Mine (mine), including ongoing operations in Area F (project area), providing the context and assumptions for the alternatives considered by Office of Surface Mining Reclamation and Enforcement (OSMRE) and U.S. Department of the Interior (DOI) decision makers in this Supplemental Environmental Impact Statement (SEIS). This chapter also describes the three alternatives: Alternative 1 – No Action, Alternative 4 – Proposed Action (Current Federal Mining Plan), and Alternative 5 – Partial Mining Alternative.

2.1.1 Alternatives Development

The alternatives considered in this SEIS have been updated from the 2018 Final Environmental Impact Statement (EIS).

- Alternative 1 – No Action has been updated to consider mining that has been occurring in the Area F permit area since 2020; current operations in Area F are described in **Section 2.2.2.2, Area F Operations and Development**, and Alternative 1 is described in **Section 2.4**.
- Alternative 2 – 2018 Final EIS Proposed Action (pursuant to the mine permit application package [PAP]) is no longer consistent with the approved Montana Department of Environmental Quality (DEQ) state operating permit C2011003F and is not analyzed further in this SEIS (see discussion in **Section 2.7, Alternatives Considered but Eliminated from Further Analysis**). Alternative 2 is used in this SEIS as a basis of comparison for Alternative 4.
- Alternative 3 – Proposed Action Plus Environmental Protection Measures has no new or additional analysis in this SEIS; a brief discussion is included in **Section 2.7, Alternatives Considered but Eliminated from Further Analysis** to help the reader understand why additional analysis was not warranted.
- Alternative 4 – Proposed Action is a new proposed action analyzed in this SEIS. While very similar to Alternative 2 – 2018 Final EIS Proposed Action, this new alternative is consistent with the DEQ-approved state operating permit C2011003F and the 2019 Assistant Secretary for Land and Minerals Management–approved Federal mining plan. Westmoreland Rosebud is currently mining Area F as described in **Section 2.2.2.2, Area F Operations and Development**. Alternative 4 represents maximum mining and is the basis of comparison for all SEIS alternatives.
- Alternative 5 – Partial Mining Alternative is a new alternative action analyzed in this SEIS, which is described in **Section 2.6, Alternative 5 – Partial Mining Alternative**. Alternative 5 would limit the term of the Federal mining plan to 5 years. Alternative 5 was developed for analysis in this SEIS to further explore a reasonable range of possible alternatives to allow for meaningful public input and informed agency decision making.

The alternatives development process used by DEQ and OSMRE for the 2018 Final EIS is provided in **Section 2.1.1** in the 2018 Final EIS.

2.2 DESCRIPTION OF PAST AND EXISTING MINE AND RECLAMATION OPERATIONS

A brief history of the development and operations of the mine is provided in **Section 1.2.1** in **Chapter 1**. The following sections provide an overview of the current state of operations at the mine. The conditions described here provide the context for the analysis of alternatives in this SEIS and provide some of the underlying assumptions.

2.2.1 Past and Existing Production

The mine is operated by Westmoreland Rosebud Mining, LLC (Westmoreland Rosebud), a subsidiary of Westmoreland Mining LLC. The Rosebud Mine operates 24 hours per day, 7 days per week, and as of 2023, employs around 320 people. Of these, about 35 salaried staff members work 5 days a week; most others work 16 days a month on a 12-hour rotation (Batie 2024).

Westmoreland Rosebud has four active mine areas at the Rosebud Mine operating under permits issued by the DEQ: Area A (permit C1986003A), Area B (permit C1984003B), Area C (permit C1985003C), and Area F (permit C2011003F, which is analyzed in this SEIS). These active permit areas have been mined since 1976 (Areas A and B) and 1983 (Area C). Pre-mining development in preparation for mining in Area F began in 2019, and coal recovery began in August 2020. Two mine areas are no longer actively mined: Area D (4,475 acres, permit C1986003D) is being reclaimed, and Area E (1,026 acres, former permit C1981003E) was released from DEQ jurisdiction in 2019. Mining occurred in Area D from 1986 to 2013 and in Area E from 1976 (or prior) to 1988. Reclamation has occurred concurrently with mine operations in all permit areas as required by the Montana Strip and Underground Mine Reclamation Act (MSUMRA).

Although the Rosebud Mine has shipped coal by rail as recently as 2010,[15] all coal produced by the mine is currently consumed locally at the Colstrip Power Plant and the Rosebud Power Plant under contracts that Westmoreland Rosebud has with the power plant operators (see **Section 1.2.2, Coal Combustion**). To meet operators' coal requirements, such as sulfur and other qualities (e.g., sodium, mercury, etc.), Westmoreland Rosebud often mixes coal from two or more permit areas; for example, Area F coal may be mixed with Area B coal to meet the right value of sulfur needed for the Colstrip Power Plant. As of 2024, the blend provided to the Colstrip Power Plant was 60 percent Area F coal (Wooley 2024). Whether mixed or not, about 6.5 million tons of low-sulfur (0.64 percent) subbituminous coal from the Rosebud Mine (Wooley 2024), including the project area, is sent annually to the Colstrip Power Plant via electrically powered conveyors and burned in Units 3 and 4. High-sulfur "waste coal" is sent via covered truck and burned in the Rosebud Power Plant.

Between 1975 and 2023 (**Table 2.2-1**), just under 514 million tons of coal were recovered from the mine's Permit Areas A, B, C, D, E, and F; in 2023 (**Table 2.2-2**), about 7.1 million tons of coal were recovered (Westmoreland Rosebud 2024a). Production from the Rosebud Mine is limited by the conditions of its DEQ-issued air quality permits, but actual production rarely reaches the air quality permits' limit levels. Montana Air Quality Permit (MAQP) #1483-09 limits annual combined coal production from Areas A, B, and D to 13 million tons per year. Combined coal production from Areas C

[15.] In the past (as recently as 2010), a railroad spur in Area D was used to ship 5,000 to 10,000 tons per year to small customers using a few coal cars at a time. In Area A, a rail loop was used to load large trains with about 2 million tons per year for shipment to larger customers (Mahrt 2017). Westmoreland Rosebud no longer ships coal from the Rosebud Mine by train.

and F is limited to 8 million tons per year per MAQP #1570-09, with an Area F–specific production cap of 4 million tons per year.

Table 2.2-1. Total Coal Produced by the Rosebud Mine between 1975 and 2023.

Permit Area	Permit Number	Coal Sold (Tons)
A	C1986003A	71,753,968
B	C1984003B	85,176,647
C	C1985003C	231,791,501
D	C1986003D (currently in reclamation)	82,894,405
E	C1981003E (no longer a mine permit area)	33,339,045
F	C2011003F	8,529,503
	Total	**513,485,069**

Note: Table includes permit areas and coal mined prior to MSUMRA (i.e., pre-1977 mining in Pit 6).
Source: Westmoreland Rosebud 2024a.

In the decade prior to retirement of the Colstrip Power Plant's Units 1 and 2 (see **Section 1.2.2.1, Colstrip Power Plant**), the mine produced between 8 and 13 million tons of low-sulfur subbituminous coal annually, which was supplied to the Colstrip Power Plant, and 300,000 tons of high-sulfur "waste coal" annually, which was supplied to the Rosebud Power Plant (Western Energy 2018). Average annual production from the mine over that 10-year period was 9.9 million tons. Production has decreased overall in more recent years, ranging from a low of about 5.4 million tons (Peterson 2022) to a high of about 7.1 million tons in 2023 (Westmoreland Rosebud 2024a) as shown in **Table 2.2-2**. This trend is consistent with decreased production rates for other Montana coal mines (see **Section 3.4.2.1**, **Table 3.4-2, Montana Coal Production in 2015 versus 2022).**

Table 2.2-2. Coal Produced by the Rosebud Mine in 2023 (January 1–December 31).

Permit Area	Permit Number	Coal Produced (Tons)
A	C1986003A	0
B	C1984003B	2,478,747
C	C1985003C	0
D	C1986003D (currently in reclamation)	0
F	C2011003F	4,549,133
	Total	**7,027,880**

Source: Westmoreland Rosebud 2024a.

2.2.2 Existing Disturbance and Reclamation

2.2.2.1 Rosebud Mine

As of December 2023, the Rosebud Mine includes 40,127 permitted and bonded acres within five permit areas (A, B, C, D, and F), of which 19,062 acres are disturbed (Westmoreland Rosebud 2024a). See **Table 2.2-3** for a summary of permitted and disturbed acres as of December 2023. **Table 2.2-4** provides an overview of reclamation and bond release by permit area as of December 2023. Westmoreland uses two of its four draglines in reclamation work to replace and recontour the landscape to the postmining topography (Wooley 2024). Operations and reclamation activities have continued over the period when this SEIS was prepared, so the values have not remained static and the acreages under each phase of reclamation and bond release may now be different.

Table 2.2-3. Rosebud Mine Permitted and Disturbed Acreage as of December 2023.

Permit Area	Permit Number	Year Mine Disturbance Began	Permitted Acreage[1]	Active Mining 2023 (acres)	Facilities (acres)[2]	Disturbance (acres)[3]
A	C1986003A	1976	4,303	862	501	3,206
B	C1984003B	1976	15,194	2,942	469	5,137
C	C1985003C	1983	9,382	1,869	780	7,100
D	C1986003D	1986	4,475	0	0	3,037
F	C2011003F	2019	6,773	494	88	582
		Rosebud Mine Total	**40,127**	**6,167**	**1,838**	**19,062**

[1.] Total permitted acreage includes minor revisions (incidental boundary changes) and final bond release as of December 2023 (Westmoreland Rosebud 2024a). Please note that minor revisions for many of the permit areas have occurred (along with reclamation and final bond release) since the SEIS was prepared and the actual acreages now may be different.
[2.] Includes roads, mine offices, equipment storage areas, coal storage barns, dams and impoundments, conveyor routes or other routes, power lines, pipelines, etc. Note: Westmoreland Rosebud added acreage into the Area F permit on the east side that overlapped Permit Area C (Westmoreland Rosebud 2024a).
[3.] Includes all surface that has been disturbed (Disturbance = Facilities + Active Mining + Complete Backfill and Grading).
Source: Westmoreland Rosebud 2024a. Data are for reporting year January 1, 2023–December 31, 2023. Please note that DEQ Coal Section data may be slightly different. Numbers have been rounded to the nearest whole number.

Table 2.2-4. Reclamation Bond Amount and Phased Bond Release by Area of the Rosebud Mine as of December 2023.

Permit Area	Permit Number	Acres Released from Phase I[1]	% of Disturbance Area Released from Phase I	Acres Released from Phase II[1]	% of Disturbance Area Released from Phase II	Acres Released from Phase III[1]	% of Disturbance Area Released from Phase III	Acres Released from Phase IV[1]	% of Permit Area Released from Phase IV[2]	Bond Retained by DEQ
A	C1986003A	1,827	57	1,682	52	1510	47	0	0	$32,750,000
B	C1984003B	1,589	31	1106	22	1240	24	186	4	$86,650,000
C	C1985003C	4,256	60	4,143	58	1141	16	50	1	$41,250,000
D	C1986003D	3,006	99	2,223	73	500	16	27	1	$7,950,000
F	C2011003F	0	0	0	0	0	0	0	0	$16,150,000
Rosebud	**Mine Total**	**10,678**	56	**9,154**	48	**4,391**	23	**263**	1	**$184,750,000**

[1.] Bond-release phases are tied to reclamation. Please see the 2018 Final EIS Section 1.6.4, Bond Release for a description of bond-release phases. Please note that reclamation and final bond release has occurred since the SEIS was prepared and the acreages now may be different.
[2.] Phase IV has been demonstrated as a percentage of the Life of Mine Permit Area, as it includes both disturbed and undisturbed acres.
Source: Westmoreland Rosebud 2024a. Data are for reporting year January 1, 2023–December 31, 2023. Numbers have been rounded to the nearest whole number. Please note that DEQ Coal Section data may be slightly different.

2.2.2.2 Area F Operations and Development

Westmoreland Rosebud began developing Area F in 2019 according to DEQ-approved state operating permit C2011003F and the 2019-approved Federal mining plan; coal recovery began in August 2020. As of December 2023, Westmoreland Rosebud has disturbed 582 acres in the project area; 494 acres of that disturbance is due to active mining, and the remainder is due to site development, such as roads and soil and/or spoil stockpiles (see **Figure 2.2-1** in **Chapter 2**; Westmoreland Rosebud 2024a). About 8.5 million tons of coal have been produced in the project area within this timeframe (Westmoreland Rosebud 2024a) and sold to the Colstrip Power Plant and the Rosebud Power Plant. The following sections describe how existing Area F operations have evolved from those described for Alternative 2 (Proposed Action pursuant to the PAP) in the 2018 Final EIS.

Conditions of Approval

The agencies outlined conditions of approval and modifications to Alternative 2 – Proposed Action in the 2018 Final EIS in their respective RODs (DEQ 2019a; OSMRE 2019a). These conditions and modifications (**Table 2.2-5**) were incorporated into the state operating permit C2011003F and the Federal mining plan.

Table 2.2-5. DEQ and OSMRE ROD conditions.

Condition	Source
ARM 17.24. 318, 1131: Treatment of cultural resources within state operating permit C2011003F is covered by a memorandum of agreement developed under the provisions of Section 106 of the National Historic Preservation Act and pursuant regulations (36 C.F.R. part 800). Treatment of all cultural resources, including incidental discoveries during the course of mining, must be handled according to the provisions of the memorandum of agreement.	DEQ 2019a
ARM 17.24.405(6)(c): As described in Section 9.6.5 of the *Cumulative Hydrologic Impact Analysis for Area F* (Appendix I to the 2019 DEQ ROD), based on information contained in the permit application, DEQ has determined that the proposed mining plan in T2N, R38E, Section 12 is likely to result in a change in water quality in the Rosebud Coal outside the permit boundary, which could result in material damage. As such, the application does not affirmatively demonstrate that the hydrologic consequences and cumulative hydrologic impacts of mining in Section 12 will not result in material damage to the hydrologic balance outside the permit area. Therefore, in accordance with ARM 17.24.405(4), DEQ does not approve mine passes proposed in T2N, R38E, Section 12.	DEQ 2019a
ARM 17.24.510(1): The proposed use of bottom and fly ash within the proposed project area is prohibited. These waste materials are derived from activities conducted outside the permit area and have not been demonstrated, in the Area F application, to not adversely affect water quality, public health or safety, or other environmental resources. Any reference to bottom ash and fly ash must be removed from the Area F permit application (specifically references on pages 313-1, 313-2, 321-1, 321-2, 501-1, and 510-1) within 45 days of issuance of state operating permit C2011003F.	DEQ 2019a
The Selected Alternative is Alternative 2 – Proposed Action as described in **Section 2.4** of the 2018 Final EIS with the exception of 74 acres of Federal coal in T2N, R38E, Section 12, which was not approved for mining.	OSMRE 2019a

Annual Reporting

Pursuant to its operating permit, Westmoreland Rosebud submits an Annual Mining Report for Area F and other permit areas of the Rosebud Mine to DEQ. Each report covers January 1 through December 31 of the previous year and is submitted by March 31 annually. The most recent reports available when the Draft SEIS was prepared covered January 1 through December 31, 2023 (Westmoreland 2024b). The report discloses mining, disturbance, and reclamation that occurred during the reporting period and

provides updates on monitoring and mitigation, including those that were conditions of permit approval. Other reports, such as the Annual Wildlife Report (ICF 2024), the Annual Hydrology Report (WET 2024), and the Annual Hazard Waste Report (Westmoreland Rosebud 2024c), are submitted on the same reporting schedule as the Annual Mining Report and also were used in the preparation of this SEIS (see discussions in relevant **Chapter 3** resource sections).

Minor Revisions to State Operating Permit C2011003F

As is typical for surface coal mines, on-the-ground conditions in the project area have necessitated minor changes to the operating permit as Area F has been developed and coal recovered; these changes have been handled by DEQ as minor revisions (MRs) to the state operating permit. Each MR was reviewed and approved by DEQ pursuant to MSUMRA and the Montana Environmental Policy Act (MEPA). **Table 2.2-6** below describes each MR that has occurred since project implementation through December 31, 2023;[16] noteworthy changes include a slight revision to the permit boundary where it intersects Area C, adjustments to the disturbance area, and new routes for the Horse Creek Road relocations described in the 2018 Final EIS. Updated features (permit boundary, disturbance area, road relocations, etc.) are shown on **Figure 2.2-1**.

16. To move forward with SEIS analyses, a data cut-off date of December 31, 2023, was implemented to provide a snapshot in time of mine operations that would be consistent throughout the environmental review process. Westmoreland Rosebud prepares annual mine reports for each permit area of the mine. The most recent annual reports were issued in 2024 and cover the January 1, 2023, through December 31, 2023, reporting period. Data from Westmoreland's annual reports were used for figures and acreages presented in the SEIS. Please note that reclamation and final bond release has occurred since the SEIS was prepared and the permit area boundaries (and associated acreages) now may be different. This approach is consistent with guidance in CEQ 2025: "Agencies must prioritize efficiency and certainty over any other policy objectives that could add delays and ambiguity to the permitting process."

Table 2.2-6. Minor Revisions to DEQ-Approved State Operating Permit C2011003F (Area F).

MR Name	Revision Subject
MR1	Permit language proposing the use of bottom ash removed from the narrative (DEQ ROD condition).
MR2	Authorized Ramp CW6a for mobile equipment access to cuts FA-1 through FA-5 prior to construction of the haul road.
MR3	Authorized a contract miner to operate in the area as Westmoreland works on the permit transfer.
MR4	Authorized the transfer of the surface mine permit from Western Energy Company to Westmoreland Rosebud Mining LLC.
MR5	Denied request for spoil movement from one operating permit to another operating permit.
MR6	Authorized the change of mining sequence and additional ramp access to mining.
MR7	Authorized an additional soil pile FT19 for which a portion of the area will be designated for the soil study area.
MR8	As-built for Pond F-02.
MR9	Authorized additional mine passes, FA-5 and FA-6, associated with the reroute of the 115 kV overhead powerline.
MR10	Revision to update the bond calculation (***Note:*** *MR10 was withdrawn by Westmoreland*).
MR11	Denied request for spoil movement from one operating permit to another operating permit.
MR12	Authorized the realignment of mine passes in the FA pit.
MR13	Authorized an incidental boundary change for approximately 28 acres; includes approximately 27 acres of Federal coal that was previously part of Permit Area C. *Please note that the 27 acres of Federal coal will not be mined or have already been mined as part of Area C operations.*
MR14	Authorized to reorient a haul road through Black Hank Creek drainage channel and add a culvert to extend ramp F1a, adding an additional 39 acres of disturbance.
MR15	Authorized to reorient the county road and haul road.
MR16	Authorized change of soil pile location, eliminating the need for three out of pit overburden stockpile footprints, reducing surface disturbance.
MR17	Authorized realignment of the haul road, reducing the disturbance footprint.
MR18	Approved the as-built for Pond F-07.
MR19	Approved the as-built for Pond F-08.
MR20	Approved change in the designs for Pond F-6A and Pond F-6B.

Current Area F Operating Permit Versus Alternative 2 – 2018 Final EIS Proposed Action

As noted above, minor adjustments to mining operations are typical as a mine is developed and operated. For the project area, these adjustments have been driven by on-the-ground conditions and other actions, such as market conditions and the rate of mining in other permit areas. **Table 2.2-7** through **Table 2.2-9** compare key components of the currently approved operating permit (as modified through MR19) to Alternative 2 from the 2018 Final EIS. **Figure 2.2-1** shows the extent of mining that has occurred in Area F since 2020 as well as showing the slightly modified permit boundary that bounds the SEIS project area and the 74 acres where mining is prohibited to protect the hydrologic balance. **Figure 2.2-2** shows the original permit boundary (Alternative 2 project area) from the 2018 Final EIS. Since 2019, the following conditions have impacted Westmoreland Rosebud's mining operations in Area F:

- MRs to state operating permit C2011003F (described in **Table 2.2-6**) have been proposed by Westmoreland to address on-the-ground conditions and have been approved by DEQ.
- Development of the Rosebud Mine (Area F and other permit areas) has not occurred at the same rate as described in the 2018 EIS. For example, Area B has not been developed to the extent anticipated in the 2018 Final EIS for Area F for several reasons, including the following: (1) DEQ only authorized about half of the acreage in Amendment 5 (AM5) to the Area B permit that was considered in the 2018 Final EIS for Area F, (2) a court recently remanded the DEQ authorization for Amendment 4 to the Area B permit, and (3) ongoing litigation of Area B AM5 makes future mining of that area uncertain. The net result of these changes to Area B (or any other permit areas

of the mine) is that Westmoreland Rosebud has made changes (or may need to make changes in the future) to the mining rate for Area F based on operational needs.

- Westmoreland must deliver coal to the Colstrip Power Plant that meets certain operational requirements (e.g., low sulfur content, high calorific value, etc.). Although Westmoreland has predicted the quality of the coal in Area F and other permit areas based on testing and modeling, on-the-ground conditions may vary. To overcome these variances, Westmoreland Rosebud blends coal from multiple permit areas to create a consistent quality coal for the Colstrip Power Plant. The need to blend coal can affect the permit areas that are used and the rate at which Westmoreland Rosebud mines (Wooley 2024). As of 2024, the blend provided to the Colstrip Power Plant was 60 percent Area F coal (Wooley 2024).
- The operational needs (e.g., production rate, coal quality, etc.) of the Rosebud Mine dictate the sequence of mining passes in the Area F permit area. For example, moving a dragline is a very costly and time-consuming process (approximately 90 days to move it from one permit area to another). Westmoreland Rosebud has adjusted the sequence of passes in the project area from those described in the 2018 Final EIS to more efficiently use and move its draglines based on current operating conditions.

Disturbance

Table 2.2-7 compares currently approved disturbance acreages to those described in the 2018 Final EIS for Alternative 2 – 2018 Final EIS Proposed Action.

Table 2.2-7. Comparison of Area F Permit Area Surface Disturbance Estimates.

Disturbance Area	Alternative 2 – 2018 Final EIS Proposed Action Acres	DEQ-Approved (MR16) Acres
Mining area	2,159	2,175
Soil storage area	197	227
Scoria pits	45	45
Haul roads	211	191
Other disturbances[1]	1,748	1,746
Acreage with two or more types of disturbance	(-99)	(-96)
Total disturbance	**4,260**	**4,288**

[1.] Other disturbances mostly include undisturbed ground near or adjacent to other disturbed areas including ponds, sediment traps, and ditching associated with surface-water sediment controls; ramps connecting haul roads to the mining area; and electrical substations.
Source: Table is based on Table 303-1 from Western Energy's PAP and Table 303-1 from C2011003F MR16 (2022). Acreages are rounded to the nearest whole number in the text of this SEIS.

Coal Recovery

Table 2.2-8 compares the estimated recoverable coal reserves in each of the Area F leases (private and Federal) from MR16 to those described in the 2018 Final EIS for Alternative 2 – 2018 Final EIS Proposed Action. Adjustments to these numbers reflect MRs (see **Table 2.2-6**). Two distinct coal seams underlie Area F, the Rosebud and McKay, and are presently mineable by surface technology. Westmoreland Rosebud, however, is only mining the Rosebud seam, which is the highest coal seam in the project area stratigraphic sequence. The Rosebud coal seam averages 18.6 feet thick with a maximum thickness of 26.0 feet. The McKay seam is 67 feet below the Rosebud seam, is approximately 9 feet thick, and is of poorer quality and less marketable. Westmoreland's rationale for not mining the McKay coal is documented in its approved R2P2 (Westmoreland 2017; BLM 2017). Recoverable coal means the amount of coal remaining after deducting the tonnage that represents a cleaning loss of 1.5 feet of coal, which results in a 94 percent recovery factor. Not all coal within the lease boundaries will be mined due to

operational limitations such as protection of drainages, poor coal quality, high stripping ratios, equipment maneuverability, location of existing utilities, and the 94 percent coal-recovery factor.

Table 2.2-8. Comparison of Area F Estimated Coal Reserve Volumes (Tons).[1]

Coal Reserve	Source	Coal Lease 1001 (Private)	Coal Lease 1001a (Private)	Coal Lease MTM 082186 (Federal)	Total
Total coal within lease area	Same numbers in MR16 and Alternative 2 – 2018 Final EIS Proposed Action	100,390,436	1,436,280	62,138,589	**163,965,305**
Loss attributable to recovery factor[2]	Same numbers in MR16 and Alternative 2 – 2018 Final EIS Proposed Action	2,361,000	3,000	2,163,000	**4,527,000**
Coal not mined due to undisturbed stream corridors	Same numbers in MR16 and Alternative 2 – 2018 Final EIS Proposed Action	12,323,193	0	829,781	**13,152,974**
Coal not mined due to existing utilities	MR16	*1,608,940	0	6,065,170	***7,674,110**
	**Alternative 2 – 2018 Final EIS Proposed Action	*2,161,658	0	6,065,170	***8,226,828**
Coal not mined due to poor quality	Same numbers in MR16 and Alternative 2 – 2018 Final EIS Proposed Action	19,629,169	0	2,529,222	**22,158,391**
Coal not mined due to equipment maneuverability	MR16	*2,627,150	0	1,338,779	***3,965,929**
	**Alternative 2 – 2018 Final EIS Proposed Action	*2,599,661	0	1,338,779	***3,938,440**
Coal not mined due to high stripping ratio	Same numbers in MR16 and Alternative 2 – 2018 Final EIS Proposed Action	24,318,470	1,394,450	15,463,661	**41,176,581**
Previously mined coal	Same numbers in MR16 and Alternative 2 – 2018 Final EIS Proposed Action	0	0	0	**0**
Mineable coal reserves in lease	MR16	*37,522,514	38,830	33,748,976	***71,310,320**
	**Alternative 2 – 2018 Final EIS Proposed Action	*36,997,285	38,830	33,748,976	***70,785,091**

* These values changed between the 2018 Final EIS and MR16.
** Information from this row is based on Table 322-2: Coal Volumes from Western Energy's PAP.
1. Coal reserves within the project area coal lease boundaries were calculated by Westmoreland Rosebud using grid files in Carlson/AutoCADD. This process yields a volume of coal to which an in situ density of 1.1 tons per cubic yard was applied to determine available reserves.
2. About 2.7 percent of total coal: unrecoverable based on 94 percent coal-recovery factor.
Source: Table 322-2 from C2011003F MR16 (2022).

Mining Plan and Annual Production

Westmoreland Rosebud is using the same surface mining method (U.S. Patent 2,291,669; August 4, 1942) in Area F as in all other permit areas of the Rosebud Mine. Mining operations run 24 hours a day, 7 days a week. The surface mining method uses dragline excavation and box-cuts as described for Alternative 2 in the 2018 Final EIS **Section 2.4**. As described above, the sequence of mine operations in the project area under the approved DEQ operating permit differs slightly from what Westmoreland Rosebud proposed in Alternative 2 due to on-the-ground conditions.

Annual production (annual tons of coal recovered and associated disturbance) values provided in both this SEIS and the 2018 Final EIS are estimates only. Actual production and associated disturbance can vary due to the factors discussed above.[17] **Table 2.2-9** compares actual annual production (annual tons of coal recovered and associated disturbance) to annual production estimates from MR16, which was approved by DEQ in 2022 and is Westmoreland Rosebud's most recent mining timetable, to annual production estimates from the 2018 Final EIS for Alternative 2 (**Section 2.4**).

Road Construction and Relocations

Construction of access roads, haul roads, ramp roads, and service roads is proceeding in the project area as described in the 2018 Final EIS **Section 2.4.3.4** with a few minor adjustments as noted in the MRs listed in **Table 2.2-6**. Pursuant to MR16, approximately 200,000 to 300,000 cubic yards of initial box-cut overburden was used as fill for the construction of the Area F haul road between the first two ramps, with the remainder placed in overburden stockpiles.

The biggest change since the 2018 Final EIS is that the Horse Creek Road alignment shown for Alternative 2 (**Figure 2.2-2**) was modified slightly from what Westmoreland Rosebud had proposed to accommodate on-the-ground conditions (**Figure 2.2-3**). Specifically, a 4.2-mile segment in the northeast/north-central portion of the project area (owned and maintained by Rosebud County) and a 1.3-mile segment in the northwestern portion of the project area (owned and maintained by Treasure County) were modified. The longer segment, which is in Rosebud County, was relocated during the initial development of the project in 2019. The west end of the realignment, which is in Treasure County, will be relocated when mining moves into the northwestern corner of the project area (in about 5 to 7 years based on current estimates).

Fugitive Dust Control

Measures to control fugitive dust are being implemented as described in the 2018 Final EIS **Section 2.4.3.4**. Westmoreland Rosebud currently maintains a Fugitive Dust Control Plan in accordance with Administrative Rules of Montana (ARM) 17.24.761 and the work practice standards and Best Available Control Technology established within its current MAQP #1570-09; see **Section 2.2.3, Other Existing Permits**.

[17.] For example, as of December 31, 2023, Westmoreland Rosebud mined less coal in Area F in four years of production (2020 to 2023) than predicted by the mine production estimates provided in **Table 2.2-9**. Based on total production tonnages provided in **Table 2.2-1**, only about 8.5 million tons of coal were produced from Area F between 2020 and 2023 as compared to the predicted 9.1 million tons in **Table 2.2-9**. At the same time, 2023 production in Area F (about 4.6 million tons) was greater than the 4 million tons predicted in **Table 2.2-9**.

Table 2.2-9. Comparison of Estimated and Actual Annual Production by Year and Acres Disturbed.

Operation Year	Alternative 2 2018 Final EIS Estimated Tons Mined (×1,000)	MR16 Estimated Tons Mined (×1,000)	Actual Tons Mined (×1,000)	Alternative 2 2018 Final EIS Estimated Annual Disturbance (acres)	Alternative 2 2018 Final EIS Estimated Total Disturbance (acres)	MR16 Estimated Annual Disturbance (acres)	MR16 Estimated Total Disturbance (acres)	Actual Annual Disturbance (acres)	Actual Total Disturbance (acres)
1 (2020)	4	.2	0.25	600	600	35.7	35.7	74	74
2	4	.9	0.98	114.8	714.8	26.4	62.1	73	147
3	4	4	2.6	114.8	829.6	614.88	676.9	394	541
4 (2023)	4	4	4,6	114.8	944.4	114.8	791.7	41	582
5	4	4		514.8	1,459.1	114.8	906.5		
6	4	4		114.8	1,573.9	114.8	1,021.2		
7	4	4		114.8	1,688.7	114.8	1,136.0		
8	4	4		514.8	2,203.5	514.8	1,650.8		
9	4	4		114.8	2,318.3	614.8	2,265.6		
10	4	4		114.8	2,433.1	114.8	2,380.4		
11	4	4		114.8	2,547.8	114.8	2,495.2		
12	4	4		114.8	2,662.6	114.8	2,609.9		
13	3.3	4		493.3	3,155.9	114.8	2,724.7		
14	3.2	4		93.3	3,249.2	414.8	3,139.5		
15	3.3	4		93.3	3,342.4	364.8	3,504.3		
16	3.2	4		493.3	3,835.7	114.8	3,619.1		
17	3.3	4		93.3	3,928.9	114.8	3,733.9		
18	3.2	4		93.3	4,022.2	114.8	3,848.6		
19	3.3	4		93.3	4,115.5	193.5	4,042.1		
20 (2039)	0.0	1.6		72.4	4,187.9	245.9	4,288.0		
21 (2040)	0.0	-		72.4	**4,260.3**	-	**4,288.0**		

Note: Acres disturbed and tons mined per year are estimates only. Actual production and disturbance may vary.

Source: Table is based on Table 303-2 from the Western Energy PAP (Alternative 2 – Proposed Action from the 2018 Final EIS),Table 303-2 from C2011003F MR16 (2022), and Westmoreland Rosebud's Annual Mining Reports (Reporting periods January 1, 2020 through December 31, 2023).

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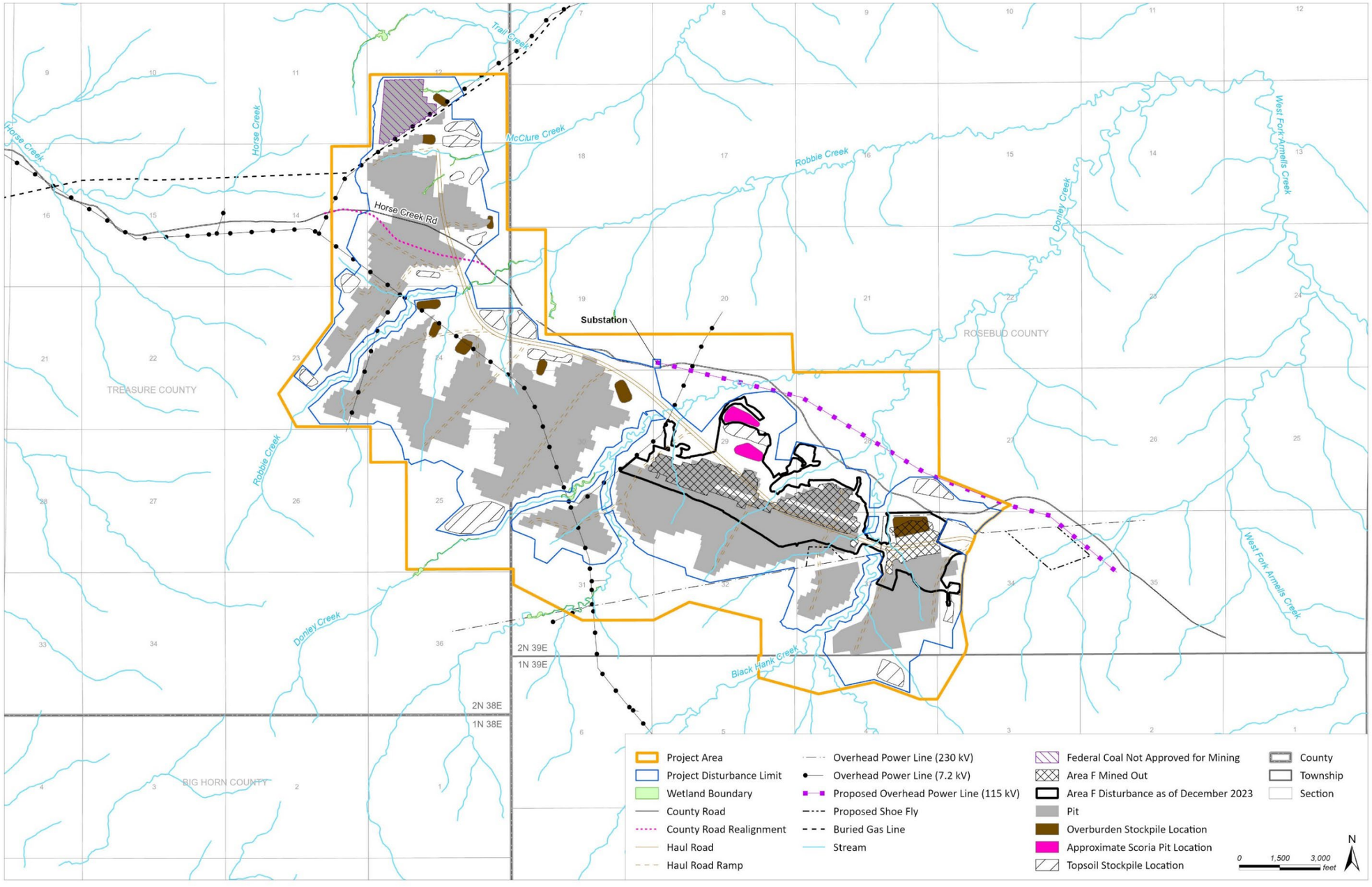

Figure 2.2-1. State Operating Permit C2011003F Features and Extent of Mining in Project Area as of December 31, 2023.

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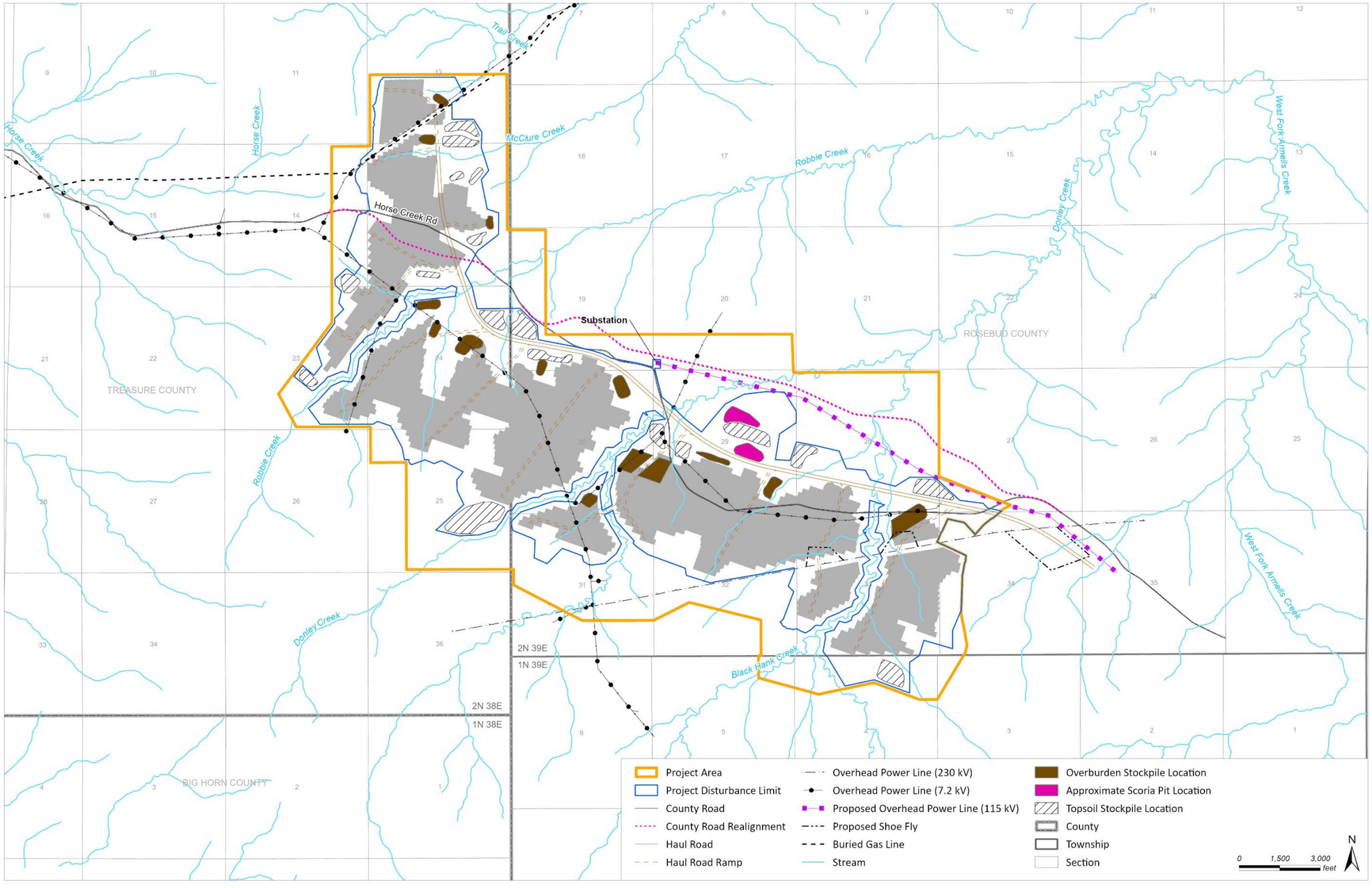

Figure 2.2-2. Alternative 2 Project Area from the 2018 Final EIS.

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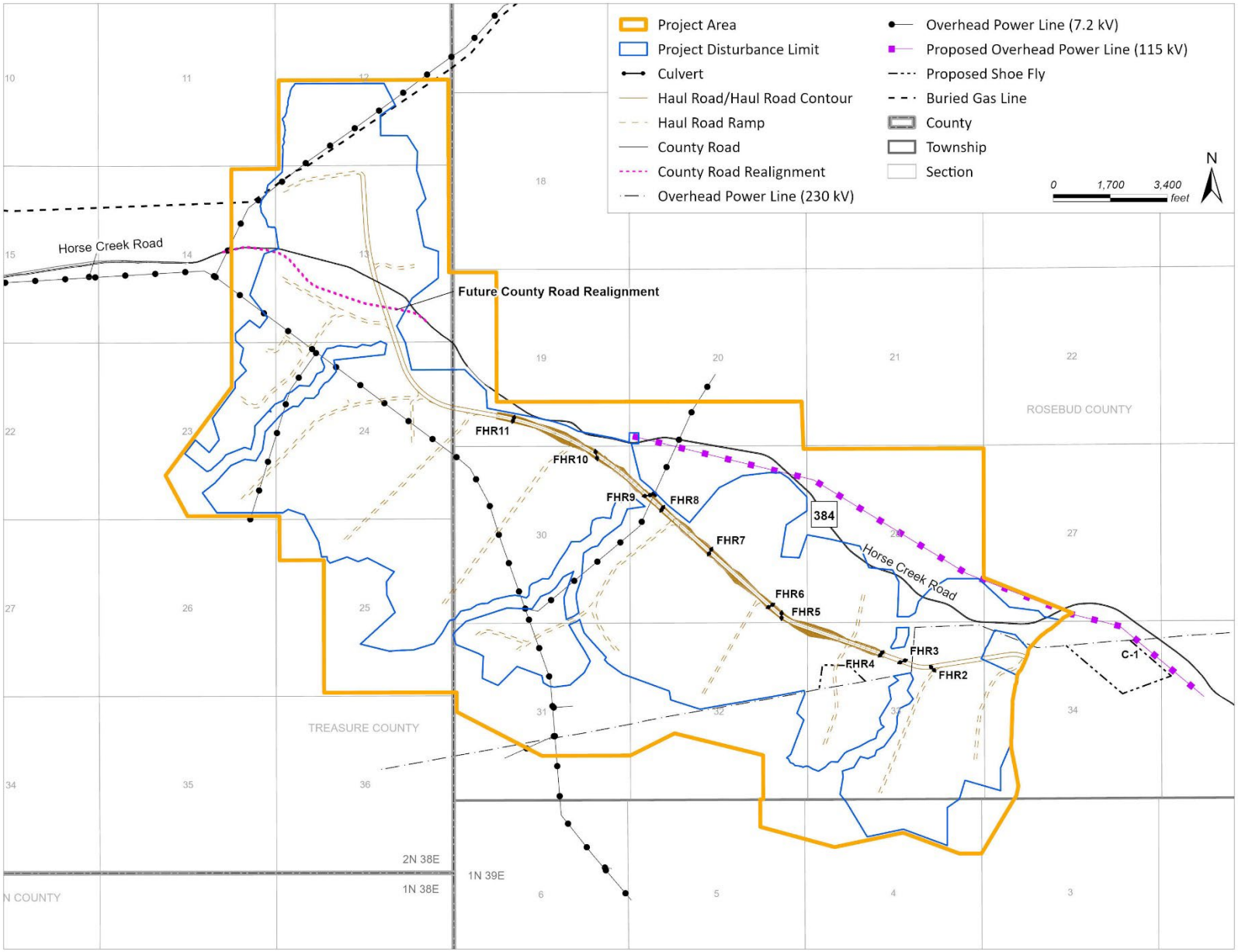

Figure 2.2-3. Roads in the Project Area.

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Protection of the Hydrologic Balance

Measures to protect the hydrologic balance, including management of surface water, groundwater, and sediment in the project area, are being implemented as described in the 2018 Final EIS **Section 2.4.5** with a few minor adjustments as noted in **Table 2.2-6**. Locations of Montana Pollutant Discharge Elimination System (MPDES) Permit MT-0031828 outfalls and sediment ponds and traps are shown on **Figure 2.2-4**.

The biggest change from the 2018 Final EIS in terms of the hydrological balance is the prohibition of mining in 74 acres of Federal coal in T2N, R38E, Section 12. Westmoreland Rosebud, however, may still disturb the surface above the 74 acres of Federal coal for mining-related activities (e.g., spoil and topsoil stockpiles). Westmoreland Rosebud estimates that there is about 1.9 million tons of recoverable coal (based on modeling using expected coal thickness and quality) that will not be mined in T2N, R38E, Section 12. Westmoreland Rosebud may at any time reapply to OSMRE and DEQ to mine the excluded 74 acres of Federal coal provided they affirmatively demonstrate that no material damage would occur.

Reclamation and Postmining Topography

Reclamation is occurring in Area F contemporaneously with mining (see discussion of the phases of reclamation in **Section 1.6.4, Bond Release**, in the 2018 Final EIS). As described above under **Mining Plan and Annual Production**, the sequence of mine operations (and reclamation) in the project area has been slightly modified in Westmoreland's approved operating permit from what was described for Alternative 2 in the 2018 Final EIS **Section 2.4.4, Reclamation**. Pursuant to its approved reclamation plan (Exhibit J as revised by MR12 and MR17; **Figure 2.2-5**)[18] and postmining topography (Exhibit B as revised by MR15; **Figure 2.2-6**), Westmoreland Rosebud continues to reclaim all mining-related land disturbances in the project area to a use equal to or better than what existed prior to mining as provided for in Sections 82-4-231 and 232, Montana Code Annotated (MCA).

As described in the 2018 Final EIS for Alternative 2 (**Section 2.4.3.6, Soil Removal and Stockpiling**), Westmoreland Rosebud uses direct haul (hauling soil directly from the stripping area to graded areas ready for soil replacement) whenever possible. As in other permit areas, Westmoreland would use one of its four draglines in Area F for reclamation activities (e.g., replacing and recontouring the landscape to the approved postmining topography) (Wooley 2024). The initial stages of reclamation (grading, application of soil, and seeding) begin within 2 years of mining and continue as subsequent mine passes are completed in the project area until Phase IV bond release (bond-release phases are discussed in the 2018 Final EIS **Section 1.6.4, Bond Release**).[19] Seeding and revegetation are occurring in the project area as described in the 2018 Final EIS **Sections 2.4.4.7, Seeding**, and **2.4.4.8, Revegetation Plan**. The status of reclamation in the project area (current as of December 31, 2023) is shown in **Table 2.2-4** but does not reflect ongoing reclamation that has occurred in Area F during the period when the SEIS was prepared.

[18.] As noted above, Westmoreland Rosebud currently is prohibited from mining 74 acres of Federal coal in T2N, R38E, Section 12, but may at any time reapply to OSMRE and DEQ to mine that area provided they affirmatively demonstrate that no material damage to the hydrologic balance would occur. Mine passes (and reclamation order) are shown for this area on Westmoreland Rosebud's approved reclamation plan (Exhibit J as revised by MR12 and MR17). To clearly demonstrate that this SEIS assumes mining would not occur within those 74 acres of Federal coal, the mine passes (and reclamation order) for that area are not shown on **Figure 2.2-5**.

[19.] As described in the 2018 Final EIS **Section 1.6.4, Bond Release**, reclamation occurs in four phases. Phase I includes pit backfilling and grading to meet the postmine topography. Phase II consists of surface stabilization to prevent accelerated erosion, soil application, revegetation, and sediment-control measures. Phase III ensures that the postmining land uses have been met and includes extensive monitoring of the reclaimed landscape, including monitoring of vegetation, soil, and surface water and groundwater resources. Phase IV ensures the restoration of the hydrologic balance, among other final reclamation measures.

Reclamation facilitates the following postmining land uses: grazing land, cropland, and wildlife habitat as described in the 2018 Final EIS **Section 2.4.4.1, Postmining Land Uses**.

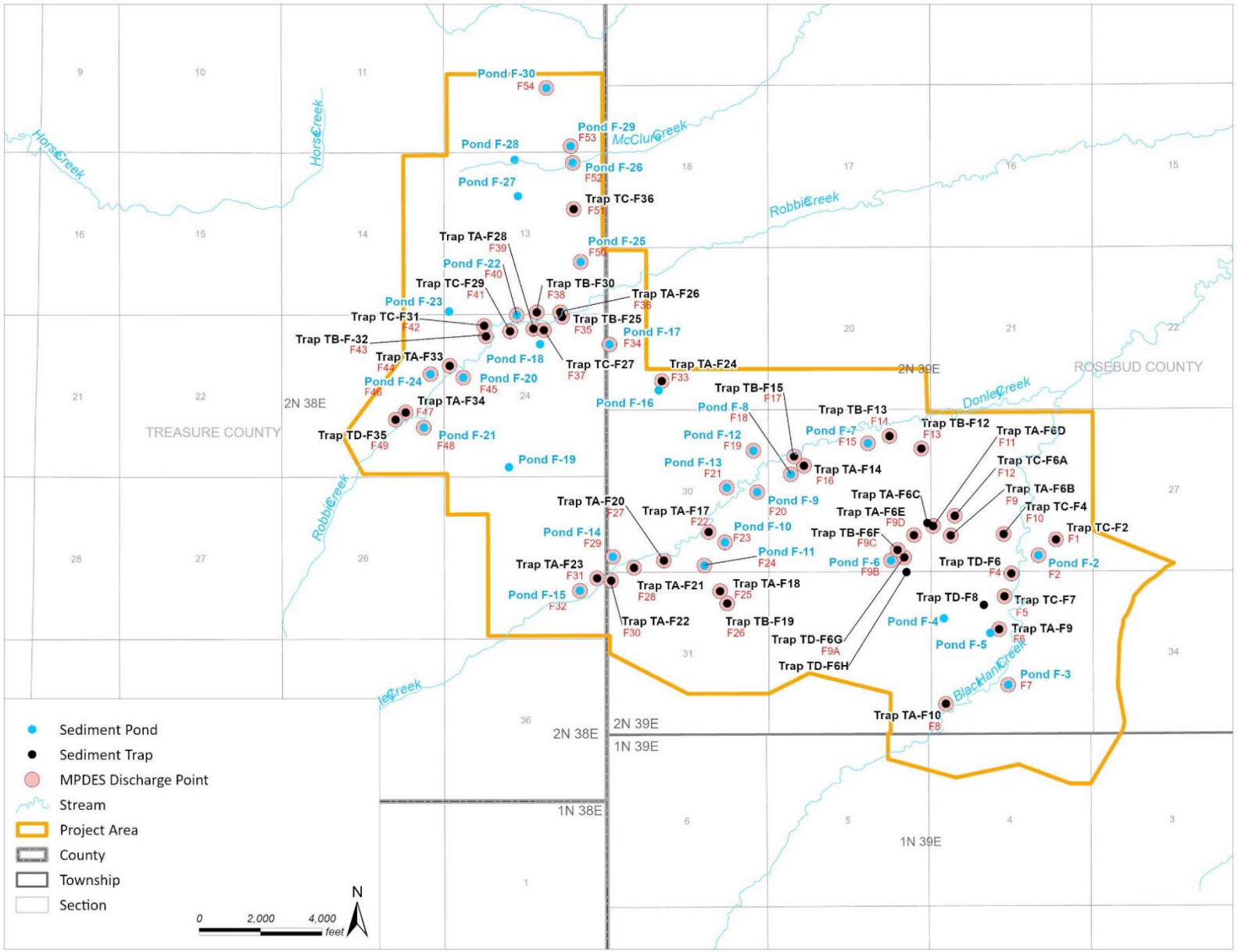

Figure 2.2-4. MPDES Outfalls (MT-0031828) and Sediment Ponds and Traps (MR15).

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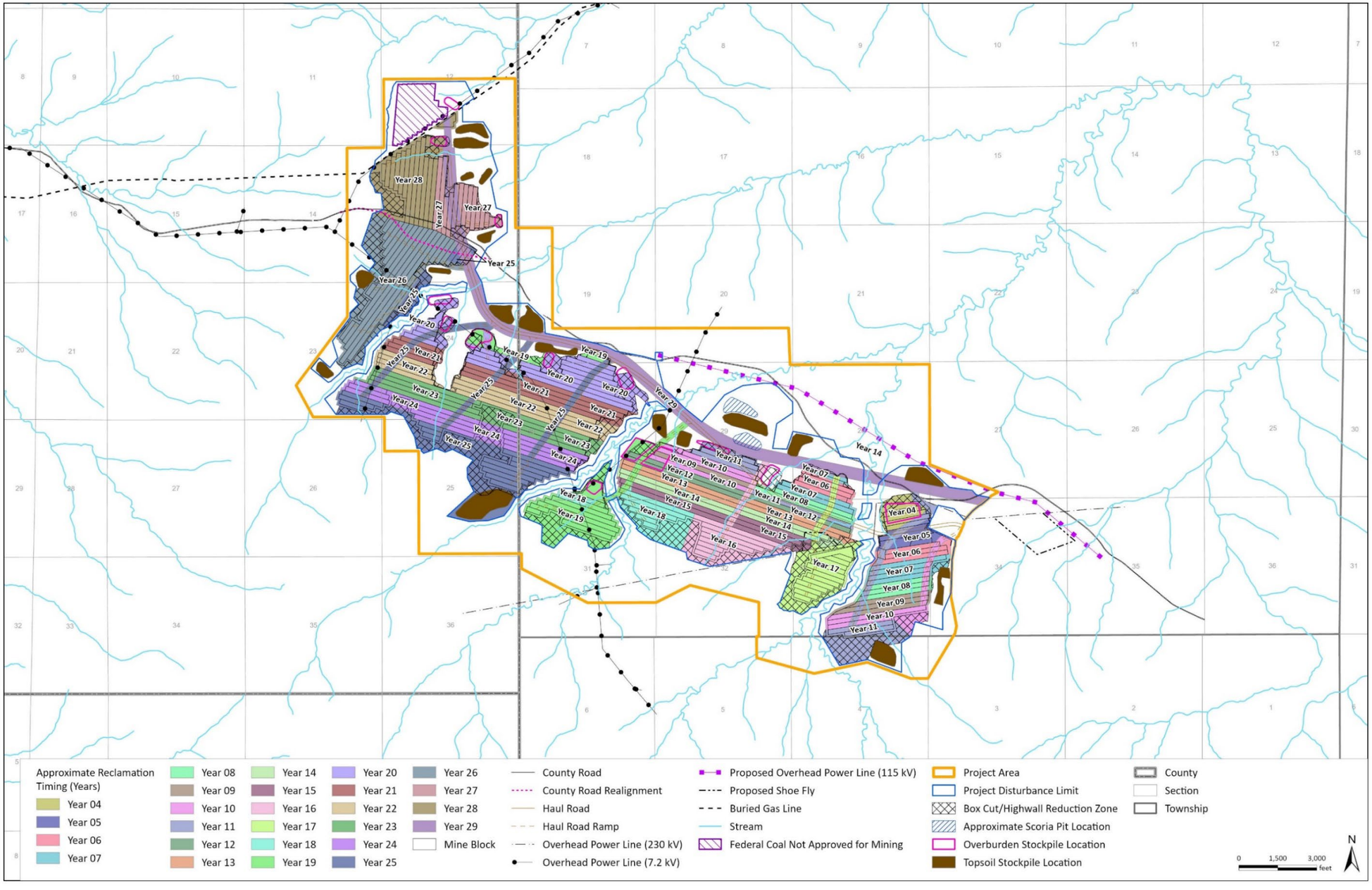

Figure 2.2-5. Currently Approved Reclamation Plan (MR12 and MR17).

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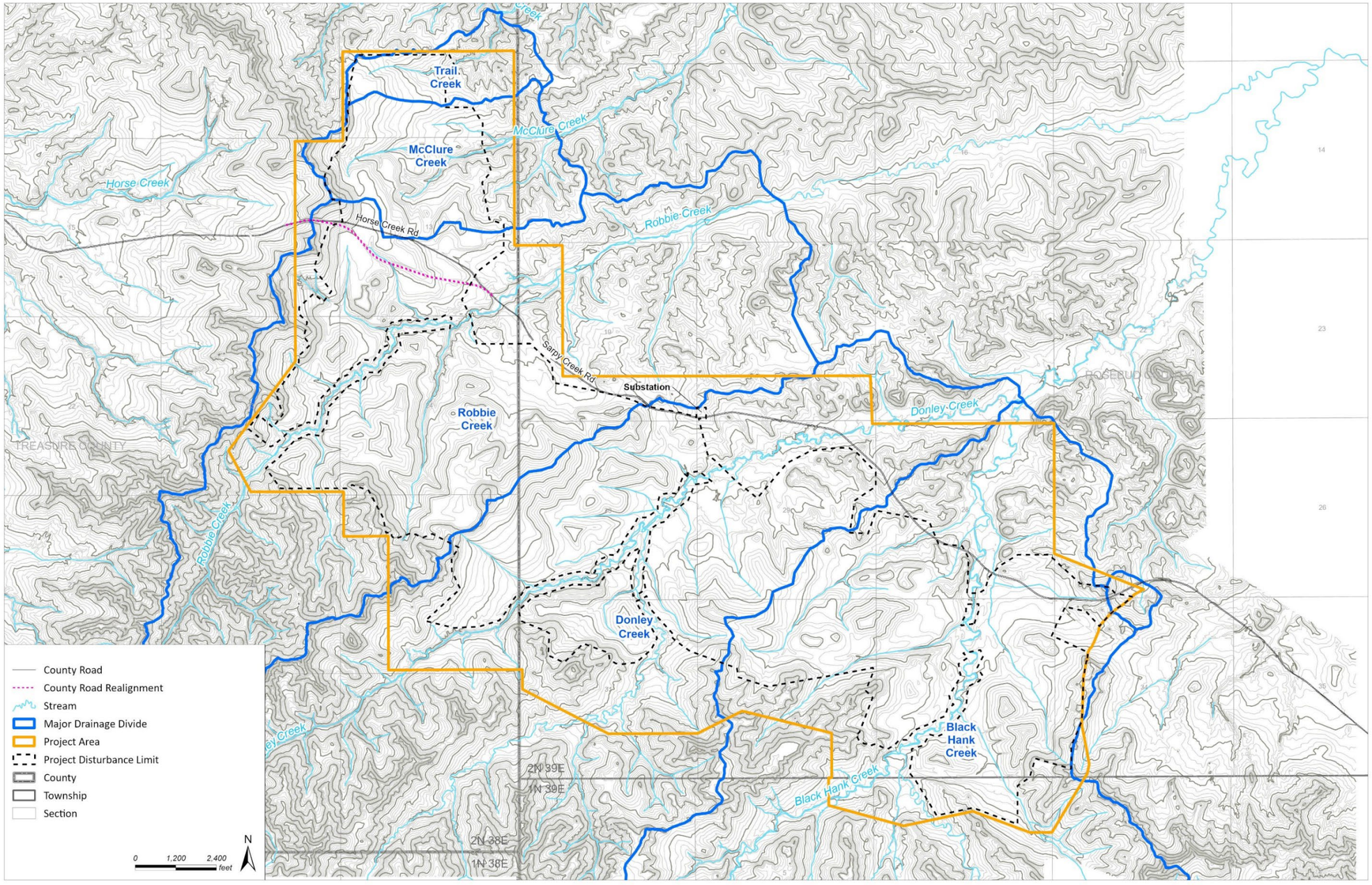

Figure 2.2-6. Currently Approved Postmining Topography (MR15).

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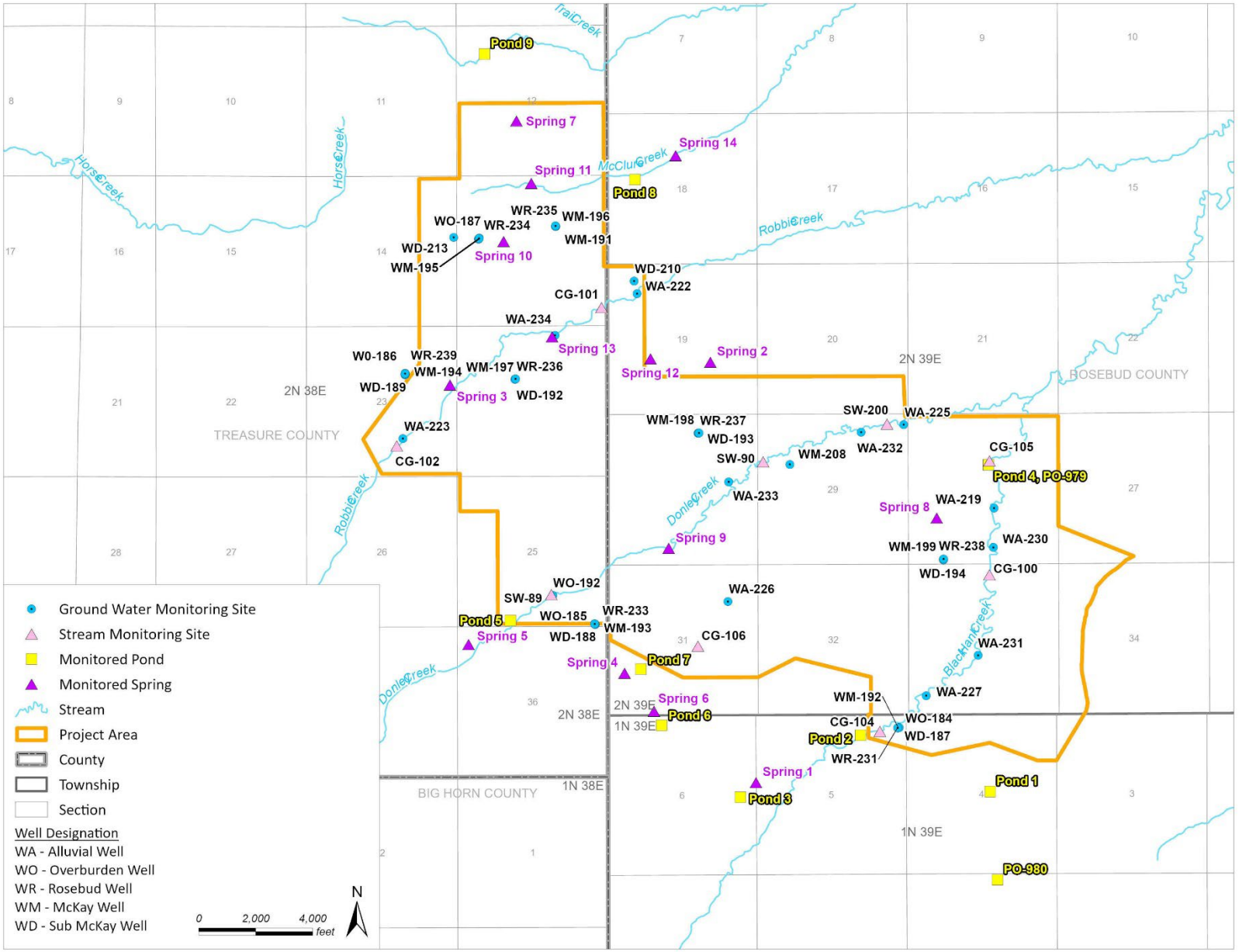

Figure 2.2-7. Surface Water and Groundwater Monitoring Locations.

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Monitoring

Westmoreland Rosebud has implemented a monitoring program in the project area, which is detailed in its approved Monitoring and Quality Assurance Plan; monitoring results are reported on annually in Westmoreland Rosebud's various reports (see **Annual Reporting**). Westmoreland Rosebud's monitoring program is largely consistent with what was described in the 2018 Final EIS **Section 2.4.7, Monitoring Plans** and is outlined in **Table 2.2-10**. The affected environment sections in this SEIS (**Chapter 3**) cover any updates and include discussions of resources based on the most recent annual reports.

Table 2.2-10. Overview of Parameters Monitored in the Project Area.

Monitoring Type	Description	Relevant Plan	Report/Reporting Interval
Stream monitoring	Surface water monitoring (**Figure 2.2-7**) is undertaken in drainages, including drainages that contain wetlands (Robbie Creek, Trail Creek, and Donley Creek). At all surface water monitoring sites, flow, field parameter data and crest gage readings are collected monthly. Water quality samples are taken on a quarterly, event-based basis. Sediment samples are collected monthly and after major precipitation and snowmelt events.	Monitoring and Quality Assurance Plan	Annual Hydrology Report (October 1 from the previous year to September 30 of the reporting year)
Pond monitoring	Pond monitoring (**Figure 2.2-7**) includes monitoring of Pond 5, which feeds wetland F049. Water level measurements are collected monthly throughout the year, and field parameters are collected monthly from March through November. Water quality samples are collected semiannually.	Monitoring and Quality Assurance Plan	Annual Hydrology Report (October 1 from the previous year to September 30 of the reporting year)
Spring monitoring	Springs, including those that feed wetlands, are monitored monthly (**Figure 2.2-7**). Spring flow data and field parameter data are collected monthly from March through November. During winter months, springs are typically frozen. Water quality samples are collected semiannually. The frequency of spring sampling increases to quarterly once mining commences in the drainage in which the spring is located.	Monitoring and Quality Assurance Plan	Annual Hydrology Report (October 1 from the previous year to September 30 of the reporting year)
Groundwater monitoring	Groundwater monitoring wells are located throughout the project area (**Figure 2.2-7**), including upgradient and downgradient of the proposed disturbance area. Water level measurements are collected quarterly, except for the majority of alluvial wells, where measurements are taken monthly. Water quality samples are collected semiannually, annually, or every third year, dependent on well characteristics.	Monitoring and Quality Assurance Plan	Annual Hydrology Report (October 1 from the previous year to September 30 of the reporting year)
Wildlife surveys	Annual wildlife monitoring for Rosebud Mine, including the project area, is undertaken for big game, upland game birds, raptors, and songbirds.	Wildlife Monitoring Plan	Annual Wildlife Report (January 1-December 31)
Aquatic macroinvertebrate surveys	Aquatic macroinvertebrate surveys undertaken in 2023 during the permit renewal cycle. Surveys followed the 2012 DEQ protocol, *Sample Collection, Sorting, Taxonomic Identification, and Analysis of Benthic Macroinvertebrate Communities Standard Operating Procedure*.	Area F Benthic Macroinvertebrate Monitoring Report	2023

Mitigation

Westmoreland Rosebud has implemented the mitigation plans and design features described in the 2018 Final EIS **Sections 2.4.8, Mitigation Plans** and **2.4.5, Protection of the Hydrologic Balance**, as well as

in the agency RODs (see **Conditions of Approval** above). Mitigation is completed in the project area for the following resources as needed or as directed in the approved DEQ operating permit: air quality, cultural resources, water rights, and wetlands. See the **Protection of the Hydrologic Balance** section above for a discussion of the design features that govern management of surface water, groundwater, and sediment in the project area. The affected environment sections in this SEIS (**Chapter 3**) cover any updates (as applicable).

2.2.3 Other Existing Permits

Other permits, such as those for air quality and surface water discharges, provide sideboards for Westmoreland's operations at the Rosebud Mine beyond those outlined in their state operating permits and Federal mining plans. Since the issuance of the 2018 Final EIS, the statuses of several of Westmoreland Rosebud's other permits have changed. The following list describes other permits held by Westmoreland Rosebud as of December 31, 2023[20] (see also **Section 5.2, Related Past, Present, and Reasonably Foreseeable Future Actions**):

- MAQP #1570-09. After the issuance of the 2018 Final EIS and DEQ 2019 ROD for Area F. MAQP #1570-07 was issued to include Area F; subsequently, the ownership transfer incremented the permit number to MAQP #1570-09. MAQP #1570-08 was issued prior to MAQP #1570-07 due to the delay associated with the Area F Final EIS. Combined coal production from Areas C and F is limited to 8 million tons per year per MAQP #1570-09, with an Area F–specific production cap of 4 million tons per year.
- MAQP #1483-09 (previously #1483-08), issued June 19, 2019, for Areas A, B, and D and former Area E, transferred ownership from Western Energy Company to Westmoreland Rosebud Mining LLC. Annual combined coal production from Areas A, B, and D is limited to 13 million tons per year.
- MAQP #4436-01, issued July 11, 2019, permits operation of a portable crusher facility.
- MPDES Permit MT-0031828, effective June 1, 2020 (expires May 31, 2025),[21] regulates discharges of mine drainage from 55 outfalls associated with Area F. The receiving waters include Black Hank Creek, Donley Creek, Robbie Creek, McClure Creek, and Trail Creek.
- MPDES Permit MT-0023965 (Modification 2) regulates discharges of mine drainage and drainage from coal preparation plant and coal preparation plant associated areas, as those terms are defined at 40 C.F.R. part 434, including Areas A, B, C, and D. MT-0023965 became effective on August 1, 2021 (expires July 31, 2026), and provides effluent limits, monitoring requirements, and other special conditions for discharges from 153 outfalls. The receiving waters include East Fork Armells Creek, Stocker Creek, Lee Coulee, West Fork Armells Creek, Black Hank Creek, Donley Creek, Cow Creek, Spring Creek, and Pony Creek.
- MPDES Permit MT-0032042 (Modification 2), effective October 1, 2022 (expires September 30, 2027), regulates discharges of mine drainage from 18 outfalls associated with Area B AM5. Receiving waters include Lee Coulee and Richard Coulee, which are both tributaries to Rosebud Creek.

[20] The most current versions of Rosebud Mine MAQP and MPDES Permits are available on DEQ's website: MAQP (https://deq.mt.gov/air/assistance) and MPDES Permits (https://deq.mt.gov/water/assistance).
[21] Westmoreland Rosebud is in the process of renewing this MPDES permit (all effluent limits, monitoring requirements, and other conditions of the permit remain fully effective and enforceable during this process). Westmoreland Rosebud submitted the renewal application on November 2, 2024, and a deficiency response on February 24, 2025. On April 7, 2025, DEQ determined that the application is complete.

2.2.4 Existing Rosebud Mine Support Facilities

The Rosebud Mine includes the following existing facilities (shown on **Figure 1.1-2** in **Chapter 1**) and equipment, which are currently being used for mine operations, including those in Area F:

- A coal-processing facility (crusher) in Area C
- Conveyor-belt systems (electrically powered) in Areas A and C to the Colstrip Power Plant
- Maintenance and operations complexes
- Haul roads with scoria surface
- Scoria pits (mined for use on road surfaces)
- Mine offices
- A mine-entrance guard shack and vehicle-weighing scale
- Four electric-powered draglines for removal of overburden, coal excavation, backfilling, and grading; as of 2024, two of the four draglines are being used for reclamation activities (Wooley 2024)
- Front-end loaders, excavators, dozers, motor graders, and a fleet of haul trucks for removal of overburden, coal excavation, coal transportation to the conveyor-belt system, soil salvage, and soil application
- A fleet of five covered trucks (owned by the Rosebud Power Plant) that haul coal to the Rosebud Power Plant; three trucks operate daily, with each truck delivering 6.5 loads daily (19.5 total loads daily)
- Area D railroad spur (not used since 2010); when it operated, it was used to ship a few cars of coal at a time to small customers

2.2.5 General Sequence of Operations

The general sequence of operations for surface mining is similar in all active permit areas of the mine. In advance of each mining pass, soil is removed from the disturbance area and stockpiled according to type for later use during reclamation. Next, the overburden (sedimentary rock material covering the coal seams) is drilled and blasted. A dragline is then used to strip the overburden from succeeding mine passes. The "strip ratios" in Area F, meaning the amount of overburden that must be stripped away to access coal, are typically lower than for other permit areas of the Rosebud Mine, resulting in less disturbance for stockpiling and less use of equipment as compared to other permit areas (Wooley 2024). The overall strip ratio for Area F is 4.3:1, and the ratio for areas recently or currently mined portions in Area F are as low as 1:1 or 2:1 (Wooley 2024). Comparatively, the strip ratio for Area B can be as high as 10:1 (Wooley 2024). Spoil (overburden that has been stripped) is cast into the mined-out pit created by the preceding pass or stockpiled.

After the dragline exposes the coal seam in each pass, the coal is drilled and blasted. A loading shovel, front-end loader, or backhoe loads the coal into coal haulers. The coal is transported on an established haul road to Area C or Area A for crushing (**Figure 1.1-2** in **Chapter 1**). Westmoreland Rosebud maintains a stockpile of coal ready for crushing in Area C, which often contains about a year's supply for Westmoreland's customers. After being processed in the Area C crusher, crushed coal is sent to the Colstrip Power Plant via an existing 4.2-mile electrically powered conveyor. If processed in the Area A crusher, which is adjacent to the Colstrip Power Plant, it is sent on an existing electrically powered short conveyor. Coal with higher sulfur content and low calorific value, which is typically the first 1-foot layer encountered in the deposit and is known as "waste coal," is trucked to the Rosebud Power Plant. Neither

the Rosebud Power Plant nor the Colstrip Power Plant is owned or operated by Westmoreland Rosebud or its parent company, Westmoreland.

As described in MR16 Table 303-3, the mining sequence in Area F is broken into eight blocks. Block 1 (a small section east of Black Hank Creek and north of the haul road) was mined in 2020. Mining has since moved into Block 2 (east of Black Hank Creek) and Block 4 (area between Donley Creek and Black Hank Creek) as mining in the project area has progressed through 2023. Mining is expected to continue in Block 2 and Block 4 for the next few years before moving into Block 3 (south of the 230 kV line and northwest of Black Hank Creek). More than a decade into Area F operations, mining would move into Blocks 5 and 6 between Robbie and Donley creeks. Block 7 (between Robbie and McClure creeks) would not be mined until the latter years of mining. Block 8 (between McClure and Trail creeks) largely overlaps the 74 acres of Federal coal where mining is currently prohibited and would not be mined without a change to the Federal mining plan and state operating permit.

2.2.6 Life of Operations

The analyses in this SEIS are based on the assumptions below regarding the operational life of the Rosebud Mine. The operational life of Permit Area F under its DEQ-approved state operating permit C2011003F and the 2019-approved Federal mining plan is expected to be about 20 years (through 2039) based on current production estimates (**Table 2.2-9**). In 2023, Area F produced nearly 4.6 million tons of coal, accounting for approximately 65 percent of the Rosebud Mine's total production (just under 7.1 million tons) (**Table 2.2-2**). Area B was the only other permit area with coal production in 2023 (about 2.5 million tons).

Future production from the Rosebud Mine will depend on a number of factors, including the regulatory environment, market conditions, availability of coal from the various permit areas of the Rosebud Mine, and the relative cost of coal operations and reclamation (Wooley 2024). Projections of future annual coal production from the project area (Area F) and the other areas of the Rosebud mine were provided in **Table 99** in **Section 4.3.3.1** of the 2018 Final EIS. Based on available updated information,[22] revised annual production estimates are provided in **Table 4.3-1** in **Section 4.3.3.1, Direct Impacts** (Air Quality). Changes to production rates, additions of other mine permit areas, reduced mining in Area F, or changed market conditions or a changed regulatory environment may influence the operational life of the Rosebud Mine as a whole or for individual permit areas. See the discussion in **Section 2.2.2.2, Area F Operations and Development**, regarding the types of conditions that could alter the operational timeline. Westmoreland estimates that it could maintain current production levels for approximately 18 months without Area F coal (Wooley 2024). Beyond that timeframe, there is uncertainty regarding production capacity. If unable to mine Area F federal coal, Westmoreland estimates that production capacity from the Rosebud Mine could drop as much as 50 percent based on currently permitted areas (Wooley 2024).

For analysis purposes, OSMRE made certain reasonable assumptions about incomplete or uncertain information, which is consistent with NEPA Section 106(3)(B). For example, in this SEIS, the Rosebud Mine is assumed to continue operations through 2045, regardless of the status of Area F. Through 2045, the mine is expected to produce up to 112.5 million tons of coal. These assumptions informed SEIS analyses, but changes to production rates, additions of other mine permit areas, reduced mining in Area F, or changed market conditions may influence the operational life of the Rosebud Mine as a whole or of individual permit areas, leading to a mine life and/or production rate that is different from the SEIS

[22] Available information includes 2023 actual production, production estimates for the currently approved Area F operating permit (**Table 2.2-9**); production estimates for Area B, pursuant to Amendment 5 (AM5), as provided in DEQ's *Rosebud Mine Area B AM5 Final Environmental Impact Statement*; and public statements from the owners and operators of the Colstrip Power Plant (**Section 1.2.2.1, Colstrip Power Plant**).

assumptions. For example, Westmoreland has indicated that "if mining in Area F must cease, Westmoreland will be forced to reassign both draglines currently in reclamation to uncovering coal" in other permit areas (Wooley 2024); under this scenario, the mine life and production rate may be different than the SEIS assumptions. See the discussion in **Section 2.2.2.2, Area F Operations and Development, Current Area F Operating Permit Versus Alternative 2 – 2018 Final EIS Proposed Action** regarding the types of conditions that could alter the operational timeline.

2.3 SUMMARY OF SEIS ALTERNATIVES

This section offers an introduction to the three alternatives (Alternatives 1, 4, and 5) considered in the SEIS and highlights common elements and key differences. Additional details for each alternative are provided in **Sections 2.4** through **2.6**. Impacts of the SEIS alternatives are summarized in **Table 2.8-1** in **Section 2.8, Summary of Impacts and Identification of the Preferred Alternative**, and detailed in **Chapters 4** and **5**.

2.3.1 Elements Common to All Alternatives

For all three alternatives analyzed in this SEIS, the mining method, reclamation plan, means of protecting the hydrologic balance, monitoring plans, and mitigation plans would be essentially the same; all of these elements were described in full in the 2018 Final EIS for Alternative 2 (see **Section 2.4, Alternative 2 – Proposed Action** in the 2018 Final EIS). The beginning year for all alternatives analyzed in this SEIS is 2019 (the year development of Area F began pursuant to DEQ-approved state operating permit C2011003F and the 2019-approved Federal mining plan); therefore, the mine life provided for all alternatives includes years of mining that have already occurred.

As described in Section 9.6.5 of the *Cumulative Hydrologic Impact Analysis for Area F* (DEQ 2019b), DEQ determined that Westmoreland Rosebud's proposed mining plan put forth in its permit application package (Alternative 2 in the 2018 Final EIS), if implemented in T2N, R38E, Section 12, would likely result in a change in water quality in the Rosebud Coal outside the permit boundary, which could result in material damage. To remove the potential for material damage, DEQ did not approve mine passes in that area in its 2019 ROD and Written Findings (DEQ 2019a). Pursuant to OSMRE's ROD (OSMRE 2019b), the Assistant Secretary for Lands and Minerals Management (ASLM) similarly prohibited mining in this area under the Federal mining plan (DOI 2019). Under any of the SEIS alternatives, mining would be prohibited in 74 acres of Federal coal in T2N, R38E, Section 12 to prevent material damage outside of the Area F permit area. Westmoreland Rosebud, however, would still be able to disturb the surface above the 74 acres of Federal coal for mining-related activities (e.g., spoil and topsoil stockpiles). Westmoreland Rosebud estimates that there is about 1.9 million tons of recoverable coal (based on modeling using expected coal thickness and quality) that will not be mined in T2N, R38E, Section 12. Westmoreland Rosebud may at any time reapply to OSMRE and DEQ to mine the excluded 74 acres of Federal coal provided they affirmatively demonstrate that no material damage would occur.

For all alternatives, avoidance and minimization measures designed to protect insect special status species (monarch butterfly, western regal fritillary, and Suckley's cuckoo bumble bee) would be implemented. These measures include the following:

- Clearing and grubbing activities would occur from September 1 through June 1, avoiding the monarch butterfly and western regal fritillary active season from June through August.
- Noxious weeds would be controlled and managed to reduce their spread by timing weed spraying to avoid the monarch butterfly and western regal fritillary breeding season (June through August), when feasible, and conducting spot spraying to limit impacts on flowering nectar plants.

For all alternatives, as documented in the Biological Assessment (OSMRE 2025) and the USFWS Concurrence Letter (USFWS 2025b):

- Westmoreland Rosebud (or any subsequent owner), OSMRE, and USFWS will meet at least once every four years to discuss any changes in the status of pallid sturgeon and other listed species, any changes in power plant or mine operations, and any other new information that might warrant an update to this effect analysis. Any of the parties may also request an ad hoc meeting if the party becomes aware of new information warranting discussion.

2.3.2 Key Differences Among Alternatives

The key differences among the three SEIS alternatives are (1) total surface disturbance, (2) tons of coal mined, and (3) the duration of mining in the project area. Under Alternative 1, mining would end in 2025[23]; during the 6-year mine life, about 17.1 million tons of coal would be mined, and approximately 1,021 acres would be disturbed in the project area. Under Alternative 4, mining would end in 2039; during the 20-year mine life, about 71.3 million tons of coal would be mined, and approximately 4,288 acres would be disturbed in the project area. Under Alternative 5, mining would end in 2030[24]; during the 11-year mine life, about 37.1 million tons of coal would be mined, and approximately 2,495 acres would be disturbed in the project area. Assumptions for each alternative, which informed the scope of the effects analyses in this SEIS, are presented in **Section 2.4, Alternative 1 – No Action**, **Section 2.5, Alternative 4 – Proposed Action (Current Federal Mining Plan)**, and **Section 2.6, Alternative 5 – Partial Mining Alternative**. **Table 2.3-1** provides a comparison of the components of each alternative, and **Table 2.3-2** compares annual production and associated disturbance across alternatives.

[23.] Under Alternative 1, it is assumed that all mining would end in 2025, including mining of private coal. See **Section 2.4, Alternative 1 – No Action** for more information about this assumption.
[24.] Under Alternative 5, it is assumed that all mining would end in 2030, including mining of private coal. See **Section 2.6, Alternative 5 – Partial Mining Alternative** for more information about this assumption.

Table 2.3-1. Comparison of SEIS Alternatives by Components.

Alternative Component	Alternative 1 – No Action	Alternative 4 – Proposed Action (Current Federal Mining Plan)	Alternative 5 – Partial Mining Alternative
Area F operational life[1]	6 years Coal removal began in 2020. Mining would cease after issuance of a new Mining Plan Decision Document (MPDD) in 2025.*	20 years Coal removal began in 2020 and would end in 2039.	11 years Coal removal began in 2020. A new 5-year mining term would be authorized after issuance of a new MPDD, which is assumed to occur in 2025.*
Last year of mining	2025	2039	2030
Area F permit area[2]	6,773 acres	6,773 acres	6,773 acres
Area F total disturbance area[3]	1,021 acres	4,288 acres	2,495 acres
Coal recovery[4]	17.1 million tons	71.3 million tons	37.1 million tons
Use of bottom ash	None	None	None
Drainages disturbed by mining operations or other related disturbance	None; in addition, 74 acres of Federal coal (1.9 million recoverable tons) in the northwestern part (T2N, R38E, Section 12) of the permit area (in the Trail Creek drainage) are excluded from mining to prevent material damage to the hydrologic balance outside the permit area.	None; in addition, 74 acres of Federal coal (1.9 million recoverable tons) in the northwestern part (T2N, R38E, Section 12) of the permit area (in the Trail Creek drainage) are excluded from mining to prevent material damage to the hydrologic balance outside the permit area.	None; in addition, 74 acres of Federal coal (1.9 million recoverable tons) in the northwestern part (T2N, R38E, Section 12) of the permit area (in the Trail Creek drainage) are excluded from mining to prevent material damage to the hydrologic balance outside the permit area.
Permitted discharges	55 outfalls (MPDES MT-0031828)	55 outfalls (MPDES MT-0031828)	55 outfalls (MPDES MT-0031828)
Surface ownership (permit area)	6,773 acres privately owned	6,773 acres privately owned	6,773 acres privately owned
Subsurface mineral estate ownership (permit area)	3,479 acres privately owned and 3,294 acres federally owned	3,479 acres privately owned and 3,294 acres federally owned	3,479 acres privately owned and 3,294 acres federally owned
Ownership of coal leases to be mined[3]	Federal (MTM 082186) and private coal (1001 and 1001-A)	Federal (MTM 082186) and private coal (1001 and 1001-A)	Federal (MTM 082186) and private coal (1001 and 1001-A)

Note: For all alternatives, acres disturbed and tons mined per year are estimates only. Actual production and disturbance may vary. See discussion in **Section 2.2.2.2, Area F Operations and Development**.

* Estimated disturbance and associated mine production tonnage estimates for Area F are only available on an annual basis. Pursuant to an extension granted by the District Court, completion of the National Environmental Policy Act (NEPA) process must occur on or before October 7, 2025. The entire 2025 year of mining is included in this SEIS for Alternative 1 as a conservative measure of effects because annual production values are estimates only.

1. Based on C2011003F MR16.

2. An incidental boundary change was approved by DEQ in MR13; this boundary change took 27 acres in Federal coal ownership from the Area C permit area and assigned them to the Area F permit area. All 27 acres of Federal coal have either been previously mined as part of Area C operations or would not be mined under Alternative 1, 4, or 5.

3. Based on Table 303-1 from C2011003F MR16. Acreages are rounded to the nearest whole number.

4. Based on Table 303-2 from C2011003F MR16.

Table 2.3-2. Comparison of SEIS Alternatives by Estimated Annual Production and Acres Disturbed.

Operation Year	Alternative 1 – No Action			Alternative 4 – Proposed Action (Current Federal Mining Plan)			Alternative 5 – Partial Mining Alternative		
	Tons (×1,000)	Annual Acres Disturbed	Total Acres Disturbed	Tons (×1,000)	Annual Acres Disturbed	Total Acres Disturbed	Tons (×1,000)	Annual Acres Disturbed	Total Acres Disturbed
1 (2020)	0.2	35.7	35.7	0.2	35.7	35.7	0.2	35.7	35.7
2	0.9	26.4	62.1	0.9	26.4	62.1	0.9	26.4	62.1
3	4	614.88	676.9	4	614.88	676.9	4	614.88	676.9
4	4	114.8	791.7	4	114.8	791.7	4	114.8	791.7
5	4	114.8	906.5	4	114.8	906.5	4	114.8	906.5
6 (2025)	4	114.8	**1,021.2**	4	114.8	1,021.2	4	114.8	1,021.2
7	-	-	-	4	114.8	1,136.0	4	114.8	1,136.0
8	-	-	-	4	514.8	1,650.8	4	514.8	1,650.8
9	-	-	-	4	614.8	2,265.6	4	614.8	2,265.6
10	-	-	-	4	114.8	2,380.4	4	114.8	2,380.4
11 (2030)	-	-	-	4	114.8	2,495.2	4	114.8	**2,495.2**
12	-	-	-	4	114.8	2,609.9	-	-	-
13	-	-	-	4	114.8	2,724.7	-	-	-
14	-	-	-	4	414.8	3,139.5	-	-	-
15	-	-	-	4	364.8	3,504.3	-	-	-
16	-	-	-	4	114.8	3,619.1	-	-	-
17	-	-	-	4	114.8	3,733.9	-	-	-
18	-	-	-	4	114.8	3,848.6	-	-	-
19	-	-	-	4	193.5	4,042.1	-	-	-
20 (2039)	-	-	-	1.6	245.9	**4,288.0**	-	-	-

Note: For all alternatives, acres disturbed and tons mined per year are estimates only. Actual production and disturbance may vary. See discussion in **Section 2.2.2.2, Area F Operations and Development**.
Source: Estimated acreage and tonnage are based on Table 303-2 from Area F Operating Permit Minor Revision 16 (2022).

2.4 ALTERNATIVE 1 – NO ACTION

Alternative 1 – No Action has been updated from the 2018 Final EIS and considers a scenario where Federal and private coal in the project area would no longer be mined in Area F after the issuance of a new MPDD in 2025.[25] As noted previously in this SEIS, Westmoreland Rosebud began developing Area F in 2019 according to its state operating permit and approved Federal mining plan; mine production began in 2020. Ongoing mining in Area F is described in **Section 2.2.2.2, Area F Operations and Development**, including estimated annual tons of coal mined and acres disturbed.

2.4.1 Area F Mine Operations and Reclamation

Under Alternative 1, the Federal mining plan approval for Area F would no longer be valid, and Westmoreland Rosebud would no longer be able to mine Federal coal lease MTM 082186 (see **Table 2.3-1** and **Table 2.3-2**). Analysis in this SEIS for this alternative assumes that without a valid Federal mining plan, Westmoreland Rosebud also would cease to mine private coal leases 1001 and 1001a for the following reasons:

- Federal coal lease MTM 082186 is not in continuous ownership blocks; instead, the lease areas are in a checkerboard pattern (see **Figure 1.1-3** in **Chapter 1**). Mining only private coal would be logistically challenging – if not operationally impossible in some areas – due to the checkerboard nature of the coal ownership (the surface is entirely private). Smaller box cuts and setbacks would have to be used to avoid disturbing the Federal coal resource. This practice would necessitate leaving large wedges of private coal in place (perhaps as much as half of the private coal), in violation of MSUMRA's requirements for coal recovery and conservation (ARM 17.24.322).
- Westmoreland would need to propose a revision to state operating permit C2011003F, and additional state permitting and analysis (pursuant to MSUMRA and MEPA) would be needed to move forward with mining of private coal leases only (see **Section 2.4.2, State Operating Permit C2011003F**).
- Mining only the private leases would not be consistent with the Purpose and Need (see Section **1.3, Purpose and Need**). Westmoreland Rosebud holds valid existing rights granted by the Bureau of Land Management under Federal coal lease MTM 082186 to access and mine undeveloped Federal coal resources located in the project area pursuant to reasonable environmental controls. Bureau of Land Management regulations (43 C.F.R. part 3480) require maximum economic recovery and diligent development of leased Federal coal.

If Alternative 1 were selected, however, Westmoreland Rosebud would still have a valid state operating permit for Area F and would assess at that time whether they would continue to mine private coal. However, denial of this mining plan modification may be inconsistent with the One Big Beautiful Bill (OBBB). For analysis of Alternative 1 effects in this SEIS, it is assumed that mining would not continue beyond 2025.[26]

[25.] Estimated disturbance and associated mine production tonnage estimates for Area F are only available on an annual basis. Pursuant to an extension granted by the District Court, completion of the NEPA process must occur on or before October 7, 2025. The entire 2025 year of mining is included in this SEIS for Alternative 1 as a conservative measure of effects because annual production values are estimates only. However, if the mining plan is vacated by the District Court before December 2025, mining of Federal coal will need to end on the date of vacatur and impacts discussed under this alternative could be reduced accordingly.
[26.] Effects of continued mining of private coal beyond 2025, if Westmoreland Rosebud decided to do so, would be similar to or less than the effects of Alternative 4 (full mine development).

It is assumed in this SEIS that under Alternative 1 about 17.1 million tons of coal would be mined from Federal and private coal leases and approximately 1,021 acres would be disturbed in Area F over a 6-year mine life that began in 2020 and would end in 2025 (see **Table 2.3-1** and **Table 2.3-2**). It is assumed that mining would occur between Donley and Black Hank Creeks and between Black Hank Creek and the eastern edge of the permit area; mining is not expected to proceed west of Donley Creek (**Figure 2.4-1**). Mining (including disturbance, coal recovery, and production rates), fugitive dust control, protection of the hydrologic balance, monitoring, and mitigation would proceed as described in the 2018 Final EIS in **Section 2.4, Alternative 2 – Proposed Action** and in this SEIS in **Section 2.2.2.2, Area F Operations and Development**, until a new MPDD has been issued in 2025. It is assumed that mining would be limited to the southeastern portion of the project area in Rosebud County as shown in **Figure 2.4-1**.[27] Under Alternative 1, Westmoreland Rosebud would not fully develop or maximize economic recovery of coal from Federal coal lease MTM 082186. Reclamation would occur contemporaneously with mining (see discussion of the phases of reclamation in **Section 1.6.4, Bond Release** in the 2018 Final EIS). Once mining has ceased due to the new MPDD, reclamation of disturbed areas (1,021 acres) in the project area would occur according to Westmoreland Rosebud's approved reclamation plan (**Figure 2.2-5**) and postmining topography (**Figure 2.2-6**), which are similar to those described for Alternative 2 in the 2018 Final EIS.

Selection of Alternative 1 would end the project operational life of Area F 14 years earlier than the timetable in Westmoreland Rosebud's approved operating permit (**Table 2.2-9**) and may lead to closure of the Rosebud Mine as a whole before 2045 (see **Section 2.2.6, Life of Operations**).

2.4.2 State Operating Permit C2011003F

Selection of Alternative 1 would require revision of Westmoreland Rosebud's state operating permit for the project area (C2011003F), particularly if Westmoreland wanted to continue to mine private coal only. Any revisions needed would be determined by DEQ after review of the MPDD. DEQ would consider the requirements of MSUMRA and may need to analyze impacts of state action pursuant to MEPA. Because it is not certain if DEQ would approve a permit revision that would allow mining of private coal only, this SEIS assumes that impacts associated with Alternative 1 would end when mining of Federal coal would end (2025) and reclamation of the permit area commences.

2.4.3 Power Plants

Under Alternative 1, Area F coal (Federal and state) would be available for combustion in the Colstrip Power Plant and the Rosebud Power Plant for a total of 6 years (2020 to 2025); current operations for both power plants are described in **Section 1.2.2, Coal Combustion**. Analyses in this SEIS assume that the Colstrip Power Plant would keep operating through 2042 based on public statements from one owner, NorthWestern Energy (Ernst 2024). Once Area F coal is no longer available, the power plants, if they continue to operate, could burn coal from other Rosebud Mine permit areas (thereby potentially changing the rate at which those areas are mined as described in **Section 2.2.6, Life of Operations**). Westmoreland Rosebud has indicated that it could supply the quantity and quality of coal needed for the Colstrip Power Plant to operate for approximately 18 months without Area F coal (Wooley 2024). Beyond that timeframe, there is uncertainty about production capacity and quality; Westmoreland Rosebud estimates

[27] **Figure 2.4-1** shows an estimate of mining and associated disturbance under Alternative 1. The mine pit footprint is based on the mining schedule provided in MR 16. The extent of disturbance boundary shown is the current extent (as of December 23, 2023) and does not encompass the full 1,021 acres (gray shaded area) that may be disturbed under Alternative 1. Finally, not all scoria pits, topsoil stockpiles, and overburden stockpiles shown on **Figure 2.4-1** would be needed under Alternative 1. Likely, only the ones closest to the mine pit footprint would be used under this alternative; any northwest of Donley Creek would not likely be needed.

that production capacity from the mine could drop as much as 50 percent based on currently permitted areas (Wooley 2024). The power plants could also use coal from sources other than the Rosebud Mine, but any alternative source of coal would need to meet the mercury, sodium, and BTU content requirements of the power plant operators as well as the air quality permits for each facility.

For analysis purposes, because of incomplete and unavailable information about the availability of particular quality and quantities of coal, OSMRE made reasonable assumptions that the power plants would continue to operate through 2042, regardless of whether Area F coal is available or not, which is consistent with NEPA Section 106(3)(B). The indirect effects of the combustion of Area F coal at the power plants are considered in the indirect effects analyses and described in **Chapter 4** of this SEIS; combustion of other coal (whether from the Rosebud Mine or other sources) are considered in the cumulative impacts analysis in **Chapter 5** of this SEIS.

2.4.4 Other Rosebud Mine Permit Areas

Selection of Alternative 1 may impact the rate of mining of other permit areas, such as Area B, of the Rosebud Mine that are currently permitted and being mined and/or reclaimed by Westmoreland Rosebud (see **Section 2.2, Description of Past and Existing Mine and Reclamation Operations**). As described in **Section 2.2.2.2, Area F Operations and Development** and **Section 2.2.6, Life of Operations**, Westmoreland Rosebud makes adjustments to the production rates for its various permit areas from time to time for a number of operational reasons, including demand from the power plants, coal quality targets, and on-the-ground conditions.

In this SEIS, the Rosebud Mine is assumed to continue operations through 2045, regardless of the status of Area F (see **Section 2.2.6, Life of Operations**). Existing permit areas are considered in the cumulative effects analyses and described in **Chapter 5** of this SEIS.

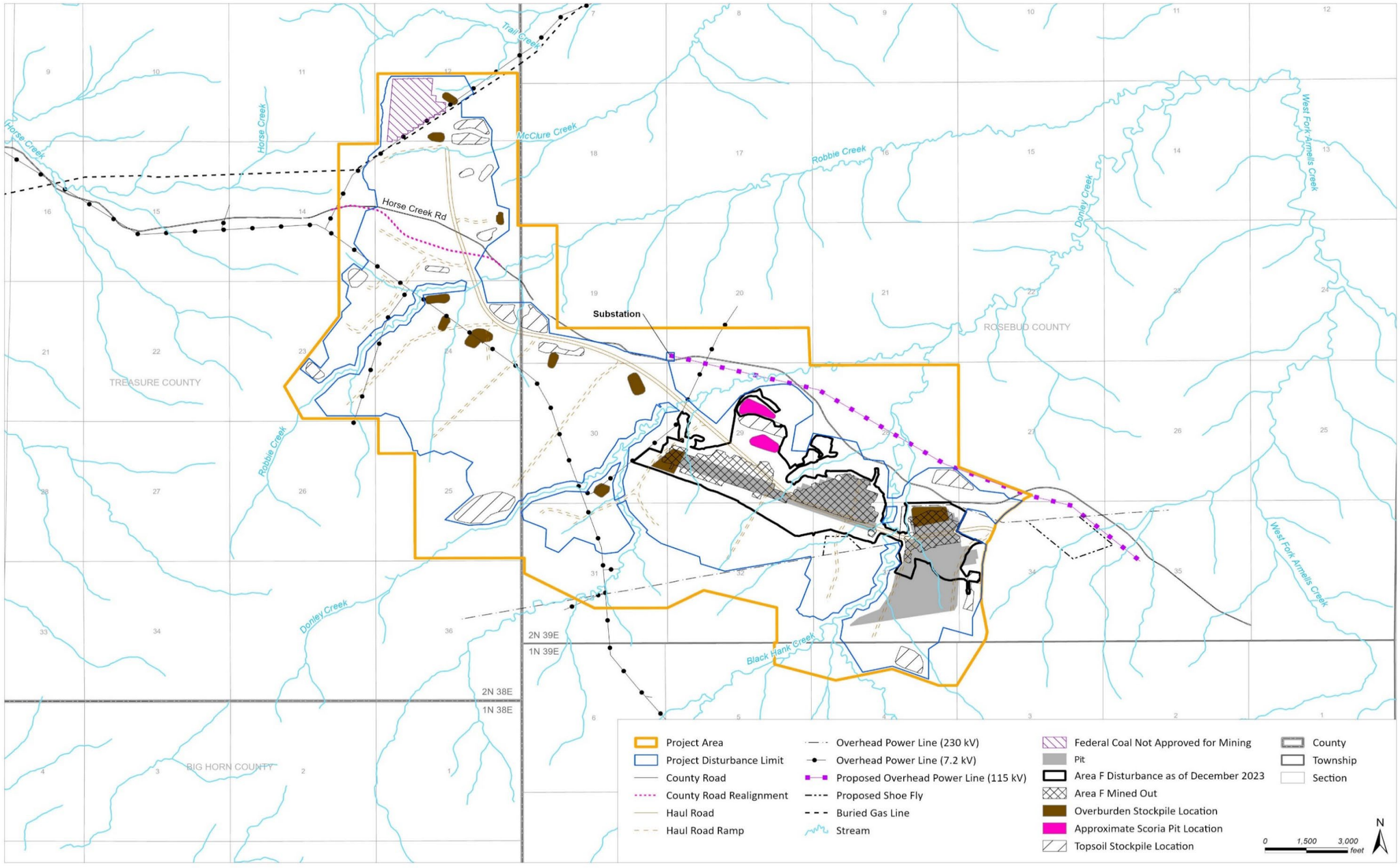

Figure 2.4-1. Alternative 1 – No Action Mining Plan and Project Area.

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2.5 ALTERNATIVE 4 – PROPOSED ACTION (CURRENT FEDERAL MINING PLAN)

Alternative 4 represents full development of Area F: it incorporates the conditions of the approved Federal mining plan for Area F and would be consistent with the DEQ-approved state operating permit C2011003F. Under Alternative 4, Westmoreland Rosebud would continue mining Area F as described in **Section 2.2.2.2, Area F Operations and Development**, until 2039.

2.5.1 Area F Mine Operations and Reclamation

Under Alternative 4, it is assumed that about 71.3 million tons of coal from Federal and private coal leases and approximately 4,288 acres would be disturbed in Area F over a 20-year mine life that began in 2020 and would end in 2039 (see **Table 2.3-1**, **Table 2.3-2**, and **Figure 2.5-1**). Mining (including disturbance, coal recovery, and production rates), fugitive dust control, protection of the hydrologic balance, monitoring, and mitigation would proceed as described in the 2018 Final EIS **Section 2.4, Alternative 2 – Proposed Action** and in this SEIS in **Section 2.2.2.2, Area F Operations and Development** until 2030. It is assumed that mining would occur in the project area as shown on **Figure 2.5-1**. Under Alternative 4, Westmoreland Rosebud would maximize economic recovery of coal in the Federal coal lease MTM 082186 (**Table 2.2-7**). Reclamation would occur contemporaneously with mining (see discussion of the phases of reclamation in **Section 1.6.4, Bond Release**, in the 2018 Final EIS). Once mining has ceased, reclamation of disturbed areas (up to 4,288 acres) in the project area would occur according to Westmoreland Rosebud's approved reclamation plan (**Figure 2.2-5**) and postmining topography (**Figure 2.2-6**), which are similar to those described for Alternative 2 in 2018 Final EIS **Section 2.4.4, Reclamation Plan**; modifications since 2018 are described in **Section 2.2.2.2, Area F Operations and Development**. Selection of Alternative 4 would end the project operational life of Area F in 2039, according to the timetable in Westmoreland Rosebud's approved operating permit (**Table 2.2-9**).

2.5.2 State Operating Permit C2011003F

Selection of Alternative 4 is not anticipated to require any revision of Westmoreland Rosebud's state operating permit for the project area (C2011003F) as the alternative is intended to be consistent with that permit. The state permit covers the entirety of the mining period for Area F (**Table 2.2-9**), with review periods every 5 years. Any revisions needed would be determined by DEQ after review of the MPDD.

2.5.3 Power Plants

Under Alternative 4, Area F coal would be available for combustion in the Colstrip Power Plant and the Rosebud Power Plant for a total of 20 years (2019 to 2039); current operations for both power plants are described in **Section 1.2.2, Coal Combustion**. Analyses in this SEIS assume that the Colstrip Power Plant would keep operating through 2042 based on public statements from one owner, NorthWestern Energy (Ernst 2024). Once Area F coal is no longer available, the power plants, if they continue to operate, could burn coal from other Rosebud Mine permit areas (thereby potentially changing the rate at which those areas are mined as described in **Section 2.2.6, Life of Operations**). Westmoreland Rosebud has indicated that it could supply the quality of coal needed for the Colstrip Power Plant to operate for approximately 18 months without Area F coal (Wooley 2024). Beyond that timeframe, there is uncertainty about production capacity; Westmoreland Rosebud estimates that production capacity from the mine could drop as much as 50 percent based on currently permitted areas (Wooley 2024). The power

plants could also use coal from sources other than the Rosebud Mine, but any alternative source of coal would need to meet the mercury, sodium, and BTU content requirements of the power plants and the air quality permits for each facility.

As noted previously, this SEIS assumes that the power plants would continue to operate through 2042, regardless of whether Area F coal is available or not. The indirect effects of the combustion of Area F coal at the power plants are considered in the indirect effects analyses and described in **Chapter 4** of this SEIS; combustion of other coal (whether from the Rosebud Mine or other sources) is considered in the cumulative impacts analysis in **Chapter 5** of this SEIS.

2.5.4 Other Rosebud Mine Permit Areas

Under Alternative 4, mining of other Rosebud Mine permit areas, such as Area B, that are currently permitted and being mined and/or reclaimed by Westmoreland Rosebud would continue as described in **Section 2.2, Description of Past and Existing Mine and Reclamation Operations** and **Section 2.2.6, Life of Operations**. Existing permit areas are considered in the cumulative effects analyses and described in **Chapter 5** of this SEIS.

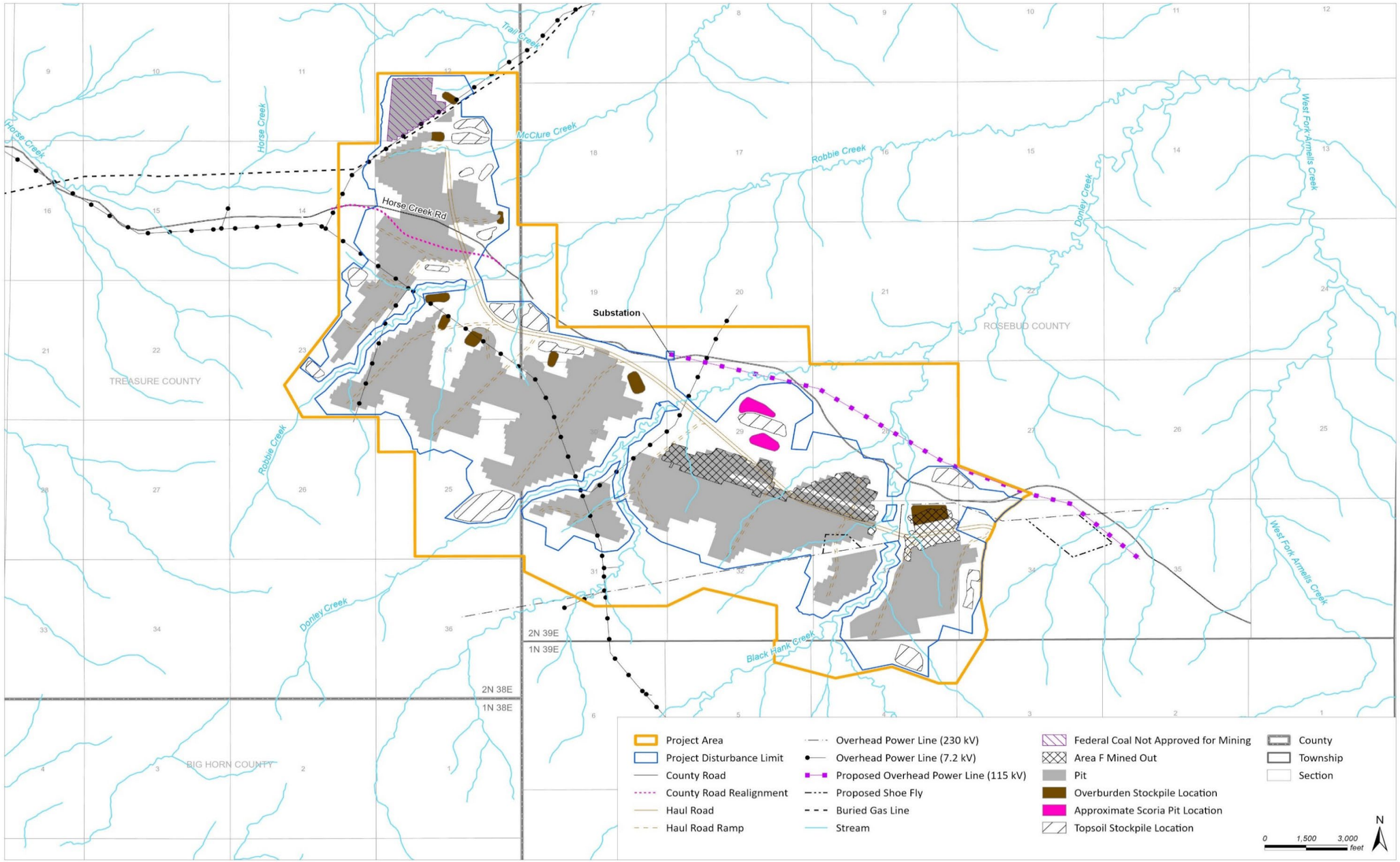

Figure 2.5-1. Alternative 4 – Proposed Action (Current Federal Mining Plan) and Project Area.

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2.6 ALTERNATIVE 5 – PARTIAL MINING ALTERNATIVE

Alternative 5 – Partial Mining Alternative was developed to further explore a reasonable range of possible alternatives to allow for meaningful public input and informed agency decision making. It would limit approved mining to approximately a 5-year term (assumed to end in 2030).

2.6.1 Area F Mine Operations and Reclamation

Under Alternative 5, mining in the project area would end after a 5-year term, beginning with the issuance of a new MPDD and ending in 2030 (see **Table 2.3-1** and **Table 2.3-2**).[28] Any mining of Federal coal beyond 2030 would likely require that Westmoreland Rosebud apply for a mining plan modification to extend the mining term, and OSMRE would need to produce a new MPDD, including a new or supplemental NEPA analysis and any other environmental reviews (by OSMRE or other agencies) that may be needed (see examples in **Table 1.4-1** and **Table 1.4-2**).

For analysis of Alternative 5 effects in this SEIS, it is assumed that mining in Area F would not continue beyond 2030.[29] Westmoreland Rosebud could theoretically continue to mine private coal under its state operating permit. However, without access to the Federal coal resource beyond the 5-year term, Westmoreland Rosebud would need to determine whether it is physically possible and economically feasible to mine private coal only (leases 1001 and 1001-A), which is in a checkerboard ownership pattern with the Federal coal (**Figure 1.1-3**); see also discussion of this issue for Alternative 1 (**Section 2.4**). If Westmoreland Rosebud determined it would be feasible to mine only private coal, Westmoreland Rosebud would need to propose a revision to state operating permit C2011003F, and additional state permitting and analysis (pursuant to MSUMRA and MEPA) would be needed to move forward with mining of private coal leases only (see **Section 2.6.2, State Operating Permit C2011003F**).

It is assumed that under Alternative 5, about 37.1 million tons of coal would be mined from Federal and private coal leases and approximately 2,495 acres would be disturbed in Area F over an approximately 11-year mine life that began in 2020 and would end in 2030 (see **Table 2.3-1** and **Table 2.3-2**). It is assumed that mining would occur between Donley and Black Hank Creeks and between Black Hank Creek and the eastern edge of the permit area; mining is not expected to proceed west of Donley Creek (**Figure 2.6-1**). Mining (including disturbance, coal recovery, and production rates), fugitive dust control, protection of the hydrologic balance, monitoring, and mitigation would proceed as described in the 2018 Final EIS **Section 2.4, Alternative 2 – Proposed Action** and in this SEIS in **Section 2.2.2.2, Area F Operations and Development** until 2030. It is assumed that mining would occur in the southern portion of the permit area as shown on **Figure 2.6-1**.[30] Under Alternative 5, Westmoreland Rosebud would not fully develop or maximize economic recovery of coal from Federal coal lease MTM 082186. Reclamation would occur contemporaneously with mining (see discussion of the phases of reclamation in **Section 1.6.4, Bond Release**, in the 2018 Final EIS). Once mining has ceased, reclamation of disturbed areas (up

[28] Under Alternative 5, mining would occur for approximately 5 years more after issuance of a new MPDD (assumed to be before December 31, 2025). Therefore, December 31, 2030, is the end-of-mining date used for this alternative, although as noted in note 25, the actual date that mining of Federal coal would end in this area may be before that date if the mining plan is vacated before that date. As noted previously, Westmoreland began development of Area F in 2019, and mining began in 2020.
[29] Effects of continued mining of private coal beyond 2030, if Westmoreland Rosebud decided to do so, would be similar to or less than the effects of Alternative 4 (full mine development).
[30] **Figure 2.6-1** shows an estimate of mining and associated disturbance under Alternative 5. The mine pit footprint is based on the mining schedule provided in MR 16. The extent of disturbance boundary shown is the extent as of December 23, 2023, and does not encompass the full 2,495 acres (gray shaded area) that may be disturbed under Alternative 5. Finally, not all scoria pits, topsoil stockpiles, and overburden stockpiles shown on **Figure 2.6-1** would be needed under Alternative 5. Likely, only the ones closest to the mine pit footprint would be used under this alternative; any northwest of Donley Creek would not likely be needed.

to 2,495 acres) in the project area would occur according to Westmoreland Rosebud's approved reclamation plan (**Figure 2.2-5**) and postmining topography (**Figure 2.2-6**), which are similar to those described for Alternative 2 in the 2018 Final EIS **Section 2.4.4, Reclamation Plan**; modifications since 2018 are described in **Section 2.2.2.2, Area F Operations and Development**.

Selection of Alternative 5 would end the project operational life of Area F 9 years earlier than the timetable in Westmoreland Rosebud's approved operating permit (**Table 2.2-9**) and may lead to closure of the Rosebud Mine as a whole prior to 2045 (see **Section 2.2.6, Life of Operations**).

2.6.2 State Operating Permit C2011003F

Selection of Alternative 5 would require revision of Westmoreland Rosebud's state operating permit for the project area (C2011003F), particularly if Westmoreland wanted to continue to mine private coal only. The state permit covers the entirety of the mining period for Area F (as described for Alternative 4), with review periods every 5 years. Any revisions needed would be determined by DEQ after review of the MPDD. DEQ would consider the requirements of MSUMRA and may need to analyze impacts of state action pursuant to MEPA. Because it is not certain if DEQ would approve a permit revision that would allow mining of private coal only, this SEIS assumes that impacts associated with Alternative 5 would end in 2030 when mining of Federal coal would end and reclamation of the permit area commences.

2.6.3 Power Plants

Under Alternative 5, Area F coal (Federal and state) would be available for combustion in the Colstrip Power Plant and the Rosebud Power Plant for a total of 11 years (2020 to 2030); current operations for both power plants are described in **Section 1.2.2, Coal Combustion**. Analyses in this SEIS assume that the Colstrip Power Plant would keep operating through 2042 based on public statements from one owner, NorthWestern Energy (Ernst 2024). Once Area F coal is no longer available, the power plants, if they continue to operate, could burn coal from other Rosebud Mine permit areas (thereby potentially changing the rate at which those areas are mined as described in **Section 2.2.6, Life of Operations**). Westmoreland Rosebud has indicated that it could supply the quality of coal needed for the Colstrip Power Plant to operate for approximately 18 months without Area F coal (Wooley 2024). Beyond that timeframe, there is uncertainty regarding production capacity; Westmoreland Rosebud estimates that production capacity from the mine could drop as much as 50 percent based on currently permitted areas (Wooley 2024). The power plants could also use coal from sources other than the Rosebud Mine, but any alternative source of coal would need to meet the mercury, sodium, and BTU content requirements of the power plant operators and the air quality permits for each facility.

As noted previously, this SEIS assumes that the power plants would continue to operate through 2042, regardless of whether Area F coal is available or not. The indirect effects of the combustion of Area F coal at the power plants are considered in the indirect effects analyses and described in **Chapter 4** of this SEIS; combustion of other coal (whether from the Rosebud Mine or other sources) is considered in the cumulative impacts analysis in **Chapter 5** of this SEIS.

2.6.4 Other Rosebud Mine Permit Areas

Selection of Alternative 5 may impact the rate of mining of other permit areas of the Rosebud Mine, such as Area B, that are currently permitted and being mined and/or reclaimed by Westmoreland Rosebud (see **Section 2.2, Description of Past and Existing Mine and Reclamation Operations**). As described in **Section 2.2.2.2, Area F Operations and Development** and **Section 2.2.6, Life of Operations**, Westmoreland Rosebud makes adjustments to the production rates for its various permit areas from time

to time for a number of operational reasons, including demand from the power plants, coal quality targets, and on-the-ground conditions. As noted previously, it is assumed in this SEIS that the Rosebud Mine would continue operations through 2045, regardless of the status of Area F (see **Section 2.2.6, Life of Operations**). Existing permit areas are considered in the cumulative effects analyses and described in **Chapter 5** of this SEIS.

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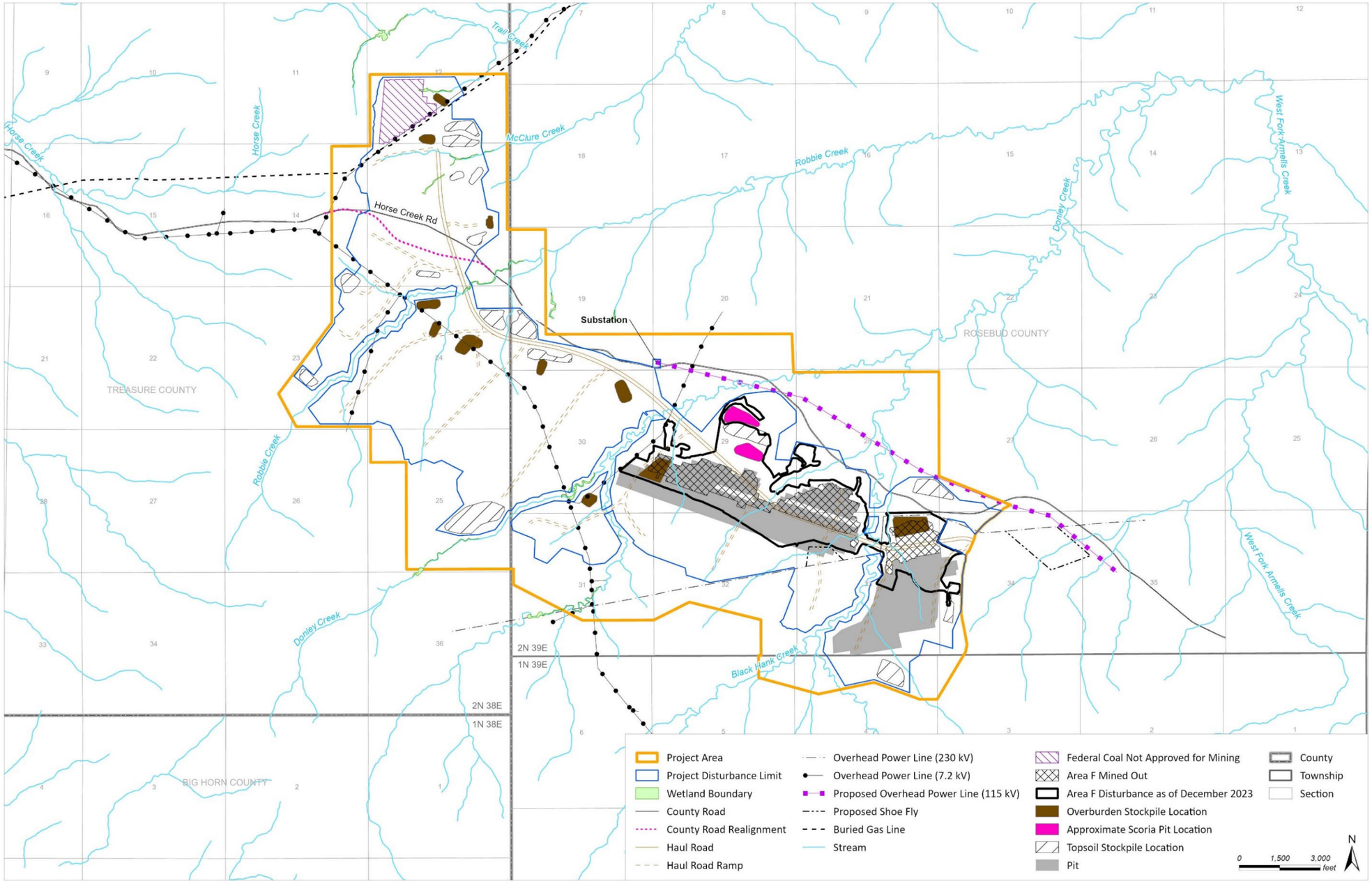

Figure 2.6-1. Alternative 5 – Partial Mining Alternative Mining Plan and Project Area.

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2.7 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER ANALYSIS

Alternatives considered but eliminated from further analysis by DEQ and OSMRE while preparing the 2018 Final EIS are described in **Section 2.6** of the 2018 Final EIS along with the rationale for their dismissal. Eliminated alternatives included the following: Coal Conservation Alternative; Private Coal Alternative; Underground Mining Alternative; Mining within a Smaller Disturbance Area, for a Shorter Duration, and/or within a Different Time Frame; Transport Coal by Rail to Western and International Ports; Alternative Land Uses; Alternative Energy Generation; and Mine High Quality Coal Only. For this SEIS, OSMRE reviewed all of the dismissed alternatives again and agreed with the dismissal rationale from the 2018 Final EIS for all alternatives except "Mining within a Smaller Disturbance Area, for a Shorter Duration, and/or within a Different Time Frame." In the 2018 Final EIS (p. 110), the agencies contemplated an alternative mining plan, including "mining within a smaller permit area or disturbance area, for a period shorter than 21 years (duration of disturbance; see Table 7), and/or using a sequence that would result in different periods of disturbance." An alternative with a smaller disturbance area and a shorter mining duration has been carried forward for analysis in this SEIS as Alternative 5 – Partial Mining Alternative and is described above in **Section 2.6**.

For this SEIS, OSMRE also reviewed all alternatives that were analyzed in the 2018 Final EIS to determine if additional analysis was warranted. Two alternatives (Alternatives 2 and 3) did not receive additional analysis in this SEIS and are described briefly in the following sections along with the rationale for not including them in the SEIS.

2.7.1 Alternative 2 – 2018 Final EIS Proposed Action

Alternative 2 was described and analyzed in the 2018 Final EIS. The alternative was based on the eighth-round PAP submitted by Western Energy (now Westmoreland Rosebud) to DEQ and certified as complete (August 8, 2012) and acceptable (October 5, 2018) by DEQ. As described above in **Section 2.2.2.2, Area F Operations and Development**, on-the-ground conditions and operational needs have necessitated several minor permit revisions since Westmoreland began development of Area F in 2019; as such, Alternative 2 cannot be selected and implemented as described in the 2018 Final EIS. Alternative 2 is included in this SEIS as a basis of comparison for other alternatives, but it is not analyzed or described in this SEIS. For a complete description of Alternative 2, including figures, please refer to the 2018 Final EIS, **Section 2.4, Alternative 2 – Proposed Action**; key elements of the alternative as they relate to current conditions are described above in **Section 2.2.2.2, Area F Operations and Development**.

2.7.2 Alternative 3 – Proposed Action Plus Environmental Protection Measures from the 2018 EIS

Alternative 3 – Proposed Action Plus Environmental Protection Measures was previously described in the 2018 Final EIS, and impacts of the alternative were analyzed. See **Section 2.5** in the 2018 Final EIS for the full description of the alternative. The Alternative 3 environmental protection measures were conceptual in nature and were designed to minimize environmental effects of the Proposed Action (Alternative 2) and to address key issues identified during the scoping process (see **Section 1.5.2.1, Key Issues Identified During Scoping for Detailed Analysis** of the 2018 Final EIS). The analysis in the 2018 Final EIS indicated that the benefits of the environmental protection measures were marginal. In its 2019 ROD, OSMRE documented the rationale for not selecting Alternative 3, noting that the agency had determined that "the requirements of MSUMRA, which are met by the Proposed Action as described in

Alternative 2 in the FEIS, are sufficiently protective of resources within the project area and the general vicinity of the project area." OSMRE chose not to select Alternative 3 as a whole or any of the individual protection measures analyzed in the EIS due to the negligible benefit they would provide to affected resources. Based on OSMRE's 2019 ROD determination, Alternative 3 was not carried forward for additional analysis in this SEIS. The Alternative 3 analysis in the 2019 ROD is still valid, and any of the environmental protection measures outlined in the alternative could be included as required mitigation in any of the SEIS alternatives, if agency decision makers determine that mitigation is warranted.

2.8 SUMMARY OF IMPACTS AND IDENTIFICATION OF THE PREFERRED ALTERNATIVE

Table 2.8-1 below summarizes impacts of the alternatives described in the preceding sections. Detailed discussions of impacts are provided in **Chapters 4** and **5**. Impacts of the alternatives considered in the 2018 Final EIS are summarized in that document in **Section 2.7, Summary of Impacts and Identification of Preferred Alternative**. Assumptions for each alternative, which informed the scope of the effects analyses in this SEIS, are presented in **Section 2.4, Alternative 1 – No Action**, **Section 2.5, Alternative 4 – Proposed Action (Current Federal Mining Plan)**, and **Section 2.6, Alternative 5 – Partial Mining Alternative**.

Table 2.8-1. Summary of Direct and Indirect Environmental Impacts.

Resource	Alternative 1 – No Action	Alternative 4 – Proposed Action (Current Federal Mining Plan)	Alternative 5 – Partial Mining Alternative
Topography	Under Alternative 1, impacts on pre-mining topography in the project area would be similar to, but less than, Alternatives 4 and 5. Approximately 3,267 fewer acres would be disturbed, and postmining topography would be achieved 14 years earlier than under Alternative 4.	Changes in topography during mining would be noticeable and would be short-term, major, and adverse. In the years immediately following reclamation, impacts from erosion would be negligible. Over time, differential erosion of the spoil would create a hummocky terrain with fragments of more resistant stone scattered throughout the analysis area; these impacts would be long-term, minor, and adverse.	Impacts would be the same as Alternative 1 except under Alternative 5, the increased disturbance of 1,474 acres would result in a greater impact on topography than Alternative 1. Compared to Alternative 4, Alternative 5 would result in the decreased disturbance of 1,793 acres. Postmining topography would be achieved 9 years earlier than Alternative 4 and 5 years later than Alternative 1.
Air Quality	Air quality impacts would be similar to, but less than, those for Alternatives 4 and 5 due to a shorter mine life for Area F (6 years). Direct criteria air pollutants (CAPs) and hazardous air pollutants (HAPs) emissions, as well as impacts on air-quality related values, such as visibility, would occur over a 6-year Area F mine life (as compared to longer mine life under Alternative 4 or 5). Indirect effects due to combustion of Area F coal would continue as described for Alternative 4 but would be attributable to the project for a shorter time period (6 years).	Direct CAPs and HAPs emissions, as well as impacts on air-quality related values, such as visibility, would occur over a 20-year Area F mine life. The continued combustion of coal at the Rosebud and Colstrip Power Plants contributes CAPs and HAPs emissions to the analysis area air, contributing to indirect impacts, including degraded air quality, visibility impairment (haze), and deposition of trace metals, SO2, and NO2 in analysis area soils and waterways. Air emissions would not result in exceedances of any National Ambient Air Quality Standards. Direct and indirect impacts on air quality would be short-term, negligible to minor, and adverse. Deposition impacts would be long-term, negligible to minor, and adverse.	Air quality impacts would be similar to, but less than, those for Alternative 4 but greater than those under Alternative 1. Direct CAPs and HAPs emissions, as well as impacts on air-quality related values, such as visibility, would occur over an 11-year Area F mine life (as compared to longer mine life under Alternative 4 and a shorter mine life under Alternative 1). Indirect effects due to combustion of Area F coal would continue as described for Alternative 4 but would be attributable to the project for a shorter time period (11 years).
Climate and Climate Change	Climate impacts would be similar to, but less than, those for Alternatives 4 and 5. GHG emissions from the project area (direct effects) would be 1,508,291 CO_2e less as compared to Alternative 4. Indirect effects of annual GHG emissions from the power plants as described would be attributable to the project for 14 years fewer as compared to Alternative 4.	Annual GHG emissions from direct sources (e.g., mining, crushing, hauling, and conveying Area F coal) and indirect sources (e.g., Area F coal combustion and worker commutes) would contribute incrementally to climate change. Direct and indirect GHG emissions would contribute incrementally to climate change. Project area coal would be burned at Colstrip Units 3 and 4 and at the Rosebud Power Plant and, thus, would indirectly contribute to GHG emissions from these facilities. Indirect effects of annual GHG emissions from the power plants would be attributable to Area F for the 20-year operational life of the project area.	Climate impacts would be similar to, but less than, those for Alternative 4 but greater than those under Alternative 1. GHG emissions from the project area (direct effects) would be 945,496 CO_2e less as compared to Alternative 4. Indirect effects of annual GHG emissions from the power plants as described would be attributable to the project for 9 years fewer as compared to Alternative 4.
Social Cost of GHGs	The social costs of GHGs under Alternative 1 would be less than those under either Alternative 4 or 5 because GHG emissions would be attributable to the project for only 6 years. Depending on the discount rate, the total direct (mining) social costs of GHGs would range from $32.1 to $66 million for Alternative 1 (**Table 4.4-6**). The indirect (combustion) social costs of GHGs would range from $7 to $15.8 billion for Alternative 1 (**Table 4.4-8**). The indirect (worker commutes) social costs of GHGs would range from $3 million to $6.7 million for Alternative 1 – No Action (**Table 4.4-10**).	The social costs of GHGs would be attributable to the project for a period of 20 years. Depending on the discount rate, the total direct (mining) social costs of GHGs would range from $127.6 to $298.9 million for Alternative 4 (**Table 4.4-6**). The total indirect (combustion) social costs of GHGs would range from $22 to $60.5 billion for Alternative 4 (**Table 4.4-8**). The indirect (worker commutes) social costs of GHGs would range from $9.4 million to $25.8 million for Alternative 4 – Proposed Action (Current Federal Mining Plan) (**Table 4.4-10**).	The social costs of GHGs under Alternative 5 would be less than those under Alternative 4 but greater than those under Alternative 1 because GHG emissions would be attributable to the project for 11 years. Depending on the discount rate, the total direct (mining) social costs of GHGs would range from $66.3 to $148.6 million for Alternative 5 (**Table 4.4-6**). The total indirect (combustion) social costs of GHGs would range from $12.5 to $31.4 billion for Alternative 5 (**Table 4.4-8**). The indirect (worker commutes) social costs of GHGs would range from $5.3 million to $13.4 million (**Table 4.4-10**).
Public Health	The public's exposure to diesel particulate matter (DPM) and fugitive dust, including coal dust, would be similar across all alternatives. However, under Alternative 1, the effects would be less significant than Alternatives 4 and 5 due to the shorter mine life (6 years). Exposure would be low because of the limited time and extent. While airborne contaminants may deposit on soils and surface waters, public exposure to these would only be incidental. Project impacts on air concentrations of particulate matter (PM) would result in a short-term minor adverse impact on public health within the project area and public access roads. Members of the public would not be permitted within the project area where PM and other hazardous substances would be present at higher concentrations. Any potential exposure of sensitive receptors to PM would be incidental and limited in duration. Therefore, the direct impacts on public health from PM2.5 and PM10, including from DPM and coal dust, would be short-term, negligible to minor, and adverse. There is a low likelihood that human consumption of or contact with contaminated surface or groundwater would occur from Alternative 1. With monitoring and mitigation activities, increased risk to public health from exposure to contaminated water resulting from Alternative 1 is not likely. Alternative 1 would have a short-term moderate beneficial impact on public health as it relates to economics and social services, a short-term negligible impact on community health, and a short-term minor adverse effect on land use as it relates to public health. Effects on public safety from noise and from solid and hazardous waste would be none to negligible. Indirect health impacts due to combustion of Area F coal would be attributable to the project for a period of 6 years.	The public health and safety effects for Alternatives 4 and 5 would generally be the same as for Alternative 1. However, due to a longer mining duration of 20 years, overall emissions would occur over a longer duration. Indirect health impacts due to combustion of Area F coal would be attributable to the project for a period of 20 years.	The public health and safety effects for Alternative 5 would generally be the same as for Alternative 4. However, due to a shorter mining duration (11 years) and earlier reclamation (9 years sooner), overall emissions would be lower. Indirect health impacts due to combustion of Area F coal would be attributable to the project for a period of 11 years.

Table 2.8-1. Summary of Direct and Indirect Environmental Impacts.

Resource	Alternative 1 – No Action	Alternative 4 – Proposed Action (Current Federal Mining Plan)	Alternative 5 – Partial Mining Alternative
Geology	Under Alternative 1, Westmoreland Rosebud would not fully use Federal coal lease MTM 082186. BLM regulations (43 C.F.R. part 3480) require maximum economic recovery and diligent development of leased Federal coal. Impacts on geology in the project area would be similar to, but less than, Alternatives 4 and 5. Approximately 3,267 fewer acres (and underlying geology) would be disturbed as compared to Alternative 4.	Under Alternative 4, Westmoreland Rosebud would maximize economic recovery and diligent development of coal in the Federal coal lease MTM 082186. BLM regulations (43 C.F.R. part 3480) require maximum economic recovery and diligent development of leased Federal coal. Horizontal continuity of the geology in the analysis area would be lost during mining, and the overburden would be vertically altered. Rock-outcrop features would also be lost. Impacts would be short- and long-term, major, and adverse. Impacts would last until the spoil used to replace the geologically distinct layers was eroded away.	Under Alternative 5, Westmoreland Rosebud would not fully use Federal coal lease MTM 082186, although utilization would be greater compared to Alternative 1. BLM regulations (43 C.F.R. part 3480) require maximum economic recovery and diligent development of leased Federal coal. As with Alternative 1, impacts on geology in the project area would be similar to, but less than, Alternatives 4. Under Alternative 5, 1,793 fewer acres (and underlying geology) would be disturbed as compared to Alternative 4 and 1,474 acres more acres would be disturbed as compared to Alternative 1.
Water Resources – Surface Water	Direct impacts of Alternative 1 would be similar to impacts for Alternative 4, but because 3,267 fewer acres would be disturbed under Alternative 1 and because the location of mine pits would be limited to the Donley Creek and Black Hank Creek watersheds, the remaining three watersheds (Trail Creek, McClure Creek, and Robbie Creek) would not be impacted from mine pit activity under Alternative 1. Indirect impacts for Alternative 1 would be similar to impacts for Alternative 4, but since the life of operations for Area F and the time period for combustion of project area coal in the Colstrip and Rosebud Power Plants would be 14 fewer years under Alternative 1, the duration of potential impacts related to water withdrawal from the Yellowstone River to supply the Colstrip Power Plant and trace metal deposition onto surface water bodies due to coal combustion at the two power plants would be shortened by 14 years.	Direct impacts to spring flows, stream flows, and the hydrologic balance would be long-term, minor to moderate, and adverse. Direct impacts to pond levels would be long-term, negligible to moderate, and adverse. Direct impacts to floodplains would be short-term, minor, and adverse. Direct impacts to spring water quality would be short-term, minor, and adverse. Direct impacts on stream and pond water quality would be long-term, minor to moderate, and adverse. Some surface water resources would be permanently lost or changed. There would be no indirect impacts to stream flow due to Colstrip Power Plant surface water diversions. There would be no indirect impacts to stream water quality due to atmospheric deposition from the Colstrip Power Plant, except in East Fork Armells Creek where indirect impacts would be long-term, negligible to moderate, and adverse. Indirect impacts on East Fork Armells Creek surface water quality from Colstrip Power Plant process wastewater migration due to pond seepage and pipeline spills would be short-term, negligible to minor, and adverse. Indirect impacts on West Fork Armells Creek surface water hydrology (ephemeral stream flows) from Area F mining activities would be adverse and minor in the short term to negligible in the long term.	Same as Alternative 1 except under Alternative 5, there would be an increased disturbance of 1,474 acres and a mine life increase of 5 years as compared to Alternative 1.
Water Resources – Groundwater	Under Alternative 1, impacts on groundwater in the project area would be similar to, but less than, Alternatives 4 and 5. Similar to Alternative 5, mining under Alternative 1 would be limited to lands east of Donley Creek with no mining occurring in the Trail Creek, McClure Creek, and Robbie Creek drainages. Within these drainages, direct impacts under Alternative 1 would be limited to water quantity impacts from drawdown related to mining occurring to the east, and groundwater quality impacts would not be anticipated. Water quantity impacts would progressively decrease further northwest of Donley Creek. The maximum drawdown at the end of mining would not be as deep as that predicted for Alternative 4 since mining would not extend as far south as the mining pits under Alternative 4 and the predicted 5-foot drawdown for the Rosebud and McKay Coals hydrostratigraphic units would not extend as far upgradient to the south as predicted for Alternative 4. In contrast to Alternative 4, Springs 3, 10, 11, 13, and 14 would not be impacted under Alternative 1.	Mining of the project area would permanently remove the Rosebud coal aquifer and result in long-term reduction of bedrock groundwater. Long-term groundwater drawdown due to mining would extend upgradient to the south beyond the mine area. Drawdown may affect existing water users of the Rosebud coal aquifer. Mining would permanently remove springs in the project area whose groundwater source is either the Rosebud Coal or overburden since this would be removed during mining. Replacement of the Rosebud Coal with spoil would have long-term moderate adverse impacts on groundwater quality in the analysis area.	Alternative 5 impacts would be the same as Alternative 1 except the predicted maximum and 5-foot drawdown would be greater than under Alternative 1 due to the increased disturbance of 1,474 acres, mine life increase of 5 years, and coal production of 20 million tons more than Alternative 1.

Table 2.8-1. Summary of Direct and Indirect Environmental Impacts.

Resource	Alternative 1 – No Action	Alternative 4 – Proposed Action (Current Federal Mining Plan)	Alternative 5 – Partial Mining Alternative
Water Resources – Water Rights	Direct impacts to surface water rights for Alternative 1 would be similar to impacts for Alternative 4, but because the location of mine pits would be limited to the Donley Creek and Black Hank Creek watersheds, the remaining three watersheds (Trail Creek, McClure Creek, and Robbie Creek) would not be impacted from mine pit activity under Alternative 1. As compared to Alternative 4, this would result in four less surface water rights potentially impacted from mining. Indirect impacts to surface water rights for Alternative 1 would be similar to impacts for Alternative 4. Under Alternative 1, impacts on groundwater in the project area would be similar to, but less than, Alternatives 4 and 5. Similar to Alternative 5, mining under Alternative 1 would be limited to lands east of Donley Creek with no mining occurring in the Trail Creek, McClure Creek, and Robbie Creek drainages so groundwater rights located within these drainages would not be anticipated to be impacted under Alternative 1. As compared to Alternative 4, this would result in three less groundwater rights eliminated due to mining, four less groundwater rights potentially impacted due to drawdown, and five less springs physically disturbed.	Direct surface water diversions downstream of the project area include seven stock water rights associated with either direct stream flow or pond inundation from Trail Creek, McClure Creek, Robbie Creek, Donley Creek, and Black Hank Creek. Under Alternative 4, 11 spring water rights would be impacted (physically disturbed due to mining, their water source would be removed, or their flow rate would be reduced until after mining) and six groundwater rights are likely to be eliminated. If a surface or groundwater right became unusable for its specified purpose due to flow or water quality changes, the impact would be short-term, moderate, and adverse; SMCRA requires that a suitable replacement source be provided by Westmoreland Rosebud. If a water right were impacted by mining but still contained sufficient water of adequate quality to meet beneficial use needs, the impact would be short-term, negligible to minor, and adverse. There would be no indirect impacts from the Colstrip Power Plant (surface water diversion or atmospheric deposition) or from the Rosebud Power Plant (atmospheric deposition) on surface water hydrology or water quality that would affect any surface water rights. Indirect impacts on East Fork Armells Creek surface water rights from Colstrip Power Plant process wastewater migration due to pond seepage and pipeline spills would be short-term, negligible to minor, and adverse.	For surface water, groundwater, and spring water rights, Alternative 5 impacts would be the same as Alternative 1. For groundwater and spring rights, Alternative 5 impacts would be the same as Alternative 1.
Vegetation	Under Alternative 1, the types of impacts on vegetation would be the same as described for Alternative 4. Approximately 1,021 acres would be disturbed in the project area over a 6-year mine life. Direct and indirect vegetation impacts would be less than under Alternative 4: approximately 3,267 fewer acres (and associated vegetation) would be disturbed under Alternative 1 as compared to Alternative 4. The life of operations for Area F (and the corresponding impacts) would be 14 years shorter in duration under Alternative 1, as compared to Alternative 4. Reclamation (including revegetation) and PMT would be achieved in the project area 14 years earlier than under Alternative 4.	The removal of 4,288 acres of vegetation for mining activities would result in direct impacts that are short-term, moderate, and adverse. Decreased vegetation vigor and diversity, and the potential for changes to vegetation communities from a reduced amount of surface water and groundwater in the area, would result in impacts that are long-term, minor, and adverse. The indirect impacts on vegetation from power-plant emissions would be long-term, minor, and adverse.	Under Alternative 5, the types of impacts on vegetation would be the same as described for Alternative 4. Approximately 2,495 acres would be disturbed in the project area over an 11-year mine life. Direct and indirect vegetation impacts would be less than under Alternative 4. Approximately 1,793 fewer acres (and associated vegetation) would be disturbed under Alternative 5 as compared to Alternative 4. The life of operations for Area F (and the corresponding impacts) would be 9 years shorter in duration under Alternative 5, as compared to Alternative 4. Reclamation (including revegetation) and PMT would be achieved in the project area 9 years earlier than under Alternative 4.
Wetlands and Riparian Zones	No direct wetland impacts are anticipated to occur under Alternative 1 because mining and disturbance would be limited to the southeastern portion of the project area. Mining would be limited to lands east of Donley Creek with no mining occurring in the Trail Creek, McClure Creek, and Robbie Creek drainages. No wetlands are within the project limits of disturbance.	Approximately 46 acres of riparian habitat occur along drainages that would have reduced flow due to mining activities. Under Alternative 4, 7.19 acres of palustrine persistent emergent saturated wetlands would be directly impacted by mining activities in the analysis area Disturbance and changes to surface water and groundwater during mining activities would result in impacts that are short- and long-term, moderate, and adverse. A wetland mitigation plan would reduce the loss of wetland function and values. Indirect impacts on wetlands from power-plant emissions would be negligible.	No direct wetland impacts are anticipated to occur under Alternative 5 because mining and disturbance would be limited to the southern portion of the project area. Mining would be limited to lands east of Donley Creek with no mining occurring in the Trail Creek, McClure Creek, and Robbie Creek drainages. No wetlands are within the project limits of disturbance.
Fish and Wildlife Resources	Under Alternative 1, the types of impacts on fish and wildlife would be the same as described for Alternative 4. Approximately 1,021 acres of wildlife habitat would be disturbed in the project area over a 6-year mine life. Direct and indirect wildlife impacts would be less than under Alternative 4: approximately 3,267 fewer acres (and associated wildlife habitat) would be disturbed under Alternative 1 as compared to Alternative 4. The life of operations for Area F (and the corresponding impacts) would be 14 years shorter in duration under Alternative 1, as compared to Alternative 4. Reclamation (including revegetation) and PMT would be achieved in the project area 14 years earlier than under Alternative 4.	Under Alternative 4, 4,288 acres of habitat would be disturbed. Mining activities would result in loss of habitat due to surface disturbances that remove vegetation, direct mortality or injury due to vehicle or construction equipment collisions, and behavioral shifts such as a change in movement or displacement to other areas due to increased human activity and noise from blasting and mining operations. Direct impacts on small mammals, carnivores, big game, migratory birds, shorebirds, raptors, reptiles and amphibians, and aquatic species would be short- and long-term, negligible to minor, and adverse. Impacts on bats would be short- and long-term, moderate, and adverse. Indirect impacts from power-plant emissions would be negligible.	The types of direct and indirect fish and wildlife impacts under Alternative 5 would be similar to those described above for Alternative 4. Direct and indirect fish and wildlife impacts would be less than under Alternative 4. About 1,793 fewer acres (and associated wildlife habitat) would be disturbed under Alternative 5 as compared to Alternative 4. The life of operations for Area F (and the corresponding impacts) would be 9 years shorter in duration under Alternative 5, as compared to Alternative 4. Reclamation (including revegetation) and PMT would be achieved in the project area 9 years earlier than under Alternative 4.

Table 2.8-1. Summary of Direct and Indirect Environmental Impacts.

Resource	Alternative 1 – No Action	Alternative 4 – Proposed Action (Current Federal Mining Plan)	Alternative 5 – Partial Mining Alternative
Special Status Species	Under Alternative 1, the types of impacts on special status species would be the same as described for Alternative 4. Direct and indirect special status species impacts would be less than under Alternative 4: about 3,267 fewer acres (and associated special status species habitat) would be disturbed under Alternative 1 as compared to Alternative 4. The life of operations for Area F (and the corresponding impacts) would be 14 years shorter in duration under Alternative 1, as compared to Alternative 4. Reclamation (including revegetation) and PMT would be achieved in the project area 14 years earlier than under Alternative 4.	Under Alternative 4, 4,288 acres of habitat would be disturbed. Mining activities would result in loss of habitat due to surface disturbances that remove vegetation, direct mortality or injury due to vehicle or construction equipment collisions, and behavioral shifts such as a change in movement or displacement to other areas due to increased human activity and noise from blasting and mining operations. There would be no direct impacts on federally listed threatened and endangered species. Direct impacts on state species of concern would be short- and long-term, moderate, and adverse. Indirect impacts from power-plant emissions on federally listed and state species of concern would be negligible.	The types of direct and indirect impacts on special status species would be the same as described for Alternative 4. Approximately 1,793 fewer acres (and associated special status species habitat) would be disturbed under Alternative 5 as compared to Alternative 4. The life of operations for Area F (and the corresponding impacts) would be 9 years shorter in duration under Alternative 5, as compared to Alternative 4. Reclamation (including revegetation) and PMT would be achieved in the project area 9 years earlier than under Alternative 4. Under Alternative 5, coal from the project area would be available for combustion in the Colstrip and Rosebud Power Plants for up to 11 years, which is 9 years fewer as compared to Alternative 4.
Cultural and Historic Resources	Long-term major adverse impacts on eight potential historic properties are likely under Alternative 1. As compared to Alternative 4, this would result in 19 fewer potential historic properties being adversely affected by proposed mining activities. Adverse impacts would be resolved through both a property-specific Memorandum of Agreement and a long-term Programmatic Agreement stipulating measures for continued Section 106 compliance.	Surface disturbance from mining and wetland mitigation activity may result in disturbance or destruction of at least 25 historic properties located within the analysis area, and these impacts would be long-term, major, and adverse. Adverse impacts would be resolved through both a property-specific Memorandum of Agreement and a long-term Programmatic Agreement stipulating measures for continued Section 106 compliance.	Long-term major adverse impacts on 10 potential historic properties are likely under Alternative 5. As compared to Alternative 4, this alternative would result in 17 fewer potential historic properties being adversely affected by proposed mining activities. Adverse impacts would be resolved through both a property-specific Memorandum of Agreement and a long-term Programmatic Agreement stipulating measures for continued Section 106 compliance.
Socioeconomic Conditions	Under Alternative 1, mining operations in Area F would continue to support the current economic conditions described in **Appendix 4** through 2025. Continued operations would delay the onset of adverse economic impacts due to the eventual closure of the Rosebud Mine, possibly allowing time for other sectors to develop. Impacts would be short-term and minor because the mine would continue to support local economic activity in and near the project area during the life of the mine through 2025.	Under Alternative 4, mining operations in Area F would continue to support the current economic conditions described in **Appendix 4** through 2039. Continued operations would delay the onset of adverse economic impacts due to the eventual closure of the Rosebud Mine, possibly allowing time for other sectors to develop. Impacts would be short-term and minor because the mine would continue to support local economic activity in and near the project area during the life of the mine through 2039.	Under Alternative 5, mining operations in Area F would continue to support the current economic conditions described in **Appendix 4** through 2030. Continued operations would delay the onset of adverse economic impacts due to the eventual closure of the Rosebud Mine, possibly allowing time for other sectors to develop. Impacts would be short-term and minor because the mine would continue to support local economic activity in and near the project area during the life of the mine through 2030.
Visual Resources	Mining activities would change the visual landscape for drivers traveling along Horse Creek Road through the project area through changes to geology and topography and the removal of vegetation; the impact would be short-term, moderate, and adverse. For seven residences adjacent to the Rosebud Mine, active mining adjacent to existing mining areas may be visible in a small portion of the viewshed from a few locations. Depending on location, visual impacts would range from none to long-term, moderate, and adverse. over a 6-year mine life. Direct impacts would be limited to the southeastern portion of the project area (east of Donley Creek) with no mining occurring in the Trail Creek, McClure Creek, and Robbie Creek drainages. Visibility impairment is expected to be negligible for all Class I areas.	Mining activities would change the visual landscape for drivers traveling along Horse Creek Road through the project area through changes to geology and topography and the removal of vegetation; the impact would be short-term, moderate, and adverse. For seven residences adjacent to the Rosebud Mine, active mining adjacent to existing mining areas may be visible in a small portion of the viewshed from a few locations. Depending on location, visual impacts would range from none to long-term, moderate, and adverse. The continued combustion of coal at the Rosebud and Colstrip Power Plants contributes particulate and gaseous air pollutants that contribute to regional haze in the surrounding viewshed. Visibility impairment is expected to be negligible for all Class I areas.	Under Alternative 5, visual impacts would be similar to those described above for Alternative 4 but would occur over an 11-year mine life. Direct impacts would be limited to the southeastern portion of the project area (east of Donley Creek) with no mining occurring in the Trail Creek, McClure Creek, and Robbie Creek drainages. There would be short-term, moderate, adverse impacts during the life of the mine on drivers traveling along Horse Creek Road through the project area. Reclamation (including revegetation) and PMT would be achieved in the project area 9 years earlier than under Alternative 4. Under Alternative 5, coal from the project area would be available for combustion in the Colstrip and Rosebud Power Plants for up to 11 years. Similar to Alternative 4, visibility impairment is expected to be negligible for all Class I areas under Alternative 5.
Recreation	All current use of the land for recreation (primarily private land hunting) would be unavailable during mine operations. Private land hunting opportunities within the analysis area would be lost until revegetation and forage production are comparable to pre-mining levels associated with adjacent land. Impacts would be long-term, moderate, and adverse. However, under Alternative 1, recreation impacts would be less than those under Alternative 4 because disturbance and mine operations would be limited to the southeastern portion of the project area, and the life of mine operations in Area F would be 14 years shorter in duration. Reclamation (including revegetation) and postmining topography (PMT) would be achieved 14 years earlier than under Alternative 4, allowing pre-mine recreational use of the analysis area to resume 14 years earlier. Additionally, coal from the project area would be available for combustion in the Colstrip and Rosebud Power Plants for up to 6 years, which is 14 years fewer as compared to Alternative 4, reducing the duration of air pollutants contributing to regional haze in the surrounding viewshed.	All current use of the land for recreation (primarily private land hunting) would be unavailable during mine operations. Private land hunting opportunities on mine-related disturbance areas would be lost until revegetation and forage production were comparable to pre-mining levels associated with adjacent land. Impacts would be long-term, moderate, and adverse.	All current use of the land for recreation (primarily private land hunting) would be unavailable during mine operations. Private land hunting opportunities within the analysis area would be lost until revegetation and forage production are comparable to pre-mining levels associated with adjacent land. Impacts would be long-term, moderate, and adverse. However, under Alternative 5, recreation impacts would be less than those under Alternative 4 because disturbance and mine operations would be limited to the southern portion of the project area, and the life of mine operations in Area F would be 9 years shorter. Reclamation (including revegetation) and PMT would be achieved 9 years earlier than under Alternative 4, allowing pre-mine recreational use of the analysis area to resume 9 years earlier. Additionally, coal from the project area would be available for combustion in the Colstrip and Rosebud Power Plants for up to 11 years, which is 9 years fewer as compared to Alternative 4, reducing the duration of air pollutants contributing to regional haze in the surrounding viewshed.
Paleontology	Under Alternative 1, impacts on paleontological resources in the project area would be similar to, but less than, Alternatives 4 and 5. Approximately 3,267 fewer acres (and any underlying paleontological resources) would be disturbed as compared to Alternative 4.	Paleontological resources not identified or salvaged prior to mining would be permanently lost, resulting in impacts that are short- and long-term, major, and adverse. However, previously unknown paleontological resources may also be identified during mining activities and potentially salvaged, resulting in a beneficial impact.	Alternative 5 impacts would be the same as Alternative 1 except the increased disturbance of 1,474 acres would result in a greater impact on paleontological resources than under Alternative 1. Compared to Alternative 4, Alternative 5 would result in the decreased disturbance of 1,793 acres.

Table 2.8-1. Summary of Direct and Indirect Environmental Impacts.

Resource	Alternative 1 – No Action	Alternative 4 – Proposed Action (Current Federal Mining Plan)	Alternative 5 – Partial Mining Alternative
Access and Transportation	The types of access and transportation impacts under Alternative 1 would be similar to Alternative 4. Under Alternative 1, though, road construction (and associated impacts) would be limited to the southeastern portion of the project area (east of Donley Creek) with no mining occurring in the Trail Creek, McClure Creek, and Robbie Creek drainages. Reclamation (including road removal) and PMT would be achieved in the project area 14 years earlier than under Alternative 4.	Two segments of Horse Creek Road would be relocated (one has already been completed; see **Section 2.2.2.2, Area F Operations and Development**). Impacts from the relocation/reroute of Horse Creek Road would be short-term, minor, and adverse. The impacts due to haul, ramp, and service roads would be short-term, negligible, and adverse because the overall transportation system would not be disrupted.	The types of direct and indirect access and transportation impacts under Alternative 5 would be similar to those described above for Alternative 4. Under Alternative 5, though, road construction (and associated impacts) would be limited to the southern portion of the project area (east of Donley Creek) with no mining occurring in the Trail Creek, McClure Creek, and Robbie Creek drainages. Reclamation (including road removal) and PMT would be achieved in the project area 9 years earlier than under Alternative 4.
Solid and Hazardous Waste	Under Alternative 1, impacts in the project area would be similar to, but less than, Alternatives 4 and 5. Potential for leaks or releases of solid or hazardous wastes would end 14 years earlier than under Alternative 4 and 5 years earlier than Alternative 5.	Potential leaks or releases of solid or hazardous wastes would result in impacts that are short-term, negligible, and adverse.	The potential for leaks or releases of solid or hazardous wastes under Alternative 5 would end 9 years earlier than under Alternative 4 and would have the potential to occur 5 years later than Alternative 1.
Noise	Noise impacts under Alternative 1 would be similar to Alternative 4 but would be 14 years shorter under Alternative 4. Mining would be limited to lands east of Donley Creek, with no mining occurring in the Trail Creek, McClure Creek, and Robbie Creek drainages. Reclamation and PMT would be achieved in the project area 14 years earlier than under Alternative 4.	Direct impacts due to noise from mining and reclamation in the project area would be short- and long-term, negligible to minor, and adverse for the nearest rural residences. Indirect impacts due to noise from operation of the Rosebud and Colstrip Power Plants would continue to be moderate to minor for the residences in Colstrip and for those adjacent to the Rosebud Power Plant.	Noise impacts under Alternative 5 would be similar to Alternative 4 but would be 9 years shorter under Alternative 5. Mining would be limited to the southeastern portion of the project area (east of Donley Creek) with no mining occurring in the Trail Creek, McClure Creek, and Robbie Creek drainages. Reclamation and PMT would be achieved in the project area 9 years earlier than under Alternative 4.
Land Use	Under Alternative 1, Westmoreland Rosebud would not fully use Federal coal lease MTM 082186. BLM regulations (43 C.F.R. part 3480) require maximum economic recovery and diligent development of leased Federal coal. Impacts on pre-mining land uses in the project area would be similar to, but less than, Alternatives 4 and 5. Approximately 3,267 fewer acres (and associated vegetation) would be disturbed, and reclamation (including revegetation) would be achieved 14 years earlier than under Alternative 4, allowing postmining land uses to commence earlier in the project area.	Under Alternative 4, Westmoreland Rosebud would maximize economic recovery and diligent development of coal in the Federal coal lease MTM 082186. BLM regulations (43 C.F.R. part 3480) require maximum economic recovery and diligent development of leased Federal coal. All current land uses within the analysis area would be temporarily disturbed during mine operations based on the timing of the approved mining plan. Impacts on grazing land would be long-term, moderate, and adverse. However, after reclamation, Westmoreland Rosebud proposes 3,930 acres of postmining grazing land, which would be an increase of 476 acres over pre-mining conditions, to achieve landowner preference for grazing lands. Impacts on cropland would be long-term, moderate, and adverse.	Under Alternative 5, Westmoreland Rosebud would not fully use Federal coal lease MTM 082186, although utilization would be greater as compared to Alternative 1. BLM regulations (43 C.F.R. part 3480) require maximum economic recovery and diligent development of leased Federal coal. Impacts on pre-mining land uses in the project area would be similar to, but less than, Alternative 4 and greater than under Alternative 1. Approximately 1,793 fewer acres (and associated vegetation) would be disturbed, and reclamation (including revegetation) would be achieved 14 years earlier than under Alternative 4, allowing postmining land uses to commence earlier in the project area.
Soil	Soil impacts would be similar to, but less than, those for Alternatives 4 and 5. Approximately 3,267 fewer acres (and associated vegetation) would be disturbed, and reclamation (including application of stockpiled soils and revegetation) would be achieved 14 years earlier than under Alternative 4. With fewer acres disturbed, the potential for erosion and sediment transport would be less than under Alternatives 4 and 5. With shorter stockpile times, the potential for changes to the chemical, physical, and biological properties of stockpiled soils would be less likely as compared to Alternatives 4 and 5. Indirect effects of coal combustion, including deposition of trace metals, SO2, and NO2 into analysis air soils, would be less as compared to Alternatives 4 and 5 due to the shorter duration of mining and fewer tons of coal combusted.	Soil salvage, storage, and respreading would result in soil erosion and changes to physical, chemical, and biological soil characteristics. During mining, soil erosion impacts would be short-term, minor, and adverse. Erosion rates in reclaimed areas would return to pre-mine rates within 2 years once vegetation stabilizes the surface. It would be many years before physical, chemical, and biological soil characteristics return to pre-mining conditions; impacts in reclaimed areas would be long-term, minor, and adverse. The continued combustion of coal at the Rosebud and Colstrip Power Plants contributes trace metals, SO2, and NO2 to the air that are then deposited into analysis area soils.	Soil impacts under Alternative 5 would be similar to, but less than, those for Alternative 4 but greater than those under Alternative 1. Approximately 1,793 fewer acres (and associated vegetation) would be disturbed, and reclamation (including application of stockpiled soils and revegetation) would be achieved 9 years earlier than under Alternative 4. With fewer acres disturbed, the potential for erosion and sediment transport would be less than under Alternative 4. With shorter stockpile times, the potential for changes to the chemical, physical, and biological properties of stockpiled soils would be less likely as compared to Alternative 4. Indirect effects of coal combustion, including deposition of trace metals, SO2, and NO2 into analysis air soils would be less as compared to Alternative 4 due to the shorter duration of mining and fewer tons of coal combusted.

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2.8.1 Preferred Alternative

NEPA does not require the identification of a preferred alternative, but the DOI *NEPA Handbook* indicates that it may be helpful for situations in which the bureau is considering a broad range of alternatives (516 DM 1 App. 3 p. 12). OSMRE's preferred alternative is Alternative 4 – Proposed Action. OSMRE will make a recommendation to the DOI ASLM that the Federal mining plan consistent with Alternative 4 be approved without conditions. OSMRE will document its selected alternative in a Record of Decision (ROD), including its rationale for selection. OSMRE has based its preference for Alternative 4 – Proposed Action on the factors outlined in 30 C.F.R. part 746.13 (see **Section 1.4.1.1, Office of Surface Mining Reclamation and Enforcement, Decision**). Other considerations that may be a factor in the DOI ASLM decision include the following:

- Direction in recent Executive Orders (EOs), including EO 14154, *Unleashing American Energy* and EO 14156, *Declaring a National Energy Emergency*. These two new EOs, which were signed in January 2025, provide specific direction related to energy policy and use of Federal lands. EO 14154 encourages energy exploration and production on Federal lands to meet U.S. domestic needs and to solidify the U.S. as a global energy leader. It also directs agencies, including OSMRE, "to identify those agency actions that impose an undue burden on the identification, development, or use of domestic energy resources — with particular attention to oil, natural gas, coal, hydropower, biofuels, critical mineral, and nuclear energy resources." EO 14156 declared that the energy (including coal) and critical minerals identification, leasing, development, production, transportation, refining, and generation capacity of the U.S. are too inadequate to meet U.S. domestic needs. It directs agencies to "identify and exercise any lawful emergency authorities available to them, as well as all other lawful authorities they may possess, to facilitate the identification, leasing, siting, production, transportation, refining, and generation of domestic energy resources, including, but not limited to, on Federal lands."
- Direction in EO 14261, *Reinvigorating America's Beautiful Clean Coal Industry and Amending Executive Order 14241* (April 8, 2025), which declared "a national priority to support the domestic coal industry by removing Federal regulatory barriers that undermine coal production, encouraging the utilization of coal to meet growing domestic energy demands, increasing American coal exports, and ensuring that Federal policy does not discriminate against coal production or coal-fired electricity generation." EO 14261 also designated coal as a "mineral" under EO 14241, *Immediate Measures to Increase American Mineral Production*.

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CHAPTER 3. AFFECTED ENVIRONMENT

This chapter summarizes the condition of the affected environment (including its human elements), the resource-specific analysis areas for direct and indirect effects, and the regulatory framework (state and Federal laws and regulations) applicable to each resource. It also provides the scientific and analytic basis for the comparison of the Proposed Action and alternatives as presented in **Chapter 2** of this Supplemental Environmental Impact Statement (SEIS).

The general setting for the project area, which is the Area F permit boundary, is briefly described in **Section 3.1.2, General Setting**, to provide context for the resource-specific discussions in this chapter. The environmental baseline and current conditions information summarized in this chapter was obtained from the review of published sources, unpublished data, communication with government agencies, and review of field studies of the area. In general, the resource-specific discussions supplement the 2018 Final Environmental Impact Statement (2018 Final EIS); new or updated data that were reviewed and considered in this SEIS are listed in **Chapter 7, References**.

3.1 RESOURCES ANALYZED AND GENERAL SETTING

3.1.1 Resources Analyzed

The 23 resources listed below in **Table 3.1-1** were analyzed in the 2018 Final EIS based on public scoping comments and internal agency scoping. Resources for which there are substantial new circumstances or information relevant to environmental concerns and bearing on the SEIS alternatives are described in detail in this chapter. For other resources, brief resource summaries and relevant changes are provided along with references to relevant sections of the 2018 Final EIS.

Table 3.1-1. Resources Analyzed.

Resource	Final EIS and SEIS Chapter and Section		
	Affected Environment	Direct and Indirect Effects	Cumulative Effects
Topography	3.2	4.2	5.3.1
Air Quality	3.3	4.3	5.3.2
Climate and Climate Change	**3.4**	**4.4**	**5.3.3**
Public Health and Safety	3.5	4.5	5.3.4
Geology	3.6	4.6	5.3.5
Water Resources – Surface Water	**3.7**	**4.7**	**5.3.6**
Water Resources – Groundwater	3.8	4.8	5.3.7
Water Resources – Water Rights	**3.9**	**4.9**	**5.3.8**
Vegetation	3.10	4.10	5.3.9
Wetlands and Riparian Zones	3.11	4.11	5.3.10
Fish and Wildlife Resources	3.12	4.12	5.3.11
Special Status Species	**3.13**	**4.13**	**5.3.12**
Cultural and Historic Resources	3.14	4.14	5.3.13
Socioeconomic Conditions	**3.15**	**4.15**	**5.3.14**
Visual Resources	3.17	4.17	5.3.16
Recreation	3.18	4.18	5.3.17
Paleontology	3.19	4.19	5.3.18
Access and Transportation	3.20	4.20	5.3.19
Solid and Hazardous Waste	3.21	4.21	5.3.20
Noise	3.22	4.22	5.3.21
Land Use	3.23	4.23	5.3.22
Soil	3.24	4.24	5.3.23

Note: Sections shown in **bold** were substantially updated in the SEIS. Pursuant to EO 14154, *Unleashing American Energy* (January 20, 2025) and a Presidential Memorandum, *Ending Illegal Discrimination and Restoring Merit-Based Opportunity* (January 21, 2025), the discussions and analyses related to environmental justice (**Sections 3.16, 4.16,** and **5.3.15)** were no longer needed and were removed from this Final SEIS.

3.1.2 General Setting

The project area is located in Treasure and Rosebud Counties (Township 2 North, Range 38 and 39 East, and Township 1 North, Range 39 East) about 12 miles west of Colstrip, Montana (**Figure 1.1-1** and **Figure 1.1-2**). The Northern Cheyenne Reservation is 13 miles south of the project area in Big Horn and Rosebud Counties. The northeast corner of the Crow Indian Reservation is about 9 miles southwest of the project area in Big Horn County.

Situated in the northern Powder River Basin, the project area is generally east and north of the Little Wolf Mountains. The region has a semiarid climate and flat to rolling topography of shale and sandstone punctuated by occasional buttes. Tributaries of Horse Creek and West Fork Armells Creek, including Black Hank Creek, Donley Creek, Robbie Creek, McClure Creek, and Trail Creek (all of which lie within the drainage of the Yellowstone River), drain the project area. A ridge in the western portion of the project area divides the Horse Creek and West Fork Armells Creek drainages.

The project area is in the Northwest Great Plains Ecoregion, which encompasses the Missouri Plateau section of the Great Plains. Precipitation is variable, ranging from 5 to nearly 24 inches per year (over the past 40 years) and averaging 15 inches. The wettest months are May and June, and the driest are November through February. Large precipitation events of 1 to 3 inches in a day occur fairly frequently, and monthly precipitation totals of 4 to 10 inches have been recorded in April through September.

Average annual snowfall is about 35 inches, and the snowiest month is January, averaging 6.9 inches. December, February, and March are nearly as snowy, averaging about 6 inches of snow.

The project area consists primarily of native grasslands, conifer/sumac woodlands, and upland shrublands, which together encompass about 80 percent (approximately 5,385 acres). Agricultural lands and pasture comprise about 15 percent (approximately 1,048 acres), and interspersed patches of lowlands, sandstone piles and cliffs, and disturbed or developed lands comprise the remaining 5 percent (approximately 313 acres).

3.2 TOPOGRAPHY

3.2.1 Introduction

Since the issuance of the 2018 Final EIS, there have been no substantial new circumstances or information relevant to topography, other than active mining in Area F. Mining in the project area began in 2020, and as of 2023, 582 acres have been disturbed; 494 acres of that disturbance was due to active mining (Westmoreland Rosebud 2024b). See **Tables 2.2-3** and **2.2-4** in **Chapter 2** for current disturbance at the Rosebud Mine and Westmoreland Rosebud's posted reclamation bonds. Minor Revision 15 to state operating permit C2011003F slightly adjusted the postmining topography and was approved by the Montana Department of Environmental Quality (DEQ) (see **Figure 2.2-6** in **Section 2.2.2.2, Area F Operations and Development**). Information on project area topography is available in **Section 3.2** of the 2018 Final EIS beginning on page 123.

3.2.1.1 Regulatory Framework

The regulatory framework for topography is unchanged since the Final EIS and is described in **Section 3.2.1.1** of the 2018 Final EIS beginning on page 123.

3.2.1.2 Analysis Area

The analysis area for topography, the proposed disturbance area, is described in detail in **Section 3.2.1.2** of the 2018 Final EIS beginning on page 123 and shown on **Figure 13** in that document.

3.2.2 Pre-mine Topography

Information on the affected environment (pre-mine topography) is available in the 2018 Final EIS in **Section 3.2.2** beginning on page 124.

3.3 AIR QUALITY

3.3.1 Introduction

Since the issuance of the 2018 Final EIS, there have been some changed conditions relevant to air quality (**Table 3.3-1**) in the analysis area, but these do not substantially change the analysis presented in the EIS. As applicable, key sections have been updated below. All other information on air quality is available in **Section 3.3** of the 2018 Final EIS beginning on page 123.

Table 3.3-1. Air Quality: Changed Conditions Since the 2018 Final EIS.

Year	Change
2019	Montana Air Quality Permit (MAQP) #1570-09 was issued to include Area F and limits the emissions from the permit area and Area C. In 2023, Westmoreland Rosebud exceeded the annual 4-million-ton Area F production cap in MAQP #1570-09. Westmoreland Rosebud is working with DEQ to prevent future exceedances. Overall production was still below the combined annual 8-million-ton limit for Areas C and F, and emissions were not inconsistent with levels from prior years. Current emissions for the Rosebud Mine are presented below in **Table 3.3-2** and discussed in **Section 3.3.4.1, Existing Emissions from the Rosebud Mine**.
2019	Westmoreland Rosebud began developing Area F in 2019, and active mining began in August 2020 according to its state operating permit and Federal mining plan. As of December 2023, Westmoreland Rosebud has disturbed 582 acres in the project area; 494 acres of that disturbance is due to active mining, and the remainder is due to site development, such as roads and soil and/or spoil stockpiles. See **Tables 2.2-3** and **2.2-4** in **Chapter 2** for current disturbance at the Rosebud Mine and Westmoreland Rosebud's posted reclamation bonds.
2019-2022	In terms of other permit areas of the Rosebud Mine, the following may contribute to changed conditions for air quality: • Amendment 5 (AM5) to Permit Area B was approved by DEQ in 2022 after preparation of an EIS pursuant to MEPA that considered the cumulative air quality impacts of Area F. The project area approved in Montana Department of Environmental Quality (DEQ) Record of Decision (ROD) for Area B AM5 was roughly half the size of the area that was analyzed in the 2018 Final EIS (see **Chapter 5** and **Appendix D** in the 2018 Final EIS). Westmoreland demonstrated to DEQ that Area B AM5 would comply with MAQP #1483-09. • Area D is no longer actively mined and is being reclaimed. • Area E has received full bond release and is no longer a Montana coal mine.
2021	A statutory amendment to the Major Facility Siting Act (MFSA) allowed operators, such as Talen Montana, the operator of the Colstrip Power Plant, to change their fuel source without amending the MFSA Certificate (75-20-228, Montana Code Annotated [MCA]).
2022	Units 1 and 2 of the Colstrip Power Plant shut down in January 2020, earlier than the date (July 1, 2022) disclosed in the 2018 Final EIS; impacts of combustion of coal in Units 1 and 2 (and the eventual end) were previously considered in the 2018 Final EIS cumulative effects analysis (see **Chapter 5** and **Appendix D** in the 2018 Final EIS).
2022	On August 10, 2022, Montana submitted its Regional Haze State Implementation Plan (SIP) for the Second Planning Period to the Environmental Protection Agency (EPA). This plan was submitted to meet the requirements of the Regional Haze Rule (40 C.F.R. part 51, subpart P) by establishing long-term strategies to achieve the 2028 reasonable progress goals. These goals are to improve existing visibility in mandatory Class I areas, prevent future impairment of visibility by manmade sources, and meet the national goal of natural visibility conditions in all mandatory Class I areas by 2064. The SIP must demonstrate Montana is on track to meet the national goal of natural visibility conditions in all mandatory Class I areas by 2064.
2019-2023	The Clean Power Plan (CPP), which was described in the 2018 Final EIS, established emission guidelines for states to follow in limiting carbon dioxide (CO_2) emissions from existing power plants. The EPA repealed the CPP in June 2019 and replaced it with the Affordable Clean Energy (ACE) rule. The ACE rule establishes emission guidelines for states to use when developing plans to limit CO_2 at their coal-fired Electric Utility Steam Generating Units (EGUs). On January 19, 2021, the D.C. Circuit Court vacated the ACE rule and remanded to the EPA for further proceedings consistent with its opinion. In March 2023, the EPA extended the due date for state plans under the ACE rule until April 15, 2024.

Table 3.3-1. Air Quality: Changed Conditions Since the 2018 Final EIS.

Year	Change
2023-2024	In May 2023, the EPA proposed new greenhouse gas (GHG) standards and guidelines for fossil-fuel-fired power plants under Section 111 of the Clean Air Act (CAA) and a repeal of the ACE rule (EPA 2024a). The intent of the new rule is to significantly reduce GHG emissions from existing coal-fired power plants and from new natural gas turbines. The EPA issued the final rule on May 9, 2024, and it became effective on July 8, 2024 (89 *Federal Register* [FR] 39798). The final rule (1) repeals the ACE rule; (2) finalizes emission guidelines for GHG emissions from existing fossil-fuel-fired (coal and oil/gas) steam-generating EGUs; (3) finalizes revisions to the new source performance standards for GHG emissions from new and reconstructed fossil-fuel-fired stationary combustion turbine EGUs; and (4) finalizes revisions to the New Source Performance Standards for GHG emissions from fossil-fuel-fired steam-generating units that undertake a large modification, based on the 8-year review required by the CAA. With the final rule, the EPA did not finalize emission guidelines for GHG emissions from existing fossil-fuel-fired combustion turbines.
2024	The EPA conducted a review of air quality criteria and National Ambient Air Quality Standards for oxides of nitrogen (NO_x), oxides of sulfur, and particulate matter (PM) and has proposed to revise the existing secondary sulfur dioxide (SO_2) standard to an annual average, averaged over three consecutive years, with a level within the range from 10 to 15 parts per billion (ppb). The EPA proposes to retain the existing secondary standards for NO_x and PM, without revision. The EPA accepted comments through June 14, 2024.
2024	The EPA issued its final rule with National Emission Standards for Hazardous Air Pollutants for Coal- and Oil-Fired EGUs, also known as the Mercury and Air Toxics Standards (MATS). With the new rule, the EPA set technology-based emissions standards for mercury and other hazardous air pollutants (HAPs), including lead, arsenic, chromium, nickel, and cadmium – and hydrogen chloride, emitted by units with a capacity of more than 25 megawatts. These new emission standards will apply to the Colstrip Power Plant, but not the Rosebud Power Plant, which produces only 24 megawatts. Federal MATS and Montana's mercury emission standards, which are more stringent than the old Federal MATS, are discussed in the 2018 Final EIS in **Section 3.3, Air Quality**. Historic mercury emissions for both the Colstrip and Rosebud Power Plants were provided in the 2018 Final EIS and are replicated below in **Section 3.3.4.2**.
2024	The Bureau of Land Management (BLM) prepared and issued the *Miles City Field Office Final Supplemental Environmental Impact Statement and Resource Management Plan Amendment* (Miles City Field Office SEIS and RMP) (BLM 2024a) in May 2024. The BLM selected Alternative D as the proposed plan for allocating BLM administered coal (BLM 2024b; 89 FR 97 2024); under this alternative, Federal coal (about 1.75 million acres of subsurface Federal coal estate) would not be available for leasing within the Miles City Field Office (MCFO) planning area (see Figure 2-4a in BLM 2024a). The BLM determined that additional leasing of Federal coal is not necessary based on the current analysis in the SEIS and that operating mines in the planning area have existing Federal leases with sufficient coal reserves to maintain existing mine production levels until 2035 for the Spring Creek Mine and 2060 for the Rosebud Mine (BLM 2024a); see **Table 5.2-1**.
2025	Secretarial Order 3418 - Unleashing American Energy (January 20, 2025) directed BLM to review and, as appropriate, revise all relevant draft and all finalized RMPs and supporting NEPA documents, including the MCFO RMP and NEPA document. BLM published a notice of intent to amend the MCFO RMP and accompanying NEPA analysis on July 8 to reevaluate coal allocations in the planning area and to determine the availability of lands acceptable for further consideration for coal leasing in accordance with recent EOs. OSMRE relied on the 2024 MCFO Final SEIS because it is in effect and revisions are still under consideration by the Department at the time of this SEIS; however, Section 50203 of the One Big Beautiful Bill (OBBB) directs the Secretary to make available for lease at least 4 million acres of recoverable Federal coal, which is inconsistent with the MCFO RMP. In addition, the MCFO RMP and NEPA documents (BLM 2024a) were challenged in court, and the MCFO RMP was remanded to the Department pending the finalization of a new RMP Amendment with supporting NEPA documentation.

3.3.1.1 Regulatory Framework

The regulatory framework applicable to air quality is described in **Section 3.3.1.1** of the 2018 Final EIS beginning on page 127. The regulatory updates since 2018 (see list in **Table 3.3-1**) include a statutory amendment to MFSA, updated air quality permits, and new emissions standards for mercury and other HAPs. Most updates discussed above would not substantially change the 2018 Final EIS air quality

analysis. For analyses in this SEIS, it has been assumed that the Colstrip Power Plant will either upgrade its technology to meet the new MATS or close the remaining two units (Units 3 and 4). Therefore, the air quality modeling conducted for the 2018 Final EIS has not been updated to reflect new MATS.

3.3.1.2 Analysis Area

The analysis area for air quality, a rectangle with a 300-kilometer (km) extent from the Colstrip and Rosebud Power Plants, includes Class I airsheds, such as the Northern Cheyenne and Fort Peck Indian Reservations, and is the same as described in **Section 3.3.1.2** and shown on **Figure 14** of the 2018 Final EIS beginning on page 132.

3.3.2 Local and Regional Meteorological Patterns

Information on local and regional meteorological patterns is available in the 2018 Final EIS in **Section 3.3.2** beginning on page 133.

3.3.3 Air Quality Monitoring at Rosebud Mine

Western Energy operated seven PM_{10} air-quality monitoring sites throughout the Rosebud Mine complex from 1992 through 2000. In 2001, Western Energy was permitted by DEQ to terminate their ambient monitoring network based on a review of the monitoring data from the mine (MAQP #1570-06). In 2012, Western Energy deployed two modern, real-time Met One Beta Attenuation Monitors to monitor PM_{10}. All of the monitored values as of the 2018 Final EIS fall well below the level of the NAAQS (and MAAQS) for PM_{10}. Additional information on air quality monitoring at Rosebud Mine is available in the 2018 Final EIS in **Section 3.3.3** beginning on page 134.

3.3.4 Existing Regional Air Pollutant Sources and Emissions

Information on regional air pollutant sources and emissions is available in the 2018 Final EIS in Section **3.3.4** beginning on page 135 and in **Appendix D**. Within the immediate surroundings of the project area, the primary sources of air pollution continue to be the existing permit areas of the Rosebud Mine and the Colstrip and Rosebud Power Plants. The following subsections include updated data (since the 2018 Final EIS) for the Rosebud Mine and the power plants. Air quality and emissions sources in the region were also recently evaluated by the BLM in support of the *Miles City Field Office Final Supplemental Environmental Impact Statement and Resource Management Plan Amendment* (BLM 2024a). Appendix C Air Resources Technical Support Document to BLM 2024a provides updated emissions inventories for coal mining, oil and gas production, and other BLM-authorized actions in the MCFO Resource Management Plan planning area, which overlaps with the indirect and cumulative effects analysis areas used in this SEIS and the 2018 Final EIS. Data presented in that document are generally consistent with what was presented in the 2018 Final EIS.

3.3.4.1 Existing Emissions from the Rosebud Mine

Criteria Air Pollutant Emissions

A detailed discussion of criteria air pollutant (CAP) emissions from the Rosebud Mine is provided in **Section 3.3.4.1** of the 2018 Final EIS; estimated future emissions are provided in **Appendix D** of the 2018 Final EIS. The following section describes key updates since the 2018 Final EIS. The existing Rosebud Mine includes Areas A, B, and D (MAQP #1483-09); Areas C and F (MAQP #1570-09); and a portable crusher used throughout the mine (MAQP #4436-01). These versions of the permits are available

on the DEQ website (https://deq.mt.gov/air/assistance) and are in the project record. Production and associated emissions from the Rosebud Mine are regulated by these MAQPs; actual production rarely reaches the MAQP limit levels. MAQP #1483-09 limits annual combined coal production from Areas A, B, and D to 13 million tons per year. Combined coal production from Areas C and F is limited to 8 million tons per year per MAQP #1570-09, with an Area F–specific production cap of 4 million tons per year.[31]

As shown in **Table 2.2-2**, coal was only produced from Area B and Area F in 2023. Active mining began in Area F in August 2020. Mining and reclamation operations include a number of sources of CAP and HAP emissions. The majority of CAP emissions are from low-level, fugitive dust emission sources. Sources of fugitive dust include:

- Removal, handling, and storage of topsoil
- Drilling, blasting, removal, handling, and storage of overburden
- Drilling, blasting, removal, and loading (Area F); dumping and crushing (Area A or Area C); and conveying of coal to the Colstrip Power Plant
- Vehicle traffic on haul and access roads, including covered trucks hauling coal to the Rosebud Power Plant and employee vehicles
- Wind erosion of disturbed areas

Westmoreland Rosebud is required to develop and employ a Fugitive Dust Control Plan to minimize fugitive dust emissions from all permit areas of the mine. The control measures include but are not limited to the application of water and chemical dust suppressant on haul and access roads, use of a foam dust-suppression system in coal processing and conveying facilities, prompt revegetation of disturbed areas, and use of an enclosure when drilling coal and overburden before blasting. Other major emission sources at the mine include diesel exhaust emissions from mobile and stationary diesel engines and blasting emissions from the explosives used in coal and overburden blasting.

Annual emissions of CAPs and volatile organic compounds (VOCs) from the existing areas of the Rosebud Mine are shown as reported by DEQ for the period 2010 through 2023 in **Table 3.3-2**; the 2018 Final EIS only included data through 2015. In general, reported CAP and VOC emissions from the Rosebud Mine have been the same as or less than the emissions disclosed in the 2018 Final EIS and used in the air quality modeling that supported the analysis. One exception is 2021, which had higher emissions for NO_x, SO_2, and CO; in 2021, NO_x emissions (320.4 tons) were approximately 48 percent higher than the average (216.9 tons) over 2020 through 2023, SO_2 emissions (35.2 tons) were approximately 51 percent higher than the average (23.3 tons) over 2020 through 2023, and CO emissions (1,182.9 tons) were approximately 51 percent higher than the average (782.8 tons) over 2020 through 2023. According to Westmoreland Rosebud's annual mining reports for January 1, 2021, through December 31, 2021, total production for the Rosebud Mine in 2021 was about 6.5 million tons, including about 0.97 tons from Area F. Emissions for NO_x, SO_2, and CO returned to lower values in 2022 and 2023. As shown in **Table 2.2-2**, current (2023) production from Area F (about 4.6 million tons) accounted for approximately 65 percent of total production for the Rosebud Mine (about 7.1 million tons).

[31] 2023 production in Area F (about 4.6 million tons) was greater than the production limit (4 million tons) in MAQP #1570-09. Westmoreland Rosebud is working with DEQ to prevent future exceedances. Overall production was still below the combined limit for Areas C and F. Areas C and F emissions were not inconsistent with levels from prior years. Current emissions for the Rosebud Mine are presented below in **Table 3.3-2**.

Table 3.3-2. Historic CAP Emissions Reported from Rosebud Mine (All Permit Areas).

Year	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOCs
	(tons/year)					
2010	1557.7	345.9	200.8	21.5	724.1	1.5
2011	1312.3	263.6	162.2	16.9	569.4	1.5
2012	1307.2	271.9	212.7	22.2	747.1	2.0
2013	1267.1	301.4	200.6	21.1	709.7	1.8
2014	1545.1	361.3	238.9	26.6	894.1	1.0
2015	1514.7	350.4	302.1	33.1	1111.7	1.7
2016	1449.6	331.5	293.4	31.8	1069.8	1.9
2017	1336.0	306.3	288.9	31.1	1047.5	2.0
2018	NA	NA	NA	NA	NA	NA
2019	1321.0	301.0	286.8	30.9	1039.2	2.0
2020	1103.6	221.3	179.2	18.4	622.0	1.8
2021	1259.0	256.5	*320.4	*35.2	*1182.9	1.8
2022	1261.9	251.6	204.3	21.5	724.0	1.8
2023	1388.0	279.6	145.7	15.4	518.0	1.2

Notes: Lead (Pb) is included under HAPs.
* These cells have higher values than what were evaluated as likely emissions levels in the 2018 Final EIS.
Source: DEQ 2024.

Hazardous Air Pollutant Emissions

Operations associated with the mining, processing, and handling of coal result in the emission of HAPs from the Rosebud Mine with the primary sources being fugitive coal dust sources and diesel engines. Coal dust contains a number of hazardous metals (e.g., antimony, arsenic, chromium, lead, mercury, and selenium), and emission of coal dust suspends these compounds in the air. Suspended fugitive coal dust can impact human health and ecosystems through inhalation or deposition to soil and waterbodies. The use of diesel engines throughout the mine results in the emission of toxic gases and particulates known as diesel particulate matter (DPM). DPM is not currently regulated by the EPA but is considered a carcinogen (EPA 2002). Further information on HAP emissions from the mine is provided in **Project Area Hazardous Air Pollutant Emissions** under **Section 4.3.3.1, Direct Impacts**.

3.3.4.2 Existing Emissions from the Colstrip and Rosebud Power Plants

Detailed discussions of CAP and HAP emissions from regional sources and Colstrip mobile sources are provided in **Section 3.3.4.2** (Colstrip and Rosebud Power Plants) and **Section 3.3.4.3** (other regional sources) in the 2018 Final EIS; estimated future emissions are provided in **Appendix D** of the 2018 Final EIS. The Colstrip Power Plant and Rosebud Power Plant continue to be the major sources of air emissions within the analysis area.

The Colstrip Power Plant, which is described in detail in **Section 1.2.2.1**, is surrounded by the Rosebud Mine (**Figure 1.1-2**) and receives coal directly from the mine via enclosed electrically powered conveyors. The facility comprises two coal-fired boilers (Units 3 and 4) with an approximate total generating capacity of 1,480 megawatts; Units 1 and 2, which were considered in the 2018 Final EIS, were retired in January 2020 (earlier than anticipated). Each operating unit employs wet Venturi scrubbers for SO_2 and PM control, advanced low NO_x firing and digital controls for NO_x control, and mercury oxidizer/sorbent systems for mercury control. The operators are also required to maintain Continuous Emissions Monitoring Systems for SO_2, NO_x, CO_2, and opacity along with Mercury Emissions Monitoring Systems for mercury compliance monitoring.

The Rosebud Power Plant, which is described in detail in **Section 1.2.2.2**, is located approximately 6 miles north of the Rosebud Mine along State Highway 39 and is an approximately 38-megawatt electric generating facility designed to burn low–British thermal unit (Btu) waste coal using a low-temperature

circulating fluidized bed boiler (see **Section 1.2.2.2**). Limestone is injected with the waste coal prior to combustion to control SO_2, and a baghouse is employed to control PM.

The existing sources of air pollution at the power plants include the boilers (which primarily burn coal but also utilize distillate fuel oil or liquid propane gas for start-up), fugitive dust sources (on-road and non-road vehicles, coal/ash handling and storage, and the limestone handling systems), emergency diesel generators, and mobile exhaust.

Criteria Air Pollutant Emissions

The most recent CAP emissions (2019-2023) for the power plants are presented below in **Table 3.3-3** and compared to the CAP emissions (2011-2015) data provided in **Table 19** of the 2018 Final EIS. In general, CAP emissions from Units 3 and 4 of the Colstrip Power Plant[32] and the Rosebud Power Plant have remained consistent with or less than the emissions data presented in the 2018 Final EIS; the cells with the asterisks notate values that are higher than what was considered in 2018. CAP emissions were higher than the highest reported emissions value in the 2018 Final EIS only for the Rosebud Power Plant and only in one year: in 2023, Rosebud Power Plant PM_{10} emissions (27 tons) were approximately 44 percent higher than the average (18.7 tons) over 2010 through 2023, SO_2 emissions (1,258.4 tons) were 11 percent higher than the average (1,138.9 tons) over 2010 through 2023, and CO emissions (5.32 tons) were 213 percent higher than the average (1.7 tons) over 2010 through 2023.

As described in 2018 Final EIS **Section 3.3.4.2**, mobile exhaust emissions from on-road and non-road mobile sources from the Colstrip Power Plant were estimated from the 2012-2013 emission inventory in the modeling study done for the Bureau of Land Management Montana Dakotas State Office (BLM-MT/DK). On-road and non-road exhaust emissions are expected to be very small at the Colstrip Power Plant because of limited use of mobile source equipment at the facility. Estimated mobile emissions from the Colstrip Power Plant are listed in **Table 20** in the 2018 Final EIS. Those estimates have not been updated in this SEIS but are assumed to still be valid.

[32.] Units 1 and 2 of the Colstrip Power Plant were no longer emission sources after their retirement in January 2020.

Table 3.3-3. CAP Emissions from the Colstrip and Rosebud Power Plants (2010–2023).

Facility/Year	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOCs
Colstrip Power Plant Units 1 and 2	(tons/year)					
2010	643.8	540.2	8080.3	10541.8	734.8	102.8
2011	502.9	421.2	6312.6	7460.8	574.5	80.4
2012	367.8	308.7	4650.5	4571.9	420.2	58.8
2013	636.1	532.9	8453.2	8402.0	718.6	100.6
2014	584.0	488.5	7622.4	5823.8	658.1	92.1
2015	512.3	428.7	5807.5	3757.9	574.9	80.5
Colstrip Power Plant All Units (1-4)	(tons/year)					
2019	505.1	131.4	NA	8325.1	2157.6	301.9
Colstrip Power Plant Units 3 and 4	(tons/year)					
2010	1625.0	1329.6	10054.5	4766.8	1818.5	254.4
2011	1323.5	1086.6	8067.1	3832.9	1486.3	207.8
2012	1362.8	1120.2	8242.7	4193.6	1523.4	213.2
2013	1138.9	932.2	6542.8	3441.9	1270.9	177.9
2014	1393.3	1120.1	7965.2	4286.1	1530.7	214.2
2015	1613.2	1295.2	9336.7	5166.1	1759.1	246.2
2020	285.2	76.4	NA	3207.5	1280.0	179.0
2021	339.9	90.1	NA	4111.8	1560.3	218.2
2022	353.5	94.2	NA	4751.9	1686.4	202.2
2023	349.8	93.6	NA	4976.1	1694.01	203.1
Rosebud Power Plant	(tons/year)					
2010	14.5	5.6	875.4	1181.4	0.2	7.0
2011	25.2	25.2	843.1	1032.9	0.3	5.4
2012	13.7	4.7	951.0	1168.9	0.2	6.2
2013	17.2	5.3	938.6	1198.4	0.4	7.0
2014	16.4	5.0	849.4	1165.3	2.6	6.7
2015	16.5	5.0	856.4	1195.3	3.4	6.7
2019	17.5	3.9	NA	1086.7	.7	6.2
2020	17.5	3.8	NA	970.6	2.4	5.8
2021	20.2	4.4	NA	1112.7	2.7	6.6
2022	20.2	4.4	NA	1157.1	0.3	6.4
2023	*27.0	4.1	NA	*1258.4	*5.32	6.7

Note: Values have been rounded to the nearest tenth decimal place.
* These cells have higher values than what were evaluated as likely emissions levels in the 2018 Final EIS.
Source: Montana DEQ Annual Emission Inventory Reporting Records (2010-2015) and DEQ 2024 (2019-2023).

Hazardous Air Pollutant Emissions

The combustion of coal in power plant boilers releases a large number of hazardous trace metals and organic and inorganic compounds contained within the coal. Mercury is the only HAP whose emission rates are continuously monitored at the Colstrip and Rosebud Power Plants. The historic mercury emissions (2010-2015) were provided in **Table 21** in the 2018 Final EIS; these emissions data are compared to more recent (2016-2022) mercury below in **Table 3.3-4**. The 2018 Final EIS also disclosed estimated emission rates of selected metal HAPs for the Colstrip Power Plant (based on 2010 and 2011 stack testing). Those estimated metal HAP emissions data from the 2018 Final EIS (**Table 22**) are compared to more recent (2016-2022) emissions data below in **Table 3.3-5**. As with CAP emissions, metal HAP emissions from the Colstrip Power Plant[33] have generally remained consistent with or less than the emissions data in the 2018 Final EIS. For the Rosebud Power Plant, the 2018 Final EIS also provided estimated metal HAPs emissions based on emission limits described in the MATS in **Table 23**. Those estimates have not been updated in this SEIS but are assumed to still be valid. In the 2018 Final

[33.] Units 1 and 2 of the Colstrip Power Plant were no longer emission sources after their retirement in January 2020.

EIS, non-metal HAP emissions data disclosed in **Table 24** for the Colstrip Power Plant were from the 2014 National Emissions Inventory (NEI) (EPA 2016b). Facility-level is not as comprehensive in the 2020 NEI (EPA 2023a); available 2020 data are provided below in **Table 3.3-6** in comparison to the 2014 data.

Table 3.3-4. Historic Mercury Emissions from the Colstrip and Rosebud Power Plants.

Year	Total Mercury Emissions (lb/year)			
	Colstrip Power Plant			Rosebud Power Plant
	Units 1 and 2	Units 3 and 4	Total All Units (1-4)	
2010	32.6	117.9	150.5	2.5
2011	26.4	86.2	112.6	1.2
2012	18.4	81.6	100.0	2.6
2013	36.0	81.6	117.6	1.4
2014	28.7	103.2	131.9	1.4
2015	23.6	121.0	144.6	0.9
2016	NA	NA	120.0	1.91
2017	NA	NA	120	1.09
2018	NA	NA	110	1.14
2019	NA	NA	110	1.56
2020	-	60	60	0.61
2021	-	70	70	0.94
2022	-	80	80	1.29

NA = Not Available.
Source: 2010-2015 data are from DEQ Mercury Emissions Monitoring System; 2016-2022 Toxic Inventory Data for the Colstrip Power and Rosebud Power Plants are from the EPA's Envirofacts site (EPA 2024b and EPA 2024c).

Table 3.3-5. Historic Metal HAP Emissions from the Colstrip Power Plant.

Year	Antimony	Arsenic	Cadmium	Chromium	Copper	Lead	Selenium
Colstrip Units 1 and 2	(lb/year)						
2010	50.2	116.2	31.5	166.7	693.7	271.6	493.2
2011	39.3	91.0	24.7	130.5	543.2	212.7	386.2
2012	29.8	69.0	18.7	99.0	411.9	161.2	292.8
2013	50.0	115.6	31.4	166.0	690.7	270.4	491.0
2014	45.4	104.9	28.5	150.5	626.4	245.2	445.3
2015	40.6	93.9	25.5	134.8	560.9	219.6	398.7
Colstrip Units 3 and 4	(lb/year)						
2010	116.6	269.6	73.2	387.0	1610.4	630.4	1144.8
2011	98.0	226.7	61.5	325.3	1353.7	529.9	962.3
2012	101.7	235.2	63.8	337.5	1404.5	549.8	998.4
2013	83.3	192.6	52.3	276.4	1150.3	450.3	817.7
2014	99.9	231.0	62.7	331.6	1379.9	540.2	980.9
2015	115.0	266.0	72.2	381.8	1588.8	622.0	1129.4
Total for All Colstrip Units (just Units 3 and 4 after 2019)	(lb/year)						
2016	140	310	NA	450	1870	800	1330
2017	140	310	NA	450	1860	730	1330
2018	130	300	NA	430	1780	730	1270
2019	140	310	NA	450	1880	730	1340
2020	NR	190	NA	270	1130	440	810
2021	NR	230	NA	330	1390	530	990
2022	NR	300	NA	430	1390	510	990

lb/year = pounds per year; NA = Not Available; NR = Not Reported.
Source: 2010-2015 Metal HAP emissions are based on 2010/2011 stack test data from Colstrip Unit 3 and annual heat input from EPA's Clean Air Markets Data (https://ampd.epa.gov/ampd/); 2016-2022 Toxic Inventory Data are from the EPA's Envirofacts site (EPA 2024b).

Table 3.3-6. 2014 Existing Non-Metal HAP Emissions from the Colstrip Power Plant.

Hazardous Air Pollutant	2014 NEI Emission Rate (tons/year)	2020 NEI Emission Rate (tons/year)
2,4-Dinitrotoluene	1.28E-03	
2-Chloroacetophenone	3.20E-02	
5-Methylchrysene	1.00E-04	
Acenaphthene	2.33E-03	
Acenaphthylene	1.14E-03	
Acetaldehyde	2.60E+00	
Acetophenone	6.86E-02	
Acrolein	1.33E+00	
Anthracene	9.64E-04	
Benz[a]Anthracene	3.66E-04	
Benzene	5.95E+00	
Benzo[a]Pyrene	1.74E-04	
Benzo[g,h,i,]Perylene	1.24E-04	
Benzyl Chloride	3.20E+00	
Beryllium	8.82E-03	5.00E-03
Biphenyl	7.78E-03	
Bis(2-Ethylhexyl)Phthalate	3.34E-01	
Bromoform	1.78E-01	
Carbon Disulfide	5.95E-01	
Chlorobenzene	1.00E-01	
Chloroform	2.70E-01	
Chrysene	4.57E-04	
Cobalt	2.48E-02	1.50E-02
Cumene	2.43E-02	
Cyanide	1.14E+01	
Dimethyl Sulfate	2.19E-01	
Ethyl Benzene	4.30E-01	
Ethyl Chloride	1.92E-01	
Ethylene Dibromide	5.49E-03	
Ethylene Dichloride	1.83E-01	
Fluoranthene	3.25E-03	
Fluorene	4.16E-03	
Formaldehyde	1.10E+00	
Hexachlorobenzene	5.00E-03	
Hexane	3.06E-01	
Hydrochloric Acid	4.83E+00	7.50E+00
Hydrogen Fluoride	1.10E+01	
Indeno[1,2,3-c,d]Pyrene	2.79E-04	
Isophorone	2.65E+00	
Methyl Bromide	7.32E-01	
Methyl Chloride	2.43E+00	4.06E+01
Methyl Methacrylate	9.18E-02	
Methyl Tert-Butyl Ether	1.60E-01	
Methylene Chloride	1.33E+00	
Methylhydrazine	7.78E-01	
Naphthalene	5.95E-02	8.00E-02
Phenanthrene	1.24E-02	
Phenol	7.32E-02	
Propionaldehyde	1.74E+00	
Pyrene	1.51E-03	
Styrene	1.14E-01	
Tetrachloroethylene	1.97E-01	
Toluene	1.10E+00	
Vinyl Acetate	3.48E-02	
Xylenes (Mixed Isomers)	1.70E-01	

Source: 2014 NEI (EPA 2016) and 2016 NEI (EPA 2023a).

3.3.4.3 Existing Emissions from Other Regional Sources

As described in the following sections, existing emissions from other regional sources, including point and non-point sources, were considered in the air quality analysis completed for the 2018 Final EIS. **Appendix D** in the 2018 Final EIS provides estimated future emissions from these sources and effects on regional air quality. For the *Miles City Field Office Final Supplemental Environmental Impact Statement and Resource Management Plan Amendment* (BLM 2024a), the BLM updated the 2016 Bureau of Land Management Montana/Dakotas (BLM-MT/DK) air quality modeling (BLM 2016a), which was also the basis for the 2018 Final EIS air quality analysis, to consider regional air quality monitoring data from 2017 to 2021. For the following constituents, the BLM found little to no trends in concentrations (e.g., values remained relatively constant from 2017 to 2021): CO, NO_2, and Ozone (O_3). The BLM found that annual SO_2 concentrations have consistently decreased from 2017 to 2021. BLM's review showed that PM_{10} concentrations may be increasing over time, but all MT monitoring sites in the vicinity of the project area (Birney and Sidney, MT) were less than 50 percent of the MAAQS. Similarly, PM_5 concentrations may be increasing over time, but concentrations from 2017 to 2021, including those in Rosebud County, were below NAAQS. Based on review of BLM's 2024 analysis, OSMRE determined that regional emissions estimates provided in the 2018 Final EIS are still valid and, therefore, have not been updated in this SEIS.

Point Sources

In addition to the Rosebud Mine and power plants, several regional point sources of air pollution (e.g., coal and hard rock mines, oil and gas refineries, gravel pits, and cities) are within the cumulative and indirect impacts analysis area for air quality that contribute to cumulative effects. **Table 25** (regional sources) in the 2018 Final EIS provides emissions for these sources based on the emissions inventory from the Bureau of Land Management Montana/Dakotas (BLM-MT/DK) air quality modeling (BLM 2016a), and **Appendix D** in the 2018 Final EIS provides estimated future emissions from these sources and effects on regional air quality.[34]

Non-Point Sources

For the 2018 Final EIS, regional emissions from non-point sources, including anthropogenic (e.g., motor vehicles and agriculture); biogenic (e.g., plants, soils, and microorganisms); and fires (wildland and prescribed), were considered in the air quality analysis. **Table 3.3-7** provides the estimated emissions for these sources.

Table 3.3-7. Regional Non-Point Source Emission Sources.

Emissions Category	Regional Emissions (tons/year)					
	PM_{10}	$PM_{2.5}$	NO_x	CO	SO_2	VOCs
Point Source	31,915	15,156	98,418	59,984	37,747	22,254
Low-Level Anthropogenic	346,881	51,479	76,566	188,103	9,554	285,519
Low-Level Biogenic	0	0	23,418	49,898	0	406,356
Fires	7,822	6,004	2,019	44,573	502	7,060
Total – Anthropogenic	**378,796**	**66,635**	**174,984**	**248,087**	**47,301**	**307,773**
Total – All	**386,618**	**72,639**	**200,421**	**342,559**	**47,804**	**721,189**

Source: Appendix D-6, 2018 Final EIS (OSMRE and DEQ 2018).

[34] Note that some regional sources identified in **Table 25** in the 2018 Final EIS are no longer sources. For example, the Decker Mine closed in January 2021 due to a decline in demand for thermal coal (AP News 2021).

Fires, both wildland and prescribed, have historically occurred in the vicinity of the Rosebud Mine, and, as demonstrated in **Table 3.3-7,** are a key source of regional air emissions, including particulate matter, in the analysis area. The town of Lame Deer in Rosebud County is within the boundaries of the Northern Cheyenne Reservation and is identified as a "moderate" nonattainment area for PM_{10} under the NAAQS (DEQ 2017). Wildland fires in the vicinity of the project area often start from coal seam fires or ignite new ones, causing fires that can burn for long durations underground, including weeks, months, or even years (Montana Free Press [MTFP] 2024). Prescribed burns have also occurred from time to time on BLM or USDA Forest Service lands in southeastern Montana. Wildland fires, including those ignited by coal seam fires, and prescribed burns have occurred in the vicinity of the project area since the preparation of the 2018 Final EIS and are expected to occur for the reasonably foreseeable future, particularly during dry, drought conditions that may be exacerbated by climate change (see **Section 3.4, Climate and Climate Change**). Additional information about fires, including those that have occurred in the vicinity of the project area since the 2018 Final EIS, is in **Table 5.2-1** in **Section 5.2, Related Past, Present, and Reasonably Foreseeable Future Actions**.

3.3.5 Regional Air Quality

Information on regional air quality, including attainment status, visibility/regional haze (as it pertains to Class I areas, including the Northern Cheyenne IMPROVE site), and atmospheric deposition, is available in the 2018 Final EIS in **Section 3.3.5** beginning on page 142.

3.4 CLIMATE AND CLIMATE CHANGE

3.4.1 Introduction

Since the issuance of the 2018 Final EIS, there have been some changed conditions relevant to air quality (**Table 3.3-1**), and therefore GHG emissions, as well as those listed below that are specific to climate change (**Table 3.4-1**).

Table 3.4-1. Climate Change: Changed Conditions Since 2018 Final EIS.

Year	Change
2019	Westmoreland Rosebud began developing Area F in 2019, and active mining began in August 2020 according to its state operating permit and Federal mining plan. As of December 2023, Westmoreland Rosebud has disturbed 582 acres in the project area; 494 acres of that disturbance is due to active mining, and the remainder is due to site development, such as roads and soil and/or spoil stockpiles. See **Tables 2.2-3** and **2.2-4** in **Chapter 2** above for current disturbance at the Rosebud Mine and Westmoreland Rosebud's posted reclamation bonds.
2019-2022	In terms of other permit areas of the Rosebud Mine, the following may contribute to changed GHG emissions: • AM5 to Permit Area B was approved by DEQ in 2022 after preparation of an EIS pursuant to MEPA that considered the cumulative impacts of Area F. • Area D is no longer actively mined and is being reclaimed. • Area E received full bond release and is no longer a Montana coal mine.
2019-2023	The CPP, which was described in the 2018 Final EIS, established emission guidelines for states to follow in limiting CO_2 emissions from existing power plants. The EPA repealed the CPP in June 2019 and replaced it with the ACE rule, which established emission guidelines for states to use when developing plans to limit CO_2 at their coal-fired EGUs. On January 19, 2021, the D.C. Circuit Court vacated the ACE rule and remanded to the EPA for further proceedings consistent with its opinion.
2023-2025	In May 2023, the EPA proposed new GHG standards and guidelines for fossil-fuel-fired power plants under Section 111 of the CAA and a repeal of the ACE rule (EPA 2024a). The EPA issued the final rule on May 9, 2024, and it became effective on July 8, 2024 (89 FR 39798). The final rule (1) repealed the ACE rule; (2) finalized emission guidelines for GHG emissions from existing fossil-fuel-fired (coal and oil/gas) steam generating EGUs; (3) finalized revisions to the new source performance standards for GHG emissions from new and reconstructed fossil-fuel-fired stationary combustion turbine EGUs; and (4) finalized revisions to the New Source Performance Standards for GHG emissions from fossil-fuel-fired steam generating units that undertake a large modification, based on the 8-year review required by the CAA. On June 17, 2025, the EPA published a proposal to repeal all GHG emissions standards for fossil fuel-fired power plants.
2024	The BLM prepared and issued the *Miles City Field Office Final Supplemental Environmental Impact Statement and Resource Management Plan Amendment* (BLM 2024a) in May 2024. The BLM selected Alternative D as the proposed plan for allocating BLM administered coal (BLM 2024b; 89 FR 97 2024); under this alternative, Federal coal (about 1.75 million acres of subsurface Federal coal estate) would not be available for leasing within the MCFO planning area (see Figure 2-4a in BLM 2024a). The BLM determined that additional leasing of Federal coal is not necessary based on the current analysis in that SEIS and that operating mines in the planning area have existing Federal leases with sufficient coal reserves to maintain existing mine production levels until 2035 for the Spring Creek Mine and 2060 for the Rosebud Mine (BLM 2024a); see **Table 5.2-1**.
2025	Secretarial Order 3418 - *Unleashing American Energy* (January 20, 2025) directed BLM to revise all relevant and all finalized RMPs and supporting NEPA documents, including the MCFO RMP and NEPA documents. BLM published a notice of intent to amend the MCFO RMP and accompanying NEPA analysis on July 8 to reevaluate coal allocations in the planning area and to determine the availability of lands acceptable for further consideration for coal leasing in accordance with recent EOs. OSMRE relied on the 2024 MCFO Final SEIS because it is in effect and revisions are still under consideration by the Department at the time of this SEIS; however, Section 50203 of the OBBB directs the Secretary to make available for lease at least 4 million acres of recoverable Federal coal, which is inconsistent with the MCFO RMP. In addition, the MCFO RMP and NEPA documents (BLM 2024a) were challenged in court, and the MCFO RMP was remanded to the Department pending the finalization of a new RMP Amendment with supporting NEPA documentation.

Table 3.4-1. Climate Change: Changed Conditions Since 2018 Final EIS.

Year	Change
2025	New EO 14162, *Putting America First in International Environmental Agreements*, signed on January 20, 2025, directs the U.S. to formally withdraw from the Paris Climate Agreement and any related agreements or pacts under the United Nations Framework Convention on Climate Change (UNFCCC).
2025	New EO 14148, *Initial Rescissions of Harmful Executive Orders and Actions*, signed on January 20, 2025, rescinded a number of EOs discussed in the Draft SEIS, including the following related to climate change: EO 13990, *Protecting Public Health and the Environment and Restoring Science To Tackle the Climate Crisis*; EO 14008, *Tackling the Climate Crisis at Home and Abroad*; EO14057, *Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability*; and EO14096, *Revitalizing Our Nation's Commitment to Environmental Justice for All*.

3.4.1.1 Regulatory Framework

Climate change-specific regulatory updates since 2018 include CEQ's repeal of its NEPA regulations, DOI's revisions to its regulations implementing NEPA and publication of a separate *NEPA Handbook*, proposed repeal of GHG standards and guidelines for fossil-fuel-fired power plants, and climate-related EOs. In general, most updates discussed above would not substantially change the 2018 Final EIS climate change analysis. Any specific changes to the analysis are described in **Section 4.4, Climate and Climate Change**.

3.4.1.2 Direct and Indirect Effects Analysis Area

The analysis area for climate change is the same as described in **Section 3.4.1.2** of the 2018 Final EIS beginning on page 132. In general, while climate impacts are global in nature, the analysis area for climate and climate change in this analysis is focused on the United States and Montana. In particular, the analysis area for air quality was used for identifying major regional sources of GHGs.

3.4.2 Climate Conditions

In general, climate conditions, including atmospheric composition and primary GHGs, remain consistent with those described in **Section 3.4.2** of the 2018 Final EIS beginning on page 157. The most common GHG produced from fuel combustion is carbon dioxide (CO_2), followed by methane (CH_4) and nitrous oxide (N_2O). These are also the primary GHGs that would be emitted from the project area and the Colstrip and Rosebud Power Plants and thus are the focus of the discussion in the 2018 Final EIS and this SEIS. GHG concentrations are measured in parts per million (ppm), parts per billion (ppb), and parts per trillion (ppt). Emissions are measured in a common unit, which is the metric tons of carbon dioxide equivalent (CO_2e); this unit of measure takes into account the Global Warming Potential (GWP) of each of the emitted GHGs in terms of CO_2e.[35]

3.4.2.1 Climate and Emissions Trends

Detailed climate and emissions trends for global-, national-, and state-level (Montana) scales are provided in the 2018 Final EIS and supplemented or updated as appropriate in the sections below.

[35.] According to the EPA, emissions of GHGs are typically expressed in a common metric so that their impacts can be directly compared, as some gases are more potent (have a higher GWP) than others. Gases with a higher GWP absorb more energy (and thus contribute more to warming the earth) than gases with a lower GWP. The international standard practice is to express GHGs in CO_2 equivalents, or CO_2e. Emissions of gases other than CO_2 are translated into CO_2e using GWPs. A GWP is calculated over a specific time interval, commonly 20, 50, or 100 years. The IPCC recommends using 100-year potentials (EPA 2017d).

Global Emission Trends

Estimates from the Rhodium Group for 2022 show global emissions at 50.6 gigatons of carbon dioxide equivalent (Gt CO_2e), representing a 1.1 percent increase from 2021 levels. Global emissions dropped in 2020 primarily due to the coronavirus (COVID-19) pandemic and global recession and rebounded by a nearly equivalent amount in 2021. In 2022, China accounted for 26 percent of all global emissions, the U.S. accounted for approximately 12 percent of global GHG emissions, and India and the European Union accounted for 7 percent each. In 2021 (the latest year for which there is sufficient data to provide sectoral-level detail) GHGs were emitted across the following primary economic sectors globally: industry (29 percent); electric power generation (29 percent); land use, agriculture, and waste (20 percent); transportation (15 percent); and buildings (7 percent) (Rivera et al. 2023).

National Emissions Trends

GHG emissions in the U.S. are tracked by the EPA through two complementary programs. First is the U.S. annual GHG emissions inventory, the *Inventory of U.S. Greenhouse Gases and Sinks*, which is published annually by the EPA; this inventory report estimates the total national GHG emissions and removals associated with human activities in all 50 states and compares it to emissions from the prior year. The 2018 Final EIS used the 2017 inventory report (EPA 2017), which covered 2015 GHG emissions data; the most recent inventory report was issued in 2024 and covers 2022 GHG emissions data (EPA 2024d). Data from 2022 (EPA 2024d) are compared to 2015 data in this SEIS to show the trends since issuance of the 2018 Final EIS; as applicable to demonstrate trends, the 2022 date is also compared to data older than 2015.[36] The second program is the Greenhouse Gas Reporting Program (GHGRP), which generally applies to facilities that emit more than 25,000 million metric tons (MMT) of CO_2e each year. The facility-level emissions reported under GHGRP are published through the Facility Level Information on Greenhouse Gases Tool (FLIGHT) (EPA 2024m). EPA estimates that the FLIGHT data reported by large emitters reflect 85 to 90 percent of the total U.S. emissions.

GHG emissions include both anthropogenic and natural emissions of GHGs. The gross total 2022 GHG emissions for the U.S. were 6,343.21 MMT CO_2e (EPA 2024e), as compared to gross total national 2015 GHG emissions of 6,736.22 MMT CO_2e cited in the 2018 Final EIS. Compared to 2015 (the latest data year used in the 2018 Final EIS), total gross annual GHG emissions in the U.S. have decreased by 5.8 percent. Net GHG emissions account for removals by sinks (e.g., carbon uptake by forests). Net GHG emissions in 2022 were 5,489.0 MMT CO_2e (EPA 2024d). Overall, net emissions increased by 1.3 percent from 2021 to 2022 and decreased by 16.7 percent from 2005 levels (EPA 2024d).

Important drivers of year-to-year emissions are long-term trends in population and economic growth, energy markets, technological changes (including energy efficiency), the price of fuel, weather, and other factors. For example, from 2019 to 2020, there was a steep decline in emissions, due in part to the impacts of the COVID-19 pandemic on travel and other economic activity (EPA 2024d). In 2020 and 2021, the increase in total GHG emissions was primarily due to an increase in CO_2 emissions from fossil fuel combustion related to the economic rebound after the height of the COVID-19 pandemic (EPA 2024d).

[36] A supplement to the annual emissions inventory report is the EPA's Greenhouse Gas Inventory Explorer (2024e), a web-based tool that allows comparison of the EPA's GHG emissions inventory for key gases across decades (1990-2022). This internet tool was used to compare data years and describe the resulting trends in this SEIS.

The primary GHG emitted by human activities in the United States is CO_2, representing nearly 80 percent of total GHG emissions in 2022, and the largest source of CO_2 is fossil fuel combustion (e.g., transportation [29 percent] and power generation [25 percent]) (EPA 2024e). Overall, CO_2 emissions (5,053.02 MMT CO_2e in 2022) have decreased 1.5 percent since 1990 (EPA 2024d) and decreased 5.9 percent since 2015 (EPA 2024e).

Methane (CH_4) emissions from sources such as domestic livestock, natural gas, and waste decomposition account for approximately 11 percent of total U.S. GHG emissions (EPA 2024e). Overall, CH_4 emissions (760.75 MMT CO_2e in 2022) in the U.S. have decreased approximately 19.4 percent since 1990 (EPA 2024d) and approximately 8.13 percent since 2015 (EPA 2024e).

In recent years, there has been a general nationwide trend of declining GHG emissions across many sectors (EPA 2024d). In its annual inventory, the EPA considers emissions in five sectors: energy (including electric power and electricity generation), industrial processes, agriculture, waste management, and land use and forestry (sinks). GHG emission sources in the energy sector account for most GHG emissions. Overall, emissions (5,199.8 MMT CO_2e in 2022) from energy production have decreased 3.4 percent since 1990 (EPA 2024d) and decreased 6.8 percent since 2015 (EPA 2024e). Agriculture is the next highest GHG emissions source after energy. Overall, emissions (593.4 MMT CO_2e in 2022) from agriculture have increased 7 percent since 1990 (EPA 2024d) and have decreased approximately 3.5 percent since 2015 (EPA 2024e). Industrial processes and product use, which include the chemical or physical transformation of raw materials, account for the third highest gross U.S. GHG emissions. Overall, emissions (383.2 MMT CO_2e in 2022) from industrial processes and product use have increased by approximately 3.9 percent since 1990 (EPA 2024d) and increased 3.7 percent since 2015 (EPA 2024e). Waste management, particularly from landfills, accounts for the least total gross U.S. GHG emissions. Overall, emissions (166.9 MMT CO_2e in 2022) from waste management have decreased approximately 29.3 percent since 1990 (EPA 2024d) and have decreased 2.8 percent since 2015 (EPA 2024e). Forests, cropland, and rangeland provide a vast terrestrial carbon sink that helps balance U.S. emissions; in 2021, these uses provided a sink for 854.27 MMT CO_2e (EPA 2024e).

Federal lands are responsible for GHG emissions from activities such as fossil fuel extraction and combustion, as well as carbon sequestration, which is the process of capturing and storing atmospheric carbon dioxide through uptake into soils, vegetation, aquatic environments, and other ecosystems (biologic sequestration) or through injection into porous underground rock formations (geologic sequestration). The U.S. Geological Survey (USGS) has estimated GHG emissions and carbon sequestration on Federal lands for the 10-year period from 2005 to 2014 (Merrill et al. 2018). GHG emissions (when considering just CO_2) associated with the combustion and extraction of fossil fuels from U.S. Federal lands increased from 1,362 MMT CO_2e in 2005 to 1,429 MMT CO_2e in 2010, and then decreased to 1,279 MMT CO_2e in 2014. CH_4 and N_2O emissions from Federal lands also decreased over the same 10-year period. When the Federal lands' fossil fuel extraction and combustion emissions are combined with ecosystem emissions and sequestration estimates, the annual net carbon emissions from Federal lands within the conterminous U.S. (48 contiguous states) ranged from 683 MMT CO_2e to 783.5 MMT CO_2e from 2005 to 2014, indicating a net increase in carbon emission from Federal lands within the conterminous U.S.

Montana Emissions Trends

Emission trends in Montana have been similar to those on the national level: there has been a slight general increase in state GHG emissions since 1990 (based on data through 2021; EPA 2024e). Overall, gross GHG emissions in Montana (52.251 MMT CO_2e in 2021) have increased approximately 2.8 percent since 1990 and have decreased 8.5 percent since 2015 (the data year used in the 2018 Final EIS).

The EPA requires reporting of GHG data from large GHG emission sources: pursuant to FLIGHT (EPA 2024m), there are 31 facilities categorized as large emitters in the state of Montana, including the Colstrip Power Plant and the Rosebud Plant. In Montana, these large emitters produced about 17.574 MMT CO_2e in 2022 (EPA 2024m). Therefore, large emitters account for approximately 34 percent of Montana's total GHG emissions.

As with national data, the EPA's Montana GHG inventory data (EPA 2024e) are broken down into several general categories: energy, industrial processes, agriculture, waste management, and land use and forestry (sinks). Since 1990, the sources of emissions in Montana have been shifting sectors from electric power generation and industry to agriculture and other sources. Overall, energy sector emissions (31.529 MMT CO_2e in 2021) have decreased 26 percent since a high in 2007 (42.784 MMT CO_2e) and approximately 14 percent since 2015 (EPA 2024e). The overwhelming energy contributor continues to be general fossil fuel combustion, especially coal power plants and oil refineries. Overall, agricultural emissions (19.014 MMT CO_2e in 2021), which are the second highest source of GHG emissions in Montana, have increased 22 percent since 1990 (EPA 2023a) and a little less than 2 percent since 2015. For industrial processes, overall emissions (1.108 MMT CO_2e in 2021) are down about 63 percent since 1990 (EPA 2024e) but have increased approximately 4 percent since 2015 (EPA 2024e). Waste emissions (0.600 MMT CO_2e in 2021) have increased more than 37 percent since 1990 and have increased a little less than 1 percent since 2015. Montana's forests, cropland, and rangeland provide a vast terrestrial carbon sink that helps balance the state's emissions; in 2021, these uses provided a sink for 10.163 MMT CO_2e (EPA 2024e).

At the state scale (as well as the national scale described above), Federal lands are responsible for GHG emissions from activities such as fossil fuel extraction and combustion, as well as biological and geological carbon sequestration. The annual net carbon emissions from Montana ranged from 15.6 MMT CO_2e to 20.2 MMT CO_2e from 2005 to 2014, indicating a net increase in carbon emission from Montana Federal lands (Merrill et al. 2018). The BLM Specialist Report on Annual Greenhouse Gas Emissions and Climate Trends presents the estimated emissions of GHGs attributable to fossil fuels produced on lands and mineral estate managed by the BLM. More specifically, the report estimates GHG emissions from coal, oil, and gas development that is occurring, and is projected to occur, on the Federal onshore mineral estate. BLM estimated a total of 1,033.21 Mt CO_2e from all coal production on Federal lands in 2022 and 33.5 Mt CO_2e from all coal production on Federal lands in Montana in 2022 (BLM 2022).

Coal Production

The Energy Information Administration (EIA) tracks coal production in the U.S. (EIA 2024). Total U.S. production in 2022 was a little more than 595 million tons as compared to nearly 897 million tons in 2015 (the data year used in the 2018 Final EIS), representing a nearly 34 percent reduction in U.S. production since the issuance of the 2018 Final EIS. In Montana, total coal production in 2022 was about 28.2 million tons, as compared to about 41.9 million tons in 2015 (data year used in the 2018 Final EIS), representing approximately a 33 percent reduction in Montana production since the issuance of the 2018 Final EIS (**Table 3.4-2**).

Table 3.4-2. Montana Coal Production in 2015 versus 2022.

Mine	Production (tons/year)	
	2015	2022
Absaloka Mine	5,534,969	2,229,591
Bull Mountains Mine	6,419,645	7,431,273
Decker (East and West) Mines	2,980,682	0*
Rosebud Mine	9,671,003	6,970,910
Savage Mine	270,285	36,282
Spring Creek Mine	16,987,420	11,565,298
Total	**41,864,004**	**28,233,354**

*The Decker coal mines closed in 2021.
Source: EIA 2024.

As described in **Section 2.2.1, Past and Existing Production**, Westmoreland Rosebud recovered about 7.1 million tons of coal from the Rosebud Mine (Areas B and F) in 2023. Production in recent years has ranged between a low of about 5.4 million tons to a high of about 7.1 million tons in 2023 (see discussion in **Chapters 1** and **2**). Future production from the Rosebud Mine will depend on a number of factors, including market conditions (see additional discussion in **Section 2.2.6, Life of Operations** and in **Section 4.3.3.1, Direct Impacts** [Air Quality]).

Three potential sources of fugitive CH_4 are associated with surface coal mining:

- Emissions from the coal excavated and processed during mining activities;
- Emissions from the coal and other gas-bearing strata in the overburden or underburden exposed by mining activities; and
- Emissions from the overburden coal excavated and stored on-site in waste piles.

As discussed in the 2018 Final EIS, despite the fact that the majority of U.S. coal comes from surface mines (approximately 63 percent in 2015), CH_4 emissions from surface mines constitute only 14 percent of total U.S. coal-mine methane emissions from active mines (EPA 2017).

3.4.2.2 Rosebud Mine GHG Emissions

The primary sources of GHG emissions from the Rosebud Mine are fugitive CH_4 emissions from exposed coal, and exhaust from mobile and stationary engines used at the mine (see discussion of sources in **Section 3.3.4.1, Existing Emissions from the Rosebud Mine**). Mobile sources of GHG include gasoline- and diesel-powered loaders, coal-haul trucks, coal and overburden drills, hydraulic excavators, support vehicles, maintenance equipment, other materials handling equipment (e.g., graders, dozers, dump trucks, and reclamation tractors), and explosive detonation. The dominant fuel used for mobile sources at the Rosebud Mine is diesel.

As described in the 2018 Final EIS **Section 3.4.2.4**, GHG emissions were estimated for the mine (Areas A B, C, D, and E) using activity data for 2010-2015 provided by Westmoreland Rosebud. To estimate emissions from off-road diesel and gasoline mobile sources, CO_2, CH_4, and N_2O emission factors for diesel and gasoline fuel combustion were applied to the annual reported fuel usage rates. Annual stationary diesel equipment emissions were calculated based on the stationary diesel usage rate for the mine (Areas A, B, C, D, and E), along with stationary diesel equipment emission factors. Emissions from the hauling of waste coal to the Rosebud Power Plant were estimated using EPA's Motor Vehicle Emissions Simulator (MOVES) model with data provided by Westmoreland Rosebud and were assumed to be representative of annual emissions. Surface methane emissions were calculated based on an emission rate of 33.1 standard cubic feet per ton (scf/ton) (EPA 2005a). None of the basins with available

methane production rates were located in Montana; therefore, the value for Green River Basin (Wyoming) was selected. The resulting annual GHG emission rates for the Rosebud Mine and associated activities (e.g., crushing, hauling, conveying, etc.) are provided in **Table 3.4-3** (**Table 33** from the 2018 Final EIS). Based on recent production and the rationale provided above in **Section 3.3.4.1, Existing Emissions from the Rosebud Mine**, the GHG emissions estimates from the Final 2018 EIS (**Table 3.4-3**) provide a reasonable or even over-estimate of current GHG emissions from the Rosebud Mine; total production from the Rosebud Mine in 2023 was 7,027,880 tons (Area F accounted for approximately 65 percent of this production).

Table 3.4-3. Historic GHG Emissions Summary from the Rosebud Mine (All Permit Areas).

Year	Coal Production (MT/year)	GHG Emissions (MT/year)			
		CO_2	CH_4	N_2O	CO_2e
2010	11,095,174	47,333	8,211	1.19	277,550
2011	7,969,457	39,554	5,898	1.00	204,959
2012	7,273,891	40,268	5,383	1.01	191,271
2013	7,482,397	42,188	5,538	1.06	197,526
2014	8,181,408	39,085	6,055	0.98	208,877
2015	8,732,547	45,887	6,463	1.16	227,151

MT/year = metric tons per year.

3.4.2.3 Colstrip and Rosebud Power Plants Stationary Source GHG Emissions

The most recent GHG emissions (2016-2022) for the power plants are presented below in **Table 3.4-4** and compared to the GHG emissions (2010-2015) data provided in **Table 34** of the 2018 Final EIS. Since then, two of the four units at the Colstrip Power Plant (Units 1 and 2) have been retired (as of January 2020); see discussion in **Chapter 1, Section 1.2.2, Coal Combustion**. Recent GHG emissions from the Colstrip Power Plant were less than those considered in the 2018 Final EIS (**Table 3.4-4**). Recent GHG emissions for the Rosebud Power Plant generally were similar to those previously considered, except in 2016 and 2021, when emissions were somewhat higher (see the cells with asterisks in **Table 3.4-4**).

Table 3.4-4. Historic GHG Emissions Summary from the Colstrip and Rosebud Power Plants.

Year	GHG Emissions (MT/year)			
	CO_2	CH_4	N_2O	CO_2e
All Colstrip Units (1 to 4)				
2010	16,994,687	1,902	277	17,121,274
2011	13,991,414	1,535	223	14,093,594
2012	13,395,792	1,455	212	13,492,605
2013	13,577,421	1,491	217	13,676,663
2014	14,796,150	1,627	237	14,904,402
2015	15,854,041	1,740	253	15,969,860
2016	14,281,357	1,596	232	14,390,436
2017	13,826,006	1,589	231	13,934,589
2018	13,211,678	1,521	221	13,315,612
2019	14,167,992	1,603	233	14,277,559
Colstrip Units 3 and 4				
2020	8,274,559	964	140	8,340,434
2021	9,954,520	1,183	172	10,035,340
2022	10,653,538	1,275	185	10,740,663
Rosebud Power Plant				
2010	415,871	51	7	419,297
2011	371,211	39	6	373,832
2012	427,247	45	7	430,267
2013	439,555	50	7	442,812
2014	418,448	48	7	421,612
2015	472,857	48	7	476,043
2016	*520,285	48	7	*523,594
2017	310,979	30	4	313,011
2018	411,215	54	8	414,892
2019	376,950	45	7	380,050
2020	370,283	46	7	373,440
2021	*487,752	48	7	*491,021
2022	436,594	45	7	439,647

MT/year = metric tons per year.
* These cells have higher values than the highest values that were disclosed in the 2018 Final EIS.
Source: 2011-2015 GHG emissions were acquired from the EPA's FLIGHT, which uses GWP from the Intergovernmental Panel on Climate Change's (IPCC's) AR4. Reported CO2e was revised for CH4 and N2O using the GWP from the IPCC's AR5. 2016-2022 GHG emissions are from the EPA's Envirofacts site (EPA 2024f, 2024g) and have been rounded to the nearest whole number.

3.4.2.4 Emissions from Worker Commutes

In addition to GHG emissions related to the operations of the Rosebud Mine, the Colstrip Power Plant, and the Rosebud Power Plant, GHG emissions are generated by workers employed at those facilities during their daily commutes. GHG emissions were calculated using a distance-based method outlined in the *Technical Guidance for Calculating Scope 3 Emissions* (World Resources Institute et al. 2013). Data inputs provided in **Table 3.4-5** below were used in the calculations. Emission factors for light trucks, which was the vehicle assumed to be the most commonly used by commuters, were obtained from Table 10 in *Emission Factors for Greenhouse Gas Inventories* (EPA 2024l). The following emissions factors were used: 0.405 kg/vehicle-mile CO_2, 0.011 g/vehicle-mile CH_4, and 0.010 g/vehicle-mile N_2O. Annual worker commute emissions are provided in **Table 3.4-6**.

Table 3.4-5. Data Used to Calculate Worker Commute GHG Emissions.

Data	Rosebud Mine[1]	Colstrip Power Plant[2]	Rosebud Power Plant
Total employees	320	260	101
Average one-way distance (miles) travelled by employees per day	40.9 miles*	40.9 miles*	40.9 miles*
Commuting days per week (7 days)	35 employees commuting 5 days/week 285 crew members commuting 4 days/week	260 employees commuting 4 days/week	101 employees commuting 4 days/week
Commuting days per year per employee	214	208	208
Total annual distance traveled (mi) for light trucks (number of employees × daily one-way distance between home and work (miles) × 2 × number of commuting days per year)	5,593,484 miles/year	4,423,744 miles/year	1,718,454 miles/year

*All three facilities (Rosebud Mine, Colstrip Power Plant, and Rosebud Power Plant) are within the immediate vicinity of the city of Colstrip. Employees of these facilities live in the tri-county (Rosebud, Treasure, and Big Horn) region that includes the following incorporated municipalities: Colstrip (1.5 miles), Forsyth (47 miles), Hardin (80 miles), Hysham (52 miles), and Lame Deer (24 miles). This analysis used an average commute distance and assumed an even distribution of employees from each of the municipalities.

1. Source: Batie 2024.
2. Source: Criswell 2024 and Olsen 2024.

Table 3.4-6. Worker Commute GHG Emissions.

Employer	Total Annual Distance (miles) for Light Trucks	CO_2 (kg) Annual CO_2e Emissions	CH_4 (g) Annual CO_2e Emissions	N_2O (g) Annual CO_2e Emissions
Colstrip Power Plant	4,423,744	1,791,616	48,661	44,237
Rosebud Power Plant	1,718,454	695,974	18,903	17,185
Rosebud Mine	5,593,484	2,265,361	61,528	55,935
Total	11,735,682	4,752,951 (4,753 MT)	129,093 (0.13 MT)	117,357 (0.18 MT)

Note: Values have been rounded to the nearest whole numbers.

3.5 PUBLIC HEALTH AND SAFETY

3.5.1 Introduction

Since the issuance of the 2018 Final EIS, there have been no substantial new circumstances or information relevant to public health and safety, other than those described above for air quality and climate. Information on public health and safety is available in **Section 3.5** of the 2018 Final EIS beginning on page 170. To address public comments on the Draft SEIS, some information from the 2018 Final EIS **Section 3.5** has been pulled forward into this SEIS and updated or supplemented as needed to address comments.

3.5.1.1 Regulatory Framework

The complete regulatory framework applicable to public health and safety is provided in **Section 3.5.1.1** of the 2018 Final EIS beginning on page 170. Laws and regulations that are particularly relevant to public health and safety updates in this SEIS are listed below.

Federal Mine Safety Act and Health Act of 1977

The Federal Mine Safety and Health Act requires the U.S. Department of Labor's Mine Safety and Health Safety Administration (MSHA) to ensure safe and healthy work environments for miners. All mines are inspected on multiple occasions each year for compliance with MSHA's regulations. In addition to setting safety and health standards for preventing hazardous and unhealthy conditions, MSHA's regulations require mine operators to provide the following:

- Immediate notification by the mine operator of accidents, injuries, and illnesses at the mine;
- Training programs that meet the requirements of the mine act; and
- Requirements for the use of personal protective equipment (PPE).

MSHA's "Respirable Dust Rule" (79 FR 24814, May 1, 2014) is intended to reduce miners' exposure to coal mine dust to prevent lung diseases such as coal worker's pneumoconiosis (CWP), emphysema, silicosis, and chronic bronchitis, known collectively as "black lung." For example, MSHA has established a permissible exposure limit (PEL) for respirable coal mine dust, and mine operators, such as Westmoreland Rosebud, are required to conduct regular sampling of respirable dust levels to ensure compliance with the PEL. When excessive dust levels are detected, mine operators must take immediate corrective actions to lower the dust concentration to acceptable levels.

3.5.1.2 Analysis Area

The analysis areas for public health and safety are described in **Section 3.5.1.2** of the 2018 Final EIS beginning on page 172. For direct public health effects, this area includes the project area,[37] nearby residences and waterbodies, and the transportation network (**Figure 1.1-2** in **Chapter 1**). As with socioeconomics, indirect public health effects were analyzed in the tri-county area (Rosebud, Bighorn,

[37.] As Westmoreland Rosebud has developed Area F, on-the-ground conditions have necessitated minor changes to the project area, which is the Area F permit boundary (now 6,773 acres instead of 6,746 acres). These minor revisions were reviewed and approved by DEQ pursuant to MSUMRA and MEPA and are described in **Section 2.2.2.2, Area F Operations and Development**.

and Treasure Counties); see **Figure 3.15-1**. For public safety, the same analysis areas as for noise (**Section 3.22.1.2**) and solid and hazardous waste (**Section 3.21.1.2**) were used.

3.5.2 Environmental Health

Information on environmental health is available in the 2018 Final EIS in **Section 3.5.2** beginning on page 173.

3.5.2.4 Surface Water and Groundwater Quality

Circular DEQ-7, which provides Montana Numeric Water Quality Standards pursuant to Administrative Rules of Montana (ARM) 17.30.629, was updated in 2019; the 2017 standards were used in the 2018 Final EIS analysis. The change in water quality standards in Circular DEQ-7 is not a significant new circumstance for the public health and safety analysis as the new standards would not result in remarkably different outcomes than the impacts described in the 2018 Final EIS. See **Section 3.7, Water Resources – Surface Water**, below for a more detailed discussion of updated water quality standards.

3.5.3 Socioeconomic Environment and Health

Detailed information on socioeconomic environment and health is available in the 2018 Final EIS in **Section 3.5.3** beginning on page 183.

3.5.3.1 Demographics

Detailed population and demographic characteristics are found in the 2018 Final EIS, specifically in **Sections 3.15** and **3.16**. The human populations within the direct and indirect effects analysis areas potentially include the following: mine workers, residents, resident farmers and ranchers, recreation users, and sensitive populations.

Sensitive Populations

Sensitive populations (e.g., minority race and low-income populations) are present in the analysis area. These populations are discussed in depth in the 2018 Final EIS in **Section 3.16**. Low-income populations are present in all three counties and on the Crow and Northern Cheyenne Reservations. Native Americans, primarily Northern Cheyenne and Crow, are the largest minority race group in the area. Tribal members are employed in the Colstrip energy sector. Although exact numbers vary, it has been reported that the Rosebud Mine employed an average of 58 Northern Cheyenne tribal members in 2024 (Haggarty 2024). In addition, it has been reported that the Colstrip Power Plant (including associated facilities) has as recently as May 2024 employed 27 Northern Cheyenne tribal members as permanent employees, and that during power plant overhauls, as many as 50 additional Northern Cheyenne tribal members are employed at the power plant (Haggarty 2024). Based on July 2024 data, Talen Energy reported that 22 Native Americans were employed at the Colstrip Power Plant (Criswell 2024).

3.5.3.2 Economics

Indirect economic impacts on public health could occur because the financial resources available to the local population or local government would affect the quality and quantity of health-related services, including treatment and prevention of chronic and infectious diseases. **Section 3.15** in this SEIS discusses the economic environment in the analysis area, including markets, employment and economic sectors, income, and revenue.

3.5.3.3 Social Characteristics

Social Services

Social services are discussed in **Section 3.15** in the 2018 Final EIS, including health care facilities, schools, libraries, and other services. The analysis area is identified as being underserved by health services.

Community Health

As described in the 2018 Final EIS, relevant community health issues include those related to particulate inhalation, which is the most significant exposure pathways associated with the proposed action and alternatives. Detailed discussions of chronic disease, infectious diseases, injury, nutrition, and well-being in the direct and indirect effects analysis area are provided in the 2018 Final EIS in **Section 3.5.3.3**.

Chronic exposure to respirable coal mine dust causes lung diseases including CWP, emphysema, silicosis, and chronic bronchitis, known collectively as "black lung" (79 FR 24814, May 1, 2014). According to the American Lung Association (2025), black lung results from long-term exposure to coal dust and leads to inflammation and scarring of the lung tissues, making it difficult to breathe. Black lung is considered an occupational disease as it is most common among coal miners. The prevalence of black lung among surface coal miners, however, has not been extensively studied. According to a Centers for Disease Control and Prevention study, 15 cases of CWP were diagnosed in non-Appalachian states (Alabama, Arizona, Colorado, Illinois, Indiana, Maryland, Montana, New Mexico, North Dakota, Ohio, Pennsylvania, Tennessee, and Wyoming) in 2010 and 2011, representing approximately 1.1 percent of surface miners in the region (Centers for Disease Control and Prevention 2012). Native American miners may be more vulnerable to black lung: a 2023 study that found that "indigenous coal miners experience greater adjusted odds for pneumoconiosis and respiratory impairment per decade of life" (Hua et al. 2024). Between 1973 and 2023, 876 black lung claims were made in Montana (U.S. Department of Labor Office of Workers' Compensation Programs 2025). Symptoms of black lung often surface later in life. MSHA's "Respirable Dust Rule," which was implemented in 2014 and is described above in **Section 3.5.1.1, Regulatory Framework**, is intended to reduce new occurrences of black lung among miners.

3.5.4 Public Safety

Information on public safety is available in the 2018 Final EIS in **Section 3.5.4** beginning on page 186.

3.6 GEOLOGY

3.6.1 Introduction

Since the issuance of the 2018 Final EIS, there have been no substantial new circumstances or information relevant to geology. Information on project area geology is available in **Section 3.6** of the 2018 Final EIS beginning on page 187.

3.6.1.1 Regulatory Framework

The regulatory framework for geology is unchanged since the Final EIS and is described in **Section 3.2.1.1** of the 2018 Final EIS beginning on page 187.

3.6.1.2 Analysis Area

The analysis areas for geology, which are the project area for direct effects and the downstream watersheds for indirect effects, are described in detail in **Section 3.6.1.2** of the 2018 Final EIS beginning on page 187.

3.6.2 Analysis Area Geology

Information on the affected environment (analysis area geology) is available in the 2018 Final EIS in **Section 3.6.2** beginning on page 187.

3.6.3 Regional Geology

Information on the affected environment (regional geology) is available in the 2018 Final EIS in **Section 3.6.3** beginning on page 195.

3.7 WATER RESOURCES – SURFACE WATER

3.7.1 Introduction

This section describes surface water resources that occur within the direct and indirect effects analysis areas, including a description of floodplains, stream flow, spring flow, and ponds. This section also describes surface water quality in the direct and indirect effects analysis areas and includes the regulatory requirements to protect surface water (floodplains, quantity, and quality).

This section has been updated from the 2018 Final EIS, in part, to address the deficiencies identified in the September 30, 2022, Court order. An updated description of the indirect analysis area is provided in **Section 3.7.1.2**, updated descriptions and data related to surface water hydrology in the indirect effects analysis area are provided in **Section 3.7.5.4**, and updated descriptions and data related to surface water quality in the indirect effects analysis area are provided in **Section 3.7.6.2**.

The direct effects analysis area remains the same as what was defined in the 2018 Final EIS, but the indirect effects analysis area and the cumulative effects analysis area, defined below in **Section 3.7.1.2, Analysis Area**, and in **Section 5.3.6, Water Resources – Surface Water**, respectively, have been enlarged to include a portion of the Yellowstone River in response to the 2022 Court order. This section has been updated to describe surface water resources in the expanded indirect and cumulative effects analysis areas to support analyses presented in **Chapter 4** (direct and indirect impacts) and **Chapter 5** (cumulative impacts). This section was also updated to describe Montana's surface water quality classifications and standards updated through state regulation and court action since the 2018 Final EIS. This includes (in **Section 3.7.1.1**) updated definitions for state waters, updated classifications for specific type waters, and updated surface water quality standards. Other changed conditions are listed in **Table 3.7-1**.

Table 3.7-1. Surface Water and Groundwater: Changed Conditions Since the 2018 Final EIS.

Year	Change
2019	In the *Cumulative Hydrologic Impact Analysis for Area F* (DEQ 2019b), referred to as the CHIA in this SEIS, DEQ determined that Westmoreland's proposed mining plan put forth in its Permit Application Package (PAP) (Alternative 2 in the 2018 Final EIS), if implemented in T2N, R38E, Section 12, would likely result in a change in water quality in the Rosebud Coal outside the permit boundary, which could result in material damage. To remove the potential for material damage, DEQ did not approve mine passes in that portion of the permit area in its 2019 ROD and Written Findings (DEQ 2019a). OSMRE similarly did not authorize mining in this portion of the permit area in its 2019 ROD (OSMRE 2019a).
2019	DEQ updated the water quality standards in Circular 7.
2019	Westmoreland Rosebud began developing Area F in 2019, and active mining began in Area F in August 2020 pursuant to the DEQ-approved state operating permit C2011003F and the 2019-approved Federal mining plan. Both the state operating permit and Federal mining plan prohibit mining in 74 acres of Federal coal in T2N, R38E, Section 12 to prevent material damage outside of the Area F permit area. As of December 2023, Westmoreland Rosebud has disturbed 582 acres in the project area; 494 acres of that disturbance is due to active mining, and the remainder is due to site development, such as roads and soil and/or spoil stockpiles. See **Tables 2.2-3** and **2.2-4** in **Chapter 2** above for current disturbance at the Rosebud Mine and Westmoreland Rosebud's reclamation bonds.
2019-2022	In terms of other permit areas of the Rosebud Mine, the following may contribute to changed conditions for groundwater: • AM5 to Permit Area B was approved by DEQ in 2022 after preparation of an EIS pursuant to MEPA that considered the cumulative groundwater impacts of Area F. Area B AM5 was analyzed as a cumulative impact in the 2018 Final EIS, and DEQ prepared a CHIA for Area B AM5. • Area D is no longer actively mined and is being reclaimed. • Area E has received full bond release and is no longer a Montana coal mine.
2023	Westmoreland monitors water resources in the project area and submits Annual Hydrology Reports to Montana DEQ as a condition of its operating permits for the Rosebud Mine. The most recent reporting year available is 2023 (January 1, 2023, through December 31, 2023); this report (WET 2024) was used to update water quality tables in **Appendix 3**.

3.7.1.1 Regulatory Framework

The regulatory framework has been updated (as applicable) to document regulatory changes since the 2018 Final EIS.

Federal Requirements

Federal surface water quantity and quality regulations applicable to the analysis area include the Clean Water Act (CWA) of 1972 and CWA Amendments of 1977, which require Federal agencies to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." The Surface Mining Control and Reclamation Act of 1977 (SMCRA), which requires minimization of the disturbance to the hydrologic balance and to the quality and quantity of water in surface water and groundwater systems both during and after surface coal mining operations and during reclamation, is also applicable. Authority to administer SMCRA in the state has been delegated by OSMRE to DEQ (see **Section 1.4.1.1, Office of Surface Mining Reclamation and Enforcement** in the 2018 Final EIS), and DEQ administers several sections of the Federal CWA pursuant to an agreement between the state and EPA. Both the CWA and SMCRA are discussed in more detail below.

Clean Water Act

The CWA utilizes both water quality standards and technology-based effluent limitations to protect water quality. To achieve its objectives, the CWA's National Pollutant Discharge Elimination System program (Section 402 of the Act) requires the discharger to attain technology-based effluent limits and specify the

effluent limitations a discharger must meet and the deadline for compliance (Congressional Research Service 2016).

For industrial sources, national effluent limit guidelines (ELGs) have been developed for specific categories of industrial facilities and represent technology-based effluent limits. The analysis area is in an industrial category that is specifically identified and included in the ELGs at 40 C.F.R. part 434, Coal Mining. The Federal ELGs that apply to discharges from the project area are for alkaline mine drainage (Subpart D), western alkaline coal mining (Subpart H), and precipitation discharge events (Subpart F). ELGs after application of the best practicable control technology currently available are provided in **Table 3.7-2** for new coal facilities. Alkaline mine drainage is defined as having a pH equal to or greater than 6.0, a total iron concentration of less than 10 mg/L, and a net alkalinity greater than zero prior to any treatment.

Table 3.7-2. Effluent Limit Guidelines for New Coal Mine Point Source Discharges.

Parameter	1-Day Maximum	30-Day Average
Iron, total (mg/L)	6.0	3.0
Total suspended sediments (mg/L)	70.0	35.0
pH (s.u.)	6.0–9.0 (within the range at all times)	6.0–9.0 (within the range at all times)
Settleable solids[1] (mL/event)	0.5	NA

mg/L = milligrams per liter; s.u. = standard units; mL = milliliters.
[1.] Settleable solids limits are for discharges caused by precipitation events less than or equal to the 10-year, 24-hour precipitation event.
Source: 40 C.F.R. Part 434, subparts D and F (new source performance standards).

Subpart H is applicable to alkaline mine drainage at western coal mining operations from reclamation areas, brushing and grubbing areas, topsoil stockpiling areas, and graded areas. Subpart H requires submittal of a site-specific Sediment Control Plan designed to prevent an increase in the average annual sediment yield from current, undisturbed conditions. The Sediment Control Plan must identify Best Management Practices (BMPs); describe design specifications, construction specifications, maintenance schedules, and criteria for inspection; and specify the expected performance and longevity of the BMPs. BMPs must be designed, implemented, and maintained as specified in the approved Sediment Control Plan.

EPA has delegated authority to the state, through DEQ, for administering non-point-source pollution prevention programs, the National Pollutant Discharge Elimination System program for point sources, and water quality standards. The Montana Water Quality Act, which prevents degradation of surface waters and groundwaters, including from discharges of mine wastewater and storm water, is also applicable.

State Requirements

State surface water quantity and quality regulations applicable to the analysis area include the Montana Surface and Underground Mine Reclamation Act (MSUMRA), which contains reclamation requirements to protect the hydrologic balance and achieve postmining land use performance standards. Hydrologic balance is defined as the relationship between the quality and quantity of water inflow to, water outflow from, and water storage in a hydrologic unit such as a drainage basin, aquifer, soil zone, lake, or reservoir, and encompasses the dynamic relationships among precipitation, runoff, evaporation, and changes in groundwater and surface water storage per Section 82-4-203(24), MCA. The Montana Water Quality Act, which prevents degradation of surface waters and groundwaters due to discharges of mine wastewater and storm water, is also applicable. Both MSUMRA and the Montana Water Quality Act are discussed in more detail below. State water rights requirements are described in **Section 3.9.1.1**.

MSUMRA conditions approval of an application for a coal mine operating permit on demonstration by the applicant that "the assessment of the probable cumulative impact of all anticipated mining in the area on the hydrologic balance has been made by the department [DEQ] and the proposed operation of the mining operation has been designed to prevent material damage to the hydrologic balance outside the permit area" under Section 82-4-227(3)(a), MCA, and ARM 17.24.405(6)(c). MSUMRA defines "material damage" as follows: "with respect to protection of the hydrologic balance, degradation or reduction by coal mining and reclamation operations of the quality or quantity of water outside of the permit area in a manner or to an extent that land uses or beneficial uses of water are adversely affected, water quality standards are violated, or water rights are impacted. Violation of a water quality standard, whether or not an existing water use is affected, is material damage." The permit application must contain a detailed description of the "measures to be taken during and after mining activities to minimize disturbance to the hydrologic balance on and off the mine permit area and prevent material damage to the hydrologic balance outside the permit area" (ARM 17.24.314(1)). Material damage criteria are established for the evaluation of both surface water and groundwater quality and quantity, and are used to determine whether water quality or quantity outside the permit area will be impacted to the extent that land uses or beneficial uses of water are adversely affected, water quality standards outside the permit area will be violated, or water rights outside the permit area will be impacted by the proposed mine operations. An approved application for a coal mine operating permit allows adverse effects on water quality and quantity within the permit boundary as long as the proposed mining includes measures to minimize disturbance on and off the mining plan area and to prevent material damage to the hydrologic balance outside the permit area (ARM 17.24.314(1)).

Surface Water Quantity and Quality

The rules implementing MSUMRA (ARM 17.24.301 through 1309) provide requirements to protect water quality and quantity, including water quality performance standards and the use of best technology currently available to protect water resources. The regulations limit or prevent stream-channel disturbances within 100 feet of a perennial or intermittent stream or a stream reach with a biological community (as defined by ARM 17.24.651(3)) and to the stream itself. Disturbances within 100 feet may be approved provided requirements are met for reclaiming drainage basins to restore the original stream function and prevent, during and after mining, adverse impacts on water quantity and quality and other environmental resources of the stream and lands within 100 feet of the stream. The regulations provide requirements for the design, construction, stabilization, and maintenance of water diversions, sediment ponds, and other treatment facilities (e.g., discharge structures and acid- and toxic-forming spoil impoundments). The regulations also require surface water monitoring and reporting. Section 82-4-203, MCA provides definitions for ephemeral drainages and intermittent and perennial streams:

- "'Ephemeral drainageway' means a drainageway that flows only in response to precipitation in the immediate watershed or in response to the melting of a cover of snow or ice and is always above the local water table."
- "'Intermittent stream' means a stream or reach of a stream that is below the local water table for at least some part of the year and obtains its flow from both groundwater discharge and surface runoff."
- "'Perennial stream' means a stream or part of a stream that flows continuously during all of the calendar year as a result of groundwater discharge or surface runoff."

DEQ is responsible for administering the Montana Water Quality Act through issuance of Montana Pollutant Discharge Elimination System (MPDES) Permits, which regulate discharges of pollutants into state surface waters, and adoption of water quality standards and nondegradation policy (implementing rules: ARM 17.30.101 *et seq*.). Montana's nondegradation policy and implementing rules apply to any

human activity resulting in a new or increased source that may cause degradation of high-quality waters. The analysis area would be considered a new source. High-quality waters include all state surface waters except those "not capable of supporting any one of the designated uses for their classification" or those that "have zero flow or surface expression for more than 270 days during most years" (Section 75-5-103(12), MCA). For all state waters, existing and anticipated uses and the water quality necessary to protect those uses must be maintained. For high-quality waters outside the permit boundary, degradation may be authorized by DEQ following procedures described in ARM 17.30.708, or it may be determined that the changes in existing water quality are nonsignificant as described in ARM 17.30.715 or 17.30.716. The nondegradation rules do not apply to nonpoint sources of pollution to water resources within (or outside) the permit boundary.

DEQ also administers several sections of the CWA pursuant to an agreement between the state and the EPA. DEQ developed water quality classifications and standards, as well as a permit system to control discharges into state waters. Mining operations must comply with state regulations and standards for surface water and groundwater. MPDES Permits are required for point source discharges of wastewater to state surface water. MPDES Permits regulate discharges of wastewater by establishing effluent limitations based on, when applicable, technology-based effluent limits, state surface water quality standards including numeric and narrative requirements, and nondegradation criteria.

Section 303(d) of the CWA requires states to assess the condition of state waters to determine where water quality is impaired (does not fully support uses identified in the stream classification or does not meet all water quality standards) or threatened (is likely to become impaired in the near future). The result of this review is the compilation of a 303(d) list, which states must submit to the EPA biannually. Section 303(d) also requires states to prioritize and target waterbodies on their list for development of water quality improvement strategies, and to develop such strategies for impaired and threatened waters such as Total Maximum Daily Loads (TMDLs). A TMDL, as defined by the EPA, is a pollution budget that includes a calculation of the maximum amount of a pollutant that can occur in a waterbody and allocates the necessary reductions to one or more pollutant sources. A TMDL serves as a planning tool and potential starting point for restoration or protection activities with the ultimate goal of attaining or maintaining water quality standards. The 303(d) list includes probable causes (a chemical or physical condition that could affect uses) and probable sources (an activity that could contribute to that condition). The actual causes and sources of impairment are determined and quantified during the TMDL development process. Causes are listed with high, medium, or low confidence, and sources are listed as either confirmed or unconfirmed.

Streams near the Rosebud Mine that are on the current 303(d) list include one stream associated with the direct effects analysis area (West Fork Armells Creek) and five streams associated with the indirect effects analysis area (East Fork Armells Creek, Armells Creek, and portions of Sarpy Creek, Rosebud Creek, and the Yellowstone River) as shown on **Figure 3.7-1** and **Figure 3.7-2**. **Table 3.7-3** summarizes impairments, probable causes of impairment, and probable sources of impairment for those streams as detailed in the current 303(d) list (DEQ 2020a).

Table 3.7-3. Impaired Waters in the Analysis Area.

Waterbody Name	Waterbody Location	Impairment	Cause Name	Source Name
West Fork Armells Creek	Headwaters to Mouth (Armells Creek)	Not Fully Supporting Aquatic Life	• Aluminum • Iron	• Natural Sources • Source Unknown
East Fork Armells Creek	Headwaters to East Rosebud Mine Outfall 020	Not Fully Supporting Aquatic Life	• Alteration in Streamside or Littoral Vegetative Covers	• Grazing in Riparian or Shoreline Zones
	East Rosebud Mine Outfall 020 to Mouth (Armells Creek)	Not Fully Supporting Aquatic Life	• Alteration in Streamside or Littoral Vegetative Covers • Aluminum • Habitat Alterations • Iron • Nitrate/Nitrite (Nitrite + Nitrate as N) • Nitrogen, Total • Phosphorus, Total • Specific Conductivity • Total Dissolved Solids (TDS)	• Agriculture • Coal Mining • Grazing in Riparian or Shoreline Zones • Natural Sources • Source Unknown • Transfer of Water from an Outside Watershed
Armells Creek	Confluence of East and West Forks to Mouth (Yellowstone River)	Not Fully Supporting Aquatic Life	• Aluminum • Iron	• Natural Sources • Source Unknown
Sarpy Creek	Crow Indian Reservation Boundary to Mouth (Yellowstone River)	Not Fully Supporting Aquatic Life	• Nitrate/Nitrite (Nitrite + Nitrate as N) • Nitrogen, Total • Phosphorus, Total	• Crop Production (Non-Irrigated) • Grazing in Riparian or Shoreline Zones
Rosebud Creek	Northern Cheyenne Reservation Boundary to Boundary at S28/29 T6N R42E	Not Fully Supporting Aquatic Life	• Cause Unknown	• Dam Construction (Other than Upstream Flood Control Projects)
	Boundary at S28/29 T6N R42E to Mouth (Yellowstone River)	Not Fully Supporting Aquatic Life	• Physical Substrate Habitat Alterations	• Loss of Riparian Habitat
Yellowstone River	Cartersville Dam to Powder River	Not Fully Supporting Aquatic Life	• Alteration in Streamside or Littoral Vegetative Covers • Copper • Lead • Nitrate/Nitrite (Nitrite + Nitrate as N) • Sediment • TDS • Zinc • pH	• Agriculture • Crop Production (Irrigated) • Municipal Point Source Discharges • Natural Sources • Post-Development Erosion/Sedimentation • Rangeland Grazing • Source Unknown • Streambank Modifications/ Destabilization

Under MSUMRA, DEQ is required to prepare a CHIA as part of the written findings DEQ must issue when it approves a permit, a major revision to a permit, or an amendment to a permit (Section 82-4-231(8)(f), MCA; ARM 17.24.314(5); 17.24.405(1)). The findings provided in the CHIA (DEQ 2019b) for Area F were incorporated into this SEIS as applicable for the water resources sections (surface water, groundwater, and water rights). MSUMRA conditions approval of an application for a coal mine operating permit on demonstration by the applicant that "the assessment of the probable cumulative impact of all anticipated mining in the area on the hydrologic balance has been made by the department and the proposed operation of the mining operation has been designed to prevent material damage to the

hydrologic balance outside the permit area" (Section 82-4-227(3)(a), MCA; see also ARM 17.24.405(6)(c)).

This requirement was adopted to make MSUMRA's requirements equivalent to a requirement in SMCRA. Neither SMCRA nor the applicable Federal rules provide a definition of "material damage" to the hydrologic balance or "designed to prevent material damage." However, MSUMRA was amended in 2003 (Section 82-4-203(32), MCA) to define "material damage" as "with respect to protection of the hydrologic balance, degradation or reduction by coal mining and reclamation operations of the quality or quantity of water outside of the permit area in a manner or to an extent that land uses or beneficial uses of water are adversely affected, water quality standards are violated, or water rights are impacted. Violation of a water quality standard, whether or not an existing water use is affected, is material damage."

Section 82-4-203(25), MCA, also provides a definition of "hydrologic balance": "the relationship between the quality and quantity of water inflow to, water outflow from, and water storage in a hydrologic unit, such as a drainage basin, aquifer, soil zone, lake, or reservoir, and encompasses the dynamic relationships among precipitation, runoff, evaporation, and changes in groundwater and surface water storage." As a result, DEQ is charged with assessing material damage at the level of a hydrologic unit, "such as a drainage basin, aquifer, soil zone, lake, or reservoir" (Section 82-4-203(25), MCA).

Classification and Standards

This section has been updated to reflect regulatory changes since the 2018 Final EIS was issued. Circular DEQ-7, Montana Numeric Water Quality Standards (ARM 17.30.629) were updated in 2019 and were used for this SEIS; the 2017 version was used for the 2018 Final EIS. Based on recent developments related to ARM 17.30.615(2) since the 2018 Final EIS was issued, DEQ adopted a different approach to application of specific water quality standards for C-3 waters and ephemeral streams. Details of these regulatory changes are described below.

Montana's surface water quality is regulated through classifications and standards, which Section 75-5-301, MCA states:

> (1) establish the classification of all state waters in accordance with their present and future most beneficial uses, creating an appropriate classification for streams that, due to sporadic flow, do not support an aquatic ecosystem that includes salmonid or nonsalmonid fish;
>
> (2) formulate and adopt standards of water quality, giving consideration to the economics of waste treatment and prevention.

State waters are bodies of water, irrigation systems, or drainage systems, either surface or underground, excluding ponds or lagoons used solely for treating, transporting, or impounding pollutants (75-5-103(32)). Surface waters are any waters on Earth's surface including, but not limited to, streams, lakes, ponds, and reservoirs, as well as irrigation and drainage systems, but not water bodies used solely for treating, transporting, or impounding pollutants (ARM 17.30.602(31)). DEQ classifies surface water in the analysis area as C-3 based on the spatial description provided under ARM 17.30.611. Class C-3 waters "are to be maintained suitable for bathing, swimming, and recreation, and growth and propagation of nonsalmonid fish and associated aquatic life, waterfowl, and furbearers." The quality of C-3 waters is "naturally marginal for drinking, culinary, food-processing purposes, agriculture, and industrial water supply" under ARM 17.30.629(1). Montana surface water quality standards identified at ARM 17.30.629(2) for C-3 waters in the analysis area are provided in **Table 3.7-4** (DEQ 2019c) (updated from the corresponding table presented in the 2018 Final EIS). Narrative water quality standards found at ARM 17.30.637 apply to all state surface waters, including those in the project area.

The specific water quality standards for C-3 waters do not apply to hydrologically ephemeral streams pursuant to ARM 17.30.637(4). The general prohibition at ARM 17.30.637(4) states: "Treatment requirements for discharges to ephemeral streams must be no less than the minimum treatment requirements set forth in ARM 17.30.1203. Ephemeral streams are subject to ARM 17.30.635 through 17.30.637, 17.30.640, 17.30.641, 17.30.645, and 17.30.646 but not to the specific water quality standards of ARM 17.30.6.20 through 17.30.629." State surface waters in the project area including Trail Creek, McClure Creek, Robbie Creek, Donley Creek, and Black Hank Creek are predominantly considered ephemeral, and as such the general prohibition of ARM 17.30.637(4) applies to these ephemeral streams. The C-3 water quality standards for other state surface waters are applicable, excluding waterbodies solely used for treating, transporting, or impounding pollutants, which includes sedimentation ponds and traps associated with the mine's drainage control plan.

Numeric surface water standards applicable to non-ephemeral streams and other surface waters such as ponds and springs are shown in **Table 3.7-4**. Discharges to ephemeral streams would be subject to general treatment standards (ARM 17.30.635), general operation standards (ARM 16.30.636), and general prohibitions (ARM 17.30.637), but would not be subject to the water quality standards listed in **Table 3.7-4**.

As noted in the Area F CHIA (DEQ 2019b), in a March 14, 2016 opinion (August 25, 2016 judgment) issued by the First Judicial District Court, Lewis and Clark County, MT, the court indicated that surface waters that are classified as C-3 waters under Montana's water use classification system may not be treated as ephemeral streams for purposes of determining the applicable water quality standards without complying with the procedures set forth in ARM 17.30.615(2) for reclassifying a specific water body in MT. This ruling was appealed to the Montana Supreme Court in early 2018 by DEQ and Western Energy Company (now Westmoreland Rosebud). At the time of finalization of the Area F CHIA (April 18, 2019), the case was not resolved, and DEQ took the conservative approach in the Area F CHIA of applying the water quality standards applicable to non-ephemeral C-3 waters to all surface water bodies that are classified as C-3 waters, regardless of whether the surface waters meet the definition of ephemeral stream. On November 19, 2019, the Montana Supreme Court reversed the District Court's 2016 decision and remanded the matter back to the District Court, which ordered the parties to the case to either move to dismiss the case or move for a status conference to determine future proceedings. As defendants, DEQ and Westmoreland Rosebud (formerly Western Energy) moved to dismiss the case, and the plaintiffs did not oppose dismissal but maintained the matter should be dismissed without prejudice. On November 5, 2021, the District Court ordered dismissal of the case, which was determined to be moot retroactively to August 1, 2021 (FWP 2022; Montana Supreme Court 2025). This SEIS has, thus, adopted a different approach from that implemented in the Area F CHIA where the numeric surface water standards shown in **Table 3.7-4** now apply only to perennial and intermittent streams and do not apply to ephemeral streams in the analysis area.

Table 3.7-4. Montana Surface Water Quality Standards for C-3 Waters.

Parameter – Category[1]	Human Health Standard	Aquatic Life Standard[2]	
		Acute	Chronic
Temperature (°F) – H	—	• 3ºF maximum increase for naturally occurring range of 32º to 77ºF • In range of 77° to 79.5°F, no increase to above 80ºF • 0.5ºF maximum increase for naturally occurring 79.5ºF or greater • 2ºF per hour maximum decrease for naturally occurring temperatures above 55ºF; 2ºF maximum decrease for naturally occurring range of 32º to 55ºF	
pH (s.u.)[3]	—	—	—

Table 3.7-4. Montana Surface Water Quality Standards for C-3 Waters.

Parameter – Category[1]	Human Health Standard	Aquatic Life Standard[2]	
		Acute	Chronic
Dissolved oxygen[4] – T	—	• 5.0 (early life) • 3.0 (other life stages)	• 6.0 (7-day mean, early life) • 4.0 (7-day mean minimum, other life stages) • 5.5 (30-day mean, other life stages)
Escherichia coli	**April 1–October 31:** geometric mean may not exceed 126 colony-forming units per 100 milliliters, and 10 percent of the total samples may not exceed 252 colony-forming units per 100 milliliters during any 30-day period **November 1–March 31:** geometric mean may not exceed 630 colony-forming units per 100 milliliters, and 10 percent of the total samples may not exceed 1,260 colony-forming units per 100 milliliters during any 30-day period	—	—
Turbidity (NTU)[8] – H	—	Increase above ambient no more than 10 NTUs	Increase above ambient no more than 10 NTUs
Nitrate+nitrite, as N – T	10	No excessive amounts that would produce undesirable aquatic life	
Ammonia, as N – T	—	Calculated based on stream pH	Calculated based on stream pH and temperature
Total nitrogen[9]	—		**July 1–September 30:** 1.30
Total phosphorus[9]	—		**July 1–September 30:** 0.15
Aluminum[5] – T	—	0.75	0.087
Antimony[5]– T	0.0056	—	—
Arsenic[5] – C	0.01	0.34	0.15
Barium[5] – T	1.0	—	—
Beryllium[5] – C	0.004	—	—
Cadmium[5] – T	0.005	0.0074	0.0024
Chromium[5] – T	0.1	5.61/0.016[6]	0.27/0.011[6]
Copper[5] – T	1.3	0.052	0.031
Fluoride[5] – T	4.0	—	—
Iron[5] – H	—	—	1.0
Lead[5] – T	0.015	0.477	0.019
Mercury[5] – T, BCF>300[7]	0.00005	0.0017	0.0009
Nickel[5] – T	0.1	1.52	0.169
Selenium[5] – T	0.05	0.020	0.005
Silver[5] – T	0.1	0.044	—
Zinc[5] – T	2.0	0.388	0.388

All units are in milligrams per liter (mg/L) unless otherwise indicated.
1. T = toxic; C = carcinogen; H = harmful (aquatic life).
2. Many metals standards are hardness-dependent; for this table, values presented are based on a hardness of 400 mg/L. DEQ-7 states that 400 mg/L is to be used to calculate hardness-dependent metals standards when hardness is greater than or equal to 400 mg/L. Hardness in most surface water samples in the analysis area is greater than 400 mg/L.
3. s.u. = standard units. Under ARM 17.30.629(2)(c), induced variation in pH within a range of 6.5 to 9.0 must be less than 0.5 pH unit; natural pH outside this range must not change; natural pH above 7.0 must be maintained above 7.0.
4. Dissolved oxygen standards are water column concentrations; see DEQ-7 for other notes.
5. All metals standards except aluminum are based on total recoverable concentrations. Aluminum standards are based on dissolved aluminum concentrations and are valid only in a pH range of 6.5 to 9.0.
6. Aquatic life chromium standards are for trivalent/hexavalent forms.
7. Mercury has a bioconcentration factor of greater than 300 (developed by the EPA).
8. NTU = nephelometric turbidity units.
mg/L = milligrams/liter; "—" = no applicable standard.
9. Numeric nutrient standards for aquatic life and recreation (Total Nitrogen and Total Phosphorus) are not included in Circular DEQ-7 and are included in Department Circular DEQ-12A, Montana Base Numeric Nutrient Standards (DEQ 2014).
Source: Circular DEQ-7, Montana Numeric Water Quality Standards (DEQ 2019c); ARM 17.30.629.

Primary pre-mining land uses in and downslope of the analysis area are grazing/pastureland, cropland, and wildlife habitat. The state and EPA have not established ambient water quality criteria for livestock or wildlife. There is little scientific consensus on recommended water quality limits for livestock, which are assumed to be appropriate for wildlife. The values presented in several studies are shown in **Table 3.7-5** (updated from the corresponding table presented in the 2018 Final EIS).

Table 3.7-5. Recommended Water Quality Concentration Limits for Livestock (mg/L).

Analyte	NRC 1972	Bagley 1997	Sigler & Bauder 2006	Raisbeck et al. 2008	Olkowski 2009	Pick 2011	Pfost et al. 2012	Meehan et al. 2015
Aluminum	5				5	5	5	5
Arsenic	0.2	0.2	0.2	1	0.025	0.01	0.2	0.2
Barium						10		10
Bicarbonate								
Boron	5				5	5	5	
Cadmium	0.05	0.05	0.05		0.08	0.05	0.05	0.05
Calcium					1,000	500		1,000
Chloride						1,500		
Chromium	1	1	1		0.05	1	1	1
Copper	0.5	0.05	0.5		0.5	0.5	0.5	0.5
Fluoride	2	2	2	2	1	2	2	2
Iron						0.3		
Lead	0.1	0.1	0.1		0.1	0.1	0.05	0.1
Magnesium						125		
Manganese						0.05		
Mercury	0.01	0.01	0.01		0.003	0.01	0.01	
Molybdenum				0.3	0.5			0.5
Nickel			1					1
Nitrate (as N)	23	100	100	114	23	100	23	100
Nitrite (as N)	2.3	33	10	23	3	10	2.3	33
pH		8.3				8.5	7.5	9
Selenium	0.05			0.1	0.05	0.05	0.05	0.05
Sodium				1,000				1,000
Sulfate		1,000	2,500	1,000	1,000	1,000	2,000	500 - 1,000
TDS		10,000	5,000		3,000	10,000	10,000	10,000
Vanadium	0.1	0.1	0.1		0.1	0.1	0.1	0.1
Zinc	25	25	25		50	25	24	25

Note: Metal limits are for both dissolved and total metals.

In southeastern Montana, ambient surface water concentrations of sodium, sulfate, and TDS often naturally exceed recommended concentrations for these parameters, particularly in stock ponds. Cattle will adapt to higher TDS concentrations, and wildlife likely also will adapt to higher TDS concentrations, but sulfate in particular can affect animal weight gain and health (MSU 2014). Aquatic life data collected by DEQ in streams in southeastern Montana, including East Fork Armells Creek (Montana Department of Environmental Quality 2017), indicate that these streams support an assemblage of species that are tolerant of naturally occurring sodium, sulfate, and TDS concentrations that exceed the recommended concentrations, which is similar to the community assemblage identified in a survey from the 1970s. In most situations, the naturally occurring minerals in water do not result in acute toxicosis but lead to chronic conditions of poor animal performance or increased health problems (National Research Council 2005). TDS toxicity in animals depends on the type and combination of ions in solution (Timpano et al. 2010). TDS concentrations exceeding 500 to 1,000 mg/L may be harmful to sensitive crops in southeastern Montana, and 3,150 mg/L is about the maximum TDS concentration tolerated by most plants (Ferreira 1984). However, waters with higher TDS concentrations support wetlands in the analysis area. Plant response to and tolerance of water quality conditions are highly variable and can be influenced by interactions between conditions associated with water (constituents, irrigation method, and drainage), soil

(profile, biota, fertility, and drainage), plants (variety, growth stage, and density), and climate (air quality and seasonality) (Maas and Grattan 1999).

Local Requirements

The Federal Emergency Management Agency (FEMA) has mapped the floodplains in the analysis area as Special Flood Hazard Areas (Zone A), which are areas subject to inundation by the 100-year flood. Detailed hydraulic analyses have not been performed for Special Flood Hazard Areas, so no base flood elevations or flood depths have been estimated (FEMA 2015). Anyone planning new development within a designated Special Flood Hazard Area, including excavation, placement of fill, storage of equipment or materials, roads, culverts, bridges, and other activities, must obtain a permit for such development from the local floodplain administrator. This administrator is designated by the city or county government.

The purpose of the Floodplain Development Permit is to review and permit appropriate uses within Special Flood Hazard Areas that will not be seriously damaged or present a hazard to life if flooded, thereby limiting the expenditure of public tax dollars for emergency operations and disaster relief.

Anyone planning to do work on or near a waterway in Montana must submit a 310 Joint Application Form 270 for Proposed Work in Montana's Streams, Wetlands, Floodplains, and Other Water Bodies to the conservation district in which the activity will take place. Projects must be designed and constructed to minimize adverse impacts on the stream and stream banks. The project must be reviewed to determine the impacts of soil erosion and sedimentation; the impacts of stream alteration; the impacts on stream flow, turbidity, and water quality; the impacts on fish and aquatic habitat; whether there are modifications or alternatives that would reduce disturbance to the stream and its environment; and whether the project would create harmful flooding or erosion problems.

3.7.1.2 Analysis Area

Direct Effects Analysis Area

The direct effects analysis area for surface water quantity and quality includes streams that may be impacted by mining in the Area F permit area by changes in flow and/or changes in water quality. **Figure 3.7-1** shows the currently approved Area F permit and disturbance areas, which differ slightly from those presented in 2018 Final EIS (see the discussion in **Section 2.2.2.2, Area F Operations and Development**). The direct effects analysis area includes where mining and/or related disturbances would occur and the watersheds of the streams in and downstream of the Area F permit area that flow through the disturbance area or receive water from the disturbance area. This includes the West Fork Armells Creek but does not include the East Fork Armells Creek (**Figure 3.7-1**). Tributaries to the West Fork Armells Creek in the analysis area are, from north to south, Trail, McClure, Robbie, Donley, and Black Hank Creeks. A small portion of the analysis area flows to Horse Creek, a tributary to Sarpy Creek. Measurable direct effects are not expected to extend beyond the watersheds of Trail Creek, McClure Creek, Robbie Creek, Donley Creek, Black Hank Creek, and the reach of West Fork Armells Creek that receives surface water flow from those watersheds and extends between its confluences with Robbie Creek and Trail Creek.

Indirect Effects Analysis Area

Project area coal would be burned in the nearby Colstrip Power Plant Units 3 and 4, located about 12 miles east of the project area, and in the Rosebud Power Plant, located 6 miles north of Colstrip. Trace metal deposition modeling due to coal combustion at the power plants was conducted to determine the indirect effects analysis area for special status species and is described in **Section 4.3, Air Quality**. Using

a conservative analysis, the deposition model identified a 32-km circular analysis area for mercury. The analysis area for selenium was substantially smaller, and for the other five metals modeled was within the plant site area of the Colstrip Power Plant (see **Section 4.3, Air Quality**). The deposition analysis area is based on soil concentrations that are deposition thresholds for plants and animals. As a result of various pathways including wind, precipitation, runoff, and erosion of soil to surface water, as well as direct deposition onto surface water bodies, mercury that is deposited from the atmosphere may reach surface water in and downstream of the 32-km circular area.

The indirect effects analysis area includes all of the Armells Creek watershed and parts of the Sarpy Creek and Rosebud Creek watersheds within and downstream of the 32-km circular area (**Figure 3.7-2**). It also includes the Yellowstone River between the Armells Creek and Tongue River confluences to account for indirect effects of water withdrawals by the Colstrip Power Plant. The diversion point for the Colstrip Power Plant's water right (42KJ94423 00) is downstream of the confluence with Armells Creek. The uppermost parts of the Sarpy and Rosebud Creek watersheds are not in the analysis area because they are outside of the 32-km circular analysis area. Because less than 3 percent of the Tongue River watershed (139 square miles of a total 5,400 square miles) is in the 32-km circular area, it is not included in the analysis area for surface water effects. Mercury water quality data for streams in the indirect effects analysis area support the indirect effects analysis area as being adequately large to evaluate the effects of coal combustion from the two power plants.

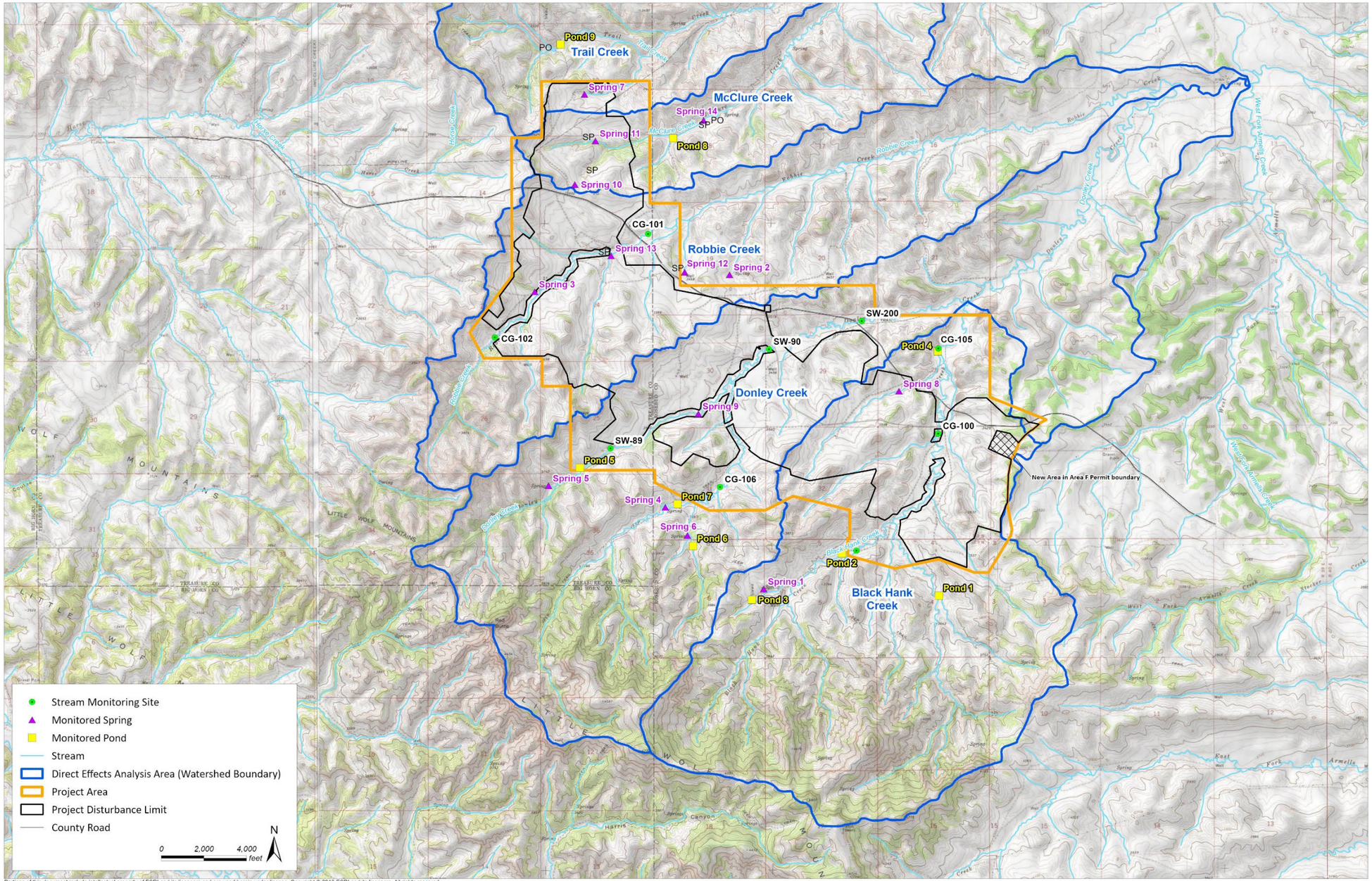

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Figure 3.7-1. Surface Water Direct Effects Analysis Area.

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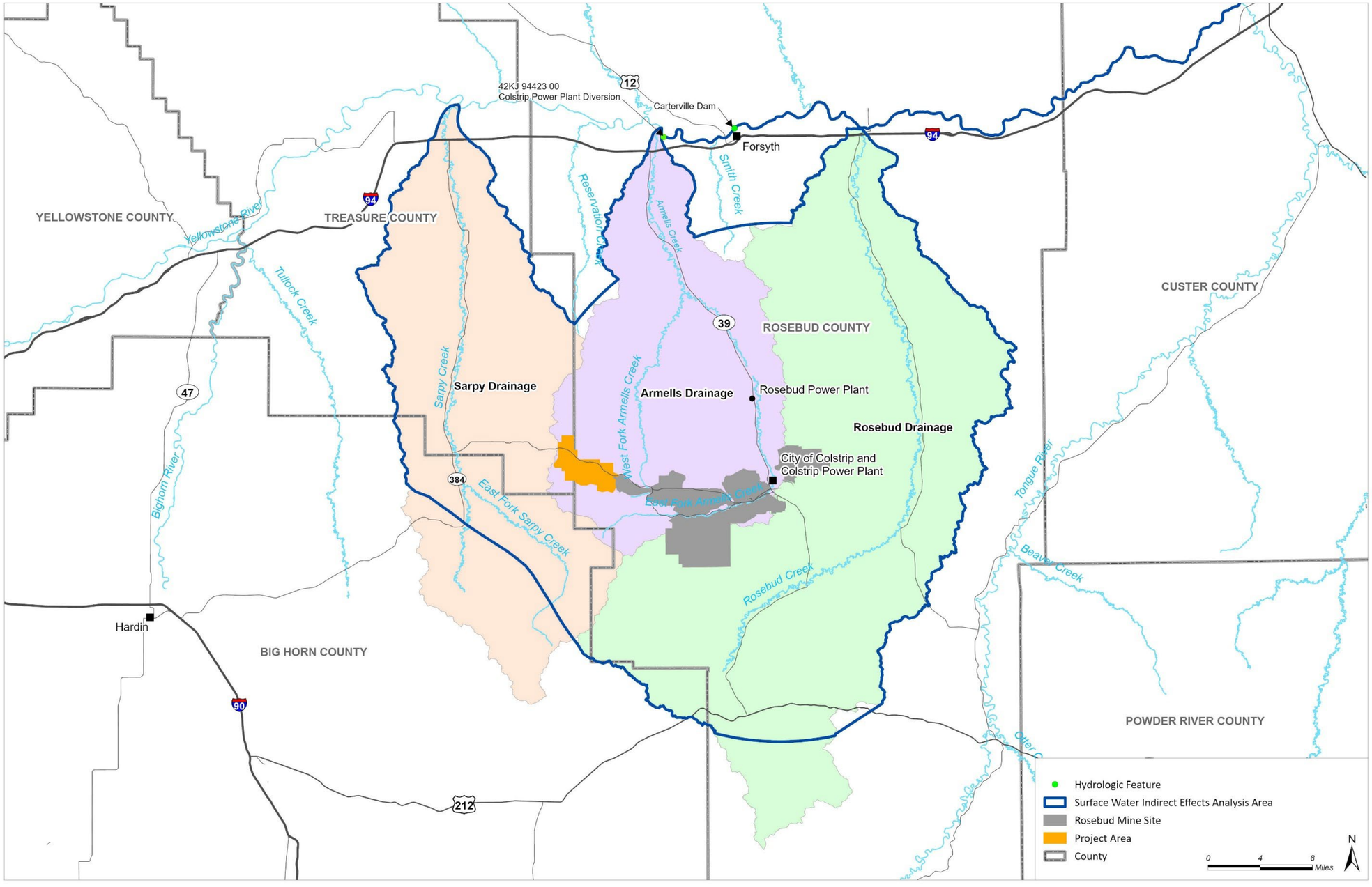

Figure 3.7-2. Surface Water Indirect Effects and Cumulative Effects Analysis Area.

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3.7.2 Climate

The analysis area is in the Northwest Great Plains Ecoregion, which encompasses the Missouri Plateau section of the Great Plains. The region has a semiarid climate and flat to rolling topography of shale and sandstone punctuated by occasional buttes. Native grasslands persist in rangeland areas. Daily precipitation and other climate data are recorded at a weather station in Colstrip (NOAA 2024), summarized below, and at multiple private weather stations within the Rosebud Mine property.

Precipitation is variable, ranging from 7 to 25 inches per year and averaging 15 inches (over the past 40 years). The wettest months are May and June, and the driest are November through February. Large precipitation events of up to 3 inches in a day have been observed, and monthly precipitation totals of 4 to 10 inches have been recorded in April through September. Large multiday events occurred on May 20 to 22, 2011, when 4.8 inches of precipitation fell, and on May 19 to 31, 2013, when 7.6 inches of precipitation fell (with 5.5 inches falling on the last 2 days). The two wettest years during the past 40 years occurred in 2016 (25.0 inches) and 2011 (23.9 inches). The two driest years during the past 40 years occurred in 2012 (7.4 inches) and 1988 (8.1 inches). Precipitation over the past 5 years ranged from drier than average (2020 and 2021) to near average (2022 and 2023) to wetter than average (2019).

Snowfall is variable, ranging from 7 to 87 inches per year and averaging 41 inches (over the past 40 years). The highest annual snow accumulation over the past 40 years was in 2018 with 87.2 inches. The highest average monthly accumulation of snow occurs in February (8.3 inches), and December, January, and March accumulations average 6.4 to 7.5 inches. From 2018 through 2023, months with the highest snow accumulation included February 2018 (34.5 inches) and February 2019 (16.0 inches), and annual accumulations ranged from above average (49 to 87 inches) in 2018, 2019, and 2020 to nearly average (40 inches) in 2022 to below average (19 to 32 inches) in 2021 and 2023.

3.7.3 Floodplains

FEMA has mapped the floodplains in the analysis area as Special Flood Hazard Areas (Zone A), which are areas subject to inundation by the 1 percent annual chance flood event (a 100-year flood). Detailed hydraulic analyses have not been performed for Special Flood Hazard Areas, so no base flood elevations or flood depths have been estimated. In general, the floodplains mapped along the creeks in the analysis area are about 300 feet wide (FEMA 2015).

3.7.4 Hydrologic Balance

Precipitation as rain and snow, described in **Section 3.7.2**, is the source of water to the hydrologic system in the project area. A majority of the precipitation is returned to the atmosphere by evaporation from water bodies, plants, and the ground surface, as well as transpiration from plants. Evapotranspiration was calculated using the Blaney Criddle formula to average nearly 28 inches at Colstrip (PAP, Appendix B, Table B-2), and using measured pan evaporation at the Rosebud Mine to average 59 inches per year (PAP, Appendix B, Table B-3). In either case, average evapotranspiration exceeds the average annual precipitation of 15 inches per year, but on a monthly basis is less on average than precipitation during November through April. The loss of moisture by evapotranspiration is a major factor in the water balance for this semiarid area. Sublimation, the direct conversion of ice or snow to water vapor, occurs during the winter months, and in the Colstrip area has been estimated to transfer about half of the winter precipitation, or about 2.5 inches, back into the atmosphere. Interception loss of precipitation occurs as a result of vegetative cover absorbing the water or evaporation from the vegetation and is estimated to range from about 0.5 to 1.8 inches per year (PAP, Appendix B, Table B-1). Infiltration is the movement

of water into and through the soil. Based on soil type, the average infiltration rate in the project area is 2.3 inches per hour (PAP, Appendix B, Table B-4). This substantially reduces runoff because most precipitation events in the area have intensities of less than 2 inches per hour. When the rainfall or snowmelt rate exceeds the infiltration rate, water flows overland to drainage channels. Soil can absorb significant quantities of water infiltrating in the subsurface. Soil in the project area has the capacity to hold water that averages 0.1 inch per inch (PAP, Appendix B, Table B-4). Soil moisture content is typically highest in the spring and early summer, and driest in late summer. Soil can be a major factor in water storage, where it can be evaporated to the atmosphere or taken up by plants. Groundwater recharge, discharge, and storage are also parts of the hydrologic balance in the project area and are discussed in **Section 3.8, Water Resources – Groundwater**. When a land surface is disturbed by human activities, there may be changes in vegetative cover, soil cover, and topography, resulting in changes to the hydrologic balance.

3.7.5 Surface Water Hydrology

3.7.5.1 Springs in the Direct Effects Analysis Area

Numerous springs occur in the analysis area. Western Energy (now Westmoreland Rosebud) inventoried springs in the analysis area and documented the locations of 53 springs (PAP, Appendix B, Table B-31). Until 2015, Springs 1 through 9 were monitored by Western Energy adjacent to tributaries or the mainstem of Trail, McClure, Robbie, Donley, and Black Hank Creeks (**Figure 3.7-1**). Beginning in 2015, five additional springs were monitored by Western Energy in the McClure and Robbie Creek watersheds. Some of the 14 monitored springs are used for livestock watering and have permitted diversion volumes of 30 gallons per day per animal. Only one (Spring 3 on a tributary of Robbie Creek) is developed and has a decreed maximum diversion rate, which is 8 gallons per minute (gpm). The springs, except for Spring 1 and Spring 8 on Black Hank Creek, are water sources for wetlands. Springs or seeps in the analysis area that support wetlands flow all or nearly all the time. The majority of the wetlands in the project area are typical of the Great Plains region, with most occurring in drainage bottoms and a few along upland seeps. The springs or seeps are typically the result of the intersection of perched groundwater and the point at which the perched groundwater terminates at the surface. As noted in the Final EIS Section 3.8.2, within the overburden, groundwater occurs in various low to moderately permeable sandstones as perched zones of saturation overlying very low permeability mudstones or claystones. Perched groundwater flows laterally on top of these mudstones or claystones until it discontinues, at which point the groundwater flows vertically downward to the groundwater table or until it intersects with the ground surface, at which point the groundwater discharges as springs or seeps. Similar to subsurface conditions, the wetlands associated with the springs persist as surface water until more pervious subsurface conditions allow the water to infiltrate vertically downward. The wetlands extend several to hundreds of feet from the surface discharge point before evaporating or percolating into the soil and to the underlying groundwater table.

The monitored springs in the analysis area, which are listed in **Section 3.8.2.1, Springs**, are typically located along or near drainages, and some of them maintain reaches of flowing water within portions of the ephemeral stream drainages. The sources of these springs are described in **Section 3.8.2.1**. Data presented in the 2018 Final EIS (2011 through 2016 monitoring events) indicated that most of the springs were nearly always flowing, with flow observed at Springs 1 through 5, 7, 10, and 11 and with the highest flow of 9 gpm occurring in Spring 4. With the location of springs along or near drainages, flow data may be a mixture of perched groundwater discharge and surface water runoff when springs were measured following precipitation events or when snow melt has mixed with spring flow. For these reasons, as well as the generally broad area that springs may diffuse from, spring flows can be difficult to consistently measure and the amount of surface water runoff contributing to flow measurement is uncertain. Data

compiled from 2017 through 2023 monitoring events indicate the following results for each of the 14 springs:

- Spring 1: No flow recorded as the site was not visited
- Spring 2: Nearly always flowing with flows up to 2 gpm
- Spring 3: Nearly always flowing with flows up to 2.3 gpm
- Spring 4: Nearly always flowing with flows up to 28.1 gpm
- Spring 5: Nearly always flowing with flows up to 2 gpm
- Spring 6: No flow recorded as the site was not visited or was ponded
- Spring 7: Nearly always flowing with flows up to 11.4 gpm (value potentially influenced by surface water runoff – typical flow value is 1 to 3 gpm)
- Spring 8: Combination of dry or flowing conditions
- Spring 9: Nearly always flowing with flows up to 9.7 gpm
- Spring 10: Nearly always flowing with flows up to 9.7 gpm
- Spring 11: Combination of dry or flowing conditions with flows up to 4.4 gpm
- Spring 12: Combination of dry or flowing conditions
- Spring 13: Combination of dry or flowing conditions with flows up to 2 gpm
- Spring 14: Nearly always flowing but flow unable to be measured

3.7.5.2 Streams in the Direct Effects Analysis Area

The direct effects analysis area contains portions of the headwaters of Trail, McClure, Robbie, Donley, and Black Hank Creeks (**Figure 3.7-1**), all of which flow in an easterly or northeasterly direction to West Fork Armells Creek, then to Armells Creek, a tributary to the Yellowstone River (**Figure 3.7-2**). A small portion of the analysis area contains the headwaters for Horse Creek, which flows west into Sarpy Creek, a tributary to the Yellowstone River.

Surveyed pre-mine channel cross-sections and geomorphic characteristics of the five watersheds in the analysis area have been measured and were provided by Western Energy in the PAP (PAP, Appendix J). Exhibit J-1 contains the channel cross-sections, and Table J-2 in Appendix J to the PAP provides drainage area, slope, length, relief, stream length, channel sinuosity, and other information for Trail, McClure, Robbie, Donley, and Black Hank Creeks and their minor tributaries within the project area.

The sections below describe flow conditions in analysis area streams. When the groundwater table is always below the channel bottom, groundwater discharge is not a source of water to a creek, and ephemeral flow occurs only during and after snowmelt runoff or rainfall events. When the groundwater table is above the channel during part of the year, a stream is intermittent and flows not only when surface runoff enters the channel but also when groundwater discharges to the stream surface as baseflow (Section 82-4-203, MCA). Baseflow is the contribution of near-channel alluvial groundwater and deeper bedrock groundwater to a stream channel. A perennial stream flows continuously, either because it has a constant source of surface runoff (such as from springs) or because the groundwater table is above the channel bottom for much or all of the year, providing baseflow.

As noted in DEQ's 2019 *Cumulative Hydrologic Impact Analysis for Area F* (CHIA [DEQ 2019b]): "There are no perennial streams within the permit boundary area. Baseline data and the EIS indicate that tributary streams within the project area exhibit ephemeral flow with localized spring/seep contributions. Lower reaches of West Fork Armells Creek tributaries (Robbie Creek and Trail Creek) are likely intermittent to perennial several miles beyond the permit boundary."

Trail Creek

Stream flows and alluvial groundwater levels have not been monitored in the project area in Trail Creek. Spring 7 is located on upper Trail Creek above Wetland B, which is described in the Rosebud Mine Wetland Delineation, Area F Report (Wetland Delineation Report; PAP, Appendix E). When measured in the summer of 2013, the wetland in the swale bottom was about 1,200 feet long. Spring 7 was flowing in every month of the year when measured from 2011 to 2016. Data compiled from 2017 through 2023 monitoring events indicate that Spring 7 is nearly always flowing with flows typically approximately 1 to 3 gpm. Water flows above the ground surface in the channel for up to about 1,200 feet downstream of Spring 7. Based on DEQ's Area F CHIA (DEQ 2019b), the upper reach of Trail Creek exhibits ephemeral flow with localized spring/seep contributions.

McClure Creek

Stream flows and alluvial groundwater levels have not been monitored in the project area in McClure Creek. The Wetland Delineation Report found two wetlands within the McClure Creek basin that were both supported by springs or seeps. At Wetland C (see **Figure 47** in the 2018 Final EIS), the wetland was observed to occur within the drainage bottom below a spring and extended 1,000 feet downstream. Observed "hydrology characteristics included soil saturation to the surface or flowing water in most locations along the thalweg [creek bottom]" (PAP, Appendix E). In August 2015, the measured wetted area of Wetland C was nearly 3,600 square feet (PAP, Appendix R). At Wetland F028 (see **Figure 47** in the 2018 Final EIS), the wetland was measured to be about 1,350 feet long in the main channel and 280 feet long in a side channel. The report states that "hydrology characteristics included apparent perennial seepage, ponded surface water, and soil saturation to the surface in most locations along the drainage" (PAP, Appendix E). In August 2015, the measured wetted area of Wetland F028 was slightly more than 12,000 square feet (PAP, Appendix B). The 2015 aquatic life survey identified more than two dozen aquatic species at both wetlands (PAP, Appendix R).

Springs located within the McClure Creek watershed include Spring 10 (within the Area F permit boundary and 0.33 mile south of the McClure Creek mainstem), Spring 11 (within the Area F permit boundary along the McClure Creek mainstem), and Spring 14 (0.5 mile downstream from the Area F permit boundary along the McClure Creek mainstem). Data compiled from 2017 through 2023 monitoring events indicate that Spring 10 is nearly always flowing with flows up to 9.7 gpm, Spring 11 exhibits a combination of dry or flowing conditions with flows up to 4.4 gpm, and Spring 14 is nearly always flowing but no flow rate was measured. Based on DEQ's Area F CHIA (DEQ 2019b), the reach of McClure Creek in the project area exhibits ephemeral flow with localized spring/seep contributions.

Robbie Creek

In Robbie Creek, surface water depth has generally been monitored monthly with two crest gages (CG-101 and CG-102). Monthly crest gage depth readings were used to calculate peak stream flow rate over a period of time and indicate that at least one flow depth was measured during the monthly observational period. Flow was calculated since 2013 at CG-101, located near the eastern proposed Area F permit boundary. During the monitoring period associated with the 2018 Final EIS (February 2013 through June 2016), wet, ponded, flowing, or frozen conditions were recorded at CG-101 from February 2013 through July 2015 with the highest flow rate estimated at 28 cubic feet per second (cfs) in early March 2014, and then predominantly dry conditions were observed from August 2015 through June 2016. During the monitoring period associated with this SEIS (July 2016 through September 2023), predominantly dry conditions were observed during monthly field visits from July 2016 through February 2019 and from August 2020 through September 2023, with predominantly flowing conditions recorded during monthly field visits from March 2019 through July 2020 and the highest flow rate estimated at 0.5 cfs (220 gpm)

in March 2021. Western Energy (now Westmoreland Rosebud) began monitoring Robbie Creek at CG-102 at the upper end of Robbie Creek within the project area in March 2016 where no flow was observed from March through June 2016 (the monitoring period associated with the 2018 Final EIS). During the monitoring period associated with this SEIS (July 2016 through September 2023), predominantly dry conditions were observed during monthly field visits with four flow events recorded between January and June 2023 up to 0.4 cfs (197 gpm).

Upstream of CG-101, Wetland D (see **Figure 47** in the 2018 Final EIS) is located where "it appears that a subterranean rock formation may be responsible for forcing alluvial water to the surface and causing the seeps" (PAP, Appendix E). Open water was observed in 2013 up to 2,000 feet downstream from the seeps. Observed "hydrology characteristics included ponded and flowing surface water and soil saturation to the surface in most locations along the drainage" (PAP, Appendix E). In August 2015, the measured wetted area of Wetland D was 27,640 square feet, and the aquatic life survey identified 30 species at Wetland D (PAP, Appendix B). Upstream of Wetland D, Spring 3 flows perennially into a tank, and there are several other springs and seeps. At alluvial well WA-222 located at the downstream end of Robbie Creek in the project area, the depth to water ranged from above ground surface to about 6 feet below ground surface in 2012 to 2016. Based on DEQ's Area F CHIA (DEQ 2019b), the reach of Robbie Creek within the project area exhibits ephemeral flow with localized spring/seep contributions.

Donley Creek

Stream flow has been measured in the Donley Creek watershed at four monitoring locations within the Area F permit boundary: since November 2013 at the upstream-most monitoring point (SW-89) located on the creek's mainstem near the west edge of the project area; since August 2011 at the next downstream monitoring point (SW-90) located on the creek's mainstem; since January 2020 at the downstream-most monitoring point (SW-200) located on the creek's mainstem near the east edge of the project area; and since May 2020 at a monitoring point (CG-106) located on an unnamed tributary to the creek's mainstem near the south edge of the project area (**Figure 3.7-1**). Monthly crest gage depth readings at CG-106 were used to calculate peak stream flow rate over a period of time and indicate that at least one flow depth was measured during the monthly observational period.

At SW-89, during the monitoring events associated with the 2018 Final EIS (November 2013 through June 2016), mostly dry conditions were observed during monthly field visits with flowing conditions recorded between May and October 2014, during which the highest flow rate of 0.04 cfs (16.6 gpm) was measured in June 2014. Continuous recorder data confirm mostly dry conditions and periodic flows at SW-89 between November 2013 and June 2016 with a maximum flow rate of 3.5 cfs (1,570 gpm) in May 2016. At SW-89, during the monitoring events associated with this SEIS (July 2016 through September 2023), mostly dry conditions were observed with flowing conditions observed during monthly field visits between October 2019 and July 2020, during which the highest flow rate of 0.01 cfs (3.7 gpm) was measured in October 2019. Based on data included in Westmoreland Rosebud's 2023 Annual Hydrology Report (WET 2024), one flow event over one day in water year 2023 was recorded on June 24, 2023 with a daily average flow rate of 0.1 cfs (65 gpm). Many of the flows at SW-89 do not appear to be directly related to large precipitation events (recorded in Colstrip and at weather station RL-5 in the project area) (PAP, Appendix C). SW-89 is located within Wetland F049 and downstream of Pond 5, a large stock pond. Leakage from the dam may be the source of smaller, longer-term flow at SW-89, and Pond 5 also reduces flows from the upper watershed at SW-89. Wetland F049 is located downstream of Pond 5, and water was observed in 2013 to flow 2,400 feet downstream. In August 2015, the measured wetted area of Wetland F049 was 7,790 square feet, and the aquatic life survey identified 21 species at Wetland F049 (PAP, Appendix B).

At SW-90, during the monitoring events associated with the 2018 Final EIS (August 2011 through June 2016), mostly dry conditions were observed during monthly field visits with flowing conditions recorded between August and September 2011 and with three periodic flow events occurring in February 2012, June 2013, and February 2014, during which the highest flow rate of 0.6 cfs (265 gpm) was measured in February 2014. Continuous recorder data confirm mostly dry conditions and periodic flows at SW-90 between November 2011 and June 2016 with a maximum flow rate of 446 cfs in March 2014. At SW-90, during the monitoring events associated with this SEIS (July 2016 through September 2023), mostly dry conditions were observed during monthly field visits with five periodic flow events in February 2017, January 2018, March 2019, February 2021, and March 2023, during which the highest flow rate of 4.5 cfs (2,032 gpm) was measured in March 2023. Based on data included in Westmoreland Rosebud's 2023 Annual Hydrology Report (WET 2024), five flow events over 17 days in water year 2023 were recorded with a maximum daily average flow rate of 1.3 cfs (602 gpm). Wetland F is located between SW-89 and SW-90 where groundwater seeps from a sandstone outcrop along the drainage (see **Figure 47** in the 2018 Final EIS). The seeps appear to be perennial or nearly perennial (PAP, Appendix E). In 2013, water was observed for a distance of 2,500 feet downstream of the seeps. Observed "hydrology characteristics included apparent perennial seepage, ponded surface water, and soil saturation to the surface in most locations along the drainage" (PAP, Appendix E). In August 2015, the measured wetted area of Wetland F was nearly 20,000 square feet, and the aquatic life survey identified 26 species at Wetland F (PAP, Appendix B). At alluvial wells WA-224 and WA-225 on Donley Creek, measured in 2012 to 2015, and in alluvial well WA-220 on Donley Creek, measured from 2005 to 2015, groundwater levels ranged from 8 to more than 30 feet below ground surface, indicating that stream flow at these locations is ephemeral. In the main southern tributary to Donley Creek, there are two wetlands (see **Figure 47** in the 2018 Final EIS). At Wetland F058, there is a spring that supports the wetland, which in 2013 was observed for 1,100 feet in the creek channel. Observed "hydrologic characteristics included ponded surface water and soil saturation to the surface in most locations along the drainage" (PAP, Appendix E). In August 2015, the measured wetted area of Wetland F058 was more than 32,290 square feet, and the aquatic life survey identified 26 species at Wetland F058 (PAP, Appendix B). At Wetland F061, a high groundwater table and ponded surface water were observed in 2013. The depth to the groundwater table at alluvial well WA-226 located upstream of Wetland F061 was about 13.5 feet in 2012 to 2016, indicating that the stream is ephemeral at that location. It appears that much of Donley Creek in the project area is ephemeral. Based on DEQ's Area F CHIA (DEQ 2019b), the reach of Donley Creek in the project area exhibits ephemeral flow with localized spring/seep contributions.

At SW-200, during the monitoring events associated with this SEIS (January 2020 through September 2023), mostly dry conditions were observed with two periodic flow events in February 2021 and March 2023, during which the highest flow rate of 0.2 cfs (109 gpm) was measured in March 2023.

At CG-106, during the monitoring events associated with this SEIS (May 2020 through September 2023), mostly dry conditions were observed during monthly field visits with one periodic flow event recorded in October 2020 at 0.08 feet of water depth and one periodic flow event recorded in March 2021 at 0.05 cfs (24.7 gpm). Based on data included in Westmoreland Rosebud's 2023 Annual Hydrology Report (WET 2024), four flow events were observed during monthly monitoring activities between January and June 2023 with a maximum flow rate recorded at 6.6 cfs (2,962 gpm) in June 2023.

Black Hank Creek

Stream flow has been measured in the Black Hank Creek watershed at four monitoring locations within the Area F permit boundary: since March 2016 at the upstream-most monitoring points (CG-103 and CG-104) located on the creek's mainstem near the south edge of the project area; since February 2013 at the next downstream monitoring point (CG-100) located on the creek's mainstem; and since January 2020 at the downstream-most monitoring point (CG-105) located on the creek's mainstem near the east edge of

the project area (**Figure 3.7-1**). Monthly crest gage depth readings were used to calculate peak stream flow rate over a period of time and indicate that at least one flow depth was measured during the monthly observational period.

At CG-103 and CG-104, during the monitoring events associated with the 2018 Final EIS (March through June 2016), dry conditions with no measurable flows were observed. At CG-103 and CG-104, during the monitoring events associated with this SEIS (July 2016 through October 2019 for CG-103 and July 2016 through September 2023 for CG-104), mostly dry conditions were observed during monthly field visits with two periods of frozen conditions in February 2017 and February 2018 and no measurable flow results. Based on data included in Westmoreland Rosebud's 2023 Annual Hydrology Report (WET 2024), three flow events were observed during monthly monitoring activities between March and June 2023 with a maximum flow rate recorded at 0.4 cfs (193 gpm) in June 2023.

At CG-100, during the monitoring events associated with the 2018 Final EIS (February 2013 through June 2016), dry conditions were observed during 27 monitoring events; and flowing, ponded, or frozen conditions were recorded during 17 monitoring events, with the highest flow rate estimated at 59 cfs in February 2014. At CG-100, during the monitoring events associated with this SEIS (July 2016 through September 2023), mostly dry conditions were observed with three periodic flow events in February 2017, March 2019, and February 2021, during which the highest flow rate of 0.2 cfs (96.3 gpm) was measured in February 2021. Based on data included in Westmoreland Rosebud's 2023 Annual Hydrology Report (WET 2024), six flow events were observed during monthly monitoring activities between January and September 2023 with a maximum flow rate recorded at 29 cfs (13,016 gpm) in June 2023.

At CG-105, during the monitoring events associated with this SEIS (January 2020 through September 2023), dry conditions were observed during monthly field visits through the entire monitoring period. Based on data included in Westmoreland Rosebud's 2023 Annual Hydrology Report (WET 2024), two flow events were observed during monthly monitoring activities between January and June 2023 with a maximum flow rate recorded at 2.7 cfs (1,194 gpm) in early 2023.

No springs or wetlands have been mapped along the main channel of Black Hank Creek, but Spring 8 is located on a tributary to Black Hank Creek. At alluvial wells WA-219 and WA-227 on Black Hank Creek, the first measured from 2005 to 2016, and the second measured in 2012 to 2016, groundwater levels ranged from 7 to 22 feet below ground surface, indicating that stream flow at these locations is ephemeral. Based on the very infrequent flow events described above, it appears that much or all of Black Hank Creek in the analysis area is ephemeral. Based on DEQ's Area F CHIA (DEQ 2019b), the reach of Black Hank Creek within the project area exhibits ephemeral flow.

Horse Creek

Horse Creek, located within the analysis area, has not been monitored. The USGS McClure Creek and Minnehaha Creek 7.5-minute topographic maps show several springs on Horse Creek.

3.7.5.3 Ponds in the Direct Effects Analysis Area

Nine monitored dam diversions, shown as man-made livestock ponds (Pond 1 to Pond 9), are located within or close to the direct effects analysis area adjacent to or on Trail Creek, McClure Creek, Donley Creek, or Black Hank Creek (**Figure 3.7-1**). There are more than two dozen ponds located within or near the project area, but water level and water quality data are not available for the other ponds. Some are in-stream ponds, and some are spring fed ponds. Ponds 1 to 9 have year-round water rights diversion volumes of 30 gallons per day per animal. Following are comparisons of monitoring results for each pond

between the monitoring period associated with the 2018 Final EIS (2011 through 2016) and the more recent monitoring period associated with the SEIS (2017 through 2023).

Black Hank Creek Watershed

- Pond 1: Combination of dry and ponded conditions with no recorded water depths (2017-2023); combination of dry and ponded conditions with 32 recorded water depths up to 1.5 feet (2011-2016).
- Pond 2: Predominantly dry conditions with recordable water depths for 11 of 153 monthly visits from 2011 through 2023. Mostly dry conditions with one recorded water depth of 0.5 feet (2017-2023); mostly dry conditions with 10 recorded water depths up to 15 feet (2011-2016).
- Pond 3: No recorded water depths as the site was not visited (2017-2023); combination of dry and ponded conditions with 31 recorded water depths up to 3 feet (2011-2016).
- Pond 4: Predominantly dry conditions with recordable water depths for 8 of 150 monthly visits from 2011 through 2023. Mostly dry conditions with one recorded water depth of 1.5 feet (2017-2023); mostly dry conditions with 7 recorded water depths up to 3 feet (2011-2016).

Donley Creek Watershed

- Pond 5: Mostly ponded conditions with no recorded water depths (2017-2023); mostly ponded conditions with 31 recorded water depths up to 9.4 feet (2011-2016).
- Pond 6: No recorded water depths as the site was visited only once (2017-2023); combination of dry and ponded conditions with 25 recorded water depths up to 5 feet (2011-2016).
- Pond 7: No recorded water depths as the site was not visited (2017-2023); mostly ponded conditions with 44 recorded water depths up to 1 foot (2011-2016).

McClure Creek Watershed

- Pond 8: Mostly ponded conditions with no recorded water depths (2017-2023); mostly ponded conditions with one recorded water depth of 3 feet (2011-2016).

Trail Creek Watershed

- Pond 9: Mostly ponded conditions with no recorded water depths (2017-2023); mostly ponded conditions with two recorded water depths up to 5 feet (2011-2016).

3.7.5.4 Surface Waters in the Indirect Effects Analysis Area

The indirect effects analysis area (**Figure 3.7-2**) includes all of the Armells Creek watershed, parts of the Sarpy Creek and Rosebud Creek watersheds, and the Yellowstone River between the Armells Creek and Tongue River confluences. The diversion point for the Colstrip Power Plant's water right is downstream of the confluence with Armells Creek.

In Armells Creek, located east of the Area F permit boundary, and into which nearly all streams in the project area flow, stream flow was measured daily by the USGS near its confluence with the Yellowstone River (USGS 06294995) from 1974 to 1995, during which time flow was measured 93 percent of monitored days (USGS 2024). Median annual flow in the stream ranged from 0.05 cfs in 1977 to 4.2 cfs in 1995. Mean annual flow in the stream ranged from 0.4 cfs in 1981 to 17.4 cfs in 1994; mean monthly flow in the stream ranged from 0.5 cfs in December to 27 cfs in March; and mean daily flow in the stream ranged from 0 cfs to 2,390 cfs on March 3, 1994.

The East Fork Armells Creek watershed includes Castle Rock Lake, a multiuse water storage facility used to receive raw water from the Yellowstone River and backwash from the Colstrip potable water treatment plant and to supply industrial water to the Colstrip Power Plant and municipal water to the City of Colstrip. Surface water discharge from the lake to the East Fork Armells Creek watershed is primarily limited to dam seepage and releases from the lake's emergency spillway, neither of which is known to be monitored for water quantity. East Fork Armells Creek is also not monitored for water quantity. Approximately 180 acre-feet per year (0.25 cfs) of water seeps continuously from Castle Rock Lake (DEQ 2016), likely contributing to a measurable portion of stream flow in East Fork Armells Creek during dry and low-flow periods. The drainage area contributing natural surface water inflow to the lake is limited to 0.89 square mile, and releases from the lake's emergency spillway are likely infrequent as a result of rare significant precipitation events within the relatively small watershed draining to the lake, which likely contributes to an infrequent and measurable portion of stream flow in East Fork Armells Creek during high-flow periods.

In Sarpy Creek, located west of the Area F permit boundary, stream flow was measured daily by the USGS near its confluence with the Yellowstone River (USGS 06294940) from 1973 to 1984, during which time flow was measured 71 percent of monitored days (USGS 2024). Median annual flow in the stream ranged from 0 cfs in 1977 to 2.8 cfs in 1979. Mean annual flow in the stream ranged from 1.5 cfs in 1981 to 20.1 cfs in 1975; mean monthly flow in the stream ranged from 0.2 cfs in August to 29 cfs in March; and mean daily flow in the stream ranged from 0 cfs to 390 cfs on January 20, 1975.

In Rosebud Creek, located east of the Area F permit boundary, stream flow was measured daily by the USGS near Colstrip (USGS 06295250) from 1974 to 2006, during which time flow was measured 90 percent of monitored days (USGS 2024). Median annual flow in the stream ranged from 0 cfs in 2002 to 55 cfs in 1975. Mean annual flow in the stream ranged from 3 cfs in 2002 to 95.9 cfs in 1975; mean monthly flow in the stream ranged from 6.1 cfs in September to 47 cfs in May; and mean daily flow in the stream ranged from 0 cfs to 668 cfs on March 3, 1994.

In the Yellowstone River, located north of the Area F permit boundary, stream flow was measured daily by the USGS at Forsyth Montana (USGS 06295000) from 1977 to 2024, during which time flow was measured 100 percent of monitored days (USGS 2024). Median annual flow in the stream ranged from 4,240 cfs in 2001 to 11,500 cfs in 1997. Mean annual flow in the stream ranged from 6,026 cfs in 2001 to 18,260 cfs in 2018; mean monthly flow in the stream ranged from 5,540 cfs in January to 31,500 cfs in June; and mean daily flow in the stream ranged from 1,400 cfs on November 23, 1977, to 97,000 cfs on May 21, 1978.

Table 3.7-6 and the narrative that follows were reported by OSMRE (2024) as part of the *Area F Biological Assessment* to evaluate the potential for and the magnitude of any effects of Yellowstone River water withdrawals on pallid sturgeon. Flow metrics were calculated using data from the USGS gage approximately 6 miles downstream of the diversion and immediately upstream of the Cartersville Dam at Forsythe (#06295000). A gage is also in Billings, Montana (USGS #06214500), upstream of the diversion. Data from this gage were not used in the analysis, as the Billings gage is approximately 100 miles upstream of the diversion and upstream of the confluence with the Bighorn River. Multiple other smaller tributaries also contribute flow to the Yellowstone River between Billings and the analysis area, and irrigation withdrawals and returns also occur throughout these reaches. No major tributaries are present between the diversion point and the Forsythe gage, although irrigation return flows and pumps are within the reach (U.S. Army Corps of Engineers [USACE] and Yellowstone River Conservation District Council 2016). Based on this, data from the Forsythe gage were determined to be representative of stream flow downstream of the diversion; the amount of water withdrawn to supply the Colstrip Power Plant was then added to the gage data to provide a reasonably accurate approximation of the magnitude of flows upstream of the diversion.

Average daily, monthly, and annual flow data were available and finalized for the Yellowstone River gage at Forsyth from October 1977 through April 2024; data from 2000 through 2023 were used in **Table 3.7-6** to represent current conditions. Data were summarized in the flow metrics to provide a comprehensive analysis of changes to the flow regime on the daily, monthly, and annual time scales. The monthly flow metrics focused on February and June, to represent monthly data when flows were typically at their lowest and highest values, respectively. For most of the flow metrics, a subset of data representing the five years with the highest and lowest values for each metric were also used to represent any effects in a typically wet (above average) or dry (below average) flow year.

Table 3.7-6. Yellowstone River Flow Data.

Flow Metric	Year Type	Flow at Forsythe (cfs)	Estimated Flow Upstream of the Diversion (cfs)	Proportion Diverted (%)
Mean Annual Flow	Average	10,354	10,423	0.7
	Dry	6,761	6,830	1.0
	Wet	15,838	15,907	0.4
Mean Peak Flow	Average	49,396	49,465	0.1
	Dry	32,080	32,149	0.2
	Wet	66,560	66,629	0.1
Mean February Flow	Average	5,210	5,279	1.3
	Dry	3,875	3,944	1.8
	Wet	7,058	7,127	1.0
Mean June Flow	Average	32,000	32,069	0.2
	Dry	18,128	18,197	0.3
	Wet	48,408	48,477	0.1

Source: OSMRE 2025.

3.7.6 Surface Water Quality

The sections below describe the water quality of surface water resources in the direct and indirect effects analysis areas. The water quality of surface water resources in the direct effects analysis area, specifically within the project area, represents largely natural conditions that have been minimally affected by man-made disturbances within or upstream of the project area. Water quality is variable in the project area primarily due to the dominance of either direct runoff from snowmelt or rainfall or groundwater discharge to surface water during various times of the year. Differences between drainages are more subtle than the effect of seasonal flow variability and are due to the presence or absence of baseflow from groundwater discharges, lithology, soil types, and land use practices (Slagle et al. 1983). Other factors affecting surface water quality are evaporation and transpiration, reactions of water with sediment, aquatic biota, and impoundments and diversions for agricultural purposes.

3.7.6.1 Water Quality in the Direct Effects Analysis Area

Streams in the Project Area

Baseline water quality results (through 2015) for streams in the project area (Robbie Creek, Donley Creek, and Black Hank Creek) were documented in the November 2018 Final EIS. Post-baseline (SEIS) water quality results (2016 through 2023) were compiled for two stream monitoring sites located on Robbie Creek (CG-101 and CG-102), four stream monitoring sites located on Donley Creek (CG-106, SW-89, SW-90, and SW-200), and three stream monitoring sites located on Black Hank Creek (CG-100, CG-103, and CG-105). Monitoring locations are shown on **Figure 3.7-1**. Post-baseline (SEIS) stream water quality data are summarized in **Appendix 3 – Water Quality Tables**: Table 1 (Robbie Creek), Table 2 (Donley Creek), and Table 3 (Black Hank Creek). Monitoring periods for the post-baseline (SEIS) stream monitoring sites are listed below.

- Robbie Creek: Six primary monitoring events:
    - CG-101 (March 2019 through July 2020)
    - CG-102 (March 2019)
- Donley Creek: 12 primary monitoring events:
    - CG-106 (March 2021)
    - SW-89 (June 2018 through June 2023)
    - SW-90 (May 2016 through June 2023)
    - SW-200 (February 2021 through March 2023)
- Black Hank Creek: Three primary monitoring events:
    - CG-100 (February 2017 through September 2023)
    - CG-103 (March 2019)
    - CG-105 (February 2017 through March 2023)

The quality of surface water was highly variable during the post-baseline (SEIS) monitoring periods. Measured pH was generally basic with values ranging from 8.7 down to 7.2.

Ponds in the Project Area

Baseline water quality results (through April 2016) for ponds in the project area (Ponds 1 through 9) were documented in the November 2018 Final EIS. Post-baseline (SEIS) water quality results (June 2014 through November 2023) were compiled for seven of the nine pond monitoring sites (not including Ponds 3 and 6). Monitoring locations are shown on **Figure 3.7-1**. Post-baseline (SEIS) pond water quality data are summarized in **Appendix 3 – Water Quality Tables**: Tables 4 through 10. Monitoring periods for the post-baseline (SEIS) spring monitoring sites are listed below.

- Pond 1: Seven primary monitoring events from April 2018 through May 2020
- Pond 2: One primary monitoring event in June 2014
- Pond 4: One primary monitoring event in March 2023
- Pond 5: 26 primary monitoring events from May 2015 through November 2023
- Pond 7: One primary monitoring event in October 2016
- Pond 8: 21 primary monitoring events from July 2016 through November 2023
- Pond 9: 21 primary monitoring events from July 2016 through November 2023

The quality of pond water was highly variable during the post-baseline (SEIS) monitoring periods. Measured pH was generally basic with values ranging from 9.55 down to 7.4. Parameters with exceedances of Montana Numeric Water Quality Standards (Circular DEQ-7) for human health (HHS) and aquatic life (ALS) during the post-baseline (SEIS) pond monitoring periods include (see **Appendix 3** for a detailed list of exceedances):

- Pond 1:
    - Dissolved Aluminum (ALS); 1 exceedance (May 15, 2020) out of 7 samples.
    - Total Iron (ALS); 1 exceedance (August 5, 2019) out of 7 samples.
    - Total Selenium (ALS); 1 exceedance (April 27, 2018) out of 7 samples.

- Pond 5:
    - Dissolved Aluminum (ALS); 2 exceedances out of 26 samples.
    - Ammonia (ALS); 3 exceedances out of 26 samples.
    - Total Arsenic (HHS); 2 exceedances out of 26 samples.
    - Total Cadmium (ALS); 2 exceedances out of 25 samples.
    - Total Iron (ALS); 1 exceedance (November 8, 2021) out of 26 samples.
    - Total Selenium (ALS); 6 exceedances out of 26 samples (source of exceedances may include upstream Spring 5 with exceedances in dissolved Selenium).
- Pond 8:
    - Ammonia (ALS); 1 exceedance (May 23, 2023) out of 21 samples.
    - Total Arsenic (HHS); 2 exceedances out of 21 samples.
    - Total Copper (ALS); 1 exceedance (October 10, 2017) out of 21 samples.
    - Total Iron (ALS); 1 exceedance (August 13, 2018) out of 21 samples.
- Pond 9:
    - Total Arsenic (HHS); 1 exceedance (October 10, 2017) out of 21 samples.

Following is a comparison of baseline (2018 Final EIS) and post-baseline (SEIS) pond water quality results that exceeded DEQ-7 Aquatic Life or Human Health Standards. The monitored ponds that included both 2018 Final EIS and SEIS water quality results (that can be compared) include Ponds 1, 2, 4, 5, 7, 8, and 9. Bold text reflects parameters with DEQ-7 exceedances for post-baseline (SEIS) monitoring events where there were no DEQ-7 exceedances for baseline (2018 Final EIS) monitoring events.

- Pond 1: 14 baseline (2018 Final EIS) monitoring events and seven post-baseline (SEIS) monitoring events resulted in:
    - **Dissolved Aluminum: No 2018 Final EIS exceedances and two SEIS exceedances of the DEQ-7 Aquatic Life Standard.**
    - Fluoride: One 2018 Final EIS exceedance and no SEIS exceedances of the DEQ-7 Human Health Standard.
    - Total Iron: Three 2018 Final EIS exceedances and one SEIS exceedance of the DEQ-7 Aquatic Life Standard.
    - Total Selenium: Five 2018 Final EIS exceedances and one SEIS exceedance of the DEQ-7 Aquatic Life Standard.
- Pond 2: Three baseline (2018 Final EIS) monitoring events and one post-baseline (SEIS) monitoring event resulted in:
    - Total Iron: Two 2018 Final EIS exceedances and no SEIS exceedances of the DEQ-7 Aquatic Life Standard.
- Pond 4: One baseline (2018 Final EIS) monitoring event and one post-baseline (SEIS) monitoring event resulted in:
    - Total Selenium: One 2018 Final EIS exceedance and no SEIS exceedances of the DEQ-7 Aquatic Life Standard.

- Pond 5: 17 baseline (2018 Final EIS) monitoring events and 26 post-baseline (SEIS) monitoring events resulted in:
    - Dissolved Aluminum: One 2018 Final EIS exceedance of the DEQ-7 Human Health and Aquatic Life Standards and two SEIS exceedances of the DEQ-7 Aquatic Life Standard.
    - **Ammonia: No 2018 Final EIS exceedances and three SEIS exceedances of the DEQ-7 Aquatic Life Standard.**
    - **Total Arsenic: No 2018 Final EIS exceedances and two SEIS exceedances of the DEQ-7 Human Health Standard.**
    - **Total Cadmium: No 2018 Final EIS exceedances and two SEIS exceedances of the DEQ-7 Aquatic Life Standard.**
    - Total Iron: Four 2018 Final EIS exceedances and one SEIS exceedance of the DEQ-7 Aquatic Life Standard.
    - **Total Selenium: No 2018 Final EIS exceedances and six SEIS exceedances of the DEQ-7 Aquatic Life Standard.**
- Pond 7: 20 baseline (2018 Final EIS) monitoring events and one post-baseline (SEIS) monitoring event resulted in:
    - Dissolved Aluminum: Three 2018 Final EIS exceedances and no SEIS exceedances of the DEQ-7 Aquatic Life Standard.
    - Total Arsenic: One 2018 Final EIS exceedance and no SEIS exceedances of the DEQ-7 Human Health Standard.
    - Total Iron: Nine 2018 Final EIS exceedances and no SEIS exceedances of the DEQ-7 Aquatic Life Standard.
    - Total Lead: One 2018 Final EIS exceedance of the DEQ-7 Human Health and Aquatic Life Standards and no SEIS exceedances of the DEQ-7 Human Health or Aquatic Life Standards.
    - Total Selenium: Six 2018 Final EIS exceedances and no SEIS exceedances of the DEQ-7 Aquatic Life Standard.
- Pond 8: Three baseline (2018 Final EIS) monitoring events and 21 post-baseline (SEIS) monitoring events resulted in:
    - **Ammonia: No 2018 Final EIS exceedances and one SEIS exceedance of the DEQ-7 Aquatic Life Standard.**
    - **Total Arsenic: No 2018 Final EIS exceedances and two SEIS exceedances of the DEQ-7 Human Health Standard.**
    - **Total Copper: No 2018 Final EIS exceedances and one SEIS exceedance of the DEQ-7 Aquatic Life Standard.**
    - **Total Iron: No 2018 Final EIS exceedances and one SEIS exceedance of the DEQ-7 Aquatic Life Standard.**
- Pond 9: Three baseline (2018 Final EIS) monitoring events and 21 post-baseline (SEIS) monitoring events resulted in:
    - **Total Arsenic: No 2018 Final EIS exceedances and one SEIS exceedance of the DEQ-7 Human Health Standard.**

Springs in the Project Area

Baseline water quality results (through April 2016) for springs in the project area (Springs 1 through 14) were documented in the November 2018 Final EIS. Post-baseline (SEIS) water quality results (July 2016 through November 2023) were compiled for the same 14 spring monitoring sites. Monitoring locations are shown on **Figure 3.7-1**. The likely source of water to these springs is listed in **Section 3.8.2.1,**

Springs. Post-baseline (SEIS) spring water quality data are summarized in **Appendix 3 – Water Quality Tables**: Tables 11 through 24. Monitoring periods for the post-baseline (SEIS) spring monitoring sites are listed below.

- Spring 1: Two primary monitoring events from July 2016 through October 2016
- Spring 2: 20 primary monitoring events from July 2016 through November 2023
- Spring 3: 21 primary monitoring events from July 2016 through November 2023
- Spring 4: 21 primary monitoring events from July 2016 through November 2023
- Spring 5: 19 primary monitoring events from July 2016 through November 2023
- Spring 6: Three primary monitoring events from July 2016 through March 2017
- Spring 7: 21 primary monitoring events from July 2016 through November 2023
- Spring 8: Nine primary monitoring events from October 2018 through March 2022
- Spring 9: 20 primary monitoring events from July 2016 through November 2023
- Spring 10: 21 primary monitoring events from July 2016 through November 2023
- Spring 11: 14 primary monitoring events from March 2017 through May 2023
- Spring 12: 16 primary monitoring events from October 2016 through November 2023
- Spring 13: Eight primary monitoring events from June 2018 through November 2023
- Spring 14: 21 primary monitoring events from July 2016 through November 2023

The quality of spring water was highly variable during the post-baseline (SEIS) monitoring periods. Measured pH was generally basic with values ranging from 9.22 down to 7.9. Parameters with exceedances of Montana Numeric Water Quality Standards (Circular DEQ-7) for HHS and ALS during the post-baseline (SEIS) spring monitoring periods include (see **Appendix 3** for a detailed list of exceedances):

- Spring 5:
  - Nitrate+Nitrite (HHS); 16 exceedances out of 19 samples (source unknown).
  - Dissolved Selenium (HHS); 13 exceedances out of 19 samples (source unknown).
- Spring 6:
  - Dissolved Nickel (HHS); 1 exceedance (July 26, 2016) out of 3 samples.
  - Dissolved Zinc (HHS); 1 exceedance (July 26, 2016) out of 3 samples.
- Spring 7:
  - Dissolved Selenium (HHS); 1 exceedance (July 26, 2016) out of 21 samples.
- Spring 8:
  - Dissolved Selenium (HHS); 1 exceedance (April 16, 2021) out of 9 samples.
- Spring 9:
  - Dissolved Arsenic (HHS); 3 exceedances out of 20 samples.
- Spring 12:
  - Nitrate+Nitrite (HHS); 3 exceedances out of 16 samples.
  - Dissolved Selenium (HHS); 3 exceedances out of 16 samples.

Following is a comparison of baseline (2018 Final EIS) and post-baseline (SEIS) spring water quality results that exceeded DEQ-7 Aquatic Life or Human Health Standards. The monitored springs that included both 2018 Final EIS and SEIS water quality results (that can be compared) include Springs 5, 6, 7, 8, 9, and 12. Bold text reflects parameters with DEQ-7 exceedances for post-baseline (SEIS)

monitoring events where there were no DEQ-7 exceedances for baseline (2018 Final EIS) monitoring events.

- Spring 5: 18 baseline (2018 Final EIS) monitoring events and 19 post-baseline (SEIS) monitoring events resulted in:
    - Nitrate+Nitrite: 17 2018 Final EIS exceedances and 16 SEIS exceedances of the DEQ-7 Human Health Standard.
    - Dissolved Selenium: 13 2018 Final EIS exceedances and 13 SEIS exceedances of the DEQ-7 Human Health Standard.
- Spring 6: 21 baseline (2018 Final EIS) monitoring events and three post-baseline (SEIS) monitoring events resulted in:
    - **Dissolved Nickel: No 2018 Final EIS exceedances and one SEIS exceedance of the DEQ-7 Human Health Standard.**
    - **Dissolved Zinc: No 2018 Final EIS exceedances and one SEIS exceedance of the DEQ-7 Human Health Standard.**
- Spring 7: 21 baseline (2018 Final EIS) monitoring events and 21 post-baseline (SEIS) monitoring events resulted in:
    - Dissolved Selenium: Two 2018 Final EIS exceedances and one SEIS exceedance of the DEQ-7 Human Health Standard.
- Spring 8: 19 baseline (2018 Final EIS) monitoring events and nine post-baseline (SEIS) monitoring events resulted in:
    - **Dissolved Selenium: No 2018 Final EIS exceedances and one SEIS exceedance of the DEQ-7 Human Health Standard.**
- Spring 9: 20 baseline (2018 Final EIS) monitoring events and 20 post-baseline (SEIS) monitoring events resulted in:
    - Dissolved Arsenic: One 2018 Final EIS exceedance and three SEIS exceedances of the DEQ-7 Human Health Standard.
- Spring 12: Four baseline (2018 Final EIS) monitoring events and 16 post-baseline (SEIS) monitoring events resulted in:
    - **Nitrate+Nitrite: No 2018 Final EIS exceedances and three SEIS exceedances of the DEQ-7 Human Health Standard.**
    - **Dissolved Selenium: No 2018 Final EIS exceedances and three SEIS exceedances of the DEQ-7 Human Health Standard.**

Effluent from MPDES Outfalls in the Project Area

Baseline water quality results for effluent from MPDES outfalls in the project area were not available for the November 2018 Final EIS as the MPDES permit associated with the outfalls (MT-0031828) did not become effective until June 1, 2020. Post-baseline (SEIS) water quality results (June 2023 through September 2023) were compiled for effluent from two MPDES (Permit MT-0031828) outfall monitoring sites (Outfalls 005 and 009). Outfall monitoring locations are shown on **Figure 3.7-1** and labeled F5 (Outfall 005) and F9 (Outfall 009). Post-baseline (SEIS) MPDES outfall effluent water quality data are summarized in **Appendix 3 – Water Quality Tables**: Tables 25 and 26. Monitoring periods for the post-baseline (SEIS) MPDES outfall effluent monitoring sites are listed below.

- Outfall 005: Two monitoring events from June 2023 through September 2023
- Outfall 009: One monitoring event in June 2023

The June 2023 MPDES outfall discharges were associated with a greater than 10-year, 24-hour storm event (DEQ 2025); therefore, MPDES Permit MT-0031828 compliance criteria for precipitation-driven discharges greater than the 10-year, 24-hour storm are used for comparisons between the precipitation-driven MPDES limits and the water quality results summarized in **Appendix 3 – Water Quality Tables**.

The quality of MPDES outfall effluent was variable during the post-baseline (SEIS) monitoring periods. Measured pH was basic with a value of 7.7. Parameters with exceedances of MPDES Permit MT-0031828 effluent limitations during the post-baseline (SEIS) MPDES outfall effluent monitoring periods include (see **Appendix 3** for a detailed list of exceedances):

- Outfall 005:
    - Total Iron (MPDES effluent limitation)
    - Settleable Solids (MPDES effluent limitation)
    - Total Suspended Sediments (MPDES effluent limitation)

3.7.6.2 Water Quality in the Indirect Effects Analysis Area

The existing water quality of streams in the indirect effects analysis area is described below in the context of coal combustion from the Colstrip and Rosebud Power Plants, specifically for the following constituents: mercury, selenium, copper, nitrate+nitrite, and total nitrogen. Water quality data were collected by DEQ, the Northern Cheyenne Tribe, and Montana PPL Corporation for Sarpy Creek (including its tributary East Fork), Armells Creek (including its tributaries East Fork and West Fork), Rosebud Creek (including its tributaries Lame Deer Creek, Miller Creek, Pony Creek, and Spring Creek), and the Yellowstone River (between the Armells Creek and Tongue River confluences).

Castle Rock Lake is a reservoir located in Colstrip (**Figure 3.7-2**). It was constructed to provide water for the Colstrip Power Plant and was filled in 1978. The source of the water is the Yellowstone River, piped 30 miles to Castle Rock Lake. The city of Colstrip also uses the lake for its municipal water supply. Montana Fish, Wildlife and Parks (FWP) has a fish consumption advisory related to mercury for Castle Rock Lake (DEQ 2016e). Mercury was not tested in any samples from Castle Rock Lake. Backwash from the Colstrip potable water treatment plant is discharged into Castle Rock Lake under the facility's MPDES Permit MT-0030422, and the backwash discharge to the lake is tested for aluminum, chlorine, and total suspended solids. No other known MPDES permits and no other known regular water quality testing activities are associated with the lake.

A summary of stream water quality data for mercury, selenium, copper, nitrate+nitrite, and total nitrogen is provided in **Table 3.7-7**; these data were collected between 2000 and 2024 (EPA 2024h). An analysis of effects on stream water quality from trace metals deposition was limited to mercury and selenium (which were predicted by the air quality modeling to have the greatest deposition areas of all the modeled metals) and copper (which was predicted by the air quality modeling to have the greatest deposition rate of all the modeled metals). Other metals were not evaluated because the deposition areas for antimony, arsenic, cadmium, chromium, and lead were predicted to be very small (within the Colstrip Power Plant site). Modeled metals deposition areas are tabulated in SEIS **Table 4.13-1** and in the 2018 Final EIS **Table 115**, and modeled metals deposition rates are tabulated in SEIS **Table 4.3-13**. The standards for mercury, selenium, and copper are provided in **Table 3.7-4**, and the lowest standard is shown in **Table 3.7-5**. Exceedances of water quality standards are shown in bold text below in **Table 3.7-7**. Alkalinity of indirect effects analysis area streams has nearly always been greater than 100 mg/L and often has been several hundred mg/L, and pH averaged approximately 8 standard units from 2000 through 2024 (EPA 2024h).

Table 3.7-7. Summary of Mercury, Selenium, Copper, Nitrate+Nitrite, and Total Nitrogen Water Quality Data for Indirect Effects Analysis Area Streams.

Stream and Sampling Period	Mercury (mg/L)	Selenium (mg/L)	Copper (mg/L)	Nitrate + Nitrite (mg/L)	Total Nitrogen[1] (mg/L)
Sarpy Creek (and East Fork) 2005	BDL-**0.0001** (estimated[2])	BDL-0.002	BDL-0.008	BDL-0.395	1.11-**1.4**
Armells Creek (and East/West Forks) 2005-2022	BDL-0.000017	BDL-**0.06**	BDL-**1.07**	BDL-3.55	BDL-**33.6**
Rosebud Creek 2001-2024	BDL-**0.0011**	BDL-**0.008**	BDL-**0.77**	BDL-0.32	BDL-1.04
Rosebud Creek Tributary (Lame Deer Creek) 2005-2024	BDL	BDL-0.0025	BDL-0.005	BDL-1.4	BDL-0.97
Rosebud Creek Tributary (Miller Creek) 2015-2016	No data	BDL	BDL-0.002	BDL-0.05	BDL-1.06
Rosebud Creek Tributary (Pony Creek) 2015-2016	No data	BDL	BDL-0.004	BDL-0.07	0.62
Rosebud Creek Tributary (Spring Creek) 2015-2016	No data	BDL-0.003	BDL-0.012	BDL-0.14	1.11-1.22
Yellowstone River (Armells Creek to Tongue River) 2017-2019	0.0000053-0.00001	BDL	0.00047-0.005	BDL-0.26	0.23-0.62
Lowest water quality standard	0.00005 (HHS)	0.005 (ALS)	0.031 (ALS)[3]	10 (HHS)	1.3 (ALS)[1]

BDL = Below Detection Limit; HHS = Human Health Standard; ALS = Aquatic Life Standard.
1. Total nitrogen data include laboratory test results from water samples collected only during the period for which the total nitrogen standard is applicable (July 1 through September 30).
2. Laboratory test results were estimated due to uncertainty associated with total method error.
3. The copper standard is hardness-dependent and is based on an assumed hardness of 400 mg/L or greater.
Source: EPA 2024h.

An analysis of the data shows the following:

- For mercury, there was one exceedance of the standard in 2005 in Sarpy Creek between its confluences with Coral Creek and West Coral Creek, and there was one exceedance of the standard in 2004 in Rosebud Creek near the mouth. In the past 10 years, mercury concentrations measured in the streams in the indirect effects analysis area have been below the water quality standard (and only four results have been above laboratory detection limits).
- For selenium, there were eight exceedances of the standard between 2000 and 2011 in East Fork Armells Creek (seven exceedances at multiple locations) and in West Fork Armells Creek (one exceedance between its confluences with Trail Creek and East Cromo Creek), and there was one exceedance of the standard in 2004 in Rosebud Creek near the mouth. In the past 10 years, selenium concentrations measured in the streams in the indirect effects analysis area have been below the water quality standard.
- For copper, there were two exceedances of the standard at two locations on East Fork Armells Creek (one exceedance in 2007 at 1.07 mg/L and one exceedance in 2015 at 0.032 mg/L), and there was one exceedance of the standard in 2004 in Rosebud Creek near the mouth. In the past 10 years, copper concentrations measured in the streams in the indirect effects analysis area have

been below the water quality standard, except for the one exceedance in East Fork Armells Creek in 2015 at 0.032 mg/L (slightly above the water quality standard of 0.031 mg/L).

- For nitrate+nitrite, all results were well below the standard.
- For total nitrogen, there was one exceedance of the standard in 2005 in Sarpy Creek between its confluences with West Coral Creek and Coral Creek, and there were 11 exceedances between 2017 and 2022 of the standard in Armells Creek (one exceedance in 2017 downstream of the East and West Fork confluence) and in East Fork Armells Creek (10 exceedances between 2017 and 2022 at multiple locations).

3.8 WATER RESOURCES – GROUNDWATER

3.8.1 Introduction

Since the issuance of the 2018 Final EIS, there have been some changed conditions relevant to groundwater (**Table 3.7-1)**. None of the changed groundwater conditions listed in **Table 3.7-1** substantially alter the analysis presented in the 2018 Final EIS. For example, AM5 to the Area B operating permit, which was approved in 2022, is for a mining area located within the Rosebud Creek groundwater basin. In contrast, Area F is located within West Fork Armells Creek groundwater basin; therefore, there is no interaction between the impacts on groundwater from AM5 and impacts from Area F. Groundwater has been continually monitored and reported annually prior to and following the start of Area F active mining in 2020, and the results do not significantly alter the analysis previously presented in the 2018 Final EIS.

As applicable, the affected environment sections below have been updated from the 2018 Final EIS to address relevant changed conditions, to incorporate groundwater information disclosed in the *Cumulative Hydrologic Impact Analysis for Area F* (DEQ 2019b), to incorporate annual monitoring data collected by Westmoreland Rosebud since the data evaluated in the 2018 Final EIS, and to incorporate updated hydrologic information reported in Westmoreland Rosebud's Annual Hydrology Reports. All other information on groundwater is available in **Section 3.8** of the 2018 Final EIS beginning on page 247.

3.8.1.1 Regulatory Framework

The complete regulatory framework applicable to groundwater is in **Section 3.8.1.1** of the 2018 Final EIS beginning on page 247. Since the 2018 Final EIS, the DEQ water quality standards have been updated, as described under surface water in **Section 3.7.1.1, Regulatory Framework**. DEQ's updated 2019 Circular 7 water quality standards for the parameters of interest are unchanged relative to the 2017 standards analyzed and disclosed in the 2018 Final EIS (Table 56) and therefore do not impact the baseline conditions or the impacts analyses presented in the 2018 Final EIS or those summarized in **Appendix 3** for groundwater (**Tables 27** through **31**) and springs (**Tables 11** through **24**).

There is little scientific consensus on recommended water quality limits for livestock. The state and EPA have not established ambient water quality criteria for livestock or wildlife. A summary of water quality criteria for livestock from several studies is provided in **Section 3.7, Water Resources – Surface Water**, **Table 3.7-5**. These criteria are also relevant to well water used for livestock. The criteria are not enforceable standards but are used as guidance in evaluating the suitability of water quality for optimal livestock performance. These criteria add to those previously disclosed but do not significantly impact the baseline conditions or the impacts analyses presented in the 2018 Final EIS. The limits are not enforceable standards but are used for guidance in evaluating suitability of pre- and postmining water quality for livestock use and represent values established from a variety of scientific studies. Even above the limits, harmful effects are not guaranteed or even necessarily likely. The criteria for livestock drinking water use are considered protective of wildlife drinking water use because wildlife are generally more acclimatized to naturally variable water quality than domesticated animals.

3.8.1.2 Analysis Area

The analysis areas for groundwater and the rationale for their use are described in detail in **Section 3.8.1.2** of the 2018 Final EIS beginning on page 249. The analysis area for direct effects on groundwater

hydrology and quality is the project area[38] (**Figure 3.7-1**), which includes the area where mining and/or related disturbances would occur and the area outside of the permit boundary where direct effects on groundwater are predicted to occur based on modeling. The analysis area for indirect effects on groundwater is within the property boundary of the Colstrip Power Plant (owned by PPL Montana LLC, WPP LLC, and Colstrip Comm Serv LLC), because the Colstrip Power Plant boundary includes all groundwater impacted by operations at the plant (Hydrometrics, Inc. 2015). Indirect effects from the storage of coal combustion products on groundwater at both the Rosebud and Colstrip Power Plants were analyzed (see **Section 4.8, Water Resources – Groundwater**).

3.8.2 Site Hydrogeology

Information on the affected environment site hydrogeology is available in the 2018 Final EIS in **Section 3.8.2** beginning on page 250. The discussion of springs from the 2018 Final EIS is included below to support the discussion of springs in **Section 3.7, Water Resources – Surface Water.**

3.8.2.1 Springs

Numerous springs have been identified in the vicinity of the project area (**Figure 3.7-1)**. Fourteen of the springs are numbered and have been periodically monitored by Westmoreland Rosebud (**Figure 2.2-7** in **Chapter 2**). Springs are typically located along or near drainages (see **Section 3.7.5, Surface Water Hydrology**). **Table 3.8-1** provides a summary of the likely groundwater source to each spring.

Table 3.8-1. Source of Groundwater to Monitored Springs.

Spring	Groundwater Source	Spring	Groundwater Source
1	Overburden	8	Rosebud Coal and possibly clinker
2	Unknown	9	Overburden
3	Overburden	10	Overburden and possibly Rosebud Coal
4	Overburden	11	Rosebud/clinker and possibly overburden
5	Overburden	12	Unknown
6	Overburden	13	McKay Coal
7	Rosebud Coal	14	Sub-McKay and possibly alluvial groundwater

Source: PAP, Appendix J, Attachment B-J.

Springs 2 and 12 are located stratigraphically below the outcrop of the Rosebud Coal and could be receiving water from interburden sandstones or possibly the McKay Coal, like nearby Spring 13. Spring 3 is located stratigraphically above the outcrop of the Rosebud Coal so that it could be receiving water from sandstone in the overburden and/or the Rosebud Coal.

3.8.3 Conceptual Hydrogeological Model

Information on the conceptual hydrogeological model is available in the 2018 Final EIS in **Section 3.8.3** beginning on page 257.

[38] As Westmoreland Rosebud has developed Area F, on-the-ground conditions have necessitated minor changes to the project area, which is the Area F permit boundary (now 6,773 acres instead of 6,746 acres), and to the configuration of the disturbance boundary (now 4,288 acres instead of 4,260 acres); these minor revisions were reviewed and approved by DEQ pursuant to MSUMRA and MEPA and are described in **Section 2.2.2.2, Area F Operations and Development**.

3.8.4 Groundwater Use

Information on groundwater use is available in the 2018 Final EIS in **Section 3.8.4** beginning on page 258.

3.8.5 Groundwater Quality

Information on analysis area groundwater quality is available in the 2018 Final EIS in **Section 3.8.5** beginning on page 258. Although there are updated groundwater monitoring data available for the analysis area, the new data do not significantly impact the baseline conditions; nor do they significantly alter the impacts analyses presented in the 2018 Final EIS. The baseline tables presented in this SEIS summarize water quality data collected following the data collection range summarized in the Final EIS and therefore allow the evaluation of any changes that have occurred since the 2018 Final EIS evaluation was conducted. In general, the Final EIS summarized groundwater data collected over the 2005-2016 timeframe, while this SEIS summarizes groundwater data collected between 2017 and 2023 (**Appendix 3 – Water Quality Tables: Tables 27 through 31**). In comparing the groundwater quality summarized in the Final EIS to that summarized here for the same hydrostratigraphic units in the project area, no significant changes are observed, and the SEIS baseline period is considered consistent with the Final EIS baseline conditions. Similar to the Final EIS baseline period evaluated, a few exceedances of human health water quality standards were observed during the SEIS baseline water quality evaluation period. Two exceedances for fluoride were observed in the overburden (WO-184 and WO-186), one exceedance of selenium in the overburden (WO-187), and one exceedance of fluoride in the Sub-McKay (WD-189). All exceedances were observed during the June 2018 sampling event prior to mining in Area F. The general water quality descriptions of each hydrostratigraphic unit described in the 2018 Final EIS remain relevant and adequately describe the data collected and summarized for this SEIS.

The livestock exceedance discussion in the 2018 Final EIS was relative to the one set of criteria used during that evaluation. Due to the lack of scientific consensus on recommended water quality limits for livestock and since the state and EPA have not established ambient water quality criteria for livestock or wildlife, detailed exceedances relative to livestock criteria have not been highlighted for the baseline tables presented in this SEIS (**Appendix 3 – Water Quality Tables**). Baseline groundwater quality reflects exceedances of one or more parameters of livestock water quality guidelines. Though water resources have historically been used by livestock, as indicated by water rights, and although even above the limits, harmful effects are not guaranteed or even necessarily likely. The criteria for livestock drinking water use are considered protective of wildlife drinking water use because wildlife are generally more acclimatized to naturally variable water quality than domesticated animals. In general, baseline samples frequently exceed guideline values for livestock drinking water for TDS, magnesium, and sulfate concentrations with slight differences depending on the hydrostratigraphic unit evaluated and with alluvium and overburden groundwater typically displaying poorer water quality relative to the other units. Alkalinity, aluminum, arsenic, calcium, copper, fluoride, iron, lead, manganese, pH, and selenium concentrations also occasionally approach or exceed livestock guidelines. The quality of alluvium, overburden, Rosebud Coal, McKay Coal, and Sub-McKay groundwater is considered marginally suitable for livestock drinking water uses.

3.9 WATER RESOURCES – WATER RIGHTS

3.9.1 Introduction

Since the issuance of the 2018 Final EIS, there have been some changed conditions relevant to water rights. These are the same as for surface water and are listed in **Table 3.7-1**. None of the changed conditions substantially alter the analysis presented in the 2018 Final EIS. Information on surface water and groundwater rights in the direct effect analysis area is available in **Section 3.9** of the 2018 Final EIS beginning on page 275 and in **Appendix E – List of Surface Water and Groundwater Rights** in that document. In response to the 2022 Court order, the analysis area for direct and cumulative impacts on surface water was increased for this SEIS to include a portion of the Yellowstone River (see **Section 3.7, Water Resources – Surface Water**). The analysis area for indirect effects on surface water rights was also increased and is described in **Section 3.9.1.2, Analysis Area.** Due to the large number of water rights in the enlarged indirect effects analysis area, the discussion below is qualitative. Analysis areas for cumulative effects are described in **Chapter 5**.

3.9.1.1 Regulatory Framework

The regulatory framework applicable to water rights is unchanged since the 2018 Final EIS and is described in **Section 3.9.1.1** of the 2018 Final EIS beginning on page 275.

3.9.1.2 Analysis Area

The analysis area for direct impacts on water rights is unchanged from the 2018 Final EIS and is shown on **Figures 43** and **44** and described in **Section 3.9.1.2** of that document beginning on page 277. It includes the project area (where mining and related disturbance would occur)[39] as well as the surrounding area that may be affected by mining in the project area. The analysis area for indirect effects on surface water rights is the same as that used for surface water and is described above in **Section 3.7.1.2** and is shown on **Figure 3.7-2**. The indirect effects analysis area for groundwater rights is the same as that described for groundwater in **Section 3.8.1.2, Analysis Area**.

3.9.2 Existing Water Rights

Surface water and groundwater rights in the direct effects analysis area and the groundwater indirect effects analysis area are described in **Section 3.9.2** of the 2018 Final EIS beginning on page 278. Water rights were compiled for T2N R38E in the southeast corner of Treasure County and for T2N R39E in Rosebud County. **Appendix E** of the 2018 Final EIS provides a list of the 122 surface water and groundwater rights on record with the Water Rights Bureau that are within the direct analysis area as well as downgradient water rights in the indirect effects analysis area that may be affected by mine operations.

Surface water rights in the indirect effects analysis area include those with points of withdrawal within the Armells Creek watershed, and parts of the Sarpy Creek and Rosebud Creek watersheds. Water rights to the Yellowstone River between the Armells Creek and Tongue River confluences are also included. Approximately 1,600 active surface water rights (subject water rights) are on record with the Montana Department of Natural Resources and Conservation that are within the indirect and cumulative effects

[39] As Westmoreland Rosebud has developed Area F, on-the-ground conditions have necessitated minor changes to the project area, which is the Area F permit boundary (now 6,773 acres instead of 6,746 acres), and to the configuration of the disturbance boundary (now 4,288 acres instead of 4,260 acres); these minor revisions were reviewed and approved by DEQ pursuant to MSUMRA and MEPA and are described in **Section 2.2.2.2, Area F Operations and Development**.

analysis area. The subject water rights cumulatively include approximately 1,900 cfs of maximum diversion potential with priority dates that range from 1900 through 2023 and are used for a wide range of water supply purposes including domestic, fish and wildlife, flood control, industrial, irrigation, lawn and garden, mining, municipal, pollution abatement, recreation, sediment control, stock, wildlife, and waterfowl. Approximately 95 percent of the maximum diversion potential associated with the subject water rights is dedicated exclusively for irrigation purposes, and approximately 70 percent of the maximum diversion potential associated with the subject water rights is sourced from the Yellowstone River. There are approximately 100 active surface water rights on the Yellowstone River within the indirect effects analysis area with a maximum diversion potential of approximately 1,400 cfs. Most of those water rights are dedicated exclusively for irrigation purposes, including the largest three of those water rights (425 cfs, 144 cfs, and 109 cfs).

A surface water right (42KJ 94423-00) with a maximum flow rate of 69.27 cfs is also sourced from the Yellowstone River, upstream of Forsyth, and is used for industrial and municipal purposes including industrial water supply for the Colstrip Power Plant. The water right is currently owned by seven entities including the City of Colstrip for municipal purposes and the six owners of the Colstrip Power Plant including Avista Corporation, NorthWestern Energy, Pacific Power & Light Company, Portland General Electric Company, Puget Sound Power & Light Company, and Talen Montana LLC (DNRC 2024). Castle Rock Lake is a multiuse water storage facility used to receive raw water from the Yellowstone River (associated with the noted 69.27 cfs water right) and backwash from the Colstrip potable water treatment plant, and is also used to supply industrial water to the Colstrip Power Plant and municipal water to the City of Colstrip. Pursuant to Section 75-8-110, MCA, Talen Montana LLC, on behalf of the six noted owners of the Colstrip Power Plant completed a 2022 Water Feasibility Study that evaluates "options to ensure access to a water supply for the City of Colstrip public water system post retirement of the Colstrip Power Plant." The evaluation includes "an inventory and assessment of the water system infrastructure from the Yellowstone River to the City of Colstrip water treatment plant" including "the Nichols Pump Station at the Yellowstone River, the transmission pipelines and appurtenances from Nichols to Castle Rock Lake, the surge pond (i.e., Castle Rock Lake), and the City of Colstrip water treatment plant." Study documentation includes "the historical and projected water use for industrial, agricultural and municipal water uses" and "future uses projected through the anticipated duration of the proposed remediation efforts following the closure" (DOWL Engineering 2022). DEQ has determined that the study is "complete as submitted on November 1, 2022, based on the factors outlined in § 75-8-110, MCA" recognizing a "continued commitment by the Colstrip Steam Electric Station owners to work in conjunction with the City toward agreements for infrastructure transition, infrastructure maintenance and reconfiguration, refined cost estimates based on City resources, and responsibility of costs; liability concerns for assuming responsibility for the infrastructure; and additional details on water rights access or updates" (DEQ 2023). DEQ has neither the authority nor the expertise to determine, on an advisory basis or otherwise, water rights issues, and the ultimate ownership and use of the noted 69.27 cfs water right is under the jurisdiction of DNRC.

3.10 VEGETATION

3.10.1 Introduction

Since the issuance of the 2018 Final EIS, there have been no substantial new circumstances or information relevant to vegetation. Please note that the following actions (**Table 3.10-1**) have occurred since the issuance of the 2018 Final EIS but would not substantially change the affected environment previously described for vegetation. Detailed information on vegetation is available in **Section 3.10** of the 2018 Final EIS beginning on page 281. See **Section 3.13, Special Status Species** in this SEIS for a discussion of federally listed plant species.

Table 3.10-1. Vegetation: Changed Conditions Since the 2018 Final EIS.

Year	Change
2019	Westmoreland Rosebud began developing Area F in 2019, and active mining began in August 2020 according to its state operating permit and Federal mining plan. As of December 2023, Westmoreland Rosebud has disturbed 582 acres in the project area; 494 acres of that disturbance is due to active mining, and the remainder is due to site development, such as roads and soil and/or spoil stockpiles. See **Tables 2.2-3** and **2.2-4** in **Chapter 2** above for current disturbance at the Rosebud Mine and Westmoreland Rosebud's posted reclamation bonds.
2019-2022	In terms of other permit areas of the Rosebud Mine, the following may contribute to changed conditions for vegetation: • AM5 to Permit Area B was approved by DEQ in 2022 after preparation of an EIS pursuant to MEPA that considered the cumulative vegetation impacts of Area F. • Area D is no longer actively mined and is being reclaimed. • Area E has received full bond release and is no longer a Montana coal mine.
2020	The monarch butterfly (*Danaus plexippus plexippus*) was designated as a candidate species under consideration for listing as an endangered species (85 FR 243). The monarch butterfly was proposed for listing as a threatened species in 2024. The monarch's range includes southern Canada and the entire continental United States to South America. This distinctive, large (5.2 to 5.8 centimeters long at the forewing), orange-and-black butterfly overwinters in California and Mexico. Larval food plants include several species of *Asclepias* (milkweed – the primary host plant genus), *Apocynum*, *Calotropis*, *Matelea*, and *Sarcostemma*; adults feed on nectar from a variety of flowers (MNHP 2022a). Potential habitat (milkweed) likely occurs in Area F, but no critical habitat has been designated by the U.S. Fish and Wildlife Service (USFWS). The nearest known occurrences of monarch butterfly to Area F are documented along the Yellowstone River and Smith Creek north and west of Forsythe in Rosebud and Custer Counties (MNHP 2022b). See **Section 3.13, Special Status Species**, below and the Area F Biological Assessment (BA; OSMRE 2025) for a more detailed discussion of monarch butterfly and its vegetation needs.
2021	The Richard Springs Fire began in a coal seam approximately 10 miles southwest of Colstrip on August 8, 2021, and burned 171,130 acres in the vicinity of the Rosebud Mine Area B, including Area B AM5, and reclaimed Area E. It was not in the same drainages as Area F but is considered in **Chapter 5** (cumulative effects).
2023	Westmoreland completes revegetation monitoring surveys and submits Annual Revegetation Monitoring Reports to Montana DEQ as a condition of its operating permits for the Rosebud Mine. The most recent reporting year available is 2023 (January 1, 2023, through December 31, 2023); this report was reviewed to confirm there have been no significant changes since the 2018 Final EIS (Cedar Creek Associates, Inc. 2023a).

3.10.1.1 Regulatory Framework

The regulatory framework applicable to vegetation is unchanged since the 2018 Final EIS and is described in **Section 3.10.1.1** of the 2018 Final EIS beginning on page 281.

3.10.1.2 Analysis Area

The analysis areas for vegetation and the rationale for their use are described in detail in **Section 3.10.1.2** of the 2018 Final EIS beginning on page 282. The analysis areas are the project area[40] (direct impacts) and the operational boundaries of the Colstrip and Rosebud Power Plants plus a 32-km area around each of the power plants (indirect impacts).

3.10.2 Vegetation Communities

Existing vegetation communities in the direct effects analysis area are described in **Section 3.10.2** of the 2018 Final EIS beginning on page 283. See **Section 3.13, Special Status Species** in this SEIS for a discussion of federally listed plant species.

3.10.3 Vegetation Communities in the Indirect Effects Analysis Area

Existing vegetation communities in the indirect effects analysis area are described in **Section 3.10.3** of the 2018 Final EIS beginning on page 289.

3.10.4 Noxious Weeds

Noxious weeds in the analysis area are described in **Section 3.10.4** of the 2018 Final EIS beginning on page 290.

[40.] As Westmoreland Rosebud has developed Area F, on-the-ground conditions have necessitated minor changes to the project area, which is the Area F permit boundary (now 6,773 acres instead of 6,746 acres), and to the configuration of the disturbance boundary (now 4,288 acres instead of 4,260 acres); these minor revisions were reviewed and approved by DEQ pursuant to MSUMRA and MEPA and are described in **Section 2.2.2.2, Area F Operations and Development**.

3.11 WETLANDS AND RIPARIAN ZONES

3.11.1 Introduction

Since the issuance of the 2018 Final EIS, there have been no substantial new circumstances or information relevant to wetlands and riparian zones other than those listed above in **Table 3.7-1** for water resources. As described in **Chapter 2**, Westmoreland Rosebud began developing Area F in 2019 according to its state operating permit and Federal mining plan, and coal recovery has been ongoing in the project area since 2020. As of 2023, no wetlands have been disturbed in the project area. Detailed information on wetlands is available in **Section 3.11** of the 2018 Final EIS beginning on page 291.

3.11.1.1 Regulatory Framework

The regulatory framework applicable to wetlands is described in **Section 3.11.1.1** of the 2018 Final EIS beginning on page 291. On May 25, 2023, the United States Supreme Court modified the definition of "waters of the U.S.," reducing the jurisdiction of the CWA over wetlands adjacent to bodies of water that do not have a continuous surface connection to other known waters of the U.S. As described in **Section 3.11.2.3** of the 2018 Final EIS, on page 297, the USACE had previously determined that all 12 wetlands in the analysis area are isolated and therefore non-jurisdictional. The United States Supreme Court ruling on the definition of waters of the U.S. does not change the status of the wetlands in the analysis area, which continue to be non-jurisdictional.

3.11.1.2 Analysis Area

The analysis areas for wetlands and the rationale for their use are described in detail in **Section 3.11.1.2** of the 2018 Final EIS beginning on page 293. For direct impacts, the analysis area is the project area[41] plus a 500-foot buffer, and for indirect impacts, the analysis area includes all of the Armells Creek watershed, and parts of the Sarpy Creek and Rosebud Creek watersheds within and downstream of the 32-km circular area (**Figure 49** in the 2018 Final EIS).

3.11.2 Wetlands in the Direct Effects Analysis Area

Existing wetlands in the direct effects analysis area are described in **Section 3.11.2** of the 2018 Final EIS beginning on page 294 and shown on **Figure 2.2-1** in **Chapter 2** of this SEIS.

3.11.3 Other Waters of the U.S. in the Direct Effects Analysis Area

Other waters of the U.S. in the direct effects analysis area are described in **Section 3.11.3** of the 2018 Final EIS beginning on page 297.

[41.] As Westmoreland Rosebud has developed Area F, on-the-ground conditions have necessitated minor changes to the project area, which is the Area F permit boundary (now 6,773 acres instead of 6,746 acres), and to the configuration of the disturbance boundary (now 4,288 acres instead of 4,260 acres); these minor revisions were reviewed and approved by DEQ pursuant to MSUMRA and MEPA and are described in **Section 2.2.2.2, Area F Operations and Development**.

3.11.4 Springs and Seeps in the Direct Effects Analysis Area

Springs and seeps in the direct effects analysis area (prior to ongoing mine development in Area F) are described in **Section 3.11.4** of the 2018 Final EIS beginning on page 298 and in this SEIS in **Section 3.7, Water Resources – Surface Water** and **Section 3.8.2.1, Springs**.

3.11.5 Wetlands in the Indirect Effects Analysis Area

Wetlands in the indirect effects analysis area are described in **Section 3.11.5** of the 2018 Final EIS beginning on page 298.

3.12 FISH AND WILDLIFE RESOURCES

3.12.1 Introduction

Since the issuance of the 2018 Final EIS, there have been no substantial new circumstances or information relevant to fish and general wildlife other than those described for special status species in **Section 3.13**. Please note that the following actions (**Table 3.12-1**) have occurred since the issuance of the 2018 Final EIS but would not substantially change the affected environment previously described for fish and general wildlife. Detailed information on fish and general wildlife is available in **Section 3.12** of the 2018 Final EIS beginning on page 303.

Table 3.12-1. Fish and Wildlife Resources: Changed Conditions Since the 2018 Final EIS.

Year	Change
2019	Westmoreland Rosebud began developing Area F in 2019, and active mining began in August 2020 according to its state operating permit and Federal mining plan. As of December 2023, Westmoreland Rosebud has disturbed 582 acres in the project area; 494 acres of that disturbance is due to active mining, and the remainder is due to site development, such as roads and soil and/or spoil stockpiles. See **Tables 2.2-3** and **2.2-4** in **Chapter 2** above for current disturbance at the Rosebud Mine and Westmoreland Rosebud's posted reclamation bonds.
2019-2022	In terms of other permit areas of the Rosebud Mine, the following may contribute to changed conditions for fish and wildlife and their habitats: • AM5 to Permit Area B was approved by DEQ in 2022 after preparation of an EIS pursuant to MEPA that considered the cumulative wildlife impacts of Area F. • Area D is no longer actively mined and is being reclaimed. • Area E has received full bond release and is no longer a Montana coal mine.
2020	The monarch butterfly (*Danaus plexippus plexippus*) was designated as a candidate species under consideration for listing as an endangered species (85 FR 243). The monarch butterfly was proposed for listing as a threatened species in 2024. The monarch's range includes southern Canada and the entire continental United States to South America. This distinctive, large (5.2 to 5.8 centimeters long at the forewing), orange-and-black butterfly overwinters in California and Mexico. Larval food plants include several species of *Asclepias* (milkweed – the primary host plant genus), *Apocynum*, *Calotropis*, *Matelea*, and *Sarcostemma*; adults feed on nectar from a variety of flowers (MNHP 2022a). Potential habitat (milkweed) likely occurs in Area F, but no critical habitat has been designated by the USFWS. The nearest known occurrences of monarch butterfly to Area F are documented along the Yellowstone River and Smith Creek north and west of Forsythe in Rosebud and Custer Counties (MNHP 2022b). See **Section 3.13, Special Status Species**, below and the Area F BA (OSMRE 2025) for a more detailed discussion of monarch butterfly and its vegetation needs.
2021	The Richard Springs Fire began in a coal seam approximately 10 miles southwest of Colstrip on August 8, 2021, and burned 171,130 acres in the vicinity of the Rosebud Mine Area B, including Area B AM5, and reclaimed Area E. It was not in the same drainages as Area F but is considered in **Chapter 5** (cumulative effects).
2023	Westmoreland completed benthic aquatic macroinvertebrate surveys as a condition of its Area F operating permit (Cedar Creek Associates, Inc. 2023b).
2023	Westmoreland completes annual wildlife surveys and submits Annual Wildlife Monitoring Reports to Montana DEQ as a condition of its operating permits for the Rosebud Mine. The most recent reporting year available is 2023 (January 1, 2023, through December 31, 2023); this report (ICF 2024) was reviewed to confirm there have been no significant changes since the 2018 Final EIS.
2024	The western regal fritillary (*Argynnis idalia occidentalis*) was proposed for listing as a threatened species in August 2024 (89 FR 63888-63909, August 6, 2024). The regal fritillary is a large butterfly consisting of two subspecies found in the native grasslands of the central and northern Great Plains and portions of the Midwest (the western regal fritillary), and a single location in eastern Pennsylvania (the eastern regal fritillary) (USFWS 2024b). Regal fritillary habitat is composed of grasslands with necessary components of native violets (*Viola* spp.) for larvae to eat and nectar sources for adults. The species' account on the USFWS Environmental Conservation Online (ECOS) website lists the species as known or believed to occur in Rosebud County, but not in Treasure County, Montana. Mapping shows that the nearest potential habitat occurs east of Rosebud Creek, but it does not intersect the project area. See **Section 3.13, Special Status Species** below and the Area F BA (OSMRE 2025) for a more detailed discussion of the western regal fritillary and its vegetation needs.
2024	Suckley's cuckoo bumble bee was proposed for listing as an endangered species in December 2024 (89 FR 102074-102091, December 17, 2024). The species has a broad distribution across most of western North America and can be found in various habitats such as prairies, grasslands, meadows, and woodlands between 6,000 and 10,500 feet in elevation (NatureServe 2025; USFWS 2024d). Suckley's cuckoo bumble bee is a generalist pollinator that is also an obligate parasitic bumble bee that invades the nests of other bees in the genus *Bombus*, including the western bumble bee (*Bombus occidentalis*) (USFWS 2024d). See **Section 3.13, Special Status Species** and the Area F BA (OSMRE 2025) for a more detailed discussion of Suckley's cuckoo bumble bee and its habitat.

3.12.1.1 Regulatory Framework

The regulatory framework for fish and general wildlife is unchanged since the Final EIS and is described in **Section 3.12.1.1** of the 2018 Final EIS beginning on page 303.

3.12.1.2 Analysis Area

The analysis areas for wildlife are described in detail in **Section 3.12.1.2** of the 2018 Final EIS beginning on page 282 along with the rationale for their use. For direct impacts, the analysis area is the project area[42] plus a 1-mile buffer (direct effects), and for indirect effects, the analysis area includes the operational boundaries of the Colstrip and Rosebud Power Plants plus a 32-km circular area around each of the power plants.

3.12.1.3 Fish and Wildlife Habitat Characteristics

Other than the Richard Springs Fire (burned Area B and former Permit Area E) and ongoing mining in Area F, the wildlife habitat characteristics in the analysis areas remain unchanged. Information on wildlife habitat is provided in **Section 3.12.1.3** of the 2018 Final EIS beginning on page 306.

3.12.2 Mammals

Information on mammals is provided in **Section 3.12.2** of the 2018 Final EIS beginning on page 307.

3.12.3 Big Game Animals

Information on big game animals is provided in **Section 3.12.3** of the 2018 Final EIS beginning on page 308.

3.12.4 Birds

Information on birds is provided in **Section 3.12.5** of the 2018 Final EIS beginning on page 312.

3.12.5 Reptiles, Amphibians, and Invertebrates

Information on reptiles, amphibians, and invertebrates is provided in **Section 3.12.5** of the 2018 Final EIS beginning on page 322. Information on the monarch butterfly is included in this SEIS in **Section 3.13, Special Status Species**, below and in the Area F BA (OSMRE 2025).

3.12.6 Aquatic Species

Information on aquatic species is provided in **Section 3.12.6** of the 2018 Final EIS beginning on page 323. Information on aquatic special status species (i.e., pallid sturgeon) is included in this SEIS in **Section 3.13, Special Status Species**, below and in the Area F BA (OSMRE 2025).

[42] As Westmoreland Rosebud has developed Area F, on-the-ground conditions have necessitated minor changes to the project area, which is the Area F permit boundary (now 6,773 acres instead of 6,746 acres), and to the configuration of the disturbance boundary (now 4,288 acres instead of 4,260 acres); these minor revisions were reviewed and approved by DEQ pursuant to MSUMRA and MEPA and are described in **Section 2.2.2.2, Area F Operations and Development**.

3.13 SPECIAL STATUS SPECIES

3.13.1 Introduction

This section describes special status wildlife and plant species within the analysis areas. Special status species include federally listed threatened, endangered, and candidate species and other sensitive wildlife and plant species. Similar to the 2018 Final EIS, the special status species direct effects analysis area is the project area; however, the indirect effects analysis area and the cumulative effects analysis area, defined below in **Section 3.13.1.2, Analysis Area**, have been revised in response to the 2022 Court order to include a portion of the Yellowstone River and a more robust analysis of indirect impacts of surface water withdrawals from the Yellowstone River on pallid sturgeon. Since the 2018 Final EIS was issued, there also have been several changed conditions relative to special status species (**Table 3.13-1**). A new BA (OSMRE 2025) considers these changed conditions and has been prepared to address the project's impacts on five species: pallid sturgeon, northern long-eared bat, monarch butterfly, western regal fritillary, and Suckley's cuckoo bumble bee (see **Section 6.1.2, Section 7 Consultation Process with the U.S. Fish and Wildlife Service**). This section has been updated accordingly to describe and update special status species in the expanded indirect and cumulative effects analysis areas.

Table 3.13-1. Special Status Species: Changed Conditions Since the 2018 Final EIS.

Year	Change
2019	Westmoreland Rosebud began developing Area F in 2019, and active mining began in August 2020 according to its state operating permit and Federal mining plan. As of December 2023, Westmoreland Rosebud has disturbed 582 acres in the project area; 494 acres of that disturbance is due to active mining, and the remainder is due to site development, such as roads and soil and/or spoil stockpiles. See **Tables 2.2-3** and **2.2-4** in **Chapter 2** above for current disturbance at the Rosebud Mine and Westmoreland Rosebud's posted reclamation bonds.
2019-2022	In terms of other permit areas of the Rosebud Mine, the following may contribute to changed conditions for special status species and their habitats: • AM5 to Permit Area B was approved by DEQ in 2022 after preparation of an EIS pursuant to MEPA that considered the cumulative wildlife impacts of Area F. • Area D is no longer actively mined and is being reclaimed. • Area E has received full bond release and is no longer a Montana coal mine.
2020	The monarch butterfly (*Danaus plexippus plexippus*) was designated as a candidate species under consideration for listing as an endangered species (85 FR 243). The monarch butterfly was proposed for listing as a threatened species in 2024. The monarch's range includes southern Canada and the entire continental United States to South America. This distinctive, large (5.2 to 5.8 centimeters long at the forewing), orange-and-black butterfly overwinters in California and Mexico. Larval food plants include several species of *Asclepias* (milkweed – the primary host plant genus), *Apocynum*, *Calotropis*, *Matelea*, and *Sarcostemma*; adults feed on nectar from a variety of flowers (MNHP 2022a). Potential habitat (milkweed) likely occurs in Area F, but no critical habitat has been designated by the USFWS. The nearest known occurrences of monarch butterfly to Area F are documented along the Yellowstone River and Smith Creek north and west of Forsythe in Rosebud and Custer Counties (MNHP 2022b). See **Section 3.13.2.3, Monarch Butterfly**, below and the Area F BA (OSMRE 2025) for a more detailed discussion of monarch butterfly and its vegetation needs.
2021	The Richard Springs Fire began in a coal seam approximately 10 miles southwest of Colstrip on August 8, 2021, and burned 171,130 acres in the vicinity of the Rosebud Mine Area B, including Area B AM5, and reclaimed Area E. It was not in the same drainages as Area F, but included portions of the indirect analysis area for special status species.
2023	Westmoreland completed aquatic macroinvertebrate surveys as a condition of its Area F operating permit (Cedar Creek Associates, Inc. 2023b).
2023	The northern long-eared bat, formerly listed as threatened under the Endangered Species Act (ESA), is now listed as endangered under the ESA as of March 31, 2023. The 2018 Final EIS relied on a programmatic BA and 4(d) rule for the impacts on the northern long-eared bat.
2023	Westmoreland completes annual wildlife surveys and submits Annual Wildlife Monitoring Reports to Montana DEQ as a condition of its operating permits for the Rosebud Mine. The most recent reporting year available is 2023 (January 1, 2023, through December 31, 2023); this report (ICF 2024) was reviewed to confirm there have been no significant changes since the 2018 Final EIS.
2023	Changes to the lists of Montana Natural Heritage Program (MNHP) species of concern (SOC) have been made since the 2018 Final EIS and are incorporated in the SEIS.
2024	Informal discussions with the USFWS on May 22, 2024, indicated that the BA for the project should address northern long-eared bat, pallid sturgeon, and monarch butterfly, since other federally listed and candidate species are not likely to occur in the analysis area. OSMRE submitted the draft BA on August 19, 2024, and a revised BA on October 8, 2024 (OSMRE 2025). See also **Section 6.1.2, Section 7 Consultation Process with the U.S. Fish and Wildlife Service**.
2024	The western regal fritillary (*Argynnis idalia occidentalis*) was proposed for listing as a threatened species in August 2024 (89 FR 63888-63909, August 6, 2024). The regal fritillary is a large butterfly consisting of two subspecies found in the native grasslands of the central and northern Great Plains and portions of the Midwest (the western regal fritillary), and a single location in eastern Pennsylvania (the eastern regal fritillary) (USFWS 2024b). Regal fritillary habitat is composed of grasslands with necessary components of native violets (*Viola* spp.) for larvae to eat and nectar sources for adults. The species' account on the USFWS ECOS website lists the species as known or believed to occur in Rosebud County, but not in Treasure County, Montana. Mapping shows that the nearest potential habitat occurs east of Rosebud Creek, but it does not intersect the project area. See **Section 3.13, Special Status Species** below and the Area F BA (OSMRE 2025) for a more detailed discussion of the western regal fritillary and its vegetation needs.

Table 3.13-1. Special Status Species: Changed Conditions Since the 2018 Final EIS.

Year	Change
2024	Suckley's cuckoo bumble bee was proposed for listing as an endangered species in December 2024 (89 FR 102074-102091, December 17, 2024). The species has a broad distribution across most of western North America and can be found in various habitats such as prairies, grasslands, meadows, and woodlands between 6,000 and 10,500 feet in elevation (NatureServe 2025; USFWS 2024d). Suckley's cuckoo bumble bee is a generalist pollinator that is also an obligate parasitic bumble bee that invades the nests of other bees in the genus *Bombus*, including the western bumble bee (*Bombus occidentalis*) (USFWS 2024d). See **Section 3.13, Special Status Species** below and the Area F BA (OSMRE 2025) for a more detailed discussion of Suckley's cuckoo bumble bee and its habitat.

3.13.1.1 Regulatory Framework

Federal Requirements

Federally listed threatened and endangered species are protected under the ESA under 16 U.S.C. §§ 1531 to 1543 (Supp. 1996), as amended, and implemented by the USFWS and National Oceanic and Atmospheric Administration. The ESA defines an endangered species as "a species in danger of becoming extinct throughout all or a portion of its range" and a threatened species as "a species likely to become endangered in the foreseeable future" (50 C.F.R. part 17.3). Candidate species are plants and animals for which there is sufficient information on their biological vulnerability to support Federal listing as threatened or endangered (63 FR 13347), but listing is precluded by other higher-priority listing activities. Potential effects on a federally listed species or its habitat resulting from a project with a Federal action require consultation with the USFWS under Section 7 of the ESA. MSUMRA requires this consultation for state permitting of coal mines (implemented by DEQ). Adverse modification of designated critical habitat for a federally listed species also requires consultation with the USFWS.

Information on the Bald and Golden Eagle Protection Act of 1940 and Migratory Bird Treaty Act can be found in **Section 3.12, Fish and Wildlife Resources** in the 2018 Final EIS.

State Requirements

FWP regulates wildlife and fish under the state Fish, Wildlife, and Parks Commission (Section 87-1-301, MCA) and designates state SOC in conjunction with the MNHP. The MNHP is operated by the University of Montana and contains the Montana State Library's Natural Resource Information System. The MNHP and FWP designate the state SOC. The MNHP maintains the list of state SOC and uses the international Natural Heritage Program's species ranking system ranging from 1 (highest risk, imperiled) to 5 (relatively stable). Designation of state SOC is not a statutory or regulatory classification; it aids in species conservation needs, data collection priorities, and agency management guidance. State SOC are native plant and animal species that are considered rare or at risk of becoming endangered or extirpated in Montana.

The state's endangered or threatened species protections pursuant to MSUMRA can be found in **Section 3.12, Fish and Wildlife Resources**.

Local Requirements

There are no applicable local regulations for special status species within or near the analysis area.

3.13.1.2 Analysis Area

Direct Effects Analysis Area

The direct effects analysis area for special status species is the project area[43] plus a 15-mile buffer outside of the Area F permit boundary (**Figure 3.13-1** and **Figure 3.13-2**). The 15-mile perimeter, which was established by KC Harvey Environmental in conjunction with Western Energy (predecessor to Westmoreland Rosebud) for the original PAP, includes portions of Rosebud and Treasure Counties. Special status species potentially occurring in both counties were assessed for direct effects. Special status species in the analysis area were assessed by reviewing data provided by ICF International (2011, 2013, 2014), DEQ, FWP, MNHP, and USFWS. This includes baseline surveys and annual and long-term monitoring reports for the Rosebud Mine and species occurrence data provided by MNHP. No federally listed threatened or endangered species are known to occur within the direct effects analysis area. General fish and wildlife species and a description of wildlife monitoring on the mine are discussed in **Section 3.12, Fish and Wildlife Resources**.

Indirect Effects Analysis Area

The indirect effects analysis area for special status species consists of the operational boundaries of the Colstrip and Rosebud Power Plants plus a 32-km buffer that includes the drainages of Sarpy, Armells, and Rosebud Creeks (**Figure 3.13-3**). This analysis area was determined as a result of trace-metal deposition modeling completed for the 2018 Final EIS that utilized soil trace-metal background concentrations from a USGS background study and air-quality modeling (Smith et al. 2013); see **Section 4.3, Air Quality**, for discussion of modeling methods and results. Of the eight trace metals modeled, mercury had the greatest deposition distance, approximately 32 km, inside which there could be potential impacts on soil and vegetation (and therefore on special status species habitat).

Water is supplied to the Colstrip Power Plant by a diversion on the Yellowstone River near Nichols, MT. As a result, the indirect effects analysis area also includes a section of the Yellowstone River from the power plant's diversion point downstream to the confluence of the Yellowstone River and Tongue River. This reach of the Yellowstone River is approximately 57 miles long and provides habitat for the pallid sturgeon (**Figure 3.13-3**). The Cartersville Dam is located approximately 6.5 miles downstream from the diversion that supplies the Colstrip Power Plant and 235 miles upstream of the mouth of the Yellowstone River (USACE 2015). The Cartersville Dam is a barrier to fish passage under most flow conditions; however, sturgeons can navigate upstream over the dam during some flow conditions. The downstream extent of the analysis area on the Yellowstone River was designated at the Tongue River confluence as any potential impact from water withdrawal would be negated by flow contributions from the Tongue River, as well as by multiple other smaller tributaries. The Tongue River contributes more than 400 cfs of water on average to the Yellowstone River in comparison to the approximately 69 cfs of water that is diverted to supply the Colstrip Power Plant.

Finally, because the indirect effects analysis area includes portions of Rosebud, Treasure, Big Horn, and Powder River Counties, special status species that potentially occur in these counties were assessed for indirect effects.

[43] As Westmoreland Rosebud has developed Area F, on-the-ground conditions have necessitated minor changes to the project area, which is the Area F permit boundary (now 6,773 acres instead of 6,746 acres), and to the configuration of the disturbance boundary (now 4,288 acres instead of 4,260 acres); these minor revisions were reviewed and approved by DEQ pursuant to MSUMRA and MEPA and are described in **Section 2.2.2.2, Area F Operations and Development**.

3.13.1.3 Wildlife Habitat Characteristics

General information on wildlife habitat characteristics in the analysis area can be found in the 2018 Final EIS in **Section 3.12, Fish and Wildlife Resources**. As previously described, the Richard Springs Fire began in a coal seam approximately 10 miles southwest of Colstrip on August 8, 2021, and burned 171,130 acres in the vicinity of the Rosebud Mine Area B, including Area B AM5, and reclaimed Area E. It was not in the same drainages as Area F but affected portions of the indirect analysis area for special status species.

A portion of the Yellowstone River was also added to the indirect effects analysis area. The analysis area includes the section of the Yellowstone River from the Cartersville Dam located near Forsythe and the confluence of the Yellowstone and Tongue Rivers. This reach of the Yellowstone River is approximately 50 miles long and provides habitat for the pallid sturgeon. Multiple diversions, mostly for agricultural and irrigation purposes, on the Yellowstone River also exist in the reach of the river between the Cartersville Dam and the Tongue River confluence as well as further upstream on the Yellowstone River.

3.13.2 Federally Listed Threatened, Endangered, and Candidate Species

According to an updated search of the USFWS Information, Planning, and Conservation System (IPaC), a total of five federally endangered species may be found in the analysis area (USFWS 2025a). Whooping crane (*Grus americana*), black-footed ferret (*Mustela nigripes*), North American wolverine (*Gulo gulo luscus*), and Ute ladies'-tresses orchid (*Spiranthes diluvialis*) were addressed in the 2018 Final EIS but are not present in the analysis area based on the latest IPaC data (USFWS 2025a). These species are not addressed further. **Table 3.13-2** gives a summary of federally listed/proposed species, designated/proposed critical habitat, species' habitat requirements, and occurrence information for species that are known to or may occur in the analysis areas. Habitat and potential occurrence of each species are discussed in greater detail below. The consultation history with the USFWS for these species is described in **Section 6.1.2, Section 7 Consultation Process with the U.S. Fish and Wildlife Service**.

Table 3.13-2. Federally Endangered Species Potentially Occurring in the Analysis Area.

Common Name	Scientific Name	Status*	General Habitat Affinity	Habitat in Analysis Area
Mammals				
Northern long-eared bat	*Myotis septentrionalis*	T	Rock cavities and crevices, behind bark in trees, dead hardwood trees.	Yes
Fish				
Pallid sturgeon	*Scaphirhynchus albus*	E	Large turbid rivers, including accessible reaches of the Yellowstone River, with diverse habitat and natural hydrographs.	Yes
Insects				
Monarch butterfly	*Danaus plexippus*	PT	Requires milkweed (*Asclepias* spp.) as larval host plants; meadow and riparian habitats support spring/summer breeding and late-season migration.	Yes
Western regal fritillary	*Argynnis idalia occidentalis*	PT	Tallgrass prairies, including dry upland, mesic, or wet areas. Requires violet species (*Viola* sp.) as a larval host plant. The range of western regal fritillary only overlaps the action area in a small area at the southern edge of the action area.	Yes
Suckley's cuckoo bumble bee	*Bombus suckleyi*	PE	Various habitats including prairies, grasslands, meadows, and woodlands between 6,000 and 10,500 feet in elevation where host species are present.	Yes

*E = Endangered; T = Threatened; PT = Proposed Threatened; PE = Proposed Endangered.
Source: USFWS 2025a.

3.13.2.1 Northern Long-Eared Bat

The northern long-eared bat (also referred to as northern myotis) has long ears and a dark brown pelage color. This species was listed as threatened in 2015, mainly due to significant population declines from the effects of white-nose syndrome. The listing status of the northern long-eared bat was changed to endangered with an effective date of March 31, 2023, due to continued population declines (88 FR 4908-4910, January 26, 2023). This species roosts in caves, cavities, or crevices and behind peeling bark in trees during the daytime hours (MNHP 2017). The species inhabits riparian areas relatively close to water.

The northern long-eared bat ranges from the southeast U.S. to northwest Canada. Montana is on the western edge of northern long-eared bat range. One hibernating individual was discovered in 1978, and two active individuals were documented in 2016 in northeastern Montana (Richland and Roosevelt Counties), approximately 190 miles north of the project area (MNHP 2017). A study of the presence, range, and status of northern long-eared bats in eastern MT from 2016 through 2019 confirmed the presence of the species in the northeastern portion of the state (Bachen 2019). Numerous northern long-eared bats have been captured in MT; however, all these captures have been in or along the Missouri River drainage or along the Yellowstone River downstream of Glendive.

Habitat modeling by the USFWS (USFWS 2024a) shows the only potential habitat in the analysis area occurs east of Rosebud Creek and does not intersect the project area. Although northern long-eared bat habitat includes both coniferous and riparian forests, surveys in eastern MT found them only in riparian forests along the Missouri River and its tributaries.

No northern long-eared bat individuals or populations have been documented within the analysis area (MNHP 2023). Summer range and hibernacula are only considered to potentially be present within the USFWS-modeled range of the species (USFWS 2024a), which only occurs within a sliver of the action area east of Rosebud Creek and does not overlap the project area.

During the public comment period for the Area F Draft SEIS (December 2024 through January 2025), a bat echolocation report prepared by an independent contractor was submitted to OSMRE as part of a public comment. OSMRE provided the report and associated echolocation data files to the USFWS, which subsequently provided the report to MNHP staff. MNHP staff conducted a review of these existing echolocation data recordings for four sites within 62 miles (100 km) of the project area (Bachen and McEwan 2025). This review found that the acoustic data provide no convincing evidence that would support a reasonable conclusion that the species was present in the area of interest during the time these data were collected. MNHP also found that northern long-eared bats are unlikely to occupy the project area as it lacks suitable habitat and connectivity to occupied and potentially occupied habitat (Bachen and McEwan 2025).

3.13.2.2 Pallid Sturgeon

The pallid sturgeon is listed as endangered throughout all of its known range. This species formerly inhabited the Missouri and Mississippi River systems from Montana to Louisiana. Threats to pallid sturgeon at the time of listing included the following primary factors:

I. Habitat alterations from channelization, impoundments, and altered flow regimes
II. Decreased water quality
III. Entrainment into diversions and ditches, particularly with age-0 and juvenile fishes
IV. Water temperature changes related to climate change
V. Habitat fragmentation and development in the river corridors
VI. Overexploitation and overharvest, primarily caused by similarities in the appearances of pallid sturgeon and shovelnose sturgeon (*S. platorhycnhus*), which is not a listed species (USFWS 2021)

This species inhabits large, slow, turbid waters with sandy bottoms. In Montana, this species is known to occur in the Missouri and Yellowstone Rivers. The diet of the pallid sturgeon is thought to consist of aquatic insects and small fish (MNHP 2014c). The biology and life history of the pallid sturgeon are described in greater detail in the 5-Year Status Review for Pallid Sturgeon (USFWS 2021) and in the BA (OSMRE 2025; see a discussion of the BA status in **Section 6.1.2, Section 7 Consultation Process with the U.S. Fish and Wildlife Service**).

Pallid sturgeon have been documented within the analysis area in limited numbers. Pallid sturgeon were documented as being observed in the Yellowstone River in most years from 2009 through 2023, but most locations were downstream of the Intake Diversion Dam (FWP 2024). Occurrences of pallid sturgeon in the Yellowstone River, including a small number of pallid sturgeon that accessed reaches of the Yellowstone River in the analysis area, were also documented in other sources (Bureau of Reclamation 2020; French 2019, 2022; USACE 2020; Rugg et al. 2023).

Prior to 2022, pallid sturgeon passage upstream over the Intake Diversion Dam, built in 1909, was very limited under most flow conditions. However, some sturgeons, of both wild and hatchery origin, were observed utilizing the side channel to get over the dam when flows were high (French 2019; Bureau of Reclamation 2020), and translocation efforts also relocated or stocked sturgeon upstream of the dam in some years (Jaegar et al. 2005; USACE 2020). Because of fish passage improvements at the Intake Diversion Dam in 2022, the number of sturgeons moving into reaches further upstream on the Yellowstone River, including as far upstream as the Cartersville Dam, has increased and is expected to increase further. The Cartersville Dam, which is approximately 6.5 miles downstream of the diversion associated with the Colstrip Power Plant, likely continues to be a migration barrier under some flow conditions, but migration over the dam was documented in 2024 (A. McCullough, USFWS, personal communication, August 19, 2024).

3.13.2.3 Monarch Butterfly

The monarch butterfly was designated as proposed threatened on December 12, 2024 (89 FR 100716) due to widespread drought, habitat loss, fragmentation, and low population abundance.

North America contains two migratory populations of the monarch butterfly separated by the Rocky Mountains. The largest migratory population breeds across the central and eastern parts of the continent and winters in Mexico. A smaller migratory population breeds in western North America and winters primarily along the California coast south into Baja California, Mexico. During the summer breeding season, monarchs live from two to five weeks, during which time they mate and lay the eggs that become the next generation. Larval food plants include several species of *Asclepias* (milkweed – the primary host plant genus), *Apocynum*, *Calotropis*, *Matelea*, and *Sarcostemma*; adults feed on nectar from a variety of flowers (MNHP 2022a). Common places where milkweed occurs include shortgrass and tallgrass prairies, livestock pastures, agricultural margins, roadsides, wetland and riparian areas, sandy areas, and gardens, in addition to deserts, open forests, and woodlands. The species is known to occur throughout Montana during the summer and fall months at elevations between 2,000 and 3,000 feet in open places, native prairie, foothills, open valley bottoms, open weedy fields, roadsides, pastures, marshes, and suburban areas (MNHP 2022a). The primary threats to this species include loss of milkweed from herbicide use, conversion of grasslands to other uses, and loss of overwintering sites (USFWS 2020b). Additional threats include loss of nectar food sources in breeding and migration habitats, insecticide exposure, and climate change effects such as increasing storm frequency and intensity in overwintering sites (USFWS 2020b).

Potential habitat for monarch butterflies occurs in the analysis area, but no critical habitat has been designated. The nearest known occurrences of this species to the analysis area are documented along the Yellowstone River and Smith Creek north and west of Forsythe in Rosebud and Custer Counties (MNHP 2022b).

3.13.2.4 Western Regal Fritillary

The western regal fritillary was proposed for listing as a threatened species in August 2024 (89 FR 63888-63909, August 6, 2024). The regal fritillary is a large butterfly consisting of two subspecies found in the native grasslands of the central and northern Great Plains and portions of the Midwest (the western regal fritillary), and a single location in eastern Pennsylvania (the eastern regal fritillary) (USFWS 2024b). Regal fritillary habitat is composed of grasslands with necessary components of native violets (*Viola* spp.) for larvae to eat and nectar sources for adults (USFWS 2023). The life history of this species is described in the Regal Fritillary Species Status Assessment (USFWS 2023) and summarized here. The species has one annual generation. Egg-laying occurs in late summer and fall when individual females may lay hundreds to thousands of eggs in native grassland habitats. The species overwinters as first instar larvae in

grassland vegetation, emerging in spring to search for violets (*Viola* spp.), their only larval food. The larvae pupate in the grasslands and emerge as adult butterflies beginning in late May through mid-July depending on their regional location (USFWS 2023).

The western regal fritillary currently occupies portions of 14 states, from Indiana to Colorado and from North Dakota to Oklahoma (USFWS 2023). States on the western and southern fringes of the regal fritillary's range are relatively sparsely occupied, with regal fritillaries occurring only in portions of those states, near their borders with adjacent occupied states (USFWS 2023).

The primary threats to this species are the expected continued loss and fragmentation of large, intact native grasslands through conversion by agriculture and development; invasive plants and woody vegetation; the reduction of violets and nectar sources from the broadcast application of herbicides; and periodic disturbances from fire, mowing, and haying (USFWS 2024b).

Montana is at the western periphery of the western regal fritillary range. The species' account on the USFWS ECOS website lists the species as known or believed to occur in Rosebud County, but not in Treasure County, Montana (USFWS 2024c). Habitat modeling by the USFWS (USFWS 2024c) shows the only potential habitat in the indirect effects analysis area occurs east of Rosebud Creek, on the southern edge of the action area, and does not intersect the project area. Past vegetation surveys have not identified extensive areas of native violets in the project area (Cedar Creek Associates, Inc. 2014, 2016). An unidentified violet species (*Viola* sp.) was documented in woody draw habitat in 2006; however, no violets were identified in grassland or other habitats (Cedar Creek Associates, Inc. 2016).

3.13.2.5 Suckley's Cuckoo Bumble Bee

Suckley's cuckoo bumble bee was proposed for listing as an endangered species in December 2024 (89 FR 102074-102091, December 17, 2024). The species has a broad distribution across most of western North America and can be found in various habitats such as prairies, grasslands, meadows, and woodlands between 6,000 and 10,500 feet in elevation (NatureServe 2025; USFWS 2024d). There are no confirmed records of the species in the eastern United States, but there are some verified records just to the north in eastern Canada and, therefore, many range maps extend south into the far northeastern portions of the U.S. This eastern population is poorly understood and does not appear to connect to the western portion of the range, while the western population extends south to Arizona, east to Nebraska and Minnesota, and north through the Yukon in Canada and has many confirmed observations (USFWS 2024d).

Suckley's cuckoo bumble bee is a generalist pollinator that is also an obligate parasitic bumble bee that invades the nests of other bees in the genus *Bombus*, including the western bumble bee (*Bombus occidentalis*) (USFWS 2024d). Female bees emerge from hibernation in the spring and take over the nests of a suitable host colony where the original host workers will then help raise the Suckley's cuckoo bumble bee young instead of their own (USFWS 2024d).

Suckley's cuckoo bumble bees cannot reproduce without available host colonies, and declines in host species such as the western bumble bee are one potential threat resulting in the species' decline. Additional threats include competition with managed and introduced bee species; pathogen and parasite spread such as fungal infections, protozoan, mite, and nematode parasites; RNA viruses; pesticide application; habitat conversion and fragmentation caused by development, agriculture, and grazing; climate change including increased temperatures, drought, and wildfire; and additional early spring frosts (USFWS 2024d).

No field reconnaissance for Suckley's cuckoo bumble bee has been conducted to date in the analysis area. Foraging habitat for Suckley's cuckoo bumble bees includes a variety of nectar-producing plant species, which are present in the action area. MNHP habitat modeling shows the analysis area as moderate to low potential Suckley's cuckoo bumble bee habitat (MNHP 2022c). There is some uncertainty about the range of Suckley's cuckoo bumble bee due to potential misidentification and limited verification of records (USFWS 2024d). In Montana, this species is believed to occur throughout the state (Koch et al. 2012; USFWS 2024d). The species' account on the USFWS ECOS website lists the species as known or believed to occur in Rosebud and Treasure Counties (USFWS 2024d). The most recent documented occurrence of this species in the MNHP database is from 2009 in Cascade County, approximately 300 miles from the analysis area (MNHP 2025). The closest known occurrence is approximately 155 miles northwest in Petroleum County in 1957 (MNHP 2025).

3.13.3 MNHP Species of Concern

A detailed discussion of MNHP SOC previously identified in the analysis area is provided in **Section 3.13.3** of the 2018 Final EIS. **Table 3.13-3** identifies MNHP SOC and their preferred habitats that have been documented in the Rosebud Mine 15-mile wildlife survey area (the same as the direct effects analysis area) since 1973; this list has been updated since the 2018 Final EIS using new MNHP data (MNHP 2024).

Table 3.13-3. MNHP Species of Concern Documented in the Direct Effects Analysis Area.[1]

Common Name	Scientific Name	Status	General Habitat Affinity	Likely to Occur in Direct Effects Analysis Area? (Y/N)
Amphibians				
Great plains toad	*Anaraxus cognatus*	S3	Grasslands, and shrublands with nearby water sources including wetlands, stock tanks, streams, springs, and stock ponds	Y
Northern leopard frog	*Lithobates (Rana) pipiens*	S1, S4[2]	Wetlands, stock tanks, streams, springs, stock ponds	Y
Birds				
American bittern	*Botaurus lentiginosus*	S3; B	Large freshwater wetlands composed of cattails and bulrushes	N
Northern goshawk	*Accipiter gentilis*	S3; B	Mature or old-growth, coniferous, or mixed conifer/aspen forests with relatively open understories	Y
American white pelican	***Pelecanus erythrorhynchos***	**S3; B**	**Aquatic and wetland habitats, including rivers, lakes, reservoirs (both large and small), estuaries, bays, marshes**	**Y**
Baird's sparrow	***Centronyx bairdii***	**S3; B**	**Native prairie with little to no grazing**	**Y**
Black rosy-finch	***Leucosticte atrata***	**S3; B**	**Cultivated lands, open areas, and around human habitation during migration**	**Y**
Black tern	*Childonias niger*	S3; B	Wetlands, marshes, prairie potholes, and small ponds with emergent vegetation	N
Black-backed woodpecker	***Picoides arcticus***	**S3; B**	**Early successional, burned forest of mixed conifer, lodgepole pine, Douglas-fir, and spruce-fir**	**N**
Black-billed cuckoo	*Coccyzus erythropthalmus*	S3; B	Riparian woodlands	Y
Black-crowned night heron	***Nycticorax nycticorax***	**S3; B**	**Shallow marshes and other wetland areas**	**Y**

Table 3.13-3. MNHP Species of Concern Documented in the Direct Effects Analysis Area.[1]

Common Name	Scientific Name	Status	General Habitat Affinity	Likely to Occur in Direct Effects Analysis Area? (Y/N)
Bobolink	***Dolichonyx oryzivorus***	**S3; B**	**Nests built in tall grass and mixed-grass prairies**	**Y**
Brewer's sparrow	*Spizella breweri*	S3; B	Sagebrush shrublands	Y
Brown creeper	***Certhia americana***	**S3; B**	**Coniferous and mixed coniferous-deciduous forests, preferring mature and old-growth stands with high canopy cover**	**N**
Burrowing owl	*Athene cunicularia*	S3; B	Open grasslands with abandoned burrows dug by mammals	N
Caspian tern	*Hydroprogne caspia*	S2; B	Large rivers, lakes, and reservoirs	N
Cassin's finch	***Certhia americana***	**S3; B**	**Every major forest type in Montana, including riparian cottonwood, especially common in ponderosa pine and postfire forests**	**N**
Clark's grebe	***Aechmophorus clarkii***	**S3; B**	**Breeds only at very large lakes and reservoirs in Montana**	**N**
Clark's nutcracker	*Nucifraga columgiana*	S3; B	Conifer forests	Y
Common loon	*Gavia immer*	S3; B	Mountain lakes with emergent vegetation	N
Common tern	*Sterna hirundo*	S3; B	Large rivers, lakes, and reservoirs	N
Evening grosbeak	***Coccothraustes vespertinus***	**S3; B**	**Mixed coniferous and spruce-fir forests of western Montana**	**N**
Ferruginous hawk	*Buteo regalis*	S3; B	Shrub-grasslands, mixed grass prairie, sagebrush grasslands and sagebrush steppe	Y
Forster's tern	*Sterna forsteri*	S3; B	Wetlands	N
Franklin's gull	*Larus pipixcan*	S3; B	Wetlands	N
Golden eagle	*Aquila chrysaetos*	S3; BGEPA	Canyons, cliffs, and bluffs	Y
Gray-crowned finch	*Leucosticte tephrocotis*	S2; B, S5	Alpine cliffs, glaciers, and snowfields above timberline.	N
Great blue heron	*Ardea herodias*	S3; B	Riparian areas along major rivers and lakes	Y[3]
Greater sage grouse	*Centrocercus urophasianus*	S2	Shrub-grasslands, mixed-grass prairie, sagebrush grasslands, and sagebrush steppe	N
Green-tailed towhee	***Pipilo chlorurus***	**S3; B**	**Species-rich shrub communities**	**N**
Horned grebe	*Podiceps auritus*	S3; B	Wetlands, freshwater ponds, and marshes	N
Least tern	***Sternula antillarum***	**S1; B**	**Unvegetated sand-pebble beaches and islands of large reservoirs and rivers in northeastern and southeastern Montana**	**N**
Lewis' woodpecker	*Melanerpes lewis*	S2; B	Riparian woodlands	Y
Loggerhead shrike	*Lanius ludovicianus*	S3, B	Upland shrublands	Y
Long-billed curlew	*Numenius americanus*	S3, B	Mixed-grass prairie and moist meadows	Y
Peregrine falcon	*Falco peregrinus*	S3; B	Cliffs and canyons	Y
Pinyon jay	*Gymnorhinus cyanocephalus*	S3; B	Low-elevation ponderosa pine limber pine-juniper woodlands	Y
Red-headed woodpecker	*Melanerpes erythrocephalus*	S2; B	Riparian woodlands	Y
Sage thrasher	*Oreoscoptes montanus*	S3; B	Upland shrublands	Y
Sprague's pipit	*Anthus spragueii*	S3; B	Mixed-grass grasslands	N
Thick-billed longspur	***Rhynchophanes mccownii***	**S3; B**	**Semi-arid shortgrass steppe, characteristically open with sparse vegetation**	**Y**
Trumpeter swan	*Cygnus buccinator*	S3; B	Lakes, ponds, and reservoirs	N

Table 3.13-3. MNHP Species of Concern Documented in the Direct Effects Analysis Area.[1]

Common Name	Scientific Name	Status	General Habitat Affinity	Likely to Occur in Direct Effects Analysis Area? (Y/N)
Veery	***Catharus fuscescens***	**S3; B**	**Damp, deciduous forests in the east; riparian habitats**	**N**
Yellow-billed cuckoo	***Coccyzus americanus***	**S3; B**	**Open woodland, deciduous riparian woodland**	**Y**
Mammals				
Black-tailed prairie dog	*Cynomys ludovicianus*	S3	Shortgrass prairie, grasslands	N
Eastern red bat	***Lasiurus borealis***	**S3**	**Migrates through eastern Montana, particularly along wooded and riparian areas**	**Y**
Fringed myotis	*Myotis thysanodes*	S3	Riparian areas within coniferous woodlands, caves; typically roosts in rock crevices, caves, abandoned buildings	Y
Hoary bat	*Lasiurus cinereus*	S3	Deciduous and occasionally coniferous woodlands; typically roosts in trees	Y
Little brown myotis	*Myotis lucifugus*	S3	Variety of habitats including buildings, woodlands, caves and mines; forages over water	Y
Long-eared myotis	***Myotis evotis***	**S3**	**Wide range of rocky and forested habitats over a broad elevation gradient**	**Y**
Long-legged myotis	***Myotis volans***	**S3**	**Forested mountain regions and river bottoms, also at high elevations**	**Y**
Merriam's shrew	*Sorex merriami*	S3	Shrublands, grasslands, and agricultural lands dominated by pasture grasses	Y
Pallid bat	*Antrozous pallidus*	S3	Woodlands, including ponderosa forests and shrublands	Y
Spotted bat	***Euderma maculatum***	**S3**	**Open arid and other habitats near cliffs**	**N**
Townsend's big-eared bat	*Corynorhinus townsendii*	S3	Woodlands, rocky outcrops, caves, tunnels, and abandoned mines; occasionally roosts in tree cavities	Y
Reptiles				
Plains hognose snake	*Heterodon nasicus*	S2	Sagebrush-grasslands and gravelly and sandy soil	Y
Short-horned lizard	*Phyrnosoma herandesi*	S3	Sandy gravelly soil	Y
Snapping turtle	*Chelydra serpentine*	S3	Prairie rivers and streams	N
Spiny softshell	***Apalone spinifera***	**S3**	**Rivers, creeks, lakes, and impoundments**	**N**
Western milksnake	*Lampropeltis triangulum*	S2	Rocky outcrops, shrublands, grasslands	Y
Western smooth greensnake	*Opheodrys vernalis*	S2	Wetlands, forested areas with open meadows	Y

S1: Very high risk of extirpation in the state due to very restricted range, steep declines, severe threats, and other factors.
S2: At high risk of extinction or extirpation in the state due to very limited and/or declining numbers, range, and/or habitat or extirpation in the state.
S3: At risk of extinction or extirpation in the state due to very limited and/or declining numbers, range, and/or habitat, even though it may be abundant in some areas.
S4: At a fairly low risk of extirpation in the state due to an extensive range and/or many populations or occurrences but with possible cause for some concern.
B: Protected under the Migratory Bird Treaty Act.
BGEPA: Protected under the Bald and Golden Eagle Protection Act.
[1.] Species in bold are newly added since the 2018 Final EIS.
[2.] Northern leopard frog is critically imperiled in mountain areas in western Montana. This species is apparently secure on the Great Plains and is not considered a SOC in eastern Montana.
Source: Adams and Hayes 2000; Barrett 1998; ICF 2014; FWP 2014, MNHP 2024.

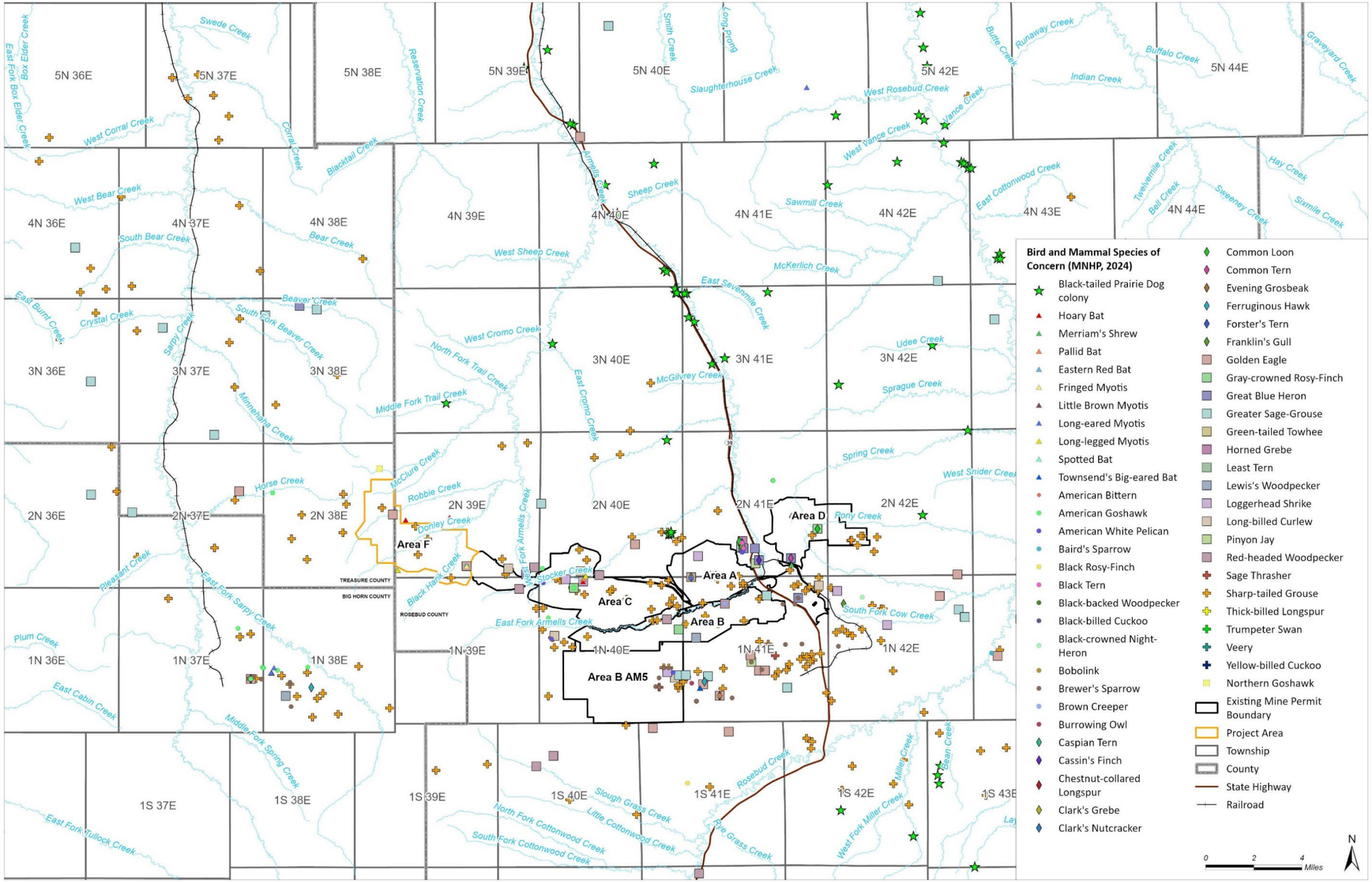

Figure 3.13-1. Bird and Mammal Species of Concern, Locations in the Direct Effects Analysis Area.

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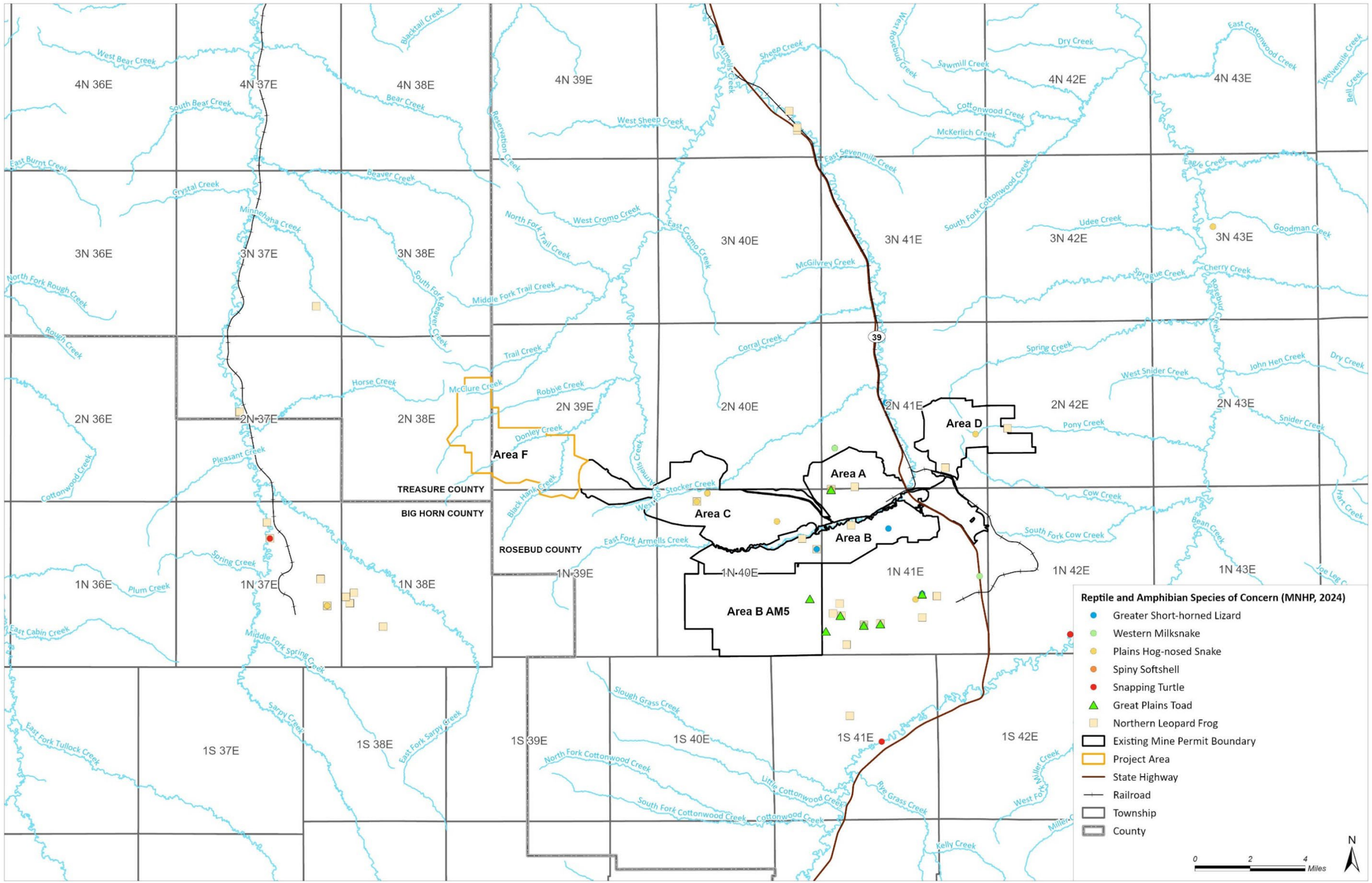

Figure 3.13-2. Reptile and Amphibian Species of Concern, Locations in the Direct Effects Analysis Area.

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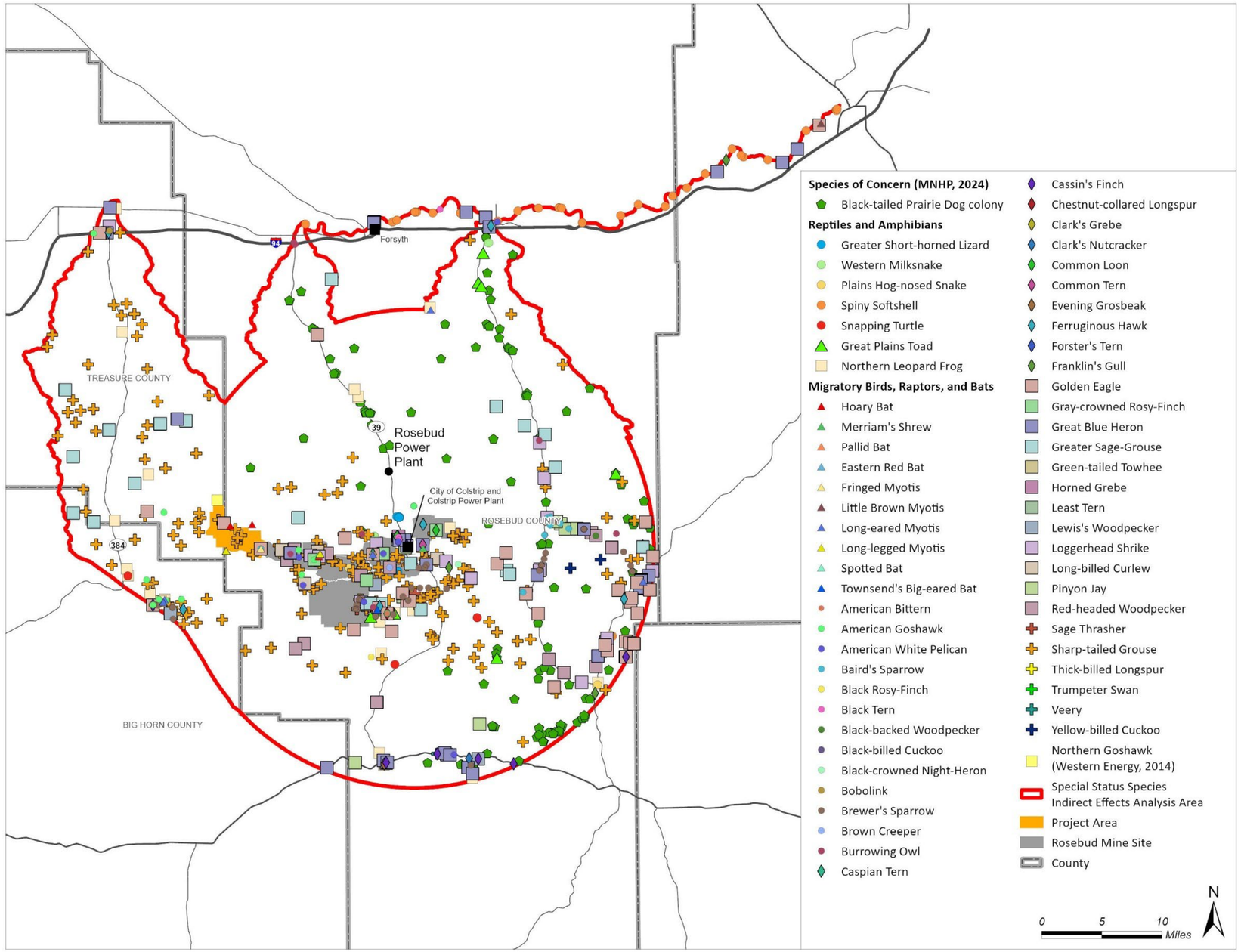

Figure 3.13-3. Special Status Species Documented in the Indirect Effects Analysis Area.

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3.13.3.1 Mammals

Bats

Five bat species documented in the direct effects analysis area are MNHP SOC and are listed above in **Table 3.13-3**: Townsend's big-eared bat, little brown myotis, hoary bat, pallid bat, and fringed myotis (**Section 3.12, Fish and Wildlife Resources** in the 2018 Final EIS).

Figure 3.13-4. Fringed Myotis.
Source: Montana Field Guide, Kristi DuBois.

Most Montana bat species are likely to occur within the indirect effects analysis area (**Figure 3.13-3**), including the following SOC: hoary bat, pallid bat, eastern red bat, fringed myotis (**Figure 3.13-4**), little brown myotis, long-eared myotis, long-legged myotis, spotted bat, and Townsend's big-eared bat. General bat species are described in more detail under **Section 3.12, Fish and Wildlife Resources** in the 2018 Final EIS.

3.13.3.2 Upland and Other Game Birds

Greater Sage-Grouse

The greater sage-grouse is listed as a Montana SOC. The species was federally listed as a candidate species; however, in 2015 the USFWS determined that the listing was "not warranted" and that the greater sage-grouse remains relatively abundant throughout its range (USFWS 2015).

The ecology of the greater sage-grouse and its occurrence in the analysis area are described in **Section 3.13.3.2** of the 2018 Final EIS. There is no change in the status of this species since the 2018 Final EIS. No sage grouse (**Figure 3.13-5**) were observed in the analysis area during surveys in 2023 (ICF 2023).

Figure 3.13-5. Greater Sage-Grouse.
Source: freebeekeeper.com.

3.13.3.3 Migratory Birds

Each of the songbird SOC listed above potentially occurs in the indirect effects analysis area where habitat is present (MNHP and FWP 2017).

Shorebirds and Waterfowl

Because aquatic habitat is limited in the direct effects analysis area, herons, cranes, egrets, and other waterfowl have not been documented nesting in the area.

Raptors

Three SOC have been documented on the Rosebud Mine: golden eagle, northern goshawk, and burrowing owl. Both the golden eagle and northern goshawk potentially occur statewide. The burrowing owl occurs in the eastern two-thirds of the state. All three species potentially occur within the direct and indirect effects analysis area.

3.13.3.4 Reptiles

Three reptile SOC – the western milksnake, western hognose snake, and short-horned lizard – have been documented in upland grassland and shrubland habitat adjacent to the project area on or adjacent to portions of the Rosebud Mine. The three reptile species occur throughout the western two-thirds of the state and potentially occur within the direct and indirect effects analysis areas, where suitable habitat exists. Reptile SOC documented in the indirect effects analysis area include greater short-horned lizard, western milksnake, plains hognose snake, and spiny softshell.

3.13.3.5 Amphibians

The northern leopard frog (**Figure 3.13-6**), Great Plains toad, and plains spadefoot toad have been documented on or near the mine. The three amphibian species, similar to the reptile SOC, occur throughout the western two-thirds of the state and potentially occur within the direct and indirect effects analysis areas, where suitable habitat exists (MNHP and FWP 2017).

Figure 3.13-6. Northern Leopard Frog.
Source: U.S. Fish and Wildlife Service.

3.13.4 Special Status Plant Species

3.13.4.1 Sensitive Plant Species

Federally Listed Threatened, Endangered, and Candidate Species

Four plant species are listed as federally threatened in Montana including Spalding's catchfly (*Silene spaldingii*), Ute ladies'-tresses orchid (*Spiranthes diluvialis*), water howellia (*Howellia aquatilis*), and whitebark pine (*Pinus albicaulis*). None of these federally listed threatened vegetation species are listed as potentially occurring in the analysis area (USFWS 2025a). No federally listed plant species were documented in the project area during the field surveys in 2005–2007 (PAP, Appendix E).

MNHP Species of Concern

Thirteen vegetation SOC potentially occur in Rosebud, Treasure, and Big Horn Counties (**Table 3.13-4**; MNHP 2015). The project area contains suitable habitat for nine SOC; however, no vegetation SOC occurrences have been documented within the project area. None of the SOC were documented during the field assessments in 2005–2007. Six vegetation SOC occur in Treasure and Rosebud Counties beyond a 12-mile radius of the project area (MNHP 2017). Each plant SOC that potentially occurs in project area also potentially occurs in the indirect effects analysis area (MNHP and FWP 2017).

Table 3.13-4. MNHP Plant Species of Concern in Rosebud, Treasure, Big Horn, and Powder River Counties, and Montana's Federally Listed Plant Species.

Common Name	Scientific Name	Status	General Habitat Affinity	Suitable Habitat Present in the Project Area?
Alderleaf mountain-mahogany	*Cercocarpus montanus*	S2/S3	Open slopes and breaks on the plains	No
Barr's milkvetch	*Astragalus barrii*	S3	Sparsely vegetated knobs and buttes; often along rivers or streams	Yes
Bractless blazingstar	*Mentzelia nuda*	S1/S2	Sandy or gravelly soil of open hills and roadsides on the plains	No
Bush morning-glory	*Ipomoea leptophylla*	S1/S2	Open prairie habitats in sandy or gravelly soil	Yes
Heavy sedge	*Carex gravida*	S3	Green ash ravines and woody draws	No
Lead plant	*Amorpha canescens*	SH	Grasslands and woodlands; often in sandy soil	Yes
Lichen	*Psora rubiformis*	S1/S2	On soil and in fissures of rock in alpine areas	No
Little Indian breadroot	*Pediomelum hypogaeum*	S3/S4	Sandy soil of grasslands and open pine woodlands	Yes
Narrowleaf milkweed	*Asclepias stenophylla*	S2	Sandy soil of prairies and open pine woodland	Yes
Nuttall desert-parsley	*Lomatium nuttallii*	S2	Open pine woodlands 3,400 to 7,200 feet in elevation	Yes
Persistent-sepal yellow-cress	*Rorippa calycina*	SH	Moist sandy to muddy banks of streams, stock ponds, and reservoirs	Yes
Plains phlox	*Phlox andicola*	S3/S4	Sparsely vegetated outcrops; sandy soil in grasslands and pine woodlands	Yes
Spalding's catchfly	*Silene spaldingii*	S2, FT	Open mesic grasslands in valleys and foothills in northwest Montana	No
Ute ladies'-tresses orchid	*Spiranthes diluvialis*	S1/S2, FT	Alkaline wetlands, swales, and old meander channels on the edge of wetlands	No
Water howellia	*Howellia aquatilis*	S3, FT	Small depressional wetlands in Swan Valley	No
Whitebark pine	*Pinus albicaulis*	S3, FT	Subalpine and krummholtz habitats	No
Woolly twinpod	*Physaria didymocarpa* var. *lanata*	S2/S3	Sandy, often calcareous soil of open grassland or shrubland slopes	Yes

S1: At very high risk of extinction or extirpation in the state due to extremely limited and/or rapidly declining numbers, range, and/or habitat, or extirpation in the state.
S2: At high risk of extinction or extirpation in the state due to very limited and/or declining numbers, range, and/or habitat, or extirpation in the state.
S3: At risk of extinction or extirpation in the state due to limited and/or declining numbers, range, and/or habitat, even though it may be abundant in some areas.
SH: Historical, known only from records usually 40 or more years old; may be rediscovered.
FT: Federally Threatened.
Source: MNHP 2017.

3.14 CULTURAL AND HISTORIC RESOURCES

3.14.1 Introduction

Since the issuance of the 2018 Final EIS, there has been additional information relevant to cultural and historical resources, but this does not substantially change the analysis presented in the EIS. Please note that the following actions (**Table 3.14-1**) have occurred since the issuance of the 2018 Final EIS but would not substantially change the affected environment previously described for cultural and historical resources. As applicable, the affected environment sections have been updated below. Detailed cultural resources information is available in **Section 3.14** of the 2018 Final EIS beginning on page 344.

Table 3.14-1. Cultural Resources: Changed Conditions Since the 2018 Final EIS.

Year	Change
2019	Westmoreland Rosebud began developing Area F in 2019, and active mining began in August 2020 according to its state operating permit and Federal mining plan. As of December 2023, Westmoreland Rosebud has disturbed 582 acres in the project area; 494 acres of that disturbance is due to active mining, and the remainder is due to site development, such as roads and soil and/or spoil stockpiles. See **Tables 2.2-3** and **2.2-4** in **Chapter 2** above for current disturbance at the Rosebud Mine and Westmoreland Rosebud's posted reclamation bonds.
2021	The Richard Springs Fire began in a coal seam approximately 10 miles southwest of Colstrip on August 8, 2021, and burned 171,130 acres in the vicinity of the Rosebud Mine Area B, including Area B AM5, and reclaimed Area E. It was not in the same drainages as Area F but is considered in **Chapter 5** (cumulative effects).
2022	AM5 Permit Area B was approved by DEQ in 2022 after preparation of an EIS that considered the cumulative cultural and historic resources impacts of Area F.

3.14.1.1 Regulatory Framework

The regulatory framework for cultural and historical resources is unchanged since the Final EIS and is described in **Section 3.14.1.1** of the 2018 Final EIS beginning on page 344.

3.14.1.2 Analysis Area

The analysis area for impacts on cultural and historical resources is the area of potential effect, which is the project area[44] (**Figure 2.2-1**); the rationale for the use of this area is provided in **Section 3.14.1.2** of the 2018 Final EIS beginning on page 346.

3.14.2 Cultural Context

The cultural context is described in **Section 3.14.2** of the 2018 Final EIS beginning on page 348.

3.14.3 Documented Cultural Resources

Documented cultural resources are described in **Section 3.14.3** of the 2018 Final EIS beginning on page 349. Additional information on documented cultural resources has been added from the 2023 Annual Mining Report (Westmoreland Rosebud 2024b). A total of 108 cultural resources have been documented

[44.] As Westmoreland Rosebud has developed Area F, on-the-ground conditions have necessitated minor changes to the project area, which is the Area F permit boundary (now 6,773 acres instead of 6,746 acres), and to the configuration of the disturbance boundary (now 4,288 acres instead of 4,260 acres); these minor revisions were reviewed and approved by DEQ pursuant to MSUMRA and MEPA and are described in **Section 2.2.2.2, Area F Operations and Development**.

within the Area F Permit Boundary (see **Section 4.14.1, Analysis Methods**, in the 2018 Final EIS), including 2 historic districts, 75 prehistoric archaeological sites, 26 historic-period archaeological sites, and 5 multicomponent (both prehistoric and historic) archaeological sites (Fredlund 1980; Meyer 2010; Meyer and Ferguson 2012). Eighteen of these sites are eligible for the National Register of Historic Places (NRHP), and nine have unevaluated or undetermined eligibility and are treated as eligible. The remaining cultural resources are not eligible for the NRHP.

Mitigation, which is summarized below, has been implemented for four NRHP-eligible sites in the area of potential effect pursuant to the memorandum of agreement. All other eligible or unevaluated/undetermined resources have been avoided.

- Site 24RB958 (prehistoric components of historic homestead site): Excavation. No further work recommended.
- Site 24RB2334: Excavation. No further work recommended.
- Site 24RB2339 (Black Hank Site): Excavation. No further work recommended.
- Site 24RB2438: Excavation. No further work recommended.

Adverse effects on the remaining potential historic properties would be resolved through the executed Programmatic Agreement (PA) entered into by Western Energy (now Westmoreland Rosebud), the State Historic Preservation Office, DEQ, BLM, and OSMRE. The PA is in Appendix H of the 2018 Final EIS. The PA provides for continuing compliance with Section 106 of the National Historic Preservation Act over the life of mining operations. The PA also includes stipulations to treat unanticipated discoveries during mining operations.

3.14.4 Tribal Consultation

Tribal consultation completed during preparation of the EIS is described in **Section 6.1.3** of the 2018 Final EIS. Consultation that has occurred during the preparation of this SEIS is described below in **Section 6.1.3, Section 106 and Tribal Consultation Processes**.

3.15 SOCIOECONOMIC CONDITIONS

3.15.1 Introduction

Socioeconomics describes a combination of the economic and social level of a specific population of people based on income, education, demographics, and occupation. The economic and social position of an individual or family, in relation to others, is taken into account when describing socioeconomics. Since the issuance of the 2018 Final EIS, changes in operations at the Colstrip Power Plant and in other permit areas of the Rosebud Mine have occurred (**Table 3.15-1**). As a result, the socioeconomic conditions in the analysis area have changed somewhat from what was presented in the Final 2018 EIS in **Section 3.15**, beginning on page 351. This section discusses the current socioeconomic conditions within and near the analysis area, as well as the regulatory framework.

Table 3.15-1. Socioeconomic Conditions: Changed Conditions Since 2018 Final EIS.

Year	Change
2019-2022	In terms of other permit areas of the Rosebud Mine, the following may contribute to changed conditions for socioeconomic conditions: • AM5 to Permit Area B was approved by DEQ in 2022 after preparation of an EIS pursuant to MEPA that considered the cumulative socioeconomic impacts of Area F. The project area approved in DEQ's ROD for Area B AM5 was roughly half the size of the area that was analyzed in the 2018 Final EIS (see **Chapter 5** and **Appendix D** in the 2018 Final EIS). • Area D is no longer actively mined and is being reclaimed. • Area E has received full bond release and is no longer a Montana coal mine.
2020	Active mining began in Area F in August 2020.
2021	A statutory amendment to the MFSA allowed operators, such as Talen Montana, the operator of the Colstrip Power Plant, to change their fuel source without amending the MFSA Certificate (Section 75-20-228, MCA).
2022	Talen Energy, the power plant operator and one of the owners, declared bankruptcy on May 9, 2022. The U.S. Bankruptcy Court in Houston, Texas, approved a Chapter 11 plan of reorganization on December 15, 2022. See updated ownership and operations information in **Chapter 1, Section 1.2.2.1, Colstrip Power Plant**.
2022	Units 1 and 2 of the Colstrip Power Plant shut down in January 2020, earlier than the date disclosed in the Final EIS (July 1, 2022); impacts associated with the shutdown of Units 1 and 2 were previously considered (see **Section 4.15, Socioeconomic Conditions** in the 2018 Final EIS).
2024	The BLM prepared and issued the *Miles City Field Office Final Supplemental Environmental Impact Statement and Resource Management Plan Amendment* (BLM 2024a) in May 2024. The BLM selected Alternative D as the proposed plan for allocating BLM administered coal (BLM 2024b; 89 FR 97 2024); under this alternative, Federal coal (about 1.75 million acres of subsurface Federal coal estate) would not be available for leasing within the MCFO planning area (see Figure 2-4a in BLM 2024a). The BLM determined that additional leasing of Federal coal is not necessary based on the current analysis in the SEIS and that operating mines in the planning area have existing Federal leases with sufficient coal reserves to maintain existing mine production levels until 2035 for Spring Creek Mine and 2060 for Rosebud Mine (BLM 2024a); see **Table 5.2-1**.
2025	Secretarial Order 3418 - *Unleashing American Energy* (January 20, 2025) directed BLM to revise all relevant and all finalized RMPs and supporting NEPA documents, including the MCFO RMP and NEPA documents. BLM published a notice of intent to amend the MCFO RMP and accompanying NEPA analysis on July 8 to reevaluate coal allocations in the planning area and to determine the availability of lands acceptable for further consideration for coal leasing in accordance with recent EOs. OSMRE relied on the 2024 MCFO Final SEIS because it is in effect and revisions are still under consideration by the Department at the time of this SEIS; however, Section 50203 of the OBBB directs the Secretary to make available for lease at least 4 million acres of recoverable Federal coal, which is inconsistent with the MCFO RMP. In addition, the MCFO RMP and NEPA documents (BLM 2024a) were challenged in court, and the MCFO RMP was remanded to the Department pending the finalization of a new RMP Amendment with supporting NEPA documentation.

Year	Change
2025	Two new executive orders, EO 14154, *Unleashing American Energy* and EO 14156, *Declaring a National Energy Emergency,* which were signed in January 2025, provide specific direction related to energy policy and the economy. EO 14154 encourages energy exploration and production on Federal lands to meet U.S. domestic needs and to solidify the U.S. as a global energy leader. It also directs agencies, including OSMRE "to identify those agency actions that impose an undue burden on the identification, development, or use of domestic energy resources — with particular attention to oil, natural gas, coal, hydropower, biofuels, critical mineral, and nuclear energy resources." EO 14156 declared that the energy (including coal) and critical minerals identification, leasing, development, production, transportation, refining, and generation capacity of the United States are too inadequate to meet U.S. domestic needs. It directs agencies to "identify and exercise any lawful emergency authorities available to them, as well as all other lawful authorities they may possess, to facilitate the identification, leasing, siting, production, transportation, refining, and generation of domestic energy resources, including, but not limited to, on Federal lands."

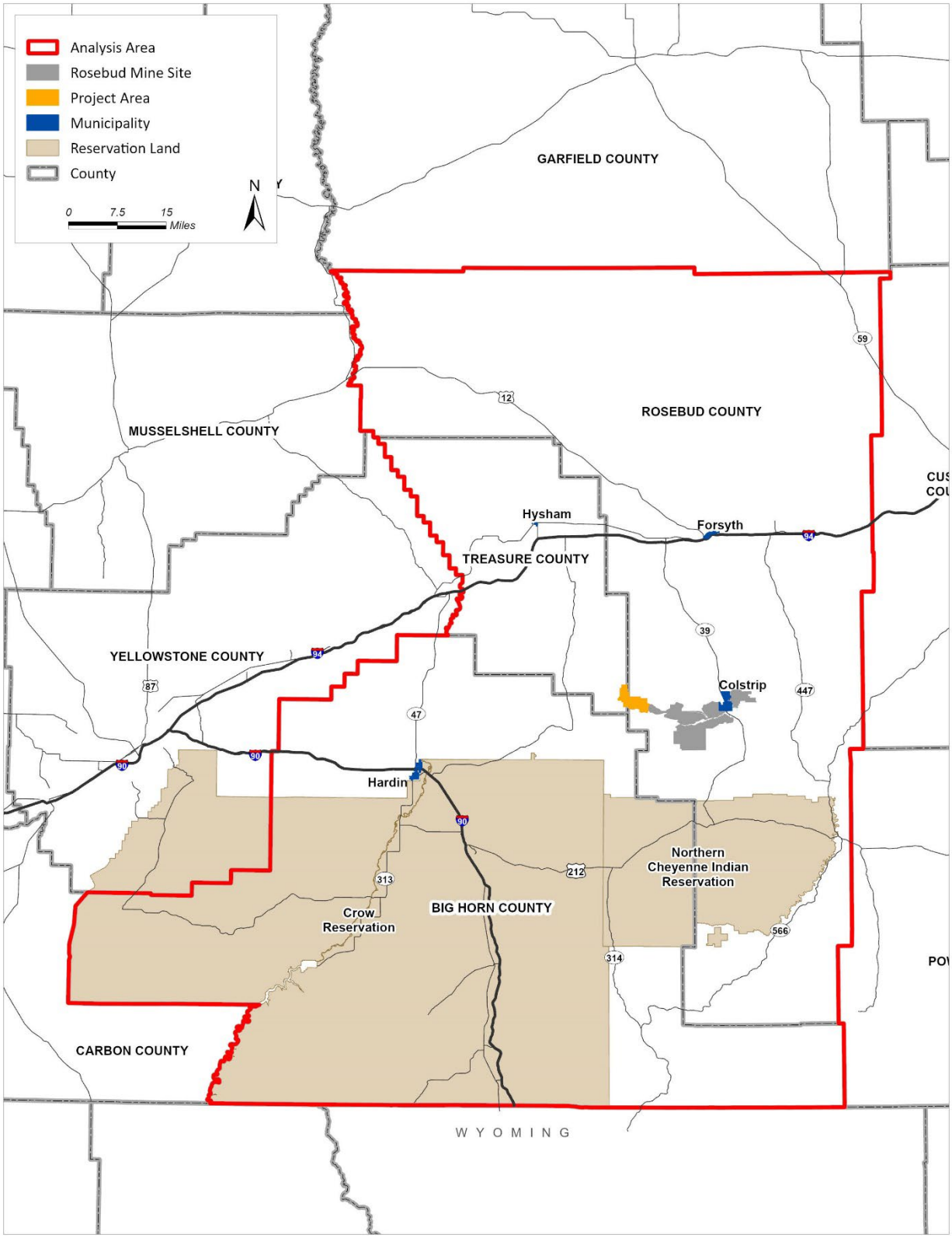

Figure 3.15-1. Socioeconomic Analysis Area.

3.15.1.1 Regulatory Framework

The regulatory framework applicable to socioeconomic conditions is unchanged since the 2018 Final EIS and is described in **Section 3.15.1.1** of the 2018 Final EIS beginning on page 351.

3.15.1.2 Analysis Area

The analysis area for direct and indirect socioeconomic effects is Rosebud, Treasure, and Big Horn Counties (**Figure 3.15-1**) and is the same analysis area used for the 2018 Final EIS. The rationale for using this analysis area is provided in **Section 3.15.1.2** of the 2018 Final EIS beginning on page 353.

3.15.2 Population and Demographics

As shown in **Table 3.15-2**, the population and demographics of the analysis area have decreased in several counties and towns since preparation of the 2018 Final EIS. Population and Demographics information is provided in **Section 3.15.2** of the 2018 Final EIS beginning on page 355.

Table 3.15-2. Rosebud, Treasure, and Big Horn Counties Population (1970–2022).

Jurisdiction	1970	1980	1990	2000	2010	2015	2022
Rosebud County	6,032	9,899	10,505	9,383	9,233	9,352	8,310
% change	—	64.1	6.1	-10.7	-1.6	1.3	-11.1
Forsyth	1,873	2,553	2,178	1,944	1,777	1,874	1,458
% change	—	36.3	-14.7	-10.1	-8.6	5.5	-22.2
Colstrip	—	—	—[1]	2,346	2,214	2,289	2,327
% change	—	—	—	-22.7	-5.6	3.4	1.7
Treasure County	1,069	981	874	861	718	812	680
% change	—	-8.2	-10.9	-1.5	-16.6	13.1	-16.3
Hysham	373	449	361	330	312	363	232
% change	—	20.3	-19.6	-8.6	-5.5	16.3	-36.1
Big Horn County	10,057	11,096	11,337	12,671	12,865	13,341	13,090
% change	—	10.3	2.2	11.8	1.5	3.5	-1.9
Hardin	2,733	3,300	2,940	3,384	3,668	3,754	3,803
% change	—	20.8	-10.9	15.1	8.4	2.3	1.3
Montana	694,409	786,690	799,065	902,125	989,415	1,014,699	1,122,867
% change	—	13.3	1.6	12.9	9.7	2.6	10.7

Source: Montana Department of Commerce 2012a, 2012b, and 2012c; USCB 2016, USCB 2022.

3.15.3 Incorporated Population Centers

Information on incorporated population centers is provided in **Section 3.15.3** of the 2018 Final EIS beginning on page 355. Population projections for the counties and incorporated municipalities were initially provided in **Table 78** of the 2018 Final EIS, these projections anticipated steady population growth for Rosebud and Big Horn Counties from 2015 to 2030, while forecasting a slight decline in Treasure County's population over the same period. However, the actual population data for 2022 reveals deviations from these projected trends for 2030.

Rosebud County's population was projected to grow by 12.1 percent from 2020 to 2025. Contrary to these projections, the actual population in 2022 showed an 11.1 percent decline from 2015. Forsyth was projected to increase by 7.7 percent by 2025, but it experienced a 22.2 percent decline by 2022. Similarly,

Colstrip was anticipated to grow by 9.8 percent by 2025, but only saw a modest increase of 1.7 percent by 2022. Treasure County was projected to see a decrease of 9.7 percent from 2020 to 2025. However, by 2022, the population had already fallen by 16.3 percent from 2015, indicating a more severe decline than anticipated. Hysham, the largest community in Treasure County, was projected to decrease by 30.3 percent by 2025, but its population fell by 36.1 percent by 2022. Big Horn County was expected to experience steady growth of 4.3 percent from 2015 to 2025. Instead, the population slightly decreased by 1.9 percent by 2022. Hardin was projected to experience substantial growth of 30.3 percent by 2025, but only saw a modest increase of 1.3 percent by 2022. These deviations in population predictions may be attributed to the unexpected closure of Colstrip Units 1 & 2, as well as decreased coal production.

3.15.4 Public Services and Infrastructure

Public services (schools, law enforcement, fire protection, and health care) and infrastructure (water supply and wastewater treatment) information is provided in **Section 3.15.4** of the 2018 Final EIS beginning on page 360.

3.16 RESERVED [NOTE: NUMBERING SEQUENCE RETAINED FOR CONTINUITY WITH THE DRAFT SEIS AND 2018 FINAL EIS]

3.17 VISUAL RESOURCES

3.17.1 Introduction

Since the issuance of the 2018 Final EIS, there have been no substantial new circumstances or information relevant to visual resources. Please note that the following actions (**Table 3.17-1**) have occurred since the issuance of the 2018 Final EIS but would not substantially change the affected environment previously described for visual resources. Detailed information on visual resources is available in **Section 3.17** of the 2018 Final EIS beginning on page 367.

Table 3.17-1. Visual Resources: Changed Conditions Since the 2018 Final EIS.

Year	Change
2019	Westmoreland Rosebud began developing Area F in 2019, and active mining began in August 2020 according to its state operating permit and Federal mining plan. As of December 2023, Westmoreland Rosebud has disturbed 582 acres in the project area; 494 acres of that disturbance is due to active mining, and the remainder is due to site development, such as roads and soil and/or spoil stockpiles. See **Tables 2.2-3** and **2.2-4** in **Chapter 2** above for current disturbance at the Rosebud Mine and Westmoreland Rosebud's posted reclamation bonds.
2021	The Richard Springs Fire began in a coal seam approximately 10 miles southwest of Colstrip on August 8, 2021, and burned 171,130 acres in the vicinity of the Rosebud Mine Area B, including Area B AM5, and reclaimed Area E. It was not in the same drainages as Area F but is considered in **Chapter 5** (cumulative effects).
2019-2022	In terms of other permit areas of the Rosebud Mine, the following may contribute to changed conditions for visual resources: • AM5 to Permit Area B was approved by DEQ in 2022 after preparation of an EIS pursuant to MEPA that considered the cumulative visual resource impacts of Area F. The project area approved in DEQ's ROD for Area B AM5 was roughly half the size of the area that was analyzed in the 2018 Final EIS (see **Chapter 5** and **Appendix D** in the 2018 Final EIS). • Area D is no longer actively mined and is being reclaimed. • Area E has received full bond release and is no longer a Montana coal mine.
2022	On August 10, 2022, Montana submitted its Regional Haze SIP for the Second Planning Period to the EPA. This plan fulfills the requirements of the Regional Haze Rule (40 C.F.R. part 51, subpart P) by establishing long-term strategies to achieve the 2028 reasonable progress goals. These goals are to improve existing visibility in mandatory Class I areas, prevent future impairment of visibility by manmade sources, and meet the national goal of natural visibility conditions in all mandatory Class I areas by 2064. The SIP demonstrates Montana is on track to meet the national goal of natural visibility conditions in all mandatory Class I areas by 2064.

3.17.1.1 Regulatory Framework

The regulatory framework for visual resources has been updated to include the Montana SIP discussed in **Table 3.17-1**. The regulatory framework applicable to visual resources is otherwise unchanged and is described in **Section 3.17.1.1** of the 2018 Final EIS beginning on page 367. The update discussed above would not substantially change the results of the 2018 Final EIS.

3.17.1.2 Analysis Area

The analysis areas for visual resources, which are the viewshed of the proposed project (direct effects) and the air quality analysis area described in **Section 3.3.1.2** (indirect effects), are described in detail in **Section 3.17.1.2** of the 2018 Final EIS beginning on page 367.

3.17.2 Visual Character

The visual character of the analysis area is described in **Section 3.17.2** of the 2018 Final EIS beginning on page 368.

3.18 RECREATION

3.18.1 Introduction

Since the issuance of the 2018 Final EIS, there have been no substantial new circumstances or information relevant to recreation. Please note that the following actions (**Table 3.18-1**) have occurred since the issuance of the 2018 Final EIS but would not substantially change the affected environment previously described for recreation. Detailed information on recreation is available in **Section 3.18** of the 2018 Final EIS beginning on page 370.

Table 3.18-1. Recreation Resources: Changed Conditions Since the 2018 Final EIS.

Year	Change
2019	Westmoreland Rosebud began developing Area F in 2019, and active mining began in August 2020 according to its state operating permit and Federal mining plan. As of December 2023, Westmoreland Rosebud has disturbed 582 acres in the project area; 494 acres of that disturbance is due to active mining, and the remainder is due to site development, such as roads and soil and/or spoil stockpiles. See **Tables 2.2-3** and **2.2-4** in **Chapter 2** above for current disturbance at the Rosebud Mine and Westmoreland Rosebud's posted reclamation bonds.
2020	DEQ approved a third major revision (TR3) to the Area A permit, which allowed for a change in the postmine land use for 1 acre in Sections 28, 29, 32, and 33 of T2N, R41E from grazing to undeveloped recreation (DEQ 2020b).
2021	The Richard Springs Fire began in a coal seam approximately 10 miles southwest of Colstrip on August 8, 2021, and burned 171,130 acres in the vicinity of the Rosebud Mine Area B, including Area B AM5, and reclaimed Area E. It was not in the same drainages as Area F but is considered in **Chapter 5** (cumulative effects).
2019-2022	In terms of other permit areas of the Rosebud Mine, the following may contribute to changed conditions for recreation: • AM5 to Permit Area B was approved by DEQ in 2022 after preparation of an EIS pursuant to MEPA that considered the cumulative recreation impacts of Area F. The project area approved in DEQ's ROD for Area B AM5 was roughly half the size of the area that was analyzed in the 2018 Final EIS (see **Chapter 5** and **Appendix D** in the 2018 Final EIS). • Area D is no longer actively mined and is being reclaimed. • Area E has received full bond release and is no longer a Montana coal mine.

3.18.1.1 Regulatory Framework

The regulatory framework for recreation is unchanged since the Final EIS and is described in **Section 3.18.1.1** of the 2018 Final EIS beginning on page 370.

3.18.1.2 Analysis Area

The analysis areas for recreation, which are the project area plus a 2,000-foot buffer (direct impacts) and the air quality analysis area described in **Section 3.3.1.2** (indirect effects), are described detail in **Section 3.18.1.2** of the 2018 Final EIS beginning on page 371.

3.18.2 Recreation Opportunities

Recreation opportunities in the analysis area are described in **Section 3.18.2** of the 2018 Final EIS beginning on page 371. Ranches in the vicinity of the Rosebud Mine allow outfitters to guide hunters on their private lands, including surface areas in the project area. Westmoreland Rosebud has surface use agreements or leases with all private surface landowners in Area F to minimize impacts on private landowner uses, including hunting.

3.19 PALEONTOLOGY

3.19.1 Introduction

Since the issuance of the 2018 Final EIS, there have been no substantial new circumstances or information relevant to paleontology, other than development of and active mining in Area F. Detailed information on paleontology is available in **Section 3.19** of the 2018 Final EIS beginning on page 373.

3.19.1.1 Regulatory Framework

The regulatory framework for paleontology is unchanged since the Final EIS. The regulatory framework applicable to paleontology is described in **Section 3.19.1.1** of the 2018 Final EIS beginning on page 373.

3.19.1.2 Analysis Area

The analysis area for direct and indirect impacts on paleontology is the project area,[45] which was also the analysis area used in the 2018 Final EIS.

3.19.2 Affected Environment

The affected environment and pre-disturbance paleontology surveys conducted in the analysis area are described in **Section 3.19.2** of the 2018 Final EIS beginning on page 373.

[45.] As Westmoreland Rosebud has developed Area F, on-the-ground conditions have necessitated minor changes to the project area, which is the Area F permit boundary (now 6,773 acres instead of 6,746 acres), and to the configuration of the disturbance boundary (now 4,288 acres instead of 4,260 acres); these minor revisions were reviewed and approved by DEQ pursuant to MSUMRA and MEPA and are described in **Section 2.2.2.2, Area F Operations and Development**.

3.20 ACCESS AND TRANSPORTATION

3.20.1 Introduction

Since the issuance of the 2018 Final EIS, there have been no substantial new circumstances or information relevant to transportation. Please note that the following actions (**Table 3.20-1**) have occurred since the issuance of the 2018 Final EIS but would not substantially change the affected environment previously described for transportation. Detailed information on access and transportation is available in **Section 3.20** of the 2018 Final EIS beginning on page 377.

Table 3.20-1. Access and Transportation: Changed Conditions Since the 2018 Final EIS.

Year	Change
2019	A 4.2-mile segment of the Horse Creek Road in Rosebud County was relocated as part of the development of Area F (see additional discussion in **Section 2.2.2.2, Area F Operations and Development, Road Construction and Relocations**).
2019	Westmoreland Rosebud began developing Area F in 2019, and active mining began in August 2020 according to its state operating permit and Federal mining plan. As of December 2023, Westmoreland Rosebud has disturbed 582 acres in the project area; 494 acres of that disturbance is due to active mining, and the remainder is due to site development, such as roads and soil and/or spoil stockpiles. See **Tables 2.2-3** and **2.2-4** in **Chapter 2** above for current disturbance at the Rosebud Mine and Westmoreland Rosebud's posted reclamation bonds.
2019-2022	In terms of other permit areas of the Rosebud Mine, the following may contribute to changed conditions for access and transportation: • AM5 to Permit Area B was approved by DEQ in 2022 after preparation of an EIS pursuant to MEPA that considered the cumulative access and transportation impacts of Area F. The project area approved in DEQ's ROD for Area B AM5 was roughly half the size of the area that was analyzed in the 2018 Final EIS (see **Chapter 5** and **Appendix D** in the 2018 Final EIS). • Area D is no longer actively mined and is being reclaimed. • Area E has received full bond release and is no longer a Montana coal mine. • MR15 and MR17 were approved in 2022 to revise road alignments to reduce hazards and environmental impacts.

3.20.1.1 Regulatory Framework

The regulatory framework for access and transportation is unchanged since the Final EIS and is described in **Section 3.20.1.1** of the 2018 Final EIS beginning on page 377.

3.20.1.2 Analysis Area

The analysis area for impacts on access and transportation (the road network used by the mine and power plants and the project area) is described in detail in **Section 3.20.1.2** of the 2018 Final EIS beginning on page 378.

3.20.2 Mine Access and Internal Road System

Mine access and the internal road system are described in **Section 3.20.2** of the 2018 Final EIS beginning on page 379.

3.20.3 Regional Transportation System

The regional transportation system is described in **Section 3.20.3** of the 2018 Final EIS beginning on page 380.

3.21 SOLID AND HAZARDOUS WASTE

3.21.1 Introduction

Since the issuance of the 2018 Final EIS, there have been no substantial new circumstances or information relevant to solid and hazardous waste. Please note that the following actions (**Table 3.21-1**) have occurred since the issuance of the 2018 Final EIS but would not substantially change the affected environment previously described for solid and hazardous waste. Detailed information on solid and hazardous waste is available in **Section 3.21** of the 2018 Final EIS beginning on page 382.

Table 3.21-1. Solid and Hazardous Waste: Changed Conditions Since the 2018 Final EIS.

Year	Change
2019	Westmoreland Rosebud began developing Area F in 2019 and active mining began in August 2020, potentially generating waste. Westmoreland Rosebud is managing disposal of any waste generated from Area F under its Waste Management Program, which consists of a Solid and Hazardous Waste Management Plan (Western Energy 2009), a Spill Prevention Control and Counter Measure Plan, and a Contingency and Emergency Response Plan (Western Energy 2017b).
2020	Units 1 and 2 of the Colstrip Power Plant were retired from use on January 2, 2020, and January 3, 2020, respectively. Due to this retirement, the annual total of Toxic Release Inventory (TRI) chemicals for land-disposal releases are now likely lower than the annual TRI total presented in **Table 87** in **Section 3.21.2.4** of the 2018 Final EIS.
2019-2022	In terms of other permit areas of the Rosebud Mine, the following may contribute to changed conditions for solid and hazardous waste: • AM5 to Permit Area B was approved by DEQ in 2022 after preparation of an EIS pursuant to MEPA that considered the cumulative solid and hazardous waste impacts of Area F. The project area approved in DEQ's ROD for Area B AM5 was roughly half the size of the area that was analyzed in the 2018 Final EIS (see **Chapter 5** and **Appendix D** in the 2018 Final EIS). • Area D is no longer actively mined and is being reclaimed. • Area E has received full bond release and is no longer a Montana coal mine.
2023	Westmoreland prepares and submits an Annual Hazardous Waste Report to Montana DEQ as a condition of its operating permits for the Rosebud Mine. The most recent reporting year available is 2023 (January 1, 2023, through December 31, 2023); this report (Westmoreland Rosebud 2024c) was reviewed to confirm there have been no significant changes since the 2018 Final EIS.

3.21.1.1 Regulatory Framework

The regulatory framework for solid and hazardous waste is unchanged since the Final EIS and is described in **Section 3.21.1.1** of the 2018 Final EIS beginning on page 382.

3.21.1.2 Analysis Area

The analysis areas for solid and hazardous waste, which are the Rosebud Mine site (direct impacts) and the sites of the Colstrip and Rosebud Power Plants (including the off-site coal combustion residuals storage areas), are described in detail in **Section 3.21.1.2** of the 2018 Final EIS beginning on page 383.

3.21.2 Waste Disposal Practices

Waste disposal practices are described in **Section 3.21.2** of the 2018 Final EIS beginning on page 383.

3.22 NOISE

3.22.1 Introduction

Since the issuance of the 2018 Final EIS, there have been no substantial new circumstances or information relevant to noise. Please note that the following actions (**Table 3.22-1**) have occurred since the issuance of the 2018 Final EIS but would not substantially change the affected environment previously described for noise. Information on noise is available in **Section 3.22** of the 2018 Final EIS beginning on page 392.

Table 3.22-1. Noise: Changed Conditions Since the 2018 Final EIS.

Year	Change
2019	Westmoreland Rosebud began developing Area F in 2019, and active mining began in August 2020, potentially generating noise.
2020	Units 1 and 2 of the Colstrip Power Plant were retired from use on January 2, 2020, and January 3, 2020, respectively. Due to this retirement, existing noise may be less (e.g., quieter) than what was described in **Section 3.22.2, Existing Noise Sources**, in the 2018 Final EIS.
2019-2022	In terms of other permit areas of the Rosebud Mine, the following may contribute to changed conditions for noise: • AM5 to Permit Area B was approved by DEQ in 2022 after preparation of an EIS pursuant to MEPA that considered the cumulative noise impacts of Area F. The project area approved in DEQ's ROD for Area B AM5 was roughly half the size of the area that was analyzed in the 2018 Final EIS (see **Chapter 5** and **Appendix D** in the 2018 Final EIS). • Area D is no longer actively mined and is being reclaimed. • Area E has received full bond release and is no longer a Montana coal mine.

3.22.1.1 Regulatory Framework

The regulatory framework for noise is unchanged since the Final EIS and is described in **Section 3.22.1.1** of the 2018 Final EIS beginning on page 392.

3.22.1.2 Analysis Area

The analysis areas for direct and indirect noise impacts (the nearest residences to the project area, the Colstrip Power Plant, and the Rosebud Power Plant) are described in detail in **Section 3.22.1.2** of the 2018 Final EIS beginning on page 392.

3.22.1.3 Noise Terminology

Noise terminology is provided in **Section 3.22.1.3** of the 2018 Final EIS beginning on page 393.

3.22.2 Existing Noise Sources

Existing noise sources are described in **Section 3.22.2** of the 2018 Final EIS beginning on page 398.

3.23 LAND USE

3.23.1 Introduction

Since the issuance of the 2018 Final EIS, there have been no substantial new circumstances or information relevant to land use. Please note that the following actions (**Table 3.23-1**) have occurred since the issuance of the 2018 Final EIS but would not substantially change the affected environment previously described for land use. Information on land use is available in **Section 3.18** of the 2018 Final EIS beginning on page 398.

Table 3.23-1. Land Use: Changed Conditions Since the 2018 Final EIS.

Year	Change
2019	Westmoreland Coal Company filed for bankruptcy on March 2, 2019, and was acquired by Westmoreland Rosebud Mining, LLC, a subsidiary of Westmoreland Mining, LLC. A minor revision (**Table 2.2-5**) was approved by DEQ on March 14, 2019, for Westmoreland Rosebud Mining, LLC, to be the contract miner at the Rosebud Mine. The permit transfer from Western Energy Company to Westmoreland Rosebud Mining, LLC, was submitted on April 12, 2019, and subsequently approved by DEQ.
2019	Westmoreland Rosebud began developing Area F in 2019, and active mining began in August 2020 according to its state operating permit and Federal mining plan. As of December 2023, Westmoreland Rosebud has disturbed 582 acres in the project area; 494 acres of that disturbance is due to active mining, and the remainder is due to site development, such as roads and soil and/or spoil stockpiles. See **Tables 2.2-3** and **2.2-4** in **Chapter 2** above for current disturbance at the Rosebud Mine and Westmoreland Rosebud's posted reclamation bonds.
2019-2022	In terms of other permit areas of the Rosebud Mine, the following may contribute to changed conditions for land use: • AM5 to Permit Area B was approved by DEQ in 2022 after preparation of an EIS pursuant to MEPA that considered the cumulative land use impacts of Area F. The project area approved in DEQ's ROD for Area B AM5 was roughly half the size of the area that was analyzed in the 2018 Final EIS (see **Chapter 5** and **Appendix D** in the 2018 Final EIS). • Area D is no longer actively mined and is being reclaimed. • Area E has received full bond release and is no longer a Montana coal mine.
2020	DEQ approved the Area A permit TR3, which allowed for a change in the postmine land use for 1 acre in Sections 28, 29, 32, and 33 of T2N, R41E from grazing to undeveloped recreation (DEQ 2020b).
2021	DEQ approved a second major revision (TR2) to the Area A permit, which allowed for a change in the postmine land use for 111 acres in Sections 15, 22, and 27 of T2N, R41E from grazing to industrial (DEQ 2021) to facilitate siting of the Clearwater to Colstrip Transmission Line Project (see also **Table 5.2-1**).
2021	The Richard Springs Fire began in a coal seam approximately 10 miles southwest of Colstrip on August 8, 2021, and burned 171,130 acres in the vicinity of the Rosebud Mine Area B, including Area B AM5, and reclaimed Area E. It was not in the same drainages as Area F but is considered in **Chapter 5** (cumulative effects).
2024	The BLM prepared and issued the *Miles City Field Office Final Supplemental Environmental Impact Statement and Resource Management Plan Amendment* (BLM 2024a) in May 2024. The BLM selected Alternative D as the proposed plan for allocating BLM administered coal (BLM 2024b; 89 FR 97 2024); under this alternative, Federal coal (about 1.75 million acres of subsurface Federal coal estate) would not be available for leasing within the MCFO planning area (see Figure 2-4a in BLM 2024a). The BLM determined that additional leasing of Federal coal is not necessary based on the current analysis in the SEIS and that operating mines in the planning area have existing Federal leases with sufficient coal reserves to maintain existing mine production levels until 2035 for the Spring Creek Mine and 2060 for the Rosebud Mine (BLM 2024a) (see **Table 5.2-1)**.

Year	Change
2025	Secretarial Order 3418 - *Unleashing American Energy* (January 20, 2025) directed BLM to revise all relevant and all finalized RMPs and supporting NEPA documents, including the MCFO RMP and NEPA documents. BLM published a notice of intent to amend the MCFO RMP and accompanying NEPA analysis on July 8 to reevaluate coal allocations in the planning area and to determine the availability of lands acceptable for further consideration for coal leasing in accordance with recent EOs. OSMRE relied on the 2024 MCFO Final SEIS because it is in effect and revisions are still under consideration by the Department at the time of this SEIS; however, Section 50203 of the OBBB directs the Secretary to make available for lease at least 4 million acres of recoverable Federal coal, which is inconsistent with the MCFO RMP. In addition, the MCFO RMP and NEPA documents (BLM 2024a) were challenged in court, and the MCFO RMP was remanded to the Department pending the finalization of a new RMP Amendment with supporting NEPA documentation.
2025	Two new executive orders, EO 14154, *Unleashing American Energy* and EO 14156, *Declaring a National Energy Emergency,* which were signed in January 2025, provide specific direction related to energy policy and use of federal lands. EO 14154 encourages energy exploration and production on Federal lands to meet U.S. domestic needs and to solidify the U.S. as a global energy leader. It also directs agencies, including OSMRE "to identify those agency actions that impose an undue burden on the identification, development, or use of domestic energy resources — with particular attention to oil, natural gas, coal, hydropower, biofuels, critical mineral, and nuclear energy resources." EO 14156 declared that the energy (including coal) and critical minerals identification, leasing, development, production, transportation, refining, and generation capacity of the United States are too inadequate to meet U.S. domestic needs. It directs agencies to "identify and exercise any lawful emergency authorities available to them, as well as all other lawful authorities they may possess, to facilitate the identification, leasing, siting, production, transportation, refining, and generation of domestic energy resources, including, but not limited to, on Federal lands."

3.23.1.1 Regulatory Framework

Except for changed ownership or other slight adjustments to lease and deed agreements, the regulatory framework for land use is unchanged since the Final EIS and is described in **Section 3.23.1.1** of the 2018 Final EIS beginning on page 398. Updated lease information is shown on **Figure 1.1-3** in **Chapter 1**.

3.23.1.2 Analysis Area

The analysis areas for land use, which are the project area plus a 2,000-foot buffer (direct impacts) and the locations of the Colstrip and Rosebud Power Plants plus a 0.5-mile buffer (indirect effects), are described in detail in **Section 3.23.1.2** of the 2018 Final EIS beginning on page 399.

3.23.2 Land Ownership

The project area encompasses 6,773 acres with three private surface owners (**Table 91** and **Figure 65** in the 2018 Final EIS): Westmoreland Rosebud (309 acres), Great Northern Properties LP (2,703 acres), and the Booth Land and Livestock Company (3,734 acres). The subsurface mineral estate is both privately (3,479 acres) and federally (3,294 acres) owned. Westmoreland Rosebud holds a BLM lease for the Federal coal (MTM 082186) and private leases for the private coal (1001 and 1001-A) in the project area (**Figure 1.1-3** and **Table 2.2-7**). Detailed land ownership information is provided in **Section 3.23.2** of the 2018 Final EIS beginning on page 399.

3.23.3 Primary Pre-mining Land Uses (Direct Effects Analysis Area)

As described in the 2018 Final EIS, the primary pre-mine land use within the project area and the adjacent areas outside of the proposed permit boundary is livestock grazing. As described in the 2018 Final EIS, the estimated annual total production for the project area is between 500 and 2,200 pounds per acre (depending on whether the vegetation is grass, forbs, or shrubs) with grassland stocking rates of 0.13 to

0.60 animal unit months (AUMs) per acre (USDA-NRCS 2006). In 2006, the project area total production ranged from 368 to 1,188 pounds per acre, depending on the plant community. Therefore, estimates indicate that project area plant communities potentially support stocking rates ranging from 0.12 to 0.29 AUMs per acre. Production can vary from year to year based on precipitation.

Pastureland and cropland are the other two primary pre-mine uses of the project area with some fish and wildlife habitat as well. Pastureland is located near ranch operations and access roads in the valley bottoms where slopes are gentle and soil is deep. These pasturelands are important feed sources for livestock in the winter. Cropland in the project area includes nonirrigated area used for small grain production. Wheat is the primary crop with small acreages of barley and oats. Detailed information on pre-mining land uses are described in **Section 3.23.3** of the 2018 Final EIS beginning on page 403.

3.23.4 Other Pre-Mining Land Uses (Direct Effects Analysis Area)

Seven dam diversions, shown as manmade livestock ponds, are located within or close to the project area adjacent to or on McClure, Robbie, Donley, or Black Hank Creeks. Nine springs are located within or near the project area adjacent to tributaries or the mainstem of McClure, Robbie, Donley, and Black Hank Creeks. Another spring at the north end of the project area on a tributary to Trail Creek is located outside of the project area. All of the springs are used for livestock watering and have permitted diversion volumes of 30 gallons per day per animal. Only one spring (Spring 3 on a tributary of Robbie Creek) is developed and has a decreed maximum diversion rate, which is 8 gpm. The livestock pond and spring rights are owned by Booth Land and Livestock Company, WPP LLC, or Western Energy (see also **Section 3.9, Water Resources – Water Rights**). Ranches in the vicinity of the Rosebud Mine allow outfitters to guide hunters on their private lands, including surface areas in the project area. Westmoreland Rosebud has surface use agreements or leases with all private surface landowners in Area F to minimize impacts on private landowner uses, including hunting and ranching (Batie 2025). Other pre-mining land uses are described in **Section 3.23.4** of the 2018 Final EIS beginning on page 404.

3.23.5 Land Use in the Indirect Effects Analysis Area

The land uses surrounding Colstrip and in Southwest Montana primarily consist of agricultural crop production, grasslands, forest/grazing, open grazed sparse woods, and irrigated land. The landscape provides the region with natural resources and space to farm, ranch, mine, and hunt. A detailed discussion of the pre-mining land uses in the indirect effects analysis area are described in **Section 3.23.5** of the 2018 Final EIS beginning on page 405.

3.24 SOIL

3.24.1 Introduction

Since the issuance of the 2018 Final EIS, there have been no substantial new circumstances or information relevant to soil. Please note that the following actions (**Table 3.24-1**) have occurred since the issuance of the 2018 Final EIS but would not substantially change the affected environment previously described for soil. Detailed information on soil is available in **Section 3.24** of the 2018 Final EIS beginning on page 406.

Table 3.24-1. Soil: Changed Conditions Since the 2018 Final EIS.

Year	Change
2019	Westmoreland Rosebud began developing Area F in 2019, and active mining began in August 2020 according to its state operating permit and Federal mining plan. As of December 2023, Westmoreland Rosebud has disturbed 582 acres in the project area; 494 acres of that disturbance is due to active mining, and the remainder is due to site development, such as roads and soil and/or spoil stockpiles. See **Tables 2.2-3** and **2.2-4** in **Chapter 2** above for current disturbance at the Rosebud Mine and Westmoreland Rosebud's posted reclamation bonds. Soil is being salvaged and stockpiled in the project area as described in **Section 2.4.3.6, Soil Removal and Stockpiling**, of the 2018 Final EIS, beginning on page 57.
2019-2022	In terms of other permit areas of the Rosebud Mine, the following may contribute to changed conditions for soil: • AM5 to Permit Area B was approved by DEQ in 2022 after preparation of an EIS pursuant to MEPA that considered the cumulative soil impacts of Area F. The project area approved in DEQ's ROD for Area B AM5 was roughly half the size of the area that was analyzed in the 2018 Final EIS (see **Chapter 5** and **Appendix D** in the 2018 Final EIS). • Area D is no longer actively mined and is being reclaimed. • Area E has received full bond release and is no longer a Montana coal mine.
2021	The Richard Springs Fire began in a coal seam approximately 10 miles southwest of Colstrip on August 8, 2021, and burned 171,130 acres in the vicinity of the Rosebud Mine Area B, including Area B AM5, and reclaimed Area E. It was not in the same drainages as Area F but is considered in **Chapter 5** (cumulative effects).

3.24.1.1 Regulatory Framework

The regulatory framework for soil is unchanged since the 2018 Final EIS and is described in **Section 3.24.1.1** of the 2018 Final EIS beginning on page 406.

3.24.1.2 Analysis Area

The analysis areas for soil, which are the proposed disturbance area (direct impacts) and the operational boundaries of the Colstrip and Rosebud Power Plants plus a 32-km irregular buffer (indirect effects), are described in detail in **Section 3.24.1.2** of the 2018 Final EIS beginning on page 407.

3.24.2 Soil Map Units and Descriptions

Soil map units and descriptions are in **Section 3.24.2** of the 2018 Final EIS beginning on page 410.

3.24.3 Suitability for Reclamation

Soil suitability for reclamation is discussed in **Section 3.24.3** of the 2018 Final EIS beginning on page 414.

3.25 RESOURCES CONSIDERED BUT DISMISSED

Resources considered but dismissed are described in **Section 3.25** of the 2018 Final EIS. Only one resource area, alluvial valley floors, was considered but not carried forward for detailed analysis. A discussion of alluvial valley floors and the rationale for not including a detailed analysis is provided in **Section 3.25.1** of the 2018 Final EIS beginning on page 418. During preparation of this SEIS, no additional resources were considered but dismissed from detailed analysis.

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CHAPTER 4. ENVIRONMENTAL CONSEQUENCES (DIRECT AND INDIRECT IMPACTS)

4.1 INTRODUCTION

This chapter discloses and analyzes the direct and indirect environmental effects that may result from selection and implementation of the alternatives described in **Chapter 2** of this Supplemental Environmental Impact Statement (SEIS); these effects are summarized at the end of **Chapter 2** in **Table 2.8-1**. While the current DOI *NEPA Handbook* directs that an EIS contain "a concise description of the reasonably foreseeable effects of the proposed action and any action alternatives," this SEIS was substantially completed before the publication of this handbook and relied on the CEQ and DOI regulations in effect during the time of preparation. Cumulative impacts, while no longer required by NEPA or DOI's NEPA-implementing regulations, are presented in **Chapter 5**.

In this SEIS, an environmental impact or effect is any change from the present condition of any resource or issue (**Table 3.1-1**) that may result because of implementing one of the alternatives. Impacts may be beneficial or adverse and are defined as short-term, long-term, or both (see analysis definitions in **Appendix 1**). Analyses in this chapter have been updated to address the September 30, 2022, Court order and to incorporate any new information available since the 2018 Final EIS (see **Section 1.1, Introduction**). Specifically, this chapter contains analysis of greenhouse gas (GHG) emissions, the indirect effects of mine expansion on water withdrawals from the Yellowstone River, and a reasonable range of alternatives. Impacts analyses and conclusions in this SEIS were based on the review of existing literature and studies, information provided by resource specialists and other agencies, professional judgment, agency staff insights, and public input; resource-specific analysis methodologies are provided in the introductions to each resource section.

As discussed in **Chapter 2**, the alternatives considered in this SEIS have been updated from those considered in the 2018 Final EIS. Alternative 4 – Proposed Action (Current Federal Mining Plan) is very similar to the Proposed Action (Alternative 2) analyzed in the 2018 Final EIS. Therefore, impacts analyses presented in this chapter are similar to and reference the effects analyses presented for Alternative 2 in the 2018 Final EIS. Alternative 1 – No Action was revised to account for ongoing mining and associated disturbance that has been occurring in the project area since 2020 according to DEQ-approved state operating permit C2011003F and the 2019-approved Federal mining plan. Alternative 5 – Partial Mining Alternative was developed to further explore a reasonable range of possible alternatives to allow for meaningful public input and informed agency decision making.

In general, the types of direct and indirect impacts under Alternatives 1 and 5 would be the same as for Alternative 4, but impact intensities would be lower due to shorter periods of mining operations, fewer acres disturbed in the project area, and fewer tons of coal mined as compared to Alternative 4. Assumptions for each alternative, which informed the scope of the effects analyses in this SEIS, are presented in **Section 2.4, Alternative 1 – No Action**, **Section 2.5, Alternative 4 – Proposed Action (Current Federal Mining Plan)**, and **Section 2.6, Alternative 5 – Partial Mining Alternative**. The alternative selected for this project may have ramifications for the operations of the Rosebud Mine as a whole. Based on production estimates for Area B and other currently approved permit areas, including Area F, the operational life of the Rosebud Mine is assumed to end in 2045 (**Section 2.2.6, Life of Operations**). Full development of Area F under Alternative 4, which is consistent with the DEQ-approved state operating permit C2011003F and the 2019-approved Federal mining plan, is expected to be about 20 years (through 2039). Ceasing production in Area F earlier than 2039 (either 2025 under Alternative 1 or 2030 under Alternative 5) would cause Westmoreland Rosebud to shift mining operations

to other approved permit areas, such as Area B, potentially leading to increased production rates for those permit areas and potential closure of the Rosebud Mine earlier than 2045.

4.2 TOPOGRAPHY

This section discloses the direct and indirect effects on topography resulting from implementation of Alternative 1 – No Action, Alternative 4 – Proposed Action (Current Federal Mining Plan), or Alternative 5 – Partial Mining Alternative. Pre-mine topography conditions and the analysis areas used for this impacts analysis are described in **Section 3.2, Topography**.

4.2.1 Analysis Methods and Impact and Intensity Thresholds

Topography impacts were evaluated in this SEIS using the same methods used in the 2018 Final EIS. Analysis methods are provided in **Section 4.2.1** of the 2018 Final EIS, beginning on page 423. The thresholds for assessment of impacts (negligible, minor, moderate, or major) on topography are the same as those defined in the 2018 Final EIS in **Table 96**. Assumptions for each alternative, which informed the scope of the effects analyses in this SEIS, are presented in **Section 2.4, Alternative 1 – No Action**, **Section 2.5, Alternative 4 – Proposed Action (Current Federal Mining Plan)**, and **Section 2.6, Alternative 5 – Partial Mining Alternative**.

4.2.2 Alternative 1 – No Action

The types of direct and indirect topography impacts under Alternative 1 (as described in this SEIS)[46] would be similar to those described below for Alternative 4 – Proposed Action (Current Federal Mining Plan). Under Alternative 1, though, impacts would be limited to the southeastern portion of the project area (east of Donley Creek) with no mining occurring in the Trail Creek, McClure Creek, and Robbie Creek drainages (**Figure 2.4-1**) based on the assumption that all mining would cease in 2025. In total, approximately 1,021 acres would be disturbed in the project area over a 6-year mine life that would produce about 17.1 million tons of coal from Federal and private coal leases. As with Alternative 4, the impacts on topography during mining would be noticeable within the analysis area and would result in short-term major adverse impacts on topography. In the short-term following reclamation, the impacts from erosion on topography would be minor, and the surface topography of the analysis area would resemble that of the postmining topography (PMT) initially contoured following mining activities.

Under Alternative 1, direct and indirect topography impacts would be less than under Alternative 4: about 54 million fewer tons of coal would be mined and approximately 3,267 fewer acres would be disturbed under Alternative 1 as compared to Alternative 4 (**Table 2.3-1** and **Table 2.3-2**). The life of operations for Area F (and the corresponding impacts) would be 14 years shorter under Alternative 1 than under Alternative 4. Reclamation and the PMT would be achieved in the project area 14 years earlier than under Alternative 4.

4.2.2.1 Mining Private Coal Only Scenario

If Westmoreland Rosebud chose to pursue mining of private coal only (leases 1001 and 1001-A) after 2025, direct and indirect topography impacts could be greater than those disclosed above for Alternative 1. The intensity of impacts, however, would be no greater than those disclosed for Alternative 4 (see below) and would be expected to be less. See **Section 2.4.2, State Operating Permit C2011003F** for a discussion of the steps that would be required for such a scenario to occur.

[46] Direct and indirect topography impacts of Alternative 1 – No Action were described in **Section 4.2.2** of the 2018 Final EIS, beginning on page 423. As described in **Chapter 2** of this SEIS, Alternative 1 – No Action has been revised since the 2018 Final EIS.

4.2.3 Alternative 4 – Proposed Action (Current Federal Mining Plan)

Direct and indirect topography impacts under Alternative 4 – Proposed Action (Current Federal Mining Plan) would be similar to those described for Alternative 2 in **Section 4.2.3** of the 2018 Final EIS, beginning on page 424. Under Alternative 4, half a million tons more coal would be mined[47] and approximately 28 acres more would be disturbed than under Alternative 2. Reclamation would occur contemporaneously with mining (see discussion of the phases of reclamation in **Section 1.6.4, Bond Release**, in the 2018 Final EIS). Once mining has ceased, reclamation of disturbed areas (up to 4,288 acres) in the project area would occur according to Westmoreland Rosebud's approved reclamation plan (**Figure 2.2-5**) and PMT (**Figure 2.2-6**), which are similar to those described for Alternative 2 in 2018 Final EIS **Section 2.4.4, Reclamation Plan**. Modifications since 2018 are described in **Section 2.2.2.2, Area F Operations and Development**.

4.2.3.1 Direct Impacts

Under Alternative 4 (as with Alternative 2), the postmining landscape of the analysis area would be restored following mining operations to the approximate original contour to facilitate postmining land uses. The PMT that Westmoreland Rosebud would meet at final bond release is the currently approved PMT shown in **Figure 2.2-6**. The PMT shows the general topography (ridges, drainages, slopes, etc.) that would serve as Westmoreland Rosebud's grading template for matching the pre-mining topography, which is described in the 2018 Final EIS in **Section 3.2, Topography** and **Figure 13**.

Annually (during operations), Westmoreland Rosebud would provide the Montana Department of Environmental Quality (DEQ) with an updated topographic map showing all existing areas to be graded, the amount of pit advance, and the actual graded contours. This map would be included in Westmoreland Rosebud's Annual Report for the project. During the final phases of spoil grading, surface drainages would be reconstructed to the approved approximate PMT. Cross-sections would be utilized to evaluate the blending of undisturbed terrain and disturbed ground to provide a smooth and stable transition in the topography.

Two postmining feature types, rock piles and cliffs, would be designed to mitigate the loss of sandstone outcrops and cliffs/bluffs that are common feature types on the pre-mine landscape. Highwall-reduction alternatives may be considered for replacement of bluff features that existed before mining. Sandstone cliff features may be created with DEQ approval in lieu of highwall reduction. Sandstone rock piles would be created and opportunistically placed on upland situations, ridges, hilltops, and sideslopes in the analysis area. With concurrence of DEQ, rocks and boulders may be placed on native areas within the permitted disturbance limits. Westmoreland Rosebud would demonstrate both slope stability and replacement of pre-mine features during the permitting process for each of these features.

Drainage-basin design would be based on pre-mine conditions. With the exception of haul-road crossings, Westmoreland Rosebud would leave the main channels of Black Hank, Donley, McClure, and Robbie Creeks undisturbed in Alternative 4, which is the same as described for Alternative 2 in the 2018 Final EIS. Reclaimed drainage basins – valleys, channels, streams, and floodplains – would be constructed to meet approved PMT and approximate original contours, and to enable the drainage channels to remain in dynamic equilibrium with the drainage basin system. **Figure 13** in the 2018 Final EIS presents the pre-mine topography with drainage divides. A pre-mining and postmining comparative analysis of geomorphic characteristics of the analysis area would be used to determine reclamation recontouring and

[47.] See coal tonnage and disturbance comparison in **Table 2.2-8**. Under Alternative 4, mine passes would not be authorized for 74 acres of Federal coal (about 1.9 million tons of recoverable coal). The 74 acres that would not be mined could still be used for other project-associated surface disturbance, such as overburden or topsoil stockpile locations (**Figure 2.5-1**).

drainage and to ensure that drainages and slope contours are designed and constructed consistent with the approved PMT (**Figure 2.2-6**).

During final grading, Westmoreland Rosebud may be able to incorporate additional drainage features to more closely approximate original contours and avoid geomorphic problems including long uniform slopes, inappropriate channel or slope profiles, or inadequate drainage density. Examples of some of the diversity features that Westmoreland Rosebud may be able to include during final grading include additional tributaries, over-steep slopes of various exposures in headwater locations, incised tributary or dry-wash areas, complex side slopes, small anomalies (i.e., hogbacks and knolls), and scoria pits. These features are not shown on **Figure 2.2-6**, but probable locations are shown on Exhibit B of the Permit Application Package (PAP). Impacts on topography would occur on 4,288 acres of previously undisturbed land within the analysis area. During operations, mining within Area F would lower the surface elevation, resulting in a steep topographic gradient toward the open pit. Areas of soil and overburden piles would result in an increase in surface elevation where these piles were stored. The impacts on topography during mining would be noticeable within the analysis area and would result in short-term major adverse impacts on topography.

In the short term following reclamation, the impacts from erosion on topography would be minor, and the surface topography of the analysis area would resemble that of the PMT initially contoured following mining activities.

4.2.3.2 Indirect Impacts

Under Alternative 4, as with Alternative 2, Westmoreland Rosebud would mix geologically distinct layers into spoil consisting of fragments of sandstone, siltstone, mudstone, and claystone in the analysis area. The resulting fine-grained sediment generated due to the breakdown of these stones into fragments would result in a well-graded mixture of lithified and non-lithified material comprising the material used to backfill the analysis area. Indirect long-term minor adverse impacts on topography from differential erosion of the spoil would include the preferential erosion of the softer stone fragments and non-lithified sediment relative to the harder stone fragments. This would occur first within the created areas of drainage within the backfill and then extend out to the hillsides over time. The initial impact on topography would be the creation of a hummocky terrain with fragments of more resistant stone scattered throughout the analysis area. This topographic terrain would persist until the erosion of the backfilled material was complete.

4.2.4 Alternative 5 – Partial Mining Alternative

The types of direct and indirect topography impacts under Alternative 5 – Partial Mining Alternative would be similar to those described above for Alternative 4 – Proposed Action (Current Federal Mining Plan). Under Alternative 5, though, direct impacts would be limited to the southeastern portion of the project area (east of Donley Creek) with no mining occurring in the Trail Creek, McClure Creek, and Robbie Creek drainages (**Figure 2.6-1**) based on the assumption that all mining would cease in 2030. In total, approximately 2,495 acres would be disturbed in the project area over an 11-year mine life that would produce about 37.1 million tons of coal from Federal and private coal leases. As with Alternative 4, the impacts on topography during mining would be noticeable within the analysis area and would result in short-term major adverse impacts on topography. In the short-term following reclamation, the impacts from erosion on topography would be minor, and the surface topography of the analysis area would resemble that of the PMT initially contoured following mining activities.

Under Alternative 5, direct and indirect topography impacts would be less than under Alternative 4. About 34 million fewer tons of coal would be mined and approximately 1,793 fewer acres would be

disturbed under Alternative 5 as compared to Alternative 4 (**Table 2.3-1** and **Table 2.3-2**). The life of operations for Area F (and the corresponding topography impacts) would be 9 years shorter under Alternative 5 than under Alternative 4. Reclamation and PMT would be achieved in the project area 9 years earlier than under Alternative 4.

4.2.4.1 Mining Private Coal Only Scenario

If Westmoreland Rosebud chose to pursue mining of private coal only (leases 1001 and 1001-A) after 2030, direct and indirect topography impacts could be greater than those disclosed above for Alternative 5. The intensity of impacts, however, would be no greater than those disclosed for Alternative 4 (see above) and would be expected to be less. See **Section 2.6.2, State Operating Permit C2011003F** for a discussion of the steps that would be required for such a scenario to occur.

4.2.5 Irreversible and Irretrievable Commitment of Resources

Irreversible and irretrievable commitments of resources would be similar to those described in **Section 4.2.5** of the 2018 Final EIS. Alteration of the previously undisturbed pre-mining topography would be an irreversible impact on the area topography. Although the postmining grading of the land surface would closely mimic the pre-mine topography, subtle variations would be noticeable when the pre-mine and postmining topographic maps are compared.

4.3 AIR QUALITY

This section discloses the direct and indirect effects on air quality resulting from implementation of Alternative 1 – No Action, Alternative 4 – Proposed Action (Current Federal Mining Plan), or Alternative 5 – Partial Mining Alternative. Existing air quality and the analysis areas used for this impacts analysis are described in **Section 3.3, Air Quality**.

4.3.1 Analysis Methods and Impact and Intensity Thresholds

Air quality impacts of Alternatives 1, 4, and 5 were evaluated using modeling and analyses completed for Alternative 2 and presented in the 2018 Final EIS. Analysis methods are provided in **Section 4.3.1** of the 2018 Final EIS, beginning on page 430, and additional detail is provided in **Appendix D** of the 2018 Final EIS. As previously noted, emissions used in the air quality impacts analysis in the 2018 Final EIS are likely an overestimate of current conditions, primarily due to the early retirement of Units 1 and 2 of the Colstrip Power Plant; when current data were available (e.g., from DEQ and publicly available on the Environmental Protection Agency's [EPA's] website), the information was updated in **Section 3.3, Air Quality**. The Office of Surface Mining Reclamation and Enforcement (OSMRE) and the EIS consultant team reviewed the changed conditions and determined that the analyses for Alternative 2 in the 2018 Final EIS were still valid and could be used to consider SEIS alternatives. Air quality and emissions information, as well as coal production estimates, presented in DEQ's *Rosebud Mine Area B AM5 Final Environmental Impact Statement* (DEQ 2022a) and the Bureau of Land Management's (BLM's) *Miles City Field Office Final Supplemental Environmental Impact Statement and Resource Management Plan Amendment* (BLM 2024a) also was reviewed and found to be consistent with the analyses presented in the 2018 Final EIS. Based on these reviews, OSMRE determined that new air quality modeling was not needed to understand the impacts of the alternatives described in this SEIS. The thresholds for assessment of impacts (negligible, minor, moderate, or major) on air quality are the same as those defined in the 2018 Final EIS in **Table 98**.

Assumptions for each alternative, which informed the scope of the effects analyses in this SEIS, are presented in **Section 2.4, Alternative 1 – No Action**, **Section 2.5, Alternative 4 – Proposed Action (Current Federal Mining Plan)**, and **Section 2.6, Alternative 5 – Partial Mining Alternative**.

4.3.2 Alternative 1 – No Action

The types of direct and indirect air quality impacts under Alternative 1 (as described in this SEIS)[48] would be similar to those described below for Alternative 4 – Proposed Action (Current Federal Mining Plan). Under Alternative 1, though, disturbance would be limited to the southeastern portion of the project area (**Figure 2.4-1**) based on the assumption that all mining would cease in 2025. In total, approximately 1,021 acres would be disturbed in the project area over a 6-year mine life that would produce about 17.1 million tons of coal from Federal and private coal leases.

Under Alternative 1, direct and indirect air quality impacts would be less than under Alternative 4: about 54 million fewer tons of coal would be mined and approximately 3,267 fewer acres would be disturbed under Alternative 1 as compared to Alternative 4 (**Table 2.3-1** and **Table 2.3-2**). The life of operations for Area F (and the corresponding impacts) would be 14 years shorter under Alternative 1 than under Alternative 4. Reclamation and PMT would be achieved in the project area 14 years earlier than under Alternative 4. Direct criteria air pollutants (CAPs) and hazardous air pollutants (HAPs) emissions, as well

[48.] Direct and indirect air quality impacts of Alternative 1 – No Action were described in **Section 4.3.2** of the 2018 Final EIS, beginning on page 430. As described in **Chapter 2** of this SEIS, Alternative 1 – No Action has been revised since the 2018 Final EIS.

as impacts on air-quality-related values, such as visibility, would occur for a shorter period under Alternative 1 (14 years less) than under Alternative 4. As with Alternative 4, direct air quality impacts would be short-term, minor, and adverse.

The continued combustion of coal at the Rosebud and Colstrip Power Plants contributes CAP and HAP emissions in the analysis area, contributing to indirect impacts (detailed in Alternative 4), including degraded air quality, visibility impairment (haze), and deposition of trace metals, SO_2, and NO_2 in analysis area soils and waterways. As with Alternative 4, these indirect air quality impacts would be minor and adverse. Under Alternative 1, coal from the project area would be available for combustion in the Colstrip and Rosebud Power Plants for up to 6 years (along with associated indirect impacts), which is 14 years fewer than under Alternative 4. Therefore, there would be 14 fewer years (as compared to Alternative 4) where CAP, HAP, and GHG emissions attributable to combustion of project area coal would be contributing to degraded air quality, visibility impairment, and deposition of trace metals, SO_2, and NO_2.

4.3.2.1 Mining Private Coal Only Scenario

If Westmoreland Rosebud chose to pursue mining of private coal only (leases 1001 and 1001-A) after 2025, direct and indirect air quality impacts could be greater than those disclosed above for Alternative 1. The intensity of impacts, however, would be no greater than those disclosed for Alternative 4 (see below) and would be expected to be less. See **Section 2.4.2, State Operating Permit C2011003F** for a discussion of the steps that would be required for such a scenario to occur.

4.3.3 Alternative 4 – Proposed Action (Current Federal Mining Plan)

Direct and indirect air quality impacts under Alternative 4 – Proposed Action (Current Federal Mining Plan) would be similar to those summarized for Alternative 2 in **Section 4.3.3** of the 2018 Final EIS, beginning on page 430 and described in detail in **Appendix D** of the 2018 Final EIS. Under Alternative 4, half a million tons more coal would be mined[49] and approximately 28 acres more would be disturbed over a 20-year mine life as compared to Alternative 2. Reclamation would occur contemporaneously with mining (see discussion of the phases of reclamation in **Section 1.6.4, Bond Release**, in the 2018 Final EIS). Once mining has ceased, reclamation of disturbed areas (up to 4,288 acres) in the project area would occur according to Westmoreland Rosebud's approved reclamation plan (**Figure 2.2-5**) and PMT (**Figure 2.2-6**), which are similar to those described for Alternative 2 in the 2018 Final EIS in **Section 2.4.4, Reclamation Plan**. Modifications since 2018 are described in **Section 2.2.2.2, Area F Operations and Development**. Under Alternative 4, coal from the project area would be available for combustion in the Colstrip and Rosebud Power Plants for up to 20 years.

The direct impacts of Alternative 4, as well as indirect impacts due to coal combustion, are disclosed below. Similar to Alternative 2 in the 2018 Final EIS, the direct and indirect components of Alternative 4 would have a minor or negligible impact on air quality and air-quality-related values in the analysis area.

4.3.3.1 Direct Impacts

The direct air quality impacts of Alternative 4 would be a consequence of the emissions from the mining, processing, and handling of project area coal (including transportation to the power plants by haul truck) as well as reclamation of the areas disturbed by these actions. The sources of air pollution include fugitive

[49]. See coal tonnage and disturbance comparison in **Table 2.2-8**. Under Alternative 4, mine passes would not be authorized for 74 acres of Federal coal (about 1.9 million tons of recoverable coal). The 74 acres that would not be mined could still be used for other project-associated surface disturbance, such as overburden or topsoil stockpile locations (**Figure 2.5-1**).

dust sources (i.e., topsoil removal and unloading; overburden drilling, blasting, and removal; coal drilling, blasting, removal, loading, dumping, crushing, and conveying; haul and access roads; and wind erosion of disturbed areas), mobile sources (i.e., haul/water trucks, graders, dozers, and waste coal hauling to the Rosebud Power Plant), portable/stationary engines, and explosive use for overburden and coal blasting. Emissions from Area F are regulated by Montana Air Quality Permit (MAQP) #1570-09, and MAQP #4436-01 regulates emissions from the portable crusher facility.

The potential to emit (PTE) of Area F CAP emission sources was quantified for the 2018 Final EIS (based on Area C operations) by Bison Engineering using the combined coal production limit in MAQP #1570-09 for Areas A and C and activity data from the year of highest coal production, 2008. The maximum additional haul road distance (approximately 5 miles or 8 kilometers [km]) was conservatively used in estimating the additional project area emissions from hauling. The existing PTE from Area C and additional PTE from the project area previously quantified in the 2018 Final EIS were utilized to estimate emissions of criteria and HAPs attributable to the direct impacts of Alternative 4. The estimated PTE did not include emissions from the hauling of waste coal to the Rosebud Power Plant. Therefore, those emissions were estimated using the EPA Motor Vehicle Emissions Simulator model (www.epa.gov/moves) with vehicle data provided by Western Energy (provided in **Appendix D-8** of the 2018 Final EIS).

Projections of future annual coal production from the Rosebud Mine (project area and the other areas of the mine) were provided in **Table 99** in the 2018 Final EIS; that table is likely an overestimate of annual coal production based on current conditions. For example, no coal was mined from Area A or Area C in 2023 (**Table 2.2-2**), and DEQ selected and approved an agency alternative, Alternative 3 – Lee Coulee Only, that cut estimated production from Area B Amendment 5 (AM5) to 42.9 million tons, which is less than half of the 104.3 million tons total AM5 production considered in the 2018 Final EIS (DEQ 2022a). **Table 4.3-1** provides updated projected annual coal production rates for the Rosebud Mine. As described in **Section 2.2.6, Life of Operations**, changes to production rates, additions of other mine permit areas, reduced mining in Area F, or changed market conditions may influence the operational life of the Rosebud Mine as a whole or of individual permit areas.

Table 4.3-1. Projected Annual Coal Production for Rosebud Mine by Area.

Year	Projected Annual Coal Production (tons/year)		
	Area F (tons ×1,000)	Area B (pursuant to AM5)	Estimated Total Rosebud Mine Production
2023	4.6*	2.5*	7.1
2024	4	3.1	7.1
2025	4	3.2	7.2
2026	4	6.9	10.9
2027	4	2.3	6.3
2028	4	3.0	7
2029	4	2.3	6.3
2030	4	2.2	6.2
2031	4	2.7	6.7
2032	4	5.1	9.1
2033	4	4.6	8.6
2034	4	4.5	8.5
2035	4	3.2	7.2
2036	4	4.4	8.4
2037	4	2.2	6.2
2038	4	3.5	7.5
2039	1.6	4.2	5.8
2040	-	3.5	3.5
2041	-	6.6	6.6
2042	-	3.9	3.9
2044	-	2.7	2.7
2045		0.0	0

*Tonnage provided for 2023 is actual production from the mine. Total production in 2023 was 7.1 million tons. **Table 99** in the 2018 Final EIS predicted that total mine production in 2023 would be 7.5 million tons.
Source: Area F production estimate based on Table 303-2 from Area F Operating Permit Minor Revision 16 (2022). Area B AM5 production estimate based on Table E-2 in the 2022 Rosebud Mine Area B AM5 Final EIS, Appendix E (DEQ 2022a).

Project Area Criteria Air Pollutant Emissions

The estimated project area CAP emission inventory from the 2018 Final EIS (**Table 100**), which is replicated below in **Table 4.3-2**, is a reasonable estimate for Alternative 4 but may overestimate CAP emissions attributable to the project, because some updates such as production data in **Table 4.3-1** are not accounted for in **Table 4.3-2**.

Table 4.3-2. Estimated Emissions Due to Project Area.

Emission Source(s)	PM_{10}	$PM_{2.5}$	NO_x	CO	SO_2	VOCs
	(tons/year)					
Topsoil removal	18.73	1.87	--	--	--	--
Topsoil dumping	0.68	0.10	--	--	--	--
Overburden drilling	0.26	0.03	--	--	--	--
Overburden blasting – cast blasting	28.85	1.66	--	--	--	--
Overburden removal by dragline	60.11	5.30	--	--	--	--
Overburden handling by truck/shovel	94.08	2.37	--	--	--	--
Overburden dumping	0.68	0.10	--	--	--	--
Overburden handling by dozer	9.28	5.13	--	--	--	--
Haul roads – travel	196.01	19.48	--	--	--	--
Access roads – unpaved	60.56	6.06	--	--	--	--
Coal drilling	0.05	0.00	--	--	--	--
Coal blasting	10.57	0.61	--	--	--	--
Coal removal	0.06	0.01	--	--	--	--
Mobile sources diesel exhaust – haul/water trucks	9.12	9.12	235.56	56.78	0.29	14.97
Mobile sources diesel exhaust – grader	0.06	0.06	0.96	0.33	0.00	0.08
Mobile sources diesel exhaust – dozers	3.53	3.41	78.99	22.91	0.08	5.26
Explosives	--	--	73.21	288.52	8.61	--
Disturbed acres – complete (<2 yr.)	9.95	0.99	--	--	--	--
Disturbed acres – complete (>2 yr.)	0.00	0.00	--	--	--	--
Disturbed acres – facilities	0.00	0.00	--	--	--	--
Disturbed acres – partial (<1 yr.)	33.52	3.35	--	--	--	--
Disturbed acres – partial (>1 yr.)	29.88	2.99	--	--	--	--
Disturbed acres – pits, peaks, soil stripping	266.53	26.65	--	--	--	--
Portable/stationary equipment – gasoline engines	0.25	0.25	4.08	2.48	0.21	7.58
Waste coal hauling to Rosebud Power Plant	0.26	0.22	6.30	1.73	0.00	0.30
Truck dump – coal	0.05	0.01	--	--	--	--
Coal crushing	0.12	0.01	--	--	--	--
Coal conveyors to the Colstrip Power Plant	0.02	0.00	--	--	--	--
Total	**833.19**	**89.80**	**399.09**	**372.75**	**9.19**	**28.19**

Project Area Hazardous Air Pollutant Emissions

Under Alternative 4, the project area would also be a source of HAPs. Raw coal contains a large number of HAPs, and the mining, processing, and handling of project area coal would result in the emission of the HAP-containing fugitive coal dust. In addition, the use of diesel equipment throughout the project area and the associated support facilities would result in the emission of diesel particulate matter (DPM). DPM is not currently regulated by the EPA but is considered a carcinogenic air toxin (EPA 2002).

Coal fugitive dust sources due to Alternative 4 include coal drilling, coal blasting, coal removal, coal truck dump, coal crushing, and coal conveyors and would be the same as those disclosed for Alternative 2 in the 2018 Final EIS. Potential project area HAP emissions from fugitive coal dust were quantified for Alternative 2 as the product of project area PM_{10} emissions[50] from these sources and the average concentration of HAPs in project area coal across 13 samples (PPL Montana 2014) (see **Appendix D** in the 2018 Final EIS). The estimated HAP emissions from fugitive coal dust are shown in **Table 4.3-3** (**Table 101** from the 2018 Final EIS). More than 97 percent of fugitive coal dust emissions from the project area are the result of coal blasting, which occurs in the active mining passes. Under Alternative 4, about 71.3 million tons of coal[51] would be removed from Area F in a process that involves coal drilling,

[50.] As shown in **Table 3.3-2**, since issuance of the 2018 Final EIS and development of Area F, PM_{10} emissions for the Rosebud Mine have remained the same as or less than those used in air quality modeling.
[51.] As compared to removal of about 70.8 million tons of coal under Alternative 2.

coal blasting, coal removal, coal truck dump, coal crushing, and coal handling (conveyors and haul trucks).

Table 4.3-3. Project Area Trace Metal HAP Emissions from Fugitive Coal Dust.

Metal HAP	Concentration in Project Area Coal[1] (ppm)	HAP Emissions (lb/year)
Antimony	0.30	6.52E-03
Arsenic	0.72	1.56E-02
Beryllium	0.28	6.08E-03
Cadmium	0.04	8.69E-04
Chromium	2.56	5.56E-02
Copper	5.05	1.10E-01
Lead	3.75	8.15E-02
Manganese	70.59	1.53E+00
Mercury	0.03	5.68E-04
Nickel	0.91	1.98E-02
Selenium	0.55	1.20E-02

ppm = parts per million; lb/year = pound(s) per year.
1. HAP concentration is the moisture-corrected average value from 13 samples of project area coal.

All fine particulate matter emissions ($PM_{2.5}$)[52] from diesel sources (i.e., haul/water trucks, graders, dozers, and waste coal haul trucks) were considered to be DPM. The potential project area DPM emissions from the 2018 Final EIS are provided in **Table 4.3-4**. Haul/water trucks, which operate on the haul roads between the project area and the coal processing facilities in Area C, contribute the majority of project area DPM emissions.

Table 4.3-4. Potential Project Area DPM Emissions.

Emission Source(s)	DPM[1] (tons/year)
Mobile sources diesel exhaust – haul/water trucks	9.12
Mobile sources diesel exhaust – grader	0.06
Mobile sources diesel exhaust – dozer	3.41
Waste coal hauling to Rosebud Power Plant	0.22
Total Project Area DPM	**12.81**

1. Project area DPM estimates are conservative because the maximum distance between project area and coal processing facilities in Area C was used in calculating additional hauling emissions.

Air Concentrations and Related Values

Criteria Air Pollutants and Precursors

As modeled for Alternative 2, the direct impacts on NO_2 (see **Figure 71** in the 2018 Final EIS) would be mostly within or adjacent to the Rosebud Mine; the same would be true for Alternative 4. The maximum values in the analysis area of the eighth-highest 1-hour daily maximum NO_2 and annual average NO_2 concentrations would be 39.4 and 2.5 ppb, respectively, both within the project area. Impacts would be lower (1-hour and annual concentrations less than 30 and 1.6 ppb, respectively) outside the proposed project area where the public would typically have access. The direct impacts on O_3 (see **Figure 72** in the 2018 Final EIS) would be seen mostly in Rosebud, Custer, Treasure, and Bighorn Counties.

As modeled for Alternative 2, project area impacts on NO_2 and O_3 concentrations in the analysis area would be well below the National Ambient Air Quality Standards (NAAQS) and Montana Ambient Air Quality Standards (MAAQS) (provided in **Section 3.3.1.1**, **Ambient Air Quality Standards** of the 2018 Final EIS). Although the form of the MAAQS for 1-hour NO_2 is different from that of the NAAQS, the MAAQS is three times that of the NAAQS (300 ppb vs. 100 ppb), so impacts much lower than the

52. As shown in **Table 3.3-2**, since issuance of the 2018 Final EIS and development of Area F, $PM_{2.5}$ emissions for the Rosebud Mine have remained the same as or less than those used in air quality modeling.

NAAQS would also imply compliance with the MAAQS. NO_2 and O_3 concentrations due to all cumulative sources in the analysis area are below the NAAQS and MAAQS (see **Section 5.3.2.2, Cumulative Impacts on Air Quality** in the 2018 Final EIS). Thus, direct impacts for NO_2 and O_3 in the analysis area under Alternative 4 (as with Alternative 2) would be short-term, minor, and adverse.

Direct impacts on $PM_{2.5}$ and PM_{10} air concentrations would be within or near the Rosebud Mine. As modeled for Alternative 2, the spatial peaks of the eighth-highest daily average $PM_{2.5}$ and the annual average $PM_{2.5}$ (see **Figure 73** in the 2018 Final EIS) would be 6.0 $\mu g/m^3$ and 1.8 $\mu g/m^3$, respectively. Both of these peaks would occur within the project area. When considering areas outside the project area, the corresponding concentrations would be typically less than 3.7 $\mu g/m^3$ and 1.0 $\mu g/m^3$, respectively, and would drop further with distance from the project area. The spatial maxima of the second-highest daily average and annual average PM_{10} due to direct impacts (see **Figure 74** in the 2018 Final EIS) would be 54.1 $\mu g/m^3$ and 15.9 $\mu g/m^3$, respectively, both occurring again within the project area. Outside the project area, the corresponding concentrations would be typically less than 29 $\mu g/m^3$ and 9 $\mu g/m^3$, respectively, and drop further with distance. Concentrations of $PM_{2.5}$ and PM_{10} modeled and reported here include both primary emitted PM and secondary formation of PM from emissions of NO_x, volatile organic compounds (VOCs), and SO_2.

Project area impacts on $PM_{2.5}$ and PM_{10} concentrations would be well below the NAAQS and MAAQS. Thus, current compliance of the mine with the NAAQS and MAAQS is expected to continue with project area operations. Direct impacts for $PM_{2.5}$ and PM_{10} in the analysis area under Alternative 4 (as with Alternative 2) would be short-term, minor, and adverse. Background concentrations due to other sources were considered in the context of cumulative effects (see **Section 5.3.2.2, Cumulative Impacts on Air Quality** in the 2018 Final EIS).

The maximum values in the analysis area of direct contributions to the fourth-highest 1-hour and second-highest 3-hour SO_2 would be 13.3 ppb and 7.0 ppb, respectively (see **Figure 75** in the 2018 Final EIS). The maximum values for the second-highest 24-hour SO_2 and annual average SO_2 would both be less than 0.1 ppb (see **Figure 76** in the 2018 Final EIS). The SO_2 concentrations would be well below the NAAQS and MAAQS, including the forms of the standard (24-hour and annual) where the MAAQS is more stringent than the NAAQS. Background concentrations due to other sources were considered in the context of cumulative effects (see **Section 5.3.2.2, Cumulative Impacts on Air Quality** in the 2018 Final EIS). Direct impacts for SO_2 in the analysis area under Alternative 4 (as with Alternative 2) would be short-term, minor, and adverse.

The negligible contributions of direct impacts on areas currently designated as non-attainment/ maintenance for SO_2 and PM_{10} in Montana and for PM_{10} and O_3 in Wyoming are documented in **Section 5.3.2.2, Cumulative Impacts on Air Quality** in the 2018 Final EIS.

Impacts of CO are discussed in **Section 5.3.2.2, Cumulative Impacts on Air Quality** in the 2018 Final EIS; modeling results for Alternative 2 (here applied to Alternative 4) show that the cumulative effects for CO after considering all sources including direct, indirect, and other sources are well below the NAAQS and the MAAQS. Thus, direct impacts under Alternative 4 for CO would be short-term, minor, and adverse.

Impacts on Pb are discussed under HAPs below.

The project area is expected to have minimal impact on or is not relevant to the MAAQS for settleable PM, hydrogen sulfide, fluoride in forage, and visibility for the reasons provided in the 2018 Final EIS. Hydrogen sulfide and fluoride emissions are negligible from the project area.

The Montana visibility standard is applicable only to Class I areas. Visibility impairment due to direct impacts at Federal and tribal Class I areas is shown to be negligible in the air-quality-related values discussion below.

Air-Quality-Related Values

Nitrogen and Sulfur Deposition

The modeled sulfur deposition for Alternative 2 (here applied to Alternative 4) consists of wet and dry deposition of SO_2 and particulate sulfate; the latter may be emitted or formed in the atmosphere from SO_2. Modeled nitrogen deposition includes wet and dry deposition of the following nitrogen compounds: nitric oxide (NO), NO_2, dinitrogen pentoxide (N_2O_5), nitrous acid (HNO_2), nitric acid (HNO_3), peroxynitric acid (HNO_4), particulate nitrate (NO_3^-), organic nitrates, and the reduced nitrogen compounds of NH_3 and particulate ammonium (NH_4^+).

Within the analysis area for direct impacts, Alternative 2 modeled annual nitrogen deposition due to direct impacts would range from 0 to 0.6 kg/ha and sulfur deposition would vary from 0 to 0.1 kg/ha (see **Appendix D** in the 2018 Final EIS). There are no regulatory thresholds for atmospheric deposition of air emissions. Therefore, modeled annual deposition for Alternative 2 (here applied to Alternative 4) was compared to the modeled cumulative annual deposition if the project area had not been approved (Alternative 1 in the 2018 Final EIS) to assess the relative intensity of impacts.

To identify potential impacts on sensitive areas, the direct impacts on NO_2 and SO_2 deposition were examined at Federal and tribal Class I areas in the cumulative effects analysis area (a map of these areas is shown in **Section 3.3.1.2, Analysis Area** in the 2018 Final EIS). **Table 4.3-5** (**Table 103** in the 2018 Final EIS) shows the modeled annual total (i.e., wet + dry) deposition of NO_2 and SO_2 due to direct impacts at Class I areas. The "maximum" value for each Class I area represents the maximum across all model grid cells spanning that area, and the "average" value is the average across all grid cells in the area.

As modeled for Alternative 2 (and here applied to Alternative 4), annual nitrogen deposition due to direct impacts would vary from 0.0001 kg/ha to 0.0084 kg/ha across all Class I areas when considering the spatial maximum in each area and from 0.0000 kg/ha to 0.0045 kg/ha when considering the average in each area. The Northern Cheyenne Reservation was modeled to experience the highest nitrogen deposition due to direct impacts across Class I areas. When conservatively considering the maximum deposition due to direct impacts across all model grid cells spanning the Northern Cheyenne Reservation, the Class I area closest to the project area, the contribution of direct impacts to nitrogen deposition was 0.4 percent of the modeled cumulative annual deposition if the project area were not approved (**Appendix D** in the 2018 Final EIS). The corresponding relative impact at other Class I areas is 0.0 percent. Thus, direct impacts on nitrogen deposition at Class I areas under Alternative 4 (as with Alternative 2) would be negligible.

Annual sulfur deposition due to direct impacts was modeled at 0.0000 kg/ha at all Class I areas except at the Northern Cheyenne Reservation, where it was 0.0004 kg/ha, when considering the spatial maximum in each area. This value is negligible relative to the modeled cumulative annual deposition if the project were not approved (Alternative 1). When considering the spatial average across each area, sulfur deposition would be 0.0000 kg/ha at all Class I areas except at the Northern Cheyenne Reservation, where it would be 0.0002 kg/ha. Thus, direct impacts on sulfur deposition at Class I areas under Alternative 4 (as with Alternative 2) would be negligible.

Table 4.3-5. Modeled Annual Nitrogen and Sulfur Deposition due to Direct Impacts at Class I Areas.

Class I Area	Nitrogen Maximum (kg/ha)	Nitrogen Average (kg/ha)	Sulfur Maximum (kg/ha)	Sulfur Average (kg/ha)
Badlands National Park	0.0004	0.0004	0.0000	0.0000
Bridger	0.0001	0.0001	0.0000	0.0000
Fitzpatrick	0.0001	0.0001	0.0000	0.0000
Fort Peck Indian Reservation	0.0004	0.0002	0.0000	0.0000
Gates of the Mountains Wilderness	0.0001	0.0001	0.0000	0.0000
Grand Teton National Park	0.0001	0.0000	0.0000	0.0000
Lostwood National Wildlife Refuge	0.0001	0.0001	0.0000	0.0000
Lostwood Wilderness	0.0001	0.0001	0.0000	0.0000
Medicine Lake (Class I)	0.0001	0.0001	0.0000	0.0000
North Absaroka	0.0003	0.0001	0.0000	0.0000
Northern Cheyenne	0.0084	0.0045	0.0004	0.0002
Teton	0.0001	0.0000	0.0000	0.0000
Theo Roosevelt National Park	0.0006	0.0004	0.0000	0.0000
UL Bend National Wildlife Refuge	0.0006	0.0005	0.0000	0.0000
UL Bend Wilderness	0.0006	0.0004	0.0000	0.0000
Washakie	0.0002	0.0001	0.0000	0.0000
Wind Cave National Park	0.0005	0.0004	0.0000	0.0000
Yellowstone National Park	0.0001	0.0000	0.0000	0.0000

kg = kilograms; ha = hectare.

Visibility Impairment

Based on guidance from the Federal Land Managers' Air Quality Related Values Work Group (2010), 0.5 and 1.0 represent levels at which the source is considered to contribute to regional haze visibility impairment or cause such visibility impairment. Under Alternative 4 (as with Alternative 2), direct impacts on haze visibility impairment would be negligible at all Class I areas, as the modeled change in haze index does not exceed 0.5 or 1.0 at any Class I area. The 98th percentile value over the year would be highest at the Northern Cheyenne Reservation with a value of 0.377 (**Table 4.3-6**, which is **Table 104** from the 2018 Final EIS). Visibility impairment is expected to be negligible under any alternative.

Table 4.3-6. Visibility Impacts from Direct Emissions at Class I Areas.

Class I Area	Number of Days in Year		98th percentile Δdv over year
	Δdv > 1.0	Δdv > 0.5	
Badlands National Park	0	0	0.014
Bridger	0	0	0.002
Fitzpatrick	0	0	0.002
Fort Peck Indian Reservation	0	0	0.027
Gates of the Mountains Wilderness	0	0	0.002
Grand Teton National Park	0	0	0.001
Lostwood National Wildlife Refuge	0	0	0.016
Lostwood Wilderness	0	0	0.014
Medicine Lake (Class I)	0	0	0.019
North Absaroka	0	0	0.005
Northern Cheyenne	0	0	0.377
Teton	0	0	0.002
Theo Roosevelt National Park	0	0	0.030
UL Bend National Wildlife Refuge	0	0	0.015
UL Bend Wilderness	0	0	0.018
Washakie	0	0	0.005
Wind Cave National Park	0	0	0.008
Yellowstone National Park	0	0	0.003

dv = deciviews; Δdv = change in deciviews.

Hazardous Air Pollutants

Mining and associated activities under Alternative 4 would be a source of both fugitive coal dust and DPM, and thus would increase the ambient air concentration and deposition of HAPs in the analysis area. As modeled for Alternative 2 (and applied here to Alternative 4), the maximum annual average air concentration and annual deposition of PM_{10} fugitive coal dust emissions would be 0.15 µg/m^3 and 153.1 kg/ha, respectively, and would occur within the boundaries of the project area, while falling off rapidly with distance from the mine (see **Figure 77** in the 2018 Final EIS). For example, the annual average air concentration and annual deposition are typically less than 0.05 µg/m^3 and 50.0 kg/ha outside the mine, respectively.

These maxima along with the known concentrations in project area coal were used to estimate the maximum annual concentrations and annual deposition of trace metal HAPs with known concentrations in project area coal (**Table 4.3-7**, which is **Table 105** from the 2018 Final EIS). This approach conservatively considers all areas within the project area even though the public do not typically have access to these areas.

Table 4.3-7. Maximum Annual Average Air Concentration and Annual Deposition of HAPs from Project Area Fugitive Coal Dust Emissions.

Metal HAP	Maximum Annual Average Air Concentration[1] (µg/m^3)	Maximum Deposition[1] (kg/ha-year)
Antimony	4.50E-08	4.59E-05
Arsenic	1.08E-07	1.10E-04
Beryllium	4.20E-08	4.28E-05
Cadmium	6.00E-09	6.12E-06
Chromium	3.84E-07	3.92E-04
Copper	7.58E-07	7.73E-04
Lead	5.63E-07	5.74E-04
Manganese	1.06E-05	1.08E-02
Mercury	4.50E-09	4.59E-06
Nickel	1.36E-07	1.39E-04
Selenium	8.25E-08	8.42E-05

µg/m^3 = micrograms per cubic meter; kg/ha-year = kilogram per hectare per year.
[1.] These results conservatively consider all areas within the project area permit boundary even though the public do not typically have access to these areas.

While the forms of the Pb NAAQS and MAAQS are different from the annual average concentration reported above, these modeled concentrations due to direct impacts would be negligible relative to the NAAQS/MAAQS values and would meet the NAAQS and MAAQS.

The annual average DPM concentration resulting from project area emissions (maximum concentration of 0.22 µg/m^3) would occur within the Area F boundary and would fall off rapidly with distance from the mine. For example, DPM concentrations are typically less than 0.1 µg/m^3 outside the mine.

DPM concentrations resulting from project area emissions would be spread throughout both the project area and Area C. This is because the majority of project area DPM emissions result from haul/water truck operations on the haul roads between the project area and the coal processing facilities in Area C. In contrast, project area fugitive coal dust emissions are almost entirely (greater than 97 percent) from coal blasting, which would occur only in the mining passes of the project area.

4.3.3.2 Indirect Impacts of Coal Combustion

Emissions of Criteria and Hazardous Air Pollutants

The indirect effects of Alternative 4, as with Alternative 2 from the 2018 Final EIS, would be the result of the combustion of project area coal; under Alternative 4, about 71.3 million tons (about half a million tons more coal as compared to Alternative 2) would be available for combustion. Under Alternative 4, indirect combustion effects would last for approximately 20 years (through 2039) because coal mined in the project area would be burned in Units 3 and 4 of the Colstrip Power Plant and the waste coal would be burned at the Rosebud Power Plant. Emission inventories (**Table 4.3-8**) do not include on-road and non-road mobile exhaust emissions for these facilities and were estimated for analysis purposes (see **Section 4.3.3.2** in the 2018 Final EIS). On-road and non-road exhaust emissions would be expected to be very small at the Colstrip Power Plant because of limited use of mobile source equipment at the facility.

Fugitive dust, petroleum product evaporation, and diesel generator emissions from the Colstrip Power Plant are provided below as facility totals, as well as the calculated on-road and non-road emissions. These emissions were apportioned between Units 1 and 2, and Units 3 and 4 to allow for determination of the indirect effects of Alternative 2 in the 2018 Final EIS; these emissions would be expected to be similar for Alternative 4. The resulting emission inventories estimates for Colstrip Units 3 and 4 and the Rosebud Power Plant from the 2018 Final EIS **Table 106** are replicated below in **Table 4.3-8** and are anticipated to be representative of maximum CAP emissions under Alternative 4 (see current CAP emissions for the power plants, which are currently combusting Area F coal, in **Table 3.3-3** to support this assessment).

Table 4.3-8. CAP Emissions from Colstrip Units 3 and 4 and the Rosebud Power Plant.[1]

Emission Source(s)	PM_{10}	$PM_{2.5}$	NO_x	CO	SO_2	VOCs
Colstrip Units 3 and 4	(tons/year)					
Boiler – Unit 3	788.32	632.93	4611.53	859.66	2543.08	120.32
Boiler – Unit 4	824.91	662.30	4725.22	899.48	2622.98	125.90
Coal Storage Pile	10.16	1.52	0	0	0	0
Fugitive dust – haul roads	0.28	0.00	0	0	0	0
Diesel emergency generator	0.0177	0.0171	0.56	0.29	0.14	0.0023
On-road mobile	0.0126	0.0075	0.32	2.35	0.0012	0.50
Non-road mobile	0.0143	0.0138	0.12	2.25	0.0003	0.10
Rosebud Power Plant	(tons/year)					
Boiler	16.52	5.04	856.39	3.42	1195.30	6.71
Fugitive dust – haul roads	7.81	1.17	0	0	0	0
Coal unloading, crushing, conveying and storage	3.22	0.54	0	0	0	0
Limestone handling system	0.60	0.10	0	0	0	0
Ash conveying, storage, and silo-unloading	2.13	0.33	0	0	0	0
Ash dump area fugitives	0.15	0.02	0	0	0	0
Ash truck unloading	3.91	0.60	0	0	0	0
Open coal storage	0.27	0.19	0	0	0	0

[1.] Emissions are rounded to two decimal places, except when additional significant figures are required to highlight differences or to show differences between pollutants.
Source: DEQ Annual Emission Inventory Reporting Records for 2015.

The HAP emissions from the combustion of project area coal in Colstrip Units 3 and 4 and the Rosebud Power Plant are attributable to the indirect effects of Alternative 4. The emission and deposition of eight trace metal HAPs were modeled in the 2018 Final EIS for Alternative 2 to quantify the air quality impacts of HAP emissions. These trace metals were antimony, arsenic, cadmium, chromium, copper, lead,

selenium, and mercury and are the same HAPs used for the deposition analysis (see **Deposition Analysis Area for Special Status Species due to Indirect Combustion Impacts** in the 2018 Final EIS).

Emission rates of the selected metals from the Colstrip and Rosebud Power Plants were estimated (see **Section 4.3.3.2** in the 2018 Final EIS for a summary of the methods used). The calculated emission rates other than mercury from the 2018 Final EIS in **Table 107** are replicated below in **Table 4.3-9** and are anticipated to be representative of maximum metal HAP emissions under Alternative 4 (see current metal HAP emissions for Colstrip Units 3 and 4, which are currently combusting coal from Area F and Area B, in **Table 3.3-5** to support this assessment). The calculated speciated mercury emissions rates from the 2018 Final EIS in **Table 108** are replicated below in **Table 4.3-10** and are anticipated to be representative of mercury emissions under Alternative 4 (see current mercury emissions for Colstrip Units 3 and 4, which are currently combusting coal from Area F and Area B, in **Table 3.3-4** to support this assessment).

The use of the total HAP emissions from Colstrip Power Plant Units 3 and 4 and the Rosebud Power Plant to represent the indirect effects of Alternative 2 (here applied to Alternative 4) is a conservative approach (i.e., protective of the environment) as it assumes that the project area would supply all of the coal combusted in these facilities, whereas coal may also be supplied to the power plants from the other active areas of the mine, such as Area B, and thus actual indirect emissions attributable to Area F would be lower.

Table 4.3-9. Selected Metal HAP Emission Rates for Colstrip Units 3 and 4 and the Rosebud Power Plant.

Pollutant	Emission Rates			
	Colstrip Units 3 and 4		Rosebud Power Plant	
	(lb/year)	(g/s)	(lb/year)	(g/s)
Antimony	123.92	1.78E-03	4.61	6.63E-05
Arsenic	286.59	4.12E-03	6.34	9.12E-05
Cadmium	77.75	1.12E-03	1.73	2.49E-05
Chromium	411.30	5.92E-03	16.14	2.32E-04
Copper [1]	1711.56	2.46E-02	74.38	1.07E-03
Lead	670.03	9.64E-03	6.92	9.95E-05
Selenium	1216.67	1.75E-02	28.83	4.15E-04

lb/year = pounds per year; g/s = gram per second.

Table 4.3-10. Mercury Emission Rates from Colstrip Units 3 and 4 and the Rosebud Power Plant.

Year	Colstrip Units 3 and 4						Rosebud Power Plant					
	Hg^0		Hg^{2+}		HgP		Hg^0		Hg^{2+}		HgP	
	(lb/ year)	(g/s)	(lb/ year)	(g/s)	(lb/ year)	(g/s)	(lb/ year)	(g/s)	(lb/ year)	(g/s)	(lb/ year)	(g/s)
2011	42.40	6.10E-04	42.94	6.18E-04	0.86	1.24E-05	0.36	5.19E-06	1.20	1.72E-05	0.01	1.72E-07
2012	37.40	5.38E-04	43.48	6.25E-04	0.82	1.17E-05	0.61	8.77E-06	2.02	2.91E-05	0.02	2.90E-07
2013	32.60	4.69E-04	48.18	6.93E-04	0.82	1.17E-05	0.33	4.76E-06	1.10	1.58E-05	0.01	1.57E-07
2014	39.00	5.61E-04	63.07	9.07E-04	1.03	1.48E-05	0.33	4.70E-06	1.08	1.56E-05	0.01	1.55E-07
2015	54.40	7.82E-04	65.29	9.39E-04	1.21	1.74E-05	0.22	3.11E-06	0.72	1.03E-05	0.01	1.03E-07
AVG	**41.16**	**5.92E-04**	**52.59**	**7.56E-04**	**0.95**	**1.36E-05**	**0.37**	**5.31E-06**	**1.22**	**1.76E-05**	**0.01**	**1.75E-07**

lb/y = pounds per year; g/s = gram per second.

Air Concentrations of Criteria Pollutants

The indirect impacts of burning project area coal at Colstrip Units 3 and 4 and the Rosebud Power Plant are described below for Alternative 4 (based on modeling completed for Alternative 2 and the rationale

for this approach provided above). The spatial distribution of these indirect impacts is shown on **Figure 79** through **Figure 84** in the 2018 Final EIS. The indirect impacts are conservative as the total emissions from Colstrip Units 3 and 4 and the Rosebud Power Plant were used in modeling although Area F may not supply all of the coal combusted in these units.

The maximum modeled values in the analysis area of the eighth-highest 1-hour daily maximum NO_2 and annual average NO_2 concentrations would be 24.0 ppb and 0.3 ppb, respectively. Indirect combustion impacts of Alternative 4 on NO_2 concentrations in the analysis area (based on Alternative 2 modeling) would be well below the NAAQS and MAAQS. As noted under **Section 5.3.2, Cumulative Effects, Air Quality** in the 2018 Final EIS, NO_2 concentrations due to all cumulative sources in the analysis area are below the NAAQS and MAAQS. Therefore, indirect impacts for NO_2 in the analysis area under Alternative 4 (as with Alternative 2) would be short-term, minor, and adverse.

The highest modeled concentrations in the analysis area of 1-hour and 8-hour O_3 in the form of the MAAQS and NAAQS, respectively, because of indirect impacts are 6.8 ppb in Rosebud County to the southeast of the mine and 4.9 ppb in Bighorn County to the south. Ozone concentrations due to all cumulative sources in the analysis area are also below the NAAQS and MAAQS (**Section 5.3.2.2, Cumulative Impacts on Air Quality** in the 2018 Final EIS). Thus, indirect impacts for O_3 in the analysis area under Alternative 4 (as with Alternative 2) would be short-term, minor, and adverse.

The highest modeled indirect impacts on daily and annual $PM_{2.5}$ in the analysis area would be 1.8 $\mu g/m^3$ near the Colstrip Power Plant and 0.5 $\mu g/m^3$ near the Rosebud Power Plant, respectively. The daily and annual $PM_{2.5}$ concentrations would be well below the NAAQS. There are no MAAQS for $PM_{2.5}$. The highest modeled indirect impacts in the analysis area on daily and annual average PM_{10} would be 5.8 $\mu g/m^3$ and 2.8 $\mu g/m^3$, respectively, both near the Rosebud Power Plant. These peak concentrations are well below the NAAQS and MAAQS, respectively. Indirect impacts for $PM_{2.5}$ and PM_{10} in the analysis area under Alternative 4 (as with Alternative 2) would be short-term, minor, and adverse. Background concentrations due to other sources are considered in the context of cumulative effects (see **Section 5.3.2.2, Cumulative Impacts on Air Quality** in the 2018 Final EIS).

The maximum modeled indirect impacts on 1-hour, 24-hour, and annual average SO_2 are 18.7 ppb, 4.8 ppb, and 0.4 ppb, respectively; all three are seen adjacent to the Rosebud Power Plant. The maximum modeled indirect impact on 3-hour SO_2 is 18.2 ppb, found near the Colstrip Power Plant. The SO_2 concentrations are well below the NAAQS and MAAQS, including the forms of the standard (24-hour and annual) where the MAAQS are more stringent than the NAAQS. Background concentrations due to other sources are considered in the context of cumulative effects (**Section 5.3.2.2, Cumulative Impacts on Air Quality** in the 2018 Final EIS). Thus, indirect impacts for SO_2 in the analysis area under Alternative 4 (as with Alternative 2) would be short-term, minor, and adverse.

Impacts on CO are discussed under **Section 5.3.2.2, Cumulative Impacts on Air Quality** in the 2018 Final EIS; modeling results show that the cumulative effects for CO after considering all sources are well below the NAAQS and the MAAQS. Thus, direct impacts for CO would be negligible.

Air-Quality-Related Values

Indirect impacts of burning project area coal on air-quality-related values – acidic deposition (of nitrogen and sulfur) and visibility – are discussed below and are based on analysis completed for Alternative 2 in the 2018 Final EIS.

Nitrogen and Sulfur Deposition

Alternative 2 modeled annual nitrogen deposition due to indirect impacts would range from 0 to 0.2 kg/ha within the indirect/cumulative effects analysis area, while sulfur deposition varies from 0 to 0.7 kg/ha (see **Appendix D** in the 2018 Final EIS). There are no regulatory thresholds for atmospheric deposition of air emissions. Therefore, indirect impacts on deposition due to Alternative 4 (based on Alternative 2 modeling) were compared to total modeled cumulative deposition if the project area were not approved (Alternative 1 in the 2018 Final EIS) to assess the relative intensity of impacts.

Indirect impacts on nitrogen and sulfur deposition were examined at Federal and tribal Class I areas in the analysis area. **Table 110** in the 2018 Final EIS (replicated below in **Table 4.3-11**) provided the modeled annual total deposition of nitrogen and sulfur due to indirect impacts at Class I areas (a map of these areas is shown in **Section 3.3.1.2, Analysis Area** in the 2018 Final EIS).

Indirect impacts on nitrogen deposition at Class I areas in the analysis area under Alternative 4 (as with Alternative 2) would be long-term, minor, and adverse. Impacts would be long-term because the effect of the deposition would occur beyond the period of deposition. Indirect impacts on sulfur deposition at Class I areas in the analysis area under Alternative 4 (as with Alternative 2) would be long-term, minor, and adverse.

Table 4.3-11. Modeled Annual Nitrogen and Sulfur Deposition Due to Indirect Impacts at Class I Areas.

Class I Area	Nitrogen Maximum (kg/ha)	Nitrogen Average (kg/ha)	Sulfur Maximum (kg/ha)	Sulfur Average (kg/ha)
Badlands National Park	0.0122	0.0094	0.0074	0.0057
Bridger	0.0020	0.0011	0.0021	0.0009
Fitzpatrick	0.0022	0.0012	0.0019	0.0012
Fort Peck Indian Reservation	0.0100	0.0055	0.0072	0.0036
Gates of the Mountains Wilderness	0.0026	0.0025	0.0022	0.0019
Grand Teton National Park	0.0015	0.0008	0.0008	0.0004
Lostwood National Wildlife Refuge	0.0026	0.0022	0.0026	0.0021
Lostwood Wilderness	0.0028	0.0026	0.0024	0.0023
Medicine Lake (Class I)	0.0043	0.0037	0.0036	0.0028
North Absaroka	0.0058	0.0022	0.0029	0.0013
Northern Cheyenne	0.1415	0.0704	0.1752	0.0722
Teton	0.0022	0.0011	0.0020	0.0007
Theo Roosevelt National Park	0.0100	0.0073	0.0075	0.0055
UL Bend National Wildlife Refuge	0.0115	0.0093	0.0062	0.0058
UL Bend Wilderness	0.0098	0.0083	0.0064	0.0056
Washakie	0.0052	0.0019	0.0048	0.0017
Wind Cave National Park	0.0145	0.0115	0.0091	0.0071
Yellowstone National Park	0.0025	0.0010	0.0013	0.0006

kg = kilograms; ha = hectare.

Visibility Impairment

The potential haze visibility impairment due to indirect impacts was also considered in the 2018 Final EIS. The modeled change in haze index due to indirect impacts of Alternative 2 (here applied to Alternative 4) were compared to annual average natural conditions (in terms of the number of days the haze index value would exceed 0.5 or 1.0 at any Class I area) and reported in **Table 111** of the 2018 Final EIS (replicated below in **Table 4.3-12**). Indirect impacts of Alternative 4 (as with Alternative 2) on haze visibility impairment at Class I areas would be short-term, minor, and adverse.

Table 4.3-12. Visibility Impacts from Indirect Emissions at Class I Areas.

Class I Area	Number of Days in Year		98th percentile Δdv over year
	Δdv > 1.0	Δdv > 0.5	
Badlands National Park	2	8	0.504
Bridger	0	0	0.091
Fitzpatrick	0	0	0.114
Fort Peck Indian Reservation	7	14	0.841
Gates of the Mountains Wilderness	0	0	0.076
Grand Teton National Park	0	0	0.064
Lostwood National Wildlife Refuge	1	4	0.308
Lostwood Wilderness	1	4	0.279
Medicine Lake (Class I)	3	9	0.680
North Absaroka	0	0	0.143
Northern Cheyenne	20	96	1.425
Teton	0	0	0.090
Theo Roosevelt National Park	4	11	0.773
UL Bend National Wildlife Refuge	1	3	0.243
UL Bend Wilderness	1	2	0.237
Washakie	0	0	0.132
Wind Cave National Park	0	2	0.338
Yellowstone National Park	0	0	0.088

dv = deciviews; Δdv = change in deciviews.

Hazardous Air Pollutants

The methods used for estimating the annual deposition for the modeled trace metal and mercury emissions resulting from the combustion of Area F coal are described in **Section 4.3.3.2** in the 2018 Final EIS. The maximum modeled deposition of each trace metal was provided in **Table 112** of the 2018 Final EIS (replicated below in **Table 4.3-13**). Deposition under Alternative 4 would be similar to what was described for Alternative 2 in the 2018 Final EIS. There are no regulatory thresholds for atmospheric deposition of HAPs. Mercury deposition due to indirect impacts of Area F coal combustion constitutes a small fraction (a few percent) of total mercury deposition in the region (see discussion in 2018 Final EIS under **Mercury Deposition** in **Section 5.3.2.2, Cumulative Impacts on Air Quality**). Therefore, indirect impacts of Alternative 4 (as with Alternative 2) on mercury deposition would be long-term, minor, and adverse. Impacts are long-term because the effect of the mercury deposition would occur beyond the period of deposition due to Colstrip and Rosebud Power Plant emissions from Area F.

Table 4.3-13. Modeled Maximum Total Deposition of Trace Metals.

Chemical	Maximum Total Annual Deposition[1] (µg/m^2-year)
Antimony	9.31E+00
Arsenic	2.15E+01
Cadmium	5.83E+00
Chromium	3.09E+01
Copper	1.28E+02
Lead	5.01E+01
Mercury	1.45E+00
Selenium	9.12E+01

µg/m^2-year = micrograms per square meter per year.
1. AERMOD was run from 2011 to 2015, and the annual total deposition (wet + dry) for each year was averaged at each receptor.

Deposition Analysis Area for Special Status Species Due to Indirect Combustion Impacts

To establish the analysis area for special status species (see **Section 4.13, Special Status Species** in the 2018 Final EIS) for indirect effects, the atmospheric dispersion and deposition of selected trace metal

HAPs emitted as a result of the combustion of project area coal were simulated by applying the AERMOD model. This methodology is described in the 2018 Final EIS, **Section 4.3.3.2**.

4.3.4 Alternative 5 – Partial Mining Alternative

The types of direct and indirect air quality impacts under Alternative 5 – Partial Mining Alternative would be similar to those described above for Alternative 4 – Proposed Action (Current Federal Mining Plan). Under Alternative 5, though, disturbance would be limited to the southern portion of the project area (**Figure 2.6-1**) based on the assumption that all mining would cease in 2030. In total, approximately 2,495 acres would be disturbed in the project area over an 11-year mine life that would produce about 37.1 million tons of coal from Federal and private coal leases.

Under Alternative 5, direct and indirect air quality impacts would be less than under Alternative 4. About 34 million fewer tons of coal would be mined and approximately 1,793 fewer acres would be disturbed under Alternative 5 as compared to Alternative 4 (**Table 2.3-1** and **Table 2.3-2**). The life of operations for Area F (and the corresponding impacts) would be 9 years shorter under Alternative 5 than under Alternative 4. Reclamation and PMT would be achieved in the project area 9 years earlier than under Alternative 4. Direct CAP and HAP emissions, as well as impacts on air-quality-related values, such as visibility, would occur for a shorter period under Alternative 5 (9 years less) than under Alternative 4. As with Alternative 4, direct air quality impacts would be short-term, minor, and adverse.

The continued combustion of coal at the Rosebud and Colstrip Power Plants contributes CAP and HAP emissions to the analysis area air, contributing to indirect impacts (detailed in Alternative 4), including degraded air quality, visibility impairment (haze), and deposition of trace metals, SO_2, and NO_2 in analysis area soils and waterways. As with Alternative 4, these indirect air quality impacts would be minor and adverse. Under Alternative 5, coal from the project area would be available for combustion in the Colstrip and Rosebud Power Plants for up to 11 years (along with associated indirect impacts), which is 9 years fewer as compared to Alternative 4. Therefore, there would be 9 fewer years (as compared to Alternative 4) where CAP, HAP, and GHG emissions attributable to combustion of project area coal would be contributing to degraded air quality, visibility impairment, and deposition of trace metals, SO_2, and NO_2.

4.3.4.1 Mining Private Coal Only Scenario

If Westmoreland Rosebud chose to pursue mining of private coal only (leases 1001 and 1001-A) after 2030, direct and indirect air quality impacts could be greater than those disclosed above for Alternative 5. The intensity of impacts, however, would be no greater than those disclosed for Alternative 4 (see above) and would be expected to be less. See **Section 2.6.2, State Operating Permit C2011003F** for a discussion of the steps that would be required for such a scenario to occur.

4.3.5 Irreversible and Irretrievable Commitment of Resources

The irreversible and irretrievable commitment of resources is not applicable to air quality.

4.4 CLIMATE AND CLIMATE CHANGE

This section discloses the direct and indirect effects on climate resulting from implementation of Alternative 1 – No Action, Alternative 4 – Proposed Action (Current Federal Mining Plan), or Alternative 5 – Partial Mining Alternative. This analysis has been revised to address the deficiencies identified in the 2022 Court order of inadequate GHG emissions analysis and failure to analyze a reasonable range of alternatives in violation of NEPA. Existing climate conditions and the analysis areas used for this impacts analysis are described in **Section 3.4, Climate and Climate Change**.

4.4.1 Analysis Methods and Impact and Intensity Thresholds

Climate impacts were evaluated in this SEIS by contextualizing GHG emissions across alternatives, relative to GHG emissions from other sources, relative to emissions reduction goals, and using the social cost of GHGs. Assumptions for each alternative, which informed the scope of the effects analyses in this SEIS, are presented in **Section 2.4, Alternative 1 – No Action**, **Section 2.5, Alternative 4 – Proposed Action (Current Federal Mining Plan)**, and **Section 2.6, Alternative 5 – Partial Mining Alternative**. There are no impact and intensity thresholds available to characterize the significance of the effect of a single action on global climate change.

The global, national, regional, and state climate and GHG emission trends are described in **Sections 4.4.2.1** through **4.4.2.3** of the 2018 Final EIS. Applicable updates to national and Montana state climate and emissions trends are discussed in **Section 3.4.2.1, Climate and Emissions Trends**. Climate change and GHG emission sources in the region were recently evaluated by the BLM in support of the *Miles City Field Office Final Supplemental Environmental Impact Statement and Resource Management Plan Amendment* (BLM 2024a), and the data presented in that document are generally consistent with what was presented in the 2018 Final EIS. The EPA tracks and publishes total U.S. annual GHG emissions in the *Inventory of U.S. Greenhouse Gases and Sinks*. The 2018 Final EIS used the 2017 inventory, which covered 2015 GHG emissions data; the most recent inventory was issued in 2024 and covers 2022 GHG emissions data (EPA 2024d). Data and emissions trends from the recent inventory were compared to the data used in the 2018 Final EIS. Based on this review and comparisons of production (see **Chapters 1** and **2**) and air quality emissions data as well (see **Section 4.3.1**), the future GHG emissions described for other Rosebud Mine permit areas (e.g., mining, crushing, hauling, conveying, etc.) and for the Colstrip and Rosebud Power Plants (e.g., combustion, coal handling, etc.) are anticipated to be the same or less than what was described in **Section 4.4.2.4** and **Section 4.4.2.5** of the 2018 Final EIS.

4.4.2 Alternative 1 – No Action

The types of direct and indirect climate impacts under Alternative 1 (as described in this SEIS) would be similar on an annual basis to those described below for Alternative 4 – Proposed Action (Current Federal Mining Plan). Under Alternative 1, though, disturbance would be limited to the southeastern portion of the project area (**Figure 2.4-1**) based on the assumption that all mining would cease in 2025. In total, approximately 1,021 acres would be disturbed in the project area over a 6-year mine life that would produce about 17.1 million tons of coal from Federal and private coal leases.

As with Alternative 4, direct GHG emissions from the project area (e.g., mining, etc.) and associated activities in other permit areas (e.g., crushing, hauling, conveying, etc.) and indirect GHG emissions (e.g., power plant operations and worker commutes) would contribute incrementally to the existing climate and emissions trends discussed in **Sections 3.4.2, Climate Conditions**. Under Alternative 1, direct and indirect climate impacts would be less than under Alternative 4: about 54 million fewer tons of coal would be mined and approximately 3,267 fewer acres would be disturbed under Alternative 1 as

compared to Alternative 4 (**Table 2.3-1** and **Table 2.3-2**). The life of operations for Area F (and the corresponding impacts) would be 14 years shorter under Alternative 1 than under Alternative 4. **Table 4.4-1** provides an estimate of the total GHG emissions (direct effect) from the project area under Alternative 1. Reclamation and PMT would be achieved in the project area 14 years earlier than under Alternative 4.

Under Alternative 1, coal from the project area would be available for combustion in the Colstrip and Rosebud Power Plants for up to 6 years, which is 14 years fewer as compared to Alternative 4. Therefore, the indirect effects of annual GHG emissions from the power plants as described in **Table 4.4-3** that would be attributable to combustion of project area coal would occur for 14 years fewer under Alternative 1 as compared to Alternative 4.

Total GHG emissions (direct and indirect) attributable to Alternative 1 are compared to total GHG emissions from Alternative 4 (Proposed Action) and Alternative 5 in **Table 4.4-5**. The social costs of GHG emissions are discussed below in **Section 4.4.5,** and summarized by alternative in **Table 4.4-13**.

Table 4.4-1. Total Annual GHG Emissions from Mining and Development of Area F and Associated Activities in other Permit Areas (Alternative 1).

Year of Active Mining	Projected Coal Production (MT)	GHG Emissions (MT/year)			
		CO_2	CH_4	N_2O	CO_2e
1 (2020)	200,000	1,863	134	0.0045	5,628
2	900,000	8,385	604	0.1013	25,326
3	4,000,000	37,266	2,685	0.45	112,559
4	4,000,000	37,266	2,685	0.45	112,559
5	4,000,000	37,266	2,685	0.45	112,559
6 (2025)	4,000,000	37,266	2,685	0.45	112,559
Total	**17,100,000[1]**	**159,312**	**11,478**	**1.91**	**481,190**

MT/year = metric tons per year.
1. Estimated acreage and tonnage are based on Table 303-2 from Area F Operating Permit Minor Revision 16.

4.4.2.1 Mining Private Coal Only Scenario

If Westmoreland Rosebud chose to pursue mining of private coal only (leases 1001 and 1001-A) after 2025, direct and indirect climate impacts could be greater than those disclosed above for Alternative 1. The intensity of impacts, however, would be no greater than those disclosed for Alternative 4 (see below) and would be expected to be less. See **Section 2.4.2, State Operating Permit C2011003F** for a discussion of the steps that would be required for such a scenario to occur.

4.4.3 Alternative 4 – Proposed Action (Current Federal Mining Plan)

Climate impacts under Alternative 4 – Proposed Action (Current Federal Mining Plan), which would include direct GHG emission impacts from the project area and other permit areas (e.g., mining, crushing, hauling, conveying, etc.) and indirect GHG emission impacts (due to power plant operations and worker commutes), would be similar to those described for Alternative 2 in **Section 4.4.3** of the 2018 Final EIS, beginning on page 486. Under Alternative 4, half a million tons more coal would be mined[53] and approximately 28 acres more would be disturbed as compared to Alternative 2. Reclamation would occur contemporaneously with mining (see discussion of the phases of reclamation in **Section 1.6.4, Bond Release**, in the 2018 Final EIS). Once mining has ceased, reclamation of disturbed areas (up to 4,288

53. See coal tonnage and disturbance comparison in **Table 2.2-8**. Under Alternative 4, mine passes would not be authorized for 74 acres of Federal coal (about 1.9 million tons of recoverable coal). The 74 acres that would not be mined could still be used for other project-associated surface disturbance, such as overburden or topsoil stockpile locations (**Figure 2.5-1**).

acres) in the project area would occur according to Westmoreland Rosebud's approved reclamation plan (**Figure 2.2-5**) and PMT (**Figure 2.2-6**), which are similar to those described for Alternative 2 in 2018 Final EIS **Section 2.4.4, Reclamation Plan**. Modifications since 2018 are described in **Section 2.2.2.2, Area F Operations and Development**. Under Alternative 4, coal from the project area would be available for combustion in the Colstrip and Rosebud Power Plants for up to 20 years.

The following sections detail direct GHG emission impacts from the project area (e.g., mining, etc.) and associated activities in other permit areas (e.g., crushing, hauling, conveying, etc.) and indirect GHG emission impacts (due to power plant operations and worker commutes). Total GHG emissions attributable to Alternative 4 (Proposed Action) are compared to total GHG emissions from Alternative 1 (No Action) and Alternative 5 (Partial Mining Alternative) in **Table 4.4-5**. The social costs of these GHG emissions are discussed below in **Section 4.4.7, Social Cost of GHGs,** and summarized by alternative in **Table 4.4-13**.

4.4.3.1 Direct Impacts

GHG emissions were disclosed in the 2018 Final EIS (**Table 121**) for Alternative 2 based on an Area F annual production rate of 4 million tons per year and the production schedule provided in the PAP.[54] As described in **Section 2.2.2.2, Area F Operations and Development**, the currently approved production schedule, which was approved by DEQ in Minor Revision (MR) 16 and is the assumed rate for Alternative 4, is somewhat different from the original estimate (see **Table 2.2-8** for a comparison). **Table 4.4-2** below uses the 2018 Final EIS estimated annual GHG emission rate (apportioned based on 4 million tons per year of production) but applies it to the Alternative 4 annual production schedule to provide an estimate of total GHG emissions from the project area under Alternative 4. Maximum annual GHG emissions (calculated based on 4 million tons/year) for each source category (e.g., mobile, portable, fugitive, etc.) are provided in **Table 122** of the 2018 Final EIS and are assumed to be the same for Alternative 4.

Under Alternative 4, direct GHG emissions associated with the project (e.g., mining, crushing, hauling, conveying, etc.) would contribute incrementally to the existing climate and emissions trends discussed in **Sections 3.4.2, Climate Conditions**. However, total annual projected GHG emissions for the project, calculated using conservative assumptions (see 2018 Final EIS), comprise a very small fraction of the total annual state, regional, and national GHG emissions. Total GHG emissions from other sources may decrease further with the ongoing transition to renewable energy sources across the country; nonetheless, project area GHG emissions would continue to constitute a very small fraction of the future emissions. The social costs of these GHG emissions are discussed below in **Section 4.4.7, Social Cost of GHGs,** and summarized by alternative in **Table 4.4-13.**

GHG emissions for the project would be a subset of total GHG emissions for the Rosebud Mine. As discussed in **Section 3.4.2.2, Rosebud Mine GHG Emissions** and shown in **Table 3.4-3**, total mine production for the years considered in the 2018 Final EIS (2010–2015) ranged from a low of about 7.3 million tons to a high of about 11.1 million tons. In 2023, total production from the Rosebud Mine in 2023 was about 7.1 million tons; Area F production, which was about 4.6 million tons, accounted for approximately 65 percent of total 2023 production. Estimates for future mine production (2024–2045) are provided in **Table 4.3-1** and would range from a low of about 2.7 million tons to a high of about 10.9 million tons. Based on these estimated future production rates (**Table 4.3-1**) and historic GHG emissions

[54] As described in the 2018 Final EIS **Section 4.4.3.1**, the estimated GHG emissions apportioned to a 4 million ton/year production rate includes estimated emissions from mine operations in the project area (detailed list in **Table 4.3-2**), emissions from off-road mobile sources, emissions from the hauling of refuse coal to the Rosebud Power Plant, portable/stationary gasoline equipment GHG emissions for the project area, and surface methane emissions.

(**Table 3.4-3**), the estimated GHGs for the entire Rosebud Mine under Alternative 4 would not exceed 277,550 MT CO_2e, which is the level of emissions associated with the high production rate (11.1 million tons) in 2010, and would more likely be consistent with the 191,271 MT CO_2e GHG emissions associated with 2012 production (7.2 million tons).

Table 4.4-2. Total Annual GHG Emissions from Mining and Development of Area F and Associated Activities in Other Permit Areas (Alternative 4).

Year of Active Mining	Projected Coal Production (MT)	GHG Emissions (MT/year)			
		CO_2	CH_4	N_2O	CO_2e
1 (2020)	200,000	1,863	134	0.0045	5,628
2	900,000	8,385	604	0.1013	25,326
3	4,000,000	37,266	2,685	0.45	112,559
4	4,000,000	37,266	2,685	0.45	112,559
5	4,000,000	37,266	2,685	0.45	112,559
6	4,000,000	37,266	2,685	0.45	112,559
7	4,000,000	37,266	2,685	0.45	112,559
8	4,000,000	37,266	2,685	0.45	112,559
9	4,000,000	37,266	2,685	0.45	112,559
10	4,000,000	37,266	2,685	0.45	112,559
11	4,000,000	37,266	2,685	0.45	112,559
12	4,000,000	37,266	2,685	0.45	112,559
13	4,000,000	37,266	2,685	0.45	112,559
14	4,000,000	37,266	2,685	0.45	112,559
15	4,000,000	37,266	2,685	0.45	112,559
16	4,000,000	37,266	2,685	0.45	112,559
17	4,000,000	37,266	2,685	0.45	112,559
18	4,000,000	37,266	2,685	0.45	112,559
19	4,000,000	37,266	2,685	0.45	112,559
20 (2039)	1,600,000	14,906	1,074	0.18	45,024
Total	**70,700,000[1]**	**658,676**	**47,457**	**7.94**	**1,989,481**

MT/year = metric tons per year.
[1.] Rounded total based on production schedule in MR 16 Table 303-2. Based on the mineable coal reserves total provided in MR 16 Table 322-2; however, up to 71,310,320 MT of coal may be available in the project area.

4.4.3.2 Indirect Impacts

Indirect impacts occur from coal combustion GHG emissions and worker commute GHG emissions. Each of these sources are described in the following sections.

GHG Emissions from Coal Combustion

Project area coal would be burned at Colstrip Units 3 and 4 and at the Rosebud Power Plant and, thus, would indirectly contribute to GHG emissions from these facilities. The total annual emissions are conservatively assigned to indirect effects of Alternative 4; that is, Colstrip Units 3 and 4 and the Rosebud Power Plant are conservatively assumed to burn only coal from Area F during the period of the Proposed Action (**Table 4.4-3**). More than 99 percent of the indirect GHG emissions would be CO_2. The social costs of these GHG emissions are discussed below in **Section 4.4.7, Social Cost of GHGs,** and summarized by alternative in **Table 4.4-13.**

Table 4.4-3. Annual Indirect GHG Emissions from Combustion of Area F Coal in Colstrip Units 3 and 4 and the Rosebud Power Plant.

Source	Estimated GHG Emissions (MT/year)			
	CO_2	CH_4	N_2O	CO_2e
2018 Final EIS Estimate for Alternative 2	12,191,729	1,349	196	12,281,509
2022 Emissions Data in **Table 3.4-4**	11,090,132	1,313	192	11,180,310

MT/year = metric tons per year.

GHG Emissions from Worker Commutes

In addition to GHG emissions related to the operations of the Rosebud Mine, the Colstrip Power Plant, and the Rosebud Power Plant, GHG emissions are generated by workers employed at those facilities during their daily commutes. Annual GHG emissions associated with these commutes are provided in **Table 3.4-6**. Under Alternative 4, annual worker commute GHG emissions would continue to be about 4,753.31 MT CO_2e (4,753 MT CO_2 + 0.13 MT CH_4 + 0.18 MT N_2O) for the duration of Area F operations (through 2039).

4.4.3.3 Effect of Climate Change on Air Quality Impacts Due to the Proposed Action

Effects of climate change on air quality due to Alternative 4 would be similar to those described for Alternative 2 in **Section 4.4.3.3** of the 2018 Final EIS. Potential effects include a slight increase in regional ozone concentrations.

Climate change could also affect Alternative 4. As described in **Section 4.4.3.3** of the 2018 Final EIS, precipitation is predicted to increase in winter and spring due to climate change in Rosebud and Treasure Counties; this would result in an increase in wet deposition due to Alternative 4. Conversely, precipitation is predicted to decrease in summer, and this would result in a decrease in wet deposition due to Alternative 4.

4.4.4 Alternative 5 – Partial Mining Alternative

The types of direct and indirect climate impacts under Alternative 5 – Partial Mining Alternative would be similar to those described above for Alternative 4 – Proposed Action (Current Federal Mining Plan). Under Alternative 5, however, disturbance would be limited to the southern portion of the project area (**Figure 2.6-1**) based on the assumption that all mining would cease in 2030. In total, approximately 2,495 acres would be disturbed in the project area over an 11-year mine life that would produce about 37.1 million tons of coal from Federal and private coal leases.

As with Alternative 4, direct GHG emissions from the project area (e.g., mining, etc.) and associated activities in other permit areas (e.g., crushing, hauling, conveying, etc.) and indirect GHG emissions (e.g., power plant operations and worker commutes) would contribute incrementally to the existing climate and emissions trends discussed in **Section 3.4.2, Climate Conditions**. Under Alternative 5, direct and indirect climate impacts would be less than under Alternative 4. About 34 million fewer tons of coal would be mined and approximately 1,793 fewer acres would be disturbed under Alternative 5 as compared to Alternative 4 (**Table 2.3-1** and **Table 2.3-2**). The life of operations for Area F (and the corresponding impacts) would be 9 years shorter under Alternative 5 than under Alternative 4. **Table 4.4-4** provides an estimate of the total GHG emissions (direct effect) from the project area under Alternative 5. Reclamation and PMT would be achieved in the project area 9 years earlier than under Alternative 4.

Under Alternative 5, coal from the project area would be available for combustion in the Colstrip and Rosebud Power Plants for up to 11 years, which is 9 years fewer as compared to Alternative 4. Therefore, the indirect effects of annual GHG emissions from the power plants as described in **Table 4.4-3** that would be attributable to combustion of project area coal would occur for 9 years fewer under Alternative 5 as compared to Alternative 4.

Total GHG emissions (direct and indirect) attributable to Alternative 5 are compared to total GHG emissions from Alternative 4 (Proposed Action) and Alternative 1 in **Table 4.4-5**. The social costs of these GHG emissions are discussed below in **Section 4.4.7, Social Cost of GHGs,** and summarized by alternative in **Table 4.4-13.**

Table 4.4-4. Total Annual GHG Emissions from Mining and Development of Area F and Associated Activities in Other Permit Areas (Alternative 5).

Year of Active Mining	Projected Coal Production (MT)	GHG Emissions (MT/year)			
		CO_2	CH_4	N_2O	CO_2e
1 (2020)	200,000	1,863	134	0.0045	5,628
2	900,000	8,385	604	0.1013	25,326
3	4,000,000	37,266	2,685	0.45	112,559
4	4,000,000	37,266	2,685	0.45	112,559
5	4,000,000	37,266	2,685	0.45	112,559
6	4,000,000	37,266	2,685	0.45	112,559
7	4,000,000	37,266	2,685	0.45	112,559
8	4,000,000	37,266	2,685	0.45	112,559
9	4,000,000	37,266	2,685	0.45	112,559
10	4,000,000	37,266	2,685	0.45	112,559
11 (2030)	4,000,000	37,266	2,685	0.45	112,559
Total	**37,100,000[1]**	**345,642**	**24,903**	**4.16**	**1,043,985**

MT/year = metric tons per year.
[1.] Estimated acreage and tonnage are based on Table 303-2 from Area F Operating Permit Minor Revision 16.

4.4.4.1 Mining Private Coal Only Scenario

If Westmoreland Rosebud chose to pursue mining of private coal only (leases 1001 and 1001-A) after 2030, direct and indirect climate impacts could be greater than those disclosed above for Alternative 5. The intensity of impacts, however, would be no greater than those disclosed for Alternative 4 (see above) and would be expected to be less. See **Section 2.6.2, State Operating Permit C2011003F** for a discussion of the steps that would be required for such a scenario to occur.

4.4.5 Comparison Across Alternatives

Table 4.4-5 summarizes the annual CO_2e emissions for each alternative and includes the total emissions for the life of each alternative. Under Alternative 1, the CO_2e emissions would be spread over 6 years, while Alternative 5 would be limited to 11 years; under both Alternatives 1 and 5, only a portion of the Federal coal lease MTM 082186 would be mined. Alternative 4 assumes that all of the Federal coal lease MTM 082186 coal would be mined over 20 years.

Table 4.4-5. Summary of Potential Annual GHG Emissions from the Project by Alternative.

Segment	Alternative 1 No Action	Alternative 4 Proposed Action	Alternative 5 Partial Mining
Total coal recovery (MT)	17.1	71.3	37.1
Annual production rate (MT)	4*	4*	4*
Years	6	20	11
Annual project (Area F) operations emissions (e.g., mining, crushing, hauling, conveying, etc.) (MT CO_2e)	112,559	112,559	112,559
Annual coal combustion emissions (MT CO_2e)	11,180,310	11,180,310	11,180,310
Annual worker commute emissions (MT CO_2e)	4,753.31	4,753.31	4,753.31
Annual (MT CO_2e)	**11,307,129**	**11,307,129**	**11,307,129**
Total for all years (MT CO_2e)	**67,842,774**	**226,142,580**	**124,378,419**

*Initial years of mining were less than 4 million tons. See **Table 2.3-2** for production by alternative.

4.4.6 Impact of the Proposed Action on Trends in Global, United States, and Montana Greenhouse Gas Emissions

4.4.6.1 Emission Levels

Existing global, national, and state emission trends are described in **Section 3.4.2.1, Climate and Emissions Trends** and summarized below in **Table 4.4-6**. Annual GHG emissions from the project (**Table 4.4-5**), including direct emissions (e.g., mining, crushing, hauling, and conveying) and indirect emissions (e.g., coal combustion and worker commutes), attributable to Alternative 4 (Proposed Action) are expected to be approximately 0.02 percent of global emissions, approximately 0.2 percent of U.S. emissions, and 21.7 percent of the annual Montana GHG emissions (**Table 4.4-6**).

Under the Proposed Action, annual GHG emissions from the project, including direct emissions (e.g., mining, crushing, hauling, and conveying) and indirect emissions (e.g., coal combustion and worker commutes), attributable to Alternative 4 (Proposed Action) are expected to be approximately 33.2 percent of Montana's Federal coal, oil, and gas development emissions authorized by the BLM and 1.1 percent of national Federal coal, oil, and gas development emissions authorized by the BLM (**Table 4.4-6**).

The annual emissions for Alternatives 1 and 5 are the same as those for the Proposed Action, but the duration of the emissions is reduced as shown in **Table 4.4-5**.

Table 4.4-6. Summary of GHG Emissions Trends.

Scale of Emissions	Data Year	CO_2e (MMT)	Percent GHG Emissions (Direct and Indirect) Attributable to Alternative 4 (Proposed Action)
Global Emissions	2022	50,600	0.02
U.S. Emissions	2022	6,343	0.2
National Federal Coal, Oil, and Gas Development (BLM Authorized)	2022	1,033	1.1
Montana Emissions	2022	52	21.7
Montana Federal Coal, Oil, and Gas Development (BLM Authorized)	2022	34	33.2
Direct and Indirect Emissions Due to Alternative 4 (Proposed Action)	Annual	11.3	100

Source: see list **in Section 3.4.2.1, Climate and Emission Trends**.

4.4.7 Social Cost of GHGs

The "social cost of carbon" (SCC), "social cost of nitrous oxide," and "social cost of methane" – together, the "social cost of greenhouse gases" (SC-GHG) – are estimates of the monetized damages associated with incremental increases in GHG emissions in a given year. In the 2018 Final EIS, OSMRE elected to not specifically quantify the social cost of GHGs in its assessment of the Federal mining plan for Area F; the rationale for that decision is provided in **Section 4.4.5, Social Cost of Carbon** in that document. NEPA does not require an agency to quantify project impacts through a specific methodology, such as SC-GHG, and the DOI *NEPA Handbook* explains that a bureau does not need to prepare an EIS on the grounds of climate change or GHG effects alone, even where a proposed action would result in an increase in GHG emissions. This is because the effects of GHG emissions and global climate change are fundamentally cumulative phenomena; therefore, it is not possible to track the effects of GHG emissions from a proposed action to climate change effects in a localized manner to be able to determine significance one way or the other, and they need not be analyzed (516 DM 1 App. 3).

A protocol to estimate what is referenced as the SCC associated with GHG emissions was developed by a Federal Interagency Working Group on the Social Cost of Greenhouse Gases (IWG). EO 14154, *Unleashing American Energy* (January 20, 2025), however, disbanded the IWG and withdrew any guidance, instruction, recommendation, or document issued by the IWG, including the SCC protocol. Section 6(c) of EO 14154 states:

> The calculation of the "social cost of carbon" is marked by logical deficiencies, a poor basis in empirical science, politicization, and the absence of a foundation in legislation. Its abuse arbitrarily slows regulatory decisions and, by rendering the United States economy internationally uncompetitive, encourages a greater human impact on the environment by affording less efficient foreign energy producers a greater share of the global energy and natural resource market. Consequently, within 60 days of the date of this order, the Administrator of the EPA shall issue guidance to address these harmful and detrimental inadequacies, including consideration of eliminating the "social cost of carbon" calculation from any Federal permitting or regulatory decision.

EO 14154 further directs agencies to ensure consistency with the guidance in Office of Management and Budget Circular A-4 of September 17, 2003, when estimating the value of changes in GHG emissions from agency actions.

In accordance with EO 14154, OSMRE would not normally include any estimates for the SCC for this action for multiple reasons. First, this action is not a rulemaking. Rulemakings are the administrative actions for which the IWG originally developed the SCC protocol. Second, EO 14154 clarifies that the IWG has been disbanded and its guidance has been withdrawn. Further, NEPA does not require agencies to conduct a cost-benefit analysis. Including an SCC analysis without a complete cost-benefit analysis, which would include the social benefits of the proposed action to society as a whole and other potential positive benefits, would be unbalanced, potentially inaccurate, and not useful to foster informed decision making. Any increased economic activity—in terms of revenue, employment, labor income, total value added, and output—that is expected to occur as a result of the proposed action is simply an economic impact, not an economic benefit, inasmuch as any such impacts might be viewed by another person as a negative or undesirable impact due to a potential increase in the local population, competition for jobs, and concerns that changes in population will change the quality of the local community. "Economic impact" is distinct from "economic benefit," as understood in economic theory and methodology, and the socioeconomic impact analysis required under NEPA is distinct from a cost-benefit analysis, which NEPA does not require, as previously stated. In addition, many benefits and costs from agency actions cannot be monetized and, even if monetizable, cannot meaningfully be compared directly to SCC

calculations for a number of reasons, including because of differences in scale (local impacts versus global impacts).

Finally, purported estimates of SCC would not measure the actual environmental impacts of a proposed action and may not accurately reflect the effects of GHG emissions. Estimates of SCC attempt to identify economic damages associated with an increase in carbon dioxide emissions—typically expressed as a 1 metric ton increase in a single year—and typically includes, but is not limited to, potential changes in net agricultural productivity, human health, and property damages from increased flood risk over hundreds of years. The estimate is developed by aggregating results across models, over time, across regions and impact categories, and across multiple scenarios. The dollar cost figure arrived at, based on consideration of SCC, represents the value of damages avoided if, ultimately, there is no increase in carbon emissions. However, SCC estimates are often expressed in an extremely wide range of dollar figures, depending on the particular discount rates used for each estimate, and would provide little benefit in informing OSMRE's or Assistant Secretary for Lands and Minerals Management's decision. For these reasons, DOI has also rescinded its memorandum of October 16, 2024, titled "Updated Estimates of the Social Cost of Greenhouse Gases," which had directed DOI bureaus to calculate SCC using the methodology contained in the EPA's Final Rule of March 8, 2024 (89 *Federal Register* [FR] 16,820).

However, notwithstanding the concerns outlined above, in this unique case, OSMRE was directed by the District Court to quantify the economic costs of GHG emissions from Area F because OSMRE quantified the economic benefits, in the form of economic outputs from continued employment, tax revenue, royalty payments, and support of local businesses, or risk having the mining plan modification approval vacated by the Court. Therefore, this subsection provides estimates of the monetary value of changes in GHG emissions that could result from selecting each alternative. Such analysis should not be construed to mean a cost determination is necessary to address potential impacts of GHGs associated with specific alternatives. These numbers were monetized; however, they neither constitute a complete cost-benefit analysis nor present a direct comparison with other impacts analyzed in this SEIS. For instance, OSMRE's overall analysis for this action does not monetize most of the major costs or benefits and does not include all revenue streams from the Proposed Action. SC-GHG is provided only as a useful measure of the benefits of GHG emissions reductions to inform agency decision making.

The SC-GHG analysis in this SEIS incorporates the 2023 EPA estimates of the social cost of greenhouse gases. The EPA estimates are based on complex models describing how GHG emissions affect global temperatures, sea level rise, and other biophysical processes; how these changes affect society through, for example, agricultural, health, or other effects; and monetary estimates of the market and nonmarket values of these effects. One key parameter in the models is the discount rate, which is used to estimate the present value of the stream of future damage associated with emissions in a particular year. A higher discount rate assumes that future benefits or costs are more heavily discounted than benefits or costs occurring in the present (i.e., future benefits or costs are a less significant factor in present-day decisions).

The 2023 EPA report published three estimates of the present value of the social cost of greenhouse gas emissions for each of the three primary GHGs – carbon dioxide, methane, and nitrous oxide. The three estimates reflect the three different discount rates used in the analysis: 2.5, 2.0, and 1.5 percent (EPA 2023b). The estimated annual costs per ton differ depending on the year when the gases are emitted. In general, future emission years have higher estimated costs due to factors such as population growth and the increase in the accumulated amount of GHGs in the atmosphere.

BBC Research & Consulting (BBC) calculated the direct (emissions from mining, crushing, hauling, conveying, etc.) and indirect (emissions from coal combustion and worker commutes) social costs of GHGs (CO_2, CH4, and N_2O) of Area F coal using the emissions estimates provided above for the three alternatives (**Table 4.4-1**, **Table 4.4-2**, **Table 4.4-3** [indirect emissions], and **Table 4.4-4**). The BBC

report (BBC 2024a), which includes the methodology to calculate the social costs of GHGs along with the results, is presented in **Appendix 2** and summarized below. Note that **Appendix 2** and **Table 4.4-7** through **4.4-13** in this Final SEIS were updated after the EPA identified calculation errors and made OSMRE aware of them through submittal of public comments on the Draft SEIS (see Comment Document #0030 in **Appendix 5**).

4.4.7.1 Direct Impacts

The annual direct social costs of GHGs (CO_2, CH4, and N_2O) from project area operations (e.g., mining, etc.) and associated activities in other permit areas (e.g., crushing, hauling, conveying, etc.) are presented in **Table 4.4-7** for years 2020-2039 (full development of Area F). The total costs of these annual emissions for the mine life of Area F under each alternative are compared in **Table 4.4-8** and represent the total direct social costs of GHGs. Based on the discount rate, the total direct (mining) social costs of GHGs would range from a low of $32 to $66 million for Alternative 1 – No Action to a high of $128 to $299 million for Alternative 4 – Proposed Action (Current Federal Mining Plan). The total direct social costs of GHGs for Alternative 5 – Partial Mine Alternative fall in the middle at $66 to $149 million (BBC 2024a).

Table 4.4-7. Annual Direct Social Costs of GHGs from Mining and Development of Area F and Associated Activities in other Permit Areas (2020-2039).

Emissions Year	Discount Rate and Statistic		
	2.5% Average	2.0% Average	1.5% Average
2020	$361,000	$516,000	$686,000
2021	$1,676,000	$2,402,000	$3,250,000
2022	$7,666,000	$11,004,000	$15,138,000
2023	$7,881,000	$11,335,000	$15,831,000
2024	$8,094,000	$11,665,000	$16,524,000
2025	$8,308,000	$11,996,000	$17,216,000
2026	$8,523,000	$12,326,000	$17,911,000
2027	$8,737,000	$12,656,000	$18,603,000
2028	$8,952,000	$12,987,000	$19,296,000
2029	$9,165,000	$13,317,000	$19,988,000
2030	$9,379,000	$13,649,000	$20,683,000
2031	$9,676,000	$14,003,000	$21,096,000
2032	$9,973,000	$14,358,000	$21,509,000
2033	$10,270,000	$14,714,000	$21,922,000
2034	$10,566,000	$15,069,000	$22,336,000
2035	$10,862,000	$15,424,000	$22,749,000
2036	$11,160,000	$15,778,000	$23,163,000
2037	$11,456,000	$16,133,000	$23,577,000
2038	$11,753,000	$16,488,000	$23,989,000
2039	$4,820,000	$6,738,000	$9,761,000

Source: BBC 2024a.

Table 4.4-8. Direct Social Costs of GHGs from Mining in Area F by Alternative.

Alternative and Emissions Year	Discount Rate and Statistic		
	2.5% Average	2.0% Average	1.5% Average
Alternative 1 (2020-2025)	$32,122,000	$46,488,000	$66,012,000
Alternative 4 (2020-2039)	$127,624,000	$193,314,000	$298,918,000
Alternative 5 (2020-2030)	$66,341,000	$99,174,000	$148,616,000

Source: BBC 2024a.

4.4.7.2 Indirect Impacts

Indirect impacts occur from coal combustion GHG emissions and worker commute GHG emissions. The social costs of GHG emissions for each of these sources that are attributable to the project are described in the following sections. The estimated indirect social costs of carbon emissions from combustion of coal mined at Rosebud are much larger than the estimated direct social costs from mining – approximately two orders of magnitude greater. Indirect social costs of carbon from workforce commuting are relatively small by comparison.

Coal Combustion

The annual social costs of GHGs (CO_2, CH4, and N_2O) associated with combustion of Area F coal are presented in **Table 4.4-9** for years 2020-2039; these estimates assume only Area F coal would be combusted in Colstrip Units 3 and 4 and the Rosebud Power Plant; in reality, combustion of coal from other permit areas or even other coal mines could also contribute to emissions (and associated social costs) during the analysis period. The total costs of these annual emissions for the mine life of Area F under each alternative are compared in **Table 4.4-10** and represent the total indirect social costs of GHGs. Based on the discount rate, the indirect (combustion) social costs of GHGs that would be attributable to the project would range from a low of $7 to $16 billion for Alternative 1 – No Action to a high of $22 to $60 billion for Alternative 4 – Proposed Action (Current Federal Mining Plan). The indirect (combustion) social costs of GHGs for Alternative 5 – Partial Mine Alternative fall in the middle at $12 to $31 billion (BBC 2024a).

Table 4.4-9. Annual Indirect Social Costs of GHGs Due to Combustion of Area F Coal (2020-2039).

Emissions Year	Discount Rate and Statistic		
	2.5% Average	2.0% Average	1.5% Average
2020	$1,214,940,000	$1,922,864,000	$2,432,486,000
2021	$1,235,308,000	$1,963,411,000	$2,573,671,000
2022	$1,255,675,000	$2,003,959,000	$2,714,855,000
2023	$1,276,043,000	$2,044,507,000	$2,856,040,000
2024	$1,296,410,000	$2,085,054,000	$2,997,224,000
2025	$1,316,777,000	$2,125,601,000	$3,138,410,000
2026	$1,337,144,000	$2,166,149,000	$3,279,595,000
2027	$1,357,512,000	$2,206,697,000	$3,420,780,000
2028	$1,377,879,000	$2,247,244,000	$3,561,964,000
2029	$1,398,247,000	$2,287,791,000	$3,703,149,000
2030	$1,418,613,000	$2,328,339,000	$3,844,335,000
2031	$1,449,065,000	$2,368,916,000	$3,895,106,000
2032	$1,479,517,000	$2,409,493,000	$3,945,878,000
2033	$1,509,969,000	$2,450,069,000	$3,996,649,000
2034	$1,540,421,000	$2,490,647,000	$4,047,420,000
2035	$1,570,873,000	$2,531,223,000	$4,098,192,000
2036	$1,601,325,000	$2,571,800,000	$4,148,963,000
2037	$1,631,776,000	$2,612,377,000	$4,199,734,000
2038	$1,662,228,000	$2,652,953,000	$4,250,507,000
2039	$1,692,681,000	$2,693,531,000	$4,301,278,000

Table 4.4-10. Total Social Costs of GHGs Due to Combustion of Area F Coal by Alternative.

Alternative and Emissions Year	Discount Rate and Statistic		
	2.5% Average	2.0% Average	1.5% Average
Alternative 1 (2020-2025)	$6,964,432,000	$11,325,485,000	$15,834,293,000
Alternative 4 (2020-2039)	$21,992,853,000	$37,305,702,000	$60,446,938,000
Alternative 5 (2020-2030)	$12,480,302,000	$20,724,418,000	$31,395,692,000

Source: BBC 2024a.

Worker Commutes

The annual social costs of GHGs (CO_2, CH4, and N_2O) associated with workers commuting to the Rosebud Mine, the Colstrip Power Plant, and the Rosebud Power Plant are presented in **Table 4.4-11** for years 2020-2039. The total costs of these annual emissions for the mine life of Area F under each alternative are compared in **Table 4.4-12** and represent the total indirect social costs of GHGs. Based on the discount rate, the indirect (worker commute) social costs of GHGs that would be attributable to the project would range from a low of $3 million to $6.7 million for Alternative 1 – No Action to a high of $9.4 million to $25.8 million for Alternative 4 – Proposed Action (Current Federal Mining Plan). The indirect (worker commute) social costs of GHGs for Alternative 5 – Partial Mine Alternative fall in the middle at $5.3 million to $13.4 million (BBC 2024a).

Table 4.4-11. Annual Indirect Social Costs of GHGs Due to Worker Commutes (2020-2039).

Emissions Year	Discount Rate and Statistic		
	2.5% Average	2.0% Average	1.5% Average
2020	$517,000	$819,000	$1,035,000
2021	$526,000	$837,000	$1,095,000
2022	$535,000	$854,000	$1,156,000
2023	$543,000	$871,000	$1,216,000
2024	$552,000	$888,000	$1,276,000
2025	$561,000	$906,000	$1,337,000
2026	$569,000	$923,000	$1,397,000
2027	$578,000	$940,000	$1,458,000
2028	$586,000	$957,000	$1,518,000
2029	$595,000	$975,000	$1,578,000
2030	$604,000	$992,000	$1,639,000
2031	$617,000	$1,009,000	$1,660,000
2032	$630,000	$1,026,000	$1,682,000
2033	$643,000	$1,044,000	$1,703,000
2034	$655,000	$1,061,000	$1,725,000
2035	$668,000	$1,078,000	$1,746,000
2036	$681,000	$1,095,000	$1,768,000
2037	$694,000	$1,113,000	$1,790,000
2038	$707,000	$1,130,000	$1,811,000
2039	$720,000	$1,147,000	$1,833,000

Source: BBC 2024a.

Table 4.4-12. Total Social Costs of GHGs Due to Worker Commutes by Alternative.

Alternative and Emissions Year	Discount Rate and Statistic		
	2.5% Average	2.0% Average	1.5% Average
Alternative 1 (2020-2025)	$2,965,000	$4,826,000	$6,741,000
Alternative 4 (2020-2039)	$9,360,000	$15,892,000	$25,753,000
Alternative 5 (2020-2030)	$5,313,000	$8,830,000	$13,373,000

Source: BBC 2024a.

4.4.7.3 Total Impact of Social Cost of GHGs

The estimated total social costs of GHGs (direct and indirect) that would be attributable to the project are presented below in **Table 4.4-13** and range from approximately $7 billion to approximately $15.9 billion under the No Action Alternative (although approximately 80 percent of those costs will have already been incurred by the end of 2024). The estimated total social costs of carbon under the Proposed Action range from approximately $22.1 billion to approximately $60.8 billion. The estimated total social costs of carbon under Alternative 5 (Partial Mining Alternative) range from approximately $12.6 billion to approximately $31.6 billion (BBC 2024a).

Table 4.4-13. Total Social Costs of GHGs Across Alternatives.

Alternative and Emissions Year	Discount Rate and Statistic		
	2.5% Average	2.0% Average	1.5% Average
Alternative 1 (2020-2025)	$6,999,519,000	$11,376,799,000	$15,907,046,000
Alternative 4 (2020-2039)	$22,129,837,000	$37,514,908,000	$60,771,609,000
Alternative 5 (2020-2030)	$12,551,956,000	$20,832,422,000	$31,557,681,000

Source: BBC 2024a.

4.4.8 Unavoidable Adverse, Irretrievable, and Irreversible Effects

The Rosebud Mine does not currently employ any CCUS technology, and there are no permit requirements to employ CCUS or reduce GHG emissions through other means; therefore, GHG emissions from the Proposed Action and their contribution to cumulative GHG levels and climate change are unavoidable and irretrievable throughout the life of the mine. Cumulative climate change impacts may be irreversible, depending on what future steps are taken to address future cumulative GHG emissions worldwide – that is, if the world is unable to limit GHG emissions, climate change impacts may be irreversible.

4.4.9 Conclusion

Annual GHG emissions from direct sources (e.g., mining, crushing, hauling, and conveying) and indirect sources (coal combustion and worker commutes) would contribute to climate change for each alternative. Under Alternative 4 (Proposed Action), average annual emissions would be the same as under Alternatives 1 and 5. As shown in **Table 4.4-5**, total GHG emissions that would be attributable to the project under Alternative 1 would be roughly a third of the emissions under Alterative 4 (Proposed Action) because the mining would end in 2025 (approximately a 6-year term). Total GHG emissions that would be attributable to the project under Alternative 5 would be roughly half of the emissions for Alterative 4 (Proposed Action) because the mining would be limited to a 5-year term ending in 2030 (11 years overall). The net present value of the total social costs is estimated to be between $7 billion and $16 billion for the No Action Alternative – although most of those costs have already been incurred between year 2000 and year 2024. The net present value of the total social costs of the Proposed Action is estimated to be between $22.1 billion and $60.8 billion. The net present value of the total social costs of Alternative 5 (Partial Mining Alternative) is estimated to be between $12.6 billion and $31.6 billion (**Table 4.4-13**).

There are currently no set specific thresholds for allowable GHG emissions; therefore, it is not possible to determine if any of the alternatives would significantly impact global GHG emissions on their own. However, all anthropogenic GHG emissions may cumulatively have a significant impact on global climate change.

4.5 PUBLIC HEALTH AND SAFETY

This section discloses the direct and indirect effects on public health and safety resulting from implementation of Alternative 1 – No Action, Alternative 4 – Proposed Action (Current Federal Mining Plan), or Alternative 5 – Partial Mining Alternative. Existing public health and safety conditions and the analysis areas used for this impacts analysis are described in **Section 3.5, Public Health and Safety**.

4.5.1 Analysis Methods and Impact and Intensity Thresholds

Public health and safety impacts were evaluated in this SEIS using the same methods used in the 2018 Final EIS. Analysis methods are provided in **Section 4.5.1** of the 2018 Final EIS, beginning on page 492. The thresholds for assessment of impacts (negligible, minor, moderate, or major) on public health and safety are the same as those defined in the 2018 Final EIS in **Table 124**. Assumptions for each alternative, which informed the scope of the effects analyses in this SEIS, are presented in **Section 2.4, Alternative 1 – No Action**, **Section 2.5, Alternative 4 – Proposed Action (Current Federal Mining Plan)**, and **Section 2.6, Alternative 5 – Partial Mining Alternative**.

4.5.2 Alternative 1 – No Action

The types of direct and indirect public health and safety impacts under Alternative 1 (as described in this SEIS)[55] would be similar to those described below for Alternative 4 – Proposed Action (Current Federal Mining Plan). Under Alternative 1, however, direct impacts would be limited to the southeastern portion of the project area (east of Donley Creek) with no mining occurring in the Trail Creek, McClure Creek, and Robbie Creek drainages (**Figure 2.4-1**) based on the assumption that all mining would cease in 2025. In total, approximately 1,021 acres would be disturbed in the project area over a 6-year mine life that would produce about 17.1 million tons of coal from Federal and private coal leases.

Under Alternative 1, direct and indirect public health and safety impacts would be less than under Alternative 4: about 54 million fewer tons of coal would be mined and approximately 3,267 fewer acres would be disturbed under Alternative 1 as compared to Alternative 4 (**Table 2.3-1** and **Table 2.3-2**). The life of operations for Area F (and the corresponding impacts) would be 14 years shorter under Alternative 1 than under Alternative 4, reducing the period of time when miners are exposed to respirable coal mine dust and mining-related safety issues. Reclamation and PMT would be achieved in the project area 14 years earlier than under Alternative 4. Under Alternative 1, coal from the project area would be available for combustion in the Colstrip and Rosebud Power Plants for up to 6 years, which is 14 years fewer as compared to Alternative 4. Therefore, there would be 14 fewer years (as compared to Alternative 4) where pollutant and GHG emissions from the power plants (and associated health impacts) would be attributable to the combustion of project area coal.

Under Alternative 1, air quality impacts would include lower emissions of DPM and PM due to the shorter duration and reduced scale of mining activities. Specifically, DPM emissions attributable to the project under Alternative 1 would be approximately 1.8 tons per year, compared to 6.4 tons per year under Alternative 4. PM_{10} emissions would be around 10.7 tons per year under Alternative 1, versus 34.2 tons per year under Alternative 4. These reductions translate to lower potential health risks for workers and nearby residents, resulting in a short-term negligible to minor adverse impact on public health within

[55] Direct and indirect public health and safety impacts of Alternative 1 – No Action were described in **Section 4.5.2** of the 2018 Final EIS, beginning on page 493. As described in **Chapter 2** of this SEIS, Alternative 1 – No Action has been revised since the 2018 Final EIS.

the project area and public access roads. Any potential exposure of sensitive receptors to PM would be incidental and limited in duration.

The updated climate change analysis in **Section 4.4, Climate and Climate Change**, indicates that reducing the duration and extent of coal mining and combustion under Alternative 1 would result in lower GHG emissions, thereby reducing the social costs associated with climate change (see **Section 4.4.7, Social Cost of GHGs**), including associated climate-related health issues such as cardiovascular and respiratory diseases, heat stress, and infectious diseases. Under Alternative 1, annual CO_2 emissions, CH_4 emissions, and N_2O emissions, including associated climate-related health risks, would not be attributable to combustion of project area coal after 2025. The annual social costs of GHGs (CO_2, CH_4, and N_2O) associated with Area F coal (direct and indirect) are presented in **Table 4.4-7** (mining), **Table 4.4-9** (combustion), and **Table 4.4-11** (worker commutes) for years 2020 through 2039. The total costs of these annual emissions for the mine life of Area F under each alternative are compared in **Table 4.4-10**. Based on the discount rate, the total direct and indirect social costs of GHGs would range from a low of $6.9 to $15.8 billion for Alternative 1 – No Action.

Water quality impacts would also be minimized under Alternative 1. The likelihood of human consumption of or contact with contaminated surface or groundwater would be low. Monitoring and mitigation activities would ensure compliance with water quality standards, minimizing public health risks.

4.5.2.1 Mining Private Coal Only Scenario

If Westmoreland Rosebud chose to pursue mining of private coal only (leases 1001 and 1001-A) after 2025, direct and indirect public health and safety impacts could be greater than those disclosed above for Alternative 1. The intensity of impacts, however, would be no greater than those disclosed for Alternative 4 (see below) and would be expected to be less. See **Section 2.4.2, State Operating Permit C2011003F** for a discussion of the steps that would be required for such a scenario to occur.

4.5.3 Alternative 4 – Proposed Action (Current Federal Mining Plan)

Direct and indirect public health and safety impacts under Alternative 4 – Proposed Action (Current Federal Mining Plan) would be similar to those described for Alternative 2 in **Section 4.5.3** of the 2018 Final EIS, beginning on page 494. Under Alternative 4, half a million tons more coal would be mined[56] and approximately 28 acres more would be disturbed as compared to Alternative 2. Reclamation would occur contemporaneously with mining (see discussion of the phases of reclamation in **Section 1.6.4, Bond Release**, in the 2018 Final EIS). Once mining has ceased, reclamation of disturbed areas (up to 4,288 acres) in the project area would occur according to Westmoreland Rosebud's approved reclamation plan (**Figure 2.2-5**) and PMT (**Figure 2.2-6**), which are similar to those described for Alternative 2 in 2018 Final EIS **Section 2.4.4, Reclamation Plan**. Modifications since 2018 are described in **Section 2.2.2.2, Area F Operations and Development**. Under Alternative 4, coal from the project area would be available for combustion in the Colstrip and Rosebud Power Plants for up to 20 years.

As described above in **Section 4.3.4**, new air quality modeling was not completed for this SEIS. Instead, analysis completed for Alternative 2 (**Sections 4.3.3** and **4.5.3** in the 2018 Final EIS) is presented below as a conservative estimate of impacts under Alternative 4. Actual impacts under Alternative 4, would be

[56] See coal tonnage and disturbance comparison in **Table 2.2-8**. Under Alternative 4, mine passes would not be authorized for 74 acres of Federal coal (about 1.9 million tons of recoverable coal). The 74 acres that would not be mined could still be used for other project-associated surface disturbance, such as overburden or topsoil stockpile locations (**Figure 2.5-1**).

expected to be less for the reasons provided above in **Section 4.3.3.1, Direct Impacts**. Alternative 4 impacts to public health are summarized in **Table 4.5-1** and detailed in following sections.

Table 4.5-1. Potential Effects on Public Health from Alternative 4.

Public Health Topic	Effect Pathway	Specific Impact	Affected Area	Effect Type	Magnitude	Likelihood	Duration	Intensity
Environmental Health	Air Quality and Surface Water Quality	Exacerbation of existing chronic disease conditions for sensitive subpopulations (asthmatics, diabetics, others with compromised respiratory/circulatory systems) resulting from direct contact with chemicals of potential concern (COPCs) and HAPs through inhalation and contact with water	Direct and Indirect	Adverse	Low	Moderate	Short-term and Long-term	Negligible to Moderate
	Air Quality and Surface Water Quality	Increase in respiratory infectious disease for sensitive subpopulations with respiratory health complications and for miners chronically exposed to coal dust	Direct and Indirect	Adverse	Low	Moderate	Short-term	Minor
	Economic	Sustained revenues to support social services and infrastructure, including access to health care	Direct and Indirect	Beneficial	Moderate	High	Short-term	Moderate
Economics	Economic	Sustained local employment, income, and economic resources for individuals and families, including members of the Northern Cheyenne Tribe	Direct and Indirect	Beneficial	Moderate	High	Short-term	Moderate
	Economic	Sustained revenues to county, state, and Federal governments through extension of lease and coal royalties to support social services and infrastructure, including access to health care	Direct and Indirect	Beneficial	Moderate	High	Shorn-term	Moderate
Demographics and Sensitive Populations	Air Quality and Surface Water Quality	Potential effects on overall community health (e.g., exacerbation of asthma, impacts on lung/heart disease rates and diabetes rates)	Direct and Indirect	Adverse	Low	Low	Short-term	Minor to Moderate
	Economic and Social	Sustained funding for health services and social services	Direct and Indirect	Beneficial	Moderate	High	Short-term	Moderate
Social Character-istics	Well-Being	Increase in stress or annoyance levels for populations living nearest to the mining areas due to noise and vibration	Direct	Adverse	Low	Low	Shorn-term	Negligible
	Social Services	Sustained funding and demand for schools, hospitals, health care providers, libraries, police and fire response	Direct and Indirect	Beneficial	Moderate	High	Shorn-term	Moderate
	Community Health	Sustained resources available to purchase healthy foods for individuals and households	Direct and Indirect	Beneficial	Moderate	High	Shorn-term	Moderate
	Community Health	Decreased stress due to sustained secure economic situation for individuals and families	Direct and Indirect	Beneficial	Moderate	High	Shorn-term	Moderate
	Community Health	Decreased stress due to sustained access to health care resources, social services, and health insurance	Direct and Indirect	Beneficial	Moderate	High	Short-term	Moderate
	Land Use	Impacts on cultural resources	Direct	Adverse	Low	High	Long-term	Moderate
	Land Use	Temporary and long-term loss of livestock grazing areas	Direct	Adverse	Low	High	Short-term and Long-term	Minor

Environmental Health

Air Quality

In the direct effects analysis area (i.e., the project area and nearby public access roads), DPM and fugitive dust are the most likely sources of risk to public health. Using data from the air quality analysis (see **Sections 3.3** and **4.3** above), the risk from DPM would be localized and would most likely affect those working in proximity to heavy machinery. The air quality analysis indicates that DPM emissions and fugitive coal dust would be largely confined to the project area and to Area C (see the **Hazardous Air Pollutants** discussion above in **Section 4.3.3.1**). Air concentrations of DPM and PM from coal dust would drop off precipitously at the mine boundary, and neither are detectable in the vicinity of Colstrip. Based on this information, the analysis considers DPM and PM from coal dust where exposure is likely to occur (i.e., in the project area boundary and immediate vicinity).

During the 20-year mine life of Area F under Alternative 4, miners would be exposed to respirable coal mine dust and mining-related safety issues. As described above in **Section 3.5.1.1, Regulatory Framework (Public Health)** and in **Section 3.5, Public Health and Safety** in the 2018 Final EIS, workers at the Rosebud Mine are protected under Mine Safety and Health Administration (MSHA) regulations, and the mine is obligated to comply with MSHA and the Occupational Safety and Health Administration (OSHA) regulations, which include standards for protecting miner health and safety. Therefore, Westmoreland Rosebud would be required to comply with MSHA regulations under all alternatives; because these safety regulations are in place to prevent coal-dust related disease and mining safety issues, effects on mine workers, including exposure to respirable coal mine dust and mining-related safety issues, were not considered further in this analysis.

The radius for exposure includes the project area and the access roads where mine-related traffic would travel. No sensitive receptors occur within the project area. Limited exposure to the public may occur when access (county) roads are used by the public and for recreation use on adjacent areas. The public's exposure to DPM and fugitive dust, including coal dust, would be low due to limited exposure time and extent. Emissions due to coal transport from the mine to the Rosebud Power Plant were included in the air quality modeling and did not result in any exceedance of public health standards or air quality thresholds that would result in adverse impacts on the environment (see **Section 4.3, Air Quality** above).

Direct impacts on public health from air quality would include exposure to emissions from mine operations, processing and handling of project area coal, and reclamation of the area. Sources may include fugitive dust from mining activities (topsoil removal and unloading; overburden drilling, blasting, and removal; coal drilling, blasting, removal, loading, dumping, crushing, and conveying; haul and access roads; and wind erosion of disturbed areas), explosives used for overburden and coal blasting, and DPM emissions from mobile and stationary sources' engines (see **Section 4.3, Air Quality** above for a complete discussion of these sources). Deposition of airborne COPCs on soils and surface waters may occur, but it is not likely that the public would be exposed to these except incidentally.

Air concentrations for both PM_{10} and $PM_{2.5}$ fall below NAAQS and MAAQS in the project area, and Alternative 4 impacts would result in a short-term minor adverse impact on public health within the project area and public access roads (i.e., county roads such as Horse Creek Road or Castle Rock Road). The concentrations of PM, along with other COPCs found in DPM and coal dust, drop off outside the project area to levels well below the MAAQS and NAAQS levels. Additionally, there would be few if any members of the public permitted within the project area where PM and other hazardous substances would be present at higher concentrations. Any potential exposure of sensitive receptors to PM would be incidental and limited in duration. Therefore, the direct impacts of Alternative 4 on public health from

$PM_{2.5}$ and PM_{10}, including from DPM and coal dust, would be short-term, negligible to minor, and adverse.

Surface Water and Groundwater Quality

Direct impacts of Alternative 4 on surface water and groundwater quality due to mine activities are discussed in **Section 4.7, Water Resources – Surface Water** and **Section 4.8, Water Resources – Groundwater** below. There are no known public recreational uses of surface water within the direct effects analysis area or project area, and recreation would not be allowed in areas where mine activities would occur (see **Section 3.5, Public Health and Safety** in the 2018 Final EIS). The project area is and would continue to be used for livestock grazing, and several surface water livestock drinking sources are monitored for water quality. If these sources were to fail to meet water quality standards for livestock consumption, mitigation and, if necessary, replacement would occur (see **Section 4.7, Water Resources – Surface Water** and **Section 4.8, Water Resources – Groundwater** below).

All discharges from the proposed mining area to state surface waters would be required to comply with applicable Montana Pollutant Discharge Elimination System (MPDES) permit effluent limits. Water management and erosion-control Best Management Practices (BMPs) would be implemented to avoid adverse impacts on surface water quality from mine activities (see **Section 4.7, Water Resources – Surface Water** below). There is a possibility that a precipitation event that exceeded the capacity of the erosion-control structures could occur, resulting in short-term increases in suspended sediment, dissolved solids, and metal concentrations in surface water (see **Section 4.7, Water Resources – Surface Water** below).

The population density in the immediate vicinity of the project area is sparse. Domestic water wells are located within the project area and vicinity. As described in **Section 4.9.3.3, Replacement Water Sources and Replacement Process**, wells are monitored by Westmoreland (results are reported to DEQ) and replaced if they failed to meet water quality standards for human consumption. Groundwater quality impacts in Areas A, B, and C have included increased concentrations of metals and nutrients, and similar impacts would be expected under Alternative 4 (see **Section 4.8, Water Resources – Groundwater** below). If groundwater failed to meet water quality standards for human consumption, containment, monitoring, and mitigation of groundwater contamination would occur to avoid impacts on groundwater outside of the project area and on wells within the project area.

During mining, surface water and groundwater in the project area would not be used by the public. Surface water and groundwater within and near the project area would be monitored to ensure water quality standards are met (see **Section 4.7, Water Resources – Surface Water** and **Section 4.8, Water Resources – Groundwater** below). Potential hydrologic changes include declining water levels in the Rosebud Coal and overburden and in stratigraphically adjacent units, changes in groundwater flow direction and gradient near the pit areas, removal or diminished flow in springs, creation of temporary localized recharge due to ponding in pits and sediment control structures, and reduction in infiltration and recharge in disturbed clinker areas (DEQ 2019b). Proximity to recharge has the greatest influence on spoil saturation and in areas with active mining, spoil saturation can be slowed as recharge is restricted and groundwater drawdown occurs (DEQ 2019b). Additionally, recharge from upgradient Rosebud Coal is often intercepted by active or open pits from flowing downgradient. These factors can result in downgradient groundwater quality being impacted during both mining and postmining, resulting in increased total dissolved solids (TDS). This could adversely impact groundwater sources that are used by downgradient ranchers and residents who use groundwater for livestock and consumption. This may result in an adverse, long-term, moderate to major impact on public health if no mitigation occurs. Monitoring of groundwater quality and mitigation of contamination would be implemented to avoid and minimize risk to downgradient water users.

Postmining, springs may develop in or near the mined area that may have higher concentrations of dissolved solids, nutrients, and metals (see **Section 4.7, Water Resources – Surface Water** and **Section 4.8, Water Resources – Groundwater** below). Discharge from the spoil to streams could result in higher concentrations of dissolved solids, nutrients, and some metals compared to pre-mining conditions. While it is unlikely that streams and springs near the project area would be used directly for drinking water or recreational use after mining, some surface water sources are used by livestock and wildlife, and ranching may occur in the project area (see **Section 3.7, Water Resources—Surface Water**, **Section 3.12**, **Fish and Wildlife**, and **Section 3.23, Land Use** in the 2018 Final EIS).

Under Alternative 4, the mined area would be reclaimed to support ranching activities after reclamation (see **Section 2.5.14, Reclamation Plan** above); reclamation would occur approximately 1 year later under Alternative 4 than under Alternative 2. Mitigation of adverse impacts, including the replacement of water supply sources if needed, and monitoring of water quality to comply with surface water and groundwater quality standards for humans, wildlife and livestock, and aquatic resources would occur (see **Section 4.7, Water Resources – Surface Water** and **Section 4.8, Water Resources – Groundwater** below for a discussion of potential impacts and implementation of mitigation and monitoring). With the implementation of BMPs and mitigation measures,[57] including the replacement of surface water and groundwater supplies adversely affected by mining, the direct impacts on public health would be short-term and negligible.

Based on the discussion above, there is a low likelihood that human consumption of or contact with contaminated surface or groundwater would occur under Alternative 4. With monitoring and mitigation activities, increased risk to public health from exposure to water because of Alternative 4 is not likely. In the event that water quality standards are violated, the mine operators would be required to mitigate and remediate the violations and are subject to penalties for violating the terms of the permit.

Socioeconomic Environment and Health

Demographics and Sensitive Populations

There are no residents within the project area where risk of exposure to PM and DPM would be greatest. Population density in the immediate vicinity of the project area is sparse. There are no subsistence farmers within the project area or immediate vicinity. There would be potential for incidental exposure to PM, DPM, and coal dust for persons traveling along county roads adjacent to the project area. Because exposure would be incidental and short in duration, the risk to public health of the overall population and to sensitive subpopulations would be short-term and negligible.

Economics

Alternative 4 would support continued revenues and jobs at the Rosebud Mine, which contribute to funding for local health resources. **Section 4.15, Socioeconomic Conditions** below discusses the economic impacts, which occur predominantly in Rosebud County, where the project area is located, and on the Northern Cheyenne Reservation, where 15 to 20 percent of the Rosebud Mine employees reside. Alternative 4 would contribute to operations of the Rosebud Mine for approximately 20 years, helping sustain economic support of public health services and availability of health insurance for individuals and families employed directly by the mine. Thus, Alternative 4 would have a moderate short-term beneficial effect on public health as it relates to economic conditions.

[57] OSMRE and DEQ are responsible for ensuring that Westmoreland is implementing BMPs and mitigation measures within the Federal Mining Plan area and within the operating permit area, respectively. See discussion under **Annual Reporting** and under **Mitigation** in **Section 2.2.2.2, Area F Operations and Development**.

Social Characteristics

Social Services

Alternative 4 would not result in immediate impacts on social services, including health care facilities, schools, libraries, and other services. Alternative 4 would contribute to operations of the Rosebud Mine for approximately 20 years (as compared to 19 years under Alternative 2), which would sustain jobs and funding for services, as discussed above and in **Section 4.15, Socioeconomic Conditions**. There would likely be no change to the rate of insured individuals, availability of health care services, or number of health care providers in the area. Alternative 4 would have a moderate short-term beneficial effect on social services in Rosebud County.

Community Health

Alternative 4 is not likely to have an immediate impact on community health; health trends described in **Section 3.5.3, Socioeconomic Environment and Health** would continue. Because there are not likely to be members of the public within the project area, it is unlikely that impacts on community health would occur. There may be incidental exposure of sensitive subpopulations, including Northern Cheyenne tribal members working at the mine and individuals with chronic or infectious diseases passing through the area on access roads. Exposure to PM would be limited in duration and intensity, and the likelihood of exposure that would result in increased public health risk would be low. Therefore, the impact on community health, including sensitive subpopulations, as a result of Alternative 4 would be short-term and negligible.

Likewise, it is not likely that impacts on nutrition-related disease would occur, as there are no subsistence farmers within the project area. There are no prime or unique farmlands that would be impacted (see **Section 3.24, Soils** in the 2018 Final EIS). It is not likely that public health would be affected by local consumption of livestock or wildlife impacted by Alternative 4 (see discussion above and **Section 4.3, Air Quality, Section 4.7, Water Resources – Surface Water,** and **Section 4.12, Fish and Wildlife Resources**). Therefore, adverse impacts of Alternative 4 on public health related to nutrition would be short-term and negligible.

Public well-being would not likely be impacted by Alternative 4. As discussed in **Section 3.5, Public Health and Safety** of the 2018 Final EIS, poor physical and mental health are compounded by poverty, behavioral risk, and lack of social services (UWPHI 2017). As with Alternative 2 from the 2018 Final EIS, these factors are not likely to be affected by Alternative 4, although the sustained economic benefits, including jobs and revenues, would sustain funding for social services and access to existing physical and mental health care and health insurance for some community members through 2038. Injury may result if trespassers enter the project area, but trespassing is not likely, and any instance would be isolated. As population density near the project area is sparse, it is not likely that residents would be adversely affected by noise and vibrations from mine operations. Therefore, Alternative 4 impacts on community well-being would be beneficial, short-term, and moderate.

Land Use and Cultural Resources

Under Alternative 4, there would be some displacement of historic land use practices because of Alternative 4 (see **Section 4.23, Land Use**). There would be a short-term displacement of livestock and wildlife within the project area where mine activities are taking place. The project area would be reclaimed, and ranching and wildlife habitat would be restored upon mine closure, which would occur approximately 1 year later under Alternative 4 than under Alternatives 2 and 3 from the 2018 Final EIS. Disturbance of cultural resources under Alternative 4 would be resolved through a programmatic

agreement with the State Historic Preservation Office (SHPO) (see **Section 4.14, Cultural and Historic Resources**). Tribal consultations with the Northern Cheyenne and Crow Tribes have been initiated to mitigate impacts on culturally significant resources within the direct affects analysis area and to mitigate effects on cultural resources that might affect traditional tribal ways of life (see **Section 6.1.3, Tribal Consultation Process** in the 2018 Final EIS). Recreation opportunities near or on surface water bodies and land within the project area would be lost until reclamation activities are completed, which would result in short-term, minor, and adverse effects on land use as it relates to public health (see **Section 4.18, Recreation**).

Public Safety

Noise

Noise from Alternative 4 activities would include coal and overburden blasting, use of heavy machinery, hauling, excavation, and truck traffic for coal transport and waste disposal, as described in **Section 4.22.3.1**. The nearest noise-sensitive receptors to the project area are seven scattered residences between 2.2 and 8 miles away from the project area boundary, and the city of Colstrip located 12 miles away from the project area. At these distances, no noise impacts are anticipated that would affect sensitive receptors. Mine workers and equipment operators in close proximity to noise sources would be required to wear protective hearing devices in accordance with MSHA regulations.

Solid and Hazardous Waste

Solid and hazardous waste would be contained, stored, transported, and disposed of as described in **Section 4.21, Solid and Hazardous Waste** below. Westmoreland Rosebud would handle all waste as outlined in the Waste Management Program. Workers would be required to wear protective gear and would follow procedures to reduce or eliminate risk from exposure to hazardous waste, in compliance with MSHA. Because regulatory compliance with applicable Federal and state laws would reduce or eliminate the risk of the public being exposed to hazardous waste from project activities, the effects of Alternative 4 on public health would be long-term, negligible, and adverse.

4.5.3.1 Indirect Impacts

Environmental Health

Air Quality

Indirect public health effects from air quality would include those from the Colstrip and Rosebud Power Plants. **Section 4.3, Air Quality** provides a discussion of indirect air quality impacts, which are associated with coal combustion from the Colstrip and Rosebud Power Plants. Predicted air concentrations are expected to remain below NAAQS and MAAQS, and $PM_{2.5}$ and PM_{10} are expected to remain well below the NAAQS at locations impacted by either the project area or Colstrip Power Plant Units 3 and 4 and the Rosebud Power Plant (i.e., indirect impacts). Therefore, Alternative 4 would have a short-term, negligible to minor, adverse effect on public health as it relates to air quality.

The Alternative 2 air quality model from the 2018 Final EIS (here applied to Alternative 4) indicates that DPM would drop off sharply outside of the immediate project area; therefore, risk to the public and sensitive receptors would be low due to limited exposure time and extent. PM is expected to remain below NAAQS and MAAQS thresholds in the indirect impacts analysis area.

Surface Water and Groundwater Quality

Municipal and residential drinking water in the area comes from aquifers and from the Yellowstone River, which would not be affected by the Proposed Action (see **Section 4.7, Water Resources – Surface Water** and **Section 4.8, Water Resources – Groundwater**). The most likely exposure pathways from surface water would be through recreational use of surface waters (e.g., wading, swimming, or fishing) or from incidental contact.

The general water quality in the indirect affects analysis area generally meets or exceeds water quality standards, and water quality monitoring data indicate that emissions from the Colstrip and Rosebud Power Plants would not adversely affect overall surface water quality in the analysis area (see **Section 4.3, Air Quality**, **Section 3.5, Public Health and Safety**, and **Section 3.7, Water Resources – Surface Water**). It is not likely that Alternative 4 would affect mercury concentrations at Castle Rock Lake. The Proposed Action would result in increased concentrations of selenium in the East Fork Armells Creek and nitrogen in Rosebud Creek. Concentrations of other metals and nutrients in other surface waters would not be affected (see **Section 4.7, Water Resources – Surface Water**). Due to the area's sparse population density and low recreational use frequency of these creeks, there is a low likelihood that increased risk to public health would occur from exposure to water during recreation or by incidental skin contact because of the Proposed Action. Selenium and nitrogen concentrations in drinking water sources, including the Yellowstone River, would not be affected, and no increase in public health risk through drinking water consumption would occur because of the Proposed Action.

Based on the discussion above, the likelihood that Alternative 4 would result in impacts on surface water and groundwater that would increase public health risk is low. Indirect effects on public health through impacts on water quality would be long-term and negligible.

Socioeconomic Environment and Health

Demographics and Sensitive Populations

Sensitive populations within the indirect effects analysis area include a high proportion of Native Americans and low-income populations. The Northern Cheyenne and Crow Indian Reservations are located within the analysis area, and both tribes partake in ranching, hunting, fishing, gathering, and farming. Based on the air quality and water quality discussions (above and in **Section 4.3, Air Quality** and **Section 4.7, Water Resources – Surface Water**), the Proposed Action would not have a disproportionate impact on the environmental health of tribal members as a result of partaking in these activities.

Subpopulations with higher rates of chronic disease, including cancer, respiratory illness, and diabetes, are present within the analysis area. The incidence of asthma in Rosebud County, where the Colstrip and Rosebud Power Plants are located, is higher than the state and regional rates (see **Section 3.5, Public Health and Safety** in the 2018 Final EIS). Air and water quality, as discussed above and in **Section 4.3, Air Quality** and **Section 4.7, Water Resources – Surface Water**, would not likely fall below the regulatory standards for human health (i.e., NAAQS, MAAQS, Montana Surface Water Quality Standards). However, as described in the 2018 Final EIS, sensitive subpopulations in the area may experience adverse effects, including increased risk of infectious disease and exacerbation of chronic disease symptoms from sustained exposure to combustion emissions from project area coal. Therefore, the indirect effects on sensitive subpopulations would be short-term, minor to moderate, and adverse. These effects from Alternative 4, however, would be comparable to effects under Alternative 1, as the power plants would operate at the same level of output under all alternatives; exposure risk would last for

14 years longer under Alternative 4 as compared to Alternative 1 and 9 years longer as compared to Alternative 1.

Economics

Alternative 4 would support continued indirect sources of revenues and jobs within the analysis area, sustaining funding and access to local health resources and funding of public health and social services. **Section 4.18, Socioeconomics** provides a discussion of the indirect economic impacts of the Proposed Action, which are assumed to occur in Rosebud, Treasure, and Big Horn Counties and on the Northern Cheyenne and Crow Indian Reservations. Members of the Northern Cheyenne Tribe hold approximately 30 percent of indirect jobs created by the Rosebud Mine. Alternative 4 would support production from the Rosebud Mine through 2039, resulting in sustained indirect economic support of public health services, income, and availability of health insurance through mine-related jobs and revenues. Thus, Alternative 4 would have a beneficial short-term minor effect on public health as it relates to economic conditions.

Social Characteristics

Social Services

Social services, including health care facilities and services, schools, libraries, and other services, would not be impacted as the Colstrip and Rosebud Power Plants and indirect jobs and revenues would remain the same. Alternative 4 would support production from the Rosebud Mine through 2039, which would extend indirect revenues and funding for social services, as discussed above. This would result in a short-term moderate beneficial impact within the region. There would likely be no change to rates of insured individuals or to the availability of health care services or ratios of providers in the area because of the Proposed Action (see **Section 4.15, Socioeconomic Conditions**).

Community Health

Alternative 4 is not likely to increase chronic or infectious disease, as there is little potential for increases in exposure to air and water pollutants. There may be minor effects on sensitive subpopulations, including those with asthma or compromised respiratory systems, who live or are present near the Colstrip and Rosebud Power Plants. Likewise, it is not likely that indirect impacts on nutrition-related disease would be experienced through consumption of livestock and wildlife (see discussion above, **Section 4.7, Water Resources – Surface Water**, and **Section 4.12, Fish and Wildlife Resources**).

Alternative 4 would not likely adversely affect the well-being of communities within the analysis area. Poor overall physical and mental health are compounded by poverty, behavioral risk, and lack of social services, as discussed in **Section 3.5, Public Health and Safety** (UWPHI 2017). Alternative 4 is not likely to affect quality of life, although the sustained economic benefits and revenues would prolong funding for social services and access to existing physical and mental health care and health insurance. Behavioral risk factors, such as physical inactivity and adult smoking rates, are unlikely to be affected because there would be no major change to the community health environment in the analysis area. Likewise, injury rates and mortality rates within the analysis area would not likely change because of Alternative 4. Sustained economic security for families and individuals who are indirectly employed would maintain existing levels of well-being, including Northern Cheyenne and Crow tribal members, and sensitive subpopulations.

Based on the above discussion, Alternative 4 would have short-term minor to moderate beneficial impacts on community public health in the analysis area.

Land Use

Alternative 4 would not affect land use in the region outside of the project area, nor would it adversely affect culturally significant resources.

Public Safety

Noise

Indirect public health impacts from noise include the operations of the Colstrip Power Plant (Units 3 and 4 after dry-stack conversion) and its associated paste plant, plus the Rosebud Power Plant. These are discussed in detail in **Section 4.22.3.2**. Workers and equipment operators in proximity to noise sources would be required to wear protective hearing devices in accordance with OSHA regulations.

The impact of noise from the Colstrip Power Plant when operating at full capacity for the nearest Colstrip residences to the plant would exceed the EPA's recommended levels (see **Section 4.22**). Therefore, the impact on these residents would be long-term, moderate, and adverse. The noise impact for the Colstrip Power Plant on the seven residences nearest to the project area would be considered less than negligible.

The impact of noise from the Rosebud Power Plant for the nearest residents to the plant would exceed the EPA's recommended levels; therefore, impacts on these residents would be long-term, minor to moderate, and adverse (see **Section 4.22**). The noise impacts at the seven residences nearest to the project area and the city of Colstrip would be considered less than negligible.

Solid and Hazardous Waste

Indirect public health impacts from waste and hazardous materials include exposure to coal combustion residuals (CCR) waste generated at both the Colstrip and Rosebud Power Plants in proportion to the amount of coal burned at the plants, and on groundwater impacts from waste disposal. These are discussed in detail in **Section 4.21.3.2** and **Section 4.8.3.2**. Workers would be required to wear protective gear and would follow procedures to reduce or eliminate risk from exposure to hazardous waste, in compliance with OSHA.

CCR would continue to be disposed of as described in **Sections 3.21.2.4** and **Section 3.21.2.5** of the 2018 Final EIS, and in compliance with the Resource Conservation and Recovery Act and other state and Federal regulations. Because compliance with regulations would reduce the risk of the public being exposed to hazardous waste from the power plants, Alternative 4 would have a less than long-term, negligible, and adverse effect on public health as it relates to waste.

4.5.4 Alternative 5 – Partial Mining Alternative

The types of direct and indirect public health and safety impacts under Alternative 5 – Partial Mining Alternative would be similar to those described above for Alternative 4 – Proposed Action (Current Federal Mining Plan). Under Alternative 5, however, direct impacts would be limited to the southeastern portion of the project area (east of Donley Creek) with no mining occurring in the Trail Creek, McClure Creek, and Robbie Creek drainages (**Figure 2.6-1**) based on the assumption that all mining would cease in 2030. In total, approximately 2,495 acres would be disturbed in the project area over an 11-year mine life that would produce about 37.1 million tons of coal from Federal and private coal leases.

Under Alternative 5, direct and indirect public health and safety impacts would be less than under Alternative 4. About 34 million fewer tons of coal would be mined and approximately 1,793 fewer acres

would be disturbed under Alternative 5 as compared to Alternative 4 (**Table 2.3-1** and **Table 2.3-2**). The life of operations for Area F (and the corresponding impacts) would be 9 years shorter under Alternative 5 than under Alternative 4, reducing the period of time when miners are exposed to respirable coal mine dust and mining-related safety issues. Reclamation and PMT would be achieved in the project area 9 years earlier than under Alternative 4. Under Alternative 5, coal from the project area would be available for combustion in the Colstrip and Rosebud Power Plants for up to 11 years, which is 9 years fewer as compared to Alternative 4. Therefore, there would be 9 fewer years (as compared to Alternative 4) where pollutant and GHG emissions from the power plants (and associated health impacts) would be attributable to the combustion of project area coal.

As outlined above in **Table 4.3-4,** air quality impacts would include lower emissions of DPM and PM due to the shorter duration and reduced scale of mining activities. Specifically, DPM emissions attributable to the project under Alternative 5 would be approximately 3.6 tons per year, compared to 6.4 tons per year under Alternative 4. PM_{10} emissions would be around 18.2 tons per year under Alternative 5, versus 34.2 tons per year under Alternative 4. These reductions translate to lower potential health risks for workers and nearby residents, resulting in a short-term negligible to minor adverse impact on public health within the project area and public access roads. Any potential exposure of sensitive receptors to PM would be incidental and limited in duration.

The updated climate change analysis in **Section 4.4, Climate and Climate Change**, indicates that reducing the duration and extent of coal mining and combustion under Alternative 5 would result in lower GHG emissions, thereby reducing the social costs associated with climate change (see **Section 4.4.7, Social Cost of GHGs**), including associated climate-related health issues, such as cardiovascular and respiratory diseases, heat stress, and infectious diseases. Under Alternative 5, annual CO_2 emissions, CH_4 emissions, and N_2O emissions, including associated climate-related health risks would not be attributable to combustion of project area coal after 2030. The annual social costs of GHGs (CO_2, CH_4, and N_2O) associated with Area F coal (direct and indirect) are presented in **Table 4.4-7** (mining), **Table 4.4-9** (combustion), and **Table 4.4-11** (worker commutes) for years 2020 through 2039. The total costs of these annual emissions for the mine life of Area F under each alternative are compared in **Table 4.4-10**. Based on the discount rate, the total direct and indirect social costs of GHGs would range from a low of $12.6 to $31.6 billion for Alternative 5– Partial Mining.

Water quality impacts would also be minimized under Alternative 5. Under Alternative 5, disturbance would be limited to the southern portion of the project area, avoiding the Trail Creek, McClure Creek, and Robbie Creek drainages. Additionally, the life of operations for Area F would be 9 years shorter, resulting in a shorter duration of potential water quality impacts that would affect public health and safety. The likelihood of human consumption of or contact with contaminated surface or groundwater would be low. Monitoring and mitigation activities would ensure compliance with water quality standards, minimizing public health risks.

4.5.4.1 Mining Private Coal Only Scenario

If Westmoreland Rosebud chose to pursue mining of private coal only (leases 1001 and 1001-A) after 2030, direct and indirect public health and safety impacts could be greater than those disclosed above for Alternative 5. The intensity of impacts, however, would be no greater than those disclosed for Alternative 4 (see above) and would be expected to be less. See **Section 2.6.2, State Operating Permit C2011003F** for a discussion of the steps that would be required for such a scenario to occur.

4.5.5 Irreversible and Irretrievable Commitment of Resources

There would be no irreversible and irretrievable commitments of public health resources because of any of the alternatives.

4.6 GEOLOGY

This section discloses direct and indirect impacts on geology resulting from implementation of Alternative 1 – No Action, Alternative 4 – Proposed Action (Current Federal Mining Plan), or Alternative 5 – Partial Mining Alternative. Pre-mine geologic conditions and the analysis areas used for this impacts analysis are described in **Section 3.6, Geology**.

4.6.1 Analysis Methods and Impact and Intensity Thresholds

Geology impacts were evaluated in this SEIS using the same methods used in the 2018 Final EIS. Analysis methods are provided in **Section 4.6.1** of the 2018 Final EIS, beginning on page 505. The thresholds for assessment of impacts (negligible, minor, moderate, or major) on geology are the same as those defined in the 2018 Final EIS in **Table 126**. Assumptions for each alternative, which informed the scope of the effects analyses in this SEIS, are presented in **Section 2.4, Alternative 1 – No Action**, **Section 2.5, Alternative 4 – Proposed Action (Current Federal Mining Plan)**, and **Section 2.6, Alternative 5 – Partial Mining Alternative**.

4.6.2 Alternative 1 – No Action

The types of direct and indirect geology impacts under Alternative 1 (as described in this SEIS)[58] would be similar to those described below for Alternative 4 – Proposed Action (Current Federal Mining Plan). Under Alternative 1, though, impacts would be limited to the southeastern portion of the project area (east of Donley Creek) with no mining occurring in the Trail Creek, McClure Creek, and Robbie Creek drainages (**Figure 2.4-1**) based on the assumption that all mining would cease in 2025. In total, approximately 1,021 acres would be disturbed in the project area over a 6-year mine life that would produce about 17.1 million tons of coal from Federal and private coal leases. As with Alternative 4, mining in the project area would result in a long-term major adverse impact on the analysis area geology that would result in impacts on the hydrogeologic system (see discussion of hydrogeologic impacts in **Section 4.8, Water Resources – Groundwater** and **Section 4.24, Soil**). The placement of heterogeneous spoil could preclude future access to the McKay Coal bed. As with Alternative 4, the creation of spoil next to geologically unaltered unmined areas (either outside of the project area or the drainage areas within the indirect effects analysis area) would result in indirect long-term impacts due to the different rates at which these materials would erode.

Under Alternative 1, direct and indirect geology impacts would be less than under Alternative 4: about 54 million fewer tons of coal would be mined and approximately 3,267 fewer acres would be disturbed under Alternative 1 as compared to Alternative 4 (**Table 2.3-1** and **Table 2.3-2**). The life of operations for Area F (and the corresponding impacts) would be 14 years shorter under Alternative 1 than under Alternative 4. Reclamation and PMT would be achieved in the project area 14 years earlier than under Alternative 4.

4.6.2.1 Mining Private Coal Only Scenario

If Westmoreland Rosebud chose to pursue mining of private coal only (leases 1001 and 1001-A) after 2025, direct and indirect geology impacts could be greater than those disclosed above for Alternative 1. The intensity of impacts, however, would be no greater than those disclosed for Alternative 4 (see below)

[58] Direct and indirect geology impacts of Alternative 1 – No Action were described in **Section 4.6.2** of the 2018 Final EIS, beginning on page 505. As described in **Chapter 2** of this SEIS, Alternative 1 – No Action has been revised since the 2018 Final EIS.

and would be expected to be less. See **Section 2.4.2, State Operating Permit C2011003F** for a discussion of the steps that would be required for such a scenario to occur.

4.6.3 Alternative 4 – Proposed Action (Current Federal Mining Plan)

Direct and indirect geology impacts under Alternative 4 – Proposed Action (Current Federal Mining Plan) would be similar to those described for Alternative 2 in **Section 4.6.3** of the 2018 Final EIS, beginning on page 506. Under Alternative 4, half a million tons more coal would be mined[59] and approximately 28 acres more would be disturbed as compared to Alternative 2. Reclamation would occur contemporaneously with mining (see discussion of the phases of reclamation in **Section 1.6.4, Bond Release**, in the 2018 Final EIS). Once mining has ceased, reclamation of disturbed areas (up to 4,288 acres) in the project area would occur according to Westmoreland Rosebud's approved reclamation plan (**Figure 2.2-5**) and PMT (**Figure 2.2-6**), which are similar to those described for Alternative 2 in 2018 Final EIS **Section 2.4.4, Reclamation Plan**. Modifications since 2018 are described in **Section 2.2.2.2, Area F Operations and Development**.

4.6.3.1 Direct Impacts

Impacts from mining under Alternative 4 would result in the disturbance of 4,288 acres within the proposed direct effects analysis area and the direct removal of an estimated 71.3 million tons of coal over a 20-year period. The mining process would alter the overburden geology in the analysis area. The removal of overburden and the Rosebud Coal and the subsequent replacement of spoil would result in the removal of rock outcrop features and the alteration of the horizontal continuity of the overburden, resulting in a long-term major adverse impact on geologic resources that would last until the spoil is eroded away. As discussed in **Section 4.2, Topography**, rock-outcrop features may be created with DEQ approval from sandstone rock piles and with highwall-reduction techniques to mitigate the loss of sandstone outcrops and cliffs/bluffs. In the short term, manmade features would mimic the habitat-diversity benefits that the sandstone outcrops and cliffs/bluffs currently provide. However, their longevity would be compromised in comparison to the features they are attempting to replicate. Sandstone rock piles would be more easily eroded than the current outcrops they are replacing, and unless the highwall reduction left only competent unaltered sandstone, as opposed to more easily eroded siltstone, mudstone, or claystone, these would also be more easily eroded than the current features they are attempting to replicate.

The spoil would consist of a mixture of geologically distinct vertical layers of sandstone, siltstone, mudstone, and claystone. As a result, the physical characteristics of the overburden as spoil would be altered and would represent a mélange deposit consisting of fragments of the overburden geologic deposits (sandstone, siltstone, mudstone, claystone) and the resulting fine-grained sediment generated due to the destruction of these stones into fragments. In addition, the spoil would contain non-hazardous construction, mining, or agricultural debris allowed by DEQ for disposal in the mine pits. The spoil would consist of a well-graded heterogeneous mixture of lithified and non-lithified material and non-hazardous construction debris of wood, metal, and concrete. The lithified fragments of rock would likely vary in size; vertical distribution would occur with large rock fragments rolling into the bottom of the pit as spoil is backfilled. Alternative 4 would result in a long-term major adverse impact on the analysis area geology that would result in impacts on the hydrogeologic system (see discussion of hydrogeologic impacts in **Section 4.8**, **Water Resources – Groundwater** and **Section 4.24, Soil**). If acid, acid-forming, toxic, toxin-forming, or other deleterious geologic materials are identified as part of implementation of the Spoil

[59] See coal tonnage and disturbance comparison in **Table 2.2-8**. Under Alternative 4, mine passes would not be authorized for 74 acres of Federal coal (about 1.9 million tons of recoverable coal). The 74 acres that would not be mined could still be used for other project-associated surface disturbance, such as overburden or topsoil stockpile locations (**Figure 2.5-1**).

Monitoring Plan, they would not be buried as spoil or stored close to streams, negating their impact on hydrogeologic resources. In addition to the geologic impacts related to mining, the placement of heterogeneous spoil could preclude future access to the McKay Coal bed.

4.6.3.2 Indirect Impacts

The creation of spoil next to geologically unaltered unmined areas (either outside of the project area or the drainage areas within the indirect effects analysis area) would result in indirect long-term impacts due to the different rates at which these materials would erode. Differential erosion of the spoil itself would be the preferential erosion of the softer stone fragments and non-lithified sediment relative to the harder stone, metal, and concrete fragments. Differential erosion in the indirect effects analysis area would be the preferential erosion of the spoil relative to areas not mined along the major drainages and the undisturbed areas outside of the analysis area. Because the current rock outcrops and overburden are short-lived occurrences (in that they would be eroded over time regardless of the alternative), there would be long-term minor adverse impacts on the overburden and rock outcrop features with new rock outcrop features naturally created by erosion over time.

4.6.4 Alternative 5 – Partial Mining Alternative

The types of direct and indirect geology impacts under Alternative 5 – Partial Mining Alternative would be similar to those described above for Alternative 4 – Proposed Action (Current Federal Mining Plan). Under Alternative 5, though, direct impacts would be limited to the southeastern portion of the project area (east of Donley Creek) with no mining occurring in the Trail Creek, McClure Creek, and Robbie Creek drainages (**Figure 2.6-1**) based on the assumption that all mining would cease in 2030. In total, approximately 2,495 acres would be disturbed in the project area over an 11-year mine life that would produce about 37.1 million tons of coal from Federal and private coal leases. As with Alternative 4, mining in the project area would result in a long-term major adverse impact on the analysis area geology that would result in impacts on the hydrogeologic system (see discussion of hydrogeologic impacts in **Section 4.8, Water Resources – Groundwater** and **Section 4.24, Soil**). The placement of heterogeneous spoil could preclude future access to the McKay Coal bed. As with Alternative 4, the creation of spoil next to geologically unaltered unmined areas (either outside of the project area or the drainage areas within the indirect effects analysis area) would result in indirect long-term impacts due to the different rates at which these materials would erode.

Under Alternative 5, direct and indirect geology impacts would be less than under Alternative 4. About 34 million fewer tons of coal would be mined and approximately 1,793 fewer acres would be disturbed under Alternative 5 as compared to Alternative 4 (**Table 2.3-1** and **Table 2.3-2**). The life of operations for Area F (and the corresponding impacts) would be 9 years shorter under Alternative 5 than under Alternative 4. Reclamation and PMT would be achieved in the project area 9 years earlier than under Alternative 4.

4.6.4.1 Mining Private Coal Only Scenario

If Westmoreland Rosebud chose to pursue mining of private coal only (leases 1001 and 1001-A) after 2030, direct and indirect geology impacts could be greater than those disclosed above for Alternative 5. The intensity of impacts, however, would be no greater than those disclosed for Alternative 4 (see above) and would be expected to be less. See **Section 2.6.2, State Operating Permit C2011003F** for a discussion of the steps that would be required for such a scenario to occur.

4.6.5 Irreversible and Irretrievable Commitment of Resources

Under all action alternatives, removal of the Rosebud Coal and the associated overburden would be an irreversible and irretrievable impact on geologic features and coal reserves. This would represent an irreversible impact on the analysis area geology. After the spoil erodes below the depth of mining, the underlying unaltered rocks below the mined-out former Rosebud Coal would begin to be exposed. Because the geology below the Rosebud Coal would not be altered by any of the action alternatives, impacts related to any of those alternatives would cease after the spoil eroded away.

4.7 WATER RESOURCES – SURFACE WATER

This section discloses the direct and indirect effects on surface water resulting from implementation of Alternative 1 – No Action, Alternative 4 – Proposed Action (Current Federal Mining Plan), or Alternative 5 – Partial Mining Alternative. This analysis has been revised to address the deficiencies identified in the 2022 Court order (see **Section 1.1, Introduction**). Specifically, this section analyzes the indirect effects of mine expansion on water withdrawals from the Yellowstone River and a reasonable range of alternatives. An updated description of the indirect analysis methods is provided in **Section 4.7.1.1**; surface water effects analysis is provided for three updated alternatives in **Section 4.7.2** (Alternative 1), **Section 4.7.3** (Alternative 4), and **Section 4.7.4** (Alternative 5); and an updated analysis of indirect effects of Alternative 4 mine expansion on water withdrawals from the Yellowstone River is provided in **Section 4.7.3.3**. Pre-mining and existing surface water conditions and the analysis areas used for this impacts analysis are described in **Section 3.7, Water Resources – Surface Water**.

4.7.1 Analysis Methods and Impact and Intensity Thresholds

Surface water impacts were evaluated in this SEIS using the same methods used in the 2018 Final EIS; these are described below. As applicable, this environmental consequences section has been updated from the 2018 Final EIS to incorporate information disclosed in the *Cumulative Hydrologic Impact Analysis for Area F* (DEQ 2019b), which is also referred to as the CHIA in this SEIS, as well as updated monitoring data collected since the data evaluated in the 2018 Final EIS and updated hydrologic information reported in the Annual Hydrology Reports prepared since the 2018 Final EIS. Assumptions for each alternative, which informed the scope of the effects analyses in this SEIS, are presented in **Section 2.4, Alternative 1 – No Action**, **Section 2.5, Alternative 4 – Proposed Action (Current Federal Mining Plan)**, and **Section 2.6, Alternative 5 – Partial Mining Alternative**.

4.7.1.1 Analysis Methods

Direct Effects

Hydrology and water quality data collected by Western Energy (now Westmoreland Rosebud) in the analysis area from mid-2016 through 2023 were used to describe existing conditions, which represents an update of data that were used for the 2018 Final EIS (through mid-2016). The 2016 through 2023 period includes a similar range of climate conditions as described in the 2018 Final EIS, shown to include very wet to very dry conditions and average conditions, as described in **Section 3.7, Water Resources – Surface Water**. The hydrologic and water quality information for the project area may not be representative of typical seasonal or annual conditions and does not represent the variability that occurs over the long term.

Effects on peak stream flows were quantitatively analyzed using U.S. Geological Survey (USGS) regression equations developed for Montana (Parrett and Johnson 2004). Western Energy used the U.S. Department of Agriculture (USDA) Water Erosion Prediction Project (WEPP) and Sediment, Erosion, Discharge by Computer Aided Design (SEDCAD) models to evaluate the impact of mining disturbance on sediment yields in drainages in the analysis area (PAP, Appendix U). The WEPP model was used to estimate average annual sediment yield based on existing vegetation and land use in the direct effects analysis area. Sediment yield from the reclaimed land in the analysis area was modeled using SEDCAD. Other effects were evaluated qualitatively or quantitatively based on data provided by Western Energy in its water quality database, information provided by Western Energy in the Area F PAP and appendices, information collected in an October 2014 field visit to the project area, information provided by DEQ on

the Rosebud and Big Sky Mines, and the analysis provided in **Section 4.8, Water Resources – Groundwater**.

Indirect Effects

The indirect effects analysis area includes the Yellowstone River between the Armells Creek and Tongue River confluences. The Yellowstone River diversion point for the Colstrip Power Plant's 69 cfs water right is downstream of the confluence with Armells Creek. USGS stream flow data for the Yellowstone River and water rights data from the Montana Department of Natural Resources and Conservation (DNRC) were reviewed to determine potential effects of the Colstrip Power Plant's water withdrawals from the Yellowstone River on surface water hydrology (**Section 4.7.3.3**) and surface water rights (**Section 4.9.3.4**) within the indirect effects analysis area.

Water quality data collected by DEQ, the Northern Cheyenne Tribe, and Montana PPL Corporation were reviewed to determine historical and recent (where data are available) mercury, selenium, copper, nitrate+nitrite, and total nitrogen concentrations in Sarpy Creek, Armells Creek (including its tributary East and West Forks), Rosebud Creek (including its tributaries Lame Deer, Miller, Pony, and Spring Creeks), and the Yellowstone River between the Armells Creek and Tongue River confluences. In addition to the water quality data, air quality modeling conducted for this SEIS (see **Section 4.3, Air Quality**) was used to evaluate potential effects of atmospheric deposition of mercury, selenium, and copper from the Colstrip and Rosebud Power Plants on stream water quality within the indirect effects analysis area. An analysis of effects on stream water quality from trace metals deposition in the indirect effects analysis area was limited to mercury and selenium (which were predicted by the air quality modeling to have the greatest deposition areas of all the modeled metals) and copper (which was predicted by the air quality modeling to have the greatest deposition rate of all the modeled metals). Other metals were not evaluated because the deposition areas for antimony, arsenic, cadmium, chromium, and lead were predicted to be very small (within the Colstrip Power Plant site). Modeled metals deposition areas are tabulated in this SEIS **Table 4.13-1** and in the 2018 Final EIS **Table 115**, and modeled metals deposition rates are tabulated in this SEIS **Table 4.3-13**.

Water quality data from Talen Montana LLC's March 23, 2022 East Fork Armells Creek Synoptic Run Report (Hydrometrics, Inc. [Hydrometrics] 2022) were used to evaluate how the disposal of coal combustion products in ponds, as well as the use of other on-site ponds and ponds near Colstrip, has affected downstream surface water quality.

Although indirect impacts associated with the Colstrip and Rosebud Power Plants' GHG emissions and the Colstrip Power Plant's water withdrawals from the Yellowstone River would continue through the operational life of the Colstrip Power Plant (2042), regardless of whether Area F coal is available or not, those indirect impacts would no longer be attributable to combustion of Area F coal once mining of Federal coal in Area F ends (2039 for Alternative 4, 2030 for Alternative 5, and 2025 for Alternative 1). Thus, Area F coal would be available for combustion in the Colstrip and Rosebud Power Plants for up to 20 years (2020 to 2039) under Alternative 4, up to 11 years (2020 to 2030) under Alternative 5 (9 fewer years than Alternative 4), and up to 6 years (2020 to 2025) under Alternative 1 (14 fewer years than Alternative 4).

4.7.1.2 Impact and Intensity Thresholds

The thresholds for assessment of impacts (negligible, minor, moderate, or major) on surface water hydrology and water quality provided in **Table 4.7-1** are the same as those defined in the 2018 Final EIS in **Table 127**. Impacts are also defined as short-term, long-term, or both (see **Appendix 1**).

Table 4.7-1. Surface Water Impact and Intensity Thresholds.

Impact Intensity	Intensity Description
Negligible	The action would result in a change to surface water hydrology and/or water quality that would be indistinguishable from those caused by fluctuations in natural processes, and of negligible consequence to existing land uses and/or beneficial uses of surface water.
Minor	The action would result in a change to surface water hydrology and/or water quality that would be localized and/or of little consequence to existing land uses and beneficial uses.
Moderate	The action would have measurable effects on surface water hydrology and/or water quality that are distinguishable from the fluctuations in natural processes, but do not permanently preclude existing land uses and/or beneficial uses of surface waters.
Major	The action would have measurable effects on surface water hydrology and/or water quality that are distinguishable from the fluctuations in natural processes, and would permanently preclude existing land uses and/or beneficial uses of surface waters.

The surface water impact and intensity thresholds described above in **Table 4.7-1** include a distinction between "moderate" and "major" impact intensities based on whether the action would permanently preclude existing land uses and/or beneficial uses of surface water. That distinction is supported by impact and intensity thresholds associated with surface water rights (see **Table 4.9-1**) with the distinction between "moderate" and "major" impact intensities based on whether a suitable replacement water source would be provided by Westmoreland Rosebud per ARM 17.24.648 ("moderate") or no replacement water supply would be available ("major"). Thus, surface water impact and intensity thresholds are somewhat unique from other resource areas based on water replacement provisions (mitigations), which are required (not optional) for the mine permit application process under MSUMRA (see **Section 4.9.3.3, Replacement Water Sources and Replacement Process**). Stated another way, mitigation (design features) goals/plans are a required part of the permit application process and, as such, they are not optional aspects of the permit, but rather requirements that are to be completed as conditions of the state operating permit and/or MPDD. Note that the overall impacts from the Proposed Action on hydrology in the direct effects analysis area could potentially be significant and adverse without the reclamation efforts required under Montana law (e.g., MSUMRA) and described in the 2018 Final EIS **Section 2.4, Alternative 2 – Proposed Action**, as well as in this SEIS in **Section 2.2.2.2, Area F Operations and Development**. However, under the MSUMRA framework described in S**ection 3.7.1.1, Regulatory Framework**, these impacts would be classified as minor in the short term to negligible in the long term as defined above in **Table 4.7-1**.

4.7.2 Alternative 1 – No Action

The types of direct and indirect surface water impacts under Alternative 1 (as described in this SEIS)[60] would be similar to those described below for Alternative 4 – Proposed Action (Current Federal Mining Plan). Under Alternative 1, though, impacts would be limited to the southeastern portion of the project area (**Figure 2.4-1**) based on the assumption that all mining would cease in 2025. In total, approximately 1,021 acres would be disturbed in the project area over a 6-year mine life that would produce about 17.1 million tons of coal from Federal and private coal leases. Under Alternative 1, direct and indirect surface water impacts would be less than under Alternative 4: about 54 million fewer tons of coal would be mined and approximately 3,267 fewer acres would be disturbed under Alternative 1 as compared to Alternative 4 (**Table 2.3-1** and **Table 2.3-2**). Although indirect impacts associated with the Colstrip and Rosebud Power Plants' GHG emissions and the Colstrip Power Plant's water withdrawals from the Yellowstone River would continue through the operational life of the Colstrip Power Plant (2042), regardless of whether Area F coal is available or not, those indirect impacts would no longer be attributable to combustion of Area F coal once mining of Federal coal in Area F ends (2025 for Alternative 1). Thus,

[60] Direct and indirect surface water impacts of Alternative 1 – No Action were described in **Section 4.7.2** of the 2018 Final EIS, beginning on page 505. As described in **Chapter 2** of this SEIS, Alternative 1 – No Action has been revised since the 2018 Final EIS.

Area F coal would be available for combustion in the Colstrip and Rosebud Power Plants for up to 6 years (2020 to 2025) under Alternative 1 (14 fewer years than Alternative 4). Reclamation and PMT would be achieved in the project area 14 years earlier than under Alternative 4.

As with Alternative 4, the overall impacts on the hydrologic balance in the direct effects analysis area would be long-term, moderate, and adverse; and effects on floodplains would be short-term, minor, and adverse.

Spring flows within the project area would be affected by mining, and the effects would range from reduced flow, particularly if the source of the spring water is at least partially from the Rosebud coal seam, to complete elimination of the spring if its source is solely from the Rosebud Coal or overburden that would be removed. It is unlikely that springs where the source is either the Rosebud Coal or overburden that is to be mined would redevelop in the postmining period. Overall impacts on spring flows and the beneficial uses of spring water in the analysis area would be long-term and moderate.

Streams located south and west of the direct effects analysis area are upstream of the project area and would not be affected by mining. Removal of the Rosebud coal aquifer by mining would eliminate recharge to the alluvium of the major channels within the permit boundary for a long period that may extend beyond 50 years as described below. Groundwater that currently discharges at the edge of the coal to the alluvium would be intercepted by pit dewatering during mining and would discharge to the reclaimed spoil placed in the pits during mining. Assuming all runoff from disturbed lands were effectively captured and treated before release to any of the unmined streams in the analysis area, and all discharges at MPDES Permit outfalls met effluent limits, adverse effects on stream water quality should be minimal, and beneficial uses should be protected. Until the spoil is resaturated, remaining groundwater in the Rosebud coal aquifer would not reach the major drainages. It is not known how much time would be required to resaturate the spoil; due to the nature of the spoil and based on Western Energy's groundwater model, the groundwater table would take more than 50 years after site reclamation to be reestablished (PAP, Appendix O). DEQ (2019b) predicted 90 percent recovery occurring 66 years after mining and less than 5 feet of drawdown remaining 58 years after mining. Spring or seep flows within the project area would be affected by mining ranging from reduced flow to complete elimination. Groundwater contributions from springs or seeps to stream flow in Black Hank Creek and Donley Creek tributaries may be reduced or may not flow through the reclaimed area as some or all surface flow may infiltrate into the spoil rather than flowing to the lower portion of the watersheds. Groundwater contributions from springs or seeps to stream flow in specific sections of Black Hank Creek and Donley Creek mainstems may be reduced or eliminated except at locations upstream of the areas to be mined. These stream sections are described in **Section 3.7.5.2, Streams in the Direct Effects Analysis Area**. Corresponding effects on Black Hank Creek and Donley Creek stream flows and on the overall corresponding beneficial uses would be long-term, minor to moderate, and adverse. Similarly, the overall impacts of mining activities on surface water quality and associated beneficial uses of streams in the analysis area would be long-term, minor to moderate, and adverse.

Much of the flow in Donley and Black Hank Creeks occurs as a result of runoff from storm events or snowmelt. During mining, the majority of runoff from undisturbed land upstream of the mine would flow through the undisturbed main stream channels. Tributary drainages would be mined out, and runoff from undisturbed lands upstream of the active pit would be captured in the pit or sediment ponds. Surface runoff from disturbed areas would be impounded in the mine pits or sediment ponds, resulting in reduced ephemeral flows during precipitation and snowmelt runoff events. The watershed areas of Donley and Black Hank Creeks would be reduced as each watershed was mined; thus, it is expected that runoff to the streams would decrease. When all of the mine passes were being or had been mined, and until the watersheds were fully restored, peak flows would be reduced in Donley and Black Hank Creeks. As the mine site is reclaimed, the PMT, drainage areas, and geomorphic characteristics would be designed to be

similar to pre-mining topography. As a result, peak flows would return to near pre-mining peak flows. MSUMRA requires that drainage basins be restored during reclamation to the original stream function. The overall impacts from the No Action Alternative on ephemeral stream flows in the direct effects analysis area would be adverse and minor in the short term to negligible in the long term.

The water supply of one mapped pond (Pond 4, located adjacent to Black Hank Creek downstream from the mine pits) may be reduced or eliminated during mining due to the impoundment of runoff that is a source of supply to the pond or due to the reduction or elimination of spring flows that are a source of supply to the pond. After mining, the pond would be reestablished, and up to three sediment ponds (located downstream of the proposed mine pits) would be retained until reclamation is complete to provide water supplies for wildlife and livestock. Pond 4 had predominantly dry conditions with recordable water depths for 8 of 150 monthly visits from 2011 through 2023; thus, the overall effect on pond water supply in the direct effects analysis area would be short-term, negligible to minor, and adverse. To mitigate the general lack of water in the vicinity of the project area (due to climate and not primarily as a consequence of mining), Westmoreland Rosebud proposes enhancement features within the PMT to capture water when available and use it to enhance habitat for wildlife and livestock, and to establish wetlands. These features would be in the form of small depressions that would store water following runoff events, thereby providing water sources, promoting establishment of wetland species, and diversifying the postmining habitat types within the project area. These small depressions would also help retain sediment within the project area.

Impacts on the direct effects analysis area for Alternative 1 would be similar to impacts for Alternative 4, but since 3,267 fewer acres would be disturbed under Alternative 1 and because the location of mine pits would be limited to the Donley Creek and Black Hank Creek watersheds, the remaining three watersheds (Trail Creek, McClure Creek, and Robbie Creek) in the direct effects analysis area would not be impacted from mine pit activity under Alternative 1. Impacts on the indirect effects analysis area for Alternative 1 would be similar to impacts for Alternative 4, but because the life of operations for Area F and the time period for combustion of project area coal in the Colstrip and Rosebud Power Plants would be 14 fewer years under Alternative 1, there would be a shorter duration of potential impacts related to water withdrawal from the Yellowstone River to supply the Colstrip Power Plant and trace metal deposition onto surface water bodies due to coal combustion at the two power plants.

4.7.2.1 Mining Private Coal Only Scenario

If Westmoreland Rosebud chose to pursue mining of private coal only (leases 1001 and 1001-A) after 2025, direct and indirect surface water impacts could be greater than those disclosed above for Alternative 1. The intensity of impacts, however, would be no greater than those disclosed for Alternative 4 (see below) and would be expected to be less. See **Section 2.4.2, State Operating Permit C2011003F** for a discussion of the steps that would be required for such a scenario to occur.

4.7.3 Alternative 4 – Proposed Action (Current Federal Mining Plan)

4.7.3.1 Summary of Impacts

Direct and indirect surface water impacts under Alternative 4 – Proposed Action (Current Federal Mining Plan) would be similar to those described for Alternative 2 in **Section 4.7.3** of the 2018 Final EIS, beginning on page 509. Under Alternative 4, half a million tons more coal would be mined[61] and

[61.] See coal tonnage and disturbance comparison in **Table 2.2-8**. Under Alternative 4, mine passes would not be authorized for 74 acres of Federal coal (about 1.9 million tons of recoverable coal). The 74 acres that would not be mined could still be used for other project-associated surface disturbance, such as overburden or topsoil stockpile locations (**Figure 2.5-1**).

approximately 28 acres more would be disturbed as compared to Alternative 2. Reclamation would occur contemporaneously with mining (see discussion of the phases of reclamation in **Section 1.6.4, Bond Release**, in the 2018 Final EIS). Once mining has ceased, reclamation of disturbed areas (up to 4,288 acres) in the project area would occur according to Westmoreland Rosebud's approved reclamation plan (**Figure 2.2-5**) and PMT (**Figure 2.2-6**), which are similar to those described for Alternative 2 in 2018 Final EIS **Section 2.4.4, Reclamation Plan**. Modifications since 2018 are described in **Section 2.2.2.2, Area F Operations and Development**. Under Alternative 4, coal from the project area would be available for combustion in the Colstrip and Rosebud Power Plants for up to 20 years (2020 to 2039).

It is anticipated that under Alternative 4 (as for Alternative 2 in the 2018 Final EIS), the greatest impacts on surface waters would be:

- The loss of tributaries and upper McClure Creek within the mining footprint during mining
- The loss of some existing springs and stock ponds within the mine disturbance boundary
- The reduction or elimination of groundwater contributions to spring or seep flows that, in turn, contribute to stream flows and water supply to stock ponds, where the source of water is from the Rosebud and/or McKay coal aquifers

Some surface runoff to streams would be captured in sediment ponds and discharged to streams at permitted MPDES outfalls during mining. Westmoreland Rosebud has obtained MPDES Permit coverage (MPDES Permit MT-0031828) for all discharges from the project area to surface waters.

Changes to site hydrology in the direct effects analysis area would continue throughout project area mining and reclamation until sedimentation ponds were removed during the reclamation process and the watershed topography and hydrology were restored to conditions similar to pre-mine conditions. Based on Western Energy's groundwater model, the groundwater table will take more than 50 years after site reclamation to be reestablished (PAP, Appendix O). DEQ (2019b) predicted 90 percent recovery occurring 66 years after mining and less than 5 feet of drawdown remaining 58 years after mining. In addition, it may take hundreds of years for the bedrock (overburden and Rosebud coal) aquifers to recover to near pre-mining conditions (Nicklin 2017). Other effects would be changes to in-stream and spring-fed pond water quality during mining and to stream water quality, which would occur after mining and reclamation was completed due to the discharge of groundwater from the spoil to streams downslope of the mine. Westmoreland Rosebud would be required to meet postmining land use performance standards and protect pre-mine and anticipated beneficial uses of the water.

To mitigate the general lack of water in the vicinity of the project area (due to climate and not primarily as a consequence of mining), Westmoreland Rosebud proposes enhancement features within the PMT to capture water when available and use it to enhance habitat for wildlife and livestock, and to establish wetlands. These features would be in the form of small depressions that would store water following runoff events, thereby providing water sources, promoting establishment of wetland species, and diversifying the postmining habitat types in the project area. These small depressions would also help retain sediment within the project area.

4.7.3.2 Direct Impacts

As noted in **Section 3.7.1.2 Analysis Area, Direct Effects Analysis Area**, measurable direct effects are not expected to extend beyond the watersheds of Trail Creek, McClure Creek, Robbie Creek, Donley Creek, Black Hank Creek, and the reach of West Fork Armells Creek that receives surface water flow from those watersheds and extends between its confluences with Robbie Creek and Trail Creek.

Surface Water Hydrology Impacts

Springs

Potential effects on the 14 monitored springs in the project area during and after mining are summarized in **Table 4.8-2** in **Section 4.8, Water Resources – Groundwater**. Springs that are not expected to be affected by mining include Springs 1, 4, 5, and 6 (overburden springs located southwest of the analysis area and upgradient of the area to be mined), Spring 7 (within the 74-acre area not approved for mining), Spring 14 (one-half mile downstream from the project area), and Springs 2 and 12 (although they are expected to be affected by nearby road construction). Springs expected to be affected by relocation of the county road and construction of the haul road (see **Section 2.4.3.4, Roads** in the 2018 Final EIS), which would disturb the ground surface near the springs, include Springs 2, 8, and 12, as well as Spring 11 prior to its expected elimination due to mining activities. The flow of springs near the mining footprint would be reduced or eliminated by mining if their water source is the overburden or Rosebud coal seam (which would be removed) or the McKay coal seam, in which groundwater drawdown would occur; this includes Springs 8 and 13. Springs 3, 9, 10, and 11 are expected to be eliminated due to mining activities. However, the impact of the removal of the springs on the direct effects analysis area would be reduced as a result of wetland mitigation, reclamation to reestablish the hydrologic balance to the extent possible, and water supply replacement as described in the PAP. Mitigation plans will be developed and implemented for all springs that are impacted by mining-related activities as also described in the PAP. The timing of effects on spring flow would be related to the mining sequence (see PAP, Exhibit A). Spring flows would not be reduced or eliminated until the Rosebud coal seam in the vicinity of the spring was mined out. After mining ceased, pre-mine flow conditions would not return to springs where the aquifer sources were removed. If some of the entire spring source is McKay coal seam and groundwater drawdown in the McKay coal seam reduced the flow during mining, spring flow would recover as the groundwater table recovered. As described in **Section 4.8, Water Resources – Groundwater**, the backfilled spoil would be less capable of transmitting groundwater horizontally than the original overburden; however, it is possible that springs from the backfilled spoil may develop within or downslope of the direct effects analysis area. For example, in Permit Area B of the Rosebud Mine, two small springs have developed in drainage bottoms during reclamation that appear to be a result of preferential subsurface flow paths in the spoil (DEQ 2015d). Overall impacts on spring flows and the beneficial uses of spring water in the analysis area as a result of the Proposed Action would be long-term and moderate.

Streams

Streams located south and west of the direct effects analysis area are upstream of the project area and would not be affected by mining. During mining, groundwater contributions to stream flows in the project area in sections of McClure, Robbie, and Donley Creeks would be reduced and may be eliminated except at locations upstream of the areas to be mined (such as upper Donley Creek). These stream sections are described in **Section 3.7.5.2, Streams in the Direct Effects Analysis Area**. Effects on groundwater contributions to stream flow would occur due to reduced water availability from the McKay Coal and/or removing the overburden and/or Rosebud coal aquifers that are sources of water to these streams via springs (for which effects are shown in **Table 4.8-2** in **Section 4.8, Water Resources – Groundwater**). In addition, the direction of groundwater flow in the unmined areas where the Rosebud coal seam was not mined would be shifted toward the mine pits rather than to the alluvium in the stream channels. After mining, until the backfilled spoil was resaturated, groundwater remaining in the Rosebud coal aquifer would not reach the major drainages. As the spoil resaturated, water would begin to flow from the spoil to downslope stream channels. Based on Western Energy's groundwater model, the groundwater table will take more than 50 years after site reclamation to be reestablished (PAP, Appendix O). DEQ (2019b) predicted 90 percent recovery occurring 66 years after mining and less than 5 feet of drawdown remaining

58 years after mining. In addition, it may take hundreds of years for the bedrock (overburden and Rosebud coal seam) aquifers to recover to near pre-mining conditions (Nicklin 2017). Groundwater contributions to stream flow from the reclaimed area would eventually return to Robbie and Donley Creeks, but as described in **Section 4.8, Water Resources – Groundwater**, the rate of flow at these locations would be less because there would no longer be discharge from the Rosebud coal aquifer and, due to the nature of the spoil, discharge from the spoil would likely be less than previously occurred. In addition, the location of groundwater discharge and contributions to flow in the creeks may change due to the change in water source (from Rosebud coal aquifer to spoil). Once the water table recovered in the McKay Coal, water from the McKay would discharge again to stream channels where it had previously discharged. Growth and propagation of aquatic life may be lost in reaches adjacent to mining that become ephemeral during mining and until water level recovery was complete. The effects of reducing groundwater contributions to stream flow at specific locations would be mitigated through wetland mitigation and reclamation to reestablish the hydrologic balance to the extent possible, as described in the PAP. Effects on groundwater contributions to stream flows and on the overall corresponding beneficial uses of stream flows in the direct effects analysis area would be long-term, minor to moderate, and adverse.

Much of the flow in the direct effects analysis area streams occurs as a result of runoff from storm events or snowmelt. During mining, the majority of runoff from undisturbed land upstream of the mine would flow through the undisturbed main stream channels (see **Figure 3.7-1** in **Section 3.7, Water Resources – Surface Water**). Tributary drainages would be mined out, and runoff from undisturbed lands upstream of the active pit would be captured in the pit or sediment ponds. Surface runoff from disturbed areas would be impounded in the mine pits or sediment ponds, resulting in reduced ephemeral flows during precipitation and snowmelt runoff events. Based on the expected 19-year mining sequence (see **Section 2.4.3.5, Approximate Mining Sequence**; see also PAP, Exhibit A), the Donley Creek drainage and a small part of the Black Hank Creek drainage would be affected first, then the Robbie Creek drainage, followed by the McClure Creek drainage, and finally the rest of the Black Hank Creek drainage. Estimated mean annual runoff and peak flows for analysis area streams and other ungaged streams in southeast Montana were determined using multiple regression equations developed by the USGS (Parrett and Johnson 2004). Using the regression equations based on basin characteristics, the single most important independent variable is drainage area, and in southeast Montana, the other variable used in the equations is percentage of basin covered by forest (defined in the analysis area as the conifer/sumac and woody draw vegetation communities; see **Section 3.10, Vegetation** and **Figure 45** in the 2018 Final EIS). Other variables considered were precipitation, basin elevation, and channel length and slope. During mining, the watershed areas of McClure, Robbie, Donley, and Black Hank Creeks would be reduced as each watershed was mined; thus, it is expected that runoff to streams would decrease. The Trail Creek watershed is not considered in this analysis because none of the watershed area is approved for mining (a portion of the 74-acre area that is not approved for mining). Using the USGS equations (Parrett and Johnson 2004) to estimate peak flows on these streams, percent flow reductions at full mine development are provided in **Table 4.7-2** (2018 Final EIS **Table 129**). To show the effect of a reduction in watershed area, the calculations assume that the percent forest cover in each basin would not change as a result of mining; however, if the percent forest cover decreased, peak flows would increase, and if the percent forest cover increased, peak flows would decrease. The flows provided in **Table 4.7-2** (2018 Final EIS **Table 129**) are for each stream from the top of each watershed to the downstream, northeastern project area boundary. Before all mine passes were excavated in each watershed, effects on stream flows would be less and would progressively increase to those shown in **Table 4.7-2** (2018 Final EIS **Table 129**). The drainage area and stream flow in Horse Creek would not change because no mining disturbances would occur in that drainage.

Table 4.7-2. Estimated Peak Flows for Streams in the Project Area Before Mining and at Full Mine Development.

Drainage Basin	Watershed Area in the Project Area (acres)[1]	Pre-mining 2-yr Peak Flow (cfs)	2-yr Peak Flow at Full Mine Development (cfs)	Percent Reduction in 2-yr Peak Flow	Pre-mining 10-yr Peak Flow (cfs)	10-yr Peak Flow at Full Mine Development (cfs)	Percent Reduction in 10-yr Peak Flow	Pre-mining 100-yr Peak Flow (cfs)	100-yr Peak Flow during Mining (cfs)	Percent Reduction in 100-yr Peak Flow
McClure Creek[2]	463.1	9	7.6	15	59	51	13	260	231	11
Robbie Creek	2,678.8	29	24	17	158	136	14	591	519	12
Donley Creek	5,440.6	41	38	7	217	204	6	783	742	5
Black Hank Creek	6,344.6	44	42	5	232	220	5	830	792	5

[1] Approximate maximum areas of each watershed assumed to be removed from contributing drainage areas during mine operations: McClure Creek (150 acres), Robbie Creek (680 acres), Donley Creek (630 acres), and Black Hank Creek (610 acres).
[2.] Since the publishing of the 2018 Final EIS, 74 acres (approximately 30 acres of which is in the McClure Creek drainage basin) has been removed from the proposed mining area. The analysis shown above reflects corresponding changes to the affected drainage basin (less affected area than reflected in the 2018 Final EIS) resulting in slightly higher peak flows during mining and slightly lower corresponding peak flow reductions in the McClure Creek drainage basin, as compared to data reflected in the 2018 Final EIS.
Source for peak flow calculations: http://wy-mt.water.usgs.gov/freq?page_type=gen_stats_1.

Maximum peak flows as measured at baseline monitoring stations are compared to the estimated pre-mining peak flows for the 2-year recurrence event as follows:

- McClure Creek: Not monitored
- Robbie Creek: 29 cfs (estimated); 28 cfs (measured)
- Donley Creek: 41 cfs (estimated); 446 cfs (measured)
- Black Hank Creek: 44 cfs (estimated); 59 cfs (measured)

Within each analysis area watershed, when all of the mine passes were being or had been mined, and until the watersheds were fully restored, estimated 2-year, 10-year, and 100-year peak flows would be reduced by up to 15 percent in McClure Creek, up to 17 percent in Robbie Creek, and less than 10 percent in Donley and Black Hank Creeks. In addition, disturbed area runoff would be controlled by a network of roadside ditches, sediment-control ponds, and sediment traps. Surface runoff from disturbed areas would be impounded in the mine pits and/or sediment-control structures in accordance with the Hydrologic Control Plan shown on **Figure 4.7-1** (2018 Final EIS **Figure 107**). The detention and controlled release of surface runoff would result in additionally reduced peak flows to the West Armells Creek drainage. Some of the water stored in the sediment ponds or mine pits would be used (such as for dust control), some would evaporate, and some would infiltrate to the subsurface; this is water that would be lost as surface or subsurface flow in the stream channels. Loss of runoff water due to storage of runoff in the sediment ponds or mine pits, evaporation, or infiltration could affect the local hydrologic balance (EPA 2001). The volume, timing, and frequency of ephemeral flows in direct effects analysis area streams and West Fork Armells Creek would change. The effect of reduced peak flows may be changes to stream morphology and reduced surface and subsurface (via the alluvium) recharge to the streams below the analysis area, including the West Fork Armells Creek. Reduced peak flows may result in less sediment transport, channel narrowing, and less water storage within channel banks and floodplains. It may be difficult to separate these effects from the effects of variability in runoff-producing storm events.

During mining, water would be discharged when needed from sedimentation ponds to McClure, Robbie, Donley, and Black Hank Creeks via MPDES outfalls. The sedimentation ponds would be designed to retain up to the volume of runoff produced by the theoretical 10-year 24-hour storm event, so runoff from

larger events would discharge to the main channels (PAP, Appendix O). Discharge may also occur when the ponds needed to be drained to comply with the minimum 24-hour retention capacity requirement per ARM 17.24.639(2). Stored water would be removed by using a non-clogging dewatering device or conduit approved by DEQ. Discharges to mine area streams would replace some of the storm water runoff, but the volume, timing, and frequency of such discharges would not be the same as would occur naturally, so effects on channel morphology would not be offset by discharges at the MPDES outfalls (**Figure 2.24**).

As the mine site is reclaimed (see **Section 2.4.4, Reclamation Plan** and **Figure 2.25** for the proposed timing of reclamation), the PMT, drainage areas, and geomorphic characteristics would be designed to be similar to pre-mine topography (given the constraints of earthmoving equipment, costs, other ongoing reclamation, and the volume of spoil available to fill the pits and restore the site topography) (PAP, Appendix J, Tables J-1 and J-2). As a result, peak flows would return to near pre-mine peak flows (PAP, Appendix J, Tables J-3 to J-5). MSUMRA requires that drainage basins be restored during reclamation to the original stream function. To the extent possible during reclamation, smooth transitions would be constructed between undisturbed and reclaimed land to reestablish surface drainage patterns. The disturbed tributary drainages and stream channels would be reconstructed to the approximate original drainage configurations, with channel geometry similar to pre-mine conditions; however, there would be small differences in watershed areas and shapes postmining that would slightly alter runoff within the watersheds (see **Section 2.4.4.5, Postmining Topography and Drainage Basin Design** and **Figure 2.26**). The disturbed stream channels within the project area formerly governed by geologic structure and the inherent variability of different strata would no longer exist. Geologic structure within the stream channels would not be disturbed upstream and downstream of the project area. Spoil in the designed postmining drainages would be covered by several feet of topsoil and vegetated. The reclaimed drainages would be designed to minimize erosion and protect the hydrologic balance.

Although stream flows may be restored to conditions similar to pre-mine stream flows, stream flow from the upstream areas of the tributaries may be reduced or may not flow through the reclaimed area because the vertical percolation rate in the spoil would be greater than in the overburden (see **Section 4.8, Water Resources – Groundwater**). Some or all surface flow may infiltrate into the spoil rather than flowing to the lower portion of the watershed, as has been observed at the Big Sky Mine during reclamation (DEQ 2015e). Whether surface flow across the spoil was reduced or totally infiltrated would be dependent on topography; where fairly flat, there may be no flow after reclamation. In addition, flow in the streams from groundwater discharge to the stream channels would not begin until after groundwater levels recovered more than 50 years to possibly hundreds of years after mining, and discharges to streams may occur at different locations than occurred before mining. Based on Western Energy's groundwater model, the groundwater table will take more than 50 years after site reclamation to be reestablished (PAP, Appendix O). DEQ (2019b) predicted 90 percent recovery occurring 66 years after mining and less than 5 feet of drawdown remaining 58 years after mining. In addition, it may take hundreds of years for the bedrock (overburden and Rosebud coal) aquifers to recover to near pre-mining conditions (Nicklin 2017). The overall impacts from the Proposed Action on ephemeral stream flows in the direct effects analysis area would be minor and adverse in the short term to negligible in the long term.

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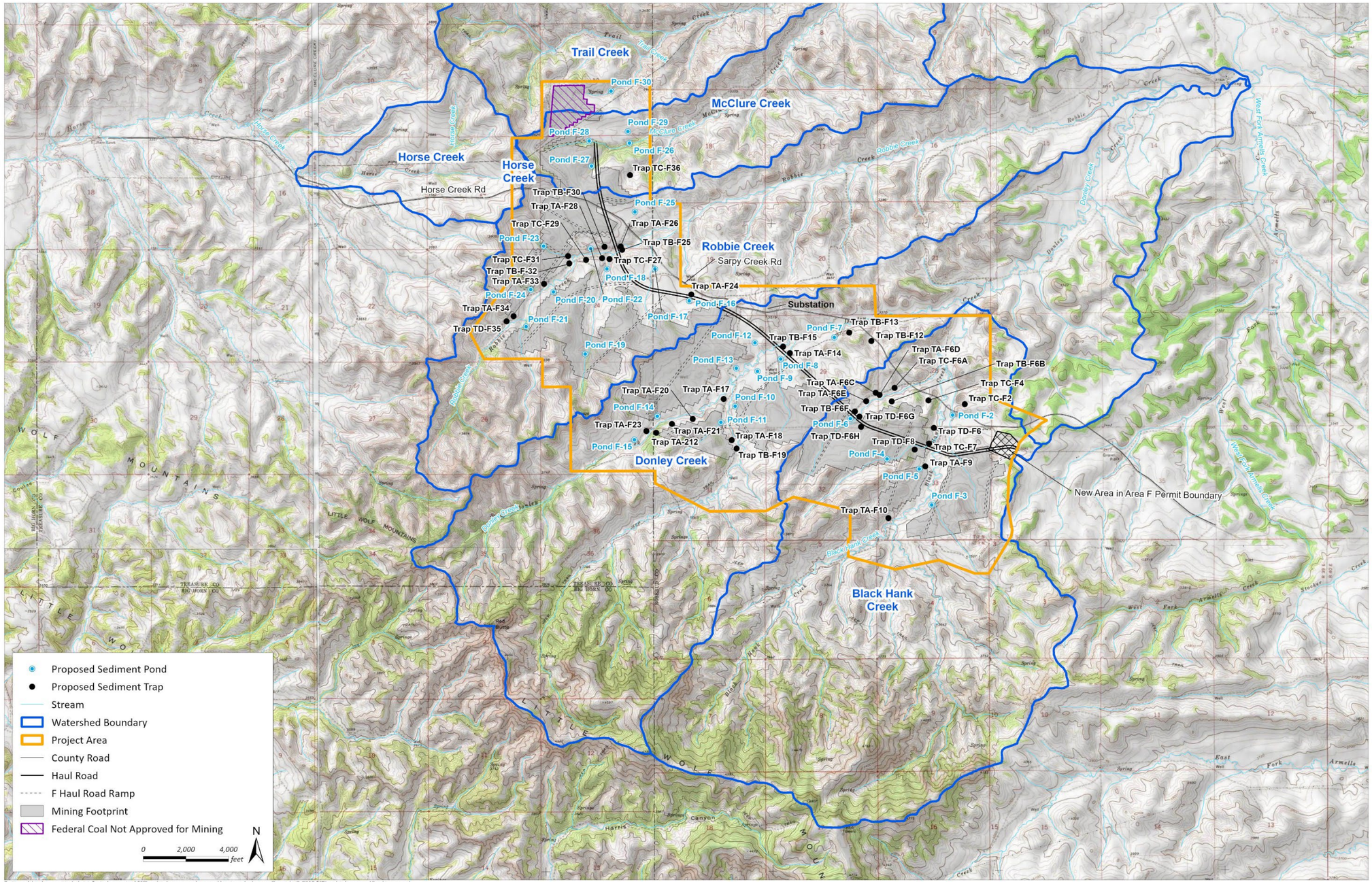

Figure 4.7-1. Proposed Project Area Mining Footprint, Haul Roads, and Sediment Ponds and Traps (2018 Final EIS Figure 107).

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Ponds

None of the seven monitored man-made livestock ponds would be removed during mining. Other ponds in the analysis area are not mapped, but if they are within the mining footprint, they would be eliminated. The water supply of two ponds (Pond 4, located adjacent to Black Hank Creek, and Pond 8, located adjacent to McClure Creek, both downstream from the mine pits) may be reduced or eliminated during mining due to the impoundment of runoff that is a source of supply to the ponds or due to the reduction or elimination of spring flows that are a source of supply to the ponds. Pond 8 also likely receives a contribution of its water from Spring 14, and Spring 14 is not expected to be affected by mining. After mining, the two ponds would be reestablished, and up to ten sediment ponds (located downstream of the proposed mine pits) would be retained until reclamation is complete to provide water supplies for wildlife and livestock. Pond 4 had predominantly dry conditions with recordable water depths for 8 of 150 monthly visits from 2011 through 2023; thus, the overall effect on pond water supply in the direct effects analysis area would be short-term, negligible to moderate, and adverse. As discussed in **Section 4.9, Water Resources – Water Rights**, if a pond with a water right for stock watering were to become unusable, a suitable replacement source would be provided by Westmoreland Rosebud. To mitigate the general lack of water in the vicinity of the project area (due to climate and not primarily as a consequence of mining), Westmoreland Rosebud proposes enhancement features within the PMT to capture water when available and use it to enhance habitat for wildlife and livestock, and to establish wetlands. These features would be in the form of small depressions that would store water following runoff events, thereby providing water sources, promoting establishment of wetland species, and diversifying the postmining habitat types within the project area. These small depressions would also help retain sediment within the project area.

Hydrologic Balance

Mining would affect the hydrologic balance within and downstream of the project area in the following ways:

- Mining through tributaries, which would affect stream and alluvial flows
- Altering the topography, which would affect stream and alluvial flows
- Storing runoff, which would affect stream and alluvial flows and alter surface water storage
- Decreasing or eliminating spring flows, which would affect stream and alluvial flows
- Eliminating some stock ponds, which would reduce surface water storage
- Storing water in sediment ponds and discharging water from MPDES outfalls, which would affect stream and alluvial flows and recharge to groundwater
- Disturbing the soil surface and removing vegetation, which would affect the interception, infiltration, evaporation, sublimation, and transpiration of water at the land surface
- Removing the Rosebud coal aquifer, which would change groundwater storage
- Removing the overburden and replacing it with spoil, which would permanently change the vertical percolation rate (**Section 4.8, Water Resources – Groundwater** states that the vertical percolation would be greater in the spoil than in the overburden) and change groundwater storage

After mining, the watershed topography and hydrology would be restored to reestablish to the extent possible the hydrologic balance in the analysis area (see **Section 2.4.4, Reclamation Plan** and **Section 2.4.5, Protection of the Hydrologic Balance**). This reclamation would be phased (see **Section 2.4.4, Reclamation Plan** and **Figure 2.25** for the proposed timing of reclamation), with spoil backfilled into the pit after each subsequent mine pass and grading and stabilization of the spoil occurring within four spoil

ridges of the active mining pass. During the final phases of spoil grading, surface drainages would be reconstructed to the approved approximate PMT, which would approximate original drainage configurations. A tributary system would be designed and constructed to restore the pre-mine incised drainages. The postmining channels and floodplains would be designed to mimic the pre-mine channels' response to rainfall events by providing channel geometry (length, slope, longitudinal profile, cross-section, and bedform) to create velocities, depths, flow areas, and other hydraulic properties similar to pre-mine properties for the same discharge events. New ponds may be constructed, and surface water flow and quality would be monitored to determine if surface water quantity and quality without treatment had stabilized to its previous undisturbed state and achieved postmining land use performance standards for livestock and wildlife use in and downstream of the project area. Effects on the hydrologic balance would vary depending on location within the direct effects analysis area. At locations where the overburden and Rosebud Coal were removed, groundwater storage would be permanently changed. At the most downstream end of the analysis area at the West Fork Armells Creek, any changes to the relationship between the quality and quantity of water inflow to, water outflow from, and water storage in the West Fork Armells Creek basin, including the dynamic relationships among precipitation, runoff, evaporation, and changes in groundwater and surface water storage, would be restored during reclamation.

Based on Western Energy's groundwater model, the groundwater table will take more than 50 years after site reclamation to be reestablished (PAP, Appendix O). DEQ (2019b) predicted 90 percent recovery occurring 66 years after mining and less than 5 feet of drawdown remaining 58 years after mining. In addition, it may take hundreds of years for the bedrock (overburden and Rosebud coal) aquifers to recover to near pre-mining conditions (Nicklin 2017). It would not be possible to completely restore the pre-mine hydrologic balance in the direct effects analysis area after mining due to the removal and replacement of the Rosebud Coal and overburden with spoil. Westmoreland Rosebud would be required to meet postmining land use performance standards and protect pre-mine and anticipated beneficial uses of the water; thus, the overall impacts on the hydrologic balance in the direct effects analysis area would be long-term, moderate, and adverse.

Floodplains

The 100-year floodplains on Trail, McClure, Robbie, Donley, and Black Hank Creeks in the analysis area, which are about 300 feet wide, would not be mined and would remain intact. Haul roads would largely be located outside of the 100-year floodplains, but where they crossed streams, culverts would be installed that were designed for the 10-year, 24-hour storm event (see **Figure 2.23**). Structural BMPs, described in **Chapter 2**, would be used to control sediment movement and erosion, and stabilize the haul roads within the 100-year floodplains. The only other mine facilities that may be installed in the floodplains would be sediment ponds or traps. The disturbance area of the sediment ponds or traps to project area streams would be very small compared to the area of the 100-year floodplains in the analysis area. Flooding would continue to occur due to large storms, such as the precipitation events in late May 2013 and early March 2014 that resulted in flows at SW-90 on Donley Creek estimated to be 360 cfs and 446 cfs, respectively. Runoff from storms greater than the 10-year, 24-hour event would flow over any haul roads located in the floodplains, and some would flow through the culverts. It is possible that damage to the floodplain and an increased hazard to life could occur temporarily if a very large storm event damaged or washed out the haul road within one or more of the creek floodplains. It is not expected that other mine structures or mine activities would damage the floodplains or cause an increased hazard to life downstream of the project area. Effects on floodplains would be short-term, minor, and adverse.

Surface Water Quality Impacts

Springs

The water quality of overburden springs located upgradient or significantly outside of the area to be mined such as Springs 1, 4, 5, 6, 7, and 14 would not be affected by mining. The water quality of springs where the source is the McKay Coal (such as Spring 13) would not be affected by mining. Rosebud Coal springs and springs within the mined area (such as Springs 3, 8, 9, 10, and 11) would either be eliminated or the water source removed (see **Table 4.8-2**). The water quality of the spoil would generally be poor (as described in **Section 4.8, Water Resources – Groundwater**), so any springs that developed in or below the mined area from spoil groundwater would likely have higher dissolved solids, sulfate, and possibly nutrient and metal concentrations. Springs 2, 8, 11, and 12 would be affected by construction of the haul road, which would disturb the ground surface near the springs; the effects would be short-term and minor.

Streams

Runoff from disturbed lands would be intercepted and treated by the implementation of sediment-control measures. Sedimentation ponds would be designed for total containment of runoff from the 10-year, 24-hour precipitation event plus storage of 3 years of sediment yield from disturbed areas in the mine area. Locations of sedimentation ponds and associated ditches are shown on **Figure 4.7-1** (2018 Final EIS **Figure 107**; see also **Section 3.7, Water Resources – Surface Water**). During mining, runoff from undisturbed land above the pit would be intercepted by the pit or by temporary impoundments or traps in the drainages above the pit. Very large runoff events would be intercepted by the pit. A system of ditches and traps proposed for the perimeter haul road is shown in the Approximate Hydrologic Control Plan (PAP, Exhibit D) and discussed in **Section 2.4.5.2, Surface Water Management and Sediment Control Measures**. Ditches along the haul road would direct runoff to either sedimentation ponds or sediment traps. In areas where the haul road crossed the ephemeral drainages, runoff from the road embankment would be collected by sediment traps. Ditches would roughly parallel the access roads to intercept runoff from disturbed lands. This containment system should prevent any sediment or untreated runoff from leaving the project area. All discharges from the proposed mining areas to state surface waters would be required to comply with applicable MPDES Permit effluent limits.

Westmoreland Rosebud would also use other sediment-control measures for roads and other disturbed areas as described in **Section 2.4.5.2, Surface Water Management and Sediment Control Measures** in the 2018 Final EIS. Erosion control BMPs listed by DEQ in the MPDES Permit for the project area would be required. Sediment and erosion control structures would remain in place after mining for as long as needed until all disturbed areas were fully reclaimed. Structural BMPs that have been proposed for use in the project area by Westmoreland Rosebud are outlined in **Section 2.4.5.2, Surface Water Management and Sediment Control Measures** in the 2018 Final EIS.

Assuming all runoff from disturbed lands were effectively captured and treated before release to any of the unmined streams in the analysis area, and all discharges at MPDES Permit outfalls met effluent limits, adverse effects on stream water quality should be minimal, and beneficial uses should be protected.

If a precipitation event occurred that was greater than the culverts, sediment ponds, ditches, and other erosion-control structures were designed for, they would not be capable of routing, holding, and/or treating sediment-laden runoff and may themselves cause erosion to roads, upland disturbed and undisturbed areas, and channels and floodplains in and downslope of the analysis area. Some storm water runoff would be captured in the mine pits, but other runoff from disturbed areas may reach streams and ponds in the unmined areas, temporarily increasing suspended sediment, dissolved solids, and total metal concentrations in streams and ponds.

During mining, the quality of storm water flow from undisturbed areas in the project area would be the same as before mining commenced if no untreated storm water runoff was released from the disturbed areas. The quality of water in sections of Trail, McClure, Robbie, and Donley Creeks with surface water flows sourced from groundwater, if and when such flows from the coal beds remained, would be similar to the existing quality of the Rosebud and/or McKay Coal water (see tables in **Section 4.8, Water Resources – Groundwater**).

As discussed in **Section 4.8, Water Resources – Groundwater**, after backfilling and once the spoil resaturated, groundwater may discharge from the spoil to alluvium along the major drainages. It is not known where such discharges would occur downstream of the analysis area, and the quantity of such discharges is not known. Discharge from the spoil to streams could result in changes in water quality in the drainages compared to pre-mining conditions. Postmining, discharge to the streams would be from spoil with water quality that, compared to stream water quality, has higher dissolved solids, nutrient, and some metal concentrations. As discussed in **Section 4.8, Water Resources – Groundwater**, the quality of spoil groundwater in other areas mined by Western Energy is highly variable, so it is difficult to predict to what extent discharge from the spoil in the analysis area would affect surface water quality, and if changes in water quality due to discharge from the spoil would be separable from natural water quality variability. In addition, an evaluation of several decades of spoil water quality data from Permit Areas A and B of the Rosebud Mine shows that in a number of wells, concentrations of the following parameters have increased over time: TDS, sulfate, carbonate alkalinity, total alkalinity, chloride, dissolved iron, and dissolved manganese. It is not known how long it would take for the quality of water in spoil to eventually improve as soluble salts and metals are flushed from the system. Based on spoil water quality presented in **Section 4.8, Water Resources – Groundwater**, TDS, sulfate, alkalinity, calcium, sodium, nitrate+nitrite, magnesium, and manganese concentrations in streams below the spoil may increase and exceed nitrate+nitrite and total nitrogen standards as well as and recommended limits for the other parameters for livestock, other ruminants, and aquatic life when and where groundwater discharge is the major or only source of water to streams. As stated in **Section 3.7, Water Resources – Surface Water**, cattle and wildlife can adapt to higher TDS concentrations, but there may be chronic adverse health effects. If surface water became unusable for its specified postmining beneficial use due to water quality changes, a suitable replacement source would be provided. The overall impacts of the Proposed Action on surface water quality and associated beneficial uses of streams in the analysis area would be long-term, minor to moderate, and adverse.

Ponds

During mining, for ponds whose water supply was reduced due to the impoundment of runoff (such as Pond 4), the quality of the pond water may improve due to the reduction in sediment-laden runoff entering the pond and reduced total metals associated with the suspended solids in the water. For any ponds whose water supply was reduced during mining due to the reduction or elimination of spring flows that are a supply source, the water quality of the pond would change. The water quality of all of the ponds may degrade due to a reduction in inflows, which would increase parameter concentrations in any water remaining in the ponds. The overall effects on water quality and associated beneficial uses of ponds in the analysis area would be long-term and moderate. Postmining ponds would be supplied water from storm water runoff, so the water quality of the ponds would be similar to that of existing ponds whose source of water is only storm runoff.

Sediment Yield

Input parameters for the WEPP model to predict existing sediment yield in the analysis area included pre-mine topography and drainage basin boundaries, Natural Resources Conservation Service soil survey data, a rangeland grass system with sagebrush vegetative cover, and precipitation data from the Colstrip

meteorological station (PAP, Appendix U). Running the model for a 20-year period resulted in a pre-mine average annual sediment yield for the analysis area ranging from 0 to 0.871 ton/acre/year, with an average of 0.142 ton/acre/year. Input parameters for the SEDCAD model included estimated PMT and drainage basin boundaries, an assumed 80 percent ground cover after reclamation, postmining soils that would be similar to pre-mine soils, a loam or silt loam soil texture, an erodibility factor with a soil of moderate infiltration rate and runoff potential, and a 10-year 24-hour storm event of 2.45 inches (PAP, Appendix U). The model-predicated postmining average annual sediment yield ranged from 0.001 to 0.18 ton/acre/year for the postmining drainage basins in the analysis area. The postmining sediment yields would be less than or equal to pre-mine sediment yields in the majority of drainages within the Robbie Creek, Donley Creek, and Black Hank Creek watersheds, and greater than pre-mine sediment yields in some of the drainages within the Robbie Creek, Donley Creek, and Black Hank Creek watersheds. In basin area RCT-7, located in lower Robbie Creek within the project area, pre-mine sediment yield was predicted to be 0 ton/acre/year for the 131-acre basin area; postmining sediment yield after disturbance of 82.8 acres was estimated to be 0.046 ton/acre/year, with a yield of 9.4 tons of sediment from a 10-year 24-hour storm event. The largest ton/acre/year sediment yield increase and largest 10-year 24-hour storm yield were predicted to occur in basin area BHCT-6, located in Black Hank Creek within the project area. The predicted increase in BHCT-6 is from 0.021 ton/acre/year to 0.145 ton/acre/year after disturbance of 344.2 acres, with a yield of 121.9 tons of sediment from a 10-year 24-hour storm event. The largest ton/acre/year sediment yield decrease is predicted to occur in RCT-2, located in the upper Robbie Creek watershed; the yield is predicted to decrease from 0.598 ton/acre/year to 0.034 ton/acre/year. Changes in sediment yield indistinguishable from those caused by fluctuations in natural processes would not have measurable effects on streams. Increases or decreases in sediment yield in some of the basins may have localized measurable effects on stream morphology and water quality. Large increases or decreases in sediment yields, such as those predicted for RCT-2 and BHCT-6, may result in measurable effects on stream morphology, stream water quality, and aquatic habitat in parts of the watersheds in the direct effects analysis area. Although a few localized watersheds may show increases in sediment yield, the overall effect of the Proposed Action is to reduce sediment yields within the analysis area from an estimated 0.142 ton/acre/year to 0.058 ton/acre/year. The reduction would be due to less steep slopes in the PMT than in the pre-mine topography. The overall impact on surface water quality due to changes in sediment yield in the analysis area would be long-term and moderate.

Other Impacts on Surface Water Quality

If not adequately suppressed, dust from mining activities could reach surface water bodies in the analysis area. The dust would add sediment and other pollutants such as metals to surface water. Westmoreland Rosebud would use a surfactant to suppress fugitive dust on haul roads that could enter surface waters in and near the analysis area and may degrade water quality. Effects on surface water quality due to dust from mining activities would be short-term, negligible to minor, and adverse.

4.7.3.3 Indirect Impacts

Although indirect impacts associated with the Colstrip and Rosebud Power Plants' GHG emissions and the Colstrip Power Plant's water withdrawals from the Yellowstone River would continue through the operational life of the Colstrip Power Plant (2042), regardless of whether Area F coal is available or not, those indirect impacts would no longer be attributable to combustion of Area F coal once mining of Federal coal in Area F ends in 2039 for Alternative 4. Thus, Area F coal would be available for combustion in the Colstrip and Rosebud Power Plants for up to 20 years (2020 to 2039) under Alternative 4.

Surface water quantity and quality data for Areas A, B, C, D, and E within the indirect impacts analysis area were reviewed in previous CHIAs associated with the other Rosebud Mine areas. The most recent

CHIA was completed for Area B Amendment 5 (DEQ 2022b) and provides detailed discussion of each Area B drainage basin, mining history, proposed operations, and relevant monitoring data. The Area B AM5 CHIA also provides detailed discussion of impacts to the Area B drainage basins, which fall under the following categories:

- Alterations in surface or spring flows from source groundwater drawdown
- Alterations in surface flows from disturbance of the watershed and stream channels
- Alterations in baseflow from disturbance to contributing aquifers
- Removal of tributary sources during mining
- Surface water quality changes from changes in source groundwater quality
- Surface water quality and quantity changes from MPDES discharges to surface water
- Water quality changes from runoff from mining infrastructure (roads and industrial facilities)

Surface Water Hydrology

The indirect effects analysis area includes the Yellowstone River between the Armells Creek and Tongue River confluences, chosen to account for indirect effects of water withdrawals by the Colstrip Power Plant. The Yellowstone River diversion point for the Colstrip Power Plant's 69 cfs water right is downstream of the confluence with Armells Creek.

Based on average annual flow data for the Forsythe gage (**Table 3.7-6**), the diversion associated with the Colstrip Power Plant currently withdraws an average of 0.7 percent of the estimated Yellowstone River flows, with a slightly higher (1.0) and lower (0.4) proportion of the total flow withdrawn in dry and wet years, respectively. Even in dry years, mean annual flows in the Yellowstone River near the diversion point were almost 7,000 cfs, whereas the maximum diversion potential is approximately 69 cfs. The other metrics demonstrated similar patterns. The proportional impact of the water withdrawals on peak flows was 0.1 to 0.2 percent (**Table 3.7-6**). In February, typically the month in which the Yellowstone River has the lowest flows on average, the water withdrawals would result in a 1.0 to 1.8 percent decrease in flows depending on the year type. As also noted in the analysis of peak flows, the impact of the diverted water in June, the wettest month on average, would be a decrease in stream flow of 0.3 percent or less. When the single individual day with the lowest flow within the period of record from 2000 through 2023 was analyzed (2,019 cfs on August 30, 2001), the water withdrawal accounted for 3 percent of the estimated total flow in the Yellowstone River, upstream of the diversion point.

To view the water withdrawal amount from a different perspective, daily flow fluctuations at the Forsythe gage averaged 541 cfs and ranged from 0 to 27,000 cfs. The maximum fluctuation occurred in mid-June 2022 during the record-breaking flooding event that year; a similar fluctuation near that magnitude occurred in May 2011. Of these data, 73 percent of the day-to-day fluctuations were greater than the diversion amount of approximately 69 cfs. The amount of water diverted to supply the Colstrip Power Plant is insignificant in comparison to daily fluctuations that occur in the Yellowstone River in the vicinity of the diversion. The proportion of flow diverted for the Colstrip Power Plant is further muted as the drainage area increases and tributaries continue to contribute water to the Yellowstone River.

Based on these analyses, stream flow in the Yellowstone River is minimally impacted by the water withdrawals for the Colstrip Power Plant, with each flow metric in average, dry, or wet years decreasing by less than 2 percent (OSMRE 2025). The amount of water diverted cannot be differentiated from the natural variability in flow observed from day to day based on data from 2000 to 2023 (**Table 3.7-6**).

The following narrative summarizes potential indirect effects from project area mining activities on surface water hydrology within the indirect effects analysis area. As described in **Section 4.7.3.2, Direct**

Impacts, Surface Water Hydrology Impacts, Streams, stream flows in sections of West Fork Armells Creek tributaries (McClure, Robbie, and Donley Creeks) would be reduced and may be eliminated due to anticipated effects of project area mining activities that would reduce groundwater contributions to stream flows, resulting in direct effects on analysis area streams that would be long-term, minor to moderate, and adverse. Project area mining activities would also reduce ephemeral stream flows in West Fork Armells Creek tributaries (McClure, Robbie, Donley, and Black Hank Creeks) during precipitation and snowmelt runoff events due to the capture of on-site and upstream surface water runoff in mine pits or sediment ponds, resulting in direct effects on analysis area streams that would be adverse and minor in the short term to negligible in the long term. The combination of these effects on stream flows in the direct effects analysis area would, in turn, affect surface water flow in receiving streams that encompass a portion of the indirect effects analysis area. DEQ's Area F CHIA (DEQ 2019b) indicates that "downstream of the confluence of Trail Creek and West Fork Armells Creek, the expected impacts would diminish to the point of being non-measurable," thus the indirect effects analysis area associated with project area mining activities is limited to West Fork Armells Creek between the Trail Creek confluence (downstream-most point of measurable impact) and the Robbie Creek confluence (upstream-most point of measurable impact). Therefore, indirect effects on surface water hydrology from project area mining activities would not be expected in the lower portion of West Fork Armells Creek, in Armells Creek, and in the Yellowstone River.

Potential indirect effects from the conditions described above on surface water hydrology were quantified by comparing estimated peak stream flows before and at full mine development (similar to the analysis shown in **Table 4.7-2**) for two points on West Fork Armells Creek: immediately above the Trail Creek confluence and immediately below the Robbie Creek confluence. Peak stream flow was chosen as the appropriate parameter for this analysis because DEQ's Area F CHIA (DEQ 2019b) indicates that the reaches of the four West Fork Armells tributary streams within the project area (McClure, Robbie, Donley, and Black Hank Creeks) exhibit ephemeral flow (only in response to precipitation or snow/ice melt) with some localized spring/seep contributions, signifying that those four stream channels within the project area do not contribute baseflow to the indirect effects analysis area stream reaches that are intermittent or perennial. Pre-mine peak stream flows for the 2-year, 10-year, and 100-year recurrence intervals (provided below in **Table 4.7-3** as the left hand value listed in columns 3, 5, and 7) were estimated using the USGS StreamStats website application (USGS 2025) based on multiple regression equations for Montana developed by the USGS (Chase et al. 2021; Sando et al. 2016; McCarthy et al. 2016). Peak stream flows at full mine development (provided below in **Table 4.7-3** as the right hand value listed in columns 3, 5, and 7) were calculated by subtracting peak stream flow reductions reflected in **Table 4.7-2** from the StreamStats-derived pre-mine peak stream flows described above.

Table 4.7-3. Estimated Peak Flows for West Fork Armells Creek Before Mining and at Full Mine Development.

West Fork Armells Creek (WFAC) Drainage Basin	Watershed Area: Pre-mine to Full Mine Development (sq. mi.)[1]	2-yr Peak Flow: Pre-mine to Full Mine Development (cfs)[2]	Percent Reduction in 2-yr Peak Flow	10-yr Peak Flow: Pre-mine to Full Mine Development (cfs)[3]	Percent Reduction in 10-yr Peak Flow	100-yr Peak Flow: Pre-Mine to Full Mine Development (cfs)[4]	Percent Reduction in 100-yr Peak Flow
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8
Immediately above the Trail Creek Confluence	(61.6 to 58.4)[A]	(97 to 86)[C]	12	(536 to 481)[E]	10	(2,260 to 2,080)[G]	8
Immediately below the Robbie Creek Confluence	(45.3 to 42.3)[B]	(70 to 60)[D]	14	(383 to 336)[F]	12	(1,610 to 1,459)[H]	9

1. Watershed area reduction from pre-mine conditions to conditions at full mine development:
   A. WFAC above Trail Creek: 61.6 mi^2 pre-mine (StreamStats) reduced by 3.2 mi^2 or 2,070 ac (150 ac from McClure Creek + 680 ac from Robbie Creek + 630 ac from Donley Creek + 610 ac from Black Hank Creek per **Table 4.7-2**) equals 58.4 mi^2 at full mine dev.
   B. WFAC below Robbie Creek: 45.3 mi^2 pre-mine (StreamStats) reduced by 3.0 mi^2 or 1,920 ac (680 ac from Robbie Creek + 630 ac from Donley Creek + 610 ac from Black Hank Creek per **Table 4.7-2**) equals 42.3 mi^2 at full mine development.
2. 2-yr peak flow reduction from pre-mine conditions to conditions at full mine development:
   C. WFAC above Trail Creek: 97 cfs pre-mine (StreamStats) reduced by 11 cfs (1 cfs from McClure Creek + 5 cfs from Robbie Creek + 3 cfs from Donley Creek + 2 cfs from Black Hank Creek per **Table 4.7-2**) equals 86 cfs at full mine development.
   D. WFAC below Robbie Creek: 70 cfs pre-mine (StreamStats) reduced by 10 cfs (5 cfs from Robbie Creek + 3 cfs from Donley Creek + 2 cfs from Black Hank Creek per **Table 4.7-2**) equals 60 cfs at full mine development.
3. 10-yr peak flow rate reduction from pre-mine conditions to conditions at full mine development:
   E. WFAC above Trail Creek: 536 cfs pre-mine (StreamStats) reduced by 55 cfs (8 cfs from McClure Creek + 22 cfs from Robbie Creek + 13 cfs from Donley Creek + 12 cfs from Black Hank Creek per **Table 4.7-2**) equals 481 cfs at full mine development.
   F. WFAC below Robbie Creek: 383 cfs pre-mine (StreamStats) reduced by 47 cfs (22 cfs from Robbie Creek + 13 cfs from Donley Creek + 12 cfs from Black Hank Creek per **Table 4.7-2**) equals 336 cfs at full mine development.
4. 100-yr peak flow rate reduction from pre-mine conditions to conditions at full mine development:
   G. WFAC above Trail Creek: 2,260 cfs pre-mine (StreamStats) reduced by 180 cfs (29 cfs from McClure Creek + 72 cfs from Robbie Creek + 41 cfs from Donley Creek + 38 cfs from Black Hank Creek per **Table 4.7-2**) equals 2,080 cfs at full mine development.
   H. WFAC below Robbie Creek: 1,610 cfs pre-mine (StreamStats) reduced by 151 cfs (72 cfs from Robbie Creek + 41 cfs from Donley Creek + 38 cfs from Black Hank Creek per **Table 4.7-2**) equals 1,459 cfs at full mine development.

Source for watershed area and peak flow calculations: https://streamstats.usgs.gov/ss/.

As shown in **Table 4.7-3**, when all of the mine passes were being or had been mined, and until the watersheds were fully restored, estimated 2-year, 10-year, and 100-year peak flows would be reduced by up to 12 percent in West Fork Armells Creek immediately above the Trail Creek confluence and up to 14 percent in West Fork Armells Creek immediately below the Robbie Creek confluence. **Section 4.7.3.2 Direct Impacts, Surface Water Hydrology Impacts, Streams** provides additional information on the direct effects of peak ephemeral stream flows from evaporation and infiltration, control of runoff through sediment ponds and mine pits, and reclamation activities. Combined with that additional information, the analysis provided above indicates that the overall impacts from the Proposed Action on ephemeral stream flows in the indirect effects analysis area would be adverse and minor in the short term to negligible in the long term, similar to corresponding impacts in the direct effects analysis area.

As described in **Section 3.7.5.4, Surface Waters in the Indirect Effects Analysis Area**, Castle Rock Lake discharges measurable amounts of surface water to East Fork Armells Creek from a combination of continuous dam seepage (approximately 0.25 cfs) and infrequent releases from the lake's emergency spillway as a result of rare significant precipitation events during high-flow periods in the stream. Although lake discharges and stream flow are ungaged, the relative proportion of beneficial flow in the stream resulting from lake discharges is expected to range from negligible (during high stream flow periods without lake spillway releases) to moderate (from the continuous dam seepage during low stream

flow periods). As described in **Section 3.9.2, Existing Water Rights**, Talen Montana, on behalf of six owners of the Colstrip Power Plant, completed a 2022 Water Feasibility Study that includes plans for potential future uses of water associated with Castle Rock Lake (including continued municipal use by the City of Colstrip) through the anticipated duration of the power plant's proposed remediation efforts following closure (DOWL Engineering 2022). DEQ has recognized a continued commitment by the power plant's owners to work in conjunction with the city toward agreements for related water supply infrastructure and water rights access or updates (DEQ 2023). This process remains active where the future existence and use of Castle Rock Lake after closure of the power plant are currently unknown, thus related effects to surface water quantity in East Fork Armells Creek are currently unknown.

Surface Water Quality

As described in **Section 1.2.2.1, Colstrip Power Plant** and in **Chapter 5, Cumulative Impacts**, the Rosebud Mine provided an annual average of 9.9 million tons of coal over the previous decade to the Colstrip Power Plant, for combustion in Units 1, 2, 3, and 4 (with the closure of Units 1 and 2, the average is expected to be about 6 million tons for the next decade). Coal mined in the project area would be burned in Units 3 and 4 only, along with coal from other active permit areas of the Rosebud Mine. The Rosebud Power Plant, located 6 miles north of the city of Colstrip, would also combust project area coal. As described in **Section 1.2.2.2, Rosebud Power Plant**, the Rosebud Mine provides 300,000 tons of coal annually to the Rosebud Power Plant. The project area would provide 30 to 50 percent of the mine's total waste coal delivery to the Rosebud Power Plant, with other permit areas of the mine providing the remainder. There are no reports of spills or seepage from storage or disposal of combustion residuals at the Rosebud Power Plant that have affected surface water quality.

At the Colstrip Power Plant, numerous lined ponds are used for various purposes, including disposal of coal combustion products, evaporation of wastewater, and storm water runoff (Hydrometrics 2015). The ponds were designed and constructed to minimize seepage losses; however, over the period of operations, seepage from various ponds has occurred, resulting in measurable impacts on groundwater beneath the plant site and potential impacts on nearby surface water in the East Fork Armells Creek (EFAC). Spills to the East Fork Armells Creek from Colstrip Power Plant pipelines have also occurred. To address potential process wastewater migration due to pond seepage and pipeline spills, the power plant operator and DEQ entered into an Administrative Order on Consent (AOC) in 2012. Pursuant to AOC requirements, in 2018 and 2019, the power plant operator prepared three Cleanup Criteria and Risk Assessment (CCRA) Reports (Marietta Canty, LLC & Neptune and Company, Inc. [Canty] 2018a, 2018b, 2019) to identify Chemicals of Potential Concern (COPCs) and implement Human Health Risk Assessments (HHRAs) and Ecological Risk Assessments (ERAs) for local groundwater, surface water, streambed sediments, and soil. The CCRA Reports provide recommendations for the incorporation of human health-based and ecological-based Cleanup Criteria as documented from 2018 to 2022 in three Remedy Evaluation Reports (RERs [Geosyntec 2018, 2019, 2022]). Following DEQ guidance, surface water samples were collected from multiple EFAC monitoring sites, and the concentrations of approximately two dozen chemicals in the samples were tested and compared to DEQ Montana Numeric Water Quality Standards, EPA Maximum Contaminant Levels (MCLs), EPA Tapwater Residential Screening Levels (RSLs), Upstream Background Screening Levels (BSLs), or Upgradient Background Threshold Values (BTVs) to identify COPCs and implement corresponding HHRAs and ERAs. Out of approximately two dozen chemicals assessed, two chemicals (boron and manganese) were identified as human health and ecological COPCs in surface water because they occur at concentrations in surface water that potentially pose a risk to human health or aquatic life. The remaining chemicals were not identified as COPCs because they do not occur at concentrations in surface water that potentially pose a risk to human health or aquatic life. Through methods described in the CCRA Reports, boron and manganese were assessed and were not retained as human health or ecological Chemicals of Concern (COC) for surface water for the following reasons:

- Boron and manganese concentrations in the EFAC appear to have originated from an upstream source.
- Boron and manganese concentrations in the EFAC appear to be consistent with background concentrations originating from regional geology, as well as coal mining and agricultural activities, where cleanup of surface water would be ineffective as the background sources would continue to affect the EFAC.
- The EFAC is not used as a potable drinking water source and is classified as a C-3 water that generally needs pretreatment because it is marginal for drinking, culinary, and food processing purposes; agriculture; and industrial water supply.

For the reasons listed above, the CCRA Reports do not provide Cleanup Criteria for surface water, and corresponding remedy evaluations assume that additional surface water actions will not be necessary along the EFAC. DEQ provided approval of the CCRA Reports, and no further action needs to be taken for surface water. Nevertheless, the power plant operator has collected, tested, and assessed (and continues to collect, test, and assess) surface water samples from 12 monitoring sites within the EFAC starting just west of the power plant to approximately 3 miles north (downstream) of the power plant. Results of the latest corresponding annual synoptic run monitoring event (March 23, 2022) were documented in a 2022 EFAC Synoptic Run Report (SRR [Hydrometrics 2022]) and evaluated in a 2023 Remedial Action Progress (RAP) Report (Hydrometrics 2023) for spatiotemporal trends in eight individual indicator parameters including two physical parameters (specific conductance and TDS); four common ions (chloride, sulfate, bromide, and calcium/magnesium ratio); one nutrient (nitrate+nitrite); and one metal (boron). A summary of the corresponding results and trends is listed below.

- **Specific Conductance (SC):** SC is an indicator of overall water quality. In March 2022, SC measured in the field ranged from a high of 6,000 umhos/centimeter at the upstream-most monitoring site to 3,461 umhos/centimeter at one of the downstream monitoring sites. The maximum SC recorded for all 12 EFAC monitoring sites throughout the full history of EFAC synoptic runs (1993-2022) was 6,000 umhos/centimeter at the upstream-most monitoring site with a general trend from higher SC at upstream monitoring sites to lower SC at downstream monitoring sites, suggesting an upstream source is affecting water quality. Overall, SC was slightly higher in March 2022 than the historical average at three upstream sites and similar to, or slightly lower than, the historical average downstream. SC has increased at most sites over the last two synoptic runs, corresponding to a period of much lower-than-average precipitation.
- **TDS:** Similar to SC, TDS is an indicator of overall water quality. TDS concentration patterns generally followed the SC profile previously discussed. In March 2022, TDS ranged from a high of 4,470 mg/L at the upstream-most monitoring site to 3,080 mg/L at three of the downstream monitoring sites. The maximum TDS recorded for all 12 EFAC monitoring sites throughout the full history of EFAC synoptic runs (1993-2022) was approximately 6,500 mg/L at the upstream-most monitoring site with a general trend from higher TDS at upstream monitoring sites to lower TDS at downstream monitoring sites, suggesting an upstream source is affecting water quality. Overall, TDS was slightly higher in March 2022 than historical averages at four upstream sites and slightly below historical averages downstream.
- **Chloride:** In March 2022, chloride concentrations ranged from a high of 154 mg/L at the upstream-most monitoring site to 78 mg/L at one of the downstream monitoring sites. The maximum chloride concentration recorded for all 12 EFAC monitoring sites throughout the full history of EFAC synoptic runs (1993-2022) was less than 300 mg/L at the upstream-most monitoring site with a general trend from higher chloride concentrations at upstream monitoring sites to lower chloride concentrations at downstream monitoring sites, suggesting an upstream source is affecting water quality. Overall, chloride concentrations were higher in March 2022 than historical averages for most sites, believed to represent normal fluctuations resulting from

changes in precipitation and flow patterns that have been below average for the past two years. Calcium chloride and magnesium chloride have commonly been used for road treatment.

- **Sulfate:** In March 2022, sulfate concentrations ranged from a high of 2,870 mg/L at one of the upstream monitoring sites to 1,800 mg/L at one of the downstream monitoring sites, which are below the ecological cleanup criterion (ECC) standard of 3,000 mg/L for sulfate concentrations in alluvium groundwater as identified in the three CCRA Reports (Canty 2018a, 2018b, 2019). Only 3 of approximately 300 sulfate concentrations recorded for all 12 EFAC monitoring sites throughout the full history of EFAC synoptic runs (1993-2022) were above the 3,000 mg/L ECC standard with a maximum historical sulfate concentration of 3,600 mg/L. Overall, sulfate concentrations were higher in March 2022 than historical averages at five upstream sites and below historical averages at most sites downstream.
- **Bromide:** Power plant operators began adding calcium bromide to the wet scrubber process in 2009 to enhance mercury removal where increased concentrations of bromide may be present in process water. However, bromide may also be found in road treatment and other products typically used in industrial and urban areas. In March 2022, bromide concentrations were detected at only 3 of the 12 monitoring sites, ranging from a high of 1.1 mg/L at one of the upstream monitoring sites to 0.5 mg/L at one of the downstream monitoring sites, consistent with historical monitoring results where detectable concentrations of bromide have been observed sparingly.
- **Calcium/Magnesium Ratio (Ca:Mg):** Process water is typically magnesium enriched in relation to calcium, where low Ca:Mg ratios in local surface water may be indicative of mixing with process water. However, calcium chloride and magnesium chloride have commonly been used for road treatment where the Ca:Mg ratio could vary widely in surface water depending on precipitation, evapotranspiration, and runoff characteristics. In March 2022, Ca:Mg ratios ranged from a high of 0.92 at one of the middle monitoring sites to 0.71 at the upstream-most monitoring site, which were well above historical averages at all sites, except the upstream-most monitoring site that had a lower-than-average Ca:Mg ratio. The minimum Ca:Mg ratio recorded for all 12 EFAC monitoring sites throughout the full history of EFAC synoptic runs (1993-2022) was approximately 0.6.
- **Nitrate plus Nitrite:** In March 2022, nitrate+nitrite concentrations ranged from a high of 0.5 mg/L at one of the upstream monitoring sites to 0.03 mg/L at the upstream-most monitoring site, which were near or below historical averages at all sites. The maximum nitrate+nitrite concentration recorded for all 12 EFAC monitoring sites throughout the full history of EFAC synoptic runs (1993-2022) was less than 3.75 mg/L, which is well below the DEQ Montana Numeric Water Quality Standard for nitrate+nitrite of 10 mg/L (DEQ 2019c).
- **Boron:** In March 2022, boron concentrations ranged from a high of 1.77 mg/L total recoverable (1.75 mg/L dissolved) at one of the upstream monitoring sites to 0.72 mg/L total recoverable (0.69 mg/L dissolved) at the upstream-most monitoring site, which were below historical averages at all sites. The maximum boron concentration recorded for all 12 EFAC monitoring sites throughout the full history of EFAC synoptic runs (1993-2022) was 4 mg/L, which is equal to the EPA Tapwater RSL of 4 mg/L as identified in the three CCRA Reports (Canty 2018a, 2018b, 2019). A slight increasing trend in boron concentrations has occurred over the past 2 to 3 years, believed to be due to natural fluctuations in weather and stream flow patterns.

The EFAC SRR provides the following summary of the results and trends of the indicator parameters:

> "*Total dissolved solids (TDS) concentrations and specific conductance (SC) are indicators of overall water quality. In March 2022, SC and TDS levels in East Fork Armells Creek were below the long-term averages indicating slightly improved water quality. However, concentrations of*

chloride and sulfate were above the long-term averages at some sites. These trends are considered a function of the Creek water quality being at, or near, natural concentrations such that concentrations of chemical constituents are expected to fluctuate near or below the historical averages."

Out of nearly three dozen parameters assessed in surface water quality through annual EFAC synoptic runs, only three parameters (nitrate plus nitrite, mercury, and selenium) are listed in the DEQ Montana Numeric Water Quality Standards (DEQ 2019c) with human health and/or aquatic life standards. As mentioned previously, the EFAC SRR (Hydrometrics 2022) indicates that the maximum nitrate plus nitrite concentration recorded for all 12 EFAC monitoring sites through the full history of EFAC synoptic runs (1993-2022) was less than 3.75 mg/L, which is well below the DEQ standard for nitrate plus nitrite of 10 mg/L (DEQ 2019c). Furthermore, the EFAC SRR indicates that in March 2022, mercury and selenium were not detected in any of the 12 EFAC monitoring sites.

Based on the results of the combined assessments summarized above and detailed within the 2018-2019 CCRA Reports, 2018-2022 RERs, 2022 EFAC SRR, and 2023 RAP Report, indirect effects to EFAC surface water quality from Colstrip Power Plant process wastewater migration due to pond seepage and pipeline spills would be adverse, negligible to minor (localized and/or of little consequence to existing land and beneficial uses related to changes in surface water quality), and short-term (no longer detectable within the Area F bond liability period that is expected to extend beyond the operational life of the Colstrip Power Plant [2042]).

The area of deposition of coal combustion emissions in soil and surface water around the two power plants is described in **Section 4.3, Air Quality** (see also **Section 3.7.1.2, Analysis Area** in the 2018 Final EIS).

In the past 10 years, mercury concentrations measured in the streams in the indirect effects analysis area (part of the Sarpy Creek, Armells Creek, Rosebud Creek, and Yellowstone River watersheds) have been below the water quality standard (and only four results have been above laboratory detection limits); this indicates that mercury deposition from the Colstrip and Rosebud Power Plants, and even from all atmospheric mercury sources, does not adversely affect the water quality of these streams. Although Castle Rock Lake in Colstrip has a fish consumption advisory related to mercury, as noted in **Section 3.7.6.2, Water Quality in the Indirect Effects Analysis Area**, mercury was not tested in any samples from Castle Rock Lake, so it is not known if atmospheric deposition of mercury from the Colstrip and Rosebud Power Plants has adversely affected the water quality of the lake. However, because mercury concentrations in the East Fork Armells Creek (located about one-half mile from Castle Rock Lake) were all below the water quality standard and below laboratory detection limits (for all but one sampling event), mercury deposition from the Colstrip and Rosebud Power Plants does not adversely affect the creek, and it seems unlikely that the power plants' mercury deposition has or would adversely affect Castle Rock Lake.

In the past 10 years, selenium concentrations measured in the streams in the indirect effects analysis area have been below the water quality standard, indicating that selenium deposition from the two power plants does not adversely affect the water quality of analysis area streams.

In the past 10 years, copper concentrations measured in the streams in the indirect effects analysis area have been below the water quality standard, except for one exceedance in East Fork Armells Creek in 2015 at 0.032 mg/L (slightly above the water quality standard of 0.031 mg/L). This indicates that copper deposition from the two power plants has very little potential adverse effect on the water quality of analysis area streams. If project area coal is burned at the Colstrip and Rosebud Power Plants, it is expected that there would be no effect on stream water quality, except possibly for copper in East Fork

Armells Creek. Effects on East Fork Armells Creek would be long-term, negligible to moderate, and adverse.

Within the indirect effects analysis area, Sarpy Creek, East Fork Armells Creek, and the Yellowstone River are listed by DEQ as impaired for nitrate+nitrite. Potential sources of increased nitrate+nitrite concentrations in surface water can include deposition from atmospheric nitrogen sources and incomplete combustion of blasting agents such as ammonium nitrate. Nitrogen can also be sourced from animal waste, and livestock grazing frequently occurs in the indirect effects analysis area. As described in the Area B CHIA (DEQ 2022b), modern blasting methods are designed to eliminate partial combustion and are effective in controlling release of residual nitrogen, and detections of high nitrate-nitrate concentrations are rare and localized. When sampled in the past 10 years, nitrate+nitrite concentrations in Rosebud Creek, Armells Creek (including East and West Fork), and the Yellowstone River have been well below the human heath standard of 10 mg/L, indicating that nitrogen deposition from all atmospheric nitrogen sources and incomplete combustion of blasting agents does not adversely affect the water quality of these streams with regard to nitrate and nitrite.

Within the indirect effects analysis area, Sarpy Creek and East Fork Armells Creek are listed by DEQ as impaired for total nitrogen. In the past 10 years, most total nitrogen concentrations in analysis area streams have also been well below the total nitrogen July through September standard of 1.3 mg/L as defined in DEQ Department Circular DEQ-12A (DEQ 2014), except for 11 exceedances between 2017 and 2022 of the standard in Armells Creek (one exceedance in 2017 downstream of the East and West Fork confluence) and in East Fork Armells Creek (10 exceedances between 2017 and 2022 at multiple locations). The average total nitrogen concentration in Armells Creek and East Fork Armells Creek during the summer months when the nitrogen standard applies was 2.2 mg/L between 2017 and 2022. Nitrogen was tested in water samples collected from all 12 East Fork Armells Creek SRR monitoring sites during the March 2022 synoptic run; however, the month of March is outside of the July through September period applicable to DEQ-12A nitrogen standards. It is possible that atmospheric deposition is a source of nitrogen to Armells Creek and East Fork Armells Creek, but it is likely that agriculture is also a source of nitrogen to the creeks. Because total nitrogen surface water concentrations in the indirect effects analysis area are nearly all low, it appears that nitrogen deposition does not affect the water quality of analysis area streams, except possibly Armells Creek and East Fork Armells Creek. The air quality modeling completed for this SEIS (refer to the 2018 Final EIS **Section 3.3**, **Section 4.3**, and **Appendix D**) shows that at East Fork Armells Creek in Colstrip, the nitrogen deposition from the Colstrip and Rosebud Power Plants is 6 percent of all nitrogen deposition at that location from all atmospheric sources, and at Rosebud Creek east of Colstrip it is 6.8 percent (the prevailing wind direction is more consistently to the east). At Sarpy Creek west of the Rosebud Mine, the nitrogen deposition from the Colstrip and Rosebud Power Plants is 3.5 percent of all nitrogen deposition at that location from all atmospheric sources. Because atmospheric nitrogen deposition from the Colstrip and Rosebud Power Plants reflected by these three values is less than 7 percent of all atmospheric deposition sources to these three streams, and because agriculture is also a likely source of nitrogen to the streams, it is likely that water quality effects to these streams of nitrogen deposition from the two power plants would be negligible compared to other sources.

The alkalinity of indirect effects analysis area streams has nearly always been greater than 100 mg/L, and often has been several hundred mg/L when measured in recent years. Alkalinity refers to the capability of water to neutralize acid and is an expression of the buffering capacity of a surface water body. Due to the high alkalinity of the analysis area streams, a result of alkaline soils in the analysis area, any acid rain deposition from the Colstrip and Rosebud Power Plants or from any other acid rain source would not change the pH of the streams appreciably. For example, at a site named AR-10PBR in the East Fork Armells Creek located within the city of Colstrip, the pH has remained essentially unchanged, with very little fluctuation, at 8.0 standard units between 2000 and 2016 (EPA 2017h).

Metal and nitrogen data collected between 2017 and 2019 from the Yellowstone River in Treasure, Rosebud, and Custer Counties show very low mercury, selenium, copper, and nitrogen concentrations in the river that are well below water quality standards. The depositional effects of coal combustion emissions from the Colstrip and Rosebud Power Plants on the Yellowstone River are not expected to be measurable for the following reasons:

- A comparison of the monthly flow contribution of Sarpy Creek, Armells Creek, and Rosebud Creek to the monthly flows in the Yellowstone River using USGS gage periods of record shows that they contribute from 0.1 percent (July) to 1.0 percent (March) of the total flow of the Yellowstone River at the Forsyth gage. Any deposition effects from the Colstrip and Rosebud Power Plants on the water quality of the three tributaries are not likely to be detectable in the Yellowstone River due to dilution.
- The air quality modeling completed for this SEIS (refer to the 2018 Final EIS **Section 3.3**, **Section 4.3**, and **Appendix D**) shows that at a location halfway between the Colstrip and Rosebud Power Plants (about 3 miles north of Colstrip), the mercury deposition from the two power plants is less than 3 percent of all mercury deposition at that location from all atmospheric sources. At the Yellowstone River about 25 miles north of Colstrip, the effects of mercury deposition from the two power plants would not be expected to be measurable compared to worldwide atmospheric deposition sources to the Yellowstone River.
- The air quality modeling completed for this SEIS (refer to the 2018 Final EIS **Section 3.3**, **Section 4.3**, and **Appendix D**) shows that at the confluence of Armells Creek and the Yellowstone River, the nitrogen deposition from the two power plants is 1.4 percent of all nitrogen deposition at that location from all atmospheric sources, and at the confluence of Rosebud Creek and the Yellowstone River, it is 1 percent. The effects of nitrogen deposition from the two power plants would not be expected to be measurable compared to worldwide atmospheric deposition sources to the Yellowstone River.

The indirect effects analysis area includes East Fork Armells Creek to account for potential indirect effects of Westmoreland Rosebud's two coal processing facilities (crushers) and one coal conveyance system in Rosebud Mine Areas A and C. Westmoreland Rosebud holds two active permits issued by DEQ for Area A (permit C1986003A) and Area C (permit C1985003C). After coal is processed in the crushers, crushed coal is delivered via an existing covered electrically powered conveyor-belt system that roughly parallels East Fork Armells Creek to the Colstrip Power Plant from the Area C crusher (4.2 miles) and from the Area A crusher (2.7 miles). The two coal processing facilities each encompass approximately 20 acres of land that contains crushers, coal stockpile areas, and related support infrastructure adjacent to East Fork Armells Creek. MPDES Permit MT-0023965 (Modification 2) regulates discharges of surface water drainage from both coal processing facilities through provisions for effluent limits, monitoring requirements, and other special conditions for discharges from two outfalls (Area A Outfall 016A and Area C Outfall 043) to East Fork Armells Creek. There have been no effluent limitation exceedances associated with the two outfalls since 2007 (EPA 2024i). Due to the physical covering of the coal conveyance system, the limited geographical extent of the two coal processing facilities, and the lack of recent effluent limitation exceedances associated with the two outfalls, adverse effects from related operations on East Fork Armells Creek surface water quality are expected to be insignificant.

As described previously in this section under **Surface Water Hydrology**, Castle Rock Lake discharges measurable amounts of surface water to East Fork Armells Creek where the relative proportion of flow in the stream resulting from lake discharges is expected to range from negligible to moderate depending on stream flow quantities. The future existence and use of Castle Rock Lake after closure of the Colstrip Power Plant are currently unknown and may include continued municipal use by the City of Colstrip;

thus, related effects to surface water quantity in East Fork Armells Creek are currently unknown. Therefore, related effects to surface water quality in East Fork Armells Creek are also currently unknown.

4.7.4 Alternative 5 – Partial Mining Alternative

The types of direct and indirect surface water impacts under Alternative 5 – Partial Mining Alternative would be similar to those described above for Alternative 4 – Proposed Action (Current Federal Mining Plan). Under Alternative 5, though, disturbance would be limited to the southern portion of the project area (**Figure 2.6-1**) based on the assumption that all mining would cease in 2030. In total, approximately 2,495 acres would be disturbed in the project area over an 11-year mine life that would produce about 37.1 million tons of coal from Federal and private coal leases. Under Alternative 5, direct and indirect surface water impacts would be less than under Alternative 4. About 34 million fewer tons of coal would be mined and approximately 1,793 fewer acres would be disturbed under Alternative 5 as compared to Alternative 4 (**Table 2.3-1** and **Table 2.3-2**). Although indirect impacts associated with the Colstrip and Rosebud Power Plants' GHG emissions and the Colstrip Power Plant's water withdrawals from the Yellowstone River would continue through the operational life of the Colstrip Power Plant (2042), regardless of whether Area F coal is available or not, those indirect impacts would no longer be attributable to combustion of Area F coal once mining of Federal coal in Area F ends (2030 for Alternative 5). Thus, Area F coal would be available for combustion in the Colstrip and Rosebud Power Plants for up to 11 years (2020 to 2030) under Alternative 5 (9 fewer years than Alternative 4). Reclamation and PMT would be achieved in the project area 9 years earlier than under Alternative 4.

As with Alternative 4, the overall impacts on the hydrologic balance in the direct effects analysis area would be long-term, moderate, and adverse, and effects on floodplains would be short-term, minor, and adverse.

Spring flows within the project area would be affected by mining, and the effects would range from reduced flow, particularly if the source of the spring water is at least partially from the Rosebud Coal, to complete elimination of the spring if its source is solely from the Rosebud Coal or overburden that would be removed. It is unlikely that springs where the source is either the Rosebud Coal or overburden that is to be mined would redevelop in the postmining period. Overall impacts on spring flows and the beneficial uses of spring water in the analysis area would be long-term and moderate.

Streams located south and west of the direct effects analysis area are upstream of the project area and would not be affected by mining. Removal of the Rosebud coal aquifer by mining would eliminate recharge to the alluvium of the major channels within the permit boundary for a long period. Groundwater that currently discharges at the edge of the coal to the alluvium would be intercepted by pit dewatering during mining and would discharge to the reclaimed spoil placed in the pits during mining. Assuming all runoff from disturbed lands were effectively captured and treated before release to any of the unmined streams in the analysis area, and all discharges at MPDES Permit outfalls met effluent limits, adverse effects on stream water quality should be minimal, and beneficial uses should be protected. Until the spoil is resaturated, remaining Rosebud Coal groundwater would not reach the major drainages. It is not known how much time would be required to resaturate the spoil, but the process is expected to require more than 50 years due to the nature of the spoil. Spring or seep flows within the project area would be affected by mining ranging from reduced flow to complete elimination. Groundwater contributions from springs or seeps to stream flow in Black Hank Creek and Donley Creek tributaries may be reduced or may not flow through the reclaimed area as some or all surface flow may infiltrate into the spoil rather than flowing to the lower portion of the watersheds. Groundwater contributions from springs or seeps to stream flow in specific sections of Black Hank Creek and Donley Creek mainstems may be reduced or eliminated except at locations upstream of the areas to be mined. These stream sections are described in **Section 3.7.5.2, Streams in the Direct Effects Analysis Area**. Corresponding effects on Black Hank Creek and Donley

Creek stream flows and on the overall corresponding beneficial uses would be long-term, minor to moderate, and adverse. Similarly, the overall impacts of mining activities on surface water quality and associated beneficial uses of streams in the analysis area would be long-term, minor to moderate, and adverse.

Much of the flow in Donley and Black Hank Creeks occurs as a result of runoff from storm events or snowmelt. During mining, the majority of runoff from undisturbed land upstream of the mine would flow through the undisturbed main stream channels. Tributary drainages would be mined out, and runoff from undisturbed lands upstream of the active pit would be captured in the pit or sediment ponds. Surface runoff from disturbed areas would be impounded in the mine pits or sediment ponds, resulting in reduced ephemeral flows during precipitation and snowmelt runoff events. The watershed areas of Donley and Black Hank Creeks would be reduced as each watershed was mined; thus, it is expected that runoff to the streams would decrease. When all of the mine passes were being or had been mined, and until the watersheds were fully restored, peak flows would be reduced in Donley and Black Hank Creeks. As the mine site is reclaimed, the PMT, drainage areas, and geomorphic characteristics would be designed to be similar to pre-mine topography. As a result, peak flows would return to near pre-mine peak flows. MSUMRA requires that drainage basins be restored during reclamation to the original stream function. The overall impacts from Alternative 5 on ephemeral stream flows in the direct effects analysis area would be adverse and minor in the short term to negligible in the long term.

The water supply of one mapped pond (Pond 4, located adjacent to Black Hank Creek downstream from the mine pits) may be reduced or eliminated during mining due to the impoundment of runoff that is a source of supply to the pond or due to the reduction or elimination of spring flows that are a source of supply to the pond. After mining, the pond would be reestablished, and up to three sediment ponds (located downstream of the proposed mine pits) would be retained until reclamation is complete to provide water supplies for wildlife and livestock. Pond 4 had predominantly dry conditions with recordable water depths for 8 of 150 monthly visits from 2011 through 2023; thus, the overall effect on pond water supply in the direct effects analysis area would be short-term, negligible to minor, and adverse. To mitigate the general lack of water in the vicinity of the project area (due to climate and not primarily as a consequence of mining), Westmoreland Rosebud proposes enhancement features within the PMT to capture water when available and use it to enhance habitat for wildlife and livestock, and to establish wetlands. These features would be in the form of small depressions that would store water following runoff events, thereby providing water sources, promoting establishment of wetland species, and diversifying the postmining habitat types within the project area. These small depressions would also help retain sediment within the project area.

Impacts on the direct effects analysis area for Alternative 5 would be similar to impacts for Alternative 4, but since 1,793 fewer acres would be disturbed under Alternative 5 and because the location of mine pits would be limited to the Donley Creek and Black Hank Creek watersheds, the remaining three watersheds (Trail Creek, McClure Creek, and Robbie Creek) in the direct effects analysis area would not be impacted from mine pit activity under Alternative 5. Impacts on the indirect effects analysis area for Alternative 5 would be similar to impacts for Alternative 4, but because the life of operations for Area F and the time period for combustion of project area coal in the Colstrip and Rosebud Power Plants would be 9 fewer years under Alternative 5, there would be a shorter duration of potential impacts related to water withdrawal from the Yellowstone River to supply the Colstrip Power Plant and trace metal deposition onto surface water bodies due to coal combustion at the two power plants.

4.7.4.1 Mining Private Coal Only Scenario

If Westmoreland Rosebud chose to pursue mining of private coal only (leases 1001 and 1001-A) after 2030, direct and indirect surface water impacts could be greater than those disclosed above for Alternative

5. The intensity of impacts, however, would be no greater than those disclosed for Alternative 4 (see above) and would be expected to be less. See **Section 2.6.2, State Operating Permit C2011003F** for a discussion of the steps that would be required for such a scenario to occur.

4.7.5 Irreversible and Irretrievable Commitment of Resources

The following would be irreversible and irretrievable commitments of surface water resources:

- The loss of water to the springs in the project area whose source of water supply was the Rosebud Coal, which likely would result in the loss of these springs and associated wetlands
- Springs, ponds, and associated wetlands within the project area disturbance boundary that would be removed during mining
- Reduced stream flow in the reclaimed stream channels because the permeability of the spoil material is higher than that of the undisturbed native material
- Changes in stream flow due to changes in postmining channel morphology
- Water quality effects on streams downslope of the spoil where the groundwater table intersects the stream bottom

The loss of wetlands in the project area and the hydrologic conditions that support the wetlands is discussed in **Section 4.11, Wetlands and Riparian Zones**. New springs may appear along project area drainages after the spoil is resaturated postmining. However, based on Western Energy's groundwater model, the groundwater table will take more than 50 years after site reclamation to be reestablished (PAP, Appendix O). In addition, it may take hundreds of years for the bedrock (overburden and Rosebud coal) aquifers to recover (Nicklin 2017). After mining, some ponds may be constructed to provide water supplies for wildlife and livestock. Because the hydrologic balance in the project area would be restored to the extent possible, there would be no other irreversible or irretrievable commitment of resources.

4.8 WATER RESOURCES – GROUNDWATER

This section discloses the direct and indirect effects on groundwater resulting from implementation of Alternative 1 – No Action, Alternative 4 – Proposed Action (Current Federal Mining Plan), or Alternative 5 – Partial Mining Alternative. Pre-mine and existing groundwater conditions and the analysis areas used for this impacts analysis are described in **Section 3.8, Water Resources – Groundwater**.

4.8.1 Analysis Methods and Impact and Intensity Thresholds

Groundwater impacts were evaluated in this SEIS using the same methods used in the 2018 Final EIS. Analysis methods are provided in **Section 4.8.1** of the 2018 Final EIS, beginning on page 527. The thresholds for assessment of impacts (negligible, minor, moderate, or major) on groundwater in **Table 4.8-1** are the same as those defined in the 2018 Final EIS in **Table 130**.

Table 4.8-1 Groundwater Impact and Intensity Thresholds.

Impact Intensity	Intensity Description
Negligible	The action would result in a change to the groundwater hydrology and/or water quality that would be indistinguishable from those caused by fluctuations in natural processes, and of negligible consequences to existing land uses and/or beneficial uses of groundwater.
Minor	The action would result in a change to groundwater hydrology and/or water quality that would be localized and/or of little consequence to existing land uses and beneficial uses.
Moderate	The action would have measurable effects on groundwater hydrology and/or water quality that are distinguishable from fluctuations of natural processes, but do not preclude existing land uses and/or beneficial uses of groundwater.
Major	The action would have measurable effects on the groundwater hydrology and/or water quality that are distinguishable from natural processes, and would preclude existing land uses and/or beneficial uses of groundwater.

The groundwater impact and intensity thresholds described above in **Table 4.8-1** include a distinction between "moderate" and "major" impact intensities based on whether the action would permanently preclude existing land uses and/or beneficial uses of groundwater. That distinction is supported by impact and intensity thresholds associated with groundwater rights (see **Table 4.9-1**) with the distinction between "moderate" and "major" impact intensities based on whether a suitable replacement water source would be provided by Westmoreland Rosebud per ARM 17.24.648 ("moderate") or no replacement water supply would be available ("major"). Thus, groundwater impact and intensity thresholds are somewhat unique from other resource areas based on water replacement provisions (mitigations), which are required (not optional) for the mine permit application process under SMCRA (see **Section 4.9.3.3, Replacement Water Sources and Replacement Process**). Stated another way, mitigation (design features) goals/plans are part of the permit application process and, as such, they are not optional aspects of the permit, but rather requirements that are to be completed as conditions of the state operating permit and/or MPDD.

Although none of the changed groundwater conditions substantially alter the impact analysis presented in the 2018 Final EIS, this environmental consequences section has been updated from the 2018 Final EIS to incorporate the groundwater impact assessments disclosed in the CHIA (DEQ 2019b), updated monitoring data collected since the data evaluated in the 2018 Final EIS, and updated hydrologic information reported in the Annual Hydrology Reports prepared since the 2018 Final EIS. Assumptions for each alternative, which informed the scope of the effects analyses in this SEIS, are presented in **Section 2.4, Alternative 1 – No Action**, **Section 2.5, Alternative 4 – Proposed Action (Current Federal Mining Plan)**, and **Section 2.6, Alternative 5 – Partial Mining Alternative**.

4.8.2 Alternative 1 – No Action

The types of direct and indirect groundwater impacts under Alternative 1 (as described in this SEIS)[62] would be similar to those described below for Alternative 4 – Proposed Action (Current Federal Mining Plan). Under Alternative 1, though, disturbance would be limited to the southeastern portion of the project area (east of Donley Creek) with no mining occurring in the Trail Creek, McClure Creek, and Robbie Creek drainages (**Figure 2.4-1**) based on the assumption that all mining would cease in 2025. In total, approximately 1,021 acres would be disturbed in the project area over a 6-year mine life that would produce about 17.1 million tons of coal from Federal and private coal leases. Under Alternative 1, direct and indirect groundwater impacts would be less than under Alternative 4: about 54 million fewer tons of coal would be mined and approximately 3,267 fewer acres would be disturbed under Alternative 1 as compared to Alternative 4 (**Table 2.3-1** and **Table 2.3-2**). The life of operations for Area F (and the corresponding impacts) would be 14 years shorter under Alternative 1 than under Alternative 4. Reclamation and PMT would be achieved in the project area 14 years earlier than under Alternative 4.

As with Alternative 4, removal and stockpiling of overburden during the Alternative 1 mining period would permanently remove any saturated zones within the overburden, and removal of the Rosebud coal aquifer by mining would eliminate recharge to the alluvium of the major channels within the permit boundary for a long period. Groundwater that currently discharges at the edge of the coal to the alluvium would be intercepted by pit dewatering during mining and would discharge to the reclaimed spoil placed in the pits during mining. Groundwater levels in the Rosebud Coal would decline as the coal is dewatered and removed. Drawdown created by removal of the coal would extend out from the mined areas as more of the coal is dewatered and removed. Until the spoil is resaturated, remaining Rosebud Coal groundwater would not reach the major drainages. It is not known how much time would be required to resaturate the spoil, but the process is expected to require more than 50 years due to the nature of the spoil. Spring flows within the project area would be affected by mining. The effects would range from reduced flow, particularly if the source of the spring water is at least partially from the Rosebud Coal, to complete elimination of the spring if its source is solely from the Rosebud Coal or overburden that would be removed. It is unlikely that springs where the source is either the Rosebud Coal or overburden that is to be mined would redevelop in the postmining period. As with Alternative 4, if any private wells were to become unusable due to mining under Alternative 1, Westmoreland Rosebud would be required to replace the well; thus, impacts on private wells in the analysis area from drawdown would be long-term, negligible to moderate, and adverse. Under Alternative 1, as with Alternative 4, the primary change to groundwater quality would result from removing the Rosebud Coal and replacing the coal with overburden as spoil. The effects on groundwater quality in the analysis area are likely to be long-term, moderate, and adverse.

Within the Trail Creek, McClure Creek, and Robbie Creek drainages (where mining would not occur), direct impacts under Alternative 1 would be limited to water quantity impacts from drawdown related to mining occurring to the east. Water quantity impacts would progressively decrease further northwest of Donley Creek. The maximum drawdown at the end of mining would not be as deep as that predicted for Alternative 4 (about 90 feet) since mining would not extend as far south as the mining pits under Alternative 4 and the predicted 5-foot drawdown for the Rosebud and McKay Coals hydrostratigraphic units would not extend as far upgradient to the south as predicted for Alternative 4 (about 1.5 miles). Groundwater quality impacts within the Trail Creek, McClure Creek, and Robbie Creek drainages would

62. Direct and indirect groundwater impacts of Alternative 1 – No Action were described in **Section 4.8.2** of the 2018 Final EIS, beginning on page 527. As described in **Chapter 2** of this SEIS, Alternative 1 – No Action has been revised since the 2018 Final EIS.

not be anticipated. In addition to the springs listed in **Table 4.8-2** as not being impacted, Springs 3, 10, 11, 13, and 14 would also not be impacted under Alternative 1.

Under Alternative 1, coal from the project area would be available for combustion in the Colstrip and Rosebud Power Plants for up to 6 years, which is 14 years fewer as compared to Alternative 4. With the exception of accidental spills, which cannot be predicted, burning of Area F coal at the Colstrip Power Plant under any of the alternatives would not likely result in any indirect impacts on groundwater because of the recent operational changes at the plant (see Alternative 4 discussion below in **Section 4.8.3**). Similarly, combustion of Area F coal in the Rosebud Power Plant would not likely result in any indirect impacts on groundwater under any of the alternatives (see Alternative 4 discussion below in **Section 4.8.3**).

4.8.2.1 Mining Private Coal Only Scenario

If Westmoreland Rosebud chose to pursue mining of private coal only (leases 1001 and 1001-A) after 2025, direct and indirect groundwater impacts could be greater than those disclosed above for Alternative 1. The intensity of impacts, however, would be no greater than those disclosed for Alternative 4 (see below) and would be expected to be less. See **Section 2.4.2, State Operating Permit C2011003F** for a discussion of the steps that would be required for such a scenario to occur.

4.8.3 Alternative 4 – Proposed Action (Current Federal Mining Plan)

Direct and indirect groundwater impacts under Alternative 4 – Proposed Action (Current Federal Mining Plan) would be similar to those described for Alternative 2 in **Section 4.8.3** of the 2018 Final EIS, beginning on page 528. Under Alternative 4, half a million tons more coal would be mined[63] and approximately 28 acres more would be disturbed as compared to Alternative 2. Reclamation would occur contemporaneously with mining (see discussion of the phases of reclamation in **Section 1.6.4, Bond Release**, in the 2018 Final EIS). Once mining has ceased, reclamation of disturbed areas (up to 4,288 acres) in the project area would occur according to Westmoreland Rosebud's approved reclamation plan (**Figure 2.2-5**) and PMT (**Figure 2.2-6**), which are similar to those described for Alternative 2 in 2018 Final EIS **Section 2.4.4, Reclamation Plan**. Modifications since 2018 are described in **Section 2.2.2.2, Area F Operations and Development**.

4.8.3.1 Direct Impacts

Open pit coal mining directly removes the overburden to remove/mine the Rosebud coal seam. Following removal, each pit is successively backfilled with the broken spoil (overburden) material removed from the previous mining cut. With the overburden and Rosebud Coal containing groundwater, water level/quantity and water quality within the project area are directly impacted, and indirect groundwater impacts occur from operations related to water storage associated with the Colstrip Power Plant and water usage at the Rosebud Power Plant. The following direct impacts related to groundwater quantity and quality were taken from the 2018 Final EIS and the CHIA (DEQ 2019b). As applicable, the discussions have been updated based on recent monitoring results and impacts currently observed from Area F mining, which started in 2020 in the Black Hank Creek drainage and progressed into the Donley Creek drainage in 2022. As of 2023, Area F wells that have been abandoned as a result of mining include WD-194, WM-199, and WR-238 (WET 2024).

[63] See coal tonnage and disturbance comparison in **Table 2.2-8**. Under Alternative 4, mine passes would not be authorized for 74 acres of Federal coal (about 1.9 million tons of recoverable coal). The 74 acres that would not be mined could still be used for other project-associated surface disturbance, such as overburden or topsoil stockpile locations (**Figure 2.5-1**).

Groundwater Quantity

As described in **Section 3.8.2, Site Hydrogeology** in the 2018 Final EIS, most of the Tongue River Member sedimentary units in the project area are saturated. However, due to the low overall hydraulic conductivity, few of the units are capable of producing water to a well or transmitting water any great distance. Groundwater in the more continuous and permeable bedrock units such as the Rosebud Coal flows from the upland areas southwest of the project area to the northeast, which is also the trend of the major drainages. Saturated zones in bedrock that overlie the coal (overburden) are typically perched on low-permeability layers and are typically discontinuous. The Rosebud Coal crops out within the project area (see **Figure 38** in **Section 3.8, Water Resources – Groundwater** in the 2018 Final EIS), and at the outcrops, partially saturated conditions are typical. This outcrop line represents the northeastern-most extent of the Rosebud Coal in the project area. Rosebud Coal groundwater currently discharges from the northeastern edge of the coal at the surface as springs or in the subsurface as underflow and ultimately ends up in the alluvium of the major drainages. Removal of the coal and the eventual replacement of the coal by spoil would have long-term, moderate, adverse effects on groundwater quantity in the analysis area.

Mining Period

Removal and stockpiling of overburden would permanently remove any saturated zones within the overburden. This would result in a more homogeneous mixture of sedimentary lithologies such as shale, siltstone, and sandstone that would be temporarily stockpiled and/or returned to the mined areas as spoil. It is unlikely that significant quantities of groundwater would flow into the mine pits from the overburden walls because of the low overall hydraulic conductivity and the discontinuous nature of the saturated zones in the overburden. Due to the characteristics of the overburden, it is likely that groundwater drawdown in the overburden would extend only a short distance from the pits being mined.

Removal of the Rosebud Coal would likely result in low to moderate groundwater inflow to the pits, some of which would be pumped from the pits into storage ponds. Some of the inflowing groundwater would evaporate from the walls of the pit due to low inflow rates. The mine pits would intercept groundwater that would otherwise have discharged to alluvium via springs in the major drainages, reducing the bedrock groundwater contribution to the stream flow to near zero within the permit boundary, except in areas where the streams may be receiving groundwater from the McKay Coal, which would not be mined. For those reaches of streams with flow sourced from groundwater, the relative contributions to alluvial groundwater and stream flow from existing bedrock groundwater sources in the project area are unknown. However, removing the Rosebud Coal adjacent to the major drainages would likely result in lower groundwater levels in the alluvium and reduced flow in corresponding reaches of the streams. Many of the mapped wetlands (see **Section 3.11, Wetlands and Riparian Zones**), which typically require a perennial or intermittent source of water, are located just downstream of Rosebud Coal outcrops or subcrops within the major drainages. Their location suggests that the Rosebud Coal is the primary contributor of groundwater to these wetlands and drainages. Groundwater in unmined Rosebud Coal beneath the unmined drainages would not continue to discharge water to the major drainages because groundwater is likely to flow toward the pits on the flanks of the drainages, rather than flow to the northeast, as it currently does (see **Section 4.7.3.2, Direct Impacts, Surface Water Hydrology Impacts, Streams** for how this impacts surface water). The hydraulic gradient in the unmined Rosebud Coal would change as a result of mining, causing the groundwater flow direction to change toward the pits. Because Westmoreland Rosebud would be required to replace any water supply where reduced bedrock inflow or drawdown precluded the beneficial use, the impacts from reduced bedrock inflow and drawdown on the quantity of alluvial groundwater would be long term, minor to moderate, and adverse.

Groundwater levels in the Rosebud Coal would decline as the coal is dewatered and removed. Drawdown created by removal of the coal would extend out from the mined areas as more of the coal is dewatered and removed. The maximum depth of drawdown would be limited by the depth of the coal, which increases to the southwest. The groundwater model described in the 2018 Final EIS for Alternative 2 (here applied to Alternative 4) indicated that the maximum drawdown at the end of mining (Year 2034) would be about 90 feet in the southeast portion of the project area, corresponding to the deeper mine pit areas (PAP, Appendix O); a similar drawdown is assumed for Alternative 4. Drawdown does not occur to the north and east of the mine pits in Area F, because mining extends to near the coal crop. To the south and west, the amount of drawdown decreases rapidly with distance from the mine pits, generally to less than 20 feet of drawdown 1,000 feet away. Drawdown is typically less than 10 feet one-half mile from the pits, and less than 5 feet one mile away. The Alternative 2 groundwater model also indicated that where the interburden between the Rosebud Coal and the McKay Coal is relatively thin, approximately 40 feet or less, dewatering and removal of the Rosebud Coal would induce drawdown in the McKay Coal into the pits. This drawdown in the McKay Coal would extend upgradient and cross-gradient of the mine pits, resulting in long-term moderate adverse effects. Results reported in the 2023 Annual Hydrology Report (WET 2024) corroborate this modeled impact. Water level declines over 2 feet were observed in well WM-192 located upgradient of mining near the southern Area F permit boundary, with water levels before October 2020 reflective of baseline conditions and recent declines likely influenced by Area F mining activities north of the well. At WD-193, located west of active mining in Area F, water level decreases near 2 feet were recently observed.

Under Alternative 4 (as for Alternative 2) groundwater levels at the end of mining would decrease upgradient to the southwest to a maximum drawdown of about 5 feet at a distance of about 1.5 miles in each of the two coals based on modeling completed for Alternative 2. Groundwater drawdown in the Rosebud and McKay Coals outside the Area F boundary to the south would reduce groundwater levels in private wells screened in one or both of the coal units. It is not known if water level decreases of between 5 and 10 feet in private wells in this area as a result of mining would impair the owner's ability to produce water because it would depend on the characteristics of the individual wells such as depth, depth to water, pump location, and specific capacity. Springs in the upgradient areas would not likely be impacted by groundwater drawdown due to mining. It is unlikely that their source of water is one of the two coals because of the depth to the coal. Limited alluvium in the drainages in the upgradient areas is also not likely to be hydraulically connected to the coals (PAP, Appendix O).

Spring flows within the project area would be affected by mining. The effects would range from reduced flow, particularly if the source of the spring water is at least partially from the Rosebud Coal, to complete elimination of the spring if its source is solely from the Rosebud Coal or overburden that would be removed. This would include subsurface flow from the Rosebud Coal to alluvium and/or overburden. The timing of effects on spring flow would be related to the mining sequence. Spring flows would not be reduced or eliminated until the Rosebud Coal in the vicinity of the spring was mined out. **Table 4.8-2** provides a summary of which springs are likely to be impacted by mining under Alternative 4.

Table 4.8-2. Alternative 4 Impacts on Identified Springs in the Analysis Area.

Spring	Groundwater Source	Likely to Be Impacted	Potential Impact during Mining	Potential Impact Postmining
1	Overburden	No	No impact on overburden, upgradient of Area F mining	No impact on overburden, upgradient of Area F mining
2	Unknown (possibly overburden)	No	Impact not likely, downgradient and outside of Area F mining	Impact not likely, downgradient and outside of Area F mining
3	Overburden	Yes	Spring removed during mining	Spring removed during mining
4	Overburden	No	No impact on overburden, upgradient of Area F mining	No impact on overburden, upgradient of Area F mining
5	Overburden	No	No impact on overburden, upgradient of Area F mining	No impact on overburden, upgradient of Area F mining
6	Overburden	No	No impact on overburden, upgradient of Area F mining	No impact on overburden, upgradient of Area F mining
7	Rosebud Coal	No	Impact not likely, located within 74-acre area not approved for mining	Impact not likely, outside of the area approved for mining
8	Rosebud and possibly clinker	Yes	Possible, located downgradient of mining but source of water likely to be removed by mining	Source of water removed by mining
9	Overburden	Yes	Possible, located downgradient of mining but source of water will be removed during mining	Spring not likely to reestablish at this location
10	Overburden and possibly Rosebud Coal	Yes	Spring removed during mining	Spring removed during mining
11	Rosebud/clinker and possibly overburden	Yes	Although not located within the proposed mine cuts, water levels in the Rosebud Coal would decline as the coal is dewatered and removed	Flow may be temporarily reduced by mining
12	Unknown	No	Not likely to be impacted except by road construction	Not likely to be impacted except by road construction
13	McKay Coal	Yes	Flow may be temporarily reduced by mining	Flow may be temporarily reduced by mining
14	Sub-McKay and possibly alluvial groundwater	Yes/No	Not likely if sourced from Sub-McKay but potential impact if sourced from alluvium	Not likely if sourced from Sub-McKay but potential impact if sourced from alluvium

Source: PAP, Appendix J, Attachment B-J. Springs 7 and 11 updated based on exclusion of 74-acre area not approved for mining. Additional updates made based on Area F CHIA (DEQ 2019b).

Areas of clinker would not be disturbed except for those scoria pits where clinker would be mined for use as road material. As described in **Section 3.8.2.2, Groundwater Conditions** in the 2018 Final EIS, clinker deposits are typically areas with high infiltration rates and provide significant recharge to the subsurface. Water entering the clinker may discharge to drainages as springs or slowly discharge to lower-permeability units such as overburden, and possibly the Rosebud Coal. Because they would be left unmined, clinker areas would continue to provide recharge to the subsurface and/or springs.

Postmining Period

The postmining effects on groundwater quantity would include the following:

- Removal of the Rosebud coal aquifer in Area F
- Change in hydrologic characteristics of the overburden as it becomes spoil
- Elimination of overburden and Rosebud Coal springs in the mined areas
- Long-term (greater than 50 years) groundwater drawdown in the Rosebud and McKay coals upgradient of Area F

Removal of the Rosebud coal aquifer by mining would eliminate recharge to the alluvium of the major channels within the permit boundary for a long period. Groundwater that currently discharges at the edge of the coal to the alluvium would be intercepted by pit dewatering during mining and would discharge to the reclaimed spoil placed in the pits during mining. Until the spoil is resaturated and water levels in the spoil recover to levels higher than the alluvial groundwater, Rosebud Coal groundwater would not reach the major drainages. It is not known how much time would be required to resaturate the spoil, but the process is expected to require more than 50 years due to the nature of the spoil (as discussed below). Existing groundwater level data collected during the last 45 years from spoils monitoring wells indicate that water levels have not yet reached equilibrium in previously mined areas. Other long-term effects on groundwater quality are described below.

The overburden consists of a mixture of lithologies in a layered sequence. Removal, temporary stockpiling, and replacement of overburden would tend to homogenize the various lithologies, eliminating the higher-hydraulic-conductivity sandstone layers in the overburden. The result would be to mix fine-grained and coarse-grained material, leading to overall lower horizontal hydraulic conductivity. Due to the increased porosity or void spaces created by the broken overburden material that forms the spoil, vertical hydraulic conductivity and storage coefficient for spoil is expected to be somewhat greater than that of the Rosebud Coal it replaced. According to the PAP, Appendix O, the spoil would be more isotropic than the undisturbed overburden, which is defined as having equal hydraulic conductivity in all directions. As a result, the vertical percolation rate would be greater than in the overburden (PAP, Appendix O), but the spoil would be less capable of transmitting groundwater horizontally in the uppermost part of the unit than the original overburden due to the lack of any substantial stratigraphy. As a result, it is unlikely that springs would redevelop at locations similar to those of existing springs. Therefore, it is unlikely that springs where the source is either the Rosebud Coal or overburden that is to be mined would redevelop in the postmining period. The Rosebud Coal would be removed, and the nature of the overburden would be permanently changed due to removal, temporary stockpiling, and/or direct replacement as spoil during mining.

Assuming at least part of the resaturation process is due to vertical recharge from precipitation, groundwater would likely percolate vertically until reaching a saturated zone. Groundwater in the developing saturated zone would likely move downgradient to the north. It is not known if any shallow perched zones would develop due to heterogeneities in the spoils or if springs would develop if any perched zones intersected the surface. The pre-mining groundwater contributions to stream flow in the creeks may change or be eliminated. It is not known if discharge from the McKay Coal would be sufficient to maintain groundwater contributions to surface water flow at the pre-mining locations.

Forty-four spoil wells are active in the Rosebud Mine. Many wells show some level of recovery, but others remain dry or have insufficient water for sampling (DEQ 2019b). Aquifer tests in spoil wells indicate that spoil has the ability to recharge and the flow system to recover. Eleven tests of mine spoil hydraulic conductivity in the Colstrip mines were completed using a bailer recovery method (Van Voast

et al. 1977). The values generated were in the same general range as those for undisturbed coal seams (DEQ 2019b). Eight spoil wells at the Rosebud Mine were tested and found to have transmissivity ranges from 3.75 to 395 square feet per day (WECo 1984). This implies that spoil, upon resaturation, has the ability to conduct groundwater similar to the Rosebud Coal prior to mining and will not restrict postmining groundwater flow.

The Alternative 2 groundwater model indicated that residual drawdown in the Rosebud and McKay Coals upgradient of Area F would require more than 50 years to recover to pre-mine conditions under Alternative 2 (PAP, Appendix O); a similar recovery period is anticipated for Alternative 4. The simulation for 50 years postmining indicated that residual drawdown upgradient of the Area F boundary would be less than 10 feet in the Rosebud Coal and less than 5 feet in the McKay Coal (PAP, Appendix O). It is not known whether residual drawdown of 10 feet or less would impact private well owners' ability to produce water from one or both of the two coals, because it would depend on the characteristics of the individual wells such as well depth, depth to water, pump location, and specific capacity of the well. If any private wells were to become unusable, Westmoreland Rosebud would be required to replace the well; thus, impacts on private wells in the analysis area from drawdown would be long-term, negligible to moderate, and adverse. Westmoreland Rosebud has identified the Sub-McKay sandstones as the most likely suitable groundwater source for any private wells that require replacement.

Groundwater Quality

The primary change to groundwater quality would result from removing the Rosebud Coal and replacing the coal with overburden as spoil. The effects on groundwater quality in the analysis area are likely to be long-term, moderate, and adverse. Currently, groundwater quality in the Rosebud Coal ranges from Class I to Class III but is typically better than that of other water-bearing units in the project area, while groundwater in the overburden is considered to have the poorest quality of any of the saturated units (see **Section 3.8.5, Groundwater Quality**).

Removing, stockpiling, and returning the overburden material to the pits as spoil would mix and homogenize all of the overburden lithologies, exposing fresh mineral surfaces to water during the resaturation process. As a result, soluble salts would dissolve into groundwater, increasing TDS concentrations in groundwater. Van Voast and Reiten (1988) reported that TDS concentrations in spoil groundwater were between 50 and 200 percent higher than TDS concentrations in undisturbed aquifers at the Decker mine site in southeastern Montana. Site-specific water quality data indicate that the TDS concentrations in spoil from Westmoreland Rosebud's mined areas A, B, and C had TDS concentrations that were between 70 and 200 percent higher than in the overburden. Geochemical conditions simulated in the laboratory with bench-scale column-leach and paste-extract leaching tests using overburden materials suggest that the dissolved-solids concentrations in the backfill water reach a maximum during initial saturation and then decrease to an equilibrium level after one or more pore volumes of water pass through the backfill (Van Voast and Reiten 1988). The increased TDS concentrations are due to increases in the concentration of all major ions, but primarily calcium, magnesium, sodium, and sulfate (Van Voast and Reiten 1988).

Due to the variability of the overburden mineralogy and the somewhat random nature of spoil backfilling, the quality of spoil groundwater in other areas mined by Westmoreland Rosebud has been variable. Consequently, some areas have shown rapid increases in TDS concentrations during approximately 45 years of data collection, while other areas show only small increases in TDS concentrations through the same period. In addition to the major ions, this also appears to be true for other constituents such as nitrate, iron, and manganese. Most data for spoil groundwater collected from other Westmoreland Rosebud mine sites have low nitrate concentrations, but there are a few locations with nitrate concentrations that equaled or exceeded the standard (WS-100, WS-107, and WS-157). The water quality

of the spoil in Areas A, B, and C when monitored between 1978 and 2023 had exceedances in arsenic, cadmium, lead, nitrate, and zinc groundwater standards (**Table 4.8-3**). The pre-mining groundwater quality of the Rosebud Coal in the project area (see **Section 3.8, Water Resources – Groundwater** and **Table 29** in **Appendix 3 – Water Quality Tables**) did not show any exceedances of arsenic, cadmium, lead, and nitrate standards, with the exception of one lead standard exceedance. It would be expected that the project area spoil would have similar spatial and temporal variability in groundwater quality.

The Area F CHIA (DEQ 2019b) noted that of the 44 spoil wells active at the Rosebud Mine, many wells show some level of recovery, but others remain dry or have insufficient water for sampling, and water quality trends in existing spoil wells are variable. Early data from wells often fluctuate in water quality, as initial resaturation occurs, but many wells appear to maintain a fairly consistent water quality after that time. Twenty-two spoil wells from throughout the mine have a history of water quality sampling and show relatively stable TDS concentrations with median TDS in these spoil wells at 3,535 mg/L (DEQ 2019b).

According to the PAP, Appendix O, TDS concentrations in the spoil should reach equilibrium after one or two pore volumes of water pass through the spoil, based on bench-scale testing. However, Van Voast and Reiten (1988) noted that this concept is valid only where there is no vertical recharge. Pre-mining water level data from the project area indicate that vertical recharge does occur in some areas (see **Section 3.8.3, Conceptual Hydrogeological Model** in the 2018 Final EIS). Also, Van Voast and Reiten (1988) state that vertical recharge to the spoil may occur where the spoil contains large quantities of sand. In arid environments where the potential evaporation rate exceeds the annual precipitation, it is not uncommon for there to be net vertical recharge to groundwater under certain conditions, such as unusually wet periods. Therefore, one or two pore volumes of groundwater in the project area may not be sufficient to reach equilibrium with respect to water quality of the spoil. Based on the spoil water quality from Areas A, B, and C, it will require more than 45 years postmining to reach equilibrium in project area spoil, which constitutes an irreversible commitment of resources where the Rosebud Coal is replaced by mine spoil (see **Section 4.8.5, Irreversible and Irretrievable Commitment of Resources**).

Impacts on alluvial groundwater quality are likely to occur when mining close to the alluvium. Impacts on groundwater could occur due to storage of water in sediment ponds near alluvium and from MPDES discharges to the streams. Recharge from the spoil to the alluvium would result in changes in alluvial groundwater quality in the drainages compared to pre-mining conditions. The current alluvial groundwater quality is variable, but TDS concentrations are generally lower than overburden concentrations and higher than Rosebud Coal TDS concentrations. Postmining, discharge to the alluvium would be from spoil containing generally poor-quality groundwater. It is not known how much time would be required for the quality of water in the spoil to improve as the soluble salts and metals are flushed from the system.

The Area F CHIA (DEQ 2019b) predicted changes in alluvial water quality after mining using the output from the groundwater model based on groundwater flow paths 100 years after mining. Using conservative assumptions that all water that leaves the spoil eventually enters alluvium (no loss due to evapotranspiration) and that all water quality impacts occur at the same time (neglecting a mixture of differing flow paths), the actual water quality impacts are likely to be less than those predicted using these assumptions. For Black Hank Creek, after mining, TDS in the alluvial groundwater is predicted to increase by approximately 16 percent. Black Hank Creek alluvial groundwater is Class III groundwater and is expected to remain Class III groundwater after mining. These increases in dissolved parameter concentrations are not expected to cause a violation of numeric water quality standards for Class III groundwater; cause an increase in a parameter to a level that renders the waters harmful, detrimental, or injurious to the beneficial uses listed for Class III groundwater; or adversely impact a land use or water right. For Donley Creek, after mining, TDS in the alluvial groundwater is predicted to increase by

approximately 29 percent. The Donley Creek reach from Black Hank Creek to the mouth at Robbie Creek is also predicted to be impacted by water quality changes after mining, resulting in a predicted increase of approximately 15 percent. Donley Creek alluvial groundwater both upstream and downstream from the confluence with Black Hank Creek is Class III groundwater and is expected to remain Class III groundwater after mining with these increases in dissolved parameter concentrations not expected to cause a violation of numeric water quality standards for Class III groundwater; cause an increase in a parameter to a level that renders the waters harmful, detrimental, or injurious to the beneficial uses listed for Class III groundwater; or adversely impact a land use or water right. For McClure Creek, after mining, TDS in the alluvial groundwater is predicted to increase by approximately 8 to 15 percent depending on the assumed pre-mining alluvial groundwater TDS concentration. McClure Creek alluvial groundwater is Class III groundwater before and after mining, and these increases in dissolved parameter concentrations are not expected to cause a violation of numeric water quality standards for Class III groundwater; cause an increase in a parameter to a level that renders the waters harmful, detrimental, or injurious to the beneficial uses listed for Class III groundwater; or adversely impact a land use or water right. For Robbie Creek alluvial groundwater upgradient from the confluence with Donley Creek, after mining, TDS in the alluvial groundwater is predicted to increase by approximately 13 percent while the short reach downstream from Donley Creek is predicted to increase by approximately 16 percent. Robbie Creek alluvial groundwater both upstream and downstream from the confluence with Donley Creek is Class III groundwater and is expected to remain Class III groundwater after mining with these increases in dissolved parameter concentrations not expected to cause a violation of numeric water quality standards for Class III groundwater; cause an increase in a parameter to a level that renders the waters harmful, detrimental, or injurious to the beneficial uses listed for Class III groundwater; or adversely impact a land use or water right. For Trail Creek, after mining based on the original mine plan, TDS in the alluvial groundwater was predicted to increase by approximately 5 to 9 percent depending on the assumed pre-mining alluvial groundwater TDS concentration. However, based on the removal of mining in the Trail Creek watershed, impacts to alluvial groundwater quality would be much less.

Similar to the overburden, water quality impacts may occur where spoil groundwater flows into the undisturbed Rosebud Coal after mining. However, the proximity of the coal crop and direction of groundwater flow limits the areas where this condition can occur. The unmined Rosebud Coal beneath the major drainages will likely see increases in TDS and other water quality parameters after mining, but these areas are all within the permit boundary.

As a result of mining, it is possible that downgradient alluvial groundwater quality near the mine pits could change as a result of eliminating the recharge from the Rosebud Coal. Without recharge from the Rosebud Coal, the TDS concentrations in the alluvial groundwater could increase initially to look more like that of the overburden TDS. Postmining, after groundwater recovery, TDS concentrations in the alluvial groundwater would likely increase. Water quality impacts on alluvial groundwater from MPDES discharges are expected to be minimal. The MPDES Permit stipulates effluent limits that are protective of the water quality of the surface water in the creeks. Because the alluvial groundwater typically contains higher parameter concentrations than surface water, limits that are protective of surface water will also be protective of groundwater.

Table 4.8-3. Water Quality of Spoil Groundwater in Areas A, B, and C.

Parameter	Number of Samples	Number of Detections	Minimum	25th Percentile	Median	75th Percentile	Maximum	Human Health Water Quality Standard
Acidity (mg/L)	280	63	1.0	1.0	1.0	1.0	306	NS
Aluminum, diss (mg/L)	339	250	0.004	0.05075	0.1	0.1035	18.7	NS
Ammonia (mg/L)	192	189	0.0073	0.333	0.551	1.01	22.9	NS
Arsenic, diss (mg/L)	250	190	0.000035	0.000598	0.00263	0.00449	**0.02**	0.01
Bicarbonate Alkalinity (mg/L)	355	355	41.0	517	620	804	1,648	NS
Boron, diss (mg/L)	279	276	0.0257	0.286	0.39	0.5	1.2	NS
Cadmium, diss (mg/L)	350	130	0.000005	0.0000811	0.000132	0.001	**0.02**	0.005
Calcium, diss (mg/L)	192	192	133	264	347	451	640	NS
Carbonate Alkalinity (mg/L)	314	117	0.52	1.0	1.0	1.0	25	NS
Chloride (mg/L)	355	355	4.0	20	25	36	200	NS
Chromium, diss (mg/L)	8	3	0.01	0.0175	0.02	0.02	0.09	0.1
Copper, diss (mg/L)	297	158	0.000018	0.000837	0.003	0.01	0.274	1.3
Fluoride (mg/L)	356	303	0.004	0.1	0.18	0.2225	2.0	4
Hydroxide Alkalinity (mg/L)	201	1	1.0	1.0	1.0	1.0	5.0	NS
Iron, diss (mg/L)	355	304	0.000688	0.05	0.13	0.715	34	NS
Laboratory Conductivity (µS/cm)	355	355	864	2,940	3,520	4,295	8,420	NS
Laboratory pH (s.u.)	356	356	4.9	7.0	7.6	7.9	8.4	NS
Lead, diss (mg/L)	348	142	0.0000023	0.0001	0.000395	0.01	**0.08**	0.015
Magnesium, diss (mg/L)	192	192	206	306	340	428	720	NS
Manganese, diss (mg/L)	338	335	0.005	0.418	0.825	1.8	7.3	NS
Nickel, diss (mg/L)	203	160	0.0005	0.00183	0.00407	0.00845	0.061	0.1
Nitrate+Nitrite (mg/L)	342	168	0.003	0.0066	0.035	0.13	**38.5**	10
Ortho Phosphate (mg/L)	109	98	0.01	0.02	0.04	0.21	13.2	NS
Total Phosphate (mg/L)	51	49	0.01	0.0245	0.07	0.43	14.0	NS
Potassium, diss (mg/L)	192	189	9.05	12.5	15.0	17.0	22.2	NS
Selenium, diss (mg/L)	279	98	0.000094	0.0002085	0.0005	0.005	0.026	0.05
Sodium, diss (mg/L)	192	192	78.1	137	164	266	751	NS
Sulfate (mg/L)	355	355	368	1,450	1,970	2,470	5,440	NS
Total Alkalinity (mg/L)	356	356	34	480	568	781	1,350	NS
TDS (mg/L)	352	352	860	2,775	3,545	4,428	8,750	NS
Total Hardness (mg/L)	354	354	519	1,800	2,120	2,690	5,407	NS
Vanadium, diss (mg/L)	279	141	0.00002	0.0008015	0.00125	0.1	1.0	NS
Zinc, diss (mg/L)	355	233	0.000855	0.00682	0.0151	0.05	**2.61**	2

Groundwater data collected from 1978 to 2023. Data summarized from CR-2, D-2, S-33, S-35, S-36, S-37, T-5B-P, WS-100, WS-101, WS-105, WS-106, WS-107, WS-113, WS-114, WS-114-B, WS-115, WS-118, WS-121, WS-157, WS-158, WS-159, WS-184, WS-191, WS-197, WS-201, WS-202, WS-203, WZ-002, and WZ-004
For less-than-detection-limit concentrations, detection limits are used to calculate percentile concentrations. Concentrations in bold exceed Montana numeric groundwater quality standards.
NS = no numeric standard or recommended concentration; µS/cm = micro Siemens per centimeter; s.u. = standard units.

Depending on the level of increase in TDS and sulfate concentrations above pre-mine concentrations, downstream groundwater users may be adversely affected. Most, if not all, alluvial groundwater users downstream of Area F use groundwater for stock watering, and it is possible that in some areas adjacent to the spoil, the water may become too degraded for livestock use due to possible increases in nitrate, calcium, magnesium, manganese, sodium, sulfate, or TDS concentrations to above recommended water quality limits for livestock (see **Table 3.7-5**, **Section 3.7, Water Resources – Surface Water**). If this were to occur, a suitable replacement source would be provided; thus, the impacts on alluvial groundwater use in the analysis area would be long-term, minor to moderate, and adverse.

It is unlikely that groundwater quality in upgradient areas would be affected by mining because the regional flow direction is toward the mined areas. Upgradient alluvium is isolated from mining-related drawdown by the overburden and receives recharge from the overburden, surface water flows, and direct precipitation.

4.8.3.2 Indirect Impacts

As described in **Section 1.2.2.1, Colstrip Power Plant** and in **Chapter 5, Cumulative Impacts**, the Rosebud Mine is the exclusive source of coal to the Colstrip Power Plant for combustion in Units 3 and 4. The Colstrip Power Plant uses a closed-loop process (with respect to water) to minimize impacts on local surface and groundwater. All water used by the Colstrip Power Plant is imported via pipeline from the Yellowstone River (see Section **3.7.6.2, Water Quality in the Indirect Effects Analysis Area**). Local surface and groundwater are not used at the plant. Numerous lined ponds are used to store combustion residuals and storm water runoff. The ponds were designed to minimize seepage losses and were constructed with either synthetic liners or compacted clay liners (Hydrometrics 2015). However, over the period of operation, seepage from various ponds has occurred, resulting in measurable impacts on groundwater. Impacted groundwater is beneath the Colstrip Power Plant site and previously extended beneath the adjacent properties within the City of Colstrip east of the Colstrip Power Plant site. Groundwater contamination is also present on Colstrip Power Plant property beneath the former Units 1 and 2 Stage One Evaporation Pond and Stage Two Evaporation Pond, and beneath the Units 3 and 4 Evaporation Holding Ponds. A site characterization investigation indicated that the clay-lined ponds were responsible for almost all of the seepage (Hydrometrics 2015). The synthetic-lined ponds contributed insignificant amounts of seepage. As a result of the impacts on groundwater and related litigation, DEQ and PPL Montana (now Talen Energy) entered into an Administrative Order of Consent (AOC) on August 3, 2012, to characterize the extent of the impacts and remediate the plant site area groundwater (see **Section 1.2.2.1, Colstrip Power Plant**). The MDEQ AOC addresses the remediation and source control measures necessary to clean up these groundwater areas.

The characterization process resulted in the installation of monitoring wells, groundwater capture wells, trenches, leachate collection systems between and below pond liners, and in-dam toe and chimney drains on the plant site. The extent of the groundwater impact beneath the plant site has been determined, and groundwater capture has been in operation for a number of years. Ponds contributing to the groundwater impact typically have elevated TDS, specific conductance, sulfate, boron, and chloride concentrations. Elevated concentrations of these constituents have been identified in groundwater beneath and downgradient from various ponds. Impacted groundwater is limited to the Colstrip Power Plant site. The Revised Cleanup Criteria and Risk Assessment Report (Canty 2018a) revised the constituents of interest/constituents of concern list to include boron, sulfate, cobalt, lithium, molybdenum, selenium, and manganese.

The groundwater impacts at the Colstrip Power Plant have been characterized, and groundwater impacts are currently being remediated. The MDEQ-selected remedies include operational changes for dry disposal activities at operational Units 3 and 4, groundwater capture and treatment in all three AOC areas,

and source removal or mitigation and dewatering activities. Remedies will also likely include monitored natural attenuation and/or permeable reactive barriers to be employed in targeted areas in the future.

With the exception of accidental spills, which cannot be predicted, burning of Area F coal at the Colstrip Power Plant would not likely result in any indirect impacts on groundwater because of the recent operational changes at the plant. Plant operations were modified due to past seepage losses and the resulting groundwater impacts. Existing groundwater impacts are currently being remediated.

The Rosebud Power Plant, located 6 miles north of the city of Colstrip, also operates on Rosebud Mine coal, including Area F coal. There have been no reported impacts on local groundwater or ongoing groundwater issues related to the Rosebud Power Plant. The source of water for the Rosebud Power Plant is groundwater from deep wells; these wells likely would continue to be the source for the Rosebud Power Plant. As discussed in **Section 4.9, Water Resources – Water Rights**, the Rosebud Power Plant was required by DNRC to demonstrate that there was adequate water to supply its demand when it applied for a Beneficial Use Permit. Given that the water source for the Rosebud Power Plant has been approved and is unlikely to change, it is unlikely that there would be any impacts on regional groundwater levels as a result of burning Area F coal. The Rosebud Power Plant would not receive substantial amounts of coal from Area F, and without any existing groundwater issues, mining in Area F would not likely result in any indirect impacts on groundwater.

4.8.4 Alternative 5 – Partial Mining Alternative

The types of direct and indirect groundwater impacts under Alternative 5 – Partial Mining Alternative would be similar to those described above for Alternative 4 – Proposed Action (Current Federal Mining Plan). Under Alternative 5, though, disturbance would be limited to the southeastern portion of the project area (east of Donley Creek) with no mining occurring in the Trail Creek, McClure Creek, and Robbie Creek drainages (**Figure 2.6-1**) based on the assumption that all mining would cease in 2030. In total, approximately 2,495 acres would be disturbed in the project area over an 11-year mine life that would produce about 37.1 million tons of coal from Federal and private coal leases. Under Alternative 5, direct and indirect groundwater impacts would be less than under Alternative 4. About 34 million fewer tons of coal would be mined and approximately 1,793 fewer acres would be disturbed under Alternative 5 as compared to Alternative 4 (**Table 2.3-1** and **Table 2.3-2**). The life of operations for Area F (and the corresponding impacts) would be 9 years shorter under Alternative 5 than under Alternative 4. Reclamation and PMT would be achieved in the project area 9 years earlier than under Alternative 4.

As with Alternative 4, removal and stockpiling of overburden during the Alternative 5 mining period would permanently remove any saturated zones within the overburden, and removal of the Rosebud coal aquifer by mining would eliminate recharge to the alluvium of the major channels within the permit boundary for a long period. Groundwater that currently discharges at the edge of the coal to the alluvium would be intercepted by pit dewatering during mining and would discharge to the reclaimed spoil placed in the pits during mining. Groundwater levels in the Rosebud Coal would decline as the coal is dewatered and removed. Drawdown created by removal of the coal would extend out from the mined areas as more of the coal is dewatered and removed. Until the spoil is resaturated, remaining Rosebud Coal groundwater would not reach the major drainages. It is not known how much time would be required to resaturate the spoil, but the process is expected to require more than 50 years due to the nature of the spoil. Spring flows within the project area would be affected by mining. The effects would range from reduced flow, particularly if the source of the spring water is at least partially from the Rosebud Coal, to complete elimination of the spring if its source is solely from the Rosebud Coal or overburden that would be removed. It is unlikely that springs where the source is either the Rosebud Coal or overburden that is to be mined would redevelop in the postmining period. As with Alternative 4, if any private wells were to become unusable due to mining under Alternative 5, Westmoreland Rosebud would be required to replace

the well; thus, impacts on private wells in the analysis area from drawdown would be long-term, negligible to moderate, and adverse. Under Alternative 5, as with Alternative 4, the primary change to groundwater quality would result from removing the Rosebud Coal and replacing the coal with overburden as spoil. The effects on groundwater quality in the analysis area are likely to be long-term, moderate, and adverse.

Within the Trail Creek, McClure Creek, and Robbie Creek drainages (where mining would not occur), direct impacts under Alternative 5 would be limited to water quantity impacts from drawdown related to mining occurring to the east. Water quantity impacts would progressively decrease further northwest of Donley Creek. The maximum drawdown at the end of mining would not be as deep as that predicted for Alternative 4 (about 90 feet) since mining would not extend as far south as the mining pits under Alternative 4 and the predicted 5-foot drawdown for the Rosebud and McKay Coals hydrostratigraphic units would not extend as far upgradient to the south as predicted for Alternative 4 (about 1.5 miles). Under Alternative 5, the predicted maximum and 5-foot drawdown would be greater than under Alternative 1 due to the increased disturbance of 1,474 acres, mine life increase of 5 years, and coal production of 20 million tons.

Groundwater quality impacts within the Trail Creek, McClure Creek, and Robbie Creek drainages would not be anticipated. In addition to the springs listed in **Table 4.8-2** as not being impacted, similar to Alternative 1, Springs 3, 10, 11, 13, and 14 would also not be impacted under Alternative 5.

Under Alternative 5, coal from the project area would be available for combustion in the Colstrip and Rosebud Power Plants for up to 11 years, which is 9 years fewer as compared to Alternative 4. With the exception of accidental spills, which cannot be predicted, burning of Area F coal at the Colstrip Power Plant under any of the alternatives would not likely result in any indirect impacts on groundwater because of the recent operational changes at the plant (see Alternative 4 discussion above in **Section 4.8.3**). Similarly, combustion of Area F coal in the Rosebud Power Plant would not likely result in any indirect impacts on groundwater under any of the alternatives (see Alternative 4 discussion above in **Section 4.8.3**).

4.8.4.1 Mining Private Coal Only Scenario

If Westmoreland Rosebud chose to pursue mining of private coal only (leases 1001 and 1001-A) after 2030, direct and indirect groundwater impacts could be greater than those disclosed above for Alternative 5. The intensity of impacts, however, would be no greater than those disclosed for Alternative 4 (see above) and would be expected to be less. See **Section 2.6.2, State Operating Permit C2011003F** for a discussion of the steps that would be required for such a scenario to occur.

4.8.5 Irreversible and Irretrievable Commitment of Resources

The Rosebud coal aquifer within the mine pit footprint would be irreversibly and irretrievably lost due to mining. The coal would be replaced with spoil, which would likely have different hydrologic characteristics and water quality.

Groundwater springs removed due to mining would be irreversibly and irretrievably lost. It is possible that after the spoil resaturates, new springs may appear along the various drainages. Groundwater quality in the saturated zones that would develop in the spoil would require an undetermined but significant amount of time to reach equilibrium and begin to improve. As defined under NEPA, this would be an irreversible commitment of resources, which cannot be reversed except over extremely long periods.

4.9 WATER RESOURCES – WATER RIGHTS

This section discloses the direct and indirect effects on water rights (surface and groundwater) resulting from implementation of Alternative 1 – No Action, Alternative 4 – Proposed Action (Current Federal Mining Plan), or Alternative 5 – Partial Mining Alternative. Pre-mining water rights and the analysis areas used for this impacts analysis are described in **Section 3.9, Water Resources – Water Rights**. This section has been updated from the 2018 Final EIS to incorporate the surface and groundwater impact assessments disclosed in the CHIA (DEQ 2019b), updated monitoring data collected since the data evaluated in the 2018 Final EIS, and updated hydrologic information reported in the Annual Hydrology Reports prepared since the 2018 Final EIS. For spring and groundwater rights, the 2018 Final EIS limited the water rights analysis to those water rights listed by DNRC. This water rights assessment has been broadened to summarize and incorporate by reference the private wells groundwater information center (GWIC) IDs, which are administrated by the Montana Bureau of Mines and Geology and were disclosed in the CHIA (DEQ 2019b).

4.9.1 Analysis Methods and Impact and Intensity Thresholds

Water rights impacts were evaluated in this SEIS using the same methods used in the 2018 Final EIS. Analysis methods are provided in **Section 4.9.1** of the 2018 Final EIS, beginning on page 540. The analysis area for indirect and cumulative impacts on surface waters was increased for this SEIS to include a portion of the Yellowstone River (see **Section 3.7, Water Resources – Surface Water**). As a result, the analysis area for indirect effects on surface water rights was also increased as described in **Section 3.9**. For purposes of assessing springs, impacts on springs are defined by their source, which is groundwater. Therefore, the analysis area for direct impacts for springs is the same as that defined for groundwater (see **Section 3.8, Water Resources – Groundwater**). Assumptions for each alternative, which informed the scope of the effects analyses in this SEIS, are presented in **Section 2.4, Alternative 1 – No Action**, **Section 2.5, Alternative 4 – Proposed Action (Current Federal Mining Plan)**, and **Section 2.6, Alternative 5 – Partial Mining Alternative**.

The thresholds for assessment of water rights impacts (negligible, minor, moderate, or major) in **Table 4.9-1** below are the same as those defined in the 2018 Final EIS in **Table 133**.

Table 4.9-1. Water Rights Impact and Intensity Thresholds.

Impact Intensity	Intensity Description
Negligible	The action would result in a change that was indistinguisable from natural variations, and the water rights owner would still have adequate flow and/or water quality to meet beneficial use needs.
Minor	The action would result in a change that would be distinguisable from natural variations, but the change would be small enough that the water rights owner would still have adequate flow and/or water quality to meet beneficial use needs.
Moderate	The action would result in a water right becoming unusable for its specified purpose due to flow or water quality changes. A suitable replacement source would be provided by Westmoreland Rosebud per ARM 17.24.648.
Major	The action would result in a water right becoming unusable for its specified purpose due to flow or water quality changes and no replacement water supply would be available.

The surface water and groundwater impact and intensity thresholds described in **Table 4.7-1** and **Table 4.8-1** include a distinction between “moderate” and “major” impact intensities based on whether the action would permanently preclude existing land uses and/or beneficial uses of surface water or groundwater. That distinction is supported by impact and intensity thresholds associated with water rights described above in **Table 4.9-1** with the distinction between “moderate” and “major” impact intensities

based on whether a suitable replacement water source would be provided by Westmoreland Rosebud per ARM 17.24.648 ("moderate") or no replacement water supply would be available ("major"). Thus, surface water and groundwater impact and intensity thresholds are somewhat unique from other resource areas based on water replacement provisions (mitigations), which are required (not optional) for the mine permit application process under SMCRA (see **Section 4.9.3.3, Replacement Water Sources and Replacement Process**). Stated another way, mitigation (design features) goals/plans are part of the permit application process and, as such, they are not optional aspects of the permit, but rather requirements that are to be completed as conditions of the state operating permit and/or MPDD.

4.9.2 Alternative 1 – No Action

The types of direct and indirect water rights impacts under Alternative 1 (as described in this SEIS)[64] would be similar to those described below for Alternative 4 – Proposed Action (Current Federal Mining Plan). Under Alternative 1, though, direct impacts would be limited to the southeastern portion of the project area (**Figure 2.4-1**) based on the assumption that all mining would cease in 2025. In total, approximately 1,021 acres would be disturbed in the project area over a 6-year mine life that would produce about 17.1 million tons of coal from Federal and private coal leases.

Under Alternative 1, direct and indirect water rights impacts would be less than under Alternative 4: about 54 million fewer tons of coal would be mined and approximately 3,267 fewer acres would be disturbed under Alternative 1 as compared to Alternative 4 (**Table 2.3-1** and **Table 2.3-2**). The life of operations for Area F (and the corresponding impacts) would be 14 years shorter under Alternative 1 than under Alternative 4. Reclamation and PMT would be achieved in the project area 14 years earlier than under Alternative 4.

Similar to Alternative 5, mining under Alternative 1 would be limited to lands east of Donley Creek, with no mining occurring in the Trail Creek, McClure Creek, and Robbie Creek drainages. Therefore, surface water rights located in the Trail Creek, McClure Creek, and Robbie Creek drainages would not be anticipated to be impacted under Alternative 1. As compared to Alternative 4, this would result in four fewer surface water rights potentially impacted from mining: two on Trail Creek (42KJ 183497 00 and 42KJ 183501 00), one on McClure Creek (42KJ 8211 00), and one on Robbie Creek (42KJ 183532 00). All of these water rights are for stock watering directly from the source or from a ditch system.

Similar to Alternative 5, mining under Alternative 1 would be limited to lands east of Donley Creek, with no mining occurring in the Trail Creek, McClure Creek, and Robbie Creek drainages (**Figure 2.4-1**). Therefore, groundwater rights located in the Trail Creek, McClure Creek, and Robbie Creek drainages would not be anticipated to be impacted under Alternative 1. As compared to Alternative 4, this would result in three fewer groundwater rights eliminated due to mining (DNRC ID 42KJ438900, 42KJ44622, and GWIC ID 14199), four fewer groundwater rights potentially impacted due to drawdown (DNR ID 42KJ18335200, 42KJ16279800, 42KJ2839400, and 42KJ16285000), and five fewer springs physically disturbed (Springs 3, 10, 11, 13, and 14).

4.9.2.1 Mining Private Coal Only Scenario

If Westmoreland Rosebud chose to pursue mining of private coal only (leases 1001 and 1001-A) after 2025, direct and indirect water rights impacts could be greater than those disclosed above for Alternative 1. The intensity of impacts, however, would be no greater than those disclosed for Alternative 4 (see

[64] Direct and indirect water rights impacts of Alternative 1 – No Action were described in **Section 4.9.2** of the 2018 Final EIS, beginning on page 541. As described in **Chapter 2** of this SEIS, Alternative 1 – No Action has been revised since the 2018 Final EIS.

below) and would be expected to be less. See **Section 2.4.2, State Operating Permit C2011003F** for a discussion of the steps that would be required for such a scenario to occur.

4.9.3 Alternative 4 – Proposed Action (Current Federal Mining Plan)

Direct and indirect water rights impacts under Alternative 4 – Proposed Action (Current Federal Mining Plan) would be similar to those described for Alternative 2 in **Section 4.9.3** of the 2018 Final EIS, beginning on page 541. Under Alternative 4, half a million tons more coal would be mined[65] and approximately 28 acres more would be disturbed as compared to Alternative 2. Reclamation would occur contemporaneously with mining (see discussion of the phases of reclamation in **Section 1.6.4, Bond Release**, in the 2018 Final EIS). Once mining has ceased, reclamation of disturbed areas (up to 4,288 acres) in the project area would occur according to Westmoreland Rosebud's approved reclamation plan (**Figure 2.2-5**) and PMT (**Figure 2.2-6**), which are similar to those described for Alternative 2 in 2018 Final EIS **Section 2.4.4, Reclamation Plan**. Modifications since 2018 are described in **Section 2.2.2.2, Area F Operations and Development**.

4.9.3.1 Direct Impacts (Active Mining)

Spring Water Rights

There are 16 spring rights used for stock watering located in the direct effects analysis area on unnamed tributaries of Trail, McClure, Robbie, Donley, and Black Hank Creeks (**Figure 3.7-1**; **Table 4.8-2**). **Table 4.9-2** has been updated based on the CHIA (DEQ 2019b); this revised table better resolves uncertainties regarding water rights and incorporates updated information disclosed in **Table 4.8-2**. **Table 4.9-2** incorporates additional springs identified by the CHIA (Table 8-2 of DEQ 2019b) as being located within the groundwater analysis area. See Figure 8-2 of the CHIA for spring water rights locations. Based on the CHIA (DEQ 2019b), Springs 2, 5, 8, 9, 12, and 14 do not have associated water rights. Eleven of the spring water rights listed in **Table 4.9-2** would be physically disturbed due to mining, their water source would be removed, or their flow rate would be reduced until after mining. The 74-acre area where mining would be prohibited under Alternative 4 would likely result in two spring rights not being impacted (as compared to Alternative 2).

[65] See coal tonnage and disturbance comparison in **Table 2.2-8**. Under Alternative 4, mine passes would not be authorized for 74 acres of Federal coal (about 1.9 million tons of recoverable coal). The 74 acres that would not be mined could still be used for other project-associated surface disturbance, such as overburden or topsoil stockpile locations (**Figure 2.5-1**).

Table 4.9-2. Spring Water Rights in the Direct Effects Analysis Area.

Identification Number (Monitored Spring #)	Water Source	Potential Impact during Active Mining	Potential Impact Postmining
DNRC 42KJ 108383 00	Overburden	No impact on overburden, upgradient of Area F mining	No impact on overburden, upgradient of Area F mining
DNRC 42KJ 162857 00 (Spring 1)	Overburden	No impact on overburden, upgradient of Area F mining	No impact on overburden, upgradient of Area F mining
DNRC 42KJ 162860 00	Overburden	No impact on overburden, upgradient of Area F mining	No impact on overburden, upgradient of Area F mining
DNRC 42KJ 44616 00	Overburden	Impact not likely, located upgradient of 74-acre area not approved for mining	Impact not likely, outside of the area approved for mining
DNRC 42KJ 44613 00 (Spring 7)	Rosebud Coal	Impact not likely, located within 74-acre area not approved for mining	Impact not likely, outside of the area approved for mining
DNRC 42KJ 108396 00	Rosebud Coal	Physically disturbed by Area F mining, loss of flow during mining likely	Water source removed, may not return
DNRC 42KJ 108673 00 (may be Spring 11)	Alluvium/interburden	Physically disturbed by Area F mining, loss of flow during mining likely	Water source removed, may not return
DNRC 42KJ 108394 00 (may be Spring 10)	Overburden	Physically disturbed by Area F mining, loss of flow during mining likely	Water source removed, may not return
DNRC 42KJ 108393 00	Overburden	Physically disturbed by Area F mining, loss of flow during mining likely	Water source removed, may not return
DNRC 42KJ 108395 00	Overburden	Physically disturbed by Area F mining, loss of flow during mining likely	Water source removed, may not return
DNRC 42KJ 183350 00 (Spring 3)	Overburden	Physically disturbed by Area F mining, loss of flow during mining likely	Water source removed, may not return
42JK 183353 00 (Spring 13)	Alluvium/interburden	Flow may be temporarily reduced by mining	Flow may be temporarily reduced by mining
DNRC 42KJ 18492 00	Overburden	Physically disturbed by Area F mining, loss of flow during mining likely	Water source removed, may not return
DNRC 42KJ 183510 00	Alluvium, overburden, and/or Rosebud Coal	Near mine pits and disturbance, loss of flow during mining likely	Increase in TDS likely due to spoil water after mining
GWIC 1055 (Spring 4)	Overburden	No impact on overburden, upgradient of Area F mining	No impact on overburden, upgradient of Area F mining
DNRC 42KJ 162853 00 (Spring 6)	Overburden	No impact on overburden, upgradient of Area F mining	No impact on overburden, upgradient of Area F mining
42KJ 183508 00	Overburden	Physically disturbed by Area F mining, loss of flow during mining likely	Water source removed, may not return
42KJ 108264 00	Overburden	May be physically disturbed by Area F mining, loss of flow during mining likely	Water source removed, may not return

If a spring water right were to become unusable for its specified purpose due to flow or water quality changes, a suitable replacement source would be provided by Westmoreland Rosebud, so the impact would be moderate and short-term. Possible replacement water sources are discussed in **Section 4.9.3.3, Replacement Water Sources**. If a spring water right were impacted by mining but still contained sufficient water of adequate quality to meet beneficial use needs, the intensity of the impact would be negligible to minor and short-term.

Surface Water Rights

Because streams located south and west of the analysis area would not be affected by mining, surface water rights located south and west of the project area would not be affected by mining. During mining, runoff from disturbed areas would be detained and contained in mining pits and/or sediment-control structures, resulting in a loss of water downstream. Although the main creek channels would not be mined, tributaries to the creeks in the project area would be mined, temporarily reducing stream flows. Impounded water would be discharged at times, after sediment settling treatment, from the sediment ponds to all of the creeks in the project area, changing the timing of water availability to downstream surface water users. Some of the impounded water would be used for dust control or would evaporate or infiltrate. In addition, removal of the Rosebud aquifer that is a source of water to some sections of McClure, Robbie, and Donley Creeks, plus the reduction of water availability from the McKay Coal, would reduce flow in and downstream of the project area until the groundwater table recovered after many decades. Effects on stream flow are described in greater detail in **Section 4.7, Water Resources – Surface Water**. Direct surface water diversions downstream of the project area include seven water rights: two on Trail Creek (42KJ 183497 00 and 42KJ 183501 00), one on McClure Creek (42KJ 8211 00), one on Robbie Creek (42KJ 183532 00), two on Donley Creek (42KJ 177102 00 and 42KJ 183513 00), and one on Black Hank Creek (42KJ 183512 00). All of these water rights are for stock watering directly from the source or from a ditch system. The 74-acre area removed from mining under Alternative 4, as compared to Alternative 2, could result in one surface water right being impacted less due to this reduction in mining. Due to the irregular nature of stream flow in Trail, Donley, Robbie, McClure, and Black Hank Creeks, it is not possible to quantify the effect on water rights on these creeks. If a surface water right were to become unusable for its specified purpose due to flow or water quality changes, a suitable replacement source would be provided by Westmoreland Rosebud; thus, the impact would be moderate and short-term. Possible replacement water sources are discussed in **Section 4.9.3.3, Replacement Water Sources**. If a surface water right were impacted by mining, but changes in flow or water quality were small enough that the flow and/or water quality were still adequate to meet beneficial use needs, the intensity of the impact would be negligible to minor and short-term.

There are surface water rights on the West Fork Armells Creek, but because the mine disturbance area is small (less than 5 percent) relative to the overall watershed area of the creek, it is expected that effects on these water rights would not be measurable except when flows from a large, localized storm event at the project area are detained during mining. The intensity of the impact on any surface water rights on the West Fork Armells Creek as a result of mining would be expected to be short-term and negligible.

Some of the surface water rights are for on-stream reservoirs used for stock watering. Stock ponds located within the disturbed area in the project area would be lost due to mining. Other ponds located near the disturbance area, both within and near the project area, may lose some or all of their water supply due to:

- Reductions in stream flow as a result of impounding water during mining
- Reductions in stream flow due to the loss of mined sections of the watersheds
- Reductions or elimination in groundwater discharge from the Rosebud and McKay aquifers to stream reaches with localized spring/seep contributions

As discussed in **Section 4.7, Water Resources – Surface Water**, the water quality of the stock ponds may be degraded as a result of mining. If a stock pond were to become unusable due to flow or water quality changes, a suitable replacement source would be provided by Westmoreland Rosebud; thus, the impact would be moderate and short-term. If a pond were impacted by mining but still contained sufficient water of adequate quality for stock watering, the intensity of the impact would be short-term and negligible to minor.

Groundwater Rights

Groundwater wells located within the 4,288-acre Alternative 4 disturbance area would be removed as a result of mining; in comparison, Alternative 2 would impact groundwater wells in a smaller disturbance area (4,260 acres). The 74-acre area removed from mining under Alternative 4 as compared to Alternative 2 would likely result in one groundwater right (GWIC ID 705195 – stock well with no DNRC water ID number) not being impacted due to this reduction in mining. The full list of groundwater rights impacted by Alternative 4 is listed in Table 8-3 and shown on Figure 8-3 of the CHIA (DEQ 2019b). Six groundwater rights (DNRC IDs 42KJ438900, 42KJ4651900, 42KJ10840000, 42KJ4462200, and 42KJ18350900 and GWIC ID 14199) are likely to be eliminated under Alternative 4 mining.

Westmoreland Rosebud's Alternative 2 groundwater model (PAP, Appendix I-B) estimated that the maximum drawdown in the Rosebud aquifer at the end of mining would be 90 feet and in the McKay aquifer would be 10 feet (see **Section 3.8, Water Resources – Groundwater**); similar drawdown would be expected under Alternative 4. For wells not removed by mining, depending on the well location, the groundwater level under Alternative 4 could be drawn down in the Rosebud aquifer from a few feet up to 90 feet as a result of mining, and in the McKay aquifer by up to 10 feet based on modeling for Alternative 2. The Alternative 2 groundwater model also showed that groundwater levels in water wells located outside of and within 1 mile to the south or west of Area F would be drawn down by 5 to 20 feet in the Rosebud aquifer and up to 5 feet in the McKay aquifer; similar drawdown would be expected under Alternative 4. Table 8-3 of the CHIA (DEQ 2019b) details the likely drawdown possible for each groundwater right assuming well completion depth; however, information is often lacking for accurate determinations to be made. It is not known what water level decreases in private wells would impair the owner's ability to produce water; production would depend on the characteristics of the individual wells such as depth, depth to water, pump location, and specific capacity. In general, wells would not be affected by mining if they are located outside the model-predicted drawdown area (i.e., groundwater analysis area). If a well were to become inadequate or unusable for its specified purpose due to drawdown in the well or change in water quality, it would be replaced by Westmoreland Rosebud, or a suitable replacement water source would be provided; thus, the impact would be moderate and short-term. Possible replacement water sources are discussed in **Section 4.9.3.3, Replacement Water Sources**. If a groundwater right were impacted by mining but still contained sufficient water of adequate quality to meet beneficial use needs, the intensity of the impact would be short-term and negligible to minor.

4.9.3.2 Direct Impacts (Postmining)

Spring Water Rights

Postmining effects on spring water rights are described in **Table 4.9-2**. The water table would recover in the McKay Coal after mining, so the flow of any spring from the McKay Coal would return to near pre-mine conditions many decades after mine closure. Increases in TDS are likely due to spoil water after mining for any Rosebud or overburden spring that returns. If a spring water right were unusable for its specified purpose due to flow or water quality changes, a suitable replacement source would be provided by Westmoreland Rosebud; thus, the impact would be moderate and short-term. If a spring water right were impacted by mining but still contained sufficient water of adequate quality to meet beneficial use needs, the intensity of the impact would be short-term and negligible to minor.

Surface Water Rights

After mining, when the site was reclaimed and the hydrologic balance restored in accordance with MSUMRA requirements for Phase IV bond release (ARM 17.24.1116(6)(d); see also **Section 1.6.4, Bond Release** in the 2018 Final EIS), effects on surface water rights would diminish and may, after many

decades, return to near pre-mine conditions. Direct surface water diversions downstream of the project area include seven water rights: two on Trail Creek (42KJ 183497 00 and 42KJ 183501 00), one on McClure Creek (42KJ 8211 00), one on Robbie Creek (42KJ 183532 00), two on Donley Creek (42KJ 177102 00 and 42KJ 183513 00), and one on Black Hank Creek (42KJ 183512 00). All of these water rights are for stock watering directly from the source or from a ditch system. If these surface water rights were to become unusable for their specified purpose due to flow or water quality changes, a suitable replacement source would be provided by Westmoreland Rosebud; thus, the impact would be moderate and short-term. If these surface water rights were impacted by mining either during or after mining, but changes in flow or water quality were small enough that the flow and/or water quality were still adequate to meet beneficial use needs, the intensity of the impact would be short-term and negligible to minor.

Stock ponds with water rights located near the disturbed area within the analysis area whose source of supply was runoff would return to near pre-mining conditions after reclamation was completed and the hydrologic balance restored to the extent possible. The ponds would fill when precipitation events resulting in stream flow and direct runoff to the ponds occurred. For stock ponds located near the disturbed area whose source of supply was at least in part spring flows, there would not be a return to pre-mine conditions. Stock ponds for livestock and wildlife watering in the project area would be reestablished or mitigated by Westmoreland Rosebud during postmining reclamation. If a stock pond were to become unusable either during or after mining due to flow or water quality changes, a suitable replacement source would be provided by Westmoreland Rosebud; thus, the impact would be moderate and short-term. If a pond were impacted during or after mining but still contained sufficient water of adequate quality for stock watering, the intensity of the impact would be short-term and negligible to minor.

Groundwater Rights

The Alternative 2 groundwater model showed that 50 years after the end of mining, there would still be residual drawdown in the coal aquifers outside of the mined area (PAP, Appendix I-B); a similar drawdown timeframe is expected for Alternative 4. It is predicted that groundwater levels would return to pre-mine conditions in the McKay Coal many decades after mine closure. Groundwater levels in the Rosebud Coal upgradient of the Area F boundary would return to pre-mining conditions many decades after mine closure. If a well were to become inadequate or unusable for its specified purpose due to drawdown in the well or change in water quality, it would be replaced by Westmoreland Rosebud, or a suitable replacement water source would be provided; thus, the impact would be moderate and short-term. If a groundwater right were impacted by mining but still contained sufficient water of adequate quality to meet beneficial use needs, the intensity of the impact would be short-term and negligible to minor.

4.9.3.3 Replacement Water Sources and Replacement Process

Possible sources of replacement water for stock and domestic groundwater, spring, and surface water rights would likely be groundwater pumped from the unmined areas of the Rosebud coal aquifer west and south of the project area, the McKay coal aquifer, or the Sub-McKay aquifer. The most likely source may be the Sub-McKay aquifer because it generally yields more water than the coal aquifers. The water quality of these aquifers is comparable to the existing quality of the streams, springs, and wells in and near the project area, so it is unlikely that beneficial uses of the existing water rights would be impaired. All of these aquifers would produce water if developed. MSUMRA requires the applicant to provide "a description of alternative water supplies, not to be disturbed by mining that could be developed to replace water supply diminished or otherwise adversely impacted in quality or quantity by mining activities so as not to be suitable for the approved postmining land uses." Approximate yields in Sub-McKay wells range from 3.5 to 35 gpm (PAP, Appendix O), which should be sufficient for stock and domestic water use. Power would need to be provided to the pumps in any wells installed for replacement water. Water could

also be delivered by truck or pipeline from other areas, which may be a viable alternative for domestic water rights but may be cost prohibitive for stock watering. Stock ponds would be constructed in the project area during reclamation.

The replacement of water sources may implicate the jurisdiction of both DEQ and DNRC. MSUMRA requires Westmoreland Rosebud to identify the probable need for and hydrologic availability of water supplies that could be used to replace any water supply interrupted, diminished, or otherwise adversely impacted by mining activities (Section 82-4-222(1)(m), Montana Code Annotated [MCA]; ARM 17.24.648; ARM 17.24.304(1)(f)(iii)). Westmoreland Rosebud's obligation to provide replacement water is unconditional (Section 82-4-253(3)(d), MCA). To the extent that such provision of replacement water implicates the Montana Water Use Act, Westmoreland Rosebud would also need to fully comply with that law and any associated DNRC rules. *Id*. DEQ has neither the authority nor the expertise to determine, on an advisory basis or otherwise, water rights issues. See Section 85-2-311, MCA; *Confederated Salish & Kootenai Tribes v. Clinch*, 2007 MT 63, P35, 336 Mont. 302, 318 (2007); see also *Confederated Salish & Kootenai Tribes v. Clinch*, 1999 MT 342, P14-P15, 297 Mont. 448, 453-454 (19990; *Peabody Coal Co. v. OSMRE*, 123 IBLA 195; 1992 IBLA LEXIS 55, 123 IBLA 195; and 1992 IBLA LEXIS 55 at [2]. The process for replacing a water right impacted by mining is described in **Section 3.9.1.1** of the 2018 Final EIS.

4.9.3.4 Indirect Impacts

The indirect effects analysis area includes the Yellowstone River between the Armells Creek and Tongue River confluences, chosen to account for indirect effects of water withdrawals by the Colstrip Power Plant. The Yellowstone River diversion point for the Colstrip Power Plant's 69 cfs water right is downstream of the confluence with Armells Creek. As described in **Section 4.7.3.3, Indirect Impacts** for surface water hydrology, the 69 cfs diversion potential of the Colstrip Power Plant represents a small fraction of average daily flow in the Yellowstone River within the indirect effects analysis area (less than 0.1 percent at maximum recorded flow to 5 percent at minimum recorded flow), indicating that corresponding diversions would not adversely affect the river's surface water hydrology. There are approximately 100 active surface water rights on the Yellowstone River within the indirect effects analysis area with a maximum diversion potential of approximately 1,400 cfs. Most of those water rights are dedicated exclusively to irrigation purposes, including the largest three of those water rights (425 cfs, 144 cfs, and 109 cfs). The Colstrip Power Plant's 69 cfs municipal and industrial water right on the Yellowstone River represents a small fraction (5 percent) of the maximum diversion potential from the river within the indirect effects analysis area, and when considered in combination with its non-adverse effect on surface water hydrology, diversions associated with the water right would not adversely affect other water rights within the indirect effects analysis area.

As described in **Section 3.9.2, Existing Water Rights**, Talen Montana, on behalf of six owners of the Colstrip Power Plant, completed a 2022 Water Feasibility Study that includes plans for potential future uses of water associated with the 69 cfs water right (including continued municipal use by the City of Colstrip) through the anticipated duration of the power plant's proposed remediation efforts following closure (DOWL Engineering 2022). DEQ has recognized a continued commitment by the power plant's owners to work in conjunction with the city toward agreements for related water supply infrastructure and water rights access or updates (DEQ 2023). This process remains active where related water rights effects are currently unknown. DEQ has neither the authority nor the expertise to determine, on an advisory basis or otherwise, water rights issues, and the ultimate ownership and use of the 69 cfs water right is under the jurisdiction of DNRC.

Coal currently mined by Westmoreland Rosebud at the Rosebud Mine is used by two coal-fired power plants (the Rosebud and Colstrip Power Plants) to generate electricity. Project area coal would be used at

these same power plants, thus contributing to their annual emissions. The source of water supply to the Colstrip Power Plant is water piped from the Yellowstone River (see Section **3.7.6.2, Water Quality in the Indirect Effects Analysis Area**). There would be no indirect impacts from the Colstrip Power Plant on water levels in wells, spring flows, or stream flows that would affect any water rights in the indirect impacts analysis area.

The source of water to the Rosebud Power Plant is deep groundwater wells. There are other deep groundwater wells near the Rosebud Power Plant wells, but for the power plant to have obtained a Beneficial Water Use Permit from DNRC to pump water from their wells required proof that water was physically and legally available at the proposed point of diversion in the amount requested. In addition, senior water rights cannot be impaired. There may be indirect impacts from the Rosebud Power Plant on water levels in nearby wells due to pumping water for the power plant, but adequate water would still be available for the other nearby groundwater rights. There have been no reported impacts on local groundwater or ongoing groundwater issues related to the Rosebud Power Plant, so there would be no indirect impacts on the water quality of groundwater rights in the analysis area. There would be no indirect impacts on spring flows or stream flows that would affect analysis area spring or surface water rights.

Impacts on groundwater quality due to the disposal of CCR at the Colstrip Power Plant are described in **Section 4.8, Water Resources – Groundwater** and are limited to the Colstrip Power Plant site. There would be no impacts on groundwater quality except on the Colstrip Power Plant site (Hydrometrics 2015). There are no groundwater wells on the Colstrip Power Plant site except for a very deep well owned by the electric power companies and City of Colstrip, as well as capture wells for site remediation, so there would be no indirect impacts on groundwater rights due to the disposal of CCR. Pumping from the on-site wells would not impair nearby senior water rights. There may be indirect impacts from the Colstrip Power Plant on water levels in nearby wells due to pumping groundwater on the power plant site, but adequate water would still be available for the other nearby groundwater rights. Therefore, there would be no indirect impacts on groundwater rights due to pumping groundwater on the Colstrip Power Plant property.

Based on the described effects on surface water quality of atmospheric deposition from the two power plants described in **Section 4.7, Water Resources – Surface Water**, it is not expected that there would be any effects on surface water rights in the analysis area. It is not expected that atmospheric deposition from the two power plants would affect groundwater quality, so there would be no effects on groundwater rights in the analysis area. Indirect impacts on East Fork Armells Creek surface water quality from Colstrip Power Plant process wastewater migration due to pond seepage and pipeline spills would be short-term, negligible to minor, and adverse; thus, corresponding indirect impacts on East Fork Armells Creek surface water rights would be short-term, negligible to minor, and adverse.

4.9.4 Alternative 5 – Partial Mining Alternative

The types of direct and indirect water rights impacts under Alternative 5 – Partial Mining Alternative would be similar to those described above for Alternative 4 – Proposed Action (Current Federal Mining Plan). Under Alternative 5, though, disturbance would be limited to the southern portion of the project area (**Figure 2.6-1**) based on the assumption that all mining would cease in 2030. In total, approximately 2,495 acres would be disturbed in the project area over an 11-year mine life that would produce about 37.1 million tons of coal from Federal and private coal leases.

Under Alternative 5, direct and indirect water rights impacts would be less than under Alternative 4. About 34 million fewer tons of coal would be mined and approximately 1,793 fewer acres would be disturbed under Alternative 5 as compared to Alternative 4 (**Table 2.3-1** and **Table 2.3-2**). The life of

operations for Area F (and the corresponding impacts) would be 9 years shorter under Alternative 5 than under Alternative 4. Reclamation and PMT would be achieved in the project area 9 years earlier than under Alternative 4.

Similar to Alternative 1, mining under Alternative 5 would be limited to lands east of Donley Creek, with no mining occurring in the Trail Creek, McClure Creek, and Robbie Creek drainages. Therefore, surface water rights located in the Trail Creek, McClure Creek, and Robbie Creek drainages would not be anticipated to be impacted under Alternative 5. As compared to Alternative 4, this would result in four fewer surface water rights potentially impacted from mining: two on Trail Creek (42KJ 183497 00 and 42KJ 183501 00), one on McClure Creek (42KJ 8211 00), and one on Robbie Creek (42KJ 183532 00). All of these water rights are for stock watering directly from the source or from a ditch system.

Mining under Alternative 5 would be limited to lands east of Donley Creek, with no mining occurring in the Trail Creek, McClure Creek, and Robbie Creek drainages (**Figure 2.6-1**). Therefore, groundwater rights located in the Trail Creek, McClure Creek, and Robbie Creek drainages would not be anticipated to be impacted under Alternative 5. As compared to Alternative 4, this would result in three fewer groundwater rights eliminated due to mining (DNRC IDs 42KJ438900 and 42KJ44622 and GWIC ID 14199), one fewer groundwater right potentially impacted due to drawdown (DNR ID 42KJ18335200), and five fewer springs physically disturbed (Springs 3, 10, 11, 13, and 14).

4.9.4.1 Mining Private Coal Only Scenario

If Westmoreland Rosebud chose to pursue mining of private coal only (leases 1001 and 1001-A) after 2030, direct and indirect water rights impacts could be greater than those disclosed above for Alternative 5. The intensity of impacts, however, would be no greater than those disclosed for Alternative 4 (see above) and would be expected to be less. See **Section 2.6.2, State Operating Permit C2011003F** for a discussion of the steps that would be required for such a scenario to occur.

4.9.5 Irreversible and Irretrievable Commitment of Resources

Assuming that any adversely affected water rights would be replaced with an adequate water supply, no irreversible or irretrievable commitment of resources would occur. If there was not an adequate water supply to replace all adversely affected water rights, then the loss of some water rights would be an irreversible and irretrievable commitment of resources.

4.10 VEGETATION

This section discloses the direct and indirect effects on vegetation resulting from implementation of Alternative 1 – No Action, Alternative 4 – Proposed Action (Current Federal Mining Plan), or Alternative 5 – Partial Mining Alternative. Pre-mine vegetation conditions and the analysis areas used for this impacts analysis are described in **Section 3.10, Vegetation**.

4.10.1 Analysis Methods and Impact and Intensity Thresholds

Vegetation impacts were evaluated in this SEIS using the same methods used in the 2018 Final EIS. Analysis methods are provided in **Section 4.10.1** of the 2018 Final EIS, beginning on page 547. The thresholds for assessment of impacts (negligible, minor, moderate, or major) on vegetation are the same as those defined in the 2018 Final EIS **Table 135**). Assumptions for each alternative, which informed the scope of the effects analyses in this SEIS, are presented in **Section 2.4, Alternative 1 – No Action**, **Section 2.5, Alternative 4 – Proposed Action (Current Federal Mining Plan)**, and **Section 2.6, Alternative 5 – Partial Mining Alternative**.

4.10.2 Alternative 1 – No Action

The types of direct and indirect vegetation impacts under Alternative 1 (as described in this SEIS)[66] would be similar to those described below for Alternative 4 – Proposed Action (Current Federal Mining Plan). Under Alternative 1, though, impacts would be limited to the southeastern portion of the project area (east of Donley Creek) with no mining occurring in the Trail Creek, McClure Creek, and Robbie Creek drainages (**Figure 2.4-1**) based on the assumption that all mining would cease in 2025. In total, approximately 1,021 acres would be disturbed in the project area, which would result in a short-term, moderate, adverse effect on vegetation. Over a 6-year mine life, about 17.1 million tons of coal would be mined from Federal and private coal leases in the project area. As with Alternative 4, areas that require vegetation clearing and removal under Alternative 1 would be subject to an overall loss of biodiversity and a short-term loss of productivity during the active mining period. Reclamation would reestablish plant communities, but biodiversity would be reduced, and species composition would not be the same. As with Alternative 4, mining dewatering activities could lower the regional water table, which would adversely impact adjacent vegetation communities, especially wetland and riparian areas.

Under Alternative 1, direct and indirect vegetation impacts would be less than under Alternative 4: about 54 million fewer tons of coal would be mined and approximately 3,267 fewer acres (and associated vegetation) would be disturbed under Alternative 1 as compared to Alternative 4 (**Table 2.3-1** and **Table 2.3-2**). The life of operations for Area F (and the corresponding impacts) would be 14 years shorter under Alternative 1 than under Alternative 4. Reclamation (including revegetation) and PMT would be achieved in the project area 14 years earlier than under Alternative 4.

4.10.2.1 Mining Private Coal Only Scenario

If Westmoreland Rosebud chose to pursue mining of private coal only (leases 1001 and 1001-A) after 2025, direct and indirect vegetation impacts could be greater than those disclosed above for Alternative 1. The intensity of impacts, however, would be no greater than those disclosed for Alternative 4 (see below)

66. Direct and indirect vegetation impacts of Alternative 1 – No Action were described in **Section 4.10.2** of the 2018 Final EIS, beginning on page 547. As described in **Chapter 2** of this SEIS, Alternative 1 – No Action has been revised since the 2018 Final EIS.

and would be expected to be less. See **Section 2.4.2, State Operating Permit C2011003F** for a discussion of the steps that would be required for such a scenario to occur.

4.10.3 Alternative 4 – Proposed Action (Current Federal Mining Plan)

Direct and indirect vegetation impacts under Alternative 4 – Proposed Action (Current Federal Mining Plan) would be similar to those described for Alternative 2 in **Section 4.10.3** of the 2018 Final EIS, beginning on page 548. Under Alternative 4, half a million tons more coal would be mined[67] and approximately 28 acres more would be disturbed as compared to Alternative 2. Reclamation would occur contemporaneously with mining (see discussion of the phases of reclamation in **Section 1.6.4, Bond Release**, in the 2018 Final EIS). Once mining has ceased, reclamation (including revegetation) of disturbed areas (up to 4,288 acres) in the project area would occur according to Westmoreland Rosebud's approved reclamation plan (**Figure 2.2-5**) and PMT (**Figure 2.2-6**), which are similar to those described for Alternative 2 in 2018 Final EIS **Section 2.4.4, Reclamation Plan**. Modifications since 2018 are described in **Section 2.2.2.2, Area F Operations and Development**.

4.10.3.1 Direct Impacts

Alternative 4 would result in the removal and loss of vegetation communities on up to 4,288 acres in the direct effects analysis area during mining operations in the project area, which would result in a short-term, moderate, adverse effect on vegetation. The upland grassland community would be most affected, with up to 1,538 acres disturbed, followed by agricultural land and pastureland with a total of 985 acres impacted. When the various shrub grassland communities are combined, they make up the third-largest vegetation community impacted, with a disturbance of 918 acres. **Table 4.10-1** lists the acreages of disturbance for each vegetation type in the direct effects analysis area and the proposed postmining revegetation target acres for each type. The vegetation types are categorized by the communities proposed for revegetation. The vegetation types listed in **Table 4.10-1** match those used by Westmoreland Rosebud in the PAP and the approved permit. These terms are similar to but differ from the terms used in the Cedar Creek Associates, Inc. 2014 report (PAP, Appendix E) as described in the affected environment discussion in **Section 3.10, Vegetation** in the 2018 Final EIS.

As shown in **Table 4.10-1**, Alternative 4 would disturb up to 4,288 acres (instead of 4,260 acres in Alternative 2) in a 6,773-acre permit area (instead of 6,746 acres under Alternative 2), and the habitat types have roughly the same distribution. As described in the 2018 Final EIS for Alternative 2, areas that require vegetation clearing and removal under Alternative 4 would be subject to an overall loss of biodiversity and a short-term loss of productivity in the direct effects analysis area during the active mining period. Reclamation would reestablish plant communities, but biodiversity would be reduced, and species composition would not be the same. After reclamation of mine disturbances, shrublands and grasslands can take many years to reestablish a community with a diversity of plants similar to but less than the original plant community. As discussed in **Section 4.24, Soil**, Alternative 4 (like Alternative 2) would impact soil structure by altering ecological processes (e.g., propagule pressure, nutrient cycling, competition, interference) and adversely affect soil/plant interaction due to decreased soil water-holding capacity, loss of aeration and pore space, and increased bulk density. Soil compaction, loss of soil structure, loss of organic matter due to mixing and storage, and loss of microorganisms due to prolonged storage of soil could lower postmining vegetation vigor and diversity for an extended period.

[67] See coal tonnage and disturbance comparison in **Table 2.2-8**. Under Alternative 4, mine passes would not be authorized for 74 acres of Federal coal (about 1.9 million tons of recoverable coal). The 74 acres that would not be mined could still be used for other project-associated surface disturbance, such as overburden or topsoil stockpile locations (**Figure 2.5-1**).

Upon completion of mining in the project area, disturbed areas would be reclaimed and revegetated. Westmoreland Rosebud's reclamation requirement is to establish a postmining environment comparable to existing conditions. The approved reclamation plan includes areas designated for various shrublands and grasslands. Shrublands would likely take longer to restore to pre-mine conditions, while grasslands would recover more quickly following reclamation. Westmoreland Rosebud would revegetate the existing pasturelands with grasslands to reflect landowner preference for more grazing land. Overall, reclamation under Alternative 4 would reestablish plant species that would have the same seasonal growth characteristics as the original vegetation, be capable of self-regeneration and plant succession, be compatible with the plant and animal species of the area, and meet the requirements of applicable seed, poisonous and noxious plant, and introduced species laws and regulations.

Success of reclamation would be measured through monitoring as described in the revegetation monitoring plan and revegetation success criteria (see 2018 Final EIS). Although the seed mixes for revegetation would be dominated by native species, it is likely over the long term that reclaimed areas would have fewer native species than pre-mine vegetation communities.

Table 4.10-1. Vegetation Impacts and Proposed Revegetation Acreages.

Vegetation Type	Acres in Project Area	Acres Disturbed	Postmining Revegetation Target Acres
Lowland			
Grassland	0.4	0.4	0
Deciduous tree/shrub	61	19	22
Upland			
Grassland	2,383	1,538	2,006
Shrub grasslands			
• Big sagebrush	443	285	253
• Silver sagebrush	643	327	429
• Skunkbush sumac	394	223	240
• Deciduous tree/shrub	159	83	145
Mixed shrub	184	82	101
Conifer	1,373	672	734
Other			
Pastureland	537	516	0
Agricultural fields	513	469	318
Ranch yards/county roads	41	32	3
Sandstone features			
• Cliff	2	2	0
• Sandstone rock	4	4	6
Scoria pit	5	5	0
Ponds	1	0	0
Wet meadow	5	2	3
Total (Alternative 2)	**6,746[1]**	**4,260**	**4,260**
Total (Alternative 4)	**6,773[2]**	**4,288**	**4,288**

[1.] Based on Table 313-1 from Western Energy's PAP. Please note this number actually equals 6,748 due to rounding to the nearest whole number.
[2.] See **Section 2.2.2.2, Area F Operations** for a discussion of how the approved operating permit has evolved from Alternative 2 – Proposed Action analyzed in the 2018 Final EIS.

In addition to ground-disturbing activities, mining dewatering activities could lower the regional water table, which would adversely impact adjacent vegetation communities, especially wetland and riparian areas. As discussed in **Section 4.11, Wetlands and Riparian Zones**, a majority of the wetlands in the project area could be impacted from mining, including a reduction in groundwater and surface water support. Although sections of these drainages would not be directly impacted by mining activities, the

reduction in surface and groundwater could cause changes to the vegetation communities along the drainages. Forty-six acres of riparian habitat occur along drainages that would have reduced flow due to mining activities. Changes to hydrology could cause these riparian areas to shift to grassland/upland communities. Loss of hydrology to wetland and riparian areas often leads to an increase in noxious and nonnative species along drainages. Although hydrology would be returned during reclamation, it could take decades before the wetland/riparian communities return to pre-mine conditions.

Adverse effects on surrounding vegetation could also occur from increased dust in the project area from mining activities. Increased dust that settles on vegetation can block photosynthesis and growth (Wijayratne et al. 2009). These impacts would be localized, and dust-control measures (see **Section 4.3, Air Quality**) would reduce the short-term negligible effects from dust.

Alternative 4 may result in new or expanded populations of noxious weeds by disturbing 4,288 acres of land (as compared to 4,260 acres under Alternative 2) that could become potential paths for dispersal of weed seeds. Existing weed populations could disperse to newly disturbed areas and other areas via vehicular traffic or soil transport. An increase in abundance and distribution of noxious weeds has the potential to displace native species and reduce vegetation diversity. The noxious weed control plan would prevent any large populations of noxious weeds from establishing within the project area. With the implementation of the noxious weed control plan, reclamation plan, and BMPs, Alternative 4 would have a short-term, minor, adverse impact on surrounding vegetation. Overall, Alternative 4 would have a short-term, moderate, adverse effect on vegetation. The Alternative 4 impact would be slightly greater than that of Alternative 2 due to the removal of 4,288 acres (instead of 4,260 acres) of vegetation for mining activities in the direct effects analysis area; however, these areas would be reclaimed following mining. Some long-term, minor, adverse effects on vegetation would occur due to decreased vegetation vigor or diversity and due to the potential for changes to vegetation communities from the reduced amount of surface and groundwater in the area.

4.10.3.2 Indirect Impacts

Deposition modeling results (see **Section 4.3, Air Quality**) indicate that the operation of the Colstrip and Rosebud Power Plants during the 20-year mining operations period in the project area would not result in adverse impacts on plants (see **Section 4.3.3.2, Indirect Impacts of Coal Combustion**). **Table 4.10-2** (**Table 137** in the 2018 Final EIS) provides a summary of background concentrations for the trace metals analyzed plus deposition in the indirect effects analysis area, compared to the ecological screening values for plants. For all trace metals except mercury and selenium, deposition of 1 percent of background concentrations would not be reached from combustion of project area coal over the 20-year operations period, and mercury deposition inside the analysis area would be less than the ecological soil screening level (Eco-SSL) for plants. Although the combined background levels and expected deposition for selenium exceed the Eco-SSL for plants, the expected deposition is only 6.1 percent of the Eco-SSL. Additional detail is provided in **Section 4.10.3.2** of the 2018 Final EIS. As such, there would be no indirect effects on vegetation from deposition of trace metals.

Table 4.10-2. Trace Metal Background, Potential Soil Impact Distance, and Ecological Screening Values for Plants.

Analyte	Background 95 Percent UCL	Total Deposition over 19-year Operations Period[1]	Total Expected Concentration (Background + Total Deposition)	Ecological Screening Values for Plants[2]	Percentage of Deposition Relative to Background	Percentage of Deposition Relative to Plant Ecological Screening Values[2]	Does Deposition plus Background Exceed the Plant Ecological Screening Values?	Potential Adverse Indirect Impacts on Plants
	mg/kg, DW	mg/kg, DW	mg/kg, DW	mg/kg, DW	Percent	Percent	(Yes/No)	(Yes/No)
Antimony	0.9	0.00504	0.90504	NA	0.56	NA	No	No
Arsenic	10.9	0.00694	10.90694	18	0.06	0.04	No	No
Cadmium	0.3	0.00189	0.30189	32	0.63	0.01	No	No
Chromium	50.5	0.01765	50.51765	NA	0.03	NA	No	No
Copper	17.8	0.08133	17.88133	70	0.46	0.12	No	No
Lead	19.1	0.00757	19.10757	120	0.04	0.01	No	No
Selenium	0.56	0.03153	0.59153	0.52	5.60	6.10	Yes	No
Mercury	0.023	0.00085	0.02385	0.3	3.70	0.28	No	No

NA = Not available. Insufficient data to derive Eco-SSLs; DW = Dry weight; UCL = Upper Confidence Limit.

1. Assumes an untilled soil mixing depth of 2 centimeters and a soil dry-bulk density of 1.5 g/cm^3 as recommended by the EPA (2005).

2. **Section 4.10.1.1, Analysis Methods** in the 2018 Final EIS describes the hierarchy of plant ecological screening values.

4.10.4 Alternative 5 – Partial Mining Alternative

The types of direct and indirect vegetation impacts under Alternative 5 – Partial Mining Alternative would be similar to those described above for Alternative 4 – Proposed Action (Current Federal Mining Plan). Under Alternative 5, though, direct impacts would be limited to the southeastern portion of the project area (east of Donley Creek) with no mining occurring in the Trail Creek, McClure Creek, and Robbie Creek drainages (**Figure 2.6-1**) based on the assumption that all mining would cease in 2030. In total, approximately 2,495 acres would be disturbed in the project area, which would result in a short-term, moderate, adverse effect on vegetation. Over an 11-year mine life, about 37.1 million tons of coal would be mined from Federal and private coal leases in the project area. As with Alternative 4, areas that require vegetation clearing and removal under Alternative 5 would be subject to an overall loss of biodiversity and a short-term loss of productivity during the active mining period. Reclamation would reestablish plant communities, but biodiversity would be reduced, and species composition would not be the same. As with Alternative 4, mining dewatering activities could lower the regional water table, which would adversely impact adjacent vegetation communities, especially wetland and riparian areas.

Under Alternative 5, direct and indirect vegetation impacts would be less than under Alternative 4. About 34 million fewer tons of coal would be mined and approximately 1,793 fewer acres (and associated vegetation) would be disturbed under Alternative 5 as compared to Alternative 4 (**Table 2.3-1** and **Table 2.3-2**). The life of operations for Area F (and the corresponding impacts) would be 9 years shorter under Alternative 5 than under Alternative 4. Reclamation (including revegetation) and PMT would be achieved in the project area 9 years earlier than under Alternative 4.

4.10.4.1 Mining Private Coal Only Scenario

If Westmoreland Rosebud chose to pursue mining of private coal only (leases 1001 and 1001-A) after 2030, direct and indirect vegetation impacts could be greater than those disclosed above for Alternative 5. The intensity of impacts, however, would be no greater than those disclosed for Alternative 4 (see above) and would be expected to be less. See **Section 2.6.2, State Operating Permit C2011003F** for a discussion of the steps that would be required for such a scenario to occur.

4.10.5 Irreversible and Irretrievable Commitment of Resources

All action alternatives would disturb vegetation communities dominated by native species, the effects of which would be subsequently mitigated by revegetation. Revegetated areas would eventually return to pre-disturbance productivity, but vegetation diversity would be lower than existing conditions. The loss of some native plant species in all alternatives would be an irreversible resource commitment. The irreversible and irretrievable commitment of resources under Alternative 4 would be slightly greater than under Alternative 1 or 5 due to additional acres of disturbance.

4.11 WETLANDS AND RIPARIAN ZONES

This section discloses the direct and indirect effects on wetlands and riparian zones resulting from implementation of Alternative 1 – No Action, Alternative 4 – Proposed Action (Current Federal Mining Plan), or Alternative 5 – Partial Mining Alternative. Existing wetland conditions and the analysis areas used for this impacts analysis are described in **Section 3.11, Wetlands and Riparian Zones**.

4.11.1 Analysis Methods and Impact and Intensity Thresholds

Wetland impacts were evaluated in this SEIS using the same methods used in the 2018 Final EIS. Analysis methods are provided in **Section 4.11.1** of the 2018 Final EIS, beginning on page 554. The thresholds for assessment of impacts (negligible, minor, moderate, or major) on wetlands are the same as those defined in the 2018 Final EIS in **Table 135**. Assumptions for each alternative, which informed the scope of the effects analyses in this SEIS, are presented in **Section 2.4, Alternative 1 – No Action**, **Section 2.5, Alternative 4 – Proposed Action (Current Federal Mining Plan)**, and **Section 2.6, Alternative 5 – Partial Mining Alternative**.

4.11.2 Alternative 1 – No Action

No direct wetland impacts are anticipated to occur under Alternative 1 because mining and disturbance would be limited to the southern portion of the project area (east of Donley Creek): no mining would occur in the Trail Creek, McClure Creek, and Robbie Creek drainages (**Figure 2.4-1**) based on the assumption that all mining would cease in 2025. In total, approximately 1,021 acres would be disturbed in the project area over a 6-year mine life that would produce about 17.1 million tons of coal from Federal and private coal leases. As with Alternative 4, indirect wetland impacts under Alternative 1 would be negligible.

Under Alternative 1, direct and indirect wetland impacts (if any) would be less than under Alternative 4: about 54 million fewer tons of coal would be mined and approximately 3,267 fewer acres would be disturbed under Alternative 1 as compared to Alternative 4 (**Table 2.3-1** and **Table 2.3-2**). The life of operations for Area F (and the corresponding impacts) would be 14 years shorter under Alternative 1 than under Alternative 4. Reclamation (including revegetation) and PMT would be achieved in the project area 14 years earlier than under Alternative 4.

4.11.2.1 Mining Private Coal Only Scenario

If Westmoreland Rosebud chose to pursue mining of private coal only (leases 1001 and 1001-A) after 2025, direct and indirect wetland impacts could be greater than those disclosed above for Alternative 1. The intensity of impacts, however, would be no greater than those disclosed for Alternative 4 (see below) and would be expected to be less. See **Section 2.4.2, State Operating Permit C2011003F** for a discussion of the steps that would be required for such a scenario to occur.

4.11.3 Alternative 4 – Proposed Action (Current Federal Mining Plan)

Direct and indirect wetland impacts under Alternative 4 – Proposed Action (Current Federal Mining Plan) would be similar to those described for Alternative 2 in **Section 4.11.3** of the 2018 Final EIS, beginning

on page 555. Under Alternative 4, half a million tons more coal would be mined[68] and approximately 28 acres more would be disturbed as compared to Alternative 2. Reclamation would occur contemporaneously with mining (see discussion of the phases of reclamation in **Section 1.6.4, Bond Release**, in the 2018 Final EIS). Once mining has ceased, reclamation (including revegetation) of disturbed areas (up to 4,288 acres) in the project area would occur according to Westmoreland Rosebud's approved reclamation plan (**Figure 2.2-5**) and PMT (**Figure 2.2-6**), which are similar to those described for Alternative 2 in 2018 Final EIS **Section 2.4.4, Reclamation Plan**. Modifications since 2018 are described in **Section 2.2.2.2, Area F Operations and Development**.

4.11.3.1 Direct Impacts

Riparian Zones

Alternative 4 would have a short-term and long-term moderate adverse impact on riparian zones because the riparian habitat along the drainages in the analysis area would likely be impacted by changes to surface and groundwater. Although sections of these drainages would not be directly impacted by mining activities, the reduction in surface and groundwater flow from springs could cause changes to the vegetation communities along the drainages. Approximately 46 acres of riparian habitat (Woody Draw community as described in **Section 3.10, Vegetation** in the 2018 Final EIS) occur along drainages that would have reduced flow due to mining activities. Changes to hydrology could cause these riparian areas to shift to grassland/upland communities. Loss of hydrology to wetland and riparian areas often leads to an increase in noxious and nonnative species along drainages. Although hydrology would be returned during reclamation, it could take decades before the wetland/riparian communities return to pre-mine conditions.

Wetlands

Wetlands in the direct effects analysis area are described in **Section 3.11.2.1, Location and Classification of Wetlands in the Direct Effects Analysis Area** in the 2018 Final EIS. Because mining would be prohibited in approximately 74 acres of Federal coal in the Trail Creek drainage, impacts on wetlands[69] under Alternative 4 would be less than those described for Alternative 2 in the 2018 Final EIS. Under Alternative 4, approximately 7.19 acres of palustrine persistent emergent saturated wetlands would be directly impacted by mining activities in the analysis area (as compared to 8.38 acres under Alternative 2); see **Table 4.11-1** below. Of these, 3.41 acres of wetlands would experience short-term impacts, and 3.78 acres of wetlands would experience long-term impacts (as compared to 3.41 acres of short-term wetland impacts and 4.97 acres of long-term wetland impacts under Alternative 2). Based on the mining sequence in the currently approved Area F operating permit (**Section 2.2.5, General Sequence of Operations**), a majority of these direct impacts would occur 10 years or more after mining begins. The wetlands would be impacted by surface mining, construction of the haul road, installation of utility structures, or changes to surface and groundwater hydrology due to mining activities. Overall, Alternative 4 would have a short-term and long-term moderate adverse impact on wetlands.

[68] See coal tonnage and disturbance comparison in **Table 2.2-8**. Under Alternative 4, mine passes would not be authorized for 74 acres of Federal coal (about 1.9 million tons of recoverable coal). The 74 acres that would not be mined could still be used for other project-associated surface disturbance, such as overburden or topsoil stockpile locations (**Figure 2.5-1**).
[69] Wetland B, within the Trail Creek drainage, would no longer be affected due to the prohibition of mining approximately 74 acres of Federal coal, reducing direct impacts by 1.19 acres.

Table 4.11-1. Alternative 4 Wetland Impacts.

Wetland Identification	Direct Short-Term Impact (acres)	Direct Long-Term Impact (acres)
A	0	0
B	0	0
C	0	0.80
D	1.64	0
E	1.23	0
F	0	2.38
F028	0	0.60
F049	0	0
F058	0	0
F061	0	0
F081	0.54	0
Total Impacts	**3.41**	**3.78**

Below is a summary of how each wetland (shown on **Figure 4.11-1**) would be impacted under Alternative 4:

- Wetland A (1.22 acres) – No impact.
- Wetland B (1.19 acres) – No impact.
- Wetland C (0.80 acre) – Approximately 0.61 acre of Wetland C would be impacted by ground-disturbing activities from mining. In addition, Wetland C is supported by Spring 10, which would not reestablish after mining is completed (see **Section 4.8, Water Resources – Groundwater**). Therefore, there would be a long-term moderate adverse impact on all 0.80 acre of Wetland C.
- Wetland D (1.64 acres) – Approximately 0.04 acre of Wetland D would be impacted by ground-disturbing activities. In addition, Wetland D is supported by Spring 13, which may be temporarily impacted by mining or road construction (see **Section 4.8, Water Resources – Groundwater**). Therefore, there would be a short-term minor adverse impact on all 1.64 acres of Wetland D.
- Wetland E (1.23 acres) – This wetland is supported by Spring 12, which may experience limited impacts from road construction. Therefore, there may be a short-term minor adverse impact on all 1.23 acres of Wetland E.
- Wetland F (2.38 acres) – This wetland is supported by overburden Spring 9, which would be impacted by mining and is not likely to reestablish at the same location after mining. Therefore, there would be a long-term moderate adverse impact on all 2.38 acres of Wetland F.
- Wetland F028 (0.60 acre) – This wetland is supported by Spring 11, which would be impacted during mining and is not expected to return postmining (see **Section 4.8, Water Resources – Groundwater**). Therefore, there would be a long-term moderate adverse impact on all 0.60 acre of Wetland F028.
- Wetland F049 (0.46 acre) – No impact.
- Wetland F058 (2.01 acres) – No impact.
- Wetland F061 (0.13 acre) – This wetland is along Donley Creek, where reduced flow to the alluvium is most likely; however, the primary source of water supporting this wetland is surface water (see **Section 4.7, Water Resources – Surface Water**). Therefore, there would be a negligible impact on Wetland F061.
- Wetland F081 (0.54 acre) – This wetland is supported by Spring 2, which may experience limited impacts from road construction. Therefore, there may be a short-term minor adverse impact on all 0.54 acre of Wetland F081.

The project would not require any Clean Water Act Section 404 permits because all of the wetlands identified in the project area were determined to be non-jurisdictional. MSUMRA (ARM 17.24.751) requires wetlands to be restored. The watershed topography and hydrology would be reclaimed to reestablish the hydrologic balance to the extent possible in and near the project area; however, as discussed above and in **Section 4.8, Water Resources – Groundwater**, the flow in the streams from groundwater discharge to the stream channels would not begin until after groundwater levels recovered many decades after mining, and discharges to streams may occur at different locations than where they occurred before mining. Pre-mine flow conditions would not return to springs where the aquifer sources were removed. There would be no impact on those springs supported by aquifers that were not impacted by mining, and they would remain fully functional. New wetlands may appear along drainages in the analysis area postmining after the spoil resaturates. After mining, some ponds may be constructed to provide water supplies for wetlands. Reclamation of wetlands on-site would achieve the same functions and values of pre-mining conditions but may not do so for a considerable amount of time. The mitigation of wetlands would provide replacement of the functions and values lost.

As discussed in **Section 2.4.8.5, Wetland Mitigation Plan**, in the 2018 Final EIS, Westmoreland Rosebud developed a wetland mitigation plan for Alternative 2 to mitigate for the loss of wetland functions and values from the proposed project; the same plan would be applied to Alternative 4.

4.11.3.2 Indirect Impacts

Indirect impacts on wetlands and riparian zones associated with Alternative 4 would result from air emissions due to the combustion of coal from the project area in the Rosebud Power Plant and in Units 3 and 4 of the Colstrip Power Plant. Alternative 4 indirect impacts would be similar to those described in **Section 4.10, Vegetation**. For all trace metals except mercury and selenium, deposition of 1 percent of background concentrations would not be reached from combustion of project area coal over the 20-year operations period, and mercury deposition inside the analysis area would be less than the Eco-SSL for plants. Although the combined background levels and expected deposition for selenium exceed the Eco-SSL for plants, the expected deposition is only 5.3 percent of the Eco-SSL. In addition, the mercury and selenium concentrations measured in the streams in the indirect effects analysis area have been below water-quality standards, with the exception of East Fork Armells Creek as described in **Section 4.7, Water Resources – Surface Water**. Indirect effects on wetlands and riparian zones from Colstrip and Rosebud Power Plant emissions likely would be negligible for one or more of the following reasons: (1) the deposition of trace metals around the power plant would not reach 1 percent of the background soil concentrations, (2) deposition would be significantly less than the Eco-SSLs for plants, or (3) deposition would only be a small percentage of the total concentrations (for selenium).

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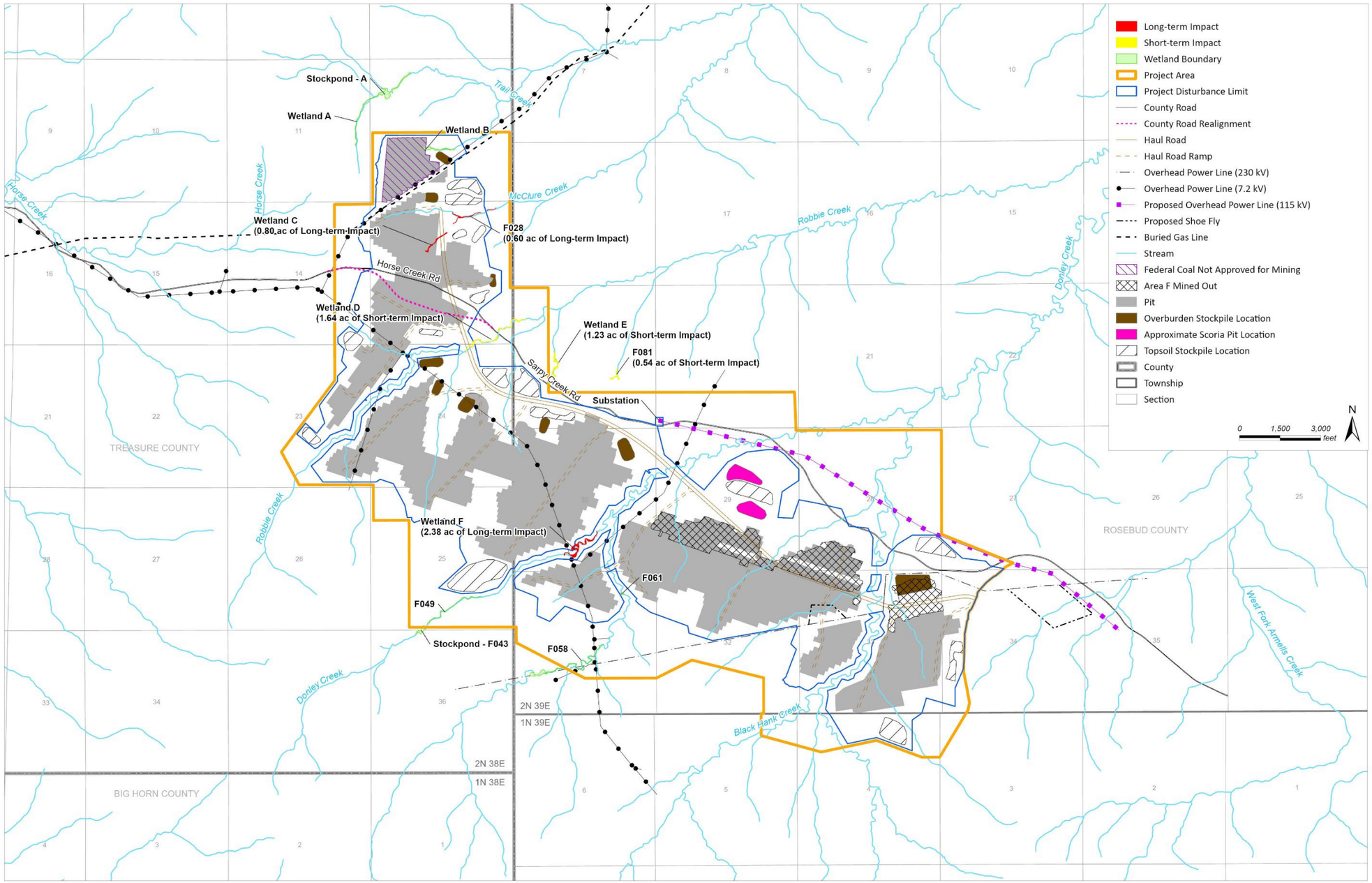

Figure 4.11-1. Alternative 4 Wetland Impacts.

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4.11.4 Alternative 5 – Partial Mining Alternative

No direct wetland impacts are anticipated to occur under Alternative 5 because mining and disturbance would be limited to the southern portion of the project area (east of Donley Creek); no mining would occur in the Trail Creek, McClure Creek, and Robbie Creek drainages (**Figure 2.6-1**) based on the assumption that all mining would cease in 2030. In total, approximately 2,495 acres would be disturbed in the project area over an 11-year mine life that would produce about 37.1 million tons of coal from Federal and private coal leases. As with Alternative 4, indirect wetland impacts under Alternative 1 would be negligible.

Under Alternative 5, direct and indirect wetland impacts (if any) would be less than under Alternative 4. About 34 million fewer tons of coal would be mined and approximately 1,793 fewer acres would be disturbed under Alternative 5 as compared to Alternative 4 (**Table 2.3-1** and **Table 2.3-2**). The life of operations for Area F (and the corresponding impacts) would be 9 years shorter under Alternative 5 than under Alternative 4. Reclamation (including revegetation) and PMT would be achieved in the project area 9 years earlier than under Alternative 4.

4.11.4.1 Mining Private Coal Only Scenario

If Westmoreland Rosebud chose to pursue mining of private coal only (leases 1001 and 1001-A) after 2030, direct and indirect wetland impacts could be greater than those disclosed above for Alternative 5. The intensity of impacts, however, would be no greater than those disclosed for Alternative 4 (see above) and would be expected to be less. See **Section 2.6.2, State Operating Permit C2011003F** for a discussion of the steps that would be required for such a scenario to occur.

4.11.5 Irreversible and Irretrievable Commitment of Resources

The following would be irreversible and irretrievable commitments of wetlands under Alternative 4:

- The loss of wetlands in the analysis area whose source of water supply would be permanently affected by mining activities.
- Wetlands within the disturbance area (4,288 acres under Alternative 4) would be removed during mining or other related disturbance.

The loss of surface water and groundwater hydrology in the analysis area are discussed in **Section 4.7, Water Resources – Surface Water** and **Section 4.8, Water Resources – Groundwater**.

4.12 FISH AND WILDLIFE RESOURCES

This section discloses the direct and indirect effects on fish and wildlife resources resulting from implementation of Alternative 1 – No Action, Alternative 4 – Proposed Action (Current Federal Mining Plan), or Alternative 5 – Partial Mining Alternative. Pre-mine fish and wildlife conditions and the analysis areas used for this impacts analysis are described in **Section 3.12, Fish and Wildlife Resources**.

4.12.1 Analysis Methods and Impact and Intensity Thresholds

Fish and wildlife impacts were evaluated in this SEIS using the same methods used in the 2018 Final EIS. Analysis methods are provided in **Section 4.12.1** of the 2018 Final EIS, beginning on page 563. The thresholds for assessment of impacts (negligible, minor, moderate, or major) on fish and wildlife are the same as those defined in the 2018 Final EIS in **Table 140**. Assumptions for each alternative, which informed the scope of the effects analyses in this SEIS, are presented in **Section 2.4, Alternative 1 – No Action**, **Section 2.5, Alternative 4 – Proposed Action (Current Federal Mining Plan)**, and **Section 2.6, Alternative 5 – Partial Mining Alternative**.

4.12.2 Alternative 1 – No Action

The types of direct and indirect fish and wildlife impacts under Alternative 1 (as described in this SEIS)[70] would be similar to those described below for Alternative 4 – Proposed Action (Current Federal Mining Plan). Under Alternative 1, though, direct disturbance-related impacts would be limited to the southeastern portion of the project area (east of Donley Creek) with no mining occurring in the Trail Creek, McClure Creek, and Robbie Creek drainages (**Figure 2.4-1**) based on the assumption that all mining would cease in 2025. In total, approximately 1,021 acres would be disturbed in the project area. Alternative 1, as with Alternative 4, would likely result in minor to moderate, short- and long-term, adverse effects on fish and wildlife species due to displacement and habitat disturbance.

Over a 6-year mine life, about 17.1 million tons of coal would be mined from Federal and private coal leases in the project area. Under Alternative 1, as with Alternative 4, the indirect effects on wildlife from Colstrip and Rosebud Power Plant emissions are expected to be negligible (for metals not exceeding the ecological screening values) to minor (for those metals exceeding the ecological screening values) over the long term.

Under Alternative 1, direct and indirect wildlife impacts would be less than under Alternative 4: about 54 million fewer tons of coal would be mined and approximately 3,267 fewer acres (and associated wildlife habitat) would be disturbed under Alternative 1 as compared to Alternative 4 (**Table 2.3-1** and **Table 2.3-2**). The life of operations for Area F (and the corresponding impacts) would be 14 years shorter under Alternative 1 than under Alternative 4. Reclamation (including revegetation) and PMT would be achieved in the project area 14 years earlier than under Alternative 4.

4.12.2.1 Mining Private Coal Only Scenario

If Westmoreland Rosebud chose to pursue mining of private coal only (leases 1001 and 1001-A) after 2025, direct and indirect fish and wildlife impacts could be greater than those disclosed above for Alternative 1. The intensity of impacts, however, would be no greater than those disclosed for Alternative

[70] Direct and indirect impacts of Alternative 1 – No Action on fish and wildlife resources were described in **Section 4.12.2** of the 2018 Final EIS, beginning on page 564. As described in **Chapter 2** of this SEIS, Alternative 1 – No Action has been revised since the 2018 Final EIS.

4 (see below) and would be expected to be less. See **Section 2.4.2, State Operating Permit C2011003F** for a discussion of the steps that would be required for such a scenario to occur.

4.12.3 Alternative 4 – Proposed Action (Current Federal Mining Plan)

Direct and indirect fish and wildlife impacts under Alternative 4 – Proposed Action (Current Federal Mining Plan) would be similar to those described for Alternative 2 in **Section 4.12.3** of the 2018 Final EIS, beginning on page 564. Under Alternative 4, half a million tons more coal would be mined[71] and approximately 28 acres more would be disturbed as compared to Alternative 2. Reclamation would occur contemporaneously with mining (see discussion of the phases of reclamation in **Section 1.6.4, Bond Release**, in the 2018 Final EIS). Once mining has ceased, reclamation (including revegetation) of disturbed areas (up to 4,288 acres) in the project area would occur according to Westmoreland Rosebud's approved reclamation plan (**Figure 2.2-5**) and PMT (**Figure 2.2-6**), which are similar to those described for Alternative 2 in 2018 Final EIS **Section 2.4.4, Reclamation Plan**. Modifications since 2018 are described in **Section 2.2.2.2, Area F Operations and Development**.

4.12.3.1 Direct Impacts

As with Alternative 2, potential adverse effects from Alternative 4 include loss of habitat due to surface disturbances that remove vegetation, direct mortality of or injury to wildlife, and behavioral shifts such as a change in movement or displacement to other areas due to increased human activity and noise from blasting and mining operations.

Wildlife species are closely tied to habitat and the plant communities that characterize these specific habitats. Thus, effects on wildlife are generally related to impacts on the plant communities as described in **Section 4.10, Vegetation** and **Section 4.11, Wetlands and Riparian Zones**. Under Alternative 4, 4,288 acres would be disturbed. Reclamation of impacts on vegetation communities (at a 1:1 ratio based on acreage) would eventually offset some adverse wildlife impacts, although species composition and maturity of certain communities may take years, which may result in long-term adverse impacts or shifts in species composition. Mortality or injury to wildlife may occur from habitat removal (especially for less mobile species including ground-nesting birds, small mammals, reptiles, and amphibians) and collisions with mine-related vehicles. Restricted movement of less mobile species due to barriers such as construction fences, pits, and stockpiles is also possible during active mining. Animals that are displaced may move to less suitable habitat or suitable habitat occupied by predators or competitors, which could result in lower survival and reproduction rates.

Reclamation following mining would restore vegetation communities, but vegetation species composition and structure would take time to establish and mature. For example, reclaimed conifer areas may initially see an influx of early successional communities before a coniferous or deciduous overstory develops (Buehler and Percy 2012). Wildlife favoring early successional stages of plant growth would be the first to move into a reclaimed area. As vegetation matures, reclaimed mined areas would support a greater diversity of wildlife.

Because mining would be conducted in phases, surface disturbance and vegetation removal would occur incrementally over 20 years. Initial stages of reclamation (grading, application of soil, and seeding) of disturbed lands would begin approximately 2 years after the removal of coal and would occur in phases throughout the life of the mine until all disturbed lands are revegetated (see **Section 2.4.4, Reclamation**

[71] See coal tonnage and disturbance comparison in **Table 2.2-8**. Under Alternative 4, mine passes would not be authorized for 74 acres of Federal coal (about 1.9 million tons of recoverable coal). The 74 acres that would not be mined could still be used for other project-associated surface disturbance, such as overburden or topsoil stockpile locations (**Figure 2.5-1**).

Plan in the 2018 Final EIS). Land in the project area that has been reclaimed and successfully revegetated, along with unmined land, would provide habitat for wildlife during mine operations.

Mammals

Small Mammals

Alternative 4 would result in moderate, short-term and possible long-term, adverse effects on small mammals. Direct losses of small mammals due to habitat loss would occur since mobility of small animals is limited and many use burrows for shelter. It is possible that localized small-mammal populations (mice, voles, shrews, and lagomorphs) would decline during land clearing. Some small mammals may be displaced to adjacent land, which could lead to increased competition.

Long-term effects would depend on how quickly different habitat types establish following reclamation. Grasslands would mature more quickly than woodland and shrub grassland habitat. Reclaimed areas would first be revegetated with early successional species providing habitat for grassland-associated species. Habitat for small mammals adapted to woodland habitats would take longer to recover. Many small mammals (lagomorphs and rodents) would be able to quickly recolonize areas due to high reproductive rates. These species tend to adapt to reclaimed areas fairly quickly. Generalist species such as deer mice and cottontail rabbits would establish more quickly than species with specialized habitat requirements.

Bats

Bat roosting habitat in the analysis area consists of structures (e.g., bridges and buildings), rock outcrops, and trees. Mining activities could remove potential roosting habitat or deter bats from roosting.

Due to surface disturbances and vegetation removal, mining in the project area would impact a variety of habitats used by bats. Vegetation removal would reduce available habitat for roosting and foraging. Common wide-ranging species such as big brown bat and long-eared myotis would be impacted by vegetation removal in all habitat types. Fringed myotis and pallid bat would be impacted by the loss of shrublands. Impacts would be greatest for forest-dwelling species such as hoary bat, Townsend's big-eared bat, and silver-eared bat due to the longer recovery time for reclaimed forest habitats.

Bat foraging behavior would possibly be affected by increased human presence and mine-related noise, because such effects may cause bats to avoid suitable foraging habitat. Studies conducted in the direct effects analysis area have determined that most bats were detected foraging near water or riparian areas. Because riparian areas would not be impacted by mining activities, bats would continue to forage in these areas. However, removal of roosting habitat could result in an overall lower number of bats.

Other effects on local bat populations would likely occur over the long term due to potential changes in habitat over time. Generalist species would likely recover more quickly due to adaptation to different habitats. Effects on forest- and shrub-dwelling species such as the hoary bat, pallid bat, and Townsend's big-eared bat would last longer and could result in a decline in these species in the analysis area. However, these localized effects would not likely affect bat populations outside of the analysis area. Alternative 4 would likely result in moderate, short- and long-term, adverse effects on bat species.

Carnivores

The effects on small carnivores from Alternative 4 are expected to be minor and short-term due to relatively high reproductive rates and ability to adapt to human presence. Smaller carnivores such as

skunk, raccoon, and weasel may decline in the analysis area due to habitat loss from mine-related surface disturbance. Small carnivores may respond to such disturbance by moving to other nearby habitat. Displacement could result in lower production or survival of local populations in the analysis area depending on the level of competition in other nearby habitats and abundance of food sources. Most large carnivore sightings in the project area have been incidental. Because larger carnivores are somewhat nomadic in nature and pass through areas while foraging, effects are expected to be minor, short-term, and adverse due to mining operations. Larger carnivores including coyote, black bear, and mountain lion are mobile and would avoid active mine areas. Predatory species would likely return following reclamation and recolonization by prey species.

Big Game Animals

Mule Deer, Elk, and Pronghorn

Direct effects on large game from mining in the project area under Alternative 4 would include loss of habitat due to mine-related surface disturbances and vegetation removal. Over the life of the mine, approximately 4,288 acres of grassland, shrub grassland, conifer, and agricultural habitat would be impacted. Habitat loss, combined with other mine-related activity such as increased human activity and noise from blasting and mining operations, could result in behavioral changes in large game. Behavioral changes may affect movement patterns, resulting in displacement of large game to other areas.

Mule deer are the most abundant of the large game animals documented on the Rosebud Mine, including the project area. Mule deer are habitat generalists (populations have been documented in nearly every habitat type in the Rosebud Mine), and ample nearby suitable habitat is available for mule deer displaced by mining. Relatively low numbers (compared to mule deer) of elk and pronghorn have been documented in the direct effects analysis area. Mining in the project area may affect elk and pronghorn individuals but would not likely affect regional populations of either species because of the limited suitable habitat for these species in the project area compared to surrounding areas. Monitoring of reclaimed habitat near active portions of the Rosebud Mine indicates that large game animals have continued to inhabit areas adjacent to active mining areas throughout the duration of mining activities.

Large game animals are highly mobile and able to move to undisturbed areas relatively readily; however, mine-related disturbance may not preclude big game animals from using active mine areas. Annual monitoring reports from the Rosebud Mine indicate that large game animals do use active mine areas, including soil stockpiles, spoil piles, and areas in the process of reclamation.

Movement through the project area would be somewhat restricted due to placement of open pits, roads, stockpiles, and staging areas associated with mining activities, as well as by the use of additional fencing (if needed). Pronghorn seem to be most susceptible to such barriers (Sawyer et al. 2005). Although no big game movement corridors have been identified in the project area, mining activities could shift big game movement patterns.

Reclamation would restore vegetation communities similar to pre-mine conditions. It is likely to take several years following reclamation to restore vegetation communities to the same wildlife carrying capacity that pre-mining conditions provided. Eventual development of mature vegetation in reclaimed areas is anticipated to support large game animals in similar numbers as pre-mining. Therefore, anticipated effects are expected to be short-term and minor.

Other Big Game Species

White-tailed deer, bighorn sheep, and moose have not been documented in the project area, although limited suitable habitat for these species is available. Given the lack of documented use of the project area by these species, effects are likely to be negligible.

Birds

Upland Game Bird Species

Mining operations in the project area under Alternative 4 would impact habitat used by upland game birds. Wild turkey, sharp-tailed grouse, ring-necked pheasant, gray partridge, and mourning dove are all associated with various habitats in the analysis area. Mining activities would likely displace upland game birds from active mining areas within the project area to other areas. Each of the species listed above is somewhat mobile and is likely to avoid areas of active mining and disturbed habitat in the project area.

Figure 4.12-1. Sharp-Tailed Grouse.
© 2003, Chuck Carlson.

Annual monitoring at the Rosebud Mine and studies from the Absaloka Mine to the west show that impacts from mining activities on sharp-tailed grouse (**Figure 4.12-1**) appear to be short-term. Similar results are likely for sharp-tailed grouse and perhaps other game birds in the project area. Mitigation and minimization measures such as soil salvaging outside of the spring months, phasing mine development areas, and establishing vegetation following mining would reduce impacts on sharp-tailed grouse. Planned reclamation following mining disturbance would restore habitats currently used by all game birds. Therefore, it is anticipated that the impacts on upland game birds would likely be short-term and minor.

Migratory Birds

Mining activities could cause abandonment or direct removal of nests if land-clearing activities occur during the breeding season. Bird use of undisturbed lands in the project area or adjacent lands in the direct effects analysis area could also be displaced as a result of human activity and noise from mining and vehicle travel.

Mining in the project area would impact a variety of habitats used by migratory birds. Vegetation removal would reduce available habitat for breeding, roosting, and foraging songbirds and other avian species. Common wide-ranging species such as meadowlark, American robin, and lark sparrow would be impacted by vegetation removal in all habitat types. Vesper sparrow, Brewer's sparrow, eastern kingbird, and similar species would be impacted by the loss of grassland and shrub grassland. Forest-dwelling species such as Bullock's oriole, black-capped chickadee, and black-headed grosbeak would be impacted by the loss of conifer and deciduous tree/shrub habitat. Mining activities would avoid disturbance in riparian and wetland habitat used by many avian species.

Habitat loss would be short-term for species that are adapted to a variety of habitats (generalists) or those adapted to open grasslands or agricultural areas (such as western meadowlark, American crow, or black-billed magpie). Longer-term impacts would occur on species that depend on shrubland or forested

habitats (loggerhead shrike and woodpecker), as these habitats may take decades to become mature. Reclamation of disturbed land following coal extraction would occur concurrently with mining of new sections and would provide habitat for avian species that use grassland and cropland habitats. Effects on migratory birds under Alternative 4 would likely be short-term and minor to moderate depending on species.

Shorebirds and Waterfowl

Waterfowl and shorebird species that have been documented in the direct effects analysis area are discussed in the 2018 Final EIS in **Section 3.12.4.3, Shorebirds and Waterfowl**. Open water and aquatic habitat is limited in the project area, and most waterfowl observations have been incidental. Approximately 3.78 acres of long-term wetland impacts and approximately 3.41 acres of short-term wetland impacts are anticipated. Long-term impacts on wetlands would be mitigated either within the project area or within the same watershed during reclamation (see also **Section 4.7, Water Resources – Surface Water** and **Section 4.11, Wetlands and Riparian Zones**). Thus, long-term impacts on potential shorebird and waterfowl habitat from Alternative 4 would be minor.

Activities associated with mining would possibly deter shorebirds and waterfowl from using the project area as foraging habitat, but surrounding undisturbed areas and reclaimed areas would provide habitat. Development of sediment ponds may attract some species. Mining in the project area would not likely affect breeding pairs of aquatic birds because no shorebird or waterfowl breeding has been documented in the project area, and breeding pairs would likely continue to nest in suitable habitat outside of the project area.

Raptors

Raptor tolerance of disturbance varies among species and individuals within the same species (Whittington and Allen 2008). Generally, species such as golden eagle respond to disturbance (associated with human activity) at greater distances than Cooper's hawk. The U.S. Fish and Wildlife Service (USFWS) has recommended spatial nest buffers for various raptor species that occur within the western United States. The purpose of a spatial buffer is to serve as a guideline for reducing the likelihood of raptor abandonment of nests (roosting or breeding) due to human-related disturbance (e.g., construction activity). **Table 141** and **Figure 112** in the 2018 Final EIS document raptor species and nests within or adjacent to the project area and the recommended buffers for each. Mining activities within these buffers may result in nest abandonment or unsuccessful breeding.

While mining in the project area would not likely affect regional raptor populations, mining activities could disrupt normal activities of individual raptors or breeding pairs. Mining could result in the loss of nests that occur in the project area. Mining activities could cause breeding raptors to abandon nests that are located close to disturbance. Long-term effects on tree-nesting species including red-tailed hawk, golden eagle, and Cooper's hawk are possible with removal of 688 acres of conifer and 84 acres of deciduous tree/shrub areas. Ground-nesting species such as short-eared owl and northern harrier may be impacted during active mining but would likely return to the area after reclamation. Species such as northern harrier that inhabit open areas may benefit in the short term from changes in habitat until woodlands begin to form and mature.

Prey availability in the project area during mining may decrease, potentially impacting raptor foraging. Raptors currently nesting in the project area would be displaced by removal of habitat, possibly resulting in increased competition in surrounding areas. Under Alternative 4, effects on raptors would be short- and long-term and would overall likely be moderate.

Amphibians and Reptiles

Under Alternative 4, mining activities would adversely affect amphibians and reptiles due to habitat loss. Direct impacts on amphibians and reptiles would occur during land-clearing due to limited mobility and the need for fairly specialized habitat. Impacts on amphibians and reptiles would possibly be long-term because their reproductive rates are relatively low and vary seasonally. Following reclamation, it is likely that amphibians and reptiles would slowly return to the area. Planned avoidance of streams and wetlands would minimize impacts on amphibian and reptile species adapted to those habitats, although flows in some aquatic habitats may be altered, which is outlined in more detail in **Section 4.7, Water Resources – Surface Water**. Due to the limited mobility and habitat alteration, effects on amphibians and reptiles would likely be long-term, moderate, and adverse.

Aquatic Species

Habitat for aquatic species is limited and poor in the project area. Armells Creek is located about 16 miles northeast of the project area, although several tributaries to Armells Creek traverse the project area. Aquatic and riparian habitat along tributaries to Armells Creek would be avoided during mining. Alternative 4 would potentially impact local populations of macroinvertebrates and notropids that may occur in impacted stock ponds, springs, and streams with localized spring/seep contributions. Aquatic habitat could be indirectly impacted by changes in stream flow and/or water quality due to mining. Reclamation and action to maintain the hydrologic balance would reduce potential impacts on aquatic habitat and species. Effects on surface water resources are explained in more detail in **Section 4.7, Water Resources – Surface Water**. Effects on aquatic species due to changes in stream flow and/or water quality under Alternative 4 would be short-term or long-term, minor to moderate, and adverse.

4.12.3.2 Indirect Impacts

Deposition modeling was completed to determine the indirect effects analysis area for special status species and was also used to determine the indirect effects analysis area for fish and wildlife (non-special status species) (see **Section 4.3, Air Quality** and **Section 3.12, Fish and Wildlife Resources**). The model determined deposition due to emissions from the Colstrip and Rosebud Power Plants in the analysis area for operations under Alternative 2 (here applied to Alternative 4).

Trace metals from total deposition over 20 years would minimally contribute to background concentrations. The trace concentrations from deposition, even when combined with naturally occurring background concentrations, do not exceed wildlife ecological screening thresholds for the majority of metals. The combined background levels and expected deposition of chromium, lead, and mercury would exceed the Eco-SSLs for birds. In addition, the combined background levels and expected deposition of antimony and chromium would exceed the Eco-SSLs for mammals. All other trace metals were below the Eco-SSLs for birds and mammals when background levels and expected deposition were combined. EPA studies determined that toxicity data were not sufficient to derive Eco-SSLs for fish, amphibians, and reptiles; therefore, there are no data for these classes (EPA 2005b). It is worth noting that the avian and reptilian classes share some physiological traits and may be affected similarly by various metal concentrations. Based on the determination that combustion of project area coal would have no effect on surface water quality except possibly for selenium in the East Fork Armells Creek (see **Section 4.7, Water Resources – Surface Water**), indirect effects on aquatic species (fish, amphibians, and aquatic invertebrates) are anticipated to be negligible to moderate.

Soil Invertebrates

Within the indirect effects analysis area, the 95 percent UCL background levels for each of the trace metals analyzed are below the Eco-SSLs for soil invertebrates such as earthworms or burrowing insects and arthropods (**Table 4.12-1**). Given that the expected deposition of these trace metals is below the Eco-SSLs for soil invertebrates, indirect effects on soil invertebrates from project area coal combustion would be negligible.

Birds

The total expected concentrations (background plus total deposition as modeled for Alternative 2) for arsenic, cadmium, copper, and selenium under Alternative 4 would not exceed the protective ecological screening values for birds (**Table 4.12-2**). There would be no unacceptable risks for birds from potential deposition of these trace metals under Alternative 4. There are no avian Eco-SSLs for antimony. The modeled antimony deposition over the mine life of Area F (for Alternative 2) is 0.56 percent of the background value. As such, there would be no unacceptable risks expected for birds exposed to antimony due to the potential deposition under Alternative 4.

As indicated in **Table 4.12-2**, the total expected chromium, lead, and mercury concentrations (50.51 mg/kg, 19.11 mg/kg, and 0.024 mg/kg) slightly exceed the ecological screening levels for birds (26 mg/kg, 11 mg/kg, and 0.013 mg/kg). The background values for chromium, lead, and mercury slightly exceed the bird ecological screening values. Therefore, the additional modeled total deposition over the period of operations (for Alternative 2), when added to background, exceeds the bird ecological screening values. Exceedance of these screening values alone does not mean that there would be adverse impacts on birds from chromium, lead, and mercury deposition. This indicates, however, that further scrutiny is warranted for these trace metals related to bird exposures; see detailed discussion in **Section 4.12.3.2, Indirect Impacts** (Fish and Wildlife Impacts) in the 2018 Final EIS and brief impacts summaries below.

Chromium: There is sufficient information to conclude that the total expected concentration for chromium (background plus modeled total deposition over Area F period of operations, 50.51765 mg/kg) would not pose unacceptable risks to birds.

Lead: There is sufficient information to conclude that the total expected concentration for lead (background plus modeled total deposition over Area F period of operations, 19.10757 mg/kg) would not pose unacceptable risks to birds.

Mercury: The EPA has not developed mercury Eco-SSLs for any receptor (invertebrates, birds, or mammals). However, there is sufficient information to conclude that the total expected concentration for mercury (background plus modeled total deposition over Area F period of operations, 0.02385 mg/kg) would not pose unacceptable risks to birds.

Table 4.12-1. Trace Metal Background, Potential Soil Impact Distance, and Eco-SSLs for Soil Invertebrates.

Analyte	Background – 95 Percent UCL	Total Deposition over 19-Year Period of Operations[1]	Total Expected Concentration (Background + Total Deposition)	Ecological Screening Value for Soil Invertebrates[2]	Percentage of Deposition Relative to Background	Percentage of Deposition Relative to Soil Invertebrate Ecological Screening Value[2]	Does Deposition plus Background Exceed the Soil Invertebrate Ecological Screening Value?	Potential Adverse Indirect Impacts on Soil Invertebrates
	mg/kg, DW	mg/kg, DW	mg/kg, DW	mg/kg, DW	Percent	Percent	(Yes/No)	(Yes/No)
Antimony	0.9	0.00504	0.90504	78	0.56	0.01	No	No
Arsenic	10.9	0.00694	10.90694	60	0.06	0.12	No	No
Cadmium	0.3	0.00189	0.30189	140	0.63	0.01	No	No
Chromium	50.5	0.01765	50.51765	NA	0.03	NA	No	No
Copper	17.8	0.08133	17.88133	80	0.46	0.1	No	No
Lead	19.1	0.00757	19.10757	1,700	0.04	0.01	No	No
Selenium	0.56	0.03153	0.59153	4.1	5.6	0.76	No	No
Mercury	0.023	0.00085	0.02385	0.1	3.7	0.85	No	No

NA = Not available. Insufficient data to derive ecological screening value; DW = Dry weight.

1. Assumes an untilled soil mixing depth of 2 centimeters and a soil dry-bulk density of 1.5 g/cm^3 as recommended by EPA (2005b).

2. **Section 4.1.1.1** in the 2018 Final EIS describes the hierarchy of soil invertebrate, bird, and mammal ecological screening values.

Table 4.12-2. Trace Metal Background, Potential Soil Impact Distance, and Eco-SSLs for Birds.

Analyte	Background – 95 Percent UCL	Total Deposition over 19-Year Period of Operations[1]	Total Expected Concen-tration (Background + Total Deposition)	Ecological Screening Value for Birds[2]	Percentage of Deposition Relative to Background	Percentage of Deposition Relative to Bird Ecological Screening Value[2]	Does Deposition plus Background Exceed the Bird Ecological Screening Value?	Potential Adverse Indirect Impacts on Birds
	mg/kg, DW	mg/kg, DW	mg/kg, DW	mg/kg, DW	Percent	Percent	(Yes/No)	(Yes/No)
Antimony	0.9	0.00504	0.90504	NA	0.56	NA	No	No
Arsenic	10.9	0.00694	10.90694	43	0.06	0.02	No	No
Cadmium	0.3	0.00189	0.30189	0.77	0.63	0.25	No	No
Chromium	50.5	0.01765	50.51765	26	0.03	0.07	Yes	No
Copper	17.8	0.08133	17.88133	28	0.46	0.3	No	No
Lead	19.1	0.00757	19.10757	11	0.04	0.07	Yes	No
Selenium	0.56	0.03153	0.59153	1.2	5.60	2.6	No	No
Mercury	0.023	0.00085	0.02385	0.013	3.70	6.5	Yes	No

NA = Not available. Insufficient data to derive ecological screening levels.

1. Assumes an untilled soil mixing depth of 2 centimeters and a soil dry-bulk density of 1.5 g/cm^3 as recommended by EPA (2005b).

2. **Section 4.12.1.1, Analysis Methods** in the 2018 Final EIS describes the hierarchy of soil invertebrate, bird, and mammal ecological screening values.

Mammals

As summarized in **Table 4.12-3**, the total expected concentrations (background plus modeled total deposition over the Area F period of operations) for arsenic, cadmium, copper, lead, mercury, and selenium would not exceed the protective ecological screening values for mammals. There would be no unacceptable risks to mammals from these trace metals related to potential deposition from Alternative 4.

As indicated in **Table 4.12-3**, the total expected concentration of antimony and chromium modeled for Alternative 2 and here applied to Alternative 4 (0.90504 mg/kg and 50.51765 mg/kg, respectively) exceed the ecological screening values for mammals (0.27 mg/kg and 34 mg/kg respectively). The background values alone for antimony and chromium exceed the mammal ecological screening values. As such, the additional modeled total deposition over lifetime of Area F, when added to background, exceeds the mammal ecological screening values. Exceedance of these screening values alone does not mean that there would be adverse impacts on mammals from antimony and chromium deposition. This indicates, however, that further scrutiny is warranted for these chemicals related to mammal exposures; see detailed discussion in **Section 4.12.3.2, Indirect Impacts** (Fish and Wildlife Impacts) in the 2018 Final EIS and brief impacts summaries below.

Antimony: There is sufficient information to conclude that the total expected concentration for antimony (background plus modeled total deposition over the Area F period of operations, 0.90504 mg/kg) would not pose unacceptable risks to mammals.

Chromium: There is sufficient information to conclude that the total expected concentration for chromium (background plus modeled total deposition over the Area F period of operations, 50.51765 mg/kg) does not pose unacceptable risks to mammals.

Table 4.12-3. Trace Metal Background, Potential Soil Impact Distance, and Eco-SSLs for Mammals.

Analyte	Background – 95 Percent UCL	Total Deposition over 19-Year Period of Operations[1]	Total Expected Concen-tration (Background + Total Deposition)	Ecological Screening Value for Mammals[2]	Percentage of Deposition Relative to Background	Percentage of Deposition Relative to Mammal Ecological Screening Value[2]	Does Deposition plus Background Exceed the Mammal Ecological Screening Value?	Potential Adverse Indirect Impacts on Mammals
	mg/kg, DW	mg/kg, DW	mg/kg, DW	mg/kg, DW	Percent	Percent	(Yes/No)	(Yes/No)
Antimony	0.9	0.00504	0.90504	0.27	0.56	1.9	Yes	No
Arsenic	10.9	0.00694	10.90694	46	0.06	0.02	No	No
Cadmium	0.3	0.00189	0.30189	0.36	0.63	0.5	No	No
Chromium	50.5	0.01765	50.51765	34	0.03	0.05	Yes	No
Copper	17.8	0.08133	17.88133	49	0.46	0.17	No	No
Lead	19.1	0.00757	19.10757	56	0.04	0.01	No	No
Selenium	0.56	0.03153	0.59153	0.63	5.6	5.0	No	No
Mercury	0.023	0.00085	0.02385	1.7	3.7	0.05	No	No

[1.] Assumes an untilled soil mixing depth of 2 centimeters and a soil dry-bulk density of 1.5 g/cm^3 as recommended by EPA (2005b).
[2.] **Section 4.12.1.1, Analysis Methods** in the 2018 Final EIS describes the hierarchy of soil invertebrate, bird, and mammal ecological screening values.

Summary of Indirect Effects

For all trace metals except selenium, mercury, and antimony (for mammals), deposition of 1 percent of background concentrations would not be reached from combustion of project area coal over the 20-year period of operations for Alternative 4. Additionally, selenium depositions inside the indirect effects analysis area would be less than the ecological screening values for all wildlife groups.

The total expected concentrations (background plus total deposition over the 20-year period of operations for Alternative 4) for arsenic, cadmium, copper, and selenium would not exceed the protective ecological screening values for birds. For birds, the combined background levels and expected deposition for chromium, lead, and mercury exceed the ecological screening values. However, the expected deposition is less than 0.07 percent of the ecological screening values for chromium and lead, and 6.5 percent of the ecological screening values for mercury for birds. Similarly, for mammals, the combined background levels and expected deposition for antimony and chromium exceed the ecological screening values.

The total expected concentrations (background plus modeled total deposition over the 20-year period of operations for Alternative 4) for arsenic, cadmium, copper, lead, mercury, and selenium would not exceed the protective ecological screening values for mammals. Therefore, there would be no unacceptable risks to mammals from these trace metals related to potential deposition for Alternative 4; see detailed discussion and rationale in **Section 4.12.3.2, Indirect Impacts** (Fish and Wildlife Impacts) in the 2018 Final EIS.

Therefore, under Alternative 4, the indirect effects on wildlife from Colstrip and Rosebud Power Plant emissions are expected to be negligible (for metals not exceeding the ecological screening values) to minor (for those metals exceeding the ecological screening values) over the long term.

4.12.4 Alternative 5 – Partial Mining Alternative

The types of direct and indirect fish and wildlife impacts under Alternative 5 – Partial Mining Alternative would be similar to those described above for Alternative 4 – Proposed Action (Current Federal Mining Plan). Under Alternative 5, though, direct disturbance-related impacts would be limited to the southeastern portion of the project area (east of Donley Creek) with no mining occurring in the Trail Creek, McClure Creek, and Robbie Creek drainages (**Figure 2.6-1**) based on the assumption that all mining would cease in 2030. In total, approximately 2,495 acres would be disturbed in the project area. Alternative 5, as with Alternative 4, would likely result in minor to moderate, short- and long-term, adverse effects on fish and wildlife species due to displacement and habitat disturbance.

Over an 11-year mine life, about 37.1 million tons of coal would be mined from Federal and private coal leases in the project area. Under Alternative 5, as with Alternative 4, the indirect effects on wildlife from Colstrip and Rosebud Power Plant emissions are expected to be negligible (for metals not exceeding the ecological screening values) to minor (for those metals exceeding the ecological screening values) over the long term.

Under Alternative 5, direct and indirect fish and wildlife impacts would be less than under Alternative 4. About 34 million fewer tons of coal would be mined and approximately 1,793 fewer acres (and associated wildlife habitat) would be disturbed under Alternative 5 as compared to Alternative 4 (**Table 2.3-1** and **Table 2.3-2**). The life of operations for Area F (and the corresponding impacts) would be 9 years shorter under Alternative 5 than under Alternative 4. Reclamation (including revegetation) and PMT would be achieved in the project area 9 years earlier than under Alternative 4.

4.12.4.1 Mining Private Coal Only Scenario

If Westmoreland Rosebud chose to pursue mining of private coal only (leases 1001 and 1001-A) after 2030, direct and indirect fish and wildlife impacts could be greater than those disclosed above for Alternative 5. The intensity of impacts, however, would be no greater than those disclosed for Alternative 4 (see above) and would be expected to be less. See **Section 2.6.2, State Operating Permit C2011003F** for a discussion of the steps that would be required for such a scenario to occur.

4.12.5 Irreversible and Irretrievable Commitment of Resources

All SEIS alternatives would disturb wildlife species individuals and local populations. All SEIS alternatives would likely result in shifts in species composition from wildlife that is less tolerant of disturbance to species that are able to adapt more readily to disturbance and increased human presence. As revegetation and reclamation of disturbed areas occurs, it is likely that species composition would eventually increase but not to the levels of pre-disturbance diversity due to an anticipated reduction in overall vegetation diversity. For all SEIS alternatives, the temporal loss of native wildlife habitat would be an irreversible resource commitment.

4.13 SPECIAL STATUS SPECIES

This section discloses the direct and indirect effects on special status species resulting from implementation of Alternative 1 – No Action, Alternative 4 – Proposed Action (Current Federal Mining Plan), or Alternative 5 – Partial Mining Alternative. This analysis addresses deficiencies identified in the 2022 Court order by analyzing the indirect effects on pallid sturgeon dues to water withdrawals from the Yellowstone River by the Colstrip Power Plant and a reasonable range of alternatives. Pre-mining conditions and the analysis areas used for this impacts analysis are described in **Section 3.13, Special Status Species**.

4.13.1 Analysis Methods and Impact and Intensity Thresholds

Special status species impacts were evaluated in this SEIS using the same methods used in the 2018 Final EIS; these are summarized below and detailed in **Section 4.13.1.1** in the 2018 Final EIS. Analysis methods for assessing indirect effects of surface water withdrawals from the Yellowstone River on pallid sturgeon used in this SEIS are described below. Assumptions for each alternative, which informed the scope of the effects analyses in this SEIS, are presented in **Section 2.4, Alternative 1 – No Action**, **Section 2.5, Alternative 4 – Proposed Action (Current Federal Mining Plan)**, and **Section 2.6, Alternative 5 – Partial Mining Alternative**.

4.13.1.1 Analysis Methods

Direct Effects

Wildlife monitoring, including monitoring for special status species, has occurred on the Rosebud Mine since 1973. Baseline survey data (2006 and 2011-2013) within the direct effects analysis area (described in the 2018 Final EIS), information from Westmoreland Rosebud's annual wildlife report, and Montana Natural Heritage Program (MNHP) data (MNHP 2024) were used to describe existing conditions for species of concern (SOC) in **Chapter 3** (see **Section 3.13, Special Status Species**). Annual wildlife monitoring has been occurring and would continue for the life of the mine as described in **Section 2.4.7.6, Wildlife** in the 2018 Final EIS.

Indirect Effects

Surface Water Withdrawals from the Yellowstone River

Effects of surface water withdrawals from the Yellowstone River on pallid sturgeon were analyzed using flow metrics data from the USGS gage approximately 6 miles downstream of the diversion and immediately upstream of the Cartersville Dam at Forsythe (#06295000). A gage is also in Billings, MT (USGS #06214500) upstream of the diversion. Data from this gage were not used in the analysis as the Billings gage is approximately 100 miles upstream of the diversion and upstream of the confluence with the Bighorn River. Multiple other smaller tributaries also contribute flow to the Yellowstone River between Billings and the analysis area, and irrigation withdrawals and returns also occur throughout these reaches. No major tributaries are present between the diversion point and the Forsythe gage, although irrigation return flows and pumps are within the reach. Based on this, data from the Forsythe gage were determined to be representative of stream flow downstream of the diversion; the amount of water withdrawn to supply the Colstrip Power Plant was then added to the gage data to provide a reasonably accurate approximation of the magnitude of flows upstream of the diversion. Data were summarized in the flow metrics to provide a comprehensive analysis of changes to the flow regime on the daily, monthly,

and annual time scales. The focus of the monthly flow metrics was on the months of February and June, to represent monthly data when flows were typically at their lowest and highest values, respectively. For most of the flow metrics, a subset of data representing the five years with the highest and lowest values for each metric were also used to represent any effects in a typically wet (above average) or dry (below average) flow year (see **Table 3.7-6** in **Section 3.7, Water Resources – Surface Water**). Analysis methods for the pallid sturgeon are described in greater detail in the Biological Assessment (BA; OSMRE 2025; see discussion of the BA status in **Section 6.1.2, Section 7 Consultation Process with the U.S. Fish and Wildlife Service**).

Deposition Modeling

Deposition modeling results for special status species (see **Section 3.13, Special Status Species, Indirect Effects Analysis Area** and **Section 4.3, Air Quality** in the 2018 Final EIS for information on modeling and results), in conjunction with ecotoxicological screening values protective of soil invertebrates, birds, and mammals, were used to determine potential Colstrip and Rosebud Power Plant emissions impacts on special status species within the indirect effects analysis area (see detailed discussion in the 2018 Final EIS). Estimated deposition (modeled for Alternative 2 and applied to Alternative 4) relative to background values and estimated deposition combined with background concentrations of trace metals were compared to the soil invertebrate, bird, and mammal screening levels to determine if impacts on special status species may occur. Eco-SSLs are not available for reptiles, amphibians, or fish. Impacts also were qualitatively assessed based on documented occurrences of special status species within the analysis area (see **Section 3.13, Special Status Species** and **Figure 3.13-3**).

4.13.1.2 Impact and Intensity Thresholds

The thresholds for assessment of impacts (negligible, minor, moderate, or major) on surface water hydrology and water quality are the same as those defined in **Table 145** in the 2018 Final EIS. Impacts are also defined as short-term, long-term, or both (see **Appendix 1**).

4.13.2 Alternative 1 – No Action

The types of direct and indirect special status species impacts under Alternative 1 (as described in this SEIS)[72] would be similar to those described below for Alternative 4 – Proposed Action (Current Federal Mining Plan). Under Alternative 1, though, direct disturbance-related impacts would be limited to the southeastern portion of the project area (east of Donley Creek) with no mining occurring in the Trail Creek, McClure Creek, and Robbie Creek drainages (**Figure 2.4-1**) based on the assumption that all mining would cease in 2025. In total, approximately 1,021 acres would be disturbed in the project area under Alternative 1. As with Alternative 4, direct disturbance to wildlife habitat within the project area and indirect impacts on surrounding lands from noise and project-related activity could adversely impact several MNHP SOC; any disturbance-related impacts on northern long-eared bat and monarch butterfly would be negligible.

Over a 6-year mine life, about 17.1 million tons of coal would be mined from Federal and private coal leases in the project area. As with Alternative 4, there would be no indirect effects due to emissions and deposition for most special status species. For aquatic species (fish, amphibians, and aquatic invertebrates), indirect effects could be long-term and negligible to moderate for species inhabiting East Fork Armells Creek due to potential selenium deposition. As with Alternative 4, 69 cfs would continue to

[72.] Direct and indirect effects of Alternative 1 – No Action on special status species were described in **Section 4.13.2** of the 2018 Final EIS, beginning on page 585. As described in **Chapter 2** of this SEIS, Alternative 1 – No Action has been revised since the 2018 Final EIS.

be diverted from the Yellowstone River during the period of operations for Area F (6 years under Alternative 1); any resulting indirect effects of the diversion on sturgeon would likely not be discernable. Although indirect impacts associated with the Colstrip and Rosebud Power Plants' GHG emissions and the Colstrip Power Plant's water withdrawals from the Yellowstone River would continue through the operational life of the Colstrip Power Plant (2042), regardless of whether Area F coal is available or not, those indirect impacts would no longer be attributable to combustion of Area F coal once mining of Federal coal in Area F ends (2025 for Alternative 1). Thus, Area F coal would be available for combustion in the Colstrip and Rosebud Power Plants for up to 6 years (2020 to 2025) under Alternative 1 (14 fewer years than Alternative 4).

Under Alternative 1, direct and indirect special status species impacts would be less than under Alternative 4: about 54 million fewer tons of coal would be mined and approximately 3,267 fewer acres (and associated wildlife habitat) would be disturbed under Alternative 1 as compared to Alternative 4 (**Table 2.3-1** and **Table 2.3-2**). The life of operations for Area F (and the corresponding impacts) would be 14 years shorter under Alternative 1 than under Alternative 4. Reclamation (including revegetation) and PMT would be achieved in the project area 14 years earlier than under Alternative 4. Under Alternative 1, coal from the project area would be available for combustion in the Colstrip and Rosebud Power Plants for up to 6 years, which is 14 years fewer as compared to Alternative 4.

As with Alternative 4, **Alternative 1** ***may affect, but is unlikely to adversely affect***, the northern long-eared bat and pallid sturgeon, and ***will not jeopardize the continued existence*** of the monarch butterfly, western regal fritillary, and Suckley's cuckoo bumble bee.

4.13.2.1 Mining Private Coal Only Scenario

If Westmoreland Rosebud chose to pursue mining of private coal only (leases 1001 and 1001-A) after 2025, direct and indirect special status species impacts could be greater than those disclosed above for Alternative 1. The intensity of impacts, however, would be no greater than those disclosed for Alternative 4 (see below) and would be expected to be less. See **Section 2.4.2, State Operating Permit C2011003F** for a discussion of the steps that would be required for such a scenario to occur.

4.13.3 Alternative 4 – Proposed Action (Current Federal Mining Plan)

Direct and indirect special status species impacts under Alternative 4 – Proposed Action (Current Federal Mining Plan) would be similar to those described for Alternative 2 in **Section 4.13.3** of the 2018 Final EIS, beginning on page 585. Under Alternative 4, half a million tons more coal would be mined[73] and approximately 28 acres more would be disturbed as compared to Alternative 2. Reclamation would occur contemporaneously with mining (see discussion of the phases of reclamation in **Section 1.6.4, Bond Release**, in the 2018 Final EIS). Once mining has ceased, reclamation (including revegetation) of disturbed areas (up to 4,288 acres) in the project area would occur according to Westmoreland Rosebud's approved reclamation plan (**Figure 2.2-5**) and PMT (**Figure 2.2-6**), which are similar to those described for Alternative 2 in 2018 Final EIS **Section 2.4.4, Reclamation Plan**. Modifications since 2018 are described in **Section 2.2.2.2, Area F Operations and Development**. Under Alternative 4, coal from the project area would be available for combustion in the Colstrip and Rosebud Power Plants for up to 20 years.

[73.] See coal tonnage and disturbance comparison in **Table 2.2-8**. Under Alternative 4, mine passes would not be authorized for 74 acres of Federal coal (about 1.9 million tons of recoverable coal). The 74 acres that would not be mined could still be used for other project-associated surface disturbance, such as overburden or topsoil stockpile locations (**Figure 2.5-1**).

4.13.3.1 Direct Impacts

As with Alternative 2, potential adverse effects from Alternative 4 on special status species include loss of habitat due to surface disturbances that remove vegetation, direct mortality of or injury to wildlife due to vehicle/construction equipment collisions, and behavioral shifts such as a change in movement or displacement to other areas due to increased human activity and noise from blasting and mining operations.

Wildlife species are closely tied to habitat and the plant communities that characterize these specific habitats. Thus, effects on wildlife are generally related to impacts on the plant communities as described in **Section 4.10, Vegetation** and **Section 4.12, Fish and Wildlife Resources**. Reclamation of impacts on vegetation communities (at a 1:1 ratio based on acreage) would eventually offset some adverse wildlife impacts, although species composition and maturity of certain communities may take years, which may result in long-term adverse impacts or shifts in species composition. Mortality or injury may occur to wildlife from habitat removal (especially for less mobile species including ground-nesting birds, small mammals, reptiles, and amphibians) and collisions with mine-related vehicles. Restricted movement of less mobile species due to barriers such as construction fences, pits, and stockpiles is also possible during active mining. Animals that are displaced may move to less suitable habitat or suitable habitat occupied by predators or competitors, which could result in lower survival and reproduction rates.

Reclamation following mining would restore vegetation communities, but vegetation species composition and structure would take time to establish and mature. Wildlife favoring early successional stages of plant growth would be the first to move into a reclaimed area. As vegetation matures, reclaimed mined areas would support a greater diversity of wildlife.

Because mining would be conducted in phases, surface disturbance and vegetation removal would occur incrementally over 20 years. Reclamation of disturbed lands would begin about 2 years after the initial removal of coal and would occur in phases throughout the life of the mine until all disturbed lands are revegetated. Land in the project area that has been reclaimed and successfully revegetated, along with unmined land, would provide habitat for wildlife during mine operations.

Special Status Wildlife Species

Federally Listed Threatened, Endangered, and Candidate Species

Table 3.13-2 lists federally threatened, endangered, and candidate species that potentially occur in Rosebud, Treasure, Big Horn, and Powder River Counties. OSMRE determined based on the best current data and scientific information available that direct effects of mining in the Area F permit area and indirect effects of emissions from the Colstrip and Rosebud Power Plants would not result in adverse effects on federally listed threatened, endangered, or candidate species or any designated critical habitat. On May 1, 2025, OSMRE submitted a final BA to the USFWS to document potential impacts and proposed conservation measures to protect federally listed species (OSMRE 2025). The BA found that the Proposed Action may affect, but is not likely to adversely affect, the northern long-eared bat and pallid sturgeon and is not likely to jeopardize the continued existence of the monarch butterfly, western regal fritillary, or Suckley's cuckoo bumble bee. OSMRE consulted with the USFWS pursuant to the Endangered Species Act (ESA) Section 7 consultation (see the discussion in **Section 6.1.2, Section 7 Consultation Process with the U.S. Fish and Wildlife Service**), and USFWS issued its concurrence letter on May 15, 2025 (USFWS 2025b). OSMRE effects determinations for these species are described below.

Northern Long-Eared Bat

The Proposed Action (Alternative 4) **may affect, but is not likely to adversely affect**, the northern long-eared bat. The direct effects analysis area is in the area of influence for this species; however, no known populations have been documented in this portion of the area of influence, and habitat is limited in the project area. No northern long-eared bat populations have ever been documented within the direct or indirect effects analysis areas (in Treasure, Big Horn, Rosebud, or Powder River Counties), and the closest known documentation of this species is in Richland and Roosevelt Counties, about 190 miles north of the project area.

If northern long-eared bats were to occur in the analysis area, potential direct effects could include loss of foraging and roosting habitat due to vegetation removal and indirect effects from potential power-plant emissions impacts on vegetation. Range-wide, habitat loss is not considered the primary threat to northern long-eared bat populations. The Proposed Action would have no effect on white nose syndrome and wind power development, which are the main threats to northern long-eared bats. Tree removal in mined areas, specifically removal of trees that provide roosting habitat, could negatively affect tree roosting bat species such as northern long-eared bats if they were to occur in the project area. However, because the project area is not within the range of northern long-eared bat, impacts from tree removal are not expected.

Pallid Sturgeon

The Proposed Action (Alternative 4) **may affect, but is not likely to adversely affect**, pallid sturgeon (OSMRE 2025). There would be no direct effects on pallid sturgeon under Alternative 4 (see the discussion of pallid sturgeon in **Section 4.13.3.2, Indirect Impacts**).

Westmoreland Rosebud (or any subsequent owner), OSMRE, and USFWS will meet at least once every four years to discuss any changes in the status of pallid sturgeon and other listed species, any changes in power plant or mine operations, and any other new information that might warrant an update to this effects analysis. Any of the parties may also request an ad hoc meeting if the party becomes aware of new information warranting discussion (USFWS 2025b).

Monarch Butterfly

The Proposed Action (Alternative 4) ***would not jeopardize the continued existence*** of the monarch butterfly (OSMRE 2025). Mining and associated land clearing and vegetation removal activities could adversely affect monarch butterflies due to foraging habitat loss and potential loss of breeding habitat on approximately 4,288 acres. Foraging habitat for adult monarchs includes a variety of nectar-producing plant species, and foraging habitat for this species is present throughout the action area. Larval food plants, *Asclepias* spp., occur in the grassland, sagebrush, and woody draw vegetation communities (Cedar Creek Associates, Inc. 2016). If the avoidance and minimization measures described in **Section 2.3.1, Elements Common to All Alternatives** are not implemented, direct impacts could occur on larval butterflies or larval food plants during land-clearing activities. Monarch butterflies could breed in the action area, and milkweeds could be removed in portions of the project area. Individual monarch larvae or eggs could be destroyed if milkweeds are removed during breeding and migration, which could result in reduced fecundity or reproductive failure. These direct effects would be avoided because clearing and grubbing activities would occur from September 1 through June 1, avoiding the monarch butterfly active season from June through August. Noxious weeds could also invade areas disturbed by the Proposed Action and degrade habitat. Noxious weeds would be controlled and managed to reduce their spread by timing weed spraying to avoid the monarch butterfly breeding season (June through August), when feasible, and conducting spot spraying to limit impacts on flowering nectar plants. Direct impacts on adult

monarch butterflies are unlikely because of the mobility of this species. After reclamation and restoration of plant communities, it is possible that monarch butterfly habitat would be reestablished.

The effects of Alternative 4 would be negligible overall because the total loss of potential monarch habitat would be approximately 4,288 acres, which is less than 0.4 percent of the analysis area and is a relatively small part of the species range, which includes a large portion of North America; noxious weeds would be controlled and managed to reduce their spread; and seed mixes used during revegetation efforts would include flowering plants and milkweed.

Western Regal Fritillary

The Proposed Action (Alternative 4) ***would not jeopardize the continued existence*** of the western regal fritillary (OSMRE 2025). Direct impacts on western regal fritillary are not expected due to the Proposed Action (Alternative 4) because suitable tallgrass prairie habitat with an abundance of native violets (*Viola* spp.) does not occur in the project area. Regal fritillary larvae will not survive without the presence and adequate supply of violets (USFWS 2023). Because of the lack of larval food plants for this species, western regal fritillaries are not likely to breed in the project area, and direct impacts on eggs or larvae are unlikely. In addition, the timing restrictions described above for monarch butterflies (and detailed in **Section 2.3.1, Elements Common to All Alternatives**) would avoid and minimize impacts on any regal fritillary adults, larvae, and eggs, if they were to occur in the project area.

Suckley's Cuckoo Bumble Bee

The Proposed Action (Alternative 4) ***would not jeopardize the continued existence*** of Suckley's cuckoo bumble bee (OSMRE 2025). As previously described, there are no known occurrences of Suckley's cuckoo bumble bee in the action area, and MNHP modeling predicts that the action area is moderate- to low-quality habitat for this species. If Suckley's cuckoo bumble bee were to occur in the action area, mining and associated land clearing and vegetation removal activities could adversely affect the species due to foraging habitat loss and potential loss of breeding habitat on approximately 4,288 acres. Foraging habitat for Suckley's cuckoo bumble bees includes a variety of nectar-producing plant species, and nectar-producing plants are present in the action area as previously described.

The USFWS has not developed recommended conservation measures for Suckley's cuckoo bumble bee as of January 2025. Permanent conversion of Suckley's cuckoo bumble bee habitat would be avoided because after reclamation and restoration of plant communities, native vegetation would be reestablished. Direct effects would be avoided because the timing restrictions described above for monarch butterflies would limit clearing and grubbing activities to September 1 through June 1. These timing restrictions would also avoid and minimize impacts on any Suckley's cuckoo bumble bee adults, larvae, and eggs, if they were to occur in the project area. Noxious weeds could also invade areas disturbed by the Proposed Action and degrade habitat. As described above for monarch butterflies, noxious weeds would be controlled and managed to reduce their spread by timing weed spraying to avoid the monarch butterfly breeding season (June through August), when feasible, and conducting spot spraying to limit impacts on flowering nectar plants. These measures would also reduce the possibility of impacts from pesticides on Suckley's cuckoo bumble bee and their principal known hosts, the western bumble bee. Direct impacts on adult Suckley's cuckoo bumble bees are unlikely because of the mobility of this species. The introduction of managed bee colonies has also been identified as a threat to this species from competition and introduction of diseases. To reduce these threats, Westmoreland Rosebud will work with the USFWS to implement additional conservation measures to protect Suckley's cuckoo bumble bee from impacts of managed bee colonies, when recommendations are developed.

MNHP Species of Concern

Table 3.13-3 lists MNHP SOC (northern leopard frog, plains spadefoot toad, golden eagle, northern goshawk, great blue heron, long-billed curlew, McCown's longspur, short-horned lizard, western milksnake, and hoary bat) that have been documented within 15 miles of the project area and potentially occur in the project area; this list has been updated since the 2018 Final EIS (MNHP 2024). In addition to this list, 18 species have potential to occur in the analysis area based on the presence of suitable habitat. Direct disturbance to wildlife habitat on 4,288 acres and indirect impacts on surrounding lands from noise and project-related activity could adversely impact several MNHP SOC.

Under Alternative 4, northern goshawk, Clark's nutcracker, pinyon jay, and hoary bat could be affected by the loss of about 672 acres of conifer habitat. Disturbance to 611 acres of sagebrush shrub grassland could impact Brewer's sparrow, long-billed curlew, loggerhead shrike, sage thrasher, Merriam's shrew, hoary bat, and plains hognose snake. The loss of approximately 1,538 acres of grassland would potentially impact McCown's longspur, plains spadefoot toad, ferruginous hawk, short-horned lizard, and western milksnake. Because mining disturbance would avoid and minimize impacts on riparian and wetland areas, direct impacts on habitat for black-billed cuckoo, Lewis' woodpecker, red-headed woodpecker, great blue heron, northern leopard frog, fringed myotis, and western smooth green snake would be minimal. However, avian use of riparian habitats could decrease from the noise and disturbance associated with nearby mine operations. Only limited cliff habitat preferred by golden eagle and peregrine falcon for nesting is present in Area F, but impacts on grassland, woodland, and shrubland vegetation types would reduce available foraging habitat for these species. Little brown myotis, pallid bat, and Townsend's big-eared bat could be impacted by the loss of woodland habitat. Townsend's big-eared bat could also be impacted by the loss of rocky outcrops removed during mining operations. Overall direct impacts on SOC would be considered moderate due to the permanent loss or modification of habitat.

Planned reclamation following mining would restore plant communities and wildlife habitat similar to pre-mining conditions. Restoration of wildlife habitat would vary depending on the habitat types. Because conifer habitat would take longer to establish than grasslands, species like Clark's nutcracker that inhabit coniferous forest would be affected longer than grassland-associated species such as McCown's longspur. Alternative 4 would have short- and long-term, negligible to moderate impacts on MNHP SOC.

Special Status Plant Species

No impacts on sensitive plant species are anticipated because none of the potential sensitive species were found in the direct effects analysis area.

4.13.3.2 Indirect Impacts

Deposition Impacts

Deposition modeling was completed to determine the indirect effects analysis area for special status species and was also used to determine the indirect effects analysis area for fish and wildlife (non-special status species) (see **Section 4.3, Air Quality** and **Section 3.12, Fish and Wildlife Resources**). The model determined deposition due to emissions from the Colstrip and Rosebud Power Plants in the analysis area for operations under Alternative 2 (here applied to Alternative 4). There are no Eco-SSLs for specific special status species. Data from the EPA Region 4 (2015j) website exists for mammals, birds, and soil invertebrates. Therefore, it is assumed that the Eco-SSLs for mammalian and avian special status species are similar to those listed in **Table 4.13-1** below.

Deposition modeling results indicate that the operation of the Colstrip and Rosebud Power Plants during the Area F period of operations would not result in deposition over the Eco-SSLs for invertebrates, birds, or mammals (**Table 4.13-1**); see species-specific discussions below for northern long-eared bat and monarch butterfly. Studies from the EPA determined that toxicity data were not sufficient to derive Eco-SSLs for amphibians and reptiles; therefore, there are no data for reptiles and amphibians (EPA 2005b). Eco-SSLs for reptiles are possibly similar to those for birds due to some similarities between the two classes. For aquatic species (fish, amphibians, and aquatic invertebrates), indirect effects could be long-term and negligible to moderate for species inhabiting East Fork Armells Creek due to potential selenium deposition (see **Section 4.7, Water Resources – Surface Water**). It is anticipated that there would be no effect on aquatic species in other streams in the region based on the determination that combustion of project area coal would have no effect on surface water quality on streams (other than East Fork Armells Creek) (see **Section 4.7, Water Resources – Surface Water**); see species-specific discussion for pallid sturgeon below.

Table 4.13-1. Trace Metal Background, Potential Soil Impact Distance, and Ecological Screening Levels for Soil Invertebrates, Birds, and Mammals.

Analyte	Background – Geometric Mean	1 Percent of Geometric Mean Background	Area Around Colstrip and Rosebud Power Plants with Higher Deposition Than 1 Percent of Geometric Mean Background	Ecological Screening Levels for Soil Invertebrates	Ecological Screening Levels for Birds	Ecological Screening Levels for Mammals
	mg/kg, DW	mg/kg, DW	km	mg/kg, DW	mg/kg, DW	mg/kg, DW
Antimony	0.7	0.007	0	78	NA	0.27
Arsenic	8.0	0.080	0	NA	43	46
Cadmium	0.2	0.002	0	140	0.77	0.36
Chromium	41.2	0.412	0	NA	26	34
Copper	13.2	0.132	0	80	28	49
Lead	15.7	0.157	0	1,700	11	56
Selenium	0.4	0.004	<19	4.1	1.2	0.63
Mercury	0.016	0.00016	<30	0.1	0.013	1.7

mg/kg = milligrams per kilogram; DW = dry weight in soil; km = kilometers.
NA = Not available. Insufficient data to derive ecological screening levels.
Section 4.13.1.1, Analysis Methods, describes the hierarchy of soil invertebrate, bird, and mammal ecological screening values.

Northern Long-Eared Bat

As previously described, a portion of Powder River County falls within the indirect effects analysis area (**Figure 3.13-3**). Powder River County is included in the area of influence for the northern long-eared bat, although the closest known documentation of this species is in Richland and Roosevelt Counties, about 190 miles north of the project area.

A possible indirect effect on species in the action area, including northern long-eared bats, is toxicity due to hazardous metals from coal dust and deposition of trace metals from combustion of project area coal in the Colstrip and Rosebud Power Plants. Coal dust contains a number of hazardous metals (e.g., antimony, arsenic, chromium, lead, mercury, and selenium); and emission of coal dust suspends these compounds in the air. Suspended fugitive coal dust can impact human health and ecosystems through inhalation or deposition to soil and waterbodies. Based on modeling conducted for the project (OSMRE and DEQ 2018), the maximum annual average air concentration and annual deposition of PM_{10} fugitive coal dust emissions would be 0.15 micrograms per cubic meter and 153.1 kilograms per hectare, respectively, and would occur within the boundaries of the project area, while falling off rapidly with distance from the mine.

As described in the 2018 EIS (OSMRE and DEQ 2018), atmospheric dispersion and deposition of selected trace metals (e.g., antimony, arsenic, cadmium, chromium, copper, lead, selenium, and mercury), which would be emitted as a result of the combustion of project area coal in the Colstrip and Rosebud Power Plants, were simulated by applying the AERMOD model. These metals were selected for modeling because they are commonly emitted from coal-fired power plants and are primary ecological risk indicators. Modeling results were compared to EPA ecological soil-screening levels (Eco-SSLs) and background concentrations to determine expected deposition of trace metals (and associated impacts) due to combustion of project area coal (see **Section 4.3.3.2, Indirect Impacts of Coal Combustion**). Impacts on northern long-eared bat would be insignificant and discountable because indirect effects on northern long-eared bats from power plant emissions are unlikely to occur because deposition modeling results (see **Section 4.3, Air Quality** and **Section 4.13.1.2, Impact and Intensity Thresholds**) indicate that the operation of the Colstrip and Rosebud Power Plants during the project area coal-combustion period (20 years) would not result in deposition over the Eco-SSLs for invertebrates (such as northern long-eared bat food sources), birds, or mammals and, thus, would be unlikely to result in adverse effects on northern long-eared bats. Impacts on northern long-eared bat habitat would be insignificant because the deposition of trace metals around the Colstrip and Rosebud Power Plants would not cause concentrations of trace metals to increase more than 1 percent compared to the existing background soil concentrations, and deposition of trace metals would be less than the Eco-SSLs for plants, mammals, and soil invertebrates.

Pallid Sturgeon

The indirect effects of coal combustion emissions from the Colstrip and Rosebud Power Plants on the Yellowstone River are not expected to be measurable. Tributaries to the Yellowstone River within the indirect effects analysis area (Sarpy Creek, Armells Creek, Rosebud Creek, and the Tongue River) would not affect water quality as a result of Colstrip and Rosebud Power Plant emissions for the following reasons (see also **Section 4.7, Water Resources – Surface Water**): (1) any effects of the Colstrip and Rosebud Power Plant deposition on the water quality of the four tributaries are not likely to be detectable in the Yellowstone River due to dilution, and (2) the percent mercury deposition from the two power plants is less than 3 percent of all mercury deposition at that location from all atmospheric sources. At the Yellowstone River about 25 miles north of Colstrip, the effects of mercury deposition from the two power plants are not expected to be measurable compared to worldwide atmospheric deposition sources to the Yellowstone River. Therefore, the emissions from coal combustion at the Colstrip and Rosebud Power

Plants would have no indirect effects on the pallid sturgeon. Indirect impacts due to Yellowstone River diversions are discussed in a separate section below.

Monarch Butterfly

As described above for northern long-eared bats, indirect effects from power plant emissions are unlikely to occur because deposition modeling results (conducted for Alternative 2 and here applied to Alternative 4) indicate that the operation of the Colstrip and Rosebud Power Plants during the period of operations for Area F would not result in deposition over the Eco-SSLs for invertebrates and thus would be unlikely to result in adverse effects on monarch butterflies. Because the deposition of trace metals around the Colstrip and Rosebud Power Plants would not reach 1 percent of the background soil concentrations, would be significantly less than the Eco-SSLs for plants, or would be only a small percentage of the total concentrations (for selenium), the indirect effects from power plant emissions on vegetation that provides habitat for this species would likely be minor.

Western Regal Fritillary

As described above for monarch butterfly, indirect effects from power plant emissions are unlikely to occur.

Suckley's Cuckoo Bumble Bee

As described above for monarch butterfly, indirect effects from power plant emissions are unlikely to occur.

Yellowstone River Diversions

Pallid Sturgeon

The Proposed Action (Alternative 4) **may affect, but is not likely to adversely affect**, pallid sturgeon (OSMRE 2025). As described in **Section 4.7, Water Resources – Surface Water**, Alternative 4 would result in the continued diversion of 69.27 cfs of water from the Yellowstone River to supply to the Colstrip Power Plant for 20 years (estimated period of operations for Area F). Any potential effects on pallid sturgeon from Alternative 4 would occur from this diversion. There would be no change in the magnitude of the diversion that would occur compared to current conditions, only an extended duration. The effects of continued water diversions are analyzed in detail in the BA (OSMRE 2025).

Water withdrawals directly impact the hydrograph, which in turn has the potential to affect pallid sturgeon through multiple pathways. Based on the analysis in the BA, stream flow in the Yellowstone River is minimally impacted by the water withdrawals for the Colstrip Power Plant, with each flow metric in average, dry, or wet years decreasing by less than 2 percent. Hydrologic alteration from water withdrawals could potentially affect sturgeon through multiple pathways; potential effects would depend on the magnitude and duration of the alterations. Potential effects could include altered spawning movements and behavior, changes in sediment transport and resulting formation and maintenance of aquatic habitat, and changes in turbidity, which could affect feeding efficiency and vulnerability to predators. Extremely low stream flows can reduce depths in riffles so that fish avoid them; this can prevent fish movement. Modest decreases in winter stream flow could directly impact sturgeon by limiting availability of desirable overwintering habitats. Changes in stream flows could also result in lower temperatures, changes in dissolved oxygen, and changes in pollutant concentrations, which could adversely affect aquatic species such as pallid sturgeon. As the water withdrawals associated with the Colstrip Power Plant only comprise 0.3 percent or less of the average peak flows and the average monthly

June flows, any direct effect on the timing or success of pallid sturgeon migrations and spawning would not be discernable over the 20 years of water withdrawals associated with combustion of Area F coal. In addition, spawning has not yet been confirmed in the Yellowstone River in the analysis area, although with the bypass around the Intake Diversion Dam now allowing for fish passage, spawning within this reach is increasingly likely to occur over the years of this project.

Spawning has not been documented above Cartersville Dam and only a single pallid sturgeon has been observed to date above this dam and in the vicinity of the Colstrip Power Plant diversion; therefore, entrainment or impingement of any life stage of pallid sturgeon in the diversion is unlikely to occur during current conditions. The low proportion of total flow withdrawn from the Yellowstone River during spring spawning, combined with the low number of pallid sturgeons expected to successfully navigate the dam and the anticipated spatial patterns in egg and larval drift, all limit the risk of entrainment or impingement in the action area. Continued diversion of water through 2039 would be expected to have an insignificant effect on pallid sturgeon.

In summary, under Alternative 4, 69 cfs would continue to be diverted from the Yellowstone River for the 20-year period of operations for Area F; as noted, withdrawal of this amount is substantially less than the average daily fluctuations in the Yellowstone River in the analysis area. Based on this, effects on stream temperature, dissolved oxygen levels, and chemical concentrations and related effects on sturgeon would likely not be discernable.

4.13.4 Alternative 5 – Partial Mining Alternative

The types of direct and indirect special status species impacts under Alternative 5 – Partial Mining Alternative would be similar to those described above for Alternative 4 – Proposed Action (Current Federal Mining Plan). Under Alternative 5, though, direct disturbance-related impacts would be limited to the southeastern portion of the project area (east of Donley Creek) with no mining occurring in the Trail Creek, McClure Creek, and Robbie Creek drainages (**Figure 2.6-1**) based on the assumption that all mining would cease in 2030. In total, approximately 2,495 acres would be disturbed in the project area under Alternative 5. As with Alternative 4, direct disturbance to wildlife habitat within the project area and indirect impacts on surrounding lands from noise and project-related activity could adversely impact several MNHP SOC; any disturbance-related impacts on northern long-eared bat and monarch butterfly would be negligible.

Over an 11-year mine life, about 37.1 million tons of coal would be mined from Federal and private coal leases in the project area. As with Alternative 4, there would be no indirect effects due to emissions and deposition for most special status species. For aquatic species (fish, amphibians, and aquatic invertebrates), indirect effects could be long-term and negligible to moderate for species inhabiting East Fork Armells Creek due to potential selenium deposition. As with Alternative 4, 69 cfs would continue to be diverted from the Yellowstone River during the period of operations for Area F (11 years under Alternative 5); any resulting indirect effects of the diversion on sturgeon would likely not be discernable. Although indirect impacts associated with the Colstrip and Rosebud Power Plants' GHG emissions and the Colstrip Power Plant's water withdrawals from the Yellowstone River would continue through the operational life of the Colstrip Power Plant (2042), regardless of whether Area F coal is available or not, those indirect impacts would no longer be attributable to combustion of Area F coal once mining of Federal coal in Area F ends (2030 for Alternative 5). Thus, Area F coal would be available for combustion in the Colstrip and Rosebud Power Plants for up to 11 years (2020 to 2030) under Alternative 5 (9 fewer years than Alternative 4).

Under Alternative 5, direct and indirect special status species impacts would be less than under Alternative 4. About 34 million fewer tons of coal would be mined and approximately 1,793 fewer acres

(and associated wildlife habitat) would be disturbed under Alternative 5 as compared to Alternative 4 (**Table 2.3-1** and **Table 2.3-2**). The life of operations for Area F (and the corresponding impacts) would be 9 years shorter under Alternative 5 than under Alternative 4. Reclamation (including revegetation) and PMT would be achieved in the project area 9 years earlier than under Alternative 4. Under Alternative 5, coal from the project area would be available for combustion in the Colstrip and Rosebud Power Plants for up to 11 years, which is 9 years fewer as compared to Alternative 4.

As with Alternative 4, Alternative 5 ***may affect, but is unlikely to adversely affect***, the northern long-eared bat and pallid sturgeon. The project ***would not jeopardize the continued existence*** of the monarch butterfly, western regal fritillary, or Suckley's cuckoo bumble bee.

4.13.4.1 Mining Private Coal Only Scenario

If Westmoreland Rosebud chose to pursue mining of private coal only (leases 1001 and 1001-A) after 2030, direct and indirect special status species impacts could be greater than those disclosed above for Alternative 5. The intensity of impacts, however, would be no greater than those disclosed for Alternative 4 (see above) and would be expected to be less. See **Section 2.6.2, State Operating Permit C2011003F** for a discussion of the steps that would be required for such a scenario to occur.

4.13.5 Irreversible and Irretrievable Commitment of Resources

There would be no irreversible or irretrievable commitment of resources for federally listed threatened or endangered species. Both action alternatives may disturb wildlife SOC individuals and local populations. Each action alternative would likely result in shifts in species composition from wildlife that is less tolerant of disturbance to species that are able to adapt more readily to disturbance and increased human presence. As revegetation and reclamation of disturbed areas occurs, it is likely that species composition would eventually increase, but not to the levels of pre-disturbance diversity due to an anticipated reduction in overall vegetation diversity. The loss of some native wildlife habitat in both alternatives would be an irreversible resource commitment.

4.14 CULTURAL AND HISTORIC RESOURCES

This section discloses the direct and indirect effects on cultural and historic resources resulting from implementation of Alternative 1 – No Action, Alternative 4 – Proposed Action (Current Federal Mining Plan), or Alternative 5 – Partial Mining Alternative. Pre-mining conditions and the analysis areas used for this impacts analysis are described in **Section 3.14, Cultural and Historic Resources**.

4.14.1 Analysis Methods and Impact and Intensity Thresholds

Cultural and historic resources impacts were evaluated in this SEIS using the same methods used in the 2018 Final EIS. Analysis methods are provided in **Section 4.14.1** of the 2018 Final EIS, beginning on page 592. The thresholds for assessment of impacts (negligible, minor, moderate, or major) on cultural and historic resources are the same as those defined in the 2018 Final EIS in **Table 147**. The 2023 Annual Mining Report (Westmoreland Rosebud 2024b) was reviewed, and, as applicable, additional information on documented cultural resources has been added. Assumptions for each alternative, which informed the scope of the effects analyses in this SEIS, are presented in **Section 2.4, Alternative 1 – No Action**, **Section 2.5, Alternative 4 – Proposed Action (Current Federal Mining Plan)**, and **Section 2.6, Alternative 5 – Partial Mining Alternative**.

4.14.2 Alternative 1 – No Action

The types of direct and indirect impacts on cultural and historic resources under Alternative 1 (as described in this SEIS)[74] would be similar to those described below for Alternative 4 – Proposed Action (Current Federal Mining Plan). Under Alternative 1, though, direct impacts would be limited to the southeastern portion of the project area (east of Donley Creek) with no mining occurring in the Trail Creek, McClure Creek, and Robbie Creek drainages (**Figure 2.4-1**) based on the assumption that all mining would cease in 2025.

In total, approximately 1,021 acres would be disturbed in the project area over a 6-year mine life that would produce about 17.1 million tons of coal from Federal and private coal leases. Under Alternative 1, eight potential historic properties may be adversely affected by ground-disturbing activity over the life of the mine, including six sites determined eligible for listing in the National Register of Historic Places (NRHP) and two sites that remain unevaluated for listing in the NRHP. Mitigation measures have been implemented at four archaeological properties (24RB958, 24RB2334, 24RB2339, and 24RB2438) within the analysis area per the existing memorandum of agreement (MOA) between Western Energy, SHPO, DEQ, BLM, and OSMRE. Adverse effects on the remaining four potential historic properties would be resolved through the executed Programmatic Agreement (PA) as described in **Section 3.14.1.1, Regulatory Framework, Federal Requirements, Resolution of Adverse Effects** of the 2018 Final EIS. The PA incorporated the mitigation measures for the above-referenced MOA and corresponding four sites and includes stipulations to treat unanticipated discoveries during mining.

Under Alternative 1, direct and indirect impacts on cultural and historic resources would be less than under Alternative 4: about 54 million fewer tons of coal would be mined and approximately 3,267 fewer acres would be disturbed under Alternative 1 as compared to Alternative 4 (**Table 2.3-1** and **Table 2.3-2**).

[74.] Direct and indirect cultural and historic resources impacts of Alternative 1 – No Action were described in **Section 4.14.2** of the 2018 Final EIS, beginning on page 593. As described in **Chapter 2** of this SEIS, Alternative 1 – No Action has been revised since the 2018 Final EIS.

4.14.2.1 Mining Private Coal Only Scenario

If Westmoreland Rosebud chose to pursue mining of private coal only (leases 1001 and 1001-A) after 2025, direct and indirect cultural resource impacts could be greater than those disclosed above for Alternative 1. The intensity of impacts, however, would be no greater than those disclosed for Alternative 4 (see below) and would be expected to be less. See **Section 2.4.2, State Operating Permit C2011003F** for a discussion of the steps that would be required for such a scenario to occur.

4.14.3 Alternative 4 – Proposed Action (Current Federal Mining Plan)

Direct and indirect impacts on cultural and historic resources under Alternative 4 – Proposed Action (Current Federal Mining Plan) would be similar to those described for Alternative 2 in **Section 4.14.3** of the 2018 Final EIS, beginning on page 593. Under Alternative 4, half a million tons more coal would be mined[75] and approximately 28 acres more would be disturbed as compared to Alternative 2.

4.14.3.1 Direct Impacts

Under the Proposed Action, 25 potential historic properties may be adversely affected by ground-disturbing activity over the life of the mine, including 18 sites determined eligible for listing on the NRHP, 7 sites that remain unevaluated for listing on the NRHP, and 1 historic district. Direct and indirect adverse effects on historic properties within the analysis area from surface mining beyond the first 5 years of permitted operations are currently undetermined, as those determinations would be phased. An existing MOA between Western Energy, SHPO, DEQ, BLM, and OSMRE implemented mitigation measures at four archaeological properties (24RB958, 24RB2334, 24RB2339, and 24RB2438) within the analysis area that would be adversely affected within the first 5 years of permitted operations. Adverse effects on the remaining 21 potential historic properties would be resolved through the executed PA as described in **Section 3.14.1.1, Regulatory Framework, Federal Requirements, Resolution of Adverse Effects** of the 2018 Final EIS. The PA incorporated the mitigation measures for the above-referenced MOA and corresponding four sites and includes stipulations to treat unanticipated discoveries during mining.

4.14.3.2 Indirect Impacts

The analysis area for indirect effects would be the area of potential effect as described in **Section 3.14.1.2, Analysis Area** in the 2018 Final EIS; therefore, indirect effects on historic properties would not increase related to the combustion of mined coal at the power plants or other activities.

4.14.4 Alternative 5 – Partial Mining Alternative

The types of direct and indirect impacts on cultural and historic resources under Alternative 5 – Partial Mining Alternative would be similar to those described above for Alternative 4 – Proposed Action (Current Federal Mining Plan). Under Alternative 5, though, direct impacts would be limited to the southeastern portion of the project area (east of Donley Creek) with no mining occurring in the Trail Creek, McClure Creek, and Robbie Creek drainages (**Figure 2.6-1**) based on the assumption that all mining would cease in 2030. In total, approximately 2,495 acres would be disturbed in the project area over an 11-year mine life that would produce about 37.1 million tons of coal from Federal and private coal leases.

[75.] See coal tonnage and disturbance comparison in **Table 2.2-8**. Under Alternative 4, mine passes would not be authorized for 74 acres of Federal coal (about 1.9 million tons of recoverable coal). The 74 acres that would not be mined could still be used for other project-associated surface disturbance, such as overburden or topsoil stockpile locations (**Figure 2.5-1**).

Under Alternative 5, ten potential historic properties may be adversely affected by ground-disturbing activity over the life of the mine, including six sites determined eligible for listing in the NRHP and four sites that remain unevaluated for listing in the NRHP. Mitigation measures have been implemented at four archaeological properties (24RB958, 24RB2334, 24RB2339, and 24RB2438) within the analysis area per the existing MOA between Western Energy, SHPO, DEQ, BLM, and OSMRE. Adverse effects on the remaining six potential historic properties would be resolved through the executed PA as described in **Section 3.14.1.1, Regulatory Framework, Federal Requirements, Resolution of Adverse Effects** of the 2018 Final EIS. The PA incorporated the mitigation measures for the above-referenced MOA and corresponding four sites and includes stipulations to treat unanticipated discoveries during mining.

Under Alternative 5, direct and indirect impacts on cultural and historic resources would be less than under Alternative 4. About 34 million fewer tons of coal would be mined and approximately 1,793 fewer acres would be disturbed under Alternative 5 as compared to Alternative 4 (**Table 2.3-1** and **Table 2.3-2**).

4.14.4.1 Mining Private Coal Only Scenario

If Westmoreland Rosebud chose to pursue mining of private coal only (leases 1001 and 1001-A) after 2030, direct and indirect cultural resource impacts could be greater than those disclosed above for Alternative 5. The intensity of impacts, however, would be no greater than those disclosed for Alternative 4 (see above) and would be expected to be less. See **Section 2.6.2, State Operating Permit C2011003F**, for a discussion of the steps that would be required for such a scenario to occur.

4.14.5 Irreversible and Irretrievable Commitment of Resources

Adverse effects on historic properties in the analysis area were resolved initially through the MOA for the four affected properties identified above and since then through the executed PA for the remaining properties; however, agreed-upon resolved adverse effects would represent an irreversible and irretrievable commitment of resources. Because avoidance and/or minimization of effects is not feasible for historic properties, excavation is an accepted method to resolve adverse effects by recovering information important to the interpretation of history or prehistory, but this mitigation measure is not the only available option.

Accidental destruction of presently unknown cultural resources, including resources with Native American significance, would constitute irreversible and irretrievable losses. The process for resolving unanticipated discoveries is addressed in the PA (**Appendix H** in the 2018 Final EIS).

4.15 SOCIOECONOMIC CONDITIONS

This section discloses the direct and indirect effects on socioeconomic conditions resulting from implementation of Alternative 1 – No Action, Alternative 4 – Proposed Action (Current Federal Mining Plan), or Alternative 5 – Partial Mining Alternative. Existing socioeconomic conditions and the analysis areas used for this impacts analysis are described in **Section 3.15, Socioeconomic Conditions**.

4.15.1 Analysis Methods and Impact and Intensity Thresholds

Socioeconomic impacts were evaluated in this SEIS using the same analysis methods used in the 2018 Final EIS, but with updated assumptions. Analysis methods are provided in **Section 4.15.1** of the 2018 Final EIS, beginning on page 595. Assumptions for each alternative, which informed the scope of the effects analyses in this SEIS, are presented in **Section 2.4, Alternative 1 – No Action**, **Section 2.5, Alternative 4 – Proposed Action (Current Federal Mining Plan)**, and **Section 2.6, Alternative 5 – Partial Mining Alternative**. Assumptions specific to the socioeconomics analysis are discussed below in **Section 4.15.1.1, Assumptions**.

The thresholds for assessment of impacts (negligible, minor, moderate, or major) on socioeconomic conditions in **Table 4.15-1** also are the same as those defined in the 2018 Final EIS **Table 148**.

Table 4.15-1. Socioeconomic Impact and Intensity Thresholds.

Impact Intensity	Intensity Description
Negligible	No effects would occur or the effects on socioeconomic conditions would be below the level of detection.
Minor	The effects on socioeconomic conditions would be small but detectable.
Moderate	The effects on socioeconomic conditions would be readily apparent. Any effects would result in changes to socioeconomic conditions on a local scale.
Major	The effects on socioeconomic conditions would be readily apparent and would cause substantial changes to socioeconomic conditions in the region.

4.15.1.1 Assumptions

Analysis assumptions have been updated since 2018, due to changed conditions in the analysis area. The economic impacts modeling and analysis in the 2018 Final EIS are likely an overestimate of current conditions, primarily due to the early retirement of Units 1 and 2 of the Colstrip Power Plant. Since 2018, analysis assumptions have been updated to reflect the increased diversity and changing socioeconomic conditions in the analysis area, as well as the early closure of Units 1 and 2.

The total minority populations have risen notably in Montana, Big Horn County, Rosebud County, and the Northern Cheyenne and Crow Reservations, indicating growing diversity. Concurrently, poverty rates have generally decreased, showing some economic improvement. However, persistent high poverty rates among Native American populations on the Northern Cheyenne and Crow Indian Reservations suggest that these communities continue to face substantial socioeconomic challenges.

4.15.1.2 Analysis Methods

As with the 2018 Final EIS, the regional economic effects of current and future mine operations were evaluated in 2024 by BBC Research & Consulting (BBC) using an input-output model (IMPLAN), to support the socioeconomics analyses in this SEIS (**Appendix 4**) (BBC 2024b); as applicable, content from that analysis has been incorporated in the SEIS. Input-output analysis is a means of examining

relationships within an economy between businesses, and between businesses and final consumers. Three types of economic impacts (effects) are identified in the analysis: direct, indirect, and induced. Direct effects are associated with the immediate effects tied to mine activity (e.g., the payroll and the supplies, materials, and services purchased by the Rosebud Mine) and should not be confused with direct effects as described in **Appendix 4**. Indirect effects are production changes resulting from spending during operations in industries that supply products and services to mine operations and should not be confused with indirect effects as described in **Appendix 4**. Induced effects are changes in economic activity resulting from households spending income earned directly or indirectly as a result of mine operations. The sum of indirect and induced economic effects are referred to as secondary effects, which is the term used in the remainder of the discussion. Additional details about the methods BBC used in its SEIS analysis are in **Section 4.15.1.2, Analysis Methods** in the 2018 Final EIS.

Socioeconomic conditions in the analysis area (and potential impacts on them due to the leasing of Federal coal in the region) were recently evaluated by the BLM in support of the *Miles City Field Office Final Supplemental Environmental Impact Statement and Resource Management Plan Amendment* (BLM 2024a). OSMRE and the EIS consultant team reviewed the data presented in that document and found it to be generally consistent with what was presented in the 2018 Final EIS.

4.15.2 All Alternatives

Similar to the analysis in the 2018 Final EIS and as described in the sections below, the annual economic effects associated with continued operation of the Rosebud Mine would be the same for Alternative 1 – No Action, Alternative 4 – Proposed Action, and Alternative 5 – Partial Mining Alternative, but would vary in duration. Under the No Action Alternative, the operational life of the Rosebud Mine would be expected to end in 2025. The difference among alternatives is that selection of Alternatives 4 or 5 would extend the life of operations for Area F (and the annual direct, indirect, and induced socioeconomic effects) beyond the No Action Alternative by 14 years or 5 years, respectively (see **Section 2.2.6, Life of Operations**). The analysis in this SEIS assumes, based on information from Westmoreland Rosebud, that employment numbers and annual coal production levels would remain the same through the end of mine life under any alternative (whether the end of Area F mine life is 2025, 2030, or 2039). It should be noted that ceasing production in Area F earlier than 2039 (either 2025 under Alternative 1 or 2030 under Alternative 5), would cause Westmoreland Rosebud to shift mining operations to other approved permit areas, such as Area B, potentially leading to increased production rates for those permit areas and potential closure of the Rosebud Mine earlier than 2045; however, the sequence of events and mine production rates in this scenario are uncertain. It should also be noted that Westmoreland Rosebud has indicated that it could supply the quality of coal needed for the Colstrip Power Plant to operate for approximately 18 months without Area F coal (Wooley 2024). Beyond that timeframe, there is uncertainty regarding production capacity; Westmoreland Rosebud estimates that production capacity from the mine could drop as much as 50 percent based on currently permitted areas (Wooley 2024). As noted previously, this SEIS assumes that the power plants would continue to operate through 2042, regardless of whether Area F coal is available or not.

Socioeconomic Impacts of Mine Closure

The summary of socioeconomic impacts of mine closure would be similar to those described in the 2018 Final EIS in **Section 4.15.2** on page 598, with the exception of the early (January 2020) closure of Units 1 and 2.

4.15.2.1 Direct Impacts – All Alternatives

Direct effects of all alternatives in this SEIS are assumed to occur in the same areas as described in the 2018 Final EIS in **Section 4.15.2.1** on page 598. Currently, the Rosebud Mine supports an annual average of approximately 320 direct jobs and $148 million in annual direct economic output (including wages and revenue generated from the purchase of supplies, materials, and services by the Rosebud Mine) (**Table 4.15-2**) (BBC 2024b); this level of employment and direct economic output would be expected to continue through 2025 for all alternatives. Similarly, based on the Northern Cheyenne Reservation's share of the Rosebud County economy, the Rosebud Mine provides almost 46 jobs; this level of employment and direct economic output also would be expected to continue through 2039 for Alternative 4 and 2030 for Alternative 5. Approximately 14 percent of employees at the Rosebud Mine are members of the Northern Cheyenne Tribe (BBC 2024b). Another 30 of the 320 workers (9 percent) are Native Americans, who are not members of the Northern Cheyenne Tribe, are likely predominantly members of the relatively nearby Crow Tribe.

Table 4.15-2. Annual Direct Effects by Location from the Rosebud Mine.

Area	Employment	Total Output
Rosebud County	320	$148,073
Big Horn County	0	$0
Treasure County	0	$0
Total	320	$148,073

Source: BBC 2024b.

4.15.2.2 Indirect Impacts – All Alternatives

The estimated indirect effects of all alternatives in this SEIS are assumed to occur in the same areas as described in the 2018 Final EIS in **Section 4.15.2.2** on page 599. The estimated indirect economic effects on the region from the Rosebud Mine are shown in **Table 4.15-3**. Indirect effects likely would continue to occur outside of the three-county analysis area—particularly in Yellowstone County, which includes the City of Billings. Billings is the largest city and the primary regional trade center in southeastern Montana. The effects beyond the three-county study area are not captured in this analysis.

The Rosebud Mine supports 53 indirect jobs (**Table 4.15-3**). This level of indirect employment would be expected to continue through 2039 for Alternative 4 and 2030 for Alternative 5. The mine also generates approximately $18.4 million annually in indirect economic output in the region. This level of indirect economic output would be expected to continue under all action alternatives (**Table 4.15-3)**.

Table 4.15-3. Indirect Effects by Location from the Rosebud Mine.

Area	Employment	Total Output
Rosebud County	49	$17,091
Big Horn County	1	$465
Treasure County	3	$819
Total	53	$18,375

Source: BBC 2024b.

4.15.2.3 Induced Effects – All Alternatives

Table 4.15-4 shows the estimated induced effects of the Rosebud Mine within Rosebud, Big Horn, and Treasure Counties and within the Northern Cheyenne Reservation. For all alternatives, the Rosebud Mine would continue to support approximately 65 induced jobs and over $10 million in annual induced output across the tri-county analysis area through 2039 for Alternative 4 and 2030 for Alternative 5.

Table 4.15-4. Induced Effects by Location from the Rosebud Mine.

Area	Employment	Total Output
Rosebud County	49	$17,091,000
Big Horn County	1	$465,000
Treasure County	3	$819,000
Total	53	$18,375,000

Source: BBC 2024b.

4.15.2.4 Total Economic Effects – All Alternatives

The total regional economic employment and output of the mine is derived by combining the direct, indirect, and induced impacts described in previous sections. The majority of the economic effects would continue to occur at or near the mine; and Rosebud County would continue to experience the largest economic impacts until the end of operational mine life. However, since indirect and induced spending occurs across the larger regional economy, both Big Horn and Treasure Counties would continue to experience some economic effects due to mine operations until the end of operational mine life (**Table 4.15-5).** As noted previously, approximately 23 percent of the mine's direct workforce are members of the Northern Cheyenne Tribe (14 percent) or other Native Americans (9 percent).

Table 4.15-5. Total Annual Economic Effects from the Rosebud Mine.

Area	Employment	Total Output
Rosebud County	427	$174,912,000
Big Horn County	7	$1,372,000
Treasure County	4	$904,000
Total	438	$177,188,000

Source: BBC 2024b.

The Rosebud Mine is estimated to currently support about 438 direct, indirect, and induced jobs throughout the three-county region and to stimulate about $177 million in annual economic output within the region. As noted previously, approximately 23 percent of the mine's direct workforce are members of the Northern Cheyenne Tribe (14 percent) or other Native Americans (9 percent).

4.15.2.5 Impacts on Government Revenues – All Alternatives

Another important component of the mine's economic effects is the resulting fiscal revenues provided to local governments, the state of Montana, and the Federal government.

The Rosebud Mine is estimated to provide approximately $52 million in annual direct revenues to Rosebud County, the state of Montana, and the Federal government, as summarized in **Table 4.15-6**. These revenues include Federal and state royalties, severance taxes, resource indemnity trusts, gross proceeds taxes, and property taxes.

As shown in **Table 4.15-6**, the Rosebud Mine directly generated approximately $32 million in annual state revenues in 2023. Local governments received approximately $11 million, and the Federal government received approximately $9 million in annual taxes and royalties.

Table 4.15-6. Direct Governmental Revenues from the Rosebud Mine.

Revenue Type	Local Governments	State of Montana	Federal Government
Taxes	$10,643,000	$30,338,000	$0
Royalties	$0	$2,003,000	$9,068,000
Total	$10,643,000	$32,341,000	$9,068,000

Source: BBC 2024b.

In addition to the direct fiscal impacts, the indirect and induced economic activity generated by the mine throughout the region produces additional tax revenues. These effects include payroll and income taxes, property taxes, and other fees. Induced fiscal effects are relatively small because there are no sales taxes in Montana that capture revenues from the induced increase in household spending.

As shown in **Table 4.15-7**, the indirect and induced effects, combined with the direct effects shown in Figure 5, are estimated to generate approximately $12 million, $33 million, and $11 million in annual revenues in 2023 for local governments, the state of Montana, and the Federal government, respectively.

Table 4.15-7. Total Annual Governmental Revenues from the Rosebud Mine.

Revenue Type	Local Governments	State of Montana	Federal Government
Direct	$10,643,000	$32,341,000	$9,068,000
Indirect	$750,000	$452,000	$918,000
Induced	$258,000	$236,000	$687,000
Total	$11,651,000	$33,029,000	$10,673,000

Source: BBC 2024b.

4.16 RESERVED [NOTE: NUMBERING SEQUENCE RETAINED FOR CONTINUITY WITH THE DRAFT SEIS AND 2018 FINAL EIS]

4.17 VISUAL RESOURCES

This section discloses the direct and indirect impacts on visual resources resulting from implementation of Alternative 1 – No Action, Alternative 4 – Proposed Action (Current Federal Mining Plan), or Alternative 5 – Partial Mining Alternative. Pre-mining visual conditions and the analysis areas used for this impacts analysis are described in **Section 3.17, Visual Resources.**

4.17.1 Analysis Methods and Impact and Intensity Thresholds

Visual impacts were evaluated in this SEIS using the same methods used in the 2018 Final EIS. Analysis methods are provided in **Section 4.17.1** of the 2018 Final EIS, beginning on page 610. The thresholds for assessment of impacts (negligible, minor, moderate, or major) on visual resources are the same as those defined in the 2018 Final EIS in **Table 157**. Assumptions for each alternative, which informed the scope of the effects analyses in this SEIS, are presented in **Section 2.4, Alternative 1 – No Action**, **Section 2.5, Alternative 4 – Proposed Action (Current Federal Mining Plan)**, and **Section 2.6, Alternative 5 – Partial Mining Alternative**.

4.17.2 Alternative 1 – No Action

The types of direct and indirect visual impacts under Alternative 1 (as described in this SEIS)[76] would be similar to those described below for Alternative 4 – Proposed Action (Current Federal Mining Plan) but would occur over a 6-year mine life. Under Alternative 1, direct impacts would be limited to the southeastern portion of the project area (east of Donley Creek) with no mining occurring in the Trail Creek, McClure Creek, and Robbie Creek drainages (**Figure 2.4-1**) based on the assumption that all mining would cease in 2025. As with Alternative 4, there would be short-term, moderate, adverse impacts during the life of the mine on drivers traveling along Horse Creek Road (County Road 384) through the project area. Under Alternative 1, however, direct and indirect visual impacts would be less than those under Alternative 4 because disturbance and mine operations would be limited to the southeastern portion of the project area (**Figure 2.4-1**), and the life of mine operations in Area F (and the corresponding impacts) would be 14 years shorter than under Alternative 4 (**Table 2.3-1** and **Table 2.3-2**). Under Alternative 1, reclamation (including revegetation) and PMT would be achieved in the project area 14 years earlier than under Alternative 4.

The continued combustion of coal at the Rosebud and Colstrip Power Plants contributes particulate and gaseous air pollutants that contribute to regional haze in the surrounding viewshed. Under Alternative 1, coal from the project area would be available for combustion in the Colstrip and Rosebud Power Plants for up to 6 years, which is 14 years fewer as compared to Alternative 4.

4.17.2.1 Mining Private Coal Only Scenario

If Westmoreland Rosebud chose to pursue mining of private coal only (leases 1001 and 1001-A) after 2025, direct and indirect visual impacts could be greater than those disclosed above for Alternative 1. The intensity of impacts, however, would be no greater than those disclosed for Alternative 4 (see below) and would be expected to be less. See **Section 2.4.2, State Operating Permit C2011003F** for a discussion of the steps that would be required for such a scenario to occur.

[76] Direct and indirect visual impacts of Alternative 1 – No Action were described in **Section 4.17.2** of the 2018 Final EIS, beginning on page 610. As described in **Chapter 2** of this SEIS, Alternative 1 – No Action has been revised since the 2018 Final EIS.

4.17.3 Alternative 4 – Proposed Action (Current Federal Mining Plan)

The types of direct and indirect visual impacts under Alternative 4 would be similar to those described in the 2018 Final EIS for Alternative 2.

4.17.3.1 Direct Impacts

There would be no direct visual impacts from project area mining operations on Colstrip residences, commercial sites, local recreation areas such as Winchester Park and Castle Rock Lakes, or locations along State Highway 39 in the analysis area, due to the following conditions:

- The nature of the topography in the area, which includes long, rolling hills and occasional bluffs and excludes views of the project area from Colstrip residences, businesses, and recreation sites, which are about 12 miles east of the project area
- The location of the existing mining operations between the project area and the observation points in Colstrip, local recreation areas, and State Highway 39
- The relatively small size of the proposed operations visible from observation points due to the relatively long distance between the observation points and proposed operations

Under Alternative 4, mining operations (**Figure 2.5-1**) would result in increased visual contrast in a small portion of the landscape in the direct effects analysis area, including changes in the color of the landscape from removal of vegetation and exposure of soil, as well as changes to the contour of the landscape. Large equipment may be visible during active mining. However, viewing times would be relatively short (only while driving through the project area) and would be negligible relative to existing mining operations adjacent to the proposed operations in the project area. Also, a segment of Horse Creek Road would be relocated as mining progresses through the project area (**Figure 2.5-1**); one segment was already relocated in 2019. Visual impacts such as ground disturbance and construction activities from relocation of Horse Creek Road would be short-term and limited to the period of construction (in about 5–7 years based on current estimates).

Residences (observation points) identified in the analysis area outside of Colstrip are listed in **Table 4.17-1** and are shown on **Figure 113** in the 2018 Final EIS. There would be no impact on residences R1, R5, R6, and R7 because topography would screen the view of mining operations. Impacts on R2 and R3 would be long-term but minor because active mining may be visible in a small amount of the viewshed of these residences and the project area is adjacent to existing mining areas. Impacts on R4, located directly west of the project area, would be long-term and moderate because no other active mining areas are visible from this residence.

Table 4.17-1. Approximate Distances from Residences to Mining Areas.

Label	Location	Direction from Mine	Distance to Area F (Miles)	Visual Impacts
R1	Airport Road	SE of the project area	4.0	Not visible due to topography – no impact
R2	Armells Creek Road	NE of the project area	2.9	Possibly visible as mining progresses – long-term but minor due to small area visible and existing mining
R3	Armells Creek Road	NE of the project area	2.2	Possibly visible as mining progresses – long-term but minor due to small area visible and existing mining
R4	Horse Creek Road	W of the project area	3.2	Possibly visible as mining progresses – long-term and moderate effect since no other mining activity is visible
R5	Highway 384	SW of the project area	8.0	Not visible due to topography – no impact
R6	Unnamed rural road	S of the project area	5.5	Not visible due to topography – no impact
R7	Unnamed rural road	S of the project area	4.7	Not visible due to topography – no impact

4.17.3.2 Indirect Impacts

Under Alternative 4, coal from the project area would be available for combustion in the Colstrip and Rosebud Power Plants for up to 20 years. The continued combustion of coal at the Rosebud and Colstrip Power Plants contributes particulate and gaseous air pollutants that contribute to regional haze in the surrounding viewshed. Depending on atmospheric conditions and sources of emissions, haze could continue to reduce the visibility of distant mountains and hills, contribute a "smoky" appearance, and detract from the clarity of the landscape. Quantitative analysis of haze-producing pollutants is provided in **Section 4.3, Air Quality**. The Colstrip and Rosebud Power Plants installed Best Available Retrofit Technology on combustion units to increase efficiency and reduce emissions, as described in **Section 4.3, Air Quality** of the 2018 Final EIS. As summarized in **Table 3.17-1** of this SEIS, Montana developed the Regional Haze State Implementation Plan for the state to meet Federal haze standards. As discussed in **Section 4.3, Air Quality** of the 2018 Final EIS, the modeled change in haze index due to indirect impacts of Alternative 4 was compared to annual average natural conditions (in terms of the number of days the haze index value would exceed 0.5 or 1.0 at any Class I area) and reported in **Table 111** of the 2018 Final EIS (replicated in this SEIS in **Table 4.3-12**). Indirect impacts of Alternative 4 on haze visibility impairment at Class I areas would be short-term, minor, and adverse.

Visibility effects are expected to emanate up to 300 km from the area surrounding the Colstrip Power Plant, the Rosebud Power Plant, and the Rosebud Mine, based on the modeling for haze-producing pollutants. Six Class I areas (defined in **Section 3.3, Air Quality**, in the 2018 Final EIS) are located within 300 km of the Colstrip and Rosebud Power Plants. The Northern Cheyenne Reservation is the closest Class I area and is 21 km (approximately 13 miles) away (see **Section 3.3, Air Quality**, in the 2018 Final EIS**)**. Potential impacts on the Northern Cheyenne Reservation and other Class I areas are discussed in **Section 4.3, Air Quality**. Visibility impairment is expected to be negligible for all Class I areas under any alternative.

4.17.4 Alternative 5 – Partial Mining Alternative

The types of direct and indirect visual impacts under Alternative 5 – Partial Mining Alternative would be similar to those described above for Alternative 4 – Proposed Action (Current Federal Mining Plan) but would occur over an 11-year mine life. Under Alternative 5, though, direct impacts would be limited to the southeastern portion of the project area (east of Donley Creek) with no mining occurring in the Trail Creek, McClure Creek, and Robbie Creek drainages (**Figure 2.6-1**) based on the assumption that all mining would cease in 2030. As with Alternative 4, there would be short-term, moderate, adverse impacts during the life of the mine on drivers traveling along Horse Creek Road (County Road 384) through the project area. and the life of mine operations in Area F (and the corresponding impacts) would be 9 years shorter than under Alternative 4 (**Table 2.3-1** and **Table 2.3-2**). Under Alternative 5, reclamation (including revegetation) and PMT would be achieved in the project area 9 years earlier than under Alternative 4.

The continued combustion of coal at the Rosebud and Colstrip Power Plants contributes particulate and gaseous air pollutants that contribute to regional haze in the surrounding viewshed. Under Alternative 5, coal from the project area would be available for combustion in the Colstrip and Rosebud Power Plants for up to 11 years, which is 9 years fewer as compared to Alternative 4. Similar to Alternative 4, visibility impairment is expected to be negligible for all Class I areas under Alternative 5.

4.17.4.1 Mining Private Coal Only Scenario

If Westmoreland Rosebud chose to pursue mining of private coal only (leases 1001 and 1001-A) after 2030, direct and indirect visual resources impacts could be greater than those disclosed above for Alternative 5. The intensity of impacts, however, would be no greater than those disclosed for Alternative 4 (see above) and would be expected to be less. See **Section 2.6.2, State Operating Permit C2011003F** for a discussion of the steps that would be required for such a scenario to occur.

4.17.5 Irreversible and Irretrievable Commitment of Resources

An irreversible and irretrievable commitment of visual resources would occur from the proposed project. Surface mining would be short-term during the life of the mine; the area would be reclaimed after mining is complete. Although the land would be recontoured and revegetated during reclamation, visual changes would include loss of natural rock outcrops, diverse vegetation, and natural drainages, gradually blending into the surrounding landscape over time. Visual changes to the land postmining would be subtle and negligible to some viewers (i.e., viewers in cars traveling on Horse Creek Road through the project area) and minor to moderate to viewers more familiar with the pre-mining landscape (i.e., residences near the project area).

4.18 RECREATION

This section discloses the direct and indirect effects on recreation resulting from implementation of Alternative 1 – No Action, Alternative 4 – Proposed Action (Current Federal Mining Plan), or Alternative 5 – Partial Mining Alternative. Pre-mine reclamation opportunities and the analysis areas used for this impacts analysis are described in **Section 3.18, Recreation**.

4.18.1 Analysis Methods and Impact and Intensity Thresholds

Recreation impacts were evaluated in this SEIS using the same methods used in the 2018 Final EIS. Analysis methods are provided in **Section 4.18.1** of the 2018 Final EIS, beginning on page 616. The thresholds for assessment of impacts (negligible, minor, moderate, or major) on recreation are the same as those defined in the 2018 Final EIS in **Table 159**. Assumptions for each alternative, which informed the scope of the effects analyses in this SEIS, are presented in **Section 2.4, Alternative 1 – No Action**, **Section 2.5, Alternative 4 – Proposed Action (Current Federal Mining Plan)**, and **Section 2.6, Alternative 5 – Partial Mining Alternative**.

4.18.2 Alternative 1 – No Action Alternative

The types of direct and indirect recreation impacts under Alternative 1 (as described in this SEIS)[77] would be similar to those described below for Alternative 4 – Proposed Action (Current Federal Mining Plan) but would occur over a 6-year mine life. Under Alternative 1, direct impacts would be limited to the southeastern portion of the project area (east of Donley Creek) with no mining occurring in the Trail Creek, McClure Creek, and Robbie Creek drainages (**Figure 2.4-1**) based on the assumption that all mining would cease in 2025. As with Alternative 4, there would be long-term, moderate, and adverse impacts on recreation due to a loss of recreation opportunities during mining operations. Private land hunting opportunities within the analysis area would be lost until revegetation and forage production are comparable to pre-mining levels associated with adjacent land. Under Alternative 1, though, recreation impacts would be less than those under Alternative 4 because disturbance and mine operations would be limited to the southeastern portion of the project area (**Figure 2.4-1**), and the life of mine operations in Area F (and the corresponding impacts) would be 14 years shorter than under Alternative 4 (**Table 2.3-1** and **Table 2.3-2**). Under Alternative 1, reclamation (including revegetation) and PMT would be achieved in the project area 14 years earlier than under Alternative 4. Therefore, pre-mine recreational use of the analysis area could resume 14 years earlier as compared to Alternative 4.

There would be no indirect impacts on recreation other than potential regional haze as described in **Section 4.3, Air Quality**. Under Alternative 1, coal from the project area would be available for combustion in the Colstrip and Rosebud Power Plants for up to 6 years, which is 14 years fewer as compared to Alternative 4. Regional haze impacts on recreation in the analysis area would be long-term, minor, and adverse.

4.18.2.1 Mining Private Coal Only Scenario

If Westmoreland Rosebud chose to pursue mining of private coal only (leases 1001 and 1001-A) after 2025, direct and indirect recreation impacts could be greater than those disclosed above for Alternative 1. The intensity of impacts, however, would be no greater than those disclosed for Alternative 4 (see below)

[77] Direct and indirect recreation impacts of Alternative 1 – No Action were described in **Section 4.18.2** of the 2018 Final EIS, beginning on page 616. As described in **Chapter 2** of this SEIS, Alternative 1 – No Action has been revised since the 2018 Final EIS.

and would be expected to be less. See **Section 2.4.2, State Operating Permit C2011003F** for a discussion of the steps that would be required for such a scenario to occur.

4.18.3 Alternative 4 – Proposed Action (Current Federal Mining Plan)

Direct and indirect recreation impacts under Alternative 4 – Proposed Action (Current Federal Mining Plan) would be similar to those described for Alternative 2 in **Section 4.18.3** of the 2018 Final EIS, beginning on page 617. Under Alternative 4, half a million tons more coal would be mined[78] and approximately 28 acres more would be disturbed as compared to Alternative 2. Reclamation would occur contemporaneously with mining (see discussion of the phases of reclamation in **Section 1.6.4, Bond Release**, in the 2018 Final EIS). Once mining has ceased, reclamation (including revegetation) of disturbed areas (up to 4,288 acres) in the project area would occur according to Westmoreland Rosebud's approved reclamation plan (**Figure 2.2-5**) and PMT (**Figure 2.2-6**), which are similar to those described for Alternative 2 in 2018 Final EIS **Section 2.4.4, Reclamation Plan**. Modifications since 2018 are described in **Section 2.2.2.2, Area F Operations and Development**.

4.18.3.1 Direct Impacts

During the life of operations (about 20 years under Alternative 4), use of the surface lands within the analysis area, which are entirely privately owned, would be devoted to mining and associated activities. All current use of the land for recreation (primarily private land hunting) would be unavailable during mine operations, displacing some individuals onto other nearby lands for hunting and other recreation opportunities. However, because the analysis area represents less than 0.01 percent of Hunting District 702, the private lands within the project area represent a relatively small portion of the currently accessible lands for recreation opportunities within the respective hunting area, including for guides and outfitters on private ranches.

There would be a loss of recreation opportunities because hunting in the analysis area would not be possible during mining operations. Private land hunting opportunities, including for guides and outfitters on private ranches, on mine-related disturbance areas within the analysis area would be lost until revegetation and forage production are comparable to pre-mining levels associated with adjacent land. Thus, impacts on recreation in the project area would be long-term, moderate, and adverse.

Adjacent Recreational Uses

Adjacent recreation uses during mine operations would be affected to some extent; these impacts are described in **Section 4.22, Noise, Section 4.17, Visual Resources,** and **Section 4.12, Fish and Wildlife Resources**. There would be no impacts on recreation uses in and immediately surrounding the city of Colstrip or in southeastern Montana.

4.18.3.2 Indirect Impacts

There would be no indirect impacts on recreation other than potential regional haze as described in **Section 4.3, Air Quality**. Under Alternative 4, coal from the project area would be available for combustion in the Colstrip and Rosebud Power Plants for up to 20 years. Regional haze impacts on recreation in the analysis area would be long-term, minor, and adverse.

78. See coal tonnage and disturbance comparison in **Table 2.2-8**. Under Alternative 4, mine passes would not be authorized for 74 acres of Federal coal (about 1.9 million tons of recoverable coal). The 74 acres that would not be mined could still be used for other project-associated surface disturbance, such as overburden or topsoil stockpile locations (**Figure 2.5-1**).

4.18.4 Alternative 5 – Partial Mining Alternative

The types of direct and indirect recreation impacts under Alternative 5 (as described in this SEIS) would be similar to those described above for Alternative 4 – Proposed Action (Current Federal Mining Plan) but would occur over an 11-year mine life. Under Alternative 5, though, direct impacts would be limited to the southeastern portion of the project area (east of Donley Creek) with no mining occurring in the Trail Creek, McClure Creek, and Robbie Creek drainages (**Figure 2.6-1**) based on the assumption that all mining would cease in 2030. As with Alternative 4, there would be long-term, moderate, and adverse impacts on recreation in the analysis area due to a loss of recreation opportunities during mining operations. Private land hunting opportunities within the analysis area would be lost until revegetation and forage production are comparable to pre-mining levels associated with adjacent land. Under Alternative 5, though, recreation impacts would be less than those under Alternative 4 because disturbance and mine operations would be limited to the southeastern portion of the project area (**Figure 2.4-1**), and the life of mine operations in Area F (and the corresponding impacts) would be 9 years shorter than under Alternative 4 (**Table 2.3-1** and **Table 2.3-2**). Under Alternative 5, reclamation (including revegetation) and PMT would be achieved in the project area 9 years earlier than under Alternative 4. Therefore, pre-mine recreational use of the analysis area could resume 9 years earlier as compared to Alternative 4.

The continued combustion of coal at the Rosebud and Colstrip Power Plants contributes particulate and gaseous air pollutants that contribute to regional haze in the surrounding viewshed. Under Alternative 5, coal from the project area would be available for combustion in the Colstrip and Rosebud Power Plants for up to 11 years, which is 9 years fewer as compared to Alternative 4.

4.18.4.1 Mining Private Coal Only Scenario

If Westmoreland Rosebud chose to pursue mining of private coal only (leases 1001 and 1001-A) after 2030, direct and indirect recreation impacts could be greater than those disclosed above for Alternative 5. The intensity of impacts, however, would be no greater than those disclosed for Alternative 4 (see above) and would be expected to be less. See **Section 2.6.2, State Operating Permit C2011003F** for a discussion of the steps that would be required for such a scenario to occur.

4.18.5 Irreversible and Irretrievable Commitment of Resources

No irreversible or irretrievable commitment of recreation resources would occur. Surface mining in the analysis area would be short-term, and the land would likely be available for hunting again after mining is complete and the private land surface has been reclaimed and revegetated.

4.19 PALEONTOLOGY

This section discloses the direct and indirect effects on paleontology resources resulting from implementation of Alternative 1 – No Action, Alternative 4 – Proposed Action (Current Federal Mining Plan), or Alternative 5 – Partial Mining Alternative. Pre-mine conditions and the analysis areas used for this impacts analysis are described in **Section 3.19, Paleontology**.

4.19.1 Analysis Methods and Impact and Intensity Thresholds

Paleontology impacts were evaluated in this SEIS using the same methods used in the 2018 Final EIS. Analysis methods are provided in **Section 4.19.1** of the 2018 Final EIS, beginning on page 618. The thresholds for assessment of impacts (negligible, minor, moderate, or major) on paleontology are the same as those defined in the 2018 Final EIS in **Table 160**.

4.19.2 Alternative 1 – No Action

The types of direct and indirect impacts on paleontology resources under Alternative 1 (as described in this SEIS)[79] would be similar to those described below for Alternative 4 – Proposed Action (Current Federal Mining Plan). Under Alternative 1, though, direct impacts would be limited to the southeastern portion of the project area (east of Donley Creek) with no mining occurring in the Trail Creek, McClure Creek, and Robbie Creek drainages (**Figure 2.4-1**) based on the assumption that all mining would cease in 2025. Under Alternative 1, approximately 1,021 acres would be disturbed in the project area over a 6-year mine life that would produce about 17.1 million tons of coal from Federal and private coal leases. As with Alternative 4, paleontology resources may be present in the disturbance area; any not identified or salvaged prior to mining would be permanently lost, resulting in a long-term major adverse impact.

Under Alternative 1, direct and indirect impacts on paleontological resources would be less than under Alternative 4: about 54 million fewer tons of coal would be mined and approximately 3,267 fewer acres would be disturbed under Alternative 1 as compared to Alternative 4 (**Table 2.3-1** and **Table 2.3-2**).

4.19.2.1 Mining Private Coal Only Scenario

If Westmoreland Rosebud chose to pursue mining of private coal only (leases 1001 and 1001-A) after 2025, direct and indirect paleontology impacts could be greater than those disclosed above for Alternative 1. The intensity of impacts, however, would be no greater than those disclosed for Alternative 4 (see below) and would be expected to be less. See **Section 2.4.2, State Operating Permit C2011003F** for a discussion of the steps that would be required for such a scenario to occur.

4.19.3 Alternative 4 – Proposed Action (Current Federal Mining Plan)

Direct and indirect impacts on paleontological resources under Alternative 4 – Proposed Action (Current Federal Mining Plan) would be similar to those described for Alternative 2 in **Section 4.19.3** of the 2018

[79] Direct and indirect paleontology impacts of Alternative 1 – No Action were described in **Section 4.19.2** of the 2018 Final EIS, beginning on page 618. As described in **Chapter 2** of this SEIS, Alternative 1 – No Action has been revised since the 2018 Final EIS.

Final EIS, beginning on page 618. Under Alternative 4, half a million tons more coal would be mined[80] and approximately 28 acres more would be disturbed as compared to Alternative 2.

4.19.3.1 Direct Impacts

Paleontological resources of scientific significance could be present in the area to be disturbed (4,288 acres) under Alternative 4. BLM classifies the clinker in the analysis area with a Potential Fossil Yield Classification (PFYC) rating of 2, the Quaternary Alluvium with a PFYC rating of 2, and all the members of the Fort Union Formation with a PFYC rating of 4 (BLM 2017). Since only the Fort Union Formation would be removed during mining, paleontological resources not identified or salvaged prior to mining would be permanently lost, resulting in a long-term major adverse impact. Paleontological resources are likely to be destroyed during mining operations; however, based on the results of the survey (SWCA 2016), some resources might be recognized before being completely destroyed; therefore, some may be potentially salvaged.

Paleontological resources belong to the owner of the surface estate (all of which is privately held), and the owners may wish to (1) donate scientifically significant fossils to a public institution for research and education for the good of everyone, (2) retain the fossils for personal use, or (3) determine to not salvage the fossils and allow them to be destroyed or eroded.

4.19.3.2 Indirect Impacts

There would be no indirect impacts on paleontological resources; all impacts would be direct impacts.

4.19.4 Alternative 5 – Partial Mining Alternative

The types of direct and indirect impacts on paleontology resources under Alternative 5 – Partial Mining Alternative would be similar to those described above for Alternative 4 – Proposed Action (Current Federal Mining Plan). Under Alternative 5, though, direct impacts would be limited to the southeastern portion of the project area (east of Donley Creek) with no mining occurring in the Trail Creek, McClure Creek, and Robbie Creek drainages (**Figure 2.6-1**) based on the assumption that all mining would cease in 2030. Under Alternative 5, approximately 2,495 acres would be disturbed in the project area over an 11-year mine life that would produce about 37.1 million tons of coal from Federal and private coal leases. As with Alternative 4, paleontology resources may be present in the disturbance area; any not identified or salvaged prior to mining would be permanently lost, resulting in a long-term major adverse impact.

Under Alternative 5, direct and indirect impacts on paleontological resources would be less than under Alternative 4: 34 million fewer tons of coal would be mined and approximately 1,793 fewer acres would be disturbed under Alternative 5 as compared to Alternative 4 (**Table 2.3-1** and **Table 2.3-2**).

4.19.4.1 Mining Private Coal Only Scenario

If Westmoreland Rosebud chose to pursue mining of private coal only (leases 1001 and 1001-A) after 2030, direct and indirect paleontology impacts could be greater than those disclosed above for Alternative 5. The intensity of impacts, however, would be no greater than those disclosed for Alternative 4 (see

[80.] See coal tonnage and disturbance comparison in **Table 2.2-8**. Under Alternative 4, mine passes would not be authorized for 74 acres of Federal coal (about 1.9 million tons of recoverable coal). The 74 acres that would not be mined could still be used for other project-associated surface disturbance, such as overburden or topsoil stockpile locations (**Figure 2.5-1**).

above) and would be expected to be less. See **Section 2.6.2, State Operating Permit C2011003F** for a discussion of the steps that would be required for such a scenario to occur.

4.19.5 Irreversible and Irretrievable Commitment of Resources

Removal of the Rosebud coal seam and the associated overburden in the project area would be an irreversible and irretrievable impact on paleontological resources.

4.20 ACCESS AND TRANSPORTATION

This section discloses the direct and indirect effects on access and transportation resulting from implementation of Alternative 1 – No Action, Alternative 4 – Proposed Action (Current Federal Mining Plan), or Alternative 5 – Partial Mining Alternative. The existing transportation system and the analysis areas used for this impacts analysis are described in **Section 3.20, Access and Transportation**.

4.20.1 Analysis Methods and Impact and Intensity Thresholds

Access and transportation impacts were evaluated in this SEIS using the same methods used in the 2018 Final EIS. Analysis methods are provided in **Section 4.20.1** of the 2018 Final EIS, beginning on page 620. The thresholds for assessment of impacts (negligible, minor, moderate, or major) to access and the transportation network are the same as those defined in the 2018 Final EIS in **Table 161**. Assumptions for each alternative, which informed the scope of the effects analyses in this SEIS, are presented in **Section 2.4, Alternative 1 – No Action**, **Section 2.5, Alternative 4 – Proposed Action (Current Federal Mining Plan)**, and **Section 2.6, Alternative 5 – Partial Mining Alternative**.

4.20.2 Alternative 1 – No Action

The types of direct and indirect access and transportation impacts under Alternative 1 (as described in this SEIS)[81] would be similar to those described below for Alternative 4 – Proposed Action (Current Federal Mining Plan). Under Alternative 1, though, road construction (and associated impacts) would be limited to the southeastern portion of the project area (east of Donley Creek) with no mining occurring in the Trail Creek, McClure Creek, and Robbie Creek drainages (**Figure 2.4-1**) based on the assumption that all mining would cease in 2025. In total, approximately 1,021 acres would be disturbed in the project area over a 6-year mine life that would produce about 17.1 million tons of coal from Federal and private coal leases.

Under Alternative 1, direct and indirect access and transportation impacts would be less than under Alternative 4: about 54 million fewer tons of coal would be mined and approximately 3,267 fewer acres would be disturbed under Alternative 1 as compared to Alternative 4 (**Table 2.3-1** and **Table 2.3-2**). The life of operations for Area F (and the corresponding impacts) would be 14 years shorter under Alternative 1 than under Alternative 4. Reclamation (including road removal) and PMT would be achieved in the project area 14 years earlier than under Alternative 4.

4.20.2.1 Mining Private Coal Only Scenario

If Westmoreland Rosebud chose to pursue mining of private coal only (leases 1001 and 1001-A) after 2025, direct and indirect access and transportation impacts could be greater than those disclosed above for Alternative 1. The intensity of impacts, however, would be no greater than those disclosed for Alternative 4 (see below) and would be expected to be less. See **Section 2.4.2, State Operating Permit C2011003F** for a discussion of the steps that would be required for such a scenario to occur.

[81] Direct and indirect access and transportation impacts of Alternative 1 – No Action were described in **Section 4.20.2** of the 2018 Final EIS, beginning on page 620. As described in **Chapter 2** of this SEIS, Alternative 1 – No Action has been revised since the 2018 Final EIS.

4.20.3 Alternative 4 – Proposed Action (Current Federal Mining Plan)

Direct and indirect transportation impacts under Alternative 4 – Proposed Action (Current Federal Mining Plan) would be similar to those described for Alternative 2 in **Section 4.20.3** of the 2018 Final EIS, beginning on page 621. As described in **Chapter 2** of this SEIS, slight adjustments have been made to the alignments for the relocation of the Horse Creek Road (MR15) from those described for Alternative 2 in the 2018 Final EIS due to on-the-ground conditions. Other differences (**Table 2.2-5**) between the 2018 Proposed Action and Alternative 4 that are relevant to the transportation network include reorienting haul roads (MR14 and MR17) and adding culvert locations (MR14).

4.20.3.1 Direct Impacts

Road Construction Impacts

Road construction proposed under the project is described in **Section 2.4.3.4**, **Roads**, in the 2018 Final EIS. Road alignments for Alternative 4, which would be consistent with those already approved by DEQ and/or OSMRE, are shown on **Figure 2.2-3** in **Chapter 2**. Road construction impacts would be short-term, negligible, and adverse as they would be limited to the period during mine construction and operations. Westmoreland Rosebud would use BMPs to mitigate environmental quality impacts. Temporary and permanent erosion-control measures would be used as necessary during road construction to control sedimentation and minimize erosion (see **Section 2.4.5.2, Surface Water Management and Sediment-Control Measures** in the 2018 Final EIS for a discussion of sediment BMPs). All cut-and-fill slopes would be re-soiled and revegetated, or otherwise stabilized, at the first seasonal opportunity. Cut slopes would not be greater than 1v:1.5h (vertical rise versus horizontal run) for unconsolidated materials or 1v:0.25h in rock.

Following abandonment, roads would be reclaimed in accordance with the approved reclamation plan. All bridges and culverts would be removed and natural drainage patterns restored to meet the approved postmining topography. Westmoreland Rosebud's approved reclamation plan (**Figure 2.2-5**) and PMT (**Figure 2.2-6**), which are similar to those described for Alternative 2 in 2018 Final EIS **Section 2.4.4, Reclamation Plan**, are described in **Chapter 2** of this SEIS. Modifications since 2018 are described in **Section 2.2.2.2, Area F Operations and Development**.

Relocation of Horse Creek Road

To accommodate the proposed mining plan, Westmoreland Rosebud would relocate Horse Creek Road in two locations. One segment in Rosebud County (about 4.2 miles long) was relocated in 2019 during initial mine development. Another segment (about 1.4 miles long) located in Treasure County would be relocated when mining moves into the northwestern corner of the project area (in about 5–7 years based on current estimates). Westmoreland Rosebud would work with the Treasure County Boards of Commissioners (as they did with the Rosebud County Commissioners for relocation of the first segment) to plan and develop a means for relocating the road per MSUMRA, Section 82-4-227(7)(d), MCA, and ARM 17.24.1135. Designs for the road relocation would be submitted to DEQ and Treasure County for review and approval. Westmoreland Rosebud would be required to provide a public hearing, appropriately noticed, to determine whether the interests of the public and affected landowners would be protected per ARM 17.24.1135(3-4). A written finding based on the information from the public hearing would be produced and submitted to DEQ (ARM 17.24.1135[5]). The relocation of Horse Creek Road would result in short-term minor adverse impacts on transportation and access.

Haul Roads, Ramp Roads, and Service Roads

No long-term impacts would be expected from construction of haul roads, ramp roads, or service roads (**Figure 2.5-1**) as effects would be limited to construction and operations of the mine. Road materials to be used in construction include pit run and crushed and/or screened scoria as described in **Section 2.4.3.4**, **Road Materials** in the 2018 Final EIS.

Transportation Impacts

Traffic

During construction, operation, and reclamation associated with the project, traffic congestion and possible accidents could occur on roads and highways used in the project area. After reclamation, impacts from project traffic would cease, and no additional impacts on traffic would be expected. Mine haul traffic would not use the mine access roads, but rather would use the existing and expanded haul roads, consistent with current mine practice.

Road Maintenance Impacts

Existing access roads would continue to be graded and/or maintained as done in other permit areas of the Rosebud Mine, resulting in short-term, negligible, adverse impacts on mine access roads. Public access roads such as State Highway 39 would continue to be maintained for local and regional traffic. No additional maintenance on public access roads is anticipated; therefore, there would be no impact on public access road maintenance.

Ingress and Egress Impacts

Westmoreland Rosebud would not conduct mining activities within 100 feet of the right-of-way line of any public road except where mine access or haul roads join that right-of-way. Agricultural lessees would continue to have road access to most parts of the permit area, though agricultural operators may experience disruptions to their operations or inefficiencies due to the need to move cattle around active mining areas. Exceptions would include the immediate vicinity of active coal-mining areas and coal-handling facilities and the two periods of time when the Horse Creek Road is relocated (see discussion above). Alternative 4 would have a short-term negligible adverse impact on agricultural operators' and residents' mobility to access certain areas and move through the project area.

4.20.3.2 Indirect Impacts

Indirect impacts on transportation and access may occur on recreational users or hunters due to mine-related traffic and closures in active mining areas. Employees traveling to and from the Rosebud Mine would contribute to local traffic, but effects would not change from current conditions. Increases in noise, dust, and lights from road construction (haul roads, ramp roads, etc.) traveling through, and to and from, the project area may impact local traffic, residents, recreationists, and hunters. Overall, indirect effects on access and transportation would be short-term, minor, and adverse.

4.20.4 Alternative 5 – Partial Mining Alternative

The types of direct and indirect access and transportation impacts under Alternative 5 – Partial Mining Alternative would be similar to those described above for Alternative 4 – Proposed Action (Current Federal Mining Plan). Under Alternative 5, though, road construction (and associated impacts) would be limited to the southern portion of the project area (east of Donley Creek) with no mining occurring in the

Trail Creek, McClure Creek, and Robbie Creek drainages (**Figure 2.6-1**) based on the assumption that all mining would cease in 2030. In total, approximately 2,495 acres would be disturbed in the project area over an 11-year mine life that would produce about 37.1 million tons of coal from Federal and private coal leases.

Under Alternative 5, direct and indirect access and transportation impacts would be less than under Alternative 4. About 34 million fewer tons of coal would be mined and approximately 1,793 fewer acres would be disturbed under Alternative 5 as compared to Alternative 4 (**Table 2.3-1** and **Table 2.3-2**). The life of operations for Area F (and the corresponding impacts) would be 9 years shorter under Alternative 5 than under Alternative 4. Reclamation (including road removal) and PMT would be achieved in the project area 9 years earlier than under Alternative 4.

4.20.4.1 Mining Private Coal Only Scenario

If Westmoreland Rosebud chose to pursue mining of private coal only (leases 1001 and 1001-A) after 2030, direct and indirect access and transportation impacts could be greater than those disclosed above for Alternative 5. The intensity of impacts, however, would be no greater than those disclosed for Alternative 4 (see above) and would be expected to be less. See **Section 2.6.2, State Operating Permit C2011003F** for a discussion of the steps that would be required for such a scenario to occur.

4.20.5 Irreversible and Irretrievable Commitment of Resources

All alternatives would contribute traffic on the roadways during construction, operations, and reclamation, thereby increasing the amount of fuel used by vehicles beyond that used prior to development of Area F. Fuel is a nonrenewable resource; thus, traffic related to Alternatives 1, 4, and 5 would result in an irreversible commitment of resources.

4.21 SOLID AND HAZARDOUS WASTE

This section discloses the direct and indirect solid and hazardous waste impacts resulting from implementation of Alternative 1 – No Action, Alternative 4 – Proposed Action (Current Federal Mining Plan), or Alternative 5 – Partial Mining Alternative. Existing waste management conditions and the analysis areas used for this impacts analysis are described in **Section 3.21, Solid and Hazardous Waste**.

4.21.1 Analysis Methods and Impact and Intensity Thresholds

Impacts were evaluated in this SEIS using the same methods used in the 2018 Final EIS. Analysis methods are provided in **Section 4.21.1** of the 2018 Final EIS, beginning on page 627. The thresholds for assessment of impacts (negligible, minor, moderate, or major) are the same as those defined in the 2018 Final EIS in **Table 162**. Assumptions for each alternative, which informed the scope of the effects analyses in this SEIS, are presented in **Section 2.4, Alternative 1 – No Action**, **Section 2.5, Alternative 4 – Proposed Action (Current Federal Mining Plan)**, and **Section 2.6, Alternative 5 – Partial Mining Alternative**.

4.21.2 Alternative 1 – No Action

The types of direct and indirect solid and hazardous waste impacts under Alternative 1 (as described in this SEIS)[82] would be similar to those described below for Alternative 4 – Proposed Action (Current Federal Mining Plan) but would be limited to a 6-year mine life. Mining would be more limited with only about 17.1 million tons of coal mined from Federal and private leases within a 1,021 acre-disturbance area limited to the southeastern portion of the project area (east of Donley Creek); no mining would occur in the Trail Creek, McClure Creek, and Robbie Creek drainages (**Figure 2.4-1**) based on the assumption that all mining would cease in 2025. As with Alternative 4, the potential for leaks or releases within the project area would be short-term, negligible, and adverse: only small quantities of waste (less than or equal to 55 gallons per accumulation point) would be collected at project area accumulation points. Impacts from the potential release of solid or hazardous wastes at the central storage location in Area A (due to mining in Area F) would be short-term, negligible, and adverse due to the continued implementation of the Solid and Hazardous Waste Management Plan (SHWMP), the Spill Prevention Control and Counter Measure Plan (SPCCMP), and the Contingency and Emergency Response Plan (CERP).

Under Alternative 1, about 54 million fewer tons of coal would be mined and approximately 3,267 fewer acres would be disturbed as compared to Alternative 4 (**Table 2.3-1** and **Table 2.3-2**). The life of operations for Area F (and the corresponding impacts) would be 14 years shorter under Alternative 1 than under Alternative 4. Reclamation and PMT would be achieved in the project area 14 years earlier than under Alternative 4. Under Alternative 1, coal from the project area would be available for combustion in the Colstrip and Rosebud Power Plants for up to 6 years, which is 14 years fewer as compared to Alternative 4.

4.21.2.1 Mining Private Coal Only Scenario

If Westmoreland Rosebud chose to pursue mining of private coal only (leases 1001 and 1001-A) after 2025, direct and indirect solid and hazardous waste impacts could be greater than those disclosed above

[82.] Direct and indirect solid and hazardous waste impacts of Alternative 1 – No Action were described in **Section 4.21.2** of the 2018 Final EIS, beginning on page 627. As described in **Chapter 2** of this SEIS, Alternative 1 – No Action has been revised since the 2018 Final EIS.

for Alternative 1. The intensity of impacts, however, would be no greater than those disclosed for Alternative 4 (see below) and would be expected to be less. See **Section 2.4.2, State Operating Permit C2011003F** for a discussion of the steps that would be required for such a scenario to occur.

4.21.3 Alternative 4 – Proposed Action (Current Federal Mining Plan)

Direct and indirect solid and hazardous waste impacts under Alternative 4 – Proposed Action (Current Federal Mining Plan) would be similar to those described for Alternative 2 in **Section 4.21.3** of the 2018 Final EIS, beginning on page 628. Under Alternative 4, coal from the project area would be available for combustion in the Colstrip and Rosebud Power Plants for up to 20 years.

4.21.3.1 Direct Impacts

Under Alternative 4, Westmoreland Rosebud would not construct any facilities or storage areas in the project area, since any that would be needed already exist and are available for use in other permit areas (see **Figure 63** in the 2018 Final EIS). As for other permit areas, hazardous wastes would be collected in 55-gallon drums at satellite accumulation points within the project area (the number of satellite accumulation points and drums would be based on the waste stream generated); within three days of filling, the waste drums would be transported to the hazardous-waste storage area located in Area A for shipment to a treatment, storage, and disposal facility. Impacts from the potential release of solid or hazardous wastes stored in Area A would be short-term, negligible, and adverse due to the continued implementation of the SHWMP, SPCCMP, and CERP. Given the small quantities that would be collected in project area satellite accumulation points (less than or equal to 55 gallons per accumulation point), potential leaks or releases within the analysis area would be short-term, negligible, and adverse.

Final disposal of non-coal solid wastes, if encountered, would be either at the Rosebud County Landfill or in the mine pits in an approved landfill site for solid wastes. Mining-related non-hazardous waste such as non-treated wood, wooden pallets, concrete, and dragline cable and wooden cable spools would be placed in the mine pits in accordance with ARM 17.24.507. On a case-by-case basis, other non-hazardous construction, mining, or agricultural debris would also be placed within the mine pits if approved to do so by DEQ (PAP, ARM 17.24.507). Any waste materials meeting the definition of "hazardous" would be handled in accordance with applicable regulations (see **Section 3.21.1.1, Regulatory Framework**, in the 2018 Final EIS). Excess waste liquid not used within the Rosebud Mine would be handled under Westmoreland Rosebud's Waste Management Program. Because of these actions, impacts would be short-term, negligible, and adverse.

4.21.3.2 Indirect Impacts

Under Alternative 4, CCR waste would continue to be generated at both the Colstrip and Rosebud Power Plants in proportion to the amount of coal burned at the plants. Coal from the project area burned at the power plants would add to the amount of CCR generated. Under all alternatives, no bottom ash would be used in the project area.

Impacts on groundwater related to the storage of CCR from the power plants are discussed in **Section 4.8, Water Resources – Groundwater**, in the 2018 Final EIS. Beneficial use of CCR from the power plants would also likely continue into the future, and the CCR generated from project area coal would contribute to the total amount of CCR available for beneficial use in proportion to the amount generated.

4.21.4 Alternative 5 – Partial Mining Alternative

The types of direct and indirect solid and hazardous waste impacts under Alternative 5 would be similar to those described for Alternative 4 – Proposed Action (Current Federal Mining Plan), but would be limited to an 11-year mine life. Mining would be more limited with only about 37.1 million tons of coal mined from Federal and private leases within a 2,495 acre-disturbance area limited to the southeastern portion of the project area (east of Donley Creek); no mining would occur in the Trail Creek, McClure Creek, and Robbie Creek drainages (**Figure 2.6-1**) based on the assumption that all mining would cease in 2030. As with Alternative 4, the potential for leaks or releases within the project area would be short-term, negligible, and adverse: only small quantities of waste (less than or equal to 55 gallons per accumulation point) would be collected at project area accumulation points. Impacts from the potential release of solid or hazardous wastes at the central storage location in Area A (due to mining in Area F) would be short-term, negligible, and adverse due to the continued implementation of the SHWMP, SPCCMP, and CERP.

Under Alternative 5, about 34 million fewer tons of coal would be mined and approximately 1,793 fewer acres would be disturbed as compared to Alternative 4 (**Table 2.3-1** and **Table 2.3-2**). The life of operations for Area F (and the corresponding impacts) would be 9 years shorter under Alternative 5 than under Alternative 4. Reclamation and PMT would be achieved in the project area 9 years earlier than under Alternative 4. Under Alternative 5, coal from the project area would be available for combustion in the Colstrip and Rosebud Power Plants for up to 11 years, which is 9 years fewer as compared to Alternative 4.

4.21.4.1 Mining Private Coal Only Scenario

If Westmoreland Rosebud chose to pursue mining of private coal only (leases 1001 and 1001-A) after 2030, direct and indirect solid and hazardous waste impacts could be greater than those disclosed above for Alternative 5. The intensity of impacts, however, would be no greater than those disclosed for Alternative 4 (see above) and would be expected to be less. See **Section 2.6.2, State Operating Permit C2011003F** for a discussion of the steps that would be required for such a scenario to occur.

4.21.5 Irreversible and Irretrievable Commitment of Resources

There is no irreversible or irretrievable commitment of resources related to solid or hazardous waste because waste is not considered a resource.

4.22 NOISE

This section discloses the direct and indirect noise impacts resulting from implementation of Alternative 1 – No Action, Alternative 4 – Proposed Action (Current Federal Mining Plan), or Alternative 5 – Partial Mining Alternative. Pre-mine noise sources and the analysis areas used for this impacts analysis are described in **Section 3.22, Noise**.

4.22.1 Analysis Methods and Impact and Intensity Thresholds

Noise impacts were evaluated in this SEIS using the same methods used in the 2018 Final EIS. Analysis methods are provided in **Section 4.22.1** of the 2018 Final EIS, beginning on page 630. The thresholds for assessment of noise impacts (negligible, minor, moderate, or major) are the same as those defined in the 2018 Final EIS in **Table 163**. Assumptions for each alternative, which informed the scope of the effects analyses in this SEIS, are presented in **Section 2.4, Alternative 1 – No Action**, **Section 2.5, Alternative 4 – Proposed Action (Current Federal Mining Plan)**, and **Section 2.6, Alternative 5 – Partial Mining Alternative**.

4.22.2 Alternative 1 – No Action

The types of direct and indirect noise impacts under Alternative 1 (as described in this SEIS)[83] would be similar to those described below for Alternative 4 – Proposed Action (Current Federal Mining Plan) but would be limited to a 6-year mine life. In addition, mining would be more limited with only about 17.1 million tons of coal mined from Federal and private leases within a 1,021 acre-disturbance area (**Figure 2.4-1**). Under Alternative 1, about 54 million fewer tons of coal would be mined and approximately 3,267 fewer acres would be disturbed as compared to Alternative 4 (**Table 2.3-1** and **Table 2.3-2**). Mining would be limited to lands east of Donley Creek, with no mining occurring in the Trail Creek, McClure Creek, and Robbie Creek drainages (**Figure 2.4-1**) based on the assumption that all mining would cease in 2025. The life of operations for Area F (and the corresponding impacts) would be 14 years shorter under Alternative 1 than under Alternative 4. Reclamation and PMT would be achieved in the project area 14 years earlier than under Alternative 4. Under Alternative 1, coal from the project area would be available for combustion in the Colstrip and Rosebud Power Plants for up to 6 years, which is 14 years fewer as compared to Alternative 4.

4.22.2.1 Mining Private Coal Only Scenario

If Westmoreland Rosebud chose to pursue mining of private coal only (leases 1001 and 1001-A) after 2025, direct and indirect noise impacts could be greater than those disclosed above for Alternative 1. The intensity of impacts, however, would be no greater than those disclosed for Alternative 4 (see below) and would be expected to be less. See **Section 2.4.2, State Operating Permit C2011003F** for a discussion of the steps that would be required for such a scenario to occur.

4.22.3 Alternative 4 – Proposed Action (Current Federal Mining Plan)

Direct and indirect noise impacts under Alternative 4 – Proposed Action (Current Federal Mining Plan) would be similar to those described for Alternative 2 in **Section 4.22.3** of the 2018 Final EIS, beginning

[83] Direct and indirect noise impacts of Alternative 1 – No Action were described in **Section 4.22.2** of the 2018 Final EIS, beginning on page 630. As described in **Chapter 2** of this SEIS, Alternative 1 – No Action has been revised since the 2018 Final EIS.

on page 631. Under Alternative 4, coal from the project area would be available for combustion in the Colstrip and Rosebud Power Plants for up to 20 years.

4.22.3.1 Direct Impacts

The primary sources of noise from surface coal mining include blasting operations and the excavation and hauling of the coal off-site. For blasting air overpressure (noise level), applicable noise limits are a maximum of 120 dB to minimize human annoyance and 134 dB to protect against damage to residential structures (USDI 1987). For excavating, hauling, and other non-blasting sources, the EPA recommends an outdoor noise limit of 55 dBA (L_{dn}). This corresponds to a limit of 55 dBA during the daytime hours (7 a.m. to 10 p.m.) and 45 dBA during the nighttime hours (10 p.m. to 7 a.m.) (EPA 1974). Because the mining operations are proposed to occur 24 hours per day and 7 days per week, the constraining guideline is 45 dBA. The following describes the expected noise from each operation and the potential noise impacts on the nearest residences in each direction from the site.

Blasting within the project area is expected to occur with similar frequency to what is done in other permit areas, which includes coal blasting one to three days per week and overburden blasting four to six times per month. The 2018 Final EIS noted that a predicted overpressure limit of 120 dB is reached at a distance of 450 feet from blasts in the project area and dissipates to around 88 dB at the nearest residence 2.2 miles away. Thus, only locations within 450 feet of the blasting are predicted to result in any human annoyance as previously described. These predicted levels are considered to be conservatively high because terrain – which impedes noise propagation – was not taken into account. Thus, no air overpressure impacts are expected from blasting in the project area. The noise generated from mining in the project area was predicted for Alternative 2 (and here applied to Alternative 4) at the seven nearest known residential receptors, as well as in Colstrip; the resulting noise impacts, which are considered to be worst case (as described in the 2018 Final EIS), would be minor to negligible at all locations (**Table 4.22-1**). All predicted noise levels are below the nighttime limit of 45 dBA and would be in compliance with EPA guidelines. This result is not unexpected as most receptors are more than 2 miles from the nearest mining activities. For mine workers and equipment operators in proximity to mining noise sources, protective hearing devices would be worn in accordance with MSHA regulations when exposed to loud noise sources. Noise impacts on wildlife are discussed in **Section 4.12, Fish and Wildlife Resources** and **Section 4.13, Special Status Species**.

Table 4.22-1. Predicted Noise Levels from Mining in the Project Area.

Location	Maximum Noise Level (dBA)	Abandoned Property (Yes/No)	Noise Impact and Intensity Threshold
R1	<40 dBA	No	Minor
R2	41 dBA	No	Minor
R3	42 dBA	No	Minor
R4	41 dBA	No	Minor
R5	<30 dBA	Unknown	Negligible
R6	<30 dBA	No	Negligible
R7	<30 dBA	No	Negligible
Colstrip	<30 dBA	N/A	Negligible

4.22.3.2 Indirect Impacts

Indirect noise impacts would include noise from the Colstrip Power Plant (Units 3 and 4) and its associated paste plant, plus the Rosebud Power Plant because coal from the project would be combusted in the power plants. Noise from the Colstrip Power Plant was estimated based on noise measurements

(Hankard 2015) of other power plants and estimations (Bradley 1985). The nearest residences to the Colstrip Power Plant's paste plant are 4 miles west in Colstrip; thus, its noise-level impact is below the intensity threshold and not discussed any further.

The noise from operating Colstrip Power Plant Units 3 and 4 at full capacity is estimated (Bradley 1985) to be 59 dBA at 1,000 feet away. Noise from its associated cooling tower to the west of the plant is estimated at 56 dBA at 1,000 feet. The nearest residences to these two noise sources are in Colstrip about 1,500 feet west of the cooling towers and 2,700 feet from Units 3 and 4. This equates to a total noise level of 54 dBA attributable to the Colstrip Power Plant. A measured level of a similar coal-fired power plant (Hankard 2015) would suggest that this is a reasonable estimate. Based on these estimates, the impact of noise from the Colstrip Power Plant when operating at full capacity would be considered long-term, moderate, and adverse for these nearest Colstrip residences. With regard to the seven residences nearest to the project area (see **Figure 115** in the 2018 Final EIS), estimated Colstrip Power Plant noise levels would be less than 30 dBA because all residences are at least 9 miles from the Colstrip Power Plant. This would be considered a less-than-negligible impact.

The Rosebud Power Plant, which is about 6.5 miles north of the Colstrip Power Plant, is also a consideration for indirect noise impacts. This single unit produces about 42 MW (DEQ Montana 2014), which is estimated to produce about 45 dBA at 1,000 feet. The noise from the associated air-cooled condenser unit is estimated to produce about 52 dBA at 1,000 feet for a total of 53 dBA at 1,000 feet. The nearest residences (R8 to R17) range from 1,000 to 3,500 feet away (**Figure 116** in the 2018 Final EIS), which equates to an estimated noise level range of 42 to 53 dBA. This would correlate to a long-term minor to moderate adverse impact. With regard to the estimated Rosebud Power Plant noise levels at the seven residences nearest to the project area and the city of Colstrip (**Table 4.22-2**), they would all be less than 30 dBA because they are all at least 6 miles from the Rosebud Power Plant. This would be considered a less-than-negligible impact.

Table 4.22-2. Predicted Noise Levels from the Rosebud Power Plant.

Location	Maximum Noise Level (dBA)	Abandoned Property (Yes/No)	Noise Impact and Intensity Threshold
R8	52 dBA	Unknown	Moderate
R9	53 dBA	Unknown	Moderate
R10	49 dBA	Unknown	Moderate
R11	49 dBA	Unknown	Moderate
R12	48 dBA	Unknown	Moderate
R13	46 dBA	Unknown	Moderate
R14	44 dBA	Unknown	Minor
R15	42 dBA	Unknown	Minor
R16	42 dBA	Unknown	Minor
R17	42 dBA	Unknown	Minor

4.22.4 Alternative 5 – Partial Mining Alternative

The types of direct and indirect noise impacts under Alternative 5 would be similar to those described for Alternative 4 – Proposed Action (Current Federal Mining Plan) but would be limited to an 11-year mine life. In addition, mining would be more limited with only about 37.1 million tons of coal mined from Federal and private leases within a 2,495 acre-disturbance area (**Figure 2.4-1**).

Under Alternative 5, about 34 million fewer tons of coal would be mined and approximately 1,793 fewer acres would be disturbed as compared to Alternative 4 (**Table 2.3-1** and **Table 2.3-2**). Mining would be

limited to the southeastern portion of the project area (east of Donley Creek) with no mining occurring in the Trail Creek, McClure Creek, and Robbie Creek drainages (**Figure 2.6-1**) based on the assumption that all mining would cease in 2030. The life of operations for Area F (and the corresponding impacts) would be 9 years shorter under Alternative 5 than under Alternative 4. Reclamation and PMT would be achieved in the project area 9 years earlier than under Alternative 4. Under Alternative 5, coal from the project area would be available for combustion in the Colstrip and Rosebud Power Plants for up to 11 years, which is 9 years fewer as compared to Alternative 4.

4.22.4.1 Mining Private Coal Only Scenario

If Westmoreland Rosebud chose to pursue mining of private coal only (leases 1001 and 1001-A) after 2030, direct and indirect noise impacts could be greater than those disclosed above for Alternative 5. The intensity of impacts, however, would be no greater than those disclosed for Alternative 4 (see above) and would be expected to be less. See **Section 2.6.2, State Operating Permit C2011003F** for a discussion of the steps that would be required for such a scenario to occur.

4.22.5 Irreversible and Irretrievable Commitment of Resources

No irreversible or irretrievable commitment of resources would be associated with noise.

4.23 LAND USE

This section discloses the direct and indirect land use impacts resulting from implementation of Alternative 1 – No Action, Alternative 4 – Proposed Action (Current Federal Mining Plan), or Alternative 5 – Partial Mining Alternative. Pre-mining land uses and the analysis areas used for this impacts analysis are described in **Section 3.23, Land Use**.

4.23.1 Analysis Methods and Impact and Intensity Thresholds

Land use impacts were evaluated in this SEIS using the same methods used in the 2018 Final EIS. Analysis methods are provided in **Section 4.23.1** of the 2018 Final EIS, beginning on page 640. The thresholds for assessment of impacts (negligible, minor, moderate, or major) on land use are the same as those defined in the 2018 Final EIS in **Table 168**. Assumptions for each alternative, which informed the scope of the effects analyses in this SEIS, are presented in **Section 2.4, Alternative 1 – No Action**, **Section 2.5, Alternative 4 – Proposed Action (Current Federal Mining Plan)**, and **Section 2.6, Alternative 5 – Partial Mining Alternative**.

4.23.2 Alternative 1 – No Action Alternative

The types of direct and indirect land use impacts under Alternative 1 (as described in this SEIS)[84] would be similar to those described below for Alternative 4 – Proposed Action (Current Federal Mining Plan). Under Alternative 1, though, direct impacts would be limited to the southeastern portion of the project area (east of Donley Creek) with no mining occurring in the Trail Creek, McClure Creek, and Robbie Creek drainages (**Figure 2.4-1**) based on the assumption that all mining would cease in 2025. Westmoreland Rosebud would not fully utilize Federal coal lease MTM 082186 under Alternative 1. In total, approximately 1,021 acres would be disturbed in the project area over a 6-year mine life that would produce about 17.1 million tons of coal from Federal and private coal leases. Selection of Alternative 1 may require revision of Westmoreland Rosebud's state operating permit C2011003F for the project area. Any revisions needed would be determined by DEQ after review of the Mining Plan Decision Document (MPDD).

Under Alternative 1, direct and indirect land use impacts would be less than under Alternative 4: about 54 million fewer tons of coal would be mined and approximately 3,267 fewer acres (and associated land uses) would be disturbed under Alternative 1 as compared to Alternative 4 (**Table 2.3-1** and **Table 2.3-2**). The life of operations for Area F (and the corresponding impacts) would be 14 years shorter under Alternative 1 than under Alternative 4. Reclamation (including revegetation) and PMT would be achieved in the project area 14 years earlier than under Alternative 4. Therefore, postmining land uses could be commenced 14 years earlier as compared to Alternative 4.

4.23.2.1 Mining Private Coal Only Scenario

If Westmoreland Rosebud chose to pursue mining of private coal only (leases 1001 and 1001-A) after 2025, direct and indirect land use impacts could be greater than those disclosed above for Alternative 1. The intensity of impacts, however, would be no greater than those disclosed for Alternative 4 (see below)

[84] Direct and indirect land use impacts of Alternative 1 – No Action were described in **Section 4.23.2** of the 2018 Final EIS, beginning on page 640. As described in **Chapter 2** of this SEIS, Alternative 1 – No Action has been revised since the 2018 Final EIS.

and would be expected to be less. See **Section 2.4.2, State Operating Permit C2011003F** for a discussion of the steps that would be required for such a scenario to occur.

4.23.3 Alternative 4 – Proposed Action (Current Federal Mining Plan)

Direct and indirect land use impacts under Alternative 4 – Proposed Action (Current Federal Mining Plan) would be similar to those described for Alternative 2 in **Section 4.23.3** of the 2018 Final EIS, beginning on page 640. Under Alternative 4, half a million tons more coal would be mined[85] and approximately 28 acres more would be disturbed as compared to Alternative 2. Reclamation would occur contemporaneously with mining (see discussion of the phases of reclamation in **Section 1.6.4, Bond Release**, in the 2018 Final EIS). Once mining has ceased, reclamation of disturbed areas (up to 4,288 acres) in the project area would occur according to Westmoreland Rosebud's approved reclamation plan (**Figure 2.2-5**) and PMT (**Figure 2.2-6**), which are similar to those described for Alternative 2 in 2018 Final EIS **Section 2.4.4, Reclamation Plan**. Modifications since 2018 are described in **Section 2.2.2.2, Area F Operations and Development**. Under Alternative 4, Westmoreland Rosebud would maximize recovery of coal in the Federal coal lease MTM 082186 (**Table 2.2-7**).

During the life of the operation, use of the lands in the direct effects analysis area would be devoted to mining and associated activities. All pre-mining land uses within the analysis area would be temporarily disturbed during mine operations. Westmoreland Rosebud would grade, apply soil, and seed each mine pass within two years of mining; however, this analysis assesses land uses permitted area-wide and does not consider contemporaneous reclamation that would occur during active mining.

4.23.3.1 Direct Impacts

Because grazing was the pre-mining land use of most of the lands in the direct effects analysis area, livestock grazing by surface landowners (e.g., Booth Land and Livestock Company or Great Northern Properties LP) would be the land use most impacted by mining operations. Under Alternative 4, these land use impacts (loss of grazing land, pastureland, and cropland), which would represent an economic impact to the surface landowners, would occur during mine operations (approximately 20 years) and would extend until the postmining land use, domestic livestock grazing, is achieved through reclamation. To minimize impacts, Westmoreland Rosebud has agreements in place with all Area F surface landowners and coordinates access through the permit areas of the mine with local ranchers (Batie 2025). In addition, there are areas within the permit boundary but outside of current active operations where activities can be safely conducted; in these areas, Westmoreland allows surface owners to continue to use the property for hunting and ranching (Batie 2025). Impacts on grazing land would be long-term, moderate, and adverse. However, after reclamation, Westmoreland Rosebud proposes 3,930 acres of postmining grazing land, which would be an increase of 476 acres over pre-mining conditions, to achieve landowner preference for grazing lands.

Similarly, impacts on cropland and wildlife habitat would occur during the period of active mining and would extend until the postmining land use, cropland, is achieved. During active mining, there would be no cropland or wildlife habitat. Impacts on cropland and wildlife habitat would be long-term, moderate, and adverse. After reclamation, Westmoreland Rosebud proposes 318 acres of cropland, which would be a 32 percent reduction from pre-mine conditions, and 9 acres of wildlife habitat, a 25 percent reduction from pre-mine conditions. Note, however, that all the lands within the project area have a joint land use of

[85] See coal tonnage and disturbance comparison in **Table 2.2-8**. Under Alternative 4, mine passes would not be authorized for 74 acres of Federal coal (about 1.9 million tons of recoverable coal). The 74 acres that would not be mined could still be used for other project-associated surface disturbance, such as overburden or topsoil stockpile locations (**Figure 2.5-1**).

wildlife habitat (see detailed discussion in **Sections 4.12, Fish and Wildlife Resources** and **4.13, Special Status Species**).

Westmoreland Rosebud does not propose pastureland as a postmining land use, so the 516 acres of existing pastureland (primarily used for winter hay) that Westmoreland Rosebud proposes to disturb during mining operations would be permanently converted to grazing land. Impacts on pastureland would be long-term, major, and adverse. However, Westmoreland Rosebud and the respective landowners previously agreed on the change in land use based on the landowners' preference for additional grazing land over cropland.

Other Land Uses

There would be no impacts on forestry or residential land uses as a result of the Proposed Action.

Impacts on developed water resources (i.e., stock ponds) located within the area of disturbance in the project area are discussed in **Section 4.9, Water Resources – Water Rights**.

Industrial or commercial uses would be relatively unaffected. Westmoreland Rosebud would mine around the 230-kV high-voltage transmission line owned by Mid-Yellowstone that bisects the southern portion of the project area, leaving a 300-foot buffer (**Figure 2.5-1** in **Chapter 2**). Likewise, Westmoreland Rosebud would mine around the 1.4 miles of a 12-inch underground natural gas transmission pipeline owned and operated by Westmoreland Power, Inc. in the northern portion of the project area. About 10 miles of 7.2-kV distribution lines within the project area would be relocated (see **Section 2.4.3.3, Utility Corridors in Proposed Permit Area**). To accommodate the proposed mining plan, Westmoreland Rosebud would relocate the Horse Creek Road (**Figure 2.5-1** in **Chapter 2**). There would be a temporary disturbance to local traffic during road construction (**Section 4.20, Access and Transportation**). Impacts on recreation land uses are discussed in **Section 4.18, Recreation**. Impacts on these other land uses would be short-term, minor, and adverse.

Adjacent Land Uses

Adjacent land use during mine operations would be affected to some extent; these impacts are described in **Sections 4.17, Visual Resources** and **4.22, Noise**. There would be no impacts on land uses in and immediately surrounding Colstrip.

4.23.3.2 Indirect Impacts

Alternative 4 would not create unplanned development or present the potential to open up new off-site areas for development. Alternative 4 would not create improved access to real estate, reduce development restrictions, or substantially induce new development in unanticipated areas. Therefore, there would be no indirect impacts on land use associated with Alternative 4.

4.23.4 Alternative 5 – Partial Mining Alternative

The types of direct and indirect land use impacts under Alternative 5 – Partial Mining Alternative would be similar to those described above for Alternative 4 – Proposed Action (Current Federal Mining Plan). Under Alternative 5, though, direct impacts would be limited to the southeastern portion of the project area (east of Donley Creek) with no mining occurring in the Trail Creek, McClure Creek, and Robbie Creek drainages (**Figure 2.6-1**) based on the assumption that all mining would cease in 2030. Westmoreland Rosebud would not fully utilize Federal coal lease MTM 082186 under Alternative 5. In total, approximately 2,495 acres would be disturbed in the project area over an 11-year mine life that

would produce about 37.1 million tons of coal from Federal and private coal leases. Selection of Alternative 5 may require revision of Westmoreland Rosebud's state operating permit C2011003F for the project area. Any revisions needed would be determined by DEQ after review of the MPDD.

Under Alternative 5, direct and indirect land use impacts would be less than under Alternative 4. About 34 million fewer tons of coal would be mined and approximately 1,793 fewer acres (and associated land uses) would be disturbed under Alternative 5 as compared to Alternative 4 (**Table 2.3-1** and **Table 2.3-2**). The life of operations for Area F (and the corresponding impacts) would be 9 years shorter under Alternative 5 than under Alternative 4. Reclamation (including revegetation) and PMT would be achieved in the project area 9 years earlier than under Alternative 4. Therefore, postmining land uses could be commenced 9 years earlier as compared to Alternative 4.

4.23.4.1 Mining Private Coal Only Scenario

If Westmoreland Rosebud chose to pursue mining of private coal only (leases 1001 and 1001-A) after 2030, direct and indirect land use impacts could be greater than those disclosed above for Alternative 5. The intensity of impacts, however, would be no greater than those disclosed for Alternative 4 (see above) and would be expected to be less. See **Section 2.6.2, State Operating Permit C2011003F** for a discussion of the steps that would be required for such a scenario to occur.

4.23.5 Irreversible and Irretrievable Commitment of Resources

Grazing and cropland production on mine-related disturbance areas within the project area would be lost until revegetation and forage production are comparable to pre-mining levels associated with adjacent land. These resources would be irretrievably affected. Westmoreland Rosebud does not propose pastureland as a postmining land use, so the 516 acres of pre-mine pastureland that Westmoreland Rosebud proposes to disturb during mining operations would be permanently converted to grazing land.

4.24 SOIL

This section discloses the direct and indirect soil impacts resulting from implementation of Alternative 1 – No Action, Alternative 4 – Proposed Action (Current Federal Mining Plan), or Alternative 5 – Partial Mining Alternative. Pre-mining soil conditions and the analysis areas used for this impacts analysis are described in **Section 3.24, Soil**.

4.24.1 Analysis Methods and Impact and Intensity Thresholds

Soil impacts were evaluated in this SEIS using the same methods used in the 2018 Final EIS. Analysis methods are provided in **Section 4.24.1** of the 2018 Final EIS, beginning on page 643. The thresholds for assessment of impacts (negligible, minor, moderate, or major) on soil are the same as those defined in the 2018 Final EIS in **Table 170**. Assumptions for each alternative, which informed the scope of the effects analyses in this SEIS, are presented in **Section 2.4, Alternative 1 – No Action**, **Section 2.5, Alternative 4 – Proposed Action (Current Federal Mining Plan)**, and **Section 2.6, Alternative 5 – Partial Mining Alternative**.

4.24.2 Alternative 1 – No Action

The types of direct and indirect soil impacts under Alternative 1 (as described in this SEIS)[86] would be similar to those described below for Alternative 4 – Proposed Action (Current Federal Mining Plan). Under Alternative 1, though, direct impacts would be limited to the southeastern portion of the project area (east of Donley Creek) with no mining occurring in the Trail Creek, McClure Creek, and Robbie Creek drainages (**Figure 2.4-1**) based on the assumption that all mining would cease in 2025. In total, approximately 1,021 acres would be disturbed in the project area over a 6-year mine life that would produce about 17.1 million tons of coal from Federal and private coal leases.

Under Alternative 1, direct and indirect soil impacts would be less than under Alternative 4: about 54 million fewer tons of coal would be mined and approximately 3,267 fewer acres (and associated vegetation) would be disturbed under Alternative 1 as compared to Alternative 4 (**Table 2.3-1** and **Table 2.3-2**). With fewer acres disturbed, the potential for erosion and sediment transport would be less under Alternative 1 than under Alternative 4. As with Alternative 4, erosion impacts on soil resources would be short-term, minor, and adverse, and would return to pre-mine erosion rates within 2 years once vegetation stabilizes the surface. The life of operations for Area F (and the corresponding impacts) would be 14 years shorter under Alternative 1 than under Alternative 4. Reclamation (including application of stockpiled soils and revegetation) as well as the PMT would be achieved in the project area 14 years earlier than under Alternative 4. With shorter stockpile times, changes to the physical, chemical, and biological properties of stockpiled soils would be less likely under Alternative 1 than under Alternative 4. As with Alternative 4, those impacts on physical, chemical, and biological soil characteristics that would occur would be long-term, minor, and adverse. It would be many years before these soil characteristics return to pre-mine conditions.

The continued combustion of coal at the Rosebud and Colstrip Power Plants contributes trace metals, such as mercury, as well as SO_2 and NO_2 to the air, which are then deposited into analysis area soils. Under Alternative 1, coal from the project area would be available for combustion in the Colstrip and Rosebud Power Plants for up to 6 years, which is 14 years fewer as compared to Alternative 4. Therefore, fewer trace metals, SO_2, and NO_2 would be deposited in analysis area soils. As with Alternative 4, soil

[86] Direct and indirect soil impacts of Alternative 1 – No Action were described in **Section 4.24.2** of the 2018 Final EIS, beginning on page 644. As described in **Chapter 2** of this SEIS, Alternative 1 – No Action has been revised since the 2018 Final EIS.

resources at a distance less than 12.6 km from the Colstrip Power Plant may experience long-term, minor, and adverse impacts due to trace metal deposition. Beyond that distance, the impact likely would be negligible. As with Alternative 4, indirect impacts on acidic soil would be long-term, minor, and adverse.

4.24.2.1 Mining Private Coal Only Scenario

If Westmoreland Rosebud chose to pursue mining of private coal only (leases 1001 and 1001-A) after 2025, direct and indirect soil impacts could be greater than those disclosed above for Alternative 1. The intensity of impacts, however, would be no greater than those disclosed for Alternative 4 (see below) and would be expected to be less. See **Section 2.4.2, State Operating Permit C2011003F** for a discussion of the steps that would be required for such a scenario to occur.

4.24.3 Alternative 4 – Proposed Action (Current Federal Mining Plan)

Direct and indirect soil impacts under Alternative 4 – Proposed Action (Current Federal Mining Plan) would be similar to those described for Alternative 2 in **Section 4.24.3** of the 2018 Final EIS, beginning on page 644. Under Alternative 4, half a million tons more coal would be mined[87] and approximately 28 acres more would be disturbed as compared to Alternative 2. Reclamation would occur contemporaneously with mining (see discussion of the phases of reclamation in **Section 1.6.4, Bond Release**, in the 2018 Final EIS). Once mining has ceased, reclamation of disturbed areas (up to 4,288 acres) in the project area would occur according to Westmoreland Rosebud's approved reclamation plan (**Figure 2.2-5**) and PMT (**Figure 2.2-6**), which are similar to those described for Alternative 2 in 2018 Final EIS **Section 2.4.4, Reclamation Plan**. Modifications since 2018 are described in **Section 2.2.2.2, Area F Operations and Development**.

4.24.3.1 Direct Impacts

Under Alternative 4, 4,288 acres would be disturbed by mining operations in the project area. Impacts on soil in the disturbance area would determine, in part, the potential success of reclaiming the land to postmining uses. Western Rosebud's reclamation plan (see **Section 2.4.4, Reclamation Plan** in the 2018 Final EIS) and measures to control on-site erosion and sediment transport (see **Section 2.4.5.2, Surface Water Management and Sediment-Control Measures** in the 2018 Final EIS) would mitigate some disturbance impacts and increase reclamation success; however, some direct effects, which are typical of any operation where soil is removed, would persist.

Some of the soil from the project area disturbance would be direct-hauled, and the rest would be stored and then later respread. Direct impacts on soil would include:

- Soil erosion in disturbed areas and of salvageable soil through handling
- Changes in physical, chemical, and biological characteristics of soil from salvage, storage, and respreading (leading to reduced soil productivity and decreased soil development)

Soil Erosion

Areas cleared of vegetation would be susceptible to soil erosion from wind and water. Erosion of soil would also occur as a result of soil removal and storage during mine operations and soil exposure during respreading and stabilization. Soil erosion caused by wind and water likely would occur during all phases

87. See coal tonnage and disturbance comparison in **Table 2.2-8**. Under Alternative 4, mine passes would not be authorized for 74 acres of Federal coal (about 1.9 million tons of recoverable coal). The 74 acres that would not be mined could still be used for other project-associated surface disturbance, such as overburden or topsoil stockpile locations (**Figure 2.5-1**).

of the project. Soil erosion on disturbed areas would likely occur until vegetation is established and surfaces are protected from erosive forces. Based on modeled sediment rates at 75 drainages in Areas A, B, C, D, and E at the Rosebud Mine, pre-mining average annual sediment yields range from 0.002 to 2.34 tons/acre/year with a mean of 0.24 tons/acre/year. Once vegetation reaches 60 to 80 percent canopy cover, average annual sediment yields would range from 0 to 2.01 tons/acre/year with a mean of 0.065 tons/acre/year (Sjolund 2015a). It typically takes about 2 years for vegetation (much of which consists of annual plants) on reclaimed sites to provide a sufficient canopy cover to protect the soil from accelerated erosion (Sjolund 2015b). Some areas such as steep slopes – especially south- and west-facing slopes – may require more time for the ground cover to stabilize reclaimed areas. Westmoreland Rosebud is required under MSUMRA (ARM 17.24.723) to monitor vegetation success in reclaimed areas for a minimum of 10 growing seasons to ensure production, cover, and density meet the approved success standards and that a stable landscape has been established consistent with the approved postmining land use (see **Section 2.4.7.4, Revegetation Monitoring Plan** in the 2018 Final EIS). Erosion impacts on soil resources would be short-term, minor, and adverse, and would return to pre-mine erosion rates within 2 years once vegetation stabilizes the surface.

Sediment

Existing sediment yield to drainages within the analysis area was estimated by the USDA WEPP, and postmining sediment yield to drainages within the analysis area was estimated by SEDCAD (see **Section 4.7, Water Resources – Surface Water** in the 2018 Final EIS). Existing annual sediment yields ranged from 0 to 0.871 tons/acre/year and ranged from 0.001 to 0.18 tons/acre/year for postmining conditions once vegetation cover reaches 80 percent. The model estimated that postmining sediment yield would increase in some drainage basins within the direct effects analysis area and decrease in other drainage basins (see **Section 4.7, Water Resources – Surface Water** for discussion of sediment yield in drainage basins).

Other direct effects on soil resources include the potential for sediment to be transported off-site and to impact off-site resources. In general, the larger the disturbance, the greater the potential for soil erosion. This effect would be unlikely because runoff would be directed to sediment storage structures, but it could occur during very heavy storm events where disturbances are unprotected. Approximate disturbances resulting from Alternative 4 encompass 4,288 acres (**Figure 2.5-1**). The disturbance acres would include the mining areas, stockpile areas, scoria pits, haul roads, haul-road ramps, proposed overhead power line, proposed shoefly (high-voltage line), and relocation alignment of Horse Creek Road.

Changes to Physical, Chemical, and Biological Soil Characteristics

Soil characteristics that would be impacted by Alternative 4 include physical and chemical properties and soil biota. Loss of soil structure through mechanical handling followed by tillage to relieve compaction would alter the native soil profile. This soil handling would adversely affect soil/plant interaction due to decreased soil water-holding capacity, loss of aeration and pore space, and increased bulk density (Sharma and Doll 1996). Soil compaction, loss of soil structure, and loss of organic matter due to mixing and storage could lower postmining vegetation vigor and diversity for an extended period of time. Developing root systems, infiltration of biota, climate, and physical processes such as freezing/thawing cycles would restart the soil-forming process and help establish a new natural soil profile over time. However, this process would require decades.

Chemical effects occur in soil stockpiled for prolonged periods. Degradation of chemical properties may include changes in available nutrients, accumulation of ammonium, and the loss of organic carbon through heat and leaching. When the input of organic matter ceases, there is a reduction or loss of nutrient

levels (Strohmayer 1999). Changes in biological properties also occur in soil that is stored for prolonged periods – most importantly the loss of soil microorganisms such as mycorrhizal fungi (Abdul-Kareem and McRae 1984). Many plants depend on mycorrhizae, which are important structures that develop when certain fungi and plant roots form a mutually beneficial relationship. They are of great importance to phosphorus nutrition and water uptake in plants (Skujins and Allen 1986). The association of mycorrhizae with plants in southeastern Montana is especially critical because of the semiarid climate and naturally low plant-available phosphorus levels in soil (Muir 1971). The loss of microorganisms in soil stored for prolonged periods could lower plant diversity and vigor, but eventually mycorrhizae would invade reclaimed soil (within a few years to more than a decade, depending on soil conditions). Mycorrhizae seem to be sensitive to soil properties such as organic matter, salts, structure, and water-holding capacity, so when respread soil conditions start improving, mycorrhizae would colonize more quickly. Impacts on physical, chemical, and biological soil characteristics would be long-term, minor, and adverse. It would be many years before these soil characteristics return to pre-mine conditions.

4.24.3.2 Indirect Impacts

Trace-Metal Deposition

Modeling for trace metal deposition from the Colstrip and Rosebud Power Plants due to combustion of Area F coal was conducted for Alternative 2 in the 2018 Final EIS; the results are applied here for Alternative 4, as the alternatives are substantially similar and only differ due to on-the-ground and operational changes that necessitated minor revisions as Area F has been developed.

Table 4.24-1 and **Table 4.24-2** show the predicted maximum deposition over the Area F operations period for each trace metal and the total expected concentration for each trace metal (background plus the maximum deposition). For all trace metals (those having sufficient data to derive screening levels), the background concentration plus the maximum deposition over the Area F period of operations is less than the plant and soil invertebrate soil screening levels (SSLs), except for selenium (for plant SSL only). This implies that the increase in soil metal concentrations due to combustion of project area coal over the Area F period of operations would not affect plants and soil invertebrates, except selenium could have an adverse impact on plants. Given that the Eco-SSLs are conservative and the selenium SSL for plants is lower than the selenium 95th percentile of background in typical U.S. soil, and, given the low selenium levels found in project area soil at a distance less than 12.6 km from the Colstrip Power Plant, selenium may have a long-term, minor, and adverse impact on plants and soil resources. Beyond that distance, the impact likely would be negligible.

Table 4.24-1 and **Table 4.24-2** also show the total concentration limits, or total original concentrations, of a solid at which the EPA would require a Toxicity Characteristic Leaching Procedure (TCLP) test (Method 1311, Section 1.2) (EPA 1992). TCLP is an analytical test to determine the mobility of metals in a solid (e.g., soil), and if the solid meets the definition of the EPA toxicity level for solid waste (40 C.F.R. part 261.24).

Table 4.24-1. Alternative 2 Modeling for Trace Metal Background, Total Concentrations, and Eco-SSLs for Plants.

Analyte	Background – 95 Percent UCL	Maximum Deposition over 19-Year Operations Period[1]	Total Expected Concentration (Background + Total Deposition)	EPA Limit for Solid Waste Test	Eco-SSL for Plants	Percentage of Deposition Relative to Background	Percentage of Deposition Relative to Plant Eco-SSL	Does Deposition + Background Exceed the Plant Eco-SSL? (Yes/No)
	mg/kg, DW	mg/kg, DW	mg/kg, DW	mg/kg	mg/kg, DW	Percent	Percent	
Antimony	0.9	0.005	0.905	None	NA	0.56	NA	No
Arsenic	10.9	0.007	10.907	100	18	0.06	0.04	No
Cadmium	0.3	0.002	0.302	20	32	0.63	0.01	No
Chromium	50.5	0.018	50.518	100	NA	0.03	NA	No
Copper	17.8	0.081	17.881	None	70	0.46	0.12	No
Lead	19.1	0.008	19.108	100	120	0.04	0.01	No
Mercury	0.023	0.001	0.024	4	0.3	3.70	0.28	No
Selenium	0.56	0.032	0.592	20	0.52	5.60	6.10	Yes

NA = Not available. Insufficient data to derive Eco-SSLs. DW = Dry weight.
[1.] Assumes an untilled soil mixing depth of 2 centimeters and a soil dry-bulk density of 1.5 g/cm^3 as recommended by EPA (2005).

Table 4.24-2. Alternative 2 Trace Metal Background, Total Concentrations, and Eco-SSLs for Soil Invertebrates.

Analyte	Background – 95 Percent UCL	Maximum Deposition over 19-Year Operations Period[1]	Total Expected Concentration (Background + Total Deposition)	EPA Limit for Solid Waste Test	Eco-SSL for Soil Invertebrates	Percentage of Deposition Relative to Background	Percentage of Deposition Relative to Soil Invertebrates Eco-SSL	Does Deposition + Background Exceed the Soil Invertebrates Eco-SSL? (Yes/No)
	mg/kg, DW	mg/kg, DW	mg/kg, DW	mg/kg	mg/kg, DW	Percent	Percent	
Antimony	0.9	0.005	0.905	None	78	0.56	1.2	No
Arsenic	10.9	0.007	10.907	100	NA	0.06	NA	No
Cadmium	0.3	0.002	0.302	20	140	0.63	0.2	No
Chromium	50.5	0.018	50.518	100	NA	0.03	NA	No
Copper	17.8	0.081	17.881	None	80	0.46	22.4	No
Lead	19.1	0.008	19.108	100	1,700	0.04	1.1	No
Mercury	0.023	0.001	0.024	4	0.1	3.70	23.9	No
Selenium	0.56	0.032	0.592	20	4.1	5.60	14.5	No

NA = Not available. Insufficient data to derive Eco-SSLs. DW = Dry weight.
[1.] Assumes an untilled soil mixing depth of 2 centimeters and a soil dry-bulk density of 1.5 g/cm^3 as recommended by EPA (2005).

Sulfur Dioxide and Nitrogen Oxide Deposition

Sulfur and nitrogen oxides (SO_2 and NO_2) emitted from the combustion of coal can be converted into acids (sulfuric acid and nitric acid) in the atmosphere through oxidation and can then return to earth as components of rain and snow. Acidification of the soil through acid deposition can impact microorganisms, leach soil nutrients, and cause aluminum toxicity to plants (Air-quality.org 2017). In turn, this can reduce vegetation vigor and cover, which can increase erosion. Soil that is more alkaline, however, does not suffer the effects from acid deposition as does more acidic soil, because the soil alkalinity buffers the acid rain by neutralizing the acidity in the water flowing through it. This capacity depends on the thickness and chemistry of the soil and the type of bedrock underneath it. In soil with pH conditions above 4.5, and in areas where precipitation is relatively low as in the analysis area, the effects on soil from acid deposition are likely minimal (Air-quality.org 2017).

The soil surface layers in the project area are typically neutral to slightly alkaline (pH 6.6 to 7.8), and the subsoil is typically slightly alkaline to strongly alkaline (pH 7.4 to 9.0) (PAP, Appendix G). In addition, the soil surface layers within the indirect effects analysis area are typically neutral to strongly alkaline, and the subsoil is slightly to strongly alkaline (USDA-SCS 1967, 1975, and 1977). This soil has a capacity to neutralize acid deposition. Given this acid-neutralizing capacity, the relatively low precipitation (15.17 inches annually at Colstrip), the relatively short period of combustion of project area coal (19 years), and the low concentrations modeled of SO_2 and NO_2, which are well below the NAAQS and MAAQS (see **Section 4.3.3.2, Indirect Impacts of Coal Combustion**), impacts on soil within the indirect effects analysis area from acid deposition would be long-term, minor, and adverse.

Given the long-range transport of these gases, however, areas outside the indirect effects analysis area that contain acidic soils could also be impacted by acid deposition (see **Section 3.3.1.2, Air Quality** in the 2018 Final EIS for a discussion of transport distances). Soil derived from granitic rocks, such as granite and metamorphic rocks derived from granitic parent rocks, is typically acidic and lacks or has little buffering capacity, and therefore is more vulnerable to acidification (Ecological Society of America 2000). These rocks do not occur in the analysis area, but they occur in mountainous areas in Wyoming and western Montana. Based on the low concentrations of these gases modeled, impacts on acidic soil also would be long-term, minor, and adverse.

Hazardous Waste

A potential indirect effect on soil resources is from oil and gas spills and releases related to project operations that could occur in other permit areas of the Rosebud Mine. There have not been any known significant hazardous waste releases at the Rosebud Mine in the past, but there have been occasional small oil and gas releases from seal ruptures on large equipment or from overfilling vehicles at fuel islands (see discussion in the 2018 Final EIS). If minor oil and gas releases or spills occur in undisturbed or reclaimed soil, the impact would be short-term, minor, and adverse. Depending on the characteristics of the released constituent, a major release on undisturbed land could require removing a significant volume of at least the more productive surface soil layer, which would require decades to return to natural productivity. Major releases on undisturbed or reclaimed land, although much less likely than on fueling islands and road surfaces, would have long-term, moderate, and adverse impacts on soil resources.

4.24.4 Alternative 5 – Partial Mining Alternative

The types of direct and indirect soil impacts under Alternative 5 – Partial Mining Alternative would be similar to those described above for Alternative 4 – Proposed Action (Current Federal Mining Plan). Under Alternative 5, though, direct impacts would be limited to the southeastern portion of the project

area (east of Donley Creek) with no mining occurring in the Trail Creek, McClure Creek, and Robbie Creek drainages (**Figure 2.6-1**) based on the assumption that all mining would cease by 2030. In total, approximately 2,495 acres would be disturbed in the project area over an 11-year mine life that would produce about 37.1 million tons of coal from Federal and private coal leases.

Under Alternative 5, direct and indirect soil impacts would be less than under Alternative 4. About 34 million fewer tons of coal would be mined and approximately 1,793 fewer acres (and associated vegetation) would be disturbed under Alternative 5 as compared to Alternative 4 (**Table 2.3-1** and **Table 2.3-2**). With fewer acres disturbed, the potential for erosion and sediment transport would be less under Alternative 1 than under Alternative 4. As with Alternative 4, erosion impacts on soil resources would be short-term, minor, and adverse, and would return to pre-mining erosion rates within 2 years once vegetation stabilizes the surface. The life of operations for Area F (and the corresponding impacts) would be 9 years shorter under Alternative 5 than under Alternative 4. Reclamation (including application of stockpiled soils and revegetation) as well as the PMT would be achieved in the project area 9 years earlier than under Alternative 4. With shorter stockpile times, changes to the physical, chemical, and biological properties of stockpiled soils would be less likely under Alternative 5 than under Alternative 4. As with Alternative 4, those impacts on physical, chemical, and biological soil characteristics that would occur would be long-term, minor, and adverse. It would be many years before these soil characteristics return to pre-mine conditions.

The continued combustion of coal at the Rosebud and Colstrip Power Plants contributes trace metals, such as mercury, as well as SO_2 and NO_2 to the air, which are then deposited into analysis area soils. Under Alternative 5, coal from the project area would be available for combustion in the Colstrip and Rosebud Power Plants for up to 11 years, which is 9 years fewer as compared to Alternative 4. As with Alternative 4, soil resources at a distance less than 12.6 km from the Colstrip Power Plant may experience long-term, minor, and adverse impacts due to trace metal deposition. Beyond that distance, the impact likely would be negligible. As with Alternative 4, indirect impacts on acidic soil would be long-term, minor, and adverse.

4.24.4.1 Mining Private Coal Only Scenario

If Westmoreland Rosebud chose to pursue mining of private coal only (leases 1001 and 1001-A) after 2030, direct and indirect soil impacts could be greater than those disclosed above for Alternative 5. The intensity of impacts, however, would be no greater than those disclosed for Alternative 4 (see above) and would be expected to be less. See **Section 2.6.2, State Operating Permit C2011003F** for a discussion of the steps that would be required for such a scenario to occur.

4.24.5 Irreversible and Irretrievable Commitment of Resources

Some soil would be irreversibly lost under all alternatives during soil removal and storage, construction and operation of the mine, and reclamation prior to the reestablishment of vegetation. Under all alternatives, soil productivity would be irreversibly lost because the Lift 1 soil materials would consist of a mix of topsoil and subsoil. Altering the soil profile would deteriorate soil structure and mix more-fertile topsoil with less-fertile subsoil, which would leave less productive soil in the root zone. Granular soil structure, which occurs mainly in the surface layer, increases water and air movement in the soil; its loss would reduce water and air movement. It would take many years for soil magnified in reclaimed areas where respread soil consists of a single-lift salvage of the upper 24 inches (the tree soil salvage class; see **Section 3.24, Soil** in the 2018 Final EIS). Irreversible effects on soil productivity would also result from prolonged soil storage in stockpiles and at disturbances that would not be reclaimed until the end of mine life, such as haul roads. These irreversible effects on soil productivity would take many years to return to pre-mine productivity levels. Under Alternative 4, approximately 2.9 acres of soil productivity would be

irreversibly lost due to the realignment of Horse Creek Road, which would remain after mine closure. In addition, approximately 3.78 acres of wetland soil would be permanently lost under this alternative.

As described above, any irreversible and irretrievable effects would be less under Alternatives 1 and 5 than under Alternative 4.

CHAPTER 5. CUMULATIVE IMPACTS

5.1 INTRODUCTION

The National Environmental Policy Act (NEPA) (described in **Chapter 1**) requires Federal agencies to examine and disclose to the public the potential impacts on the human environment of proposed projects or activities that require state or Federal approval but does not explicitly require a cumulative effects analysis, which was instead a requirement stemming from Council on Environmental Quality (CEQ) regulations that are no longer in effect. Direct and indirect impacts are presented in **Chapter 4**. There is currently no statutory or regulatory requirement for the Office of Surface Mining Reclamation and Enforcement (OSMRE) to include a cumulative impacts discussion or an analysis of the environmental effects of activities separate in time or place from an agency's proposed action in any NEPA analysis.

Nonetheless, this chapter was drafted to address the deficiencies identified in the September 30, 2022, court order (see **Section 1.1, Introduction**). It discloses and analyzes the cumulative effects that may result from selection and implementation of the alternatives described in **Chapter 2** of this Supplemental Environmental Impact Statement (SEIS) and other actions in the vicinity that are occurring, have occurred, or will occur. Impacts analyses and conclusions in this SEIS were based on the review of existing literature and studies, information provided by resource specialists and other agencies, professional judgment, agency staff insights, and public input; resource-specific analysis methodologies are provided in the introductions to each resource section. However, as explained in more detail in the Executive Summary, subsequent changes to the CEQ and U.S. Department of the Interior (DOI) NEPA regulations and the United States Supreme Court's recent decision in *Seven County Infrastructure Coalition v. Eagle County, Colorado*, 145 S. Ct. 1497 (2025) (*Seven County*) make it unlikely that such analysis is required.

5.2 RELATED PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS

In general, the related past, present, and reasonably foreseeable future actions are similar to those described in Chapter 5 of the 2018 Final EIS, beginning on page 654. **Table 5.2-1** summarizes the past, present, and reasonably foreseeable future actions that were considered in the SEIS cumulative effects analyses and the corresponding resources they have the potential to affect. Key changes since the 2018 Final EIS include the retirement of Units 1 and 2 of the Colstrip Power Plant in 2020, decreased production at Montana coal mines (due to market conditions and mine closure), new and future renewable energy projects in the vicinity of Colstrip, the Bureau of Land Management (BLM) issuance of the *Miles City Field Office Final Supplemental Environmental Impact Statement and Resource Management Plan Amendment* in 2024 (BLM 2024a), and BLM's recent announcement that it is reevaluating the *Miles City Field Office Final Supplemental Environmental Impact Statement and Resource Management Plan Amendment*.

The general analysis area considered for cumulative effects analyses is shown on **Figure 5.2-1**; some resources, though, such as surface water (**Figure 3.7-2**), socioeconomics (**Figure 3.15-1**), special status species (**Figure 3.13-3**), and air quality considered a larger geographic analysis area. For air quality, please see the description of modeling in the 2018 Final EIS (**Section 3.2, Air Quality** and **Appendix D-6** in that document) because the list of actions below does not cover all actions used in air quality modeling for cumulative effects.

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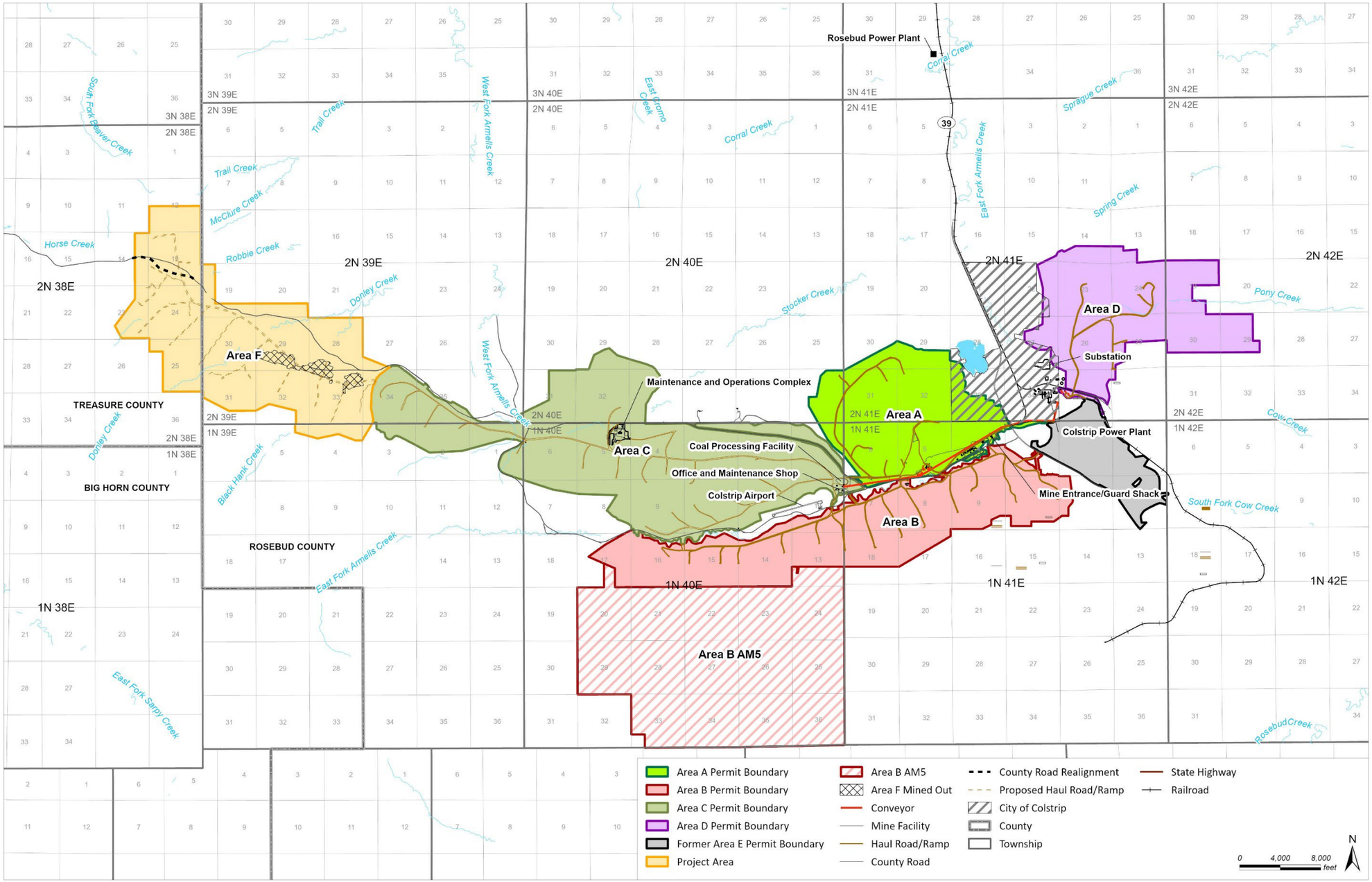

Figure 5.2-1. General Area of Cumulative Impacts and Contributing Actions.

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Table 5.2-1. Key Past, Present, and Reasonably Foreseeable Future Actions.

Action	Type of Action	Past, Present, or Reasonably Foreseeable Future Action (RFA)	Action Description	Impacted Resources
Agriculture	Private	Past and present	The project area and surrounding areas have been used for agricultural purposes – particularly stock watering and grazing – for decades and continue to be used in this manner. Agriculture has historically had and continues to have a substantial effect on land and water use in the three drainages surrounding the project area. Continuous strips of irrigated farmland border the Rosebud Creek, Armells Creek, and Sarpy Creek drainages (**Figure 3.7-2**), with extensive dryland areas between the drainages used primarily for grazing. The source of water for irrigation is predominantly surface water. According to U.S. Department of Agriculture (USDA) 2015 statistics, the largest portion of irrigated farmland is used for hay production, with barley and sugar beets as additional crops (USDA 2015). Irrigated acreage accounts for approximately 1 percent of the land in the Rosebud, Armells, and Sarpy Creek watersheds (Montana Department of Natural Resources and Conservation 2016). Agricultural operations are expected to continue for the reasonably foreseeable future. Agricultural water uses are discussed below in this table under "Water uses and discharges."	Land Use Water Resources Special Status Species
Alternative energy and transmission development and infrastructure	Private	Past, present, or RFA.	The Clearwater Wind project was developed by NextEra Energy Resources in conjunction with Orion Renewable Energy Group in the southeastern counties of Rosebud, Custer, and Garfield and began its operation in November 2022. It has the capacity to produce up to 750 megawatts, contributing to Montana's expanding renewable energy production. However, as renewables projects are developed across the state, more transmission capacity will be needed to export energy and distribute it locally. Westmoreland Rosebud is building a transmission line project to provide increased power transmission capacity through connections to existing transmission lines in the area. A section of the Clearwater to Colstrip Transmission Line Project (Clearwater Project) includes a 500 kV transmission line that crosses in a general north-south orientation near the western edge of Permit Area D for approximately 1.7 miles. The Montana Department of Environmental Quality (DEQ) prepared an Environmental Assessment (EA) to disclose potential impacts that would result from the proposed major permit revision (TR2) to the Area D permit and alternative actions in 2021. DEQ issued written findings approving TR2 in November 2021, allowing a change to the postmining land use for approximately 111 acres in Sections 15, 22, and 27 of T2N, R41E from grazing to industrial to facilitate siting of the Clearwater Project (DEQ 2021). Grid United is proposing the development of a power transmission line, North Plains Connector, that would bridge the Eastern and Western energy grids by running power lines between Colstrip substation and Center, North Dakota. The line would total 415 miles of high voltage and would increase the potential for energy generation and the availability of power in Montana. A joint NEPA/MEPA analysis is expected to be completed in 2024 or 2025 for this project by the U.S. Department of Energy and DEQ. The Northern Cheyenne Tribe is actively exploring commercial-scale wind and solar projects on their reservation, developing a community solar project (a Reservation-scale electrical micro-grid), and improving residential and community energy efficiency (Small 2024).	All analysis resources
Airport	Private	Past, present, and RFA	Rosebud County owns and operates a small public airfield located between Areas B and C of the Rosebud Mine (about 3 miles southwest of Colstrip). The airfield, which is identified as M46 by the Federal Aviation Administration, has operated since 1990 and has two runways open daily from sunrise to sunset. Eleven single-engine aircraft are based at the airfield. The airfield averages 62 flights per week (Airnav.com 2014). The M46 airfield is expected to continue to operate for the reasonably foreseeable future.	Noise
Air emissions and associated land uses/disturbance: **Colstrip Power Plant**	Private	Past, present, and RFA	Detailed information about past and present operations of the Colstrip Power Plant is provided in **Chapter 1** in **Section 1.2.2, Coal Combustion**. The Colstrip Power Plant is located within the city of Colstrip and currently is operated by Talen Energy. Units 1 and 2, which each have 307 megawatts (MW) of generating capacity, were constructed in 1972 and operating since 1975 and 1976, respectively; they were retired from use on January 2, 2020, and January 3, 2020, respectively. Units 3 and 4, which each have about 740 MW of generating capacity, started operating in 1984 and 1986, respectively, and are anticipated to operate through at least 2042. Combustion of Area F coal in Units 3 and 4 is analyzed as an indirect effect by resource (as applicable) in **Chapter 4**. The Colstrip Power Plant and the operations of its associated facilities (paste plant, ponds, etc.) are governed by a certificate issued by DEQ under the Major Facility Siting Act, Section 75-20-101, Montana Code Annotated *et seq*. In recent years, the Rosebud Mine has delivered between about 5.5 million tons and 7.1 million tons of coal to the Colstrip Power Plant primarily by a covered conveyor system and a small amount by truck. The Colstrip Power Plant currently exclusively uses coal from the Rosebud Mine; in 2023, coal combusted in Units 3 and 4 came from Area F (the project area) and Area B. Emissions from the Colstrip Power Plant, which is a major source pursuant to Title V, are regulated by the applicable requirements outlined in Title V operating permit OP0513-18 and Montana Air Quality Permit (MAQP) #0513-16. Current and historic emissions for criteria air pollutants (CAPs) and hazardous air pollutants (HAPs) are provided in **Table 3.3-2** through **Table 3.3-6**; modeled combustion impacts, including cumulative impacts, are discussed in **Section 4.3.3.2, Indirect Impacts of Coal Combustion**. As detailed in **Appendix 4**, operations of the Colstrip Power Plant and the Rosebud Power Plant (combined) support 361 local jobs and $403 million in annual economic output (BBC 2024b).	All analysis resources

Table 5.2-1. Key Past, Present, and Reasonably Foreseeable Future Actions.

Action	Type of Action	Past, Present, or Reasonably Foreseeable Future Action (RFA)	Action Description	Impacted Resources
Air emissions and associated land uses/disturbance: **Rosebud Power Plant**	Private	Past, present, and RFA	Detailed information about past and present operations of the Rosebud Power Plant is provided in **Chapter 1** in **Section 1.2.2, Coal Combustion**. The Rosebud Power Plant is a 24-MW coal-fired power plant located about 6 miles north of the city of Colstrip that has been operating since May 1990. The Rosebud Power Plant was designed to burn low-Btu (British thermal unit) "waste coal" from the Rosebud Mine, which is coal not suitable for use at the Colstrip Power Plant due to the high sulfur content and low calorific value. This waste coal is typically found in the first 1-foot layer of the Rosebud Coal deposit. Coal from all of the active permit areas is currently used in the plant. The Rosebud Mine trucks 300,000 tons of coal annually to the Rosebud Power Plant using a fleet of five covered haul trucks (Spang 2013). Three of the five trucks operate daily, with each truck delivering 6.5 loads, for a total of 19.5 total loads daily. The Rosebud Power Plant currently exclusively uses coal from the Rosebud Mine; in 2023, coal combusted in the plant came from Area F (the project area) and Area B. The Rosebud Power Plant is expected to continue operations, using waste coal from Areas B and F through 2045 and 2039, respectively. Emissions from the Rosebud Power Plant, which is a major source pursuant to Title V, are regulated by the applicable requirements outlined in Title V OP2035-05 and MAQP #2035-08. Current and historic CAPs and HAPs are provided in **Table 3.3-2** through **Table 3.3-6**; modeled combustion impacts, including cumulative impacts, are discussed in **Section 4.3.3.2, Indirect Impacts of Coal Combustion**. Combustion of Area F coal is analyzed as an indirect effect by resource (as applicable) in **Chapter 4**. As detailed in **Appendix 4**, operations of the Colstrip Power Plant and the Rosebud Power Plant (combined) support 361 local jobs and $403 million in annual economic output (BBC 2024b).	All analysis resources
Air emissions and associated land uses/disturbance: **Rosebud Mine**	Private	Past, present, and RFA	Westmoreland Rosebud's past and present operations at the Rosebud Mine are described in **Section 2.2, Description of Existing Mine and Reclamation Operations**. The Rosebud Mine includes 40,127 permitted and bonded acres within five permit areas (A, B, C, D, and F), of which 19,062 acres are currently disturbed (**Table 2.2-3**). As of 2023, as shown in **Table 2.2-4**, the following acreage has been released from the following bond phases in Permit Areas A, B, C, and D: 10,678 acres (Phase I), 9,154 acres (Phase II), 4,391 acres (Phase III), and 263 acres (Phase IV). DEQ retains $184.75 million in bond for the Rosebud Mine as of 2023. The most recent addition to the Rosebud Mine was the DEQ-approved Amendment 5 (AM5) to the Area B Permit (C1984003B) in 2022, which added additional acreage adjacent to the southern boundary of the original Area B permit area (**Figure 5.2-1**). Like the project area, Area B AM5 expanded the disturbance footprint of the Rosebud Mine (by approximately 2,658 acres). The AM5 disturbance area and estimated production approved by DEQ was less than what was analyzed for Area B AM5 in the 2018 Area F Final EIS and associated air quality modeling: in DEQ's selected alternative, Westmoreland Rosebud was prohibited from mining in Richard Coulee. Over a 21-year period, about 43 million tons of coal are anticipated to be mined from the AM5 addition to Area B. Between 1975 and 2023, just under 514 million tons of coal were recovered from the mine's Permit Areas A, B, C, D, E, and F (Westmoreland Rosebud 2024a). In recent years, total mine production has ranged from a low of about 5.4 million tons (Peterson 2022) to a high of about 7.1 million tons in 2023 (Westmoreland Rosebud 2024a). Two mine areas are no longer actively mined: Area D (4,475 acres, permit C1986003D) is being reclaimed, and Area E (1,026 acres, former permit C1981003E) was released from DEQ jurisdiction in 2019. Mining occurred in Area D from 1986 to 2013 and in Area E from 1976 (or prior) to 1988. Reclamation has occurred concurrently with mine operations in all permit areas as required by the Montana Strip and Underground Mine Reclamation Act. In 2023, about 7.1 million tons of coal was produced from the Rosebud Mine; of that total, about 4.6 million tons came from Area F (project area), and the remaining 2.5 million tons came from Area B. No coal was produced from Area A or C in 2023. As described in **Appendix 4**, the Rosebud Mine supports a total of 438 local jobs and $177 million in annual economic output – primarily, though not exclusively, in Rosebud County. Approximately 23 percent of the mine's labor force are Native Americans, including approximately 14 percent of the workforce that are members of the Northern Cheyenne Tribe (BBC 2024b). Future production from the Rosebud Mine will depend on a number of factors, including market conditions (see additional discussion in **Section 2.2.6, Life of Operations** and annual production estimates in **Section 4.3.3.1, Direct Impacts** (Air Quality). In this SEIS, the Rosebud Mine is assumed to continue operations through 2045. During this time the mine is expected to produce up to 112.5 million tons of coal. Changes to production rates, additions of other mine permit areas, reduced mining in Area F, or changed market conditions may influence the operational life of the Rosebud Mine as a whole or of individual permit areas. As described in **Section 2.2.3, Other Existing Permits**, the Rosebud Mine's five existing operating areas (A, B, C, D, and F) are currently covered by three MAQPs: • MAQP #1570-09 (Permit Areas C and F), issued June 19, 2019. Area F was incorporated into MAQP #1570-07 with a final permit previously issued on May 30, 2019. Combined coal production from Areas C and F is limited to 8 million tons per year per MAQP #1570-09, with an Area F–specific production cap of 4 million tons per year. • MAQP #1483-09, issued June 19, 2019, for Areas A, B, and D and former Area E. Annual combined coal production from Areas A, B, and D is limited to 13 million tons per year. • MAQP #4436-01, issued July 11, 2019, for operating a portable crusher.	All analysis resources

Table 5.2-1. Key Past, Present, and Reasonably Foreseeable Future Actions.

Action	Type of Action	Past, Present, or Reasonably Foreseeable Future Action (RFA)	Action Description	Impacted Resources
Air emissions and associated land uses/disturbance: **Other coal mines in southeastern Montana**	Private	Past, present, and RFA	In addition to the Rosebud Mine, three coal mines currently operate in Montana: the Bull Mountains Mine (underground mine that produces about 7.4 million tons per year), the Spring Creek Mine (more than 11.5 million tons per year), and the Absaloka (about 2.2 million tons per year). Several others operated in the recent past in the near vicinity of the Rosebud Mine, including the Big Sky Mine (adjacent to the Rosebud Mine, last operated more than a decade ago) and the East and West Decker coal mines (closed in 2021). The BLM developed reasonably foreseeable development scenarios for the Rosebud Mine and the Spring Creek Mine in its recent *Miles City Field Office Final Supplemental Environmental Impact Statement and Resource Management Plan Amendment* (BLM 2024a); see discussion in this table below under "Federal land management" and in **Chapter 3, Section 3.4.2.1, Climate and Emissions Trends, Coal Production**. BLM published a notice of intent to amend the (MCFO) RMP and accompanying NEPA analysis on July 8 to reevaluate coal allocations in the planning area and to determine the availability of lands acceptable for further consideration for coal leasing in accordance with recent EOs. The Bull Mountains Mine is operated by Signal Peak Energy and is located 30 miles north of Billings (more than 50 miles away); this mine is not expected to influence or be influenced by the proposed Area F permitting action. OSMRE prepared an EIS in June 2025 for the Bull Mountains Mine Amendment 3 to address the deficiencies identified by the U.S. Court of Appeals for the Ninth Circuit in OSMRE's 2018 EA; the Assistant Secretary for Lands and Minerals Management (ASLM) subsequently approved the mining plan modification for Amendment 3. In 2022, production for this mine was about 7.4 million tons. The Spring Creek Mine is operated by Navajo Transitional Energy Company, LLC and is located north of Decker in Big Horn County (more than 50 miles away); this mine is not expected to influence or be influenced by the proposed Area F permitting action. A Lease by Application 1 Mining Plan Modification EA was published by OSMRE on October 3, 2016. OSMRE prepared an EIS for the Spring Creek Mine Federal Mining Plan Modification for Federal Coal Lease MTM 94378 in January 2025 to address deficiencies identified by the U.S. District Court for the District of Montana; the ASLM issued a new mining plan modification for these federal tracts in March 2025. DEQ released a Final EIS on August 11, 2023, analyzing the potential impacts from the proposed fifth amendment to the surface mine permit (C1979012) of the Spring Creek Mine to add a haul road extending to the Wyoming border. Production for the Spring Creek Mine in 2022 was 11.6 million tons. The BLM estimates that the Spring Creek Mine has Federal lease reserves to support 88.2 million tons of production through 2035 (BLM 2024a). Big Sky (reclaimed) and Absaloka are located near the Rosebud Mine. Big Sky Mine is a surface coal mine that was operated by Peabody Energy from 1984 to 2003 and is located just south of Area B of the Rosebud Mine. Big Sky Mine is fully reclaimed, and the Phase IV bond has been released. Westmoreland Resources currently operates the Absaloka Mine, a 10,427-acre surface coal mine located about 8 miles southwest of the project area in Big Horn County on the Crow Indian Reservation near Hardin. The mine has produced coal since 1974; production in 2022 was about 2.2 million tons. Until recently, coal produced in this mine was used in both the nearby Sherco plant owned by Xcel Energy and the Hardin plant operated by Rocky Mountain Power. The Absaloka Mine is no longer supplying coal to the Sherco plant: the plant closed one of its three coal units in 2023 and is expected to close the remaining two in 2026 and 2030. The remaining customer for the Absaloka Mine is the Hardin plant, and reclamation of large areas of the mine is ongoing. The East Decker Mine and the West Decker Mines were located near Decker in Big Horn County but closed in January 2021, after the owner of the mines, Decker Coal Company (Lighthouse Resources), filed for bankruptcy (AP 2021). DEQ holds reclamation bonds for the mines, which will not be released until full reclamation requirements have been satisfied. Westmoreland Rosebud has one active prospecting permit for Rosebud County, No. X2004322, which was renewed September 8, 2013, and one active Notice of Intent for Rosebud and Treasure Counties, No. N2006005, which was renewed February 15, 2014 (Peterson 2014a). Section 50203 of the One Big Beautiful Bill (OBBB) directs the Secretary to make available for lease at least 4 million acres of recoverable Federal coal. While it is too soon to know the exact locations of future coal leases as a result of the OBBB, additional Federal coal leases will be made available in this area as a result of this legislation.	Air Quality Climate and Climate Change
Air emissions and associated land uses/disturbance: **Gravel quarries**	Private	Past, present, and RFA	There are eight gravel quarries operating within 25 miles of the project area. These quarries have operating permits through DEQ's Opencut Mining Program. Westmoreland Rosebud has five gravel quarry sites for mining scoria (used on road surfaces within the Rosebud Mine). These quarries are authorized under Westmoreland Rosebud's existing Rosebud Mine operating permits. Gravel quarry operations are expected to continue for the reasonably foreseeable future.	All analysis resources
Climate change	N/A	Present and RFA	Detailed information on the direct and indirect impacts of the project on greenhouse gas (GHG) emissions is provided and discussed in the SEIS Climate Change sections (**Section 3.4** and **Section 4.4**) and **Appendix 2 – Social Cost of GHGs**. Climate change is anticipated to increase the frequency and intensity of wildfire, alter precipitation patterns, and increase temperature, which is expected to impact water quality and quantity, wildlife habitats, threatened and endangered species habitat, and soil resources. Climate change may also contribute to exacerbating the potential impacts of the proposed project on these resources. Sensitive populations, including the Northern Cheyenne and Crow Tribes, may be disproportionally affected by climate change.	All analysis resources

Table 5.2-1. Key Past, Present, and Reasonably Foreseeable Future Actions.

Action	Type of Action	Past, Present, or Reasonably Foreseeable Future Action (RFA)	Action Description	Impacted Resources
Federal land management: **U.S. Department of the Interior–BLM**	Federal	Past, present, and RFA	There is no BLM-administered Federal surface land within the immediate vicinity of the project area, though there is within wider analysis areas considered for socioeconomics, air quality, and other resources. BLM-administered subsurface Federal mineral estate (including coal), which is administered by the MCFO, is located both within and in the vicinity of the project area (see **Figure 1.1-3** and **Section 3.23, Land Use**). The BLM's MCFO recently revised and combined the Big Dry (1996) and Powder River (1985) Resource Management Plans (RMPs), as amended, into one document, the MCFO RMP. The MCFO planning area includes 17 Montana counties: Carter, Custer, Daniels, Dawson, Fallon, Garfield, McCone, Powder River, Prairie, Richland, Roosevelt, Rosebud, Sheridan, Treasure, and Wibaux Counties as well as portions of Big Horn and Valley Counties (northern Big Horn County is under the Billings Field Office Management Plan). The BLM administers approximately 2.7 million acres of surface lands and 11.7 million acres of subsurface Federal coal estate in the planning area. The amended RMP applies to BLM surface and subsurface Federal coal estate. Following a 2022 Court order issued regarding litigation of the RMP amendment (*Western Organization of Resource Councils, et al., vs. BLM*), the BLM prepared and issued the *Miles City Field Office Final Supplemental Environmental Impact Statement and Resource Management Plan Amendment* (BLM 2024a) in May 2024. The BLM selected Alternative D as the proposed plan for allocating BLM-administered coal (BLM 2024b; 89 *Federal Register* 97, May 17, 2024); under this alternative, Federal coal (approximately 1.75 million acres of subsurface Federal coal estate) would not be available for leasing within the MCFO planning area (see Figure 2-4a in BLM 2024a). The BLM determined that additional leasing of Federal coal is not necessary based on the current analysis in the SEIS and that operating mines in the planning area have existing leases with sufficient coal reserves to maintain existing mine production levels until 2035 for Spring Creek Mine and 2060 for Rosebud Mine (BLM 2024a). Secretarial Order 3418 - *Unleashing American Energy* (January 20, 2025) directed BLM to review and, as appropriate, revise all relevant draft and all finalized RMPs and supporting NEPA documents, including the MCFO RMP and NEPA documents. BLM published a notice of intent to amend the MCFO RMP and accompanying NEPA analysis on July 8 to reevaluate coal allocations in the planning area and to determine the availability of lands acceptable for further consideration for coal leasing in accordance with recent EOs. Section 50203 of the OBBB directs the Secretary to make available for lease at least 4 million acres of recoverable Federal coal, which is inconsistent with the MCFO RMP. In addition, the MCFO RMP and NEPA documents (BLM 2024a) were challenged in court, and the MCFO RMP was remanded to the Department pending the finalization of a new RMP Amendment with supporting NEPA documentation. Oil and gas leases were issued by the BLM in the past, but currently none are authorized in the near vicinity of the project area. Oil and gas production and refineries were considered in the air quality and emissions modeling completed for the 2018 Final EIS (see **Appendix D** in that document). The BLM estimates that peak oil production from the MCFO planning region would be 3.0 million barrels of oil and that peak gas production would be 13.1 billion cubic feet of gas (BLM 2024a). Federal oil and gas development is not anticipated to contribute to regional exceedances of the National Ambient Air Quality Standards (NAAQS) and Montana Ambient Air Quality Standards (MAAQS) (BLM 2024a). Other actions on BLM-managed Federal lands in the near vicinity of the project area must be completed in compliance with the amended RMP and include the following: vegetation management, fire management, forestry, livestock grazing, recreation (trails and travel management), and road maintenance. Other actions include BLM authorized rights-of-way for powerlines and pipelines, administration of coal leases and mineral material sites, land withdrawals, and land sales and exchanges. BLM land management actions within the MCFO planning area are expected to continue for the reasonably foreseeable future.	Land Use Climate
Federal land management: **USDA – Forest Service (Custer Gallatin National Forest)**	Federal	Past, present, and RFA	The Custer Gallatin National Forest is located in southeastern Montana. The closest ranger district, the Ashland District, is about 35 miles to the southeast of the project area. With the exception of management activities such as controlled burns, past and present management activities on the Ashland District are not expected to influence or be influenced by the proposed Area F permitting action. The applicable land and resource management plan, the Custer Gallatin Land Management Plan, was approved in January 2022. Management actions by the Custer Gallatin National Forest are expected to continue for the reasonably foreseeable future.	Air Quality Climate and Climate Change Water Resources Vegetation
Hunting	Federal, state, and private	Past, present, and RFA	Montana Fish, Wildlife and Parks (FWP) Hunting District 702, which is 1,793,846 acres, includes the Rosebud Mine. During hunting season for big game (mule deer, white-tailed deer, pronghorn, and elk) and upland birds, Westmoreland Rosebud allows public access to inactive areas of the mine (private land) through FWP's Block Management Program. A cooperative program between private landowners and FWP, Block Management helps landowners manage hunting activities and provides the public with free hunting access to private land, and sometimes to adjacent or isolated public lands. Based on data presented in **Section 3.18.2.1** of the 2018 Final EIS, an average of 465 hunter days (all days hunted by all hunters) each year have been hunted on the mine site. Hunter success for all species is approximately 20 percent (average). Mule deer and upland birds are the most common species harvested on the mine site. Hunting also occurs on public (state) and private land surrounding the mine, and hunters likely reach these locations using the Horse Creek Road, which passes through the Rosebud Mine and the Area F project area.	Fish and Wildlife Recreation
Rail transport	Private	Past	The Northern Pacific Railway established the city of Colstrip and its associated mine in the 1920s to provide fuel for the railway's steam-locomotive trains. BNSF Railway currently owns and operates a functioning rail spur that runs north-south from Nichols, Montana, to the Rosebud Mine, but it has not been used since 2010. Westmoreland Rosebud has intermittently shipped coal via this line in the past (as recently as 2010) but does not have a current contract to ship coal via railway. As stated in the 2018 Final EIS, the Tongue River Railroad Company Inc. (TRRC) intended to construct and operate a rail line between Miles City and Ashland, Montana; the initial customer of the rail line would have been the proposed Otter Creek Mine. TRRC's preferred alignment was the 42-mile Colstrip Alternative, which would generally parallel Greenleaf Road (S-447). However, on April 26, 2016, the Surface Transportation Board issued a decision dismissing the Tongue River Railroad proceeding without prejudice because the Otter Creek Mine permit application with DEQ was suspended. At this time, the development of the Tongue River Railroad is no longer a reasonably foreseeable future action.	Air Quality Fish and Wildlife Vegetation
Water uses and discharges: **Rosebud Power Plant**	Private	Past, present, and RFA	Deep groundwater wells provide water to the Rosebud Power Plant. Colstrip Energy Limited Partnership, owner of the Rosebud Power Plant, is permitted under Montana Pollutant Discharge Elimination System (MPDES) Permit MT-0031780 to discharge water from a storm-water control pond to an unnamed ephemeral tributary to the East Fork Armells Creek. The discharge must meet effluent limitations and conditions.	Water Resources Wetlands and Riparian Zones

Table 5.2-1. Key Past, Present, and Reasonably Foreseeable Future Actions.

Action	Type of Action	Past, Present, or Reasonably Foreseeable Future Action (RFA)	Action Description	Impacted Resources
Water uses and discharges: **Colstrip Power Plant**	Private	Past, present, and RFA	Water piped from the Yellowstone River (up to 69 cubic feet per second [cfs]) is the source of water to the Colstrip Power Plant, which operates as a zero-discharge facility. Process water is contained in ponds on the plant site. Water use from the Yellowstone River is expected to continue for the reasonably foreseeable future. Discharges of storm water from construction activities is permitted under MPDES, storm-water construction permit MTR106638, effective January 1, 2023, for the Colstrip steam electric station borrow area.	Water Resources Wetlands and Riparian Zones
Water uses and discharges: **Rosebud Mine**	Private	Past, present, and RFA	As discussed in **Section 2.2.3, Other Existing Permits**, Westmoreland Rosebud has three MPDES Permits that regulate point source discharges of pollutants from the Rosebud Mine. In addition to MPDES Permit MT-0031828, which covers Area F discharges, Westmoreland holds MPDES Permit MT-0023965 and MPDES Permit MT-0032042. MPDES Permit MT-0023965 (Modification 2) regulates discharges of mine drainage and drainage from coal preparation plant and coal preparation plant associated areas, as those terms are defined at 40 C.F.R. part 434, including Areas A, B, C, and D. MT-0023965 became effective on August 1, 2021 (expires July 31, 2026), and provides effluent limits, monitoring requirements, and other special conditions for discharges from 153 outfalls. The receiving waters include East Fork Armells Creek, Stocker Creek, Lee Coulee, West Fork Armells Creek, Black Hank Creek, Donley Creek, Cow Creek, Spring Creek, and Pony Creek. MPDES Permit MT-0032042 (Modification 2), effective October 1, 2022 (expires September 30, 2027), regulates discharges of mine drainage from 18 outfalls associated with Area B AM5. Receiving waters include Lee Coulee and Richard Coulee, which are both tributaries to Rosebud Creek.	Water Resources Wetlands and Riparian Zones
Water uses and discharges: **Colstrip Water Treatment Plant**	Private	Past, present, and RFA	The Colstrip Water Treatment Plant provides potable water from Castle Rock Reservoir to the city of Colstrip. The water supply to Castle Rock Reservoir is piped from the Yellowstone River. Backwash from the potable water treatment plant is discharged back to the reservoir under MPDES Permit MT-0030422. Municipal sewage flows via a collection system to the Colstrip Wastewater Treatment Plant, which operates at about 200,000 gallons per day, about one-third of stated capacity (DEQ 2015d). The city of Colstrip is authorized to discharge from its sewage treatment plant to the East Fork Armells Creek pursuant to MPDES Discharge Permit MT-0022373. Discharges and water uses are expected to continue for the reasonably foreseeable future.	Water Resources Wetlands and Riparian Zones
Water uses and discharges: **Irrigation – golf course**	Private	Past, present, and RFA	A nine-hole public golf course is located adjacent to the East Fork Armells Creek about 1 mile downstream of Colstrip. Water used to maintain the greens infiltrates into the creek, likely causing undefined changes in water level and water quality. Irrigation water for the golf course comes from the municipal water supply, which is piped from the Yellowstone River. Water use is expected to continue for the reasonably foreseeable future.	Water Resources Wetlands and Riparian Zones
Water uses and discharges: **Agricultural diversions**	Private	Past, present, and RFA	Cartersville Dam is a six-foot-high, 800-foot-long irrigation diversion dam/weir spanning the Yellowstone River at Forsyth, Montana. The dam is approximately 235 miles upstream from the mouth of the Yellowstone River and 165 miles upstream from the Intake Diversion Dam. The dam was originally constructed during the 1930s and consists of a rock and willow structure capped in concrete. The dam provides head for gravity diversion to the Cartersville Irrigation District. Cartersville Dam is a private irrigation dam owned and operated by the Cartersville Irrigation District. The dam has been documented as a barrier to upstream fish migration of Yellowstone River native warm-water fish (including shovelnose sturgeon, blue sucker, sauger, and burbot). The dam itself is also a safety concern for recreational fishermen and boaters due to uneven crest and turbulence. The headgate structure, which diverts water into the canal, is currently unscreened, and there is concern that native fish may be unintentionally entrained into the canal. The Cartersville Dam has suffered some deterioration due to age, high-flow, and ice events. A multi-agency collaborative effort has been initiated to work with the irrigation district to pursue fish passage and potential screening of the canal for ecosystem restoration purposes. Cartersville Dam is the second diversion dam upstream from the mouth of the Yellowstone River, approximately 165 river miles above Intake Diversion Dam. Other diversion dams upstream from Cartersville are somewhat smaller and are believed to be only partial barriers to fish migration. Restoring fish passage at Cartersville Dam would complement ongoing rehabilitation work at Intake Dam to provide unimpeded passage from the Bighorn River confluence to the mouth, a total distance of over 300 miles. There are approximately 100 active surface water rights on the Yellowstone River within the surface water and special status species cumulative effects analysis areas with a maximum diversion potential of approximately 1,400 cfs. Most of those water rights are dedicated exclusively for irrigation purposes, including the largest three of those water rights (425 cfs, 144 cfs, and 109 cfs).	Water Resources Special Status Species
Wildland fire and prescribed burns	N/A	Past, present, or RFA	Wildland fires have historically occurred in the vicinity of the Rosebud Mine. Wildland fires in this area often start from coal seam fires or ignite new ones, causing fires that can burn for long durations underground, including weeks, months, or even years (Montana Free Press [MTFP] 2024). During the 2012 wildland fire season, the McClure Creek and Donley Creek fires burned 221 acres, impacting vegetation and wildlife on and around the southern boundary of Rosebud Mine Areas B, C, and F. The 2012 Chalky Fire, which was caused by a lightning strike, burned 131,000 acres south of Area B, including the majority of the Area B AM5 area. The Poverty Flats Fire burned more than 75,000 acres in Big Horn County in July 2021 and threatened the safety of county residents and infrastructure east of the project area. In the summer of 2021, the Richard Spring Fire, which was sparked by a coal seam fire approximately 10 miles southwest of Colstrip on August 8, burned 171,130 acres in the vicinity of the Rosebud Mine, including nearly the entire project area. Vegetation burned in the fire was primarily short grass beneath a ponderosa pine overstory but also included interspersed areas of sagebrush and juniper (InciWeb 2021). In 2021, the Montana Department of Natural Resources and Conservation (DNRC) reported that 51 of the total 458 fires in southeastern Montana that fire season were coal seam fires (MTFP 2022), and in Rosebud County, it was estimated that 60 percent of the 70 wildland fires during the 2021 fire season were ignited by coal seams (High Country News 2022). In August and September 2024, the Remington Fire, which began in Sheridan County, Wyoming, burned more than 196,000 acres in Wyoming and southeastern Montana, including in Rosebud County, potentially igniting new coal seam fires (MTFP 2024). Effects of wildland fires, such as the Chalky Fire and the Richard Spring Fire, include impacts on water quality, alteration of vegetation communities, increases or decreases in nonnative and noxious weed species, alteration of wetland habitats, and reduction in insect pests that may be adversely affecting native vegetation. Prescribed burns have also occurred from time to time on BLM or USDA Forest Service lands in southeastern Montana. Wildland fires, including those ignited by coal seam fires, and prescribed burns are expected to occur for the reasonably foreseeable future in the vicinity of the project area, particularly during dry, drought conditions.	All Resources

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5.3 RESOURCES

5.3.1 Topography

Cumulative effects on topography would be similar to those described in **Section 5.3.1** of the 2018 Final EIS, beginning on page 665. The analysis area for evaluation of cumulative impacts for topography includes all permit areas of the Rosebud Mine, including past and ongoing mining areas (**Figure 5.2-1**). **Table 5.3-1** summarizes the related past, present, or reasonably foreseeable actions (described and quantified where possible in **Table 5.2-1**) that have directly or indirectly affected or will affect topography in the analysis area.

Table 5.3-1. Topography: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
Rosebud Mine (other permit areas) and gravel quarry sites for mining scoria (used on road surfaces within the Rosebud Mine)	Past, present, and RFA	Past and ongoing mining at the Rosebud Mine along with ongoing mining of scoria for road surfaces has resulted in short-term minor cumulative impacts during mining activities and long-term minor cumulative impacts on the overall topography due to the removal of geologic outcrops and scoria, and slight differences in the pre-mine topography versus the postmining topography. Mining in the project area and possible future mining of other sites at the Rosebud Mine would result in additional short-term minor cumulative topographic changes during active mining and long-term minor cumulative topographic changes following reclamation.

5.3.2 Air Quality

Cumulative effects on air quality would be similar to those described in **Section 5.3.2** of the 2018 Final EIS, beginning on page 666. The analysis area for cumulative impacts on air quality is the same as that used for the indirect effects for air quality, a rectangular region extending to approximately 300 kilometers (km) from Colstrip in all directions (see **Section 3.3, Air Quality**). The air quality modeling performed for the 2018 Final EIS with the CAMx modeling system, which is described in **Section 4.3.1, Analysis Methods and Impact and Intensity Thresholds** of the 2018 Final EIS, considered cumulative impacts in addition to direct and indirect impacts. **Table 5.3-2** summarizes the related past, present, or reasonably foreseeable actions (described and quantified where possible in **Table 5.2-1**) that have directly or indirectly affected or will affect air quality in the analysis area. More detail, including a more comprehensive list of actions, is provided in the 2018 Final EIS (see **Section 5.3.2** and **Appendix D**).

Table 5.3-2. Air Quality: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
Airport	Past, present, and RFA	Past and current airport operation has contributed and continues to contribute to air quality degradation due to emissions from aircraft, equipment, and stationary and vehicle sources. Emissions from aircraft are mainly caused by fuel combustion in the engines. Aircraft disturb the atmosphere by changing background levels of trace gases and particles. As stated at the beginning of this chapter, the airfield averages 62 flights per week, which likely results in some cumulative air quality impacts. However, only smaller turboprop planes use the Colstrip Airport, which includes only two short runways. Therefore, air pollution from local airport operation and aircraft use is likely minor because turboprops burn less fuel than jet planes.
Rosebud Mine (other permit areas)	Past, present, and RFA	Past and current coal mining in Areas A, B, C, D, and E of the Rosebud Mine have contributed to cumulative impacts on local air quality. Similarly, future coal mining in other permit areas of the Rosebud Mine will contribute to cumulative impacts on air quality. Existing CAP and HAP emissions from these permit areas have been estimated in **Section 3.3.4.1, Existing Emissions from the Rosebud Mine**. Future cumulative CAP and HAP emissions from Areas A, B (including AM5), and C (including the portable crusher) are included in the Environmental Protection Agency (EPA) National Emissions Inventory (NEI) and in the EIS air quality modeling (see **Section 5.3.2** and **Appendix D** in the 2018 Final EIS). In general, other areas of the Rosebud Mine had relatively small contributions to the occurrences of high cumulative CAPs concentrations and to the exceedance of NAAQS or MAAQS in the direct and indirect/cumulative effects analysis areas. Similarly, impacts of other Rosebud Mine permit areas on nitrogen and sulfur deposition were relatively small.

Table 5.3-2. Air Quality: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
Coal combustion	Past, present, and RFA	CAP and HAP emissions due to Colstrip Units 1 and 2 (retired in January 2020) are listed in Table D-6-2, Appendix D-6 (**Appendix D** in the 2018 Final EIS); Units 1 and 2 are no longer sources of emissions. Emissions of oxides of nitrogen (NO_x) were the largest among the CAPs from Units 1 and 2, with a total of 5,808 tons/year, followed by SO_2 at 3,758 tons/year. The approach used for calculating these emissions is similar to that used for estimating CAP and HAP emissions from Colstrip Units 3 and 4 as discussed in **Section 4.3.3.2, Indirect Impacts of Coal Combustion** in the 2018 Final EIS. In general, Units 1 and 2 had relatively small contributions to the occurrences of high cumulative CAP concentrations and to the exceedance of NAAQS or MAAQS in the direct and indirect/cumulative effects analysis areas. Indirect effects of Area F coal would constitute less than 1 percent and 0.1 percent of the cumulative nitrogen and sulfur deposition in lakes and streams in the analysis area (**Appendix D** in the 2018 Final EIS). Across the Class I areas in the indirect/cumulative impacts analysis area, the change in haze index due to cumulative impacts varies from 6.0 to 22.2, with the peak values modeled at Medicine Lake NWR and Flathead Indian Reservation (**Table D-6-7, Appendix D-6** in the 2018 Final EIS). At these two locations, direct and indirect impacts represent up to 0.1 percent and 3.1 percent, respectively, of the cumulative change in haze index. The change in haze index due to direct impacts does not exceed 0.5 or 1.0 on any days at any Class I area except at Northern Cheyenne, where it is exceeded two days in the year. The change in haze index due to indirect impacts exceeds 0.5 on 14 days or less except at Northern Cheyenne, where it is exceeded 96 days in the year. The modeled wet and dry deposition of mercury due to indirect effects (Colstrip Units 3 and 4 and the Rosebud Power Plant) is provided in **Appendix D** in the 2018 Final EIS. The contribution of indirect effects to cumulative mercury deposition is relatively small, less than 8 percent in the vicinity of Colstrip, and 1 percent or less farther away.
Federal land management – BLM and Forest Service	Past, present, and RFA	Emissions sources from Federal land management (BLM and Forest Service) were considered in the modeling completed for the 2018 Final EIS (see **Section 5.3.2** and **Appendix D**). Since that time, the BLM has issued a SEIS for the MCFO RMP and indicated selection of Alternative D, which would disallow any new leasing of the Federal coal estate in the MCFO planning area. Under Alternative D, there would be no emissions or air quality impacts from coal mining, transportation, and downstream combustion due to pending Federal lease applications or potential future subsequent Federal leases (BLM 2024a). However, Secretarial Order 3418 - *Unleashing American Energy* (January 20, 2025) directed BLM to review and, as appropriate, revise all relevant draft and all finalized RMPs and supporting NEPA documents, including the MCFO RMP and NEPA documents. BLM published a notice of intent to amend the MCFO RMP and accompanying NEPA analysis on July 8 to reevaluate coal allocations in the planning area and to determine the availability of lands acceptable for further consideration for coal leasing in accordance with recent EOs. Further, Section 50203 of the OBBB directs the Secretary to make available for lease at least 4 million acres of recoverable Federal coal, which is inconsistent with the 2024 MCFO RMP. In addition, the MCFO RMP and NEPA documents (BLM 2024a) were challenged in court, and the MCFO RMP was remanded to the Department pending the finalization of a new RMP Amendment with supporting NEPA documentation. Because no lease sales in response to the OBBB have been held or completed, it is not possible to know where additional mining might occur or analyze potential future impacts.

Table 5.3-2. Air Quality: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
Energy and mineral development	Past, present, and RFA	Energy and mineral development in the region could result in adverse impacts on air quality. CAP and HAP emissions from current and reasonably foreseeable mineral development and other large regional sources are described in **Section 3.3.4.3, Existing Emissions from Other Regional Sources, Section 4.3.2.1, Regional Emissions**, and the 2018 Final EIS (see **Section 5.3.2** and **Appendix D**).
Rail transport	Past, present, and RFA	Local and regional rail transport contributes to air quality degradation from exhaust emissions, particularly carbon monoxide (CO), NO_x, and particulate matter (PM). Rail transport emissions are included in the EPA NEI and in the EIS air quality modeling (see **Section 5.3.2** and **Appendix D** in the 2018 Final EIS).
Wildland fire	Past, present, and RFA	Wildland fires, including those ignited by coal seam fires, can result in substantial air pollution, particularly through the release of fine particles. However, the severity of the impacts depends on the scale and frequency of fires. Periodic wildland fires in the vicinity of the Rosebud Mine could negatively affect local air quality. The air quality modeling for the 2018 Final EIS uses wildland fire data for the year 2012/2013 from the BLM-MT/DK inventory (BLM 2016a) discussed in **Section 4.3.2.1, Regional Emissions** in the 2018 Final EIS.
Climate change	Past, present, and RFA	Not only does air pollution affect climate change, but the close connection between climate and air quality is also reflected in the impacts of climate change on air pollution levels. Ozone and particulate pollution are strongly influenced by shifts in the weather (e.g., heat waves or droughts). Based on projected future climate scenarios, the Intergovernmental Panel on Climate Change (IPCC) projected “declining air quality in cities” into the future as a result of climate change (IPCC 2014). According to Zeng et al. (2008), a hypothetical 50 percent increase in isoprene emissions due to climate change by 2100 could increase ground-level ozone concentrations over the United States by up to 6 parts per billion (ppb), while a hypothetical doubling of soil NO_x emissions due to climate change could increase ozone concentrations by up to 5 ppb. Cumulative ozone concentrations could be further exacerbated by climate change on days when weather is already conducive to high ozone concentrations. In the Great Plains Region, average temperatures are already increasing, along with the frequency of extreme heat, droughts, wildland fires, heavy precipitation events, and reduced air quality (Melillo et al. 2014). Because climate represents meteorological conditions over a long period, it is difficult to identify exactly whether emissions reductions from air quality regulations are outpacing cumulative climate impacts. Climate change is discussed further under **Sections 3.4**, **4.4**, and **5.3.3, Climate and Climate Change.**
Other sources	Past, present, and RFA	CAP and HAP emissions from other regional sources of air pollution will also contribute to the cumulative impacts on air quality in the analysis area. Emissions from all sources in the BLM-MT/DK 2025/2032 future year modeling platform (BLM 2016a, 2016b) originally derived from EPA’s 2025 projection of the 2011 NEI that are within the indirect/cumulative impacts analysis area are included in the CAMx air quality modeling (see **Section 5.3.2** and **Appendix D** in the 2018 Final EIS).

5.3.3 Climate and Climate Change

Climate change cumulative effects would be similar to those described in **Section 5.3.3** of the 2018 Final EIS, beginning on page 676. GHG emissions sources and trends occur at global, national, state, and regional scales. For this section, the focus is cumulative effects at a regional scale, and the analysis area is the same as that used for cumulative effects for air quality, a rectangular 300-km extent. **Table 5.3-3** summarizes the related past, present, or reasonably foreseeable actions (described and quantified where possible in **Table 5.2-1**) that have directly or indirectly affected or will affect climate change. More detail is provided in the 2018 Final EIS.

Table 5.3-3. Climate Change: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
Agriculture	Past, present, and RFA	Agricultural development in the area consists mostly of cropland, pastureland, and grazing lands. Continued agricultural development would contribute to local GHG emissions and surface warming due to land-use changes, thus contributing to global warming. Agricultural soil management practices and livestock contribute to Montana GHG emissions; see additional discussions on current national and Montana agricultural emissions in **Section 3.4.2.1, Climate and Emissions Trends**. Emerging management practices in Montana are already moving toward reducing emissions and storing more carbon in soil (sequestering). Consequently, Montana agricultural soil is believed to remain positive for carbon sinks. As discussed in **Section 3.4.2** of the 2018 Final EIS, the impacts of climate change (e.g., rising temperatures, changes to precipitation, etc.) on agriculture will continue.
Airport	Past, present, and RFA	Airport construction and continued operation has not only resulted in land-use changes and loss of grasslands but has contributed to changes in atmospheric composition due to GHG emissions from the combustion of fossil fuels. Aircraft disturb the atmosphere by changing background levels of trace gases and particles, including GHGs, and by forming condensation trails. Direct emissions from aircraft accumulate in the atmosphere, change its chemistry and microphysics, and trap heat that would otherwise escape from Earth, contributing to global warming (IPCC 1999). However, only smaller turboprop planes use the Colstrip Airport, which has two short runways. Therefore, emissions from local airport operation and aircraft use are likely minor, as turboprops burn less fuel than jet planes.
Rosebud Mine (other permit areas)	Past, present, and RFA	Projected annual GHG emissions from other Rosebud Mine permit areas are provided in **Tables 173** and **174** in the 2018 Final EIS. As discussed in **Section 4.3.3.1, Direct Impacts** (Air Quality), the GHG emissions presented in the 2018 Final EIS likely overestimate total emissions for the Rosebud Mine Area B but represent a reasonable upper bound. Because the life of the mine could change based on the tenure of mining in the project area, slightly greater cumulative impacts would occur under Alternative 4 (as compared to Alternatives 1 and 5) from increased GHG emissions over the long term. However, Alternative 4 is expected to have a very small contribution to cumulative impacts on regional climate since GHG emissions from indirect effects due to combustion of Area F coal would constitute a small fraction of total U.S. GHG emissions.
Coal combustion	Past, present, and RFA	Estimated annual GHG emissions from Colstrip Units 1 and 2 were provided in **Section 4.4.2.5, Future GHG Emissions from Colstrip and Rosebud Power Plant** in the 2018 Final EIS. Units 1 and 2 were retired in January 2020 and are no longer sources of emissions. GHGs from Units 3 and 4 are considered indirect effects in this analysis, regardless of whether the coal was sourced from Area F or Area B.

Table 5.3-3. Climate Change: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
Federal land management – BLM and Forest Service	Past, present, and RFA	GHG emissions sources from Federal land management activities were considered in the 2018 Final EIS (see **Section 5.3.3**). Since that time, the BLM has issued a SEIS for the MCFO RMP and indicated selection of Alternative D, which would disallow new leasing of the Federal coal estate in the MCFO planning area. However, on July 8, 2025, BLM published a notice of intent to amend the MCFO RMP and accompanying NEPA analysis to reevaluate coal allocations in the planning area and to determine the availability of lands acceptable for further consideration for coal leasing in accordance with recent EOs. Further, Section 50203 of the OBBB directs the Secretary to make available for lease at least 4 million acres of recoverable Federal coal, which is inconsistent with the MCFO RMP, but those lease sales have not yet been announced. Therefore, emissions impacts (or associated social costs) from coal mining, transportation, and downstream combustion due to pending Federal lease applications or potential future subsequent Federal leases are unknown.
Alternative energy development	Past, present, and RFA	Alternative energy development in the region could result in cumulative GHG impacts. On the other hand, development of wind and solar projects, including those on the Northern Cheyenne Reservation, for example, could potentially reduce GHG emissions in the area over the long term.
Wildland fire	Past, present, and RFA	Fire, including wildfires ignited by coal seam fires, affects climate change through loss of vegetation and the release of CO_2 and other GHGs into the atmosphere. Large amounts of stored CO_2 are released when vegetation burns, which significantly influences the Earth's atmosphere and climate (Cole 2001; Sommers et al. 2014). Periodic wildland fires would result in negative cumulative effects on climate change.
Other GHG activities	Past, present, and RFA	The GHG emissions from large regional, national, and non-U.S. (global) sources and climate and climate change impacts are discussed under No Action and Proposed Action in **Section 4.4, Climate and Climate Change** of the 2018 Final EIS. There is a general scientific consensus that the cumulative effects of GHGs have influenced the ambient environment on a global scale (e.g., IPCC 2014); this is considered a major cumulative effect. Global anthropogenic GHG emissions were about 52 gigatons (Gt)-CO_2e in 2010, and by 2037 (the last year of the period of the Proposed Action) global GHG emissions estimates vary from 30 to 80 Gt-CO_2e across RCP scenarios (IPCC 2014).

5.3.4 Public Health and Safety

Cumulative effects on public health and safety would be similar to those described in **Section 5.3.4** of the 2018 Final EIS, beginning on page 679. The analysis area for evaluation of cumulative impacts on public health includes Rosebud, Big Horn, and Treasure Counties, and the Northern Cheyenne and Crow Reservations (**Figure 3.15-1**). **Table 5.3-4** summarizes the related past, present, or reasonably foreseeable actions (described and quantified where possible in **Table 5.2-1**) that have directly or indirectly affected or will affect public health and safety in the analysis area.

Table 5.3-4. Public Health and Safety: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
Agriculture	Past, present, and RFA	Past, present, and future agricultural production within the analysis area includes production of commodity crops and domestic livestock grazing. While some of these products may be consumed within the analysis area, it is not likely that subsistence farming, hunting and gathering, and gardening comprise a significant part of the overall source of nutrition in the area. As noted in **Section 5.3.3, Climate and Climate Change**, agricultural production would contribute to GHG emissions and to climate change, as well as to changes in land use patterns. Increased GHGs and climate change may adversely impact public health, to which the Proposed Action would contribute negligibly.
Air pollution	Past, present, and RFA	Air pollution sources include fugitive dust from unpaved roads and wind erosion. The town of Lame Deer is identified as a nonattainment area for PM_{10} under the NAAQS due to fugitive dust (DEQ 2017). Vehicle emissions may contribute marginally to environmental health, although population density in the area is sparse and exposure to emissions is not likely. The cumulative impacts within the area of other air pollution sources would be short- to long-term, minor to major, and adverse, to which the Proposed Action would contribute negligibly.
Rosebud Mine (other permit areas)	Past, present, and RFA	The past, ongoing, and future activities at the Rosebud Mine may affect air quality and the socioeconomics of the area, as discussed in **Section 5.3.3, Climate and Climate Change**, **Section 5.3.2, Air Quality**, and **Section 5.3.14, Socioeconomic**. Cumulative impacts from Rosebud Mine operations may include continued emissions of HAPs and PM that could impact public health, especially among subpopulations with compromised respiratory and circulatory health close to the Rosebud Mine (Stanek et al. 2011; Jenkins et al. 2015). The Rosebud Mine, however, contributes substantially to the area's economy through direct and indirect jobs and revenues. These contribute to the funding and availability of public-health resources and social services and to the community health and well-being of the area through sustained economic resources. As discussed below (**Section 5.3.14, Socioeconomic**), future operations at the mine, including the proposed Area B AM5, would have long- and short-term moderate to major adverse economic impacts on the area, to which the Proposed Action would contribute negligibly.
Oil, gas, and other mines (coal and gravel)	Past, present, and RFA	Other past, present, and future land uses in the area include other coal mines, oil and gas development, and quarrying. These activities likely adversely affect the environmental health of the area through exposure to HAPs and PM (including coal dust) and release of GHGs (see **Section 5.3.2, Air Quality** and **Section 5.3.3, Climate and Climate Change**) while contributing beneficial economic resources that support public-health resources and social services.

Table 5.3-4. Public Health and Safety: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
Coal combustion	Past, present, and RFA	The Colstrip and Rosebud Power Plant activities contribute to the area's public health through environmental and socioeconomic impacts, as discussed in **Section 5.3.3, Climate and Climate Change**, **Section 5.3.2, Air Quality**, and **Section 5.3.14, Socioeconomic**. Combustion at these plants contributes to the overall environmental status of the area, including air and water quality. While the current environmental quality in the area meets state and Federal standards, the local population has higher rates of chronic disease, including respiratory illness and cancer (see **Section 3.5**, **Public Health and Safety**). It is possible that past and present combustion at these facilities contributes to this and may exacerbate symptoms through incidental and long-term exposure to HAPs in plant emissions (Kelly and Fussell 2011; Ghio et al. 2012). The retirement of Colstrip Units 1 and 2 would reduce the amount of HAP and PM emissions in the area (see **Section 5.3.2, Air Quality**), and may contribute to improved environmental health conditions. Like the Rosebud Mine, however, the Colstrip and Rosebud Power Plants contribute substantially to the area's economy with direct and indirect jobs and revenues contributing to the funding of public health and social services and the economic stability of individuals and households. Therefore, the power plants' contribution to the area's environmental health is long-term, minor to moderate, and adverse, to which the Proposed Action would contribute negligibly. The power plants' contribution to the area's community well-being is long-term, minor to moderate, and beneficial, to which the Proposed Action would contribute negligibly. The closure of Colstrip Units 1 and 2 would result in long-term minor effects on environmental health and long-term moderate adverse effects on community well-being, to which the Proposed Action would not contribute.
Water use and discharge	Past, present, and RFA	Past, present, and future surface water usage and discharges are discussed in **Section 5.3.6, Water Resources – Surface Water**. Cumulative impacts on water resources in the area would be long-term, moderate to major, and adverse. Public health impacts could result if exposure to HAPs and other pollutants becomes likely through incidental contact with water and recreation (swimming, wading, fishing, etc.). Municipal and residential drinking water in the area comes from Castle Rock Lake (filled with water piped from the Yellowstone River) and from a few domestic water wells. MPDES requires discharge permitting, water quality monitoring, and mitigation of point source contamination to protect public and environmental health. With regulation and mitigation, the cumulative impacts on public health from surface water quality would be long-term, minor, and adverse, to which the Proposed Action would contribute negligibly.
Wildland fire	Past, present, and RFA	Past and future wildland fires, including those ignited by coal seam fires, may result in short- and long-term adverse effects on environmental health and well-being. As discussed in **Section 5.3.3, Climate and Climate Change**, **Section 5.3.6, Water Resources – Surface Water**, and **Section 5.3.17, Recreation**, wildland fire may contribute to surface water quality and the local effects of climate change. Short-term impacts from wildland fire on air quality may exacerbate the symptoms of respiratory illness among sensitive subpopulations. Wildland fire may have long-term adverse impacts on community well-being within Montana through the loss of property, displacement of populations, and cost of response and management (Power and Power 2015). The Proposed Action would not contribute directly to the short- and long-term adverse impacts of wildland fire but could contribute negligibly through climate change.

Table 5.3-4. Public Health and Safety: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
Climate change	Past, present, and RFA	Climate change threatens public health and well-being in many ways. Increased extreme-weather events, regional drought, wildland fire, decreased air quality, impacts on mental health and culturally significant resources, and exacerbation of the spread of infectious diseases transmitted by food, water, and disease carriers (insects and wildlife) are all anticipated threats to public health from climate change (Luber et al. 2014). The impacts of climate change would vary locally. Anticipated changes to Montana's climate include increased year-round temperatures, increased winter precipitation, and decreased summer precipitation (NOAA 2013). Adverse socioeconomic impacts could include losses to sectors of the economy such as agriculture, recreation, and tourism (Power and Power 2015). The impacts of climate change on both environmental health and well-being would be long-term, major, and adverse, to which the Proposed Action would contribute negligibly.

5.3.5 Geology

Cumulative effects on geology would be similar to those described in **Section 5.3.4** of the 2018 Final EIS, beginning on page 682. The analysis area for evaluation of cumulative impacts for geology includes all permit areas of the Rosebud Mine, including past and ongoing mining areas (**Figure 5.2-1**). **Table 5.3-5** summarizes the related past, present, or reasonably foreseeable actions (described and quantified where possible in **Table 5.2-1**) that have directly or indirectly affected or will affect geology in the analysis area.

Table 5.3-5. Geology: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
Rosebud Mine (other permit areas) and gravel quarry sites for mining scoria (used on road surfaces within the Rosebud Mine)	Past, present, and RFA	Past and ongoing mining at the Rosebud Mine and scoria mining has resulted in cumulative impacts on the overall geologic formations in the region and the loss of horizontal continuity in geologic beds overlying the coal. Because scoria mining and surface mining of the Rosebud Coal and overlying geologic formation are small relative to the entire Fort Union deposit, mining in the project area and possible future mining of other sites at the Rosebud Mine would result in long-term minor cumulative impacts on geologic resources.

5.3.6 Water Resources – Surface Water

Cumulative impacts on surface water have been updated from those that were described in **Section 5.3.6** of the 2018 Final EIS, beginning on page 683; this section now incorporates information and conclusions from the *Cumulative Hydrologic Impact Analysis for Area F* (DEQ 2019b), which is referred to as the CHIA. The CHIA's geographic area of analysis, illustrated in the CHIA on **Figure 5-1** and designated in the CHIA as the "cumulative hydrologic impact area," is different than the "cumulative impacts analysis area" defined by NEPA and considered for this section. The CHIA's "cumulative hydrologic impact area" is defined by ARM 17.24.301(32) as "the area, including, but not limited to, the permit and mine plan area within which impacts to the hydrologic balance resulting from the proposed operation may interact with the impacts of all previous, existing and anticipated mining on surface and ground water systems." For the purposes of the CHIA, the surface water "cumulative hydrologic impact area" "encompasses the areas that might potentially develop a measurable change in water quantity or quality due to mining activities in the Rosebud Mine" and "covers West Fork Armells Creek from the headwaters to the confluence with Trail Creek" and "includes Black Hank Creek, Donley Creek, Robbie Creek, McClure Creek, Trail Creek and the upper portion of West Fork Armells Creek." As noted in the CHIA, "measurable impacts to surface water are not expected to extend beyond Trail Creek, McClure Creek, Robbie Creek, Donley Creek, and Black Hank Creek watersheds."

A key finding from the CHIA is that the direct surface water effects of mining in Area F are confined to the uppermost reaches of the West Fork Armells Creek drainage, and downstream surface water impacts from Area F, if any, would not be measurable or discernable from natural background below the confluence of Trail Creek and West Fork Armells Creek, which is many miles upgradient from the confluence of West Fork Armells Creek and East Fork Armells Creek. Importantly, Area F is in the West Fork Armells Creek drainage, whereas the existing Rosebud Mine areas (except for a small portion of Area C), the Colstrip Power Plant, and the Town of Colstrip are in the East Fork Armells Creek drainage. Therefore, there are no incremental or additive direct surface water effects of Area F mining to waters already affected by other areas of the mine, the power plant, or the town. See the 2018 Final EIS at F-182 (surface water impacts are "indiscernible from the natural variability" at the East/West Fork's confluence).

Under the now-rescinded NEPA regulations, cumulative impacts were the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions, and indirect impacts were those impacts caused by the action that occur later in time or farther away in distance but are still reasonably foreseeable. While no longer binding on OSMRE, those NEPA definitions of cumulative impacts and indirect impacts were used during the drafting of this portion of the SEIS. The surface water "cumulative impacts analysis area" considered in this section is the same as the "indirect impacts analysis area" (**Figure 3.7-2**) and includes the Sarpy Creek, Armells Creek, and Rosebud Creek watersheds, and the reach of the Yellowstone River between the Armells Creek and Tongue River confluences. This "cumulative impacts analysis area" was delineated to consider potential surface water impacts from atmospheric deposition of Colstrip Power Plant and Rosebud Power Plant emissions and is much broader geographically than the CHIA "cumulative hydrologic impact area."

Though the direct effects of mining do not extend outside of the West Fork Armells Creek drainage, for completeness, **Table 5.3-6** summarizes the related past, present, or reasonably foreseeable actions (described and quantified where possible in **Table 5.2-1**) that have directly or indirectly affected or will affect surface water resources in the "cumulative impacts analysis area." Overall, the combined past, present, and reasonably foreseeable future actions would contribute short-term and long-term adverse cumulative impacts on surface water quantity and quality with a range of intensities from negligible to moderate. Corresponding impacts would include changes to spring and stream flows, pond levels, floodplains, and the hydrologic balance, as well as to spring, stream, and pond water quality. Importantly,

the cumulative effects on surface waters of Colstrip Power Plant operations across the indirect effects area are effects that would occur regardless of the source of coal to the power plant. Whether the coal is sourced from Area F, another area of the Rosebud Mine, or another mine entirely does not change the cumulative effects on surface waters discussed in this section.

Table 5.3-6. Water Resources – Surface Water: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
Agriculture	Past, present, and RFA	Specific areas within the cumulative impacts analysis area have been used for decades for agricultural purposes focused on crop irrigation and livestock watering and grazing, which is expected to continue through the reasonably foreseeable future. Approximately 1 percent of the cumulative impacts analysis area adjacent to Rosebud Creek, Armells Creek, and Sarpy Creek drainages supports hay (primary crop), barley, and sugar beet production with irrigation water that is diverted from the streams. The portion of the irrigation water that is not consumed by evaporation and vegetative transpiration eventually reenters the streams through surface water and groundwater return flows. Extensive dryland areas between the surface water drainages are used for livestock grazing. Surface water diverted from the Yellowstone River also supports a significant amount of agricultural irrigation along the northern part of the cumulative impacts analysis area (see discussion in this table below under: “Water uses and discharges: Agricultural diversions”). A relatively small amount of surface water in the cumulative impacts analysis area is consumed by livestock from springs that discharge native groundwater to the land surface, from ponds that impound localized surface water runoff behind small man-made dams, and from stream channels that convey localized and regional surface water flow. Agriculture historically has and continues to have a substantial effect on surface water resources in the cumulative impacts analysis area (Rosebud Creek, Armells Creek, and Sarpy Creek watersheds) through the following activities: • Surface water diversions – Based on data collected from the DNRC Water Rights Bureau (DNRC 2024), there are approximately 1,400 active surface water rights associated with spring, pond, and stream water diversions that are dedicated to agricultural irrigation (about 200 water rights) and stock watering (about 1,200 water rights) within the cumulative impacts analysis area. Those water rights collectively represent a combined maximum diversion potential of about 400 cfs used primarily for irrigation purposes. Such diversions reduce local and regional surface water flow rates, which can adversely affect corresponding surface water hydrology if the actual diversion rates reflect a significant portion of available quantities of surface water from the springs, ponds, and streams. Historical levels of regional agricultural diversions are expected to continue through the reasonably foreseeable future. Further quantitative analysis has not been completed due to data limitations for historical agricultural diversions in the cumulative impacts analysis area. Corresponding impacts on surface water hydrology in the cumulative impacts analysis area would be long-term and adverse with an unidentified range of intensity. • Irrigation return flows – The return flows from agricultural irrigation activities can contain elevated levels of contaminants that can adversely affect the quality of surface water in a watershed. Contaminants can include nutrients, herbicides, insecticides, and other agrochemicals if used for crop production in the cumulative impacts analysis area. Water evaporation and transpiration by plants can also increase salinity in agricultural return flows. These collective contaminants can contribute to non-point-source pollution of surface

Table 5.3-6. Water Resources – Surface Water: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
		water resources. Historical levels of regional irrigation activities and corresponding return flows are expected to continue through the reasonably foreseeable future. Quantitative analysis has not been completed due to data limitations for historical irrigation return flows and for the use and presence of the contaminants of concern in the cumulative impacts analysis area. Corresponding impacts on surface water quality in the cumulative impacts analysis area would be long-term and adverse with an unidentified range of intensity. • Livestock grazing – The grazing of livestock near springs, ponds, and streams can adversely affect surface water quality through increased sedimentation (from trampling and heavy grazing), increased levels of pathogenic microorganisms (from fecal deposits), and increased temperature (from vegetative defoliation and streambank widening). Historical levels of regional grazing activities are expected to continue through the reasonably foreseeable future. Quantitative analysis has not been completed due to data limitations for historical levels of the contaminants of concern in the cumulative impacts analysis area. Corresponding impacts on surface water quality in the cumulative impacts analysis area would be long-term and adverse with an unidentified range of intensity.
Air emissions and associated land uses/disturbance: **Colstrip Power Plant and Rosebud Power Plant**	Past, present, and RFA	The Colstrip Power Plant, located within the city of Colstrip, historically included power generation Units 1 and 2 that were retired from use in 2020, and now includes Units 3 and 4 that started operating in 1984 and 1986, respectively, and are anticipated to operate through at least 2042. The power plant currently exclusively uses coal from the Rosebud Mine (Areas B and F as of 2023). The Rosebud Power Plant, located about 6 miles north of the city of Colstrip, has been operating since 1990. Coal from all of the active permit areas is currently used in the plant. The Rosebud Power Plant currently exclusively uses coal from the Rosebud Mine; in 2023, coal combusted in the plant came from Area F (the project area) and Area B. The Rosebud Power Plant is expected to continue operations, using waste coal from Areas B and F through 2045 and 2039, respectively. The area of deposition of coal combustion emissions in soil and surface water around the Colstrip Power Plant and the Rosebud Power Plant is described in **Section 4.3, Air Quality** (see also **Section 3.7.1.2, Analysis Area** in the 2018 Final EIS). An analysis of potential effects on stream water quality from deposition from the Colstrip Power Plant and the Rosebud Power Plant was limited to mercury, selenium, copper, nitrate+nitrite, and total nitrogen. Other metals were not evaluated because the deposition areas for antimony, arsenic, cadmium, chromium, and lead were predicted to be very small. Historical levels of atmospheric deposition from the power plants are expected to continue through the reasonably foreseeable future. Following is a summary of corresponding cumulative impacts of atmospheric deposition from the Colstrip Power Plant and the Rosebud Power Plant on water quality of streams in the cumulative impacts analysis area (see **Section 4.7.3.3, Indirect Impacts, Surface Water Quality** for detailed quantitative analysis): • Sarpy Creek (mercury): Short-term, negligible to moderate, and adverse possible impacts. • Rosebud Creek (mercury and copper): Short-term, negligible to moderate, and adverse possible impacts. • West Fork Armells Creek (selenium): Short-term, negligible to moderate, and adverse possible impacts. • East Fork Armells Creek (selenium and copper): Long-term, negligible to moderate, and adverse possible impacts.

Table 5.3-6. Water Resources – Surface Water: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
Climate change	Present and RFA	Climate change is anticipated to alter precipitation patterns and increase temperature and the frequency and intensity of wildfire over the long term, which is expected to adversely affect surface water quantity and quality in the cumulative impacts analysis area over the long term. Changes to these conditions are expected to proceed through the reasonably foreseeable future. Quantitative analysis has not been completed due to data limitations for long-term changes to those conditions in the cumulative impacts analysis area. Corresponding impacts on surface water quantity and quality in the cumulative impacts analysis area would be long-term and adverse with an unidentified range of intensity.
Federal land management: **U.S. Department of the Interior – BLM**	Past, present, and RFA	Approximately 3 percent (50 square miles) of the cumulative impacts analysis area (1,500 square miles) is BLM land. The 2015 MCFO Approved Resource Management Plan (ARMP) includes a goal for water resources to maintain or enhance the beneficial uses of surface water and groundwater with objectives to support natural surface water flow regimes and to protect water resources from point-source and non-point-source pollution. The ARMP also includes the following management decisions related to water resources: • BLM activities conducted will meet or exceed Montana water quality standards. • Surface-disturbing activities are allowed in 100-year floodplains with specialized design features to minimize impacts on the functionality and resiliency of the floodplain in compliance with Executive Order 11988. • Surface-disturbing activities that do not benefit the functionality of the perennial or intermittent stream, lake, pond, or reservoir are allowed with specialized design features to ensure that all state water quality standards are met and that all beneficial uses remain fully supported. • Surface-disturbing activities are allowed within state-designated Source Water Protection Areas with specialized design features to minimize impacts on surface or groundwater quality. • Surface water impoundments are allowed with measures designed to maintain water quality, and riparian and watershed functionality and resiliency. • Oil and gas leasing is open and surface occupancy and use is prohibited on 100-year floodplains (NSO). • Oil and gas leasing is open and surface occupancy and use is prohibited on perennial or intermittent streams, lakes, ponds, and reservoirs. • Oil and gas leasing is open and surface occupancy and use is prohibited within state-designated Source Water Protection Areas. The 2024 MCFO Final EIS and RMP Amendment indicates that Federal coal would not be available for leasing within the MCFO planning area, except for in the existing Rosebud Mine that is within the cumulative impacts analysis area. Secretarial Order 3418 - *Unleashing American Energy* (January 20, 2025) directed BLM to review and, as appropriate, revise all relevant draft and all finalized RMPs and supporting NEPA documents, including the MCFO RMP and NEPA documents. BLM published a notice of intent to amend the MCFO RMP and accompanying NEPA analysis on July 8 to reevaluate coal allocations in the planning area and to determine the availability of lands acceptable for further consideration for coal leasing in accordance with recent EOs. Further, Section 50203 of the OBBB directs the Secretary to make available for lease at least 4 million acres of recoverable Federal coal, but no lease sales have occurred yet. Impacts from Rosebud Mine activities under BLM management on surface water quantity and quality in the cumulative

Table 5.3-6. Water Resources – Surface Water: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
		impacts analysis area would include short-term and long-term adverse impacts that would range from negligible to moderate if the RMP remains as issued in 2024; however, if the RMP is revised and additional mining occurs in the region, the impacts could be greater. Other actions on BLM-managed Federal lands in the near vicinity of the project area must be completed in compliance with the amended RMP and include the following: vegetation management, fire management, forestry, livestock grazing, recreation (trails and travel management), road maintenance, BLM-authorized rights-of-way for powerlines and pipelines, administration of coal leases and mineral material sites, land withdrawals, and land sales and exchanges. Of those actions, livestock grazing may contribute measurable impacts on surface water quality within the cumulative impacts analysis area, which would be long-term and adverse with an unidentified range of intensity (see discussion in this table above specific to livestock grazing under "Agriculture").
Water uses and discharges: **Rosebud Power Plant**	Past, present, and RFA	The Rosebud Power Plant uses deep groundwater wells as a source of water supply, which does not affect surface water resources in the cumulative impacts analysis area. The power plant, under the facility's MPDES Permit MT-0031780, can discharge surface water from a storm water control pond to an unnamed ephemeral tributary to the East Fork Armells Creek that is within the cumulative impacts analysis area. Any effluent discharge must meet effluent limitations and conditions specified in the MPDES Permit. Since the permit was issued in January 2016, there have been no recorded discharges of effluent from the facility (EPA 2024i). Any potential future discharge would likely result in minor flow increases in the unnamed tributary with negligible effects on surface water hydrology or water quality in the cumulative impacts analysis area.
Water uses and discharges: **Colstrip Power Plant**	Past, present, and RFA	The Yellowstone River diversion point associated with the 69 cfs water right dedicated to municipal and industrial purposes near Colstrip (e.g., the Colstrip Power Plant's industrial supply and the city of Colstrip's municipal supply) is downstream of the confluence with Armells Creek. Based on USGS stream flow data at Forsyth (USGS 2024), Montana, the 69 cfs municipal/industrial water right represents a small percentage of flow in the river (see analysis and narrative in **Section 4.7.3.3, Indirect Impacts, Surface Water Hydrology**). The diversion currently withdraws an average of 0.7 percent of the estimated Yellowstone River flows, with a slightly higher (1.0) and lower (0.4) proportion of the total flow withdrawn in dry and wet years, respectively. The proportional impact of the water withdrawals on peak flows was 0.1 to 0.2 percent. In February, typically the month in which the Yellowstone River has the lowest flows on average, the water withdrawals would result in a 1.0 to 1.8 percent decrease in flows depending on the year type. The impact of the diverted water in June, the wettest month on average, would be a decrease in stream flow of 0.3 percent or less. When the single individual day with the lowest flow within the period of record from 2000 through 2023 was analyzed, the water withdrawal accounted for 3 percent of the estimated total flow in the Yellowstone River, upstream of the diversion point. Based on these analyses, there would be a negligible impact to stream flow in the Yellowstone River from the water withdrawals for the Colstrip Power Plant, with each flow metric in average, dry, or wet years decreasing by less than 2 percent. The amount of water diverted cannot be differentiated from the natural variability in flow observed from day to day. The municipal/industrial water supply diverted from the Yellowstone River as described above is piped at a rate of up to 69 cfs to Castle Rock Lake near East Fork Armells Creek. Approximately 180 acre-feet per year (0.25 cfs) of water seeps continuously from Castle Rock Lake (DEQ 2016),

Table 5.3-6. Water Resources – Surface Water: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
		contributing to a negligible to moderate beneficial increase in flow of East Fork Armells Creek. Effects to the stream flow from potential future changes in dam seepage are unknown. Raw water is conveyed from the lake to the Colstrip Power Plant's holding tanks and then treated and distributed for process use to the boilers, cooling towers as makeup water, bottom-ash systems, and scrubbers. Most of the facility's process water is used in the cooling-water systems. The power plant does not use any local surface or groundwater for its supply, and its closed-loop process system is intended to keep process water from discharging to surface or groundwater. Historical operations of the power plant are expected to continue through the reasonably foreseeable future. Numerous lined ponds at the power plant are used for disposal of coal combustion products, evaporation of wastewater, and storm water runoff. Although the ponds were designed and constructed to minimize seepage losses, seepage from various ponds has occurred, resulting in measurable impacts on groundwater beneath the plant site and on nearby surface water in East Fork Armells Creek. Spills to the East Fork Armells Creek from Colstrip Power Plant pipelines have also occurred. Indirect impacts on East Fork Armells Creek surface water quality from Colstrip Power Plant process wastewater migration due to pond seepage and pipeline spills would be short-term, negligible to minor, and adverse. A local borrow area associated with the power plant is permitted (MPDES Permit MTR106638) for discharges of storm water from construction activities to Cow Creek in the Rosebud Creek watershed. No violations of corresponding effluent limitations have been identified since permit records began in 2021 (EPA 2024i). Corresponding impacts on surface water hydrology and quality in the cumulative impacts analysis area would be negligible.
Water uses and discharges: **Rosebud Mine, other coal mines in southeastern Montana, and gravel quarries**	Past, present, and RFA	**Rosebud Mine (Area F):** As described in the cumulative impacts section of the 2018 Final EIS for Area F, corresponding short-term and long-term adverse impacts on surface water quantity and quality include: • Removal of tributaries during mining • Changes to spring flows from groundwater drawdown • Changes to stream flows from groundwater drawdown and from filling of channels with more permeable unconsolidated materials postmining • Changes to surface water quantity from disturbance of the watershed and stream channels and from MPDES discharges and mine pit dewatering to streams • Changes to surface water quality from MPDES discharges and mine pit dewatering to streams and from changes in groundwater quality and runoff from mine roads and facilities • Changes to storm runoff from retention of runoff in sediment-control ponds • Changes to the hydrologic balance from changes in topography postmining As detailed in **Section 4.7, Water Resources – Surface Water**, Area F would contribute adverse impacts to surface water quantity and quality within the direct and indirect impacts areas. Summary: Area F would contribute short-term to long-term adverse cumulative impacts on surface water quantity and quality that would range from negligible to moderate. This would occur due to changes to spring and stream flows, pond levels, floodplains, and the hydrologic balance, as well as to spring, stream, and pond water quality. Overall, when combined

Table 5.3-6. Water Resources – Surface Water: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
		with other past, present, and reasonably foreseeable future actions, Area F would have short-term to long-term, negligible to moderate, adverse cumulative effects on surface water quantity and quality. Direct Impacts: Direct impacts to spring flows, stream flows, and the hydrologic balance would be long-term, minor to moderate, and adverse. Direct impacts to pond levels would be long-term, negligible to moderate, and adverse. Direct impacts to floodplains would be short-term, minor, and adverse. Direct impacts to spring water quality would be short-term, minor, and adverse. Direct impacts to stream and pond water quality would be long-term, minor to moderate, and adverse. Some surface water resources would be permanently lost or changed. Indirect Impacts: There would be no indirect impacts to stream flow due to Colstrip Power Plant surface water diversions. There would be no indirect impacts to stream water quality due to atmospheric deposition from the Colstrip Power Plant, except in East Fork Armells Creek where indirect impacts would be long-term, negligible to moderate, and adverse. Indirect impacts on East Fork Armells Creek surface water quality from Colstrip Power Plant process wastewater migration due to pond seepage and pipeline spills would be short-term, negligible to minor, and adverse. Indirect impacts on West Fork Armells Creek surface water hydrology (ephemeral stream flows) from Area F mining activities would be adverse and minor in the short term to negligible in the long term. **Rosebud Mine (Areas A through E):** Past and current coal mining activities at the Rosebud Mine (Areas A through E) are in various stages of operation, reclamation, or closure that have and will continue to affect surface water quantity and quality in the following watersheds in ways similar to those described above for Area F. These actions occur within the cumulative impacts analysis area and are expected to continue into the foreseeable future for Areas A, B, and C (Area D is being reclaimed, and Area E was released from DEQ jurisdiction in 2019). • Rosebud Creek watershed due to mining in Areas B, D, and E • East Fork Armells Creek watershed due to mining in Areas A, B, C, and D • West Fork Armells Creek watershed due to mining in Area C • Lee Coulee watershed due to mining in Area B (including AM5) • Richard Coulee watershed due to mining in Area B (AM5) • Cow Creek watershed due to mining in Areas D and E • Pony Creek and Spring Creek watersheds due to mining in Area D • Stocker Creek watershed due to mining in Areas A and C Surface water quantity and quality impacts for specific Rosebud Mine Areas are included in the CHIAs. The most recent CHIA was completed (DEQ 2022b) for Area B Amendment 5 (AM5) and provides detailed discussion of impacts to Area B drainage basins. Additional information on mining-related impacts within the cumulative impacts analysis area is provided (DEQ 2022a) in the Rosebud Mine Area B AM5 Final Environmental Impact Statement (FEIS). Cumulative impacts described in the Area B AM5 CHIA and FEIS fall under the following categories: • Alterations in surface or spring flows from source groundwater drawdown • Alterations in surface flows from disturbance of the watershed and stream channels • Alterations in baseflow from disturbance to contributing aquifers • Changes in storm runoff due to retention of runoff in sediment-control ponds

Table 5.3-6. Water Resources – Surface Water: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
		• Changes in stream flow due to filling of channels with more permeable unconsolidated materials postmining • Changes in the hydrologic balance due to changes in topography postmining • Removal of tributary sources during mining • Surface water quality changes from changes in source groundwater quality • Surface water quality and quantity changes from MPDES discharges and mine pit dewatering to surface water • Water quality changes from runoff from mining infrastructure (roads and industrial facilities) Overall, Rosebud Mine Area B AM5 would contribute long-term adverse cumulative impacts on surface water hydrology due to changes in stream and spring flows, loss of springs, and loss of ponds or reduction in water supply to ponds and would contribute short-term and long-term adverse cumulative impacts on surface water quality due to backfilling with spoil and surface disturbances. These categories of impacts are representative of impacts from all Rosebud Mines (Areas A through E); thus, when combined with other past, present, and reasonably foreseeable future actions, Rosebud Mine Areas A through E would have short-term and long-term adverse cumulative effects on surface water quantity and quality that would range from negligible to moderate. **Rosebud Mine (MPDES)** Westmoreland Rosebud has three MPDES Permits that regulate point-source discharges of pollutants from various areas of the Rosebud Mine including MT-0031828 (Area F), MT-0023965 (Areas A through D), and MT-0032042 (Area B AM5). MPDES Permit MT-0031828 provides effluent limits for 55 outfalls to Trail Creek, McClure Creek, Robbie Creek, Donley Creek, and Black Hank Creek watersheds. MPDES Permit MT-0023965 provides effluent limits for 153 outfalls to East Fork Armells Creek, Stocker Creek, Lee Coulee, West Fork Armells Creek, Black Hank Creek, Donley Creek, Cow Creek, Spring Creek, and Pony Creek. MPDES Permit MT-0032042 provides effluent limits for 18 outfalls to Lee Coulee and Richard Coulee, which are both tributaries to Rosebud Creek. Discharges must meet effluent numeric and narrative limits to protect surface water quality and uses. In the past 10 years (2014-2024), effluent limitation exceedances were restricted to outfalls with discharges to East Fork Armells Creek, which included two violations (2020 and 2023) for total suspended solids and one violation (2017) for total iron (EPA 2024i). **Rosebud Mine (Future)** Possible future coal mining and prospecting proposed by Westmoreland Rosebud would have similar impacts on surface water quantity and quality as described above for Area F. Quantitative analysis has not been completed for future coal mining and prospecting because these actions are speculative at this time. **Absaloka Mine** The Absaloka Mine, located in the Sarpy Creek basin approximately 8 miles southwest of the project area, was operated since 1974. Past and current coal mining and reclamation activities at the Absaloka Mine have likely affected surface water quantity and quality in ways similar to those described above for Rosebud Mine Areas A through F. These actions are expected to continue into the foreseeable future. **Big Sky Mine** The Big Sky Mine, located south of Rosebud Mine Area B, was operated by Peabody Energy from 1984 to 2003 and is now fully reclaimed, and the

Table 5.3-6. Water Resources – Surface Water: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
		Phase IV bond has been released. Past coal mining and reclamation activities at the Big Sky Mine affected surface water quantity and quality for the Lee Coulee, Miller Coulee, and Rosebud Creek watersheds, which are located within the cumulative impacts analysis area, as follows: • Removal of tributaries during mining • Changes to spring flows from groundwater drawdown • Changes to stream flows from groundwater drawdown and from filling of channels with more permeable unconsolidated materials postmining • Changes to surface water quantity from disturbance of the watershed and stream channels and from MPDES discharges and mine pit dewatering to streams • Changes to surface water quality from MPDES discharges and mine pit dewatering to streams and from changes in groundwater quality and runoff from mine roads and facilities • Changes to storm runoff from retention of runoff in sediment control ponds • Changes to the hydrologic balance from changes in topography postmining Impacts from the Big Sky Mine on surface water quantity and quality in the Lee Coulee, Miller Coulee, and Rosebud Creek watersheds have likely been similar to impacts described above for Rosebud Mine Areas A through F. **Gravel Quarries** The cumulative impacts analysis area includes eight active gravel quarries with operating permits through DEQ's Opencut Mining Program, five of which are for mining scoria by Westmoreland Rosebud (used on road surfaces within the Rosebud Mine) that are authorized under Westmoreland Rosebud's existing Rosebud Mine operating permits. Historical levels of gravel quarrying activities are expected to continue through the reasonably foreseeable future. If located near a stream channel, the gravel quarries may contribute to cumulative impacts on surface water quantity (from excess precipitation runoff) and on surface water quality (from erosion, sedimentation, or inadvertent spills or releases of hazardous or deleterious substances such as petroleum products). Gravel quarry permits include a mining and reclamation plan specifying that surface and groundwater will be given appropriate protection from deterioration of water quality and quantity that could be caused by mining and reclamation activities. Quantitative analysis has not been completed due to data limitations for historical gravel quarry operations and any reported surface water discharges, spills, or releases in the cumulative impacts analysis area. Impacts from gravel quarries on surface water quality within the cumulative impacts analysis area would be long-term and adverse with an unidentified range of intensity.

Table 5.3-6. Water Resources – Surface Water: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
Water uses and discharges: **Colstrip Water Treatment Plant**	Past, present, and RFA	The Colstrip Water Treatment Plant supplies potable water to Colstrip. The municipal water supply is sourced from the Yellowstone River from where it is piped to Castle Rock Lake near East Fork Armells Creek and then conveyed from the lake to the treatment plant. Impacts on surface water flow hydrology from the treatment plant's portion of diversions in the Yellowstone River within the cumulative impacts analysis area would be negligible (see discussion in this table above under "Water uses and discharges: Colstrip Power Plant"). Backwash from the potable water treatment plant is discharged back to Castle Rock Lake under the facility's MPDES Permit MT-0030422. There were no violations of effluent limitations over the past nine years (since September 2015), before which there were 52 effluent limit violations over eight years (between December 2007 and September 2015), with 16 violations for dissolved aluminum and 36 violations for total suspended solids (EPA 2024i). Laboratory tests associated with the 16 historical violations for dissolved aluminum included a range of concentrations from 0.13 mg/L to 12.3 mg/L (as compared to the effluent limitation of 0.12 mg/L). Laboratory tests associated with the 36 historical violations for suspended solids included a range of average concentrations from 51 mg/L to 113 mg/L (as compared to the average effluent limitation of 50 mg/L). These historical water quality violations have adversely affected the water quality of Castle Rock Reservoir, indicating a possible corresponding water quality impact in the cumulative impacts analysis area that is short-term, negligible to moderate, and adverse. The city of Colstrip is authorized to discharge from its wastewater treatment plant to East Fork Armells Creek pursuant to its MPDES Discharge Permit MT-0022373. The treatment plant operates at about 200,000 gallons per day, about one-third of the stated capacity (DEQ 2015d). There were no violations of effluent limitations over the past 17 years (since the earliest records were available in January 2007), and records indicate there was no discharge from the facility since January 2012 (EPA 2024i), but during historical operations, the treated effluent has caused increases in East Fork Armells Creek stream flow. Historical discharge rates and volumes are expected to continue through the reasonably foreseeable future. Quantitative analysis has not been completed due to data limitations for historical stream flow in East Fork Armells Creek. Impacts from wastewater treatment plant discharges on surface water hydrology within the cumulative impacts analysis area would be long-term and beneficial.

Table 5.3-6. Water Resources – Surface Water: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
Water uses and discharges: **Irrigation – golf course**	Past, present, and RFA	The nine-hole public golf course located adjacent to East Fork Armells Creek uses irrigation water to maintain the greens that is sourced from Colstrip's municipal water supply, which is piped from the Yellowstone River. Impacts on surface water flow hydrology from the golf course's portion of diversions in the Yellowstone River within the cumulative impacts analysis area would be negligible (see discussion in this table above under "Water uses and discharges: Colstrip Power Plant"). Historical levels of golf course irrigation activities are expected to continue through the reasonably foreseeable future. The portion of the irrigation water that is not consumed by evaporation and vegetative transpiration eventually reenters East Fork Armells Creek through surface water and groundwater return flows. The irrigation return flows can contain elevated levels of contaminants (nutrients, herbicides, and insecticides if used) that can adversely affect the water quality of the stream by contributing to non-point-source pollution of surface water resources. Quantitative analysis has not been completed due to data limitations for historical irrigation return flows and for the use and the potential presence of the contaminants of concern in the cumulative impacts analysis area. Corresponding impacts on surface water quality in the cumulative impacts analysis area would be long-term and adverse with an unidentified range of intensity.
Water uses and discharges: **Agricultural diversions**	Past, present, and RFA	The cumulative effects analysis area includes the Yellowstone River between the Armells Creek and Tongue River confluences. There are approximately 100 active surface water irrigation rights on the Yellowstone River within the cumulative effects analysis area with a cumulative maximum diversion potential of approximately 1,400 cfs (DNRC 2024). Approximately 70 of these water rights (1,100 cfs cumulative maximum diversion potential) are dedicated exclusively for irrigation purposes, including the largest three of those water rights (425 cfs, 144 cfs, and 109 cfs). The Yellowstone River diversion point associated with the 69 cfs water right dedicated to municipal and industrial purposes near Colstrip (e.g., city of Colstrip municipal supply and Colstrip Power Plant industrial supply) is downstream of the confluence with Armells Creek. Based on nearly five decades of USGS stream flow data at Forsyth, Montana (USGS 2024), average daily flow in the river during the irrigation season (May through September) ranged from 1,950 cfs (August 2001) to 97,000 cfs (May 1978) with an average daily flow of about 7,600 cfs during the month of August when river flow is usually at its lowest and irrigation activities are near their most active. The 1,100 cfs cumulative maximum irrigation diversion potential represents a wide percentage range of the average daily flow in the river during the irrigation season, from 1 percent at maximum recorded flow to 56 percent at minimum recorded flow and 14 percent at average flow in August. Historical levels of irrigation activities are expected to continue through the reasonably foreseeable future. Therefore, impacts on surface water flow hydrology from agricultural diversions in the Yellowstone River within the cumulative impacts analysis area would be long-term, negligible to moderate, and adverse.

Table 5.3-6. Water Resources – Surface Water: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
Wildland fire and prescribed burns	Past, present, or RFA	Four wildland fires have historically occurred in the vicinity of the Rosebud Mine with a wide range of affected acreage: • In 2012, the McClure Creek Fire and Donley Creek Fire burned a total of 221 acres around the southern boundary of Rosebud Mine Areas B, C, and F. • In 2012, the Chalky Fire burned 131,000 acres south of Area B, including the majority of the AM5 area. • In 2021 (July), the Poverty Flats Fire burned 75,000 acres east of the project area in Big Horn County. • In 2021 (August), the Richard Spring Fire burned 171,130 acres near the Rosebud Mine, including nearly the entirety of the project area. Wildland fires can affect surface water hydrology through increased speed and volume of surface water runoff due to changes in land surface properties like decreased vegetative cover and increased water repellency, which can lead to flooding in the affected drainages. These conditions can affect surface water quality through increased erosion that can move debris, ash, sediment, nutrients, metals, and other pollutants from the land surface into stream drainages. Wildland fires can also destroy organic soil matter (such as vegetative roots) that helps hold it in place, thereby reducing the soil's ability to absorb and retain water and increasing the potential for soil erosion, mudslides, and landslides. Quantitative analysis has not been completed due to data limitations for the geographical extents of the historical wildland fires, the post-fire flood conditions, and the potential presence of the contaminants of concern in the cumulative impacts analysis area. Wildland fires are expected to continue through the reasonably foreseeable future. Therefore, impacts from wildland fires on surface water hydrology and surface water quality within the cumulative impacts analysis area would be long-term and adverse with an unidentified range of intensity.

5.3.7 Water Resources – Groundwater

Cumulative effects on groundwater have been updated from those that were described in **Section 5.3.7** of the 2018 Final EIS, beginning on page 686; this section now incorporates information from the CHIA (DEQ 2019b), which is referred to as the CHIA. The analysis area for cumulative groundwater impacts comprises all of the Rosebud Mine, including areas previously and presently mined (**Figure 5.2-1**).

A review of groundwater level data from the various Rosebud Mine permit areas indicates that groundwater drawdown resulting from mine dewatering and removal of the Rosebud coal seam does not extend any significant distance from each specific mined area. Groundwater drawdown does overlap between adjacent mine areas with little to no overlap between groundwater basins. For example, Area F is located within the West Fork Armells Creek groundwater basin, and therefore there is no interaction between the impacts on groundwater from Area B (as modified by AM5) and impacts from Area F. A possible action that could have cumulative impacts on project area groundwater conditions is continued mining in Area C, which is also located in the West Fork Armells Creek groundwater basin. Groundwater drawdown due to mining in Area C would overlap with drawdown created by mining in the project area. Monitoring well WR-231, screened in the project area Rosebud Coal, has shown groundwater declines of 10 to 15 feet in the southeastern portion of the project area, likely due to past and current mining in Area C. Westmoreland Rosebud did not mine any coal in Area C in 2023 (Westmoreland Rosebud 2024a). Because the total drawdown during mining would be limited by the depth of the Rosebud Coal and the coal would eventually be removed from the project area, there would not be any long-term cumulative impacts of overlapping drawdown cones from the two mined areas for what was previously the Rosebud Coal. It is likely there would be long-term (more than 50 years postmining) cumulative residual drawdown of between 5 and 10 feet in the McKay coal seam in the southeast portion of the project area, extending into Area C.

Modeled drawdown in the Rosebud and McKay coal seams conducted as part of the Alternative 2 analysis included approved past, ongoing, and future mining of Area A, B, and C and therefore quantitatively assessed the cumulative impacts for drawdown at end of mining (**Figures 108** and **109** of the 2018 Final EIS). The model is calibrated by an iterative process of comparing model results to measured water levels in monitoring wells, then adjusting model parameters to create a closer match. The calibrated steady-state model is then used to simulate the mining progress using a transient simulation, which adds in mining passes year by year according to the actual history of mining for the past and the permitted mining plan for the future. After each pass is mined, the model parameters are changed in that area to represent the spoil. The results of the transient simulation are the groundwater levels for each year from the 1970s to the end of mining. A 50-year simulation models the postmining recovery period. The water levels for each year are subtracted from the pre-mining water level to give the drawdown, or reduction in water levels due to mining. As reported in the CHIA (DEQ 2019b), drawdown caused by mining in western portion of Area C will overlap with drawdown from Area F to cumulatively create greater drawdown near the shared boundary between the two mine areas. Spoil groundwater from a small area at the westernmost end of the western portion of Area C is predicted to flow northwest, through a portion of Area F, where it will have cumulative impacts on groundwater quality with Area F spoil groundwater. Additionally, postmining water quality impacts of Area C and Area F spoil groundwater on alluvial groundwater have cumulative impacts in the West Fork Armells Creek alluvial groundwater downgradient from Robbie Creek, although as described in Section 9.6.3.6 of the CHIA, Area C impacts are predicted to not be measurable at the confluence.

Areas A, B, D, and E, where past and present mining has occurred, are too distant to affect groundwater levels in the project area or to overlap off-site groundwater drawdown. Any impacts on water quality from resaturating spoil in the other mine areas, including any mine expansion, would be seen in East Fork Armells Creek or in tributaries to Rosebud Creek. Any potential cumulative impact on project area water

quality would occur downstream of the confluence of the East and West Forks of Armells Creek. However, at that distance from the mined areas, any effect on water quality would be long-term but have negligible adverse impacts. There would not be any cumulative groundwater quality impacts from project area operations within the Rosebud Creek watershed.

Other past, present, and future mining activities in southeastern Montana, as described in **Table 5.2-1**, are too distant to have any cumulative impact with respect to groundwater level changes in the project area.

5.3.8 Water Resources – Water Rights

Cumulative impacts on water rights would be similar to those described in **Section 5.3.8** of the 2018 Final EIS, beginning on page 687. However, similar to the surface water discussion, this discussion has been supplemented to include a discussion of surface water rights within a larger analysis area. The cumulative impacts analysis area for water rights includes the watersheds in which either direct or indirect impacts on water rights may be expected to occur, including the Sarpy Creek, Armells Creek, and Rosebud Creek watersheds and the reach of the Yellowstone River between the Armells Creek and Tongue River confluences.

Related past, current, and future actions (described in **Table 5.2-1**) that would affect groundwater rights include:

- Past, present, and future mine activities in the analysis area; and
- The use of groundwater for agricultural purposes, particularly livestock watering.

Other mine activities and agricultural use of groundwater resulting in groundwater drawdown in area wells may result in long-term, negligible to major, adverse impacts on existing groundwater rights. Water for livestock is the most common use of spring and shallow groundwater in the CHIA area. As part of the CHIA (DEQ 2019b), groundwater and spring users were identified within 3 miles downgradient and 1 mile in all other directions of Area F, and where the CHIA area extended further from the mine, the boundaries of the water user search area was extended to include all of the CHIA area. This represents a larger search area than summarized for Alternative 4, which limited the area to the analysis area (i.e. the model-predicted drawdown area). Therefore, Table 8-2 and 8-3 of the CHIA (DEQ 2019b) also contain additional cumulative analysis of water rights impacts for spring and groundwater that incorporate impacts related to Area C.

Table 5.3-7 summarizes the related past, present, or reasonably foreseeable actions (described and quantified where possible in **Table 5.2-1**) that have directly or indirectly affected or will affect surface water resources and, consequently, surface water rights in the analysis area. Overall, the combined past, present, and reasonably foreseeable future actions would contribute short-term and long-term adverse cumulative impacts on surface water rights with a range of intensities from negligible to moderate.

Table 5.3-7. Water Resources – Surface Water Rights: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
Agriculture	Past, present, and RFA	Impacts from agricultural activities on surface water rights in the cumulative impacts analysis area would be long-term and adverse with an unidentified range of intensity, consistent with corresponding surface water quantity and quality impacts described in **Section 5.3.6, Water Resources – Surface Water**.
Air emissions and associated land uses/disturbance: **Colstrip Power Plant and Rosebud Power Plant**	Past, present, and RFA	Impacts from the Colstrip Power Plant's and Rosebud Power Plant's air emissions on surface water rights in the cumulative impacts analysis area would be short-term and long-term, negligible to moderate, and adverse, consistent with corresponding surface water quality impacts described in **Section 5.3.6, Water Resources – Surface Water**.
Climate change	Present and RFA	Impacts from climate change on surface water rights in the cumulative impacts analysis area would be long-term and adverse with an unidentified range of intensity, consistent with corresponding surface water quantity and quality impacts described in **Section 5.3.6, Water Resources – Surface Water**.

Table 5.3-7. Water Resources – Surface Water Rights: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
Federal land management: **U.S. Department of the Interior –BLM**	Past, present, and RFA	Impacts from Rosebud Mine activities under BLM management on surface water rights in the cumulative impacts analysis area would include short-term and long-term adverse impacts that would range from negligible to moderate, consistent with corresponding surface water quantity and quality impacts described in **Section 5.3.6, Water Resources – Surface Water**. Impacts from livestock grazing activities on lands under BLM management on surface water rights in the cumulative impacts analysis area would be long-term and adverse with an unidentified range of intensity, consistent with corresponding surface water quality impacts described in **Section 5.3.6, Water Resources – Surface Water**.
Water uses and discharges: **Rosebud Power Plant**	Past, present, and RFA	Impacts on surface water rights from the Rosebud Power Plant's MPDES storm water control pond discharge to the unnamed ephemeral tributary to the East Fork Armells Creek would be negligible, consistent with corresponding surface water hydrology and water quality impacts described in **Section 5.3.6, Water Resources – Surface Water**.
Water uses and discharges: **Colstrip Power Plant**	Past, present, and RFA	Impacts from the Colstrip Power Plant's portion of diversions in the Yellowstone River on surface water rights in the cumulative impacts analysis area would be negligible, consistent with the corresponding description provided in **Section 5.3.6, Water Resources – Surface Water**. Impacts from potential future changes in Castle Rock Lake's dam seepage in East Fork Armells Creek on surface water rights in the cumulative impacts analysis area are unknown, consistent with the corresponding description provided in **Section 5.3.6, Water Resources – Surface Water**. There would be no impacts from the Colstrip Power Plant's operations on local surface water rights in the cumulative impacts analysis area, consistent with the corresponding description provided in **Section 5.3.6, Water Resources – Surface Water**. Indirect impacts on East Fork Armells Creek surface water rights from Colstrip Power Plant process wastewater migration due to pond seepage and pipeline spills would be short-term, negligible to minor, and adverse, consistent with the corresponding description provided in **Section 5.3.6, Water Resources – Surface Water**. Impacts from the Colstrip Power Plant's borrow area's Cow Creek storm water discharges on surface water rights in the cumulative impacts analysis area would be negligible, consistent with the corresponding description provided in **Section 5.3.6, Water Resources – Surface Water**.

Table 5.3-7. Water Resources – Surface Water Rights: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
Water uses and discharges: **Rosebud Mine, other coal mines in southeastern Montana, and gravel quarries**	Past, present, and RFA	Impacts from Rosebud Mine Area F activities on surface water rights in the cumulative impacts analysis area would be short-term and long-term, negligible to moderate, and adverse, consistent with corresponding surface water quantity and quality impacts described in **Section 5.3.6, Water Resources – Surface Water**. Impacts from Rosebud Mine Areas A through E, Absaloka Mine, and Big Sky Mine activities on surface water rights in the cumulative impacts analysis area would include short-term and long-term adverse impacts that would range from negligible to moderate, consistent with corresponding surface water quantity and quality impacts described in **Section 5.3.6, Water Resources – Surface Water**. Impacts from gravel quarry activities on surface water rights in the cumulative impacts analysis area would be long-term and adverse with an unidentified range of intensity, consistent with corresponding surface water quality impacts described in **Section 5.3.6, Water Resources – Surface Water**.
Water uses and discharges: **Colstrip Water Treatment Plant**	Past, present, and RFA	Impacts from the Colstrip Water Treatment Plant's portion of diversions in the Yellowstone River on surface water rights in the cumulative impacts analysis area would be negligible, consistent with the corresponding description provided in **Section 5.3.6, Water Resources – Surface Water**. Impacts from the Colstrip Water Treatment Plant's backwash discharge into Castle Rock Lake would be short-term, negligible to moderate, and adverse, consistent with the corresponding description provided in **Section 5.3.6, Water Resources – Surface Water**. Impacts from Colstrip's Wastewater Treatment Plant's East Fork Armells Creek discharges on surface water rights in the cumulative impacts analysis area would be long-term and beneficial, consistent with corresponding surface water quantity impacts described in **Section 5.3.6, Water Resources – Surface Water**.
Water uses and discharges: **Irrigation – golf course**	Past, present, and RFA	Impacts from the nine-hole public golf course's portion of diversions in the Yellowstone River on surface water rights in the cumulative impacts analysis area would be negligible, consistent with the corresponding description provided in **Section 5.3.6, Water Resources – Surface Water**. Impacts from the nine-hole public golf course's East Fork Armells Creek irrigation return flows on surface water rights in the cumulative impacts analysis area would be long-term and adverse with an unidentified range of intensity, consistent with corresponding surface water quality impacts described in **Section 5.3.6, Water Resources – Surface Water**.
Water uses and discharges: **Agricultural diversions**	Past, present, and RFA	Impacts from agricultural diversions on the Yellowstone River on surface water rights in the cumulative impacts analysis area would be long-term, negligible to moderate, and adverse, consistent with corresponding surface water quantity impacts described in **Section 5.3.6, Water Resources – Surface Water**.
Wildland fire and prescribed burns	Past, present, and RFA	Impacts from wildland fires on surface water rights in the cumulative impacts analysis area would be long-term and adverse with an unidentified range of intensity, consistent with corresponding surface water quantity and quality impacts described in **Section 5.3.6, Water Resources – Surface Water**.

5.3.9 Vegetation

Cumulative effects on vegetation would be similar to those described in **Section 5.3.9** of the 2018 Final EIS, beginning on page 688. The analysis area for evaluation of cumulative impacts on vegetation includes all permit areas of the Rosebud Mine, including past and ongoing mining areas, and the region surrounding the Rosebud Mine (**Figure 5.2-1**). **Table 5.3-8** summarizes the related past, present, or reasonably foreseeable actions (described and quantified where possible in **Table 5.2-1**) that have directly or indirectly affected or will affect vegetation in the analysis area.

Table 5.3-8. Vegetation: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
Agriculture	Past, present, and RFA	Agricultural development in the area consists mostly of cropland, pastureland, and grazing lands. Continued agricultural use would alter vegetation in areas adjacent to the mine and increase introduced species and noxious weeds to the area.
Alternative energy and transmission development and infrastructure	Past, present, and RFA	Alternative energy and transmission development and infrastructure projects in the analysis area include the Clearwater Wind project, the Clearwater to Colstrip Transmission Line project, and the North Plains Connector Power Transmission Line. These projects would result in surface disturbance that would affect vegetation, and loss of vegetation due to the proposed expansion of the project area would contribute to the adverse impacts of vegetation loss from past and future land disturbance associated with construction of alternative energy and transmission development.
Rosebud Mine (other permit areas) and other mines (coal and gravel)	Past, present, and RFA	Past and current coal and gravel mining and reclamation by Westmoreland and coal mining by other companies in southeast Montana could affect vegetation in ways similar to those described for the project area. Mining activity through 2023 has disturbed 19,062 acres at the Rosebud Mine. Past surface disturbances at the Rosebud Mine and other mines are summarized and quantified to the extent practicable in **Table 2.2-3** and **Table 5.2-1**. These actions are expected to continue in the foreseeable future and could have adverse impacts on vegetation. Westmoreland Rosebud plans to avoid mining through many drainage bottoms in the project area (all alternatives). Preservation of these drainage bottoms would create islands of native plants and seed sources within the project area and would reduce the impact on wetland and woody draw communities. Because this approach would be a change from the mining practices in other permit areas of the Rosebud Mine, the project area would be expected to have different impacts on vegetation than past mining activities (in other permit areas). Past and current coal-mining activities have altered the vegetation communities in the region. Vegetation cover and diversity in disturbed areas have decreased. The temporary loss of vegetation, reduction in vegetation diversity, and changes in species composition during mining activities in the project area would contribute to regional cumulative impacts on vegetation. Area F would contribute short-term, moderate, adverse cumulative impacts on vegetation from removal of vegetation for mining activities. Area F would also contribute long-term, minor, adverse cumulative impacts on vegetation due to decreased vegetation vigor and diversity and due to the potential for changes to vegetation communities from the reduced amount of surface and groundwater in the area. Overall, when combined with other past, present, and reasonably foreseeable future actions, Area F (all alternatives) would have a long-term, minor to moderate, adverse impact on vegetation.

Table 5.3-8. Vegetation: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
Coal combustion	Past, present, and RFA	Development of the power plants resulted in loss of vegetation due to land disturbances. Loss of vegetation due to the proposed expansion of the project area would contribute to the adverse impacts of vegetation loss from past and future land disturbance associated with construction of infrastructure. Trace-metal, SO_2, and NO_2 deposition in the analysis area from past and present combustion of Rosebud Mine coal at the Colstrip and Rosebud Power Plants may have adverse impacts on vegetation within a 32-km radius around the power plants (see Section **4.3**, **Air Quality** and **Section 4.24, Soil**). Deposition of trace metals, SO_2, and NO_2 continue to have long-term, minor, adverse cumulative vegetation impacts (due to soil impacts).
Federal land management – BLM and Forest Service	Past, present, and RFA	BLM-authorized actions in the near vicinity of the project area, such as rights-of-way for powerlines and pipelines, coal leases, mineral material sites, land withdrawals, and land sales and exchanges, may result in vegetation loss from new infrastructure development. However, BLM's MCFO RMP includes implementation of conservation measures and protection of wetland and riparian areas for BLM-authorized projects, resulting in a beneficial contribution to vegetation in those areas. Cumulative impacts resulting from these Federal land management activities were considered in the 2018 Final EIS (see **Section 5.3.9**). Since that time, the BLM has issued a SEIS for the MCFO RMP and indicated selection of Alternative D, which would disallow new leasing of the Federal coal estate in the MCFO planning area. Without the opportunity to develop new coal leases, there would be no additional impacts on vegetation related to coal leasing if the RMP remains as issued in 2024. Note that under Secretarial Order 3418 - *Unleashing American Energy* (January 20, 2025), the BLM has been directed to review and, as appropriate, revise all relevant draft and all finalized RMPs and supporting NEPA documents, including the MCFO RMP and NEPA documents. In addition, the *Miles City Field Office Final Supplemental Environmental Impact Statement and Resource Management Plan Amendment* (BLM 2024a) are currently under litigation. Actions on the Custer Gallatin Forest that could impact vegetation include management actions such as controlled burns, which would result in beneficial effects on vegetation.
Wildland fire	Past, present, and RFA	Wildland fires, including those ignited by coal seam fires, affect vegetation through plant mortality, loss of seed sources, and altering of vegetation communities (including community structure and vegetation patterns). Past wildland fires altered or eliminated vegetation composition in the burn areas and likely reduced tree and shrub cover within those areas. Wildland fires can potentially increase introduced or noxious weed species if a seed source for those invasive species is present. Wildland fires can also remove existing invasive species and allow for an increase in native species or new vegetation communities, such as that of the conifer/sumac complex present in the project area. Fires also can add nutrients to the soil for vegetation and kill insect pests that may be killing native vegetation. Fires are part of the natural ecosystem, and many native plant communities are accustomed to periodic fires. Periodic wildland fires could contribute both beneficial and adverse cumulative impacts on vegetation.
Climate change	Past, present, and RFA	Climate change is anticipated to increase the frequency and intensity of wildfire, alter precipitation patterns, and increase temperature, which is expected to impact vegetation resources. Climate change may also contribute to exacerbating the potential impacts of the proposed project on these resources.

5.3.10 Wetlands and Riparian Zones

Cumulative effects on wetlands would be similar to those described in **Section 5.3.10** of the 2018 Final EIS, beginning on page 690. The analysis area for evaluation of cumulative impacts on wetlands includes all permit areas of the Rosebud Mine, including past and ongoing mining areas, and the region surrounding the Rosebud Mine (**Figure 5.2-1**). **Table 5.3-9** summarizes the related past, present, or reasonably foreseeable actions (described and quantified where possible in **Table 5.2-1**) that have directly or indirectly affected or will affect wetlands in the analysis area.

Table 5.3-9. Wetlands: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
Agriculture	Past, present, and RFA	Agricultural development in the area consists mostly of cropland, pastureland, and grazing lands. Past livestock grazing has destabilized stream channels and disturbed spring and wetland areas. Continued agricultural development would alter wetlands adjacent to the mine and decrease the functions and values of surrounding wetlands.
Alternative energy and transmission development and infrastructure	Past, present, and RFA	Alternative energy and transmission development and infrastructure projects in the analysis area include the Clearwater Wind project, the Clearwater to Colstrip Transmission Line project, and the North Plains Connector Power Transmission Line. These projects would result in surface disturbance that could affect wetlands. Wetland impacts due to the proposed expansion of the project area would contribute to the adverse impacts of wetland loss from past and future land disturbance associated with construction of alternative energy and transmission development. Impacts from these activities are described qualitatively due to a lack of available data.
Rosebud Mine (other permit areas) and other coal mines	Past, present, and RFA	Past and current coal mining and reclamation at the Rosebud Mine, Absaloka Mine, and Big Sky Mine have likely affected wetlands in ways similar to those described for the Proposed Action (see **Section 4.11, Wetlands and Riparian Zones**). These actions are expected to continue into the foreseeable future and would have adverse impacts on wetlands. Expansion of the Rosebud Mine Area B (pursuant to approved AM5) will have direct long-term impacts on 1.93 acres of wetlands and indirect impacts on 3.13 acres of freshwater ponds and 0.40 acre of downstream wetlands shown on NWI mapping. A wetland mitigation plan is being implemented as Area B is mined to restore wetland functions and values in Area B. Alternative 4 would contribute long-term adverse cumulative impacts on wetlands that would range from minor to moderate. This would occur due to changes in or loss of hydrology, which may adversely affect wetlands. Alternative 4 would also contribute short-term and long-term adverse cumulative impacts on wetlands due to surface disturbances. Overall, when combined with other past, present, and reasonably foreseeable future actions, Alternative 4 would have a long-term, minor to moderate, adverse cumulative effects on wetlands.
Gravel quarry operations	Past, present, and RFA	Gravel quarry operations may have resulted in wetland loss due to land disturbances. Loss of wetlands due to the proposed expansion of the project area would contribute to the adverse impacts of vegetation loss from past and future land disturbance associated with gravel mining. Impacts from these activities are described qualitatively due to lack of available data on past impacts on wetlands from gravel quarries in the analysis area.

Table 5.3-9. Wetlands: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
Water use and discharge	Past, present, and RFA	Water uses and discharges have the potential to affect wetlands in the analysis area. Water is discharged from a storm-water control pond at the Rosebud Power Plant to an unnamed ephemeral tributary to the East Fork Armells Creek. The city of Colstrip is authorized to discharge from its wastewater treatment plant to East Fork Armells Creek pursuant to its MPDES discharge permit. As described in **Section 3.7, Water Resources – Surface Water**, there have been no recent effluent violations from the wastewater treatment plant to the creek, but the treated effluent causes changes in stream flow and water quality. The nine-hole public golf course is located adjacent to East Fork Armells Creek about a mile downstream of the city of Colstrip. Water used to maintain the greens infiltrates into the creek, likely causing undefined changes in water level and water quality. Changes in water flows could result in changes to wetland habitat along creek banks and result in a reduction of wetland functions or may provide water to support and/or expand wetland functions.
Wildland fire	Past, present, and RFA	Past and future fires, both wildland fires, including those ignited by coal seam fires, and prescribed burns, have affected and will affect wetlands mainly through alteration or reduction of wetland habitat, depending on the severity of the fire. During the 2012 wildland fire season, the McClure Creek and Donley Creek fires burned 221 acres on and around the southern boundary of the Rosebud Mine Areas B, C, and F, potentially affecting wetland habitat.
Climate change	Past, present, and RFA	Climate change is anticipated to increase the frequency and intensity of wildfire, alter precipitation patterns, and increase temperature, which is expected to impact wetland resources. Future climate change may result in changes in timing of runoff in streams in the western United States, including a reduction in flows in summer that may result in loss of riparian forests and wetlands region-wide. Changes in water flows may result in changes to wetland habitat along creek banks and result in a reduction of wetland functions. Climate change may also contribute to exacerbating the potential impacts of the proposed project on these resources. Impacts from climate change are described qualitatively due to uncertainty about the timing and magnitude of these impacts.

5.3.11 Fish and Wildlife Resources

Cumulative effects on fish and wildlife would be similar to those described in **Section 5.3.11** of the 2018 Final EIS, beginning on page 691. The analysis area for evaluation of cumulative impacts on fish and wildlife includes all permit areas of the Rosebud Mine, including past and ongoing mining areas, and the region surrounding the Rosebud Mine (**Figure 5.2-1**). **Table 5.3-10** summarizes the related past, present, or reasonably foreseeable actions (described and quantified where possible in **Table 5.2-1**) that have directly or indirectly affected or will affect fish and wildlife in the analysis area.

Table 5.3-10. Fish and Wildlife: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
Agriculture	Past, present, and RFA	Agricultural development in the area consists mostly of cropland, pastureland, and grazing lands. Continued agricultural development would alter habitat in areas adjacent to the mine. Wildlife is often displaced when native habitat is converted to cropland or pastureland. Grazing also affects wildlife habitat because livestock compete with native herbivores such as deer and elk. Loss of wildlife habitat and displacement of wildlife due to mining operations in the project area would contribute to regional cumulative impacts on wildlife habitat and populations. Agriculture historically has and continues to have a substantial effect on surface waters that provide habitat for fish and other aquatic species in the cumulative impacts analysis area (Rosebud Creek, Armells Creek, and Sarpy Creek watersheds); see **Table 5.3-6**.
Alternative energy and transmission development and infrastructure	Past, present, and RFA	Alternative energy and transmission development and infrastructure projects in the analysis area include the Clearwater Wind project, the Clearwater to Colstrip Transmission Line project, and the North Plains Connector Power Transmission Line. These projects would result in surface disturbance that could affect fish and wildlife habitat. Impacts on fish and wildlife from the proposed expansion of the project area would contribute to the adverse impacts of habitat loss from past and future land disturbance associated with construction of alternative energy and transmission development. Impacts from these activities are described qualitatively due to a lack of available data.
Actions by Federal land management agencies	Past, present, and RFA	BLM-authorized actions in the near vicinity of the project area, such as rights-of-way for powerlines and pipelines, coal leases, mineral material sites, land withdrawals, and land sales and exchanges, may result in habitat loss and fragmentation from new infrastructure development. However, BLM's ARMP also includes implementation of conservation and habitat protection of wetland and riparian areas. Displacement of wildlife from ongoing energy and mineral development and other actions on federally managed lands in the analysis area in combination with the Proposed Action may increase competition in available habitat containing sensitive resources.
Hunting	Past, present, and RFA	Regulated hunting generally does not significantly impact wildlife populations. Many state and Federal agencies use hunting as a management tool to control populations, reduce the spread of disease, produce maximum yield for hunters, reduce intra- and inter-species competition, and reduce damage caused by overpopulation of a species (Conover 2001). Private land hunting is allowed on inactive areas of the Rosebud Mine. Most large game that are hunted in the area (deer, elk, and pronghorn) appear to have relatively stable populations and have not been reduced in the past by hunting pressure (ICF International (ICF) 2013). Under the Proposed Action, some wildlife would be displaced. The possible shift of movement patterns, especially for large game, may affect the yield from hunting.

Table 5.3-10. Fish and Wildlife: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
Rosebud Mine (other permit areas) and other mines (coal and gravel)	Past, present, and RFA	Past and current coal mining and reclamation at the Rosebud Mine, Absaloka Mine, and Big Sky Mine have likely affected fish and wildlife in ways similar to those described for the Proposed Action (see **Section 4.12, Fish and Wildlife Resources**). Infrastructure associated with mining including roads and fencing further divides habitat and creates barriers to wildlife movement. Railroad construction results in surface disturbance, increased human presence during construction, and habitat fragmentation. Loss of wildlife habitat and displacement of wildlife due to mining operations in the project area would contribute to habitat losses and displacement impacts from past and future land disturbance associated with construction of infrastructure. Mining activity through 2023 has disturbed 19,062 acres at the Rosebud Mine. Past, present, and RFA mining activities in Area B AM5 would impact 2,658 acres of wildlife habitat. Past surface disturbances at the Rosebud Mine are summarized in **Table 2.2-3**. Disturbances at other mines are summarized and quantified to the extent practicable in **Table 5.2-1**. These actions are expected to continue into the foreseeable future and would have adverse impacts on wildlife and wildlife habitat. Past operation of the Rosebud Mine and other mines likely contributed to atmospheric deposition of trace metals in the analysis area and would contribute to cumulative effects on fish and wildlife resources. Trace metal concentrations and ecological screening values for birds and mammals are described in **Table 4.12-2**, in **Section 4.12.3.2, Indirect Impacts; Birds** and **Table 4.12-3** in **Section 4.12.3.2, Indirect Impacts; Mammals**. **Tables 4.12-2** and **4.13-3** quantify the background concentrations, total deposition over the period of operations, total expected concentrations (background plus deposition), ecological screening value, percentage of deposition relative to background, and percentage of deposition relative to ecological screening value. Alternative 4 would contribute long-term adverse cumulative impacts on wildlife that would range from minor to moderate. This would occur due to changes in or loss of hydrology, which may adversely affect fish and wildlife habitat. Alternative 4 would also contribute short-term and long-term adverse cumulative impacts on wildlife habitat due to surface disturbances. Overall, when combined with other past, present, and reasonably foreseeable future actions, Alternative 4 would have a long-term, minor to moderate, adverse cumulative effects on fish and wildlife habitat.
Power plant operations and rail transport	Past, present, and RFA	Power plant operation (coal combustion) and rail transport have resulted in habitat loss or fragmentation due to land disturbances. Railroad construction results in surface disturbance, increased human presence during construction, and habitat fragmentation. Loss of wildlife habitat and displacement of wildlife due to mining operations in the project area would contribute to habitat losses and displacement impacts from past and future land disturbance associated with construction of infrastructure.

Table 5.3-10. Fish and Wildlife: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
Wildland fire	Past, present, and RFA	Wildland fire affects wildlife mainly through alteration of habitat. The severity of the impacts on wildlife depends on the extent of habitat change from fire. Fires in forested areas usually cause more drastic alterations to habitat and associated fauna than those that occur in grasslands (Smith 2000). Certain studies suggest that direct mortality from fires is relatively low. Large, mobile animals and birds are capable of fleeing rather quickly. Smaller species may seek refuge under debris or in burrows (Kennedy and Fontaine 2009). Smith (2000) suggests that fire "reorganizes" animal communities because of alteration of habitat. Following some fires, generalist species may recolonize the burn area or move to adjacent unburned habitats. Generalist species may simply move to another habitat type that was not affected (e.g., breeding shrubland birds may move to grassland habitat) (Smith 2000). Some predators and raptors may benefit from fires exposing potential prey. Past wildland fires, including those ignited by coal seam fires, likely changed or eliminated habitat components in the burn areas and may have prevented or altered use by certain species. Periodic wildland fires would contribute both positive and negative cumulative impacts on regional wildlife.
Climate change	Past, present, and RFA	Climate change is anticipated to increase the frequency and intensity of wildfire, alter precipitation patterns, and increase temperature, which is expected to impact fish and wildlife habitat. Future climate change may result in changes in timing of runoff in streams in the western United States, including a reduction in flows in summer that may result in changes to habitat for species that rely on aquatic, riparian, or wetland habitats region-wide. Changes in precipitation patterns, increased drought and extreme weather events, and increased frequency of wildland fires may result in long-term changes to terrestrial wildlife habitat. Climate change may also contribute to exacerbating the potential impacts of the proposed project on these resources. Impacts from climate change are described qualitatively due to uncertainty about the timing and magnitude of these impacts.

5.3.12 Special Status Species

Cumulative effects on special status species would be similar to those described in described in **Section 5.3.12** of the 2018 Final EIS, beginning on page 693. The analysis area for evaluation of cumulative impacts on special status species is the same as described for indirect effects (**Figure 3.13-3**). **Table 5.3-11** summarizes the related past, present, or reasonably foreseeable actions (described and quantified where possible in **Table 5.2-1**) that have directly or indirectly affected or will affect fish and wildlife in the analysis area.

Table 5.3-11. Special Status Species: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
Agriculture	Past, present, and RFA	Agricultural development in the area consists mostly of cropland, pastureland, and grazing lands. Continued agricultural development would alter habitat in areas adjacent to the mine. Wildlife is often displaced when native habitat is converted to cropland or pastureland. Grazing also affects wildlife habitat because livestock compete with native herbivores such as deer and elk. Loss of wildlife habitat and displacement of special status species due to mining operations in the project area would contribute to regional cumulative impacts on special status wildlife and plant species habitat and populations. Agriculture historically has and continues to have a substantial effect on surface waters that provide habitat for fish and other aquatic species in the cumulative impacts analysis area (Rosebud Creek, Armells Creek, and Sarpy Creek watersheds); see **Table 5.3-6**.
Alternative energy and transmission development and infrastructure	Past, present, and RFA	Alternative energy and transmission development and infrastructure projects in the analysis area include the Clearwater Wind project, the Clearwater to Colstrip Transmission Line project, and the North Plains Connector Power Transmission Line. These projects would result in surface disturbance that could affect habitat for special status species. Impacts on special status species from the proposed expansion of the project area would contribute to the adverse impacts of habitat loss from past and future land disturbance associated with construction of alternative energy and transmission development. Impacts from these activities are described qualitatively due to a lack of available data.
Actions by Federal land management agencies	Past, present, and RFA	BLM-authorized actions in the near vicinity of the project area, such as rights-of-way for powerlines and pipelines, coal leases, mineral material sites, land withdrawals, and land sales and exchanges, may result in habitat loss and fragmentation from new infrastructure development. However, the BLM's ARMP also includes implementation of conservation and habitat protection of wetland and riparian areas and for the greater sage-grouse, resulting in a beneficial contribution to species that inhabit wetlands and riparian habitat, and to grasslands and shrublands associated with greater sage-grouse habitat. Displacement of natural resources, including special status species, from ongoing energy and mineral development and other actions on federally managed lands in the analysis area and the project area may increase competition in available habitat containing sensitive resources.

Table 5.3-11. Special Status Species: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
Rosebud Mine (other permit areas) and other mines (coal and gravel)	Past, present, and RFA	Past and current coal mining and reclamation at the Rosebud Mine, Absaloka Mine, and Big Sky Mine have likely affected fish and wildlife in ways similar to those described for the Proposed Action (see **Section 4.13, Special Status Species**). Infrastructure associated with mining including roads and fencing further divides habitat and creates barriers to wildlife movement. Railroad construction results in surface disturbance, increased human presence during construction, and habitat fragmentation. Loss of habitat and displacement of special status species due to mining operations in the project area would contribute to habitat losses and displacement impacts from past and future land disturbance associated with construction of infrastructure. Mining activity through 2023 has disturbed 19,062 acres at the Rosebud Mine. Past, present, and RFA mining activities in Area B AM5 would impact 2,658 acres of habitat for special status species. Past surface disturbances at the Rosebud Mine are summarized in **Table 2.2-3**. Disturbances at other mines are summarized and quantified to the extent practicable in and **Table 5.2-1**. These actions are expected to continue into the foreseeable future and would have adverse impacts on special status species and their habitat. Past operation of the Rosebud Mine and other mines likely contributed to atmospheric deposition of trace metals in the analysis area and would contribute to cumulative effects on northern long-eared bats and other special status species. Trace metal concentrations and ecological screening values for birds and mammals are described in **Table 4.12-2** in **Section 4.12.3.2, Indirect Impacts; Birds** and **Table 4.12-3** in **Section 4.12.3.2, Indirect Impacts; Mammals**. **Tables 4.12-2** and **4.13-3** quantify the background concentrations, total deposition over the period of operations, total expected concentrations (background plus deposition), ecological screening value, percentage of deposition relative to background, and percentage of deposition relative to ecological screening value. Alternative 4 would contribute long-term adverse cumulative impacts on special status species that would range from minor to moderate. This would occur due to changes in or loss of hydrology, which may adversely affect habitat for special status species. Alternative 4 would also contribute short-term and long-term adverse cumulative impacts on special status species due to surface disturbances. Overall, when combined with other past, present, and reasonably foreseeable future actions, Alternative 4 would have long-term, minor to moderate, adverse cumulative effects on special status species and their habitat.
Power plant operations and rail transport	Past, present, and RFA	Power plant operation (coal combustion) and rail transport have resulted in habitat loss or fragmentation due to land disturbances. Railroad construction results in surface disturbance, increased human presence during construction, and habitat fragmentation. Loss of habitat and displacement of special status species due to mining operations in the project area would contribute to habitat losses and displacement impacts from past and future land disturbance associated with construction of infrastructure.

Table 5.3-11. Special Status Species: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
Water use and discharges	Past, present, and RFA	Changes in surface water flow and water quality from water use and discharges from the Rosebud and Colstrip Power Plants, the Rosebud Mine, and agricultural activities could affect aquatic special status species. Potential effects on special status species such as pallid sturgeon could include altered spawning movements and behavior, changes in sediment transport and resulting formation and maintenance of aquatic habitat, and changes in turbidity, which could affect feeding efficiency and vulnerability to predators. Changes in stream flows could also result in lower temperatures, changes in dissolved oxygen, and changes in pollutant concentrations. Continued diversion of 69 cfs from the Yellowstone River due to Colstrip Power Plant operations would contribute to cumulative effects on special status species, but the effects are not expected to be discernable.
Wildland fire	Past, present, and RFA	Wildland fires, including those ignited by coal seam fires, affect special status species mainly through alteration of habitat. The severity of the impacts on special status species depends on the extent of habitat change from fire. Fires in forested areas usually cause more drastic alterations to habitat and associated fauna than those that occur in grasslands (Smith 2000). Certain studies suggest that direct mortality from fires is relatively low. Large, mobile animals and birds are capable of fleeing rather quickly. Smaller species may seek refuge under debris or in burrows (Kennedy and Fontaine 2009). Smith (2000) suggests that wildland fire “reorganizes” animal communities because of alteration of habitat. Following some fires, generalist species may recolonize the burn area or move to adjacent unburned habitats. Some special status predators and raptors may benefit from fires exposing potential prey. Past fires likely changed or eliminated habitat components in the burn areas and may have prevented or altered use by certain species. Periodic wildland fires would contribute both positive and negative cumulative impacts on regional special status species.

Table 5.3-11. Special Status Species: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
Climate change	Past, present, and RFA	Climate change is anticipated to increase the frequency and intensity of wildfire, alter precipitation patterns, and increase temperature, which is expected to impact habitat for special status species. Future climate change may result in changes in timing of runoff in streams in the western United States, including a reduction in flows in summer that may result in changes to habitat for species that rely on aquatic, riparian, or wetland habitats region-wide. Changes in precipitation patterns, increased drought and extreme weather events, and increased frequency of wildland fires may result in long-term changes to terrestrial special status species habitat. Climate change may also contribute to exacerbating the potential impacts of the proposed project on these resources. Impacts from climate change are described qualitatively due to uncertainty about the timing and magnitude of these impacts. Climate change is listed as a threat that affects the habitat and range of pallid sturgeon (USFWS 2014, 2021). Climate change will increase the risk of pallid sturgeon encountering reaches with fluctuating or increased stream temperature. As fish have specific temperature ranges that are determined directly by the temperatures that support efficient metabolism, reproductive stress, and disease resistance (Ficke et al. 2005), changes to stream temperatures will affect sturgeons and other fish through multiple pathways. Changes in precipitation and weather patterns resulting from climate change will alter the timing, duration, and interannual variability of peak and low flows, with earlier and potentially larger runoff flows and lower, later season flows expected to occur (Ficke et al. 2005; USFWS 2014). These changes will likely impact pallid sturgeon through altered spawning behavior, reduced larval and young-of-year survival, and reduced availability of suitable habitat during the low-flow and over-wintering time periods (USFWS 2014). Additionally, the expected increase in stream temperatures directly results in both decreases in dissolved oxygen (DO) levels and increased oxygen demand as metabolic rates increase. Climate change could conversely result in some beneficial effects on pallid sturgeon. Decreased stream flows would slow dispersal rates of free embryos, with increased water temperatures concurrently promoting faster development. These factors could potentially result in increases in survival of this life stage to the larval stage (A. McCullough, USFWS, personal communication, January 8, 2025). Additional discussion of climate change is in the BA (OSMRE 2025; see discussion of the BA status in **Section 6.1.2, Section 7 Consultation Process with the U.S. Fish and Wildlife Service**).

5.3.13 Cultural and Historic Resources

Cumulative effects on cultural and historic resources would be similar to those described in **Section 5.3.13** of the 2018 Final EIS, beginning on page 695. The analysis area for evaluation of cumulative impacts on cultural and historical resources includes all permit areas of the Rosebud Mine, including past and ongoing mining areas (**Figure 5.2-1**). **Table 5.3-12** summarizes the related past, present, or reasonably foreseeable actions (described and quantified where possible in **Table 5.2-1**) that have directly or indirectly affected or will affect cultural and historic resources in the analysis area.

Table 5.3-12. Cultural and Historic Resources: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
Agriculture	Past, present, and RFA	Past, present, and reasonably foreseeable agricultural development of surrounding lands has the potential to result in ground disturbances and may affect the integrity of buried archaeological sites as well as known and unknown historic properties.
Rosebud Mine (other permit areas)	Past, present, and RFA	Past, ongoing, and future mining within the Rosebud Mine may result in adverse cumulative impacts on historic properties. Ground disturbances from mining activities may uncover buried archaeological sites and adversely affect known and unknown historic properties. Other potential future development of the Rosebud Mine would also cause ground disturbances, potentially resulting in long-term moderate cumulative impacts on historic properties. Any actions would be subject to Section 106 compliance and the stipulations of the Programmatic Agreement (PA) to consider potential impacts on historic properties. Mining within the project area would have long-term, moderate, and adverse cumulative impacts, but these adverse impacts would be resolved through treatment proposed under the Memorandum of Agreement and through continued Section 106 compliance as stipulated in the PA (**Appendix H** in the 2018 Final EIS).
Wildland fire	Past, present, and RFA	Past and future wildland fires, including those ignited by coal seam fires, in and around the project area have had and will continue to have the potential to destroy historic artifacts and properties, resulting in cumulative impacts on cultural resources.

5.3.14 Socioeconomic Conditions

Cumulative effects on socioeconomics have been updated from those described in **Section 5.3.14** of the 2018 Final EIS, beginning on page 696, to incorporate a new IMPLAN analysis completed for the SEIS (**Appendix 4**). The analysis area for evaluation of cumulative impacts on socioeconomic resources includes Rosebud, Treasure, and Big Horn Counties (**Figure 3.15-1**). **Table 5.3-13** summarizes the related past, present, or reasonably foreseeable actions (described and quantified where possible in **Table 5.2-1**) that have directly or indirectly affected or will affect socioeconomic resources in the analysis area.

Table 5.3-13. Socioeconomics: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
Agriculture	Past, present, and RFA	Past and ongoing mining at the Rosebud Mine has resulted in the loss of potential agricultural lands and economic productivity associated with agriculture. This loss impacts local farmers and ranchers relying on agriculture as a source of livelihood. However, this loss of potential agricultural lands is temporary, as mined areas are reclaimed and returned to postmining land use. For example, reclaimed areas are available for grazing as soon as the vegetation is established and a management unit is large enough to support appropriate numbers of livestock. This reclamation process helps restore agricultural productivity, which is vital for the local economy. In the near future, as more reclaimed lands become available for grazing and other agricultural uses, these communities can regain and potentially enhance their agricultural productivity, mitigating some of the economic disruptions caused to agriculture by mining activities.
Colstrip Power Plant	Past, present, and RFA	The retirement of Colstrip Power Plant Units 1 and 2 in January 2020 occurred earlier than anticipated in the 2018 Final EIS, resulting in reduced power generation and associated revenues for the local economy. Units 3 and 4 are anticipated to operate through at least 2042, however, and will continue to contribute cumulatively to the local economy. As described in Section 5.2, operations of the Colstrip Power Plant and the Rosebud Power Plant (combined) support 361 local jobs and $403 million in annual economic output (BBC 2024b).
Rosebud Power Plant	Past, present, and RFA	The Rosebud Power Plant has and will continue to contribute to the local economy, although this facility burns a much smaller proportion of the Rosebud Mine project area coal. The plant will continue to provide a cumulative beneficial economic contribution to the local economy.
Alternative Energy and Transmission Development and Infrastructure	Present, and RFA	A number of alternative energy and transmission development projects are in the planning stages and would contribute to the local economy based on alternative energy production. Renewable energy development could offer additional opportunities for local communities and serve as mitigation for the direct and indirect disproportionate loss of economic activities associated with reduced activities at the mine. These projects can provide substantial job creation during both construction and operational phases. These projects can also diversify the local economy, reducing reliance on coal mining, lessening the negative economic effects on businesses both related and unrelated to energy development, and generate revenue that can be reinvested into local infrastructure, schools, and social services. In addition, the Westmoreland Rosebud transmission line will enable the mine to export coal from the site to other outside power plant facilities, which would enable Westmoreland Rosebud to ship coal from the Colstrip facility to other power generation facilities around the country or world, contributing to the financial stability and overall revenues of the mine and surrounding communities.

Table 5.3-13. Socioeconomics: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
Federal land management – BLM	Past, present, and RFA	Secretarial Order 3418 - *Unleashing American Energy* (January 20, 2025) directed BLM to review and, as appropriate, revise all relevant draft and all finalized RMPs and supporting NEPA documents, including the MCFO RMP and NEPA documents. BLM published a notice of intent to amend the MCFO RMP and accompanying NEPA analysis on July 8 to reevaluate coal allocations in the planning area and to determine the availability of lands acceptable for further consideration for coal leasing in accordance with recent EOs. Section 50203 of the OBBB directs the Secretary to make available for lease at least 4 million acres of recoverable Federal coal, which will likely result in economic benefits from additional mining in the region. However, the exact locations of future lease sale is currently unknown; therefore, additional analysis of potential socioeconomic impacts is not possible.

5.3.15 Reserved [Note: numbering sequence retained for continuity with the Draft SEIS and 2018 Final EIS]

5.3.16 Visual Resources

Cumulative effects on visual resources would be similar to those described in **Section 5.3.16** of the 2018 Final EIS, beginning on page 699. The analysis area for evaluation of cumulative impacts on visual resources includes all permit areas of the Rosebud Mine, including past and ongoing mining areas (**Figure 5.2-1**). **Table 5.3-14** summarizes the related past, present, or reasonably foreseeable actions (described and quantified where possible in **Table 5.2-1**) that have directly or indirectly affected or will affect visual resources in the analysis area.

Table 5.3-14. Visual Resources: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
Rosebud Mine (other permit areas)	Past, present, and RFA	Mining has resulted in increased visual contrast on the landscape including changes in the color of the landscape from removal of vegetation and exposure of soil, as well as changes to the contour of the landscape.
Wildland fire	Past, present, and RFA	Wildland fires, including those ignited by coal seam fires, have impacted visual resources south of the project area in the past by burning the shrubs, grasses, and trees in the area and leaving large swaths of blackish charred areas (approximately 221 acres) with some burned stumps remaining in the present and future. The visual impacts from wildland fires would continue until the burned areas have become naturally revegetated over the next several years. In combination with the impacts on visual resources from other active mining areas and wildland fires in the analysis area, all SEIS alternatives would have a short-term minor contribution to cumulative impacts.

5.3.17 Recreation

Cumulative effects on recreation would be similar to those described in **Section 5.3.17** of the 2018 Final EIS, beginning on page 700. The analysis area for evaluation of cumulative impacts on recreation includes all permit areas of the Rosebud Mine, including past and ongoing mining areas (**Figure 5.2-1**). **Table 5.3-15** summarizes the related past, present, or reasonably foreseeable actions (described and quantified where possible in **Table 5.2-1**) that have directly or indirectly affected or will affect recreation in the analysis area.

Table 5.3-15. Recreation: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
Rosebud Mine (other permit areas)	Past, present, and RFA	Within the permit areas of the Rosebud Mine, there would be short-term cumulative impacts on wildlife land uses and associated hunting opportunities on private lands (depending on timing of mining and reclamation). Mining in the project area may reduce active mining that is occurring on other permit areas of the Rosebud Mine; however, those permit areas may not be completely reclaimed at the time the project area is mined, leading to additional loss of wildlife habitat and areas associated with private land hunting opportunities until vegetation is established on reclaimed mine areas. The conversion of the project area to full-scale mining is unlikely to contribute to long-term cumulative impacts on recreation in the area. After reclamation, the project area would revert to wildlife use and potential private land hunting by permission. Recreational use in the areas surrounding the Rosebud Mine is unlikely to change substantially given the existing land ownership pattern. The areas surrounding but outside the permit boundary of the Rosebud Mine could continue to be made available (or be made available in the future) for hunting with landowner permission.
Wildland fire	Past, present, and RFA	Wildland fires, including those ignited by coal seam fires, have impacted visual resources and land use (potentially impacting wildlife use and recreation) south of the project area in the past by burning the shrubs, grasses, and trees in the area and leaving large swaths of blackish charred areas (approximately 221 acres) with some burned stumps remaining in the present and future. The visual impacts from wildland fires would continue until the burned areas have become naturally revegetated over the next several years. In combination with the impacts on visual resources from other active mining areas and wildland fires in the analysis area, all SEIS alternatives would have a short-term minor contribution to cumulative impacts.

5.3.18 Paleontology

Cumulative effects on paleontology would be similar to those described in **Section 5.3.18** of the 2018 Final EIS, beginning on page 701. The analysis area for evaluation of cumulative impacts on paleontological resources includes all permit areas of the Rosebud Mine, including past and ongoing mining areas (**Figure 5.2-1**). **Table 5.3-16** summarizes the related past, present, or reasonably foreseeable actions (described and quantified where possible in **Table 5.2-1**) that have directly or indirectly affected or will affect paleontology resources in the analysis area.

Table 5.3-16. Paleontology: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
Rosebud Mine (other permit areas)	Past, present, and RFA	Past and ongoing mining at the Rosebud Mine has resulted in cumulative impacts on the overall geologic formations in the region, which have the potential to contain significant paleontological resources. Mining in the project area and possible future mining of other sites at the Rosebud Mine would result in additional cumulative surface and subsurface disturbance to geologic materials that have the potential to contain significant paleontological resources. Because the Fort Union Formation is classified as Class 4 (geologic units containing a high occurrence of significant fossils) and these geologic units would be lost, mining within the project area boundary would contribute to major long-term cumulative impacts on paleontological resources.

5.3.19 Access and Transportation

Cumulative effects on access and transportation would be similar to those described in **Section 5.3.19** of the 2018 Final EIS, beginning on page 702. The analysis area for cumulative impacts on access and transportation includes the project area, existing permit areas of the Rosebud Mine (which include the existing haul road and access roads), county roads (e.g., Castle Rock Road and Horse Creek Road), the section of State Highway 39 between the Rosebud Mine and the Rosebud Power Plant, and the Rosebud and Colstrip Power Plants, plus an approximate 0.5-mile buffer area around the power plants (**Figure 5.2-1**). **Table 5.3-17** summarizes the related past, present, or reasonably foreseeable actions (described and quantified where possible in **Table 5.2-1**) that have directly or indirectly affected or will affect access and transportation in the analysis area.

Table 5.3-17. Access and Transportation: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
Rosebud Mine (other permit areas)	Past, present, and RFA	Depending on the timing of mining in the project area and other Rosebud Mine permit areas, traffic volumes may be cumulatively greater within the analysis area. Westmoreland Rosebud's coal mining in other permit areas, such as Area B, will consist of construction of new roads, road-decommissioning activities, road reconstruction, and implementation of Best Management Practices. The reasonably foreseeable actions and the project could have short-term negligible cumulative impacts by increasing traffic volumes near access roads. However, any additional traffic would not adversely affect the level of service on roads within the analysis area or lead to congestion. Localized access impacts could occur for those living in the vicinity of the Rosebud Mine, including agricultural operators who may face access obstacles as they fight rangeland fires or when they relocate cattle to reclaimed areas of the mine as they work their operations around active mining areas. The conversion of the project area to full-scale mining is unlikely to contribute to long-term cumulative access impacts but would contribute to near-term cumulative access impacts until the haul road through Area C can be reclaimed (reclamation would be delayed until after reclamation of Area F is complete). After reclamation, the project area would revert back to grazing and agricultural uses, but the return to pre-mine conditions may be many years after access impacts have occurred.
Other activities	Past, present, and RFA	Many other reasonably foreseeable actions, including alternative/renewable energy infrastructure, gravel mining, recreation, and airport use and operations, would use the same regional transportation system as the project area. Depending on the timing of mining in the project area and other Rosebud Mine permit areas, traffic volumes may be cumulatively greater within the analysis area.

5.3.20 Solid and Hazardous Waste

Solid and hazardous waste cumulative effects would be similar to those described in **Section 5.3.20** of the 2018 Final EIS, beginning on page 703. The analysis area for evaluation of cumulative impacts related to solid and hazardous waste includes all permit areas of the Rosebud Mine, including past and ongoing mining areas, the Rosebud Power Plant, the Colstrip Power Plant and off-site storage areas where coal-combustion residuals (CCR) from the Colstrip Power Plant are stored, the Rosebud County Landfill where solid waste would be sent, and the disposal area where hazardous wastes generated would reside. **Figure 5.2-1** encompasses the analysis area. **Table 5.3-18** summarizes the related past, present, or reasonably foreseeable actions (described and quantified where possible in **Table 5.2-1**) that have directly or indirectly affected or will affect solid and hazardous waste in the analysis area. In other permit areas of the Rosebud Mine, Westmoreland Rosebud has used bottom ash generated from the Colstrip Power Plant in the construction of parking facilities, as a sanding agent for ramp and haul roads during periods of poor road conditions due to weather, and as tank and culvert bedding (past uses of bottom ash are described in **Section 3.21.2** of the 2018 Final EIS beginning on page 383). Although no bottom ash would be used in the project area, Area F actions would cumulatively contribute waste impacts to past solid and hazardous waste impacts including the use of bottom ash. Historic use of bottom ash for the activities noted above has resulted in boron toxicity impacts to water quality.

Table 5.3-18. Solid and Hazardous Waste: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
Rosebud Mine (other permit areas)	Past, present, and RFA	Mining of coal at the Rosebud Mine has contributed to the generation of solid and hazardous waste. Mining of coal within the project area would add to the total amount of solid and hazardous waste already generated and would also add to the total amount of CCR already generated and stored at the power plants as well as past uses of bottom ash in other permit areas of the mine where it was used in the construction of parking facilities, as a sanding agent for ramp and haul roads during periods of poor road conditions due to weather, and as tank and culvert bedding. Cumulative impacts as a result of Alternatives 4 and 5 would be short-term, negligible, and adverse due to the small quantities used.
Coal combustion	Past, present, and RFA	Solid or hazardous waste as a result of Alternatives 4 and 5 would have a short-term, negligible, and adverse cumulative impact on the landfill and disposal areas receiving solid or hazardous waste from the mine. This is due to the relatively small quantities of these wastes generated relative to past and future amounts received at the disposal areas from other permit areas of the Rosebud Mine. Cumulative impacts as a result of Alternatives 4 and 5 would be short-term, negligible, and adverse due to the small quantities used, the monitoring conducted that recognizes adverse impacts, and the reclamation that would be conducted in areas where CCR was previously used. Cumulative impacts as a result of Alternatives 4 and 5 from the combustion of project area coal and the storage of the associated CCR at the power plants and associated storage facilities would be short-term, negligible, and adverse due to the relatively small proportion of project area coal generated CCR relative to the total amount of CCR already generated at the power plants from non–project area coal.

5.3.21 Noise

Noise cumulative effects would be similar to those described in **Section 5.3.21** of the 2018 Final EIS, beginning on page 704. The analysis area for cumulative impacts on noise includes the city of Colstrip, existing permit areas of the Rosebud Mine, the project area, and a buffer area to the north, south, west, and east that includes portions of Rosebud, Treasure, and Big Horn Counties, including the Colstrip and Rosebud Power Plants (**Figure 5.2-1**). **Table 5.3-19** summarizes the related past, present, or reasonably foreseeable actions (described and quantified where possible in **Table 5.2-1**) that have directly or indirectly affected or will affect noise levels in the analysis area.

Table 5.3-19. Noise: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
Rosebud Mine (other permit areas)	Past, present, and RFA	Existing coal mining and/or reclamation of Areas A, B, and C have contributed to the cumulative noise level in the area surrounding the Rosebud Mine. While mining in the project area would result in noise impacts on the immediate area, operations are not expected to contribute cumulatively to regional noise due to the distance from these activities.
Coal combustion	Past, present, and RFA	The only continuous noise source in proximity to any residences is the Colstrip and Rosebud Power Plants. The nearest residences to the Colstrip Power Plant are in Colstrip and are 1,500 feet west of the two cooling towers and 2,500 feet west of the center of the Colstrip Power Plant. This results in an estimated noise level of 57 A-weighted decibels (dBA) (Bradley 1985) at these residences when continuously operating. This estimate is consistent with noise-level measurements conducted at a similar coal-fired power plant (Hankard 2015). Therefore, noise as a result of any of the SEIS alternatives would have moderate long-term cumulative impacts on the Colstrip residences directly west of the Colstrip Power Plant, long-term minor cumulative impacts on the other residences in Colstrip, and long-term negligible cumulative impacts on residences more than 2 miles away.
Other sources	Past, present, and RFA	All other cumulative noise sources (e.g., Rosebud County airstrip, alternative/renewable energy infrastructure, mining operations, etc.) are substantially distant from residences and would have short- and long-term negligible cumulative impacts on noise under any of the SEIS alternatives.

5.3.22 Land Use

Land use cumulative effects would be similar to those described in **Section 5.3.22** of the 2018 Final EIS, beginning on page 705. The analysis area for evaluation of cumulative impacts on land use includes all permit areas of the Rosebud Mine, including past and ongoing mining areas (**Figure 5.2-1**). **Table 5.3-20** summarizes the related past, present, or reasonably foreseeable actions (described and quantified where possible in **Table 5.2-1**) that have directly or indirectly affected or will affect land use in the analysis area.

Table 5.3-20. Land Use: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
Agriculture	Past, present, and RFA	As described in the 2018 Final EIS in **Section 3.23**, agriculture (primarily grazing) is the dominant land use in the areas surrounding the Rosebud Mine. These land uses are unlikely to change substantially given that the existing land uses are well-established. Exceptions include alternative energy development in the vicinity of Colstrip; many such projects are being completed on formal industrial areas, such as Area D, but there could be cumulative losses to agricultural land uses as transmission lines are constructed and wind turbines are erected. The areas surrounding but outside the permit boundary of the Rosebud Mine could continue to be grazed or used by the landowners for agricultural purposes.
Rosebud Mine (other permit areas)	Past, present, and RFA	Within the permit areas of the Rosebud Mine, there would be short-term moderate cumulative impacts on agriculture (primarily cattle grazing and pasture) and wildlife land uses (depending on the timing of activities). Mining in the project area is intended to reduce the active mining that is occurring on other permit areas of the Rosebud Mine; however, those permit areas may not be completely reclaimed at the time the project area would be developed, leading to additional loss of active grazing areas, pastureland, and cropland until vegetation is established on reclaimed mine areas. Agriculture operators may face logistical challenges as they relocate cattle to reclaimed areas of the mine and work their operations around active mining areas. The conversion of the project area to full-scale mining is unlikely to contribute to long-term cumulative impacts on land use in the area but would contribute to near-term cumulative land use impacts until the haul road through Area C can be reclaimed (reclamation would be delayed until after reclamation of Area F is complete). After reclamation, the project area would revert back to grazing and agricultural uses, but the return to pre-mine conditions may be many years after agricultural and wildlife uses have been displaced.
Federal land management – BLM and Forest Service	Past, present, and RFA	Land use impacts resulting from Federal land management activities were considered in the 2018 Final EIS (see **Section 5.3.4**). Since that time, the BLM has issued a SEIS for the MCFO RMP and indicated selection of Alternative D, which would disallow new leasing of the Federal coal estate in the MCFO planning area. Without the opportunity to develop new coal leases, there would be no additional impacts on land use if the RMP remains as issued in 2024. Note that under Secretarial Order 3418 - *Unleashing American Energy* (January 20, 2025), the BLM has been directed to review and, as appropriate, revise all relevant draft and all finalized RMPs and supporting NEPA documents, including the MCFO RMP and NEPA documents. In addition, the *Miles City Field Office Final Supplemental Environmental Impact Statement and Resource Management Plan Amendment* (BLM 2024a) are currently under litigation.
Energy and mineral development	Past, present, and RFA	Alternative energy development in the region could result in cumulative land use changes (see discussion above under “Agriculture”), either conversion of agricultural lands to transmission line corridors and wind farms or redevelopment of already disturbed sites, such as the Area D permit area to uses for or in support of alternative energy production.

5.3.23 Soil

Soil cumulative effects would be similar to those described in **Section 5.3.23** of the 2018 Final EIS, beginning on page 706. The cumulative impacts analysis area for soil is the 32-km-radius area described for indirect impacts in **Section 3.24, Soil**. **Table 5.3-21** summarizes the related past, present, or reasonably foreseeable actions (described and quantified where possible in **Table 5.2-1**) that have directly or indirectly affected or will affect soil in the analysis area.

Table 5.3-21. Soil: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
Agriculture	Past, present, and RFA	Cumulative impacts from past agricultural operations where the surface soil is disturbed by tillage have increased erosion rates, especially during times when there is no crop cover protecting the soil from erosion. Most of this farmland is located along the major drainages (Rosebud, Armells, and Sarpy Creeks) within the analysis area. Cumulative impacts on soil from agricultural operations are a function of the agricultural practices and the number of years the practices have been utilized. If the amount of soil erosion has been severe and ongoing for many years, the cumulative impact on soil would be long-term, moderate, and adverse. But with standard agricultural practices that protect the soil surface from erosion, the cumulative impact on soil likely would be long-term, minor, and adverse. Agricultural operations are expected to continue for the reasonably foreseeable future with the same types of impacts.
Airport	Past, present, and RFA	The construction of the Rosebud County Airport contributed to soil erosion within the analysis area, but pre-construction erosion rates likely returned once vegetation stabilized the soil surface. This adverse impact on soil was short-term and minor.
Rosebud Mine (other permit areas)	Past, present, and RFA	Past and present actions of soil salvage, stockpiling, and replacement at the Rosebud Mine have increased erosion rates and reduced soil productivity in comparison to undisturbed portions of the mine site. Soil erosion rates have a short-term minor adverse cumulative impact on soil and begin to return to natural conditions in a couple of years once vegetation stabilizes reclaimed areas, something that is already occurring in many of the reclaimed areas at the Rosebud Mine. Reduction of soil productivity is a minor but long-term adverse cumulative impact, likely requiring decades to return to natural conditions.
Other mines (coal, gravel, etc.)	Past	Cumulative impacts on soil from another active coal mine, the Absaloka Mine, a currently active surface coal mine, and from one inactive surface coal mine, the Big Sky Mine, both within the analysis area have increased erosion rates and reduced soil productivity, resulting in similar impact types as those from the Rosebud Mine. Soil-handling operations at several gravel quarries within the analysis area may also contribute to cumulative impacts on soil, but on a smaller scale. Foreseeable future actions that would have adverse cumulative impacts on soil include those current coal-mining activities and gravel quarries.

Table 5.3-21. Soil: Summary of Cumulative Effects.

Action	Past, Present, or RFA	Cumulative Effects
Coal combustion	Past, present, and RFA	Trace-metal deposition from past and present combustion of Rosebud Mine coal at the Colstrip and Rosebud Power Plants may have adverse impacts on soil resources within a 32-km radius around the power plants. The Colstrip Power Plant, which contributes significantly more trace metals through coal combustion than the Rosebud Power Plant (see **Section 4.3**, **Air Quality**), has been in operation since the mid-1970s. The modeling results of combustion of project area coal at the Colstrip Power Plant have demonstrated that impacts on soil resources from selenium deposition are adverse, long-term, and minor within the analysis area, and deposition from the other trace metals is likely negligible within the analysis area (see **Section 4.24**, **Soil**). The combustion of Rosebud Mine coal likely has had and will continue to have similar cumulative impacts on soil resources. Retirement of Colstrip Power Plants Units 1 and 2 has decreased the level of trace-metal deposition from the power plants from what was previously considered in the 2018 Final EIS. Selenium deposition would continue to have long-term, minor, adverse cumulative impacts on soil. Of the other trace metals at the current deposition rates, mercury deposition would require the fewest years to exceed either the plant or soil invertebrate soil-screening level, which would be over 1,400 years. Therefore, deposition of the other trace metals would continue to have negligible impacts. Acid deposition resulting from coal combustion would also likely decrease, but similar impacts on soil would continue. Like trace-metal deposition, acid deposition from past and present combustion of coal from Areas A, B, C, D, and E at the Colstrip and Rosebud Power Plants, as well as future combustions of Area B coal, may have adverse impacts on soil throughout the region. Modeling of SO2 and NOx gas emissions from the power plants has estimated that these gases have a long-range transport (see Section 3.3.1.2, Air Quality in the 2018 EIS for a discussion of transport distances). The magnitude of the cumulative impacts is a function of soil chemistry and bedrock. More alkaline soil, having acid-buffering capacity, is less susceptible to acid deposition, whereas more acidic soil, having little or no acid-buffering capacity, is more sensitive to acid deposition (see **Section 4.24**, **Soil**). Modeling SO2 and NO2, however, has shown cumulative concentrations are below NAAQS and MAAQS (see **Section 5.3.2.2, Cumulative Impacts on Air Quality** in the 2018 Final EIS). Given this, cumulative impacts on soil with and without acid-buffering capacity would be long-term, minor, and adverse.
Federal land management – BLM	Past, present, and RFA	BLM has authorized actions in the near vicinity of the project area, such as rights-of-way for powerlines and pipelines, coal leases (past), mineral material sites, land withdrawals, oil and gas leases, and land sales and exchanges. Many of these activities have involved soil removal, and some have likely involved soil stockpiling and replacement. These operations have likely increased soil erosion and reduced soil productivity and were considered in the 2018 Final EIS (see **Section 5.3.22**). Since that time, the BLM has issued a SEIS for the MCFO RMP and indicated selection of Alternative D, which would disallow new leasing of the Federal coal estate in the MCFO planning area. Without the opportunity to develop new coal leases, there would be no additional impacts on soil related to leasing of the Federal coal estate if the RMP remains as issued in 2024. Note that under Secretarial Order 3418 - *Unleashing American Energy* (January 20, 2025), the BLM has been directed to review and, as appropriate, revise all relevant draft and all finalized RMPs and supporting NEPA documents, including the MCFO RMP and NEPA documents. In addition, the *Miles City Field Office Final Supplemental Environmental Impact Statement and Resource Management Plan Amendment* (BLM 2024a) are currently under litigation.

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CHAPTER 6. COORDINATION AND CONSULTATION

This chapter provides a summary of the formal consultation processes that occurred during the preparation of this Supplemental Environmental Impact Statement (SEIS). This chapter also provides a list of the interdisciplinary team members that prepared and contributed to this SEIS and provides the distribution list for this SEIS. For information on coordination and consultation completed previously, please see Chapter 6 in the 2018 Final EIS, beginning on page 709.

6.1 CONSULTATION PROCESSES

6.1.1 Public Comment Process

Public involvement processes for the original EIS, including the opportunity to submit public comments during the two formal scoping periods and on the Draft EIS, are described in **Section 1.5, Public Outreach** of the 2018 Final EIS beginning on page 22 and summarized in this SEIS in **Section 1.5, Public Outreach**.

The Office of Surface Mining Reclamation and Enforcement (OSMRE) accepted public comments on the Draft SEIS for a 46-day comment period beginning the date that the Environmental Protection Agency's (EPA) Notice of Availability was published in the *Federal Register*. Notice of the comment period was also provided on the OSMRE website (https://www.osmre.gov/laws-and-regulations/nepa/projects) and in legal notices published in the *Billings Gazette* and the *Forsyth Independent Press*. See additional discussion of the comment period in **Section 1.5.2, Public Comment Period for the Draft SEIS**. Substantive comments received during the comment period and OSMRE responses are in **Appendix 5**.

6.1.2 Section 7 Consultation Process with the U.S. Fish and Wildlife Service

The Endangered Species Act (ESA) provides a means for conserving the ecosystems upon which threatened and endangered species depend and a program for the conservation of such species. The ESA directs all Federal agencies to participate in conserving these species. Specifically, Section 7(a)(1) of the ESA charges Federal agencies to aid in the conservation of listed species, and Section 7(a)(2) requires the agencies to ensure that their activities are not likely to jeopardize the continued existence of listed species or adversely modify designated critical habitats. Section 7 of the ESA (16 U.S.C. §§ 1531 *et seq*.) outlines the procedures for Federal interagency cooperation to conserve federally listed species and designated critical habitats; Federal agencies are required to confer with the U.S. Fish and Wildlife Service (USFWS) on any agency action that is likely to jeopardize the continued existence of any species proposed for listing or result in the adverse modification of critical habitat proposed to be designated.

Five federally listed species, or species proposed for listing, potentially occur near or are affected by projects in the analysis area, as shown in **Table 6.1-1**.

Table 6.1-1. Federally Endangered Species Potentially Occurring in the Analysis Area.

Common Name	Scientific Name	Status* Federal/State	General Habitat Affinity	Habitat in Analysis Area
Mammals				
Northern long-eared bat	*Myotis septentrionalis*	T	Winter hibernation occurs in caves; summer roosts occur under loose tree bark or in tree cavities. Rarely roosts in structures.	Yes
Fish				
Pallid sturgeon	*Scaphirhynchus albus*	E	Large turbid rivers, including accessible reaches of the Yellowstone River, with diverse habitat and natural hydrographs.	Yes
Insects				
Monarch butterfly	*Danaus plexippus*	PT	Requires milkweed (*Asclepias* spp.) as larval host plants; meadow and riparian habitats support spring/summer breeding and late-season migration.	Yes
Western regal fritillary	*Argynnis idalia occidentalis*	PT	Tallgrass prairies, including dry upland, mesic, and wet areas. Requires violet species (*Viola* sp.) as a larval host plant. The range of western regal fritillary only overlaps the action area in a small area at the southern edge of the action area.	Yes
Suckley's cuckoo bumble bee	*Bombus suckleyi*	PE	Various habitats including prairies, grasslands, meadows, and woodlands between 6,000 and 10,500 feet in elevation where host species are present.	Yes

*E = Endangered; T = Threatened; PT=Proposed Threatened; PE = Proposed Endangered.
Source: USFWS 2025a.

The Section 7 consultation that previously occurred for this project is described in **Section 6.1.2** of the 2018 Final EIS, beginning on page 709. When work began on the SEIS in 2022, OSMRE contacted the USFWS Ecological Services Montana Field Office in Helena to discuss the project. In December 2022, OSMRE staff and contractors met with USFWS staff to discuss the need to prepare a Biological Assessment (BA) for the project.

On May 22, 2024, OSMRE staff and contractors held a virtual BA strategy meeting to discuss the Proposed Action and potential impacts for the SEIS with USFWS staff. Discussions indicated that the BA prepared for the project should address northern long-eared bat, pallid sturgeon, and monarch butterfly, since other listed and candidate species are not likely to occur in the action area.

An unofficial list of federally listed species and designated critical habitat in the action area was obtained from the USFWS Information for Planning and Conservation (IPaC) website on June 10 and September 18, 2024, and updated on January 17, 2025 (USFWS 2025). Using this list, in addition to informal discussion with USFWS staff on May 22, 2024, OSMRE determined which species and critical habitats might occur in the analysis area (**Table 6.1-1**). During preparation of the BA, the status of the monarch

butterfly changed from candidate to proposed threatened. While proposed threatened or endangered species are not protected by the take prohibitions of Section 9 of the ESA until the proposed rule to list is finalized, two proposed species were added to the BA (OSMRE 2025), the western regal fritillary (proposed for listing as threatened in August 2024) and Suckley's cuckoo bumble bee (proposed for listing as endangered in December 2024), to ensure that the proposed mining plan modification will not jeopardize the continued existence of the proposed species.

ERO Resources Corporation and GEI, on behalf of OSMRE, prepared a BA. OSMRE submitted the draft BA to the USFWS for consultation on August 19, 2024, a second Draft BA on October 8, 2024, a third draft on December 4, 2024, and a fourth draft on January 28, 2025. OSMRE prepared the final BA in April 2025 and submitted it to the USFWS for consultation on May 1, 2025. The BA determined that the project may affect, but is not likely to adversely affect, the northern long-eared bat and the pallid sturgeon, and is not likely to jeopardize the continued existence of monarch butterfly, western regal fritillary and Suckley's cuckoo bumble bee.

Upon review of the final BA (OSMRE 2025), the USFWS issued a concurrence letter on May 15, 2025, agreeing with OSMRE's effects determination (USFWS 2025b). Based on the ESA Section 7 consultation, the following measures would be required (USFWS 2025b):

- Clearing and grubbing activities would occur from September 1 through June 1, avoiding the monarch butterfly and western regal fritillary active season from June through August.
- Noxious weeds would be controlled and managed to reduce their spread by timing weed spraying to avoid the monarch butterfly and western regal fritillary breeding season (June through August), when feasible, and conducting spot spraying to limit impacts on flowering nectar plants.
- As agreed to among the three parties and documented in the BA, Westmoreland Rosebud (or any subsequent owner), OSMRE, and USFWS will meet at least once every four years to discuss any changes in the status of pallid sturgeon and other listed species, any changes in power plant or mine operations, and any other new information that might warrant an update to this effects analysis. Any of the parties may also request an ad hoc meeting if the party becomes aware of new information warranting discussion.

The final BA and USFWS concurrence letter are provided in **Appendix 7 – ESA Section 7 Consultation Documentation.**

6.1.3 Section 106 and Tribal Consultation Processes

Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, and its implementing regulations at 36 C.F.R. part 800 require all Federal agencies to consider effects of Federal actions on cultural resources eligible for or listed in the National Register of Historic Places (NRHP). To comply with Section 106, Federal agencies are required to consult with interested parties, including Native American tribes who claim cultural affiliation with the affected lands.

Traditional cultural properties (TCPs) are protected under Section 106 of the NHPA as historic properties, and when applicable, they have additional protections under the American Indian Religious Freedom Act of 1978 and the Native American Graves Protection and Repatriation Act of 1990. A TCP may be eligible for listing in the NRHP. Examples of TCPs include, but are not limited to, locations where Native Americans have performed ceremonies, traditional locations for resource gathering, and rural community land use patterns such as farming and ranching (see **Section 3.14, Cultural and Historic Resources**).

Section 106 consultation previously occurred for this project as described in **Section 3.14, Cultural and Historic Resources**. Adverse effects on potential historic properties as a result of mining in the project area would be resolved through the executed Programmatic Agreement (PA) entered into by Western Energy, the State Historic Preservation Office, the Montana Department of Environmental Quality (DEQ), the Bureau of Land Management (BLM), and OSMRE. The PA is in **Appendix H** of the 2018 Final EIS. The PA provides for continuing compliance with Section 106 of the NHPA over the life of mining operations. The PA also includes stipulations to address unanticipated discoveries during mining operations.

Tribal consultation that previously occurred for this project is described in **Section 6.1.3** of the 2018 Final EIS, beginning on page 711. For this SEIS, OSMRE reinitiated formal tribal consultation with the Northern Cheyenne, Fort Peck Assiniboine and Sioux Tribes, and Crow Tribes.

Consultation was reinitiated through letters sent to each of the potentially impacted tribes on December 6, 2024. A comment letter was received during the Draft SEIS public comment period from the Northern Cheyenne Tribe on January 13, 2025 (see Correspondence #0013 in **Appendix 5**); no other tribes responded to OSMRE's letter. The following consultation and coordination has occurred between the Northern Cheyenne Tribe and OSMRE for the SEIS:

- January 28, 2025 – OSMRE responded to the Northern Cheyenne Tribe's January 13, 2025, comment letter and invited the tribe to consider government-to-government consultation.
- March 25, 2025 – OSMRE and the Northern Cheyenne Tribe consulted remotely in a Microsoft Teams meeting.
- March 27, 2025 – OSMRE provided the executed PA to the THPO for the Northern Cheyenne Tribe and again invited the tribe to consult regarding cultural resources.
- April 15, 2025 – Teanna Limpy, the Northern Cheyenne Tribal Historic Preservation Officer (THPO), emailed OSMRE requesting copies of the cultural resource survey documentation. In accordance with the PA, OSMRE will continue consultation with the THPO pursuant to stipulation #10 that allows for ongoing consultation with any Indian tribe.
- April 28, 2025 – Gene Small, President of the Northern Cheyenne Tribe submitted a comment letter to OSMRE as part of the ongoing consultation and coordination process between the Northern Cheyenne Tribe and OSMRE.
- June 11, 2025 – OSMRE submitted a response letter to President Gene Small of the Northern Cheyenne Tribe documenting how each of the Tribe's comments from the April 2025 letter were addressed.

6.1.4 Federal, State, and Local Agencies

OSMRE consulted the following agencies during the development of this SEIS:

- Advisory Council on Historic Preservation (see Section 6.1.3, Section 106 and Tribal Consultation Processes)
- DEQ (see Section 6.2.1, Montana Department of Environmental Quality and Correspondence #0035 in Appendix 5)
- Montana Natural Heritage Program
- Montana Fish, Wildlife and Parks (see Correspondence #0036 in Appendix 5)
- Montana State Historic Preservation Officer (see Section 6.1.3, Section 106 and Tribal Consultation Processes)

- BLM (see Section 6.2.3, Bureau of Land Management)
- EPA (see Correspondence #0030 in Appendix 5)
- USFWS (see Section 6.1.2, Section 7 Consultation Process with the U.S. Fish and Wildlife Service)

6.2 PREPARERS AND CONTRIBUTORS

The following sections list the names and credentials of the agency and third-party consultants that prepared this SEIS. For the list of preparers and contributors to the 2018 Final EIS, please see **Section 6.2** in that document.

6.2.1 Montana Department of Environmental Quality

DEQ was not involved in the preparation of the SEIS. As needed, OSMRE requested data and other information from DEQ to prepare this SEIS. For the names and credentials of the DEQ preparers of the 2018 Final EIS, please see **Section 6.2.1** in that document.

6.2.2 Office of Surface Mining Reclamation and Enforcement

The following table provides the names and credentials of OSMRE preparers of the SEIS. For the names and credentials of the OSMRE preparers of the 2018 Final EIS, please see **Section 6.2.2** in that document.

Name	Responsibilities	Education	Experience (Years)
Calle, Marcelo	Project Supervision/ Manager, Program Support Division, Western Region	B.A. Anthropology B.S. Watershed	16
Iliff, Jeremy	Archaeologist, Federal Operations Branch	B.A. Anthropology	18
Martinez Hernandez, Roberta	Project Coordination (2024 –Present)/Natural Resource Specialist	M.S. Environmental Engineering B.S. Engineering	13
Shaeffer, Elizabeth	Project Supervision/ Program Manager, Field Operations Branch	B.S. Land Use Planning, Environment and Resources	15
Trent, Erica	Section 7 Coordinator	B.S. Biology	13
Kwak, Charlie	Environmental Protection Specialist	M.S. Environmental Biology B.S. Biology	6

6.2.3 Bureau of Land Management

The following table provides the names and credentials of BLM preparers of the SEIS. For the names and credentials of the BLM preparers of the 2018 Final EIS, please see **Section 6.2.3** in that document.

Name	Responsibilities	Education	Experience (Years)
Tessa Wallace	BLM, Cooperating Agency	M.S. Geology B.S. Geology B.S. Ecology	16

6.2.4 EIS Consultant Team

The following table provides the names and credentials of third-party consultant preparers of the SEIS. For the names and credentials of third-party consultant preparers of the 2018 Final EIS, please see **Section 6.2.4** in that document.

Name/Firm	Responsibilities	Education	Experience
Brown, Matt Confluence Water	Surface Water and Water Rights	M.S. Civil Engineering B.S. Civil Engineering	30
Butler, Steve ERO Resources Corporation	Fish and Wildlife, Special Status Species, Vegetation, and Wetlands	M.E.M. Water and Air Resources B.S. Biology	27
Conklin, Don GEI Consultants	Fisheries	M.S. Water Resource Management	40
Corsi, Emily ERO Resources Corporation	Assistant Project Manager; Senior NEPA/MEPA Specialist: Chapters 1 and 2 and various resource sections, including Air Quality, Climate and Climate Change, Land Use, Recreation, and Soil	M.S. Natural Resources Conservation B.A. Politics	18
Croll, Kathy ERO Resources Corporation	Cultural Resources and Paleontology	Ph.D. Anthropology M.A. Anthropology B.S. Social Science	26
Den Herder, Nicole ERO Resources Corporation	Project Manager; Principal NEPA/MEPA Specialist: various resource sections, including Socioeconomics, Visual Resources, Access and Transportation, and Noise	Master of Environmental Policy and Management B.S. Communication	26
Ficke, Ashley GEI Consultants	Fisheries	Ph.D. Fishery Biology M.S. Fish, Wildlife, and Conservation B.S. Fish and Wildlife Biology	24
Hodges, Wendy ERO Resources Corporation	Geographic Information Systems	Master of Environmental Policy and Management B.S. Natural Science	17
Jeavons, Doug BBC Research & Consulting	Socioeconomics Modeling and GHG Social Costs	M.A. Economics	28
Lane, Jennifer ERO Resources Corporation	Senior NEPA/MEPA Specialist: various resource sections, including Public Health and Safety, Environmental Justice, Socioeconomics, and Access and Transportation	B.S. Environmental Policy	11
Lynch, Jeniffer GEI Consultants	Fisheries	M.S. Environmental Science	20
Olmsted, Brian ERO Resources Corporation	Topography, Geology, Groundwater, Water Rights, and Solid and Hazardous Waste	M.S. Geochemistry B.S. Geology	18

Name/Firm	Responsibilities	Education	Experience
Panlilio, Autumn ERO Resources Corporation	NEPA Specialist: various resource sections, including Public Health and Safety	Master of Environment Bachelors of Environmental Studies	2
Perreault, Lili ERO Resources Corporation	NEPA Specialist	Ph.D. Forestry and Environmental Resources M.S. Biology B.S. Environmental Science	5
Troyer, Lizzie ERO Resources Corporation	Technical Editor	M.S. Interdisciplinary Ecology B.A. Biology	7
Wall, Kay ERO Resources Corporation	Technical Editor	B.A. Behavioral Science	33

6.3 LIST OF AGENCIES, ORGANIZATIONS, AND PERSONS TO WHOM COPIES OF THIS SEIS HAVE BEEN DISTRIBUTED

Montana DEQ Headquarters (Lee Metcalf Building)
1520 East 6th Avenue
Helena, MT 59620-0901
Between the hours of 8:00 AM and 5:00 PM Monday through Friday (Closed Saturday and Sunday)

BLM Miles City Field Office
111 Garryowen Road
Miles City, MT 59301
Between the hours of 7:45 AM and 4:30 PM Monday through Friday (Closed Saturday and Sunday)

Rosebud County Library
201 North 9th Avenue
Forsyth, MT 59327-0007
Between the hours of 11:00 AM and 7:00 PM Monday through Thursday; 11:00 AM to 5:00 PM Friday; 10:00 AM to 1:00 PM Saturday (Closed Sunday)

OSMRE, Western Region
1999 Broadway, Suite 3320
Denver, CO 80202
Between the hours of 8:00 AM and 4:00 PM Monday through Friday (Closed Saturday and Sunday)

BLM State Office, Billings, MT
5001 Southgate Drive
Billings, MT 59101
Between the hours of 8:00 AM and 4:00 PM Monday through Friday (Closed Saturday and Sunday)

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Appendix 1 – Acronyms, Abbreviations, Analysis Definitions, and Glossary

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Acronyms and Abbreviations

AADT	annual average daily traffic
ACHP	Advisory Council on Historic Preservation
ACS	American Community Survey
AHR	Annual Hydrology Report
AML	abandoned mine lands
AMM	abandoned mine methane
AMPD	U.S. Environmental Protection Agency Clean Air Markets Program Data
AMRF	Abandoned Mine Reclamation Fund
AOC	Administrative Order of Consent
AQS	Air Quality Service
AR5	Fifth Assessment Report of the IPCC
ARM	Administrative Rules of Montana
ARMP	Approved Resource Management Plan
asl	above sea level
ASLM	Assistant Secretary for Land and Minerals Management
AUM	animal unit month
AVF	alluvial valley floor
BACT	Best Available Control Technology
BGEPA	Bald and Golden Eagle Protection Act of 1940
BLM	Bureau of Land Management
BLM-MT/DK	Bureau of Land Management Montana/Dakotas
BLS	U.S. Department of Labor, Bureau of Labor Statistics
BMP	Best Management Practices
BP	before present
BSL	background screening level
BTCA	best technology currently available
BTU	British thermal units
BTV	background threshold value
CAA	Clean Air Act
Ca:Mg	calcium/magnesium ratio
CAMx	Comprehensive Air Quality Model with Extensions
CAP	criteria air pollutant
CASTNET	Clean Air Status and Trends Network
CCAC	Climate Change Advisory Committee
CCR	coal combustion residuals
CCRA	cleanup criteria and risk assessment
CCUS	carbon capture, utilization, and storage
CDC	Center for Disease Control
CELP	Colstrip Energy Limited Partnership
CEQ	Council on Environmental Quality

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERP	Contingency and Emergency Response Plan
C.F.R.	Code of Federal Regulations
cfs	cubic feet per second
cf/t	cubic feet per short ton
CH_4	methane
CHIA	cumulative hydrologic impact analysis
CMM	coal mine methane
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
COC	chemicals of concern
COPC	chemicals of potential concern
CPRD	Colstrip Park and Recreation District
CSAPR	Cross-State Air Pollution Rule
CWA	Clean Water Act
dB	decibel
dBA	decibel (A-weighted)
DEQ	Montana Department of Environmental Quality
DNRC	Montana Department of Natural Resources and Conservation
DOI	U.S. Department of the Interior
DPM	diesel particulate matter
dv	deciview
DV	design value
EA	Environmental Assessment
EC	electrical conductivity
ECC	ecological cleanup criterion
ECOS	Environmental Conservation Online
Eco-SSL	ecological soil screening level
EFAC	East Fork Armells Creek
EHP	effluent holding pond
EIA	Energy Information Administration
EIS	Environmental Impact Statement
ELG	effluent limit guidelines
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EPRI	Electric Power Research Institute
ERA	ecological risk assessment
ERO	Resources Corporation
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency

FGDM	flue gas desulfurization material
FLIGHT	Facility Level Information on Greenhouse Gases Tool
FLPMA	Federal Land Policy and Management Act
FR	Federal Register
FWP	Montana Fish, Wildlife and Parks
FY	fiscal year
GHG	greenhouse gas
GIS	geographic information systems
gpm	gallons per minute
Gt	gigatons
Guidelines	Clean Water Act Section 404(b)(1) Guidelines
GWIC	groundwater information center
GWP	Global Warming Potential
HAP	hazardous air pollutant
HFC	hydrofluorocarbon
Hg	mercury
HHRA	human health risk assessment
HI	hazard index
HVTL	high voltage transmission line
HWC	Hazardous Waste Coordinator
ICMM	International Council on Mining and Metals
IMPROVE	Interagency Monitoring of Protected Visual Environments
IPaC	USFWS Information, Planning, and Conservation System
IPCC	Intergovernmental Panel on Climate Change
kg/ha	kilograms per hectare
kV	kilovolt
L_{dn}	day-night average noise level
L_{eq}	equivalent noise level
LANL	Los Alamos National Laboratory
LBM	lease by modification
LOAEL	lowest observed adverse effect level
LQG	Large Quantity Generator
m/s	meters per second
MAAQS	Montana Ambient Air Quality Standards
MAQP	Montana Air Quality Permit
MBTA	Migratory Bird Treaty Act
MCA	Montana Code Annotated
MCFO	Miles City Field Office
MCL	maximum contaminant level
MDA	Montana Department of Agriculture
MDHHS	Montana Department of Health and Human Services

MDN	Mercury Deposition Network
MDSL	Montana Department of State Lands
MDT	Montana Department of Transportation
MEGAN	Model of Emissions of Gases and Aerosols in Nature
MEIC	Montana Environmental Information Center
MEPA	Montana Environmental Policy Act
MFSA	Major Facility Siting Act
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mg/m^3	milligrams per cubic meter
MLA	Mineral Leasing Act
MMT	million metric tons
$MMtCO_2e$	million metric tons of carbon dioxide equivalent
MNHP	Montana Natural Heritage Program
MOA	memorandum of agreement
MOU	Memorandum of Understanding
MP	milepost
MPDD	Mining Plan Decision Document
MPDES	Montana Pollutant Discharge Elimination System
mph	miles per hour
MQAP	Montana Quality Assurance Plan
MSGWG	Montana Sage-Grouse Working Group
MSHA	Mine Safety and Health Administration
MSU	Montana State University
MSUMRA	Montana Strip and Underground Mine Reclamation Act
MT	Montana
MW	megawatts
MWAM	Montana Department of Transportation Wetland Assessment Method
MYED	Mid Yellowstone Electric Cooperative Inc.
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NADP	National Atmospheric Deposition Program
NCA	National Climate Assessment
NCAR	National Center for Atmospheric Research
NCCV	National Climate Change Viewer
ND	normalized difference
NEI	National Emissions Inventory
NEPA	National Environmental Policy Act
NO_x	nitrogen oxide
NO_2	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration

NOAEL	no observed adverse effect level
NHPA	National Historic Preservation Act
NRC	National Research Council
NRHP	National Register of Historic Places
NSR	New Source Review
NTN	National Trends Network
NWR	National Wildlife Refuge
O_3	ozone
OEA	Office of Environmental Analysis
OSAT	Ozone Source Apportionment Technology
OSHA	Occupational Safety and Health Administration
OSMRE	Office of Surface Mining Reclamation and Enforcement
PA	Programmatic Agreement
PAP	Permit Application Package
PCI	per-capita income
PD	Preliminary Determination
PFC	perfluorocarbon
PFYC	Potential Fossil Yield Classification
PHC	probable hydrologic consequences
PM	particulate matter
PLS	pure live seed
PMT	postmining topography
ppb	parts per billion
PPE	personal protective equipment
PPL	Colstrip Power Plant
ppm	parts per million
ppt	parts per trillion
PSAT	Particulate Source Apportionment Technology
PSD	Prevention of Significant Deterioration
PTE	potential to emit
QA	quality assurance
QC	quality control
RAP	remedial action progress
RCP	representative concentration pathway
RCRA	Resource Conservation and Recovery Act
RER	remedy evaluation report
ROD	Record of Decision
RRA	Resource Recovery Act
RRPP	Resource Recovery and Protection Plan
RMP	Resource Management Plan
RSL	residential screening level

SAR	sodium adsorption ratio
SC	specific conductance
scf	standard cubic feet
SC-GHG	social cost of greenhouse gases
SCORP	Montana State Comprehensive Outdoor Recreation Plan
SEDCAD	Sediment, Erosion, Discharge by Computer Aided Design
SFHA	Special Flood Hazard Area
SHPO	State Historic Preservation Office
SHWMP	Solid and Hazardous Waste Management Plan
SIP	State Implementation Plan
SMCRA	Surface Mining Control and Reclamation Act of 1977
SOC	Species of Concern
SO_2	sulfur dioxide
SPCCMP	Spill Prevention Control and Counter Measure Plan
SRR	synoptic run report
SSL	soil screening level
STEP	stage two evaporation pond
TBTU	trillion British thermal units
TCLP	Toxicity Characteristic Leaching Procedure
TCP	traditional cultural property
TDS	total dissolved solids
THC	total hydrocarbon
TMDL	Total Maximum Daily Load
TRI	Toxic Release Inventory
TRRC	Tongue River Railroad Company Inc.
TRV	toxicity reference value
TSDF	treatment, storage, and disposal facility
UCL	Upper Confidence Limit
UDP	Unanticipated Discovery Plan
USACE	U.S. Army Corps of Engineers
U.S.C.	United States Code
USDA	U.S. Department of Agriculture
USFS	USDA Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UWPHI	University of Wisconsin Population Health Institute
VER	valid existing rights
VOC	volatile organic compound
VRM	Visual Resource Management
Water Rights Bureau	Montana Department of Natural Resources and Conservation, Water Resources Division, Montana Water Rights Bureau

W/m^2	watts per square meter
WCI	Western Climate Initiative
WEPP	USDA Water Erosion Prediction Project
WGIII	Working Group III
WRAP	Western Regional Air Partnership
WRI	World Resources Institute
$\mu g/m^3$	micrograms per cubic meter
µS/cm	microSiemens/centimeter

Analysis Definitions

The following terms were used in this SEIS to describe the nature of impacts associated with each alternative. These definitions were formulated through the review of existing laws (such as NEPA), policies, and guidelines, and with assistance from resource specialists.

Direct, Indirect, and Cumulative Impacts: Impacts can be direct, indirect, or cumulative.

Direct impacts are caused by an action and occur at the same time and place as the action.

Indirect impacts under NEPA are caused by the action and occur later in time or farther away in distance but are still reasonably foreseeable.

Cumulative impacts under NEPA are the effects on the environment that result from the incremental effects of the action when added to the effects of other past, present, and reasonably foreseeable future actions. Cumulative impacts are disclosed in **Chapter 5**.

Duration: For this SEIS, impact duration is described as short-term or long-term; generally, these are defined as follows (exceptions occur for Cultural and Historic Resources, Geology, and Paleontology):

- Short-term impact/effect – a change that within a short period would no longer be detectable as the resource is returned to its pre-mine condition, appearance, or use. In this SEIS a "short period" is defined as the length of the Area F bond liability period (see **Chapter 1** for a description of the bond liability period).
- Long-term impact/effect – a change in a resource or its condition that does not immediately return the resource to pre-mine condition, appearance, or productivity; long-term impacts would apply to changes in condition that continue beyond the bond liability period but would be expected to eventually return to pre-mine condition, or would meet SMCRA or MSUMRA requirements.

Impact Intensity and Thresholds of Change: Intensity of impacts and the thresholds of change for the intensity of impacts vary by resource and are defined in a table at the beginning of each resource section. There may be no impact, adverse impacts, or beneficial impacts (defined below). In general, the intensity of adverse and beneficial impacts may be negligible, minor, moderate, or major. The thresholds of change for the intensity of impacts are also defined differently for each resource. With the exception of Climate Change, Water Resources – Surface Water, and Special Status Species, these "Impact and Intensity Thresholds" are not reproduced in this SEIS but are provided in the 2018 Final EIS at the beginning of each **Chapter 4** resource section.

Type: Impacts can be beneficial or adverse. Beneficial impacts are those that create a positive change in the condition or appearance of the resource or a change that moves the resource toward a desired condition. Adverse impacts are those that move the resource away from a desired condition or detract from its appearance or condition.

Appendix 2 – Social Cost of Greenhouse Gases (BBC analysis)

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MEMORANDUM

To: Nicole DenHerder, ERO Resources Corporation

From: Doug Jeavons, BBC Research & Consulting (BBC)

Re: Social Cost of Greenhouse Gases Analysis for the Rosebud Mine Area F Supplemental Environmental Impact Statement (SEIS)

Date: Revised April 22, 2025

For the Westmoreland Rosebud Mine Area F SEIS, BBC examined the social cost of greenhouse gas emissions under the SEIS alternatives. This technical memorandum describes the analysis and results.

Note that this April 22, 2025 revision to this memorandum has been revised to (1) convert the original air quality emissions data from standard tons to metric tons for consistency with published U.S. Environmental Protection Agency (EPA) estimates of the social costs of carbon (SCC), and (2) report net present value estimates of the total social costs of greenhouse gas emissions for each alternative using EPA's recommended discount rates.

Background

SCC, more accurately referred to as the social cost of greenhouse gases, is a measure that is intended to capture, in current monetary terms, the long-term damage done by each ton of greenhouse gas emissions. As described by the EPA:

"The measure is meant to be a comprehensive estimate of climate change damages and includes, among other things: changes in net agricultural productivity, human health, property damages from increased flood risk and changes in energy system costs, such as reduced costs for heating and increased costs for air conditioning."[1]

Federal agencies have been estimating the SCC since an Interagency Work Group (IWG) was convened by the Council of Economic Advisors and the Office of Management and Budget in 2009 for that purpose.[2] Subsequently, an IWG was convened under Executive Order 13990, "Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis" to develop updated estimates

[1] EPA Fact Sheet: Social Cost of Carbon. December 2016.
[2] Ibid.

of the social cost from emissions of carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O).[3] The IWG published those estimates in February 2021.[4]

Most recently, the EPA published new estimates of the social cost of greenhouse gases in 2023.[5] On October 16, 2024, the Department of the Interior's (DOI) Director of Policy Analysis and its Chief Economist issued an informational memorandum recommending the use of the EPA's estimates as the best available science at this time.[6]

This analysis incorporates the 2023 EPA estimates of the social cost of greenhouse gases.

Discount rates and other factors. Like other measures of the present value of a stream of future monetary costs or benefits, the SCC uses discount rates to convert values in future years to their current economic value. Discount rates are intended to reflect the concept that, all else equal, more immediate costs have a higher present value than projected costs further in the future. The EPA estimates used in this analysis were developed under the following discount rates: 2.5 percent, 2.0 percent, and 1.5 percent.

The estimated annual costs per ton also differ depending on the year when the gases are emitted. In general, future emission years have higher estimated costs due to factors such as population growth and the increase in the accumulated amount of greenhouse gases in the atmosphere.

EPA Estimates of the Social Cost of Greenhouse Gas Emissions

The 2023 EPA report published three estimates of the present value of the social cost of greenhouse gas emissions for each of the three primary greenhouse gases – carbon dioxide, methane, and nitrous oxide. The three estimates reflect the three different discount rates used in the analysis.

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[3] Fourteen federal agencies participated in the IWG, including the DOI and the EPA.

[4] *Technical Support Document: Social Cost of Carbon, Methane and Nitrous Oxide Interim Estimates Under Executive Order 13990.* February 2021.

[5] "EPA Report on the Social Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advances." Published under the heading Supplementary Material for the Regulatory Impact Analysis for the Final Rulemaking, "Standards of Performance for New, Reconstructed, and Modified Sources and Emissions Guidelines for Existing Sources: Oil and Natural Gas Sector Climate Review." November 2023.

[6] Informational Memorandum. DOI Comparison of Available Estimates of Social Cost of Greenhouse Gases. Jacob Malcom, Director, Office of Policy Analysis and Kawa Ng, DOI Chief Economist. October 16, 2024.

Table 1 presents the estimated current social costs for each ton of carbon dioxide emitted from 2020 through 2039.

Table 1. Estimated Current Social Cost per Metric Ton of CO_2 Emissions (2020 dollars)

	Discount Rate		
Emissions Year	**2.5%**	**2.0%**	**1.5%**
2020	$120	$190	$240
2021	$122	$194	$254
2022	$124	$198	$268
2023	$126	$202	$282
2024	$128	$206	$296
2025	$130	$210	$310
2026	$132	$214	$324
2027	$134	$218	$338
2028	$136	$222	$352
2029	$138	$226	$366
2030	$140	$230	$380
2031	$143	$234	$385
2032	$146	$238	$390
2033	$149	$242	$395
2034	$152	$246	$400
2035	$155	$250	$405
2036	$158	$254	$410
2037	$161	$258	$415
2038	$164	$262	$420
2039	$167	$266	$425

Source: EPA Report on the Social Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advances. November 2023.

Table 2 presents the estimated current social costs for each ton of methane emitted from 2020 through 2039.

Table 2. Estimated Current Social Cost per Metric Ton of CH_4 Emissions (2020 dollars)

	Discount Rate		
	2.5%	2.0%	1.5%
Emissions Year	Average	Average	Average
2020	$1,300	$1,600	$2,300
2021	$1,360	$1,680	$2,390
2022	$1,420	$1,760	$2,480
2023	$1,480	$1,840	$2,570
2024	$1,540	$1,920	$2,660
2025	$1,600	$2,000	$2,750
2026	$1,660	$2,080	$2,840
2027	$1,720	$2,160	$2,930
2028	$1,780	$2,240	$3,020
2029	$1,840	$2,320	$3,110
2030	$1,900	$2,400	$3,200
2031	$1,980	$2,490	$3,300
2032	$2,060	$2,580	$3,400
2033	$2,140	$2,670	$3,500
2034	$2,220	$2,760	$3,600
2035	$2,300	$2,850	$3,700
2036	$2,380	$2,940	$3,800
2037	$2,460	$3,030	$3,900
2038	$2,540	$3,120	$4,000
2039	$2,620	$3,210	$4,100

Source: EPA Report on the Social Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advances. November 2023.

Table 3 presents the estimated current social costs for each ton of nitrous oxide emitted from 2020 through 2039.

Table 3. Estimated Current Social Cost per Metric Ton of N_2O Emissions (2020 dollars)

	Discount Rate		
Emissions Year	**2.5%**	**2.0%**	**1.5%**
2020	$35,000	$54,000	$87,000
2021	$36,000	$55,200	$88,300
2022	$37,000	$56,400	$89,600
2023	$38,000	$57,600	$90,900
2024	$39,000	$58,800	$92,200
2025	$40,000	$60,000	$93,500
2026	$41,000	$61,200	$94,800
2027	$42,000	$62,400	$96,100
2028	$43,000	$63,600	$97,400
2029	$44,000	$64,800	$98,700
2030	$45,000	$66,000	$100,000
2031	$46,000	$67,300	$102,000
2032	$47,000	$68,600	$104,000
2033	$48,000	$69,900	$106,000
2034	$49,000	$71,200	$108,000
2035	$50,000	$72,500	$110,000
2036	$51,000	$73,800	$112,000
2037	$52,000	$75,100	$114,000
2038	$53,000	$76,400	$116,000
2039	$54,000	$77,700	$118,000

Source: EPA Report on the Social Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advances. November 2023.

Estimated Direct Annual Emissions from Rosebud Mining Operations and Indirect Annual Emissions from Combustion of Rosebud Coal at Colstrip and Rosebud Generating Stations and Workforce Commuting

To calculate the estimated SCC for the alternatives examined in the SEIS, the current annual costs per ton of CO_2, CH_4, and N_2O emissions shown in Tables 1 through 3 are multiplied by the projected annual emissions from the project area under each SEIS alternative. For this analysis, emissions have been converted from standard tons to metric tons. Direct emissions include all emissions from mining operations. Indirect emissions include emissions from combustion of coal mined at the Rosebud Mine at

the Colstrip and Rosebud generating facilities. Indirect emissions also include emissions generated by workers commuting to the Rosebud Mine and the two generating facilities.

The Colstrip Power Plant currently consists of two large generating units (Units 3 and 4), each with a rated capacity of approximately 740 megawatts. Units 1 and 2 at the Colstrip Power Plant were recently retired from service.[7] The Rosebud Power Plant is a much smaller generating facility designed to burn low-British thermal unit (Btu) waste coal from Rosebud mining operations.[8]

Table 4 presents the estimated annual direct emissions from Rosebud Mine operations for each of the three primary greenhouse gases from 2020 through 2039. These emissions also include activities such as coal crushing, hauling, and conveying. Production from Area F would be a subset of these total emissions. Further detail regarding these emission projections is provided in SEIS Section 4.4, Climate and Climate Change.

Table 4. Projected Annual Direct Greenhouse Gas Emissions from Rosebud Mining Operations (metric tons per year)

Emissions Year	CO_2	CH_4	N_2O
2020	1,690	122	0.0041
2021	7,607	548	0.0919
2022	33,807	2,436	0.4082
2023	33,807	2,436	0.4082
2024	33,807	2,436	0.4082
2025	33,807	2,436	0.4082
2026	33,807	2,436	0.4082
2027	33,807	2,436	0.4082
2028	33,807	2,436	0.4082
2029	33,807	2,436	0.4082
2030	33,807	2,436	0.4082
2031	33,807	2,436	0.4082
2032	33,807	2,436	0.4082
2033	33,807	2,436	0.4082
2034	33,807	2,436	0.4082
2035	33,807	2,436	0.4082
2036	33,807	2,436	0.4082
2037	33,807	2,436	0.4082
2038	33,807	2,436	0.4082
2039	13,502	974	0.1633

Note: Emissions projections converted from standard tons to metric tons by BBC.
Source: Personal communication from Emily Corsi, Senior Environmental Planner/Associate, ERO Resources Corporation, July 2024.

[7] Talen Energy. https://www.talenenergy.com/plant/colstrip-steam-electric-station/.

[8] Colstrip Energy Limited Partnership. CCR Rule Compliance Data and Information. Rosebud Power Plant. Colstrip, MT. https://celpccr.com/.

Table 5 presents the estimated annual indirect emissions from combustion of Rosebud coal at the Colstrip and Rosebud generating facilities from 2020 through 2039. Combustion of coal mined from Area F would be a subset of these emissions. Further detail regarding these emission projections is also provided in SEIS Section 4.4, Climate and Climate Change.

Table 5. Projected Annual Indirect Greenhouse Gas Emissions from Combustion of Rosebud Coal (metric tons per year)

Emissions Year	CO_2	CH_4	N_2O
2020	10,060,801	1,191	174
2021	10,060,801	1,191	174
2022	10,060,801	1,191	174
2023	10,060,801	1,191	174
2024	10,060,801	1,191	174
2025	10,060,801	1,191	174
2026	10,060,801	1,191	174
2027	10,060,801	1,191	174
2028	10,060,801	1,191	174
2029	10,060,801	1,191	174
2030	10,060,801	1,191	174
2031	10,060,801	1,191	174
2032	10,060,801	1,191	174
2033	10,060,801	1,191	174
2034	10,060,801	1,191	174
2035	10,060,801	1,191	174
2036	10,060,801	1,191	174
2037	10,060,801	1,191	174
2038	10,060,801	1,191	174
2039	10,060,801	1,191	174

Note: Emissions projections converted from standard tons to metric tons by BBC.
Source: Personal communication from Emily Corsi, Senior Environmental Planner/Associate, ERO Resources Corporation, July 2024.

Table 6 presents the estimated annual indirect emissions from workers commuting to the Rosebud Mine, the Rosebud Power Plant, and the Colstrip Power Plant from 2020 through 2039. Emissions from workforce commuting are expressed in terms of CO_2 equivalent tons per year (CO_{2e}). Further detail regarding these emissions projections is also provided in SEIS Section 4.4, Climate and Climate Change.

Table 6. Projected Annual Indirect Greenhouse Gas Emissions from Workers Commuting to Rosebud Mine, Rosebud Power Plant, and Colstrip Power Plant (metric tons per year)

Emissions Year	CO_2e
2020	4,312
2021	4,312
2022	4,312
2023	4,312
2024	4,312
2025	4,312
2026	4,312
2027	4,312
2028	4,312
2029	4,312
2030	4,312
2031	4,312
2032	4,312
2033	4,312
2034	4,312
2035	4,312
2036	4,312
2037	4,312
2038	4,312
2039	4,312

Note: Emissions projections converted from standard tons to metric tons by BBC.
Source: Personal communication from Emily Corsi, Senior Environmental Planner/Associate, ERO Resources Corporation, July 2024.

Estimated Social Cost of Carbon from Rosebud Mining, Combustion of Rosebud Coal, and Workforce Commuting

The estimated SCC emissions from mining coal at the Rosebud Mine is the product of the projected emissions (Tables 4, 5, and 6) and the estimated social cost per ton of those emissions by pollutant (Tables 1 through 3). At the bottom of each of the following Tables 7 through 10, the net present value of the estimated social cost of emissions is summarized for each SEIS alternative, including Alternative 1: No Action (NAA; assumes mining ceases after 2025), Alternative 4: Proposed Action (PA; assumes

mining ceases after 2039), and Alternative 5: Partial Mining Alternative (Alt 5; assumes mining ceases after 2030).

Table 7 presents the estimated direct social cost from emissions created by Rosebud mining, including emissions of carbon dioxide, methane, and nitrous oxide. Mining from Area F would produce a portion of these emissions.

As summarized at the bottom of the table, the net present value of the estimated direct SCC emissions under the No Action Alternative ranges from approximately $32 million to $66 million, depending on the discount rate. It should be noted, however, that approximately 76 percent of the costs under the No Action Alternative are due to mining, which will have already occurred by the end of the current year (2025).

The largest components of the direct SCC under Alternative 4 (Proposed Action) are from carbon dioxide emissions (50 to 61 percent depending on the discount rate), followed by methane emissions (39 to 50 percent of the total cost). The social costs of nitrous oxide emissions are relatively minimal due to the comparatively low level of projected direct emissions of that pollutant.

The net present value of the estimated direct SCC emissions under Alternative 4 (Proposed Action) ranges from approximately $128 million to $299 million, depending on the discount rate. The net present value of the direct SCC emissions under Alternative 5 (Partial Mining Alternative) ranges from approximately $66 million to $149 million.

Table 7. Projected Annual Direct SCC Emissions from Rosebud Mining (including CO_2, CH_4, and N_2O - 2020 dollars)

	Discount Rate		
Emissions Year	**2.5%**	**2.0%**	**1.5%**
2020	$361,000	$516,000	$686,000
2021	$1,676,000	$2,402,000	$3,250,000
2022	$7,666,000	$11,004,000	$15,138,000
2023	$7,881,000	$11,335,000	$15,831,000
2024	$8,094,000	$11,665,000	$16,524,000
2025	$8,308,000	$11,996,000	$17,216,000
2026	$8,523,000	$12,326,000	$17,911,000
2027	$8,737,000	$12,656,000	$18,603,000
2028	$8,952,000	$12,987,000	$19,296,000
2029	$9,165,000	$13,317,000	$19,988,000
2030	$9,379,000	$13,649,000	$20,683,000
2031	$9,676,000	$14,003,000	$21,096,000
2032	$9,973,000	$14,358,000	$21,509,000
2033	$10,270,000	$14,714,000	$21,922,000
2034	$10,566,000	$15,069,000	$22,336,000
2035	$10,862,000	$15,424,000	$22,749,000
2036	$11,160,000	$15,778,000	$23,163,000
2037	$11,456,000	$16,133,000	$23,577,000
2038	$11,753,000	$16,488,000	$23,989,000
2039	$4,820,000	$6,738,000	$9,761,000
Net Present Value			
2020-2025 (NAA)	$32,122,000	$46,488,000	$66,012,000
2020-2039 (PA)	$127,624,000	$193,314,000	$298,918,000
2020-2030 (Alt 5)	$66,341,000	$99,174,000	$148,616,000

Source: BBC Research & Consulting, 2025.

Table 8 presents the estimated indirect social cost from emissions created by combustion of Rosebud coal, including emissions of carbon dioxide, methane, and nitrous oxide.

As summarized at the bottom of the table, the total estimated indirect SCC emissions from coal combustion are at least two orders of magnitude (100 times) larger than the estimated direct SCC emissions from mining shown previously in Table 7. The present value of the estimated indirect costs under the No Action Alternative ranges from $7 billion to $16 billion, depending on the discount rate. As discussed regarding the direct costs estimates presented previously, more than 80 percent of the costs under the No Action Alternative are due to coal combustion, which will have already occurred by the end of the current year (2025).

In contrast to the direct social costs of carbon from mining, the largest component of the indirect SCC is from carbon dioxide emissions (more than 99 percent of the total costs). The indirect social costs from emissions of methane and nitrous oxide make up 1 percent or less of the total estimated indirect social costs.

The net present value of the estimated indirect SCC emissions under Alternative 4 (Proposed Action) ranges from approximately $22 billion to $60 billion, depending on the discount rate. The net present value of the estimated indirect SCC emissions under Alternative 5 (Partial Mining Alternative) ranges from approximately $12 billion to $31 billion.

Table 8. Projected Annual Indirect SCC Emissions from Combustion of Rosebud Coal (including CO_2, CH_4, and N_2O – 2020 dollars)

	Discount Rate		
Emissions Year	**2.5%**	**2.0%**	**1.5%**
2020	$1,214,940,000	$1,922,864,000	$2,432,486,000
2021	$1,235,308,000	$1,963,411,000	$2,573,671,000
2022	$1,255,675,000	$2,003,959,000	$2,714,855,000
2023	$1,276,043,000	$2,044,507,000	$2,856,040,000
2024	$1,296,410,000	$2,085,054,000	$2,997,224,000
2025	$1,316,777,000	$2,125,601,000	$3,138,410,000
2026	$1,337,144,000	$2,166,149,000	$3,279,595,000
2027	$1,357,512,000	$2,206,697,000	$3,420,780,000
2028	$1,377,879,000	$2,247,244,000	$3,561,964,000
2029	$1,398,247,000	$2,287,791,000	$3,703,149,000
2030	$1,418,613,000	$2,328,339,000	$3,844,335,000
2031	$1,449,065,000	$2,368,916,000	$3,895,106,000
2032	$1,479,517,000	$2,409,493,000	$3,945,878,000
2033	$1,509,969,000	$2,450,069,000	$3,996,649,000
2034	$1,540,421,000	$2,490,647,000	$4,047,420,000
2035	$1,570,873,000	$2,531,223,000	$4,098,192,000
2036	$1,601,325,000	$2,571,800,000	$4,148,963,000
2037	$1,631,776,000	$2,612,377,000	$4,199,734,000
2038	$1,662,228,000	$2,652,953,000	$4,250,507,000
2039	$1,692,681,000	$2,693,531,000	$4,301,278,000
Net Present Value			
2020-2025 (NAA)	$6,964,432,000	$11,325,485,000	$15,834,293,000
2020-2039 (PA)	$21,992,853,000	$37,305,702,000	$60,446,938,000
2020-2030 (Alt 5)	$12,480,302,000	$20,724,418,000	$31,395,692,000

Source: BBC Research & Consulting, 2025.

Table 9 presents the estimated indirect SCC from workforce commuting to the Rosebud Mine, the Rosebud Power Plant, and the Colstrip Power Plant. The net present value of the indirect social costs of carbon from commuting ranges from approximately $3.0 to $6.7 million under the No Action Alternative, approximately $9.4 to $25.8 million under Alternative 4 (Proposed Action), and approximately $5.3 million to $13.4 million under Alternative 5 (Partial Mining Alternative).

Table 9. Projected Annual Indirect SCC Emissions from Workforce Commuting (2020 dollars)

	Discount Rate		
Emissions Year	**2.5%**	**2.0%**	**1.5%**
2020	$517,000	$819,000	$1,035,000
2021	$526,000	$837,000	$1,095,000
2022	$535,000	$854,000	$1,156,000
2023	$543,000	$871,000	$1,216,000
2024	$552,000	$888,000	$1,276,000
2025	$561,000	$906,000	$1,337,000
2026	$569,000	$923,000	$1,397,000
2027	$578,000	$940,000	$1,458,000
2028	$586,000	$957,000	$1,518,000
2029	$595,000	$975,000	$1,578,000
2030	$604,000	$992,000	$1,639,000
2031	$617,000	$1,009,000	$1,660,000
2032	$630,000	$1,026,000	$1,682,000
2033	$643,000	$1,044,000	$1,703,000
2034	$655,000	$1,061,000	$1,725,000
2035	$668,000	$1,078,000	$1,746,000
2036	$681,000	$1,095,000	$1,768,000
2037	$694,000	$1,113,000	$1,790,000
2038	$707,000	$1,130,000	$1,811,000
2039	$720,000	$1,147,000	$1,833,000
Net Present Value			
2020-2025 (NAA)	$2,965,000	$4,826,000	$6,741,000
2020-2039 (PA)	$9,360,000	$15,892,000	$25,753,000
2020-2030 (Alt 5)	$5,313,000	$8,830,000	$13,373,000

Source: BBC Research & Consulting, 2025.

Table 10 presents the estimated total SCC from the SEIS alternatives, combining the direct social costs presented in Table 7 and the indirect social costs presented in Tables 8 and 9. Approximately 99 percent of the total SCC are due to the indirect costs from coal combustion. As shown in Table 10, the estimated net present value of the total SCC ranges from approximately $7.0 billion to $15.9 billion under the No Action Alternative (though more than 80 percent of those costs will have already been incurred by the end of 2024). The estimated net present value of the total SCC under Alternative 4 (Proposed Action) ranges from approximately $22 billion to $61 billion. The estimated net present value of the total SCC under Alternative 5 (Partial Mining Alternative) ranges from approximately $13 billion to $32 billion.

Table 10. Projected Annual Total SCC Emissions for Rosebud Mining Alternatives (combining direct costs and indirect costs – 2020 dollars)

	Discount Rate		
Emissions Year	**1.5%**	**2.0%**	**1.5%**
2020	$1,215,818,000	$1,924,199,000	$2,434,207,000
2021	$1,237,510,000	$1,966,650,000	$2,578,016,000
2022	$1,263,876,000	$2,015,817,000	$2,731,149,000
2023	$1,284,467,000	$2,056,713,000	$2,873,087,000
2024	$1,305,056,000	$2,097,607,000	$3,015,024,000
2025	$1,325,646,000	$2,138,503,000	$3,156,963,000
2026	$1,346,236,000	$2,179,398,000	$3,298,903,000
2027	$1,366,827,000	$2,220,293,000	$3,440,841,000
2028	$1,387,417,000	$2,261,188,000	$3,582,778,000
2029	$1,408,007,000	$2,302,083,000	$3,724,715,000
2030	$1,428,596,000	$2,342,890,000	$3,866,657,000
2031	$1,459,358,000	$2,383,928,000	$3,917,862,000
2032	$1,490,120,000	$2,424,877,000	$3,969,069,000
2033	$1,520,882,000	$2,465,827,000	$4,020,274,000
2034	$1,551,642,000	$2,506,777,000	$4,071,481,000
2035	$1,582,403,000	$2,547,725,000	$4,122,687,000
2036	$1,613,166,000	$2,588,673,000	$4,173,894,000
2037	$1,643,926,000	$2,629,623,000	$4,225,101,000
2038	$1,674,688,000	$2,670,571,000	$4,276,307,000
2039	$1,698,221,000	$2,701,416,000	$4,312,872,000
Net Present Value			
2020-2025 (NAA)	$6,999,519,000	$11,376,799,000	$15,907,046,000
2020-2039 (PA)	$22,129,837,000	$37,514,908,000	$60,771,609,000
2020-2030 (Alt 5)	$12,551,956,000	$20,832,422,000	$31,557,681,000

Source: BBC Research & Consulting, 2025.

Summary

This technical memorandum has presented the estimated direct, indirect, and total SCC emissions (CO_2, CH_4, and N_2O) from mining at the Rosebud coal mine and combustion of Rosebud coal at the Colstrip

Power Plant and the Rosebud Power Plant, as well as the indirect SCC from workers commuting to the mine and the two power plants. The estimated SCC combine projected emissions data from SEIS Section 4.4, Climate and Climate Change with estimated social costs per ton by pollutant published by the EPA in 2023. All monetary estimates are presented in year 2020 dollars.

The present value of the annual direct SCC emissions from Rosebud mining ranges from $32 million to $66 million for the No Action Alternative, $128 to $299 million for Alternative 4 (Proposed Action), and $66 million to $149 million for Alternative 5 (Partial Mining Alternative). The majority of the SCC from mining are due to methane emissions, followed by carbon dioxide emissions. Nitrous oxide emissions are comparatively small and represent a small portion of the estimated direct SCC.

The estimated indirect SCC emissions from combustion of coal mined at the Rosebud Mine are much larger than the estimated direct social costs from mining – at least two orders of magnitude greater. Indirect SCC from workforce commuting are relatively small by comparison. Unlike the direct social costs from mining, the indirect social costs from coal combustion are dominated by the costs of carbon dioxide emissions.

Combining the direct and indirect SCC estimates, the net present value of the total social costs is estimated to be between $7 billion and $16 billion for the No Action Alternative – though most of those costs have already been incurred between year 2000 and year 2024. The net present value of the total SCC of Alternative 4 (Proposed Action) is estimated to be between $22 billion and $60 billion. The net present value of the total SCC of Alternative 5 (Partial Mining Alternative) is estimated to be between $12 billion and $31 billion.

Appendix 3 – Water Quality Tables

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Baseline Surface Water Quality Tables

Streams

Table 1. Water Quality of Robbie Creek Surface Water.

Parameter	Number of Samples	Number of Detections	Minimum	Median	Maximum
Acidity (mg/L)	6	0	1	1	1
Aluminum, diss (mg/L)	6	6	0.017	0.0255	0.142
Aluminum, total (mg/L)	6	6	0.020	0.0425	0.321
Ammonia, as N (mg/L)	6	1	0.0073	0.0073	0.0142
Arsenic, diss (mg/L)	6	5	0.000314	0.000479	0.001
Arsenic, total (mg/L)	6	5	0.000518	0.000927	0.001
Bicarbonate Alkalinity (mg/L)	6	6	94	589	693
Boron, diss (mg/L)	6	6	0.070	0.48	0.64
Boron, total (mg/L)	6	6	0.070	0.58	0.78
Cadmium, diss (mg/L)	6	0	0.0000658	0.000180	0.000294
Cadmium, total (mg/L)	6	1	0.0000923	0.000138	0.000287
Calcium, diss (mg/L)	6	6	27	177	200
Carbonate Alkalinity (mg/L)	6	4	1	23.5	57
Chloride (mg/L)	6	6	3	22	27
Chromium, diss (mg/L)	0	0	-	-	-
Chromium, total (mg/L)	0	0	-	-	-
Copper, diss (mg/L)	6	2	0.000358	0.000358	0.00135
Copper, total (mg/L)	6	2	0.000319	0.000488	0.051
Fluoride (mg/L)	6	6	0.0495	0.20	0.30
Hydroxide alkalinity (mg/L)	6	0	1	1	1
Iron, diss (mg/L)	6	6	0.017	0.045	0.14
Iron, total (mg/L)	6	6	0.10	0.15	0.49
Laboratory Conductivity (µS/cm)	6	6	549	3,200	3,540
Laboratory pH (s.u.)	6	6	8.1	8.4	8.5
Lead, diss (mg/L)	6	0	0.0000332	0.0000349	0.0000365
Lead, total (mg/L)	6	1	0.0000627	0.0000627	0.000124
Magnesium, diss (mg/L)	6	6	36	352	378
Manganese, diss (mg/L)	6	6	0.046	0.137	0.786
Manganese, total (mg/L)	6	6	0.054	0.180	0.744
Mercury, diss (mg/L)	0	0	-	-	-
Mercury, total (mg/L)	0	0	-	-	-
Nickel, diss (mg/L)	6	3	0.000763	0.000995	0.0030
Nickel, total (mg/L)	6	5	0.000774	0.0025	0.0050
Nitrate+Nitrite (mg/L)	6	1	0.0066	0.0066	0.10
Orthophosphate as P (mg/L)	0	0	-	-	-

Table 1. Water Quality of Robbie Creek Surface Water.

Parameter	Number of Samples	Number of Detections	Minimum	Median	Maximum
Potassium, diss (mg/L)	6	6	9.0	13	16
Selenium, diss (mg/L)	6	2	0.00028	0.00055	0.00088
Selenium, total (mg/L)	6	3	0.000379	0.000504	0.000521
Sodium, diss (mg/L)	6	6	17	200	228
Sodium Absorption Ratio	6	6	0.50	1.94	2.28
Sulfate (mg/L)	6	6	172	1,765	1,890
Total Alkalinity (mg/L)	6	6	94	618	716
Total Dissolved Solids (mg/L)	6	6	370	3,125	3,210
Total Hardness (mg/L)	6	6	216	1,930	2,020
Total Nitrogen (mg/L)	6	6	0.37	0.73	1.37
Total Phosphate (mg/L)	6	6	0.020	0.025	0.35
Total Suspended Sediments (mg/L)	8	8	2.0	5.0	31
Turbidity (NTU)	0	0	-	-	-
Vanadium, diss (mg/L)	6	2	0.000828	0.000828	0.00348
Vanadium, total (mg/L)	6	1	0.000914	0.00213	0.00323
Zinc, diss (mg/L)	6	0	0.00307	0.00307	0.00477
Zinc, total (mg/L)	6	6	0.0028	0.0081	0.019

Data collected between March 2019 and July 2020 for locations CG-101 and CG-102.
diss = dissolved; µS/cm = micro Siemens/centimeter; s.u. = standard units; NTU = nephelometric turbidity units; mg/L = milligrams per liter.
For less than detection limit concentrations, detection limit used to calculate summary statistics.

Table 2. Water Quality of Donley Creek Surface Water.

Parameter	Number of Samples	Number of Detections	Minimum	Median	Maximum
Acidity (mg/L)	12	0	1	1	1
Aluminum, diss (mg/L)	12	12	0.00323	0.18	1.3
Aluminum, total (mg/L)	12	12	0.00617	1.0	9.92
Ammonia, as N (mg/L)	12	8	0.0073	0.29	14.9
Arsenic, diss (mg/L)	12	10	0.000299	0.000848	0.0010
Arsenic, total (mg/L)	12	11	0.000518	0.00108	0.0090
Bicarbonate Alkalinity (mg/L)	12	12	37	207	341
Boron, diss (mg/L)	12	10	0.0257	0.10	0.68
Boron, total (mg/L)	12	12	0.0269	0.11	0.85
Cadmium, diss (mg/L)	12	2	0.0000658	0.000106	0.000348
Cadmium, total (mg/L)	12	5	0.0000772	0.000159	0.000496
Calcium, diss (mg/L)	12	12	7.0	33	227
Carbonate Alkalinity (mg/L)	12	5	1	1	41
Chloride (mg/L)	12	12	0.637	7.5	19
Chromium, diss (mg/L)	1	1	0.000456	0.000456	0.000456
Chromium, total (mg/L)	1	1	0.00543	0.00543	0.00543
Copper, diss (mg/L)	12	8	0.000358	0.0017	0.0070
Copper, total (mg/L)	12	9	0.000319	0.0050	0.031
Fluoride (mg/L)	12	9	0.0398	0.132	0.30
Hydroxide alkalinity (mg/L)	12	0	1	1	1
Iron, diss (mg/L)	12	12	0.00502	0.196	0.830
Iron, total (mg/L)	12	12	0.040	1.46	18
Laboratory Conductivity (µS/cm)	12	12	86	877	4,870
Laboratory pH (s.u.)	13	13	7.2	7.89	8.7
Lead, diss (mg/L)	12	7	0.0000332	0.000208	0.00090
Lead, total (mg/L)	12	8	0.0000627	0.00137	0.0165
Magnesium, diss (mg/L)	12	12	2.0	36.5	365
Manganese, diss (mg/L)	12	11	0.00122	0.0397	0.247
Manganese, total (mg/L)	12	12	0.0080	0.074	0.532
Mercury, diss (mg/L)	1	0	0.000023	0.000023	0.000023
Mercury, total (mg/L)	1	0	0.000023	0.000023	0.000023
Nickel, diss (mg/L)	12	7	0.000763	0.00118	0.0050
Nickel, total (mg/L)	12	11	0.000967	0.00293	0.0220
Nitrate+Nitrite (mg/L)	12	7	0.0066	0.13	1.78
Orthophosphate as P (mg/L)	1	1	0.657	0.657	0.657
Potassium, diss (mg/L)	12	12	6.0	15	100
Selenium, diss (mg/L)	12	10	0.000135	0.000696	0.0020

Table 2. Water Quality of Donley Creek Surface Water.

Parameter	Number of Samples	Number of Detections	Minimum	Median	Maximum
Selenium, total (mg/L)	12	11	0.000225	0.000806	0.0020
Sodium, diss (mg/L)	12	10	0.508	47	605
Sodium Absorption Ratio	12	10	0.010	1.27	5.85
Sulfate (mg/L)	12	12	0.743	236	2,770
Total Alkalinity (mg/L)	12	12	37	207	372
Total Dissolved Solids (mg/L)	12	12	90	750	4,450
Total Hardness (mg/L)	12	12	26	234	2,060
Total Nitrogen (mg/L)	12	12	0.35	1.86	18.6
Total Phosphate (mg/L)	12	12	0.020	0.305	5.56
Total Suspended Sediments (mg/L)	66	66	2.0	97	1,080
Turbidity (NTU)	1	1	43.2	43.2	43.2
Vanadium, diss (mg/L)	12	8	0.000651	0.001099	0.00241
Vanadium, total (mg/L)	12	8	0.000914	0.00323	0.03
Zinc, diss (mg/L)	12	5	0.00197	0.00580	0.024
Zinc, total (mg/L)	12	9	0.00225	0.0138	0.077

Data collected between May 2016 and June 2023 for locations CG-106, SW-89, SW-90, and SW-200.
diss = dissolved; µS/cm = micro Siemens/centimeter; s.u. = standard units; NTU = nephelometric turbidity units; mg/L = milligrams per liter.
For less than detection limit concentrations, detection limit used to calculate summary statistics.

Table 3. Water Quality of Black Hank Creek Surface Water.

Parameter	Number of Samples	Number of Detections	Minimum	Median	Maximum
Acidity (mg/L)	3	0	1	1	1
Aluminum, diss (mg/L)	3	3	0.066	0.114	0.599
Aluminum, total (mg/L)	3	3	0.162	0.339	2.04
Ammonia, as N (mg/L)	3	2	0.0073	0.0435	0.0816
Arsenic, diss (mg/L)	3	3	0.000325	0.000389	0.000661
Arsenic, total (mg/L)	3	3	0.000343	0.000647	0.002
Bicarbonate Alkalinity (mg/L)	3	3	42	52.4	68
Boron, diss (mg/L)	3	3	0.0254	0.0282	0.03
Boron, total (mg/L)	3	3	0.030	0.040	0.0486
Cadmium, diss (mg/L)	3	0	0.00004	0.0000658	0.000106
Cadmium, total (mg/L)	3	1	0.0000923	0.0000949	0.00025
Calcium, diss (mg/L)	3	3	9.0	15.8	27
Carbonate Alkalinity (mg/L)	3	0	1	1	1
Chloride (mg/L)	3	3	1.0	2.0	2.08
Chromium, diss (mg/L)	1	1	0.000327	0.000327	0.000327
Chromium, total (mg/L)	1	1	0.000811	0.000811	0.000811
Copper, diss (mg/L)	3	3	0.000823	0.00147	0.002
Copper, total (mg/L)	3	3	0.00271	0.0030	0.0060
Fluoride (mg/L)	3	1	0.00834	0.035	0.0451
Hydroxide alkalinity (mg/L)	3	0	1	1	1
Iron, diss (mg/L)	3	3	0.070	0.0861	0.43
Iron, total (mg/L)	3	3	0.21	0.502	3.1
Laboratory Conductivity (µS/cm)	3	3	100	295	377
Laboratory pH (s.u.)	3	3	7.6	7.96	8.0
Lead, diss (mg/L)	3	1	0.0000365	0.000125	0.000295
Lead, total (mg/L)	3	2	0.0000627	0.000401	0.0028
Magnesium, diss (mg/L)	3	3	3.0	14.3	15
Manganese, diss (mg/L)	3	3	0.011	0.013	0.0139
Manganese, total (mg/L)	3	3	0.016	0.025	0.067
Mercury, diss (mg/L)	1	0	0.000023	0.000023	0.000023
Mercury, total (mg/L)	1	0	0.000023	0.000023	0.000023
Nickel, diss (mg/L)	3	1	0.000764	0.000995	0.00133
Nickel, total (mg/L)	3	2	0.000774	0.00132	0.003
Nitrate+Nitrite (mg/L)	3	3	0.060	0.223	0.25
Orthophosphate as P (mg/L)	1	1	0.234	0.234	0.234
Potassium, diss (mg/L)	3	3	9.49	10	14
Selenium, diss (mg/L)	3	0	0.000125	0.000171	0.00076

Table 3. Water Quality of Black Hank Creek Surface Water.

Parameter	Number of Samples	Number of Detections	Minimum	Median	Maximum
Selenium, total (mg/L)	3	1	0.00021	0.000521	0.00057
Sodium, diss (mg/L)	3	3	0.552	13.6	14.0
Sodium Absorption Ratio	3	2	0.010	0.54	0.59
Sulfate (mg/L)	3	3	3.0	80.8	105
Total Alkalinity (mg/L)	3	3	42	52.4	68
Total Dissolved Solids (mg/L)	3	3	130	208	260
Total Hardness (mg/L)	3	3	34	98.4	129
Total Nitrogen (mg/L)	3	3	1.45	1.65	1.82
Total Phosphate (mg/L)	3	3	0.33	0.396	0.41
Total Suspended Sediments (mg/L)	18	18	4.0	45.5	39,900
Turbidity (NTU)	1	1	8.07	8.07	8.07
Vanadium, diss (mg/L)	3	2	0.000412	0.000581	0.000828
Vanadium, total (mg/L)	3	3	0.00106	0.00122	0.00675
Zinc, diss (mg/L)	3	0	0.00146	0.00307	0.00682
Zinc, total (mg/L)	3	3	0.0032	0.0048	0.012

Data collected between February 2017 and September 2023 for locations CG-100, CG-103, and CG-105.
diss = dissolved; µS/cm = micro Siemens/centimeter; s.u. = standard units; NTU = nephelometric turbidity units; mg/L = milligrams per liter.
For less than detection limit concentrations, detection limit used to calculate summary statistics.

Ponds

Table 4. Water Quality of Pond 1.

Parameter	Number of Samples	Number of Detections	Minimum	Median	Maximum	Human Health Standard	Aquatic Life Standard (acute)	Aquatic Life Standard (chronic)
Acidity (mg/L)	7	0	1	1	1	NS	NS	NS
Aluminum, diss (mg/L)	7	7	0.030	0.0444	**0.10**	NS	0.75	0.087
Aluminum, total (mg/L)	7	7	0.062	0.19	0.699	NS	NS	NS
Ammonia, as N (mg/L)[1]	7	2	0.0073	0.0073	0.0686	NS	T/pH dependent	T/pH dependent
Arsenic, diss (mg/L)	7	6	0.000314	0.000883	0.00204	NS	NS	NS
Arsenic, total (mg/L)	7	6	0.000518	0.0010	0.0020	0.01	0.34	0.15
Bicarbonate Alkalinity (mg/L)	7	7	420	457	558	NS	NS	NS
Boron, diss (mg/L)	7	7	0.547	0.72	0.87	NS	NS	NS
Boron, total (mg/L)	7	7	0.758	0.94	1.36	NS	NS	NS
Cadmium, diss (mg/L)	7	4	0.000056	0.0000658	0.000378	NS	NS	NS
Cadmium, total (mg/L)[2]	7	3	0.0000514	0.0000923	0.00075	0.005	Hardness Dependent	Hardness Dependent
Calcium, diss (mg/L)	7	7	288	330	366	NS	NS	NS
Carbonate Alkalinity (mg/L)	7	6	1.0	20.4	45	NS	NS	NS
Chloride (mg/L)	7	7	11	13	18	NS	NS	NS
Chromium, diss (mg/L)	0	0	-	-	-	NS	NS	NS
Chromium, total (mg/L)[2]	0	0	-	-	-	0.1	Hardness Dependent	Hardness Dependent
Copper, diss (mg/L)	7	3	0.0000224	0.000358	0.00218	NS	NS	NS
Copper, total (mg/L)[2]	7	7	0.000778	0.00245	0.0075	1.3	Hardness Dependent	Hardness Dependent
Fluoride (mg/L)	7	7	0.20	0.30	0.389	4	NS	NS
Hydroxide alkalinity (mg/L)	7	0	1	1	1	NS	NS	NS
Iron, diss (mg/L)	7	5	0.000688	0.0127	0.040	NS	NS	NS
Iron, total (mg/L)	7	7	0.080	0.29	**1.52**	NS	NS	1
Laboratory Conductivity (µS/cm)	7	7	4,920	5,580	6,000	NS	NS	NS
Laboratory pH (s.u.)	7	7	8.2	8.37	8.5	NS	NS	NS
Lead, diss (mg/L)	7	3	0.00000507	0.0000365	0.00067	NS	NS	NS
Lead, total (mg/L)[2]	7	4	0.0000122	0.000073	0.00070	0.015	Hardness Dependent	Hardness Dependent
Magnesium, diss (mg/L)	7	7	474	512	600	NS	NS	NS
Manganese, diss (mg/L)	7	6	0.00122	0.025	0.131	NS	NS	NS
Manganese, total (mg/L)	7	7	0.0207	0.094	0.155	NS	NS	NS
Mercury, diss (mg/L)	0	0	-	-	-	NS	NS	NS
Mercury, total (mg/L)	0	0	-	-	-	0.00005	0.0017	0.00091

Table 4. Water Quality of Pond 1.

Parameter	Number of Samples	Number of Detections	Minimum	Median	Maximum	Human Health Standard	Aquatic Life Standard (acute)	Aquatic Life Standard (chronic)
Nickel, diss (mg/L)	7	5	0.000764	0.0014	0.004	NS	NS	NS
Nickel, total (mg/L)[2]	7	6	0.000574	0.0030	0.0102	0.100	Hardness Dependent	Hardness Dependent
Nitrate+Nitrite (mg/L)	7	2	0.0066	0.0066	0.023	10	NS	NS
Orthophosphate as P (mg/L)	0	0	-	-	-	NS	NS	NS
Potassium, diss (mg/L)	7	7	16	19.3	24	NS	NS	NS
Selenium, diss (mg/L)	7	7	0.000582	0.00106	0.00539	NS	NS	NS
Selenium, total (mg/L)	7	7	0.000937	0.0020	**0.00584**	0.05	0.02	0.005
Sodium, diss (mg/L)	7	7	441	539	637	NS	NS	NS
Sodium Absorption Ratio	7	7	3.61	4.37	4.76	NS	NS	NS
Sulfate (mg/L)	7	7	3,280	3,480	3,870	NS	NS	NS
Total Alkalinity (mg/L)	7	7	420	472	581	NS	NS	NS
Total Dissolved Solids (mg/L)	7	7	4,930	5,860	7,070	NS	NS	NS
Total Hardness (mg/L)	7	7	2,710	2,820	3,380	NS	NS	NS
Total Nitrogen (mg/L)	7	7	0.58	0.83	1.27	NS	NS	NS
Total Phosphate (mg/L)	7	7	0.00675	0.0338	0.13	NS	NS	NS
Total Suspended Sediments (mg/L)	7	7	3.0	11	89	NS	NS	NS
Turbidity (NTU)	0	0	-	-	-	NS	NS	NS
Vanadium, diss (mg/L)	7	7	0.000343	0.00167	0.00287	NS	NS	NS
Vanadium, total (mg/L)	7	5	0.000606	0.00261	0.00437	NS	NS	NS
Zinc, diss (mg/L)	7	1	0.00146	0.00146	0.00477	NS	NS	NS
Zinc, total (mg/L)[2]	7	7	0.0080	0.018	0.075	7.4	Hardness Dependent	Hardness Dependent

Data collected between April 2018 and May 2020.
NS = no numeric standard.
diss = dissolved; µS/cm = micro Siemens/centimeter; s.u. = standard units; NTU = nephelometric turbidity units; mg/L = milligrams per liter.
[1] Aquatic Life Standards for Ammonia are temperature and pH dependent. No exceedances occurred during the monitoring period.
[2] Aquatic Life Standards for specific parameters are hardness dependent. No exceedances occurred during the monitoring period.
For less than detection limit concentrations, detection limit used to calculate summary statistics.
Concentrations in bold exceed noted standards.

Table 5. Water Quality of Pond 2.

Parameter	Number of Samples	Number of Detections	Minimum	Median	Maximum	Human Health Standard	Aquatic Life Standard (acute)	Aquatic Life Standard (chronic)
Acidity (mg/L)	1	0	1	1	1	NS	NS	NS
Aluminum, diss (mg/L)	1	1	0.03	0.03	0.03	NS	0.75	0.087
Aluminum, total (mg/L)	1	1	0.153	0.153	0.153	NS	NS	NS
Ammonia, as N (mg/L)[1]	1	1	0.37	0.37	0.37	NS	T/pH dependent	T/pH dependent
Arsenic, diss (mg/L)	1	1	0.00183	0.00183	0.00183	NS	NS	NS
Arsenic, total (mg/L)	1	1	0.00184	0.00184	0.00184	0.01	0.34	0.15
Bicarbonate Alkalinity (mg/L)	1	1	468	468	468	NS	NS	NS
Boron, diss (mg/L)	1	1	0.583	0.583	0.583	NS	NS	NS
Boron, total (mg/L)	1	1	0.853	0.853	0.853	NS	NS	NS
Cadmium, diss (mg/L)	1	1	0.0005	0.0005	0.0005	NS	NS	NS
Cadmium, total (mg/L)[2]	1	1	0.0005	0.0005	0.0005	0.005	Hardness Dependent	Hardness Dependent
Calcium, diss (mg/L)	1	1	273	273	273	NS	NS	NS
Carbonate Alkalinity (mg/L)	1	1	24.5	24.5	24.5	NS	NS	NS
Chloride (mg/L)	1	1	11.8	11.8	11.8	NS	NS	NS
Chromium, diss (mg/L)	1	0	0.000253	0.000253	0.000253	NS	NS	NS
Chromium, total (mg/L)[2]	1	1	0.00161	0.00161	0.00161	0.1	Hardness Dependent	Hardness Dependent
Copper, diss (mg/L)	1	1	0.00331	0.00331	0.00331	NS	NS	NS
Copper, total (mg/L)[2]	1	1	0.0036	0.0036	0.0036	1.3	Hardness Dependent	Hardness Dependent
Fluoride (mg/L)	1	0	0.004	0.004	0.004	4	NS	NS
Hydroxide alkalinity (mg/L)	1	0	1	1	1	NS	NS	NS
Iron, diss (mg/L)	1	1	0.02	0.02	0.02	NS	NS	NS
Iron, total (mg/L)	1	1	0.217	0.217	0.217	NS	NS	1
Laboratory Conductivity (µS/cm)	1	1	5,070	5,070	5,070	NS	NS	NS
Laboratory pH (s.u.)	1	1	8.33	8.33	8.33	NS	NS	NS
Lead, diss (mg/L)	1	1	0.0003	0.0003	0.0003	NS	NS	NS
Lead, total (mg/L)[2]	1	0	0.000088	0.000088	0.000088	0.015	Hardness Dependent	Hardness Dependent
Magnesium, diss (mg/L)	1	1	436	436	436	NS	NS	NS
Manganese, diss (mg/L)	1	1	0.0669	0.0669	0.0669	NS	NS	NS
Manganese, total (mg/L)	1	1	0.11	0.11	0.11	NS	NS	NS
Mercury, diss (mg/L)	1	0	0.00003	0.00003	0.00003	NS	NS	NS
Mercury, total (mg/L)	1	0	0.00003	0.00003	0.00003	0.00005	0.0017	0.00091
Nickel, diss (mg/L)	1	1	0.002	0.002	0.002	NS	NS	NS

Table 5. Water Quality of Pond 2.

Parameter	Number of Samples	Number of Detections	Minimum	Median	Maximum	Human Health Standard	Aquatic Life Standard (acute)	Aquatic Life Standard (chronic)
Nickel, total (mg/L)[2]	1	1	0.00866	0.00866	0.00866	0.100	Hardness Dependent	Hardness Dependent
Nitrate+Nitrite (mg/L)	1	0	0.0046	0.0046	0.0046	10	NS	NS
Orthophosphate as P (mg/L)	1	0	0.007	0.007	0.007	NS	NS	NS
Potassium, diss (mg/L)	1	1	21.3	21.3	21.3	NS	NS	NS
Selenium, diss (mg/L)	1	1	0.00187	0.00187	0.00187	NS	NS	NS
Selenium, total (mg/L)	1	1	0.00267	0.00267	0.00267	0.05	0.02	0.005
Sodium, diss (mg/L)	1	1	443	443	443	NS	NS	NS
Sodium Absorption Ratio	1	1	3.9	3.9	3.9	NS	NS	NS
Sulfate (mg/L)	1	1	3,160	3,160	3,160	NS	NS	NS
Total Alkalinity (mg/L)	1	1	492	492	492	NS	NS	NS
Total Dissolved Solids (mg/L)	1	1	5,260	5,260	5,260	NS	NS	NS
Total Hardness (mg/L)	1	1	2,480	2,480	2,480	NS	NS	NS
Total Nitrogen (mg/L)	1	1	1.38	1.38	1.38	NS	NS	NS
Total Phosphate (mg/L)	1	1	0.0375	0.0375	0.0375	NS	NS	NS
Total Suspended Sediments (mg/L)	1	1	7	7	7	NS	NS	NS
Turbidity (NTU)	1	1	5.33	5.33	5.33	NS	NS	NS
Vanadium, diss (mg/L)	1	1	0.01	0.01	0.01	NS	NS	NS
Vanadium, total (mg/L)	1	1	0.01	0.01	0.01	NS	NS	NS
Zinc, diss (mg/L)	1	0	0.000855	0.000855	0.000855	NS	NS	NS
Zinc, total (mg/L)[2]	1	0	0.00178	0.00178	0.00178	7.4	Hardness Dependent	Hardness Dependent

Data collected in June 2014.
NS = no numeric standard.
diss = dissolved; µS/cm = micro Siemens/centimeter; s.u. = standard units; NTU = nephelometric turbidity units; mg/L = milligrams per liter.
[1] Aquatic Life Standards for Ammonia are temperature and pH dependent. No exceedances occurred during the monitoring period.
[2] Aquatic Life Standards for specific parameters are hardness dependent. No exceedances occurred during the monitoring period.
For less than detection limit concentrations, detection limit used to calculate summary statistics.
Concentrations in bold exceed noted standards.

Table 6. Water Quality of Pond 4.

Parameter	Number of Samples	Number of Detections	Minimum	Median	Maximum	Human Health Standard	Aquatic Life Standard (acute)	Aquatic Life Standard (chronic)
Acidity (mg/L)	1	0	1	1	1	NS	NS	NS
Aluminum, diss (mg/L)	1	1	0.082	0.082	0.082	NS	0.75	0.087
Aluminum, total (mg/L)	1	1	0.251	0.251	0.251	NS	NS	NS
Ammonia, as N (mg/L)[1]	1	1	0.0465	0.0465	0.0465	NS	T/pH dependent	T/pH dependent
Arsenic, diss (mg/L)	1	1	0.000292	0.000292	0.000292	NS	NS	NS
Arsenic, total (mg/L)	1	1	0.000403	0.000403	0.000403	0.01	0.34	0.15
Bicarbonate Alkalinity (mg/L)	1	1	30	30	30	NS	NS	NS
Boron, diss (mg/L)	1	1	0.0292	0.0292	0.0292	NS	NS	NS
Boron, total (mg/L)	1	1	0.0228	0.0228	0.0228	NS	NS	NS
Cadmium, diss (mg/L)	1	0	0.0000858	0.0000858	0.0000858	NS	NS	NS
Cadmium, total (mg/L)[2]	1	0	0.0000772	0.0000772	0.0000772	0.005	Hardness Dependent	Hardness Dependent
Calcium, diss (mg/L)	1	1	6	6	6	NS	NS	NS
Carbonate Alkalinity (mg/L)	1	0	1	1	1	NS	NS	NS
Chloride (mg/L)	1	1	0.647	0.647	0.647	NS	NS	NS
Chromium, diss (mg/L)	0	0	-	-	-	NS	NS	NS
Chromium, total (mg/L)[2]	0	0	-	-	-	0.1	Hardness Dependent	Hardness Dependent
Copper, diss (mg/L)	1	1	0.00097	0.00097	0.00097	NS	NS	NS
Copper, total (mg/L)[2]	1	0	0.000278	0.000278	0.000278	1.3	Hardness Dependent	Hardness Dependent
Fluoride (mg/L)	1	0	0.0451	0.0451	0.0451	4	NS	NS
Hydroxide alkalinity (mg/L)	1	0	1	1	1	NS	NS	NS
Iron, diss (mg/L)	1	1	0.05	0.05	0.05	NS	NS	NS
Iron, total (mg/L)	1	1	0.26	0.26	0.26	NS	NS	1
Laboratory Conductivity (µS/cm)	1	1	66	66	66	NS	NS	NS
Laboratory pH (s.u.)	1	1	7.4	7.4	7.4	NS	NS	NS
Lead, diss (mg/L)	1	0	0.0000589	0.0000589	0.0000589	NS	NS	NS
Lead, total (mg/L)[2]	1	1	0.000277	0.000277	0.000277	0.015	Hardness Dependent	Hardness Dependent
Magnesium, diss (mg/L)	1	1	2	2	2	NS	NS	NS
Manganese, diss (mg/L)	1	1	0.011	0.011	0.011	NS	NS	NS
Manganese, total (mg/L)	1	1	0.02	0.02	0.02	NS	NS	NS
Mercury, diss (mg/L)	0	0	-	-	-	NS	NS	NS
Mercury, total (mg/L)	0	0	-	-	-	0.00005	0.0017	0.00091
Nickel, diss (mg/L)	1	0	0.000937	0.000937	0.000937	NS	NS	NS

Table 6. Water Quality of Pond 4.

Parameter	Number of Samples	Number of Detections	Minimum	Median	Maximum	Human Health Standard	Aquatic Life Standard (acute)	Aquatic Life Standard (chronic)
Nickel, total (mg/L)[2]	1	0	0.00154	0.00154	0.00154	0.100	Hardness Dependent	Hardness Dependent
Nitrate+Nitrite (mg/L)	1	1	0.06	0.06	0.06	10	NS	NS
Orthophosphate as P (mg/L)	0	0	-	-	-	NS	NS	NS
Potassium, diss (mg/L)	1	1	7	7	7	NS	NS	NS
Selenium, diss (mg/L)	1	0	0.000095	0.000095	0.000095	NS	NS	NS
Selenium, total (mg/L)	1	0	0.000147	0.000147	0.000147	0.05	0.02	0.005
Sodium, diss (mg/L)	1	0	0.508	0.508	0.508	NS	NS	NS
Sodium Absorption Ratio	1	0	0.01	0.01	0.01	NS	NS	NS
Sulfate (mg/L)	1	1	1	1	1	NS	NS	NS
Total Alkalinity (mg/L)	1	1	30	30	30	NS	NS	NS
Total Dissolved Solids (mg/L)	1	1	60	60	60	NS	NS	NS
Total Hardness (mg/L)	1	1	23	23	23	NS	NS	NS
Total Nitrogen (mg/L)	1	1	0.48	0.48	0.48	NS	NS	NS
Total Phosphate (mg/L)	1	1	0.29	0.29	0.29	NS	NS	NS
Total Suspended Sediments (mg/L)	1	1	12	12	12	NS	NS	NS
Turbidity (NTU)	0	0	-	-	-	NS	NS	NS
Vanadium, diss (mg/L)	1	0	0.000443	0.000443	0.000443	NS	NS	NS
Vanadium, total (mg/L)	1	1	0.000947	0.000947	0.000947	NS	NS	NS
Zinc, diss (mg/L)	1	0	0.00682	0.00682	0.00682	NS	NS	NS
Zinc, total (mg/L)[2]	1	1	0.009	0.009	0.009	7.4	Hardness Dependent	Hardness Dependent

Data collected in March 2023.
NS = no numeric standard.
diss = dissolved; µS/cm = micro Siemens/centimeter; s.u. = standard units; NTU = nephelometric turbidity units; mg/L = milligrams per liter.
[1] Aquatic Life Standards for Ammonia are temperature and pH dependent. No exceedances occurred during the monitoring period.
[2] Aquatic Life Standards for specific parameters are hardness dependent. No exceedances occurred during the monitoring period.
For less than detection limit concentrations, detection limit used to calculate summary statistics.
Concentrations in bold exceed noted standards.

Table 7. Water Quality of Pond 5.

Parameter	Number of Samples	Number of Detections	Minimum	Median	Maximum	Human Health Standard	Aquatic Life Standard (acute)	Aquatic Life Standard (chronic)
Acidity (mg/L)	26	0	1	1	1	NS	NS	NS
Aluminum, diss (mg/L)	26	24	0.00316	0.0365	**0.115**	NS	0.75	0.087
Aluminum, total (mg/L)	26	25	0.00697	0.127	0.494	NS	NS	NS
Ammonia, as N (mg/L)[1]	26	18	0.005	0.0822	**1.31**	NS	T/pH dependent	T/pH dependent
Arsenic, diss (mg/L)	26	26	0.000557	0.00328	0.0090	NS	NS	NS
Arsenic, total (mg/L)	26	26	0.000639	0.004	**0.011**	0.01	0.34	0.15
Bicarbonate Alkalinity (mg/L)	26	25	1.0	217	381	NS	NS	NS
Boron, diss (mg/L)	26	26	0.397	0.934	2.15	NS	NS	NS
Boron, total (mg/L)	26	26	0.452	1.09	2.47	NS	NS	NS
Cadmium, diss (mg/L)	25	10	0.0000050	0.0000858	0.000936	NS	NS	NS
Cadmium, total (mg/L)[2]	25	13	0.0000514	0.000154	**0.00384**	0.005	Hardness Dependent	Hardness Dependent
Calcium, diss (mg/L)	26	26	93	180	300	NS	NS	NS
Carbonate Alkalinity (mg/L)	26	25	1	36.5	141	NS	NS	NS
Chloride (mg/L)	26	26	8	20.5	41.9	NS	NS	NS
Chromium, diss (mg/L)	9	4	0.000287	0.000388	0.00167	NS	NS	NS
Chromium, total (mg/L)[2]	9	4	0.00035	0.00134	0.00684	0.1	Hardness Dependent	Hardness Dependent
Copper, diss (mg/L)	25	17	0.000018	0.000837	0.00278	NS	NS	NS
Copper, total (mg/L)[2]	26	20	0.000093	0.00186	0.0149	1.3	Hardness Dependent	Hardness Dependent
Fluoride (mg/L)	26	24	0.00834	0.20	1.34	4	NS	NS
Hydroxide alkalinity (mg/L)	26	1	1	1	3.09	NS	NS	NS
Iron, diss (mg/L)	25	16	0.00050	0.00502	0.148	NS	NS	NS
Iron, total (mg/L)	26	26	0.0822	0.216	**1.07**	NS	NS	1
Laboratory Conductivity (µS/cm)	26	26	3,430	5,655	11,400	NS	NS	NS
Laboratory pH (s.u.)	26	26	8.03	8.61	9.31	NS	NS	NS
Lead, diss (mg/L)	26	11	0.0000023	0.0000668	0.000488	NS	NS	NS
Lead, total (mg/L)[2]	26	10	0.0000122	0.000109	0.00361	0.015	Hardness Dependent	Hardness Dependent
Magnesium, diss (mg/L)	26	26	234	547	1,180	NS	NS	NS
Manganese, diss (mg/L)	26	26	0.00315	0.0785	1.04	NS	NS	NS
Manganese, total (mg/L)	26	26	0.015	0.119	1.06	NS	NS	NS
Mercury, diss (mg/L)	9	1	0.0000080	0.0000080	0.000023	NS	NS	NS
Mercury, total (mg/L)	9	0	0.0000080	0.000030	0.000030	0.00005	0.0017	0.00091
Nickel, diss (mg/L)	26	15	0.000661	0.00167	0.0040	NS	NS	NS

Table 7. Water Quality of Pond 5.

Parameter	Number of Samples	Number of Detections	Minimum	Median	Maximum	Human Health Standard	Aquatic Life Standard (acute)	Aquatic Life Standard (chronic)
Nickel, total (mg/L)[2]	26	14	0.000574	0.00177	0.0060	0.100	Hardness Dependent	Hardness Dependent
Nitrate+Nitrite (mg/L)	26	8	0.0030	0.0066	1.31	10	NS	NS
Orthophosphate as P (mg/L)	9	0	0.00616	0.022	0.022	NS	NS	NS
Potassium, diss (mg/L)	26	26	8.91	17.9	41	NS	NS	NS
Selenium, diss (mg/L)	26	26	0.000707	0.0020	0.0131	NS	NS	NS
Selenium, total (mg/L)	26	26	0.000941	0.0030	**0.0146**	0.05	0.02	0.005
Sodium, diss (mg/L)	26	26	401	792	1,760	NS	NS	NS
Sodium Absorption Ratio	26	26	4.52	6.75	10.2	NS	NS	NS
Sulfate (mg/L)	26	26	1,930	4,030	7,830	NS	NS	NS
Total Alkalinity (mg/L)	26	26	142	266	395	NS	NS	NS
Total Dissolved Solids (mg/L)	26	26	2,880	6,670	12,700	NS	NS	NS
Total Hardness (mg/L)	26	26	1,200	2,685	5,600	NS	NS	NS
Total Nitrogen (mg/L)	26	26	0.81	1.44	3.85	NS	NS	NS
Total Phosphate (mg/L)	26	26	0.0308	0.066	0.21	NS	NS	NS
Total Suspended Sediments (mg/L)	26	26	3.0	7.0	46	NS	NS	NS
Turbidity (NTU)	9	9	1.5	3.88	8.12	NS	NS	NS
Vanadium, diss (mg/L)	25	23	0.000241	0.00152	0.00397	NS	NS	NS
Vanadium, total (mg/L)	25	18	0.000164	0.00238	0.0077	NS	NS	NS
Zinc, diss (mg/L)	26	0	0.00108	0.00146	0.00682	NS	NS	NS
Zinc, total (mg/L)[2]	26	19	0.00109	0.0128	0.078	7.4	Hardness Dependent	Hardness Dependent

Data collected between May 2015 and November 2023.
NS = no numeric standard.
diss = dissolved; µS/cm = micro Siemens/centimeter; s.u. = standard units; NTU = nephelometric turbidity units; mg/L = milligrams per liter.
[1] Aquatic Life Standards for Ammonia are temperature and pH dependent. The Aquatic Life Standard for Ammonia was exceeded three times during the monitoring period.
[2] Aquatic Life Standards for specific parameters are hardness dependent. The Aquatic Life Standard for Cadmium was exceeded twice during the monitoring period.
For less than detection limit concentrations, detection limit used to calculate summary statistics.
Concentrations in bold exceed noted standards.

Table 8. Water Quality of Pond 7.

Parameter	Number of Samples	Number of Detections	Minimum	Median	Maximum	Human Health Standard	Aquatic Life Standard (acute)	Aquatic Life Standard (chronic)
Acidity (mg/L)	1	0	1	1	1	NS	NS	NS
Aluminum, diss (mg/L)	1	0	0.00304	0.00304	0.00304	NS	0.75	0.087
Aluminum, total (mg/L)	1	1	0.494	0.494	0.494	NS	NS	NS
Ammonia, as N (mg/L)[1]	1	1	0.0185	0.0185	0.0185	NS	T/pH dependent	T/pH dependent
Arsenic, diss (mg/L)	1	1	0.000861	0.000861	0.000861	NS	NS	NS
Arsenic, total (mg/L)	1	1	0.00132	0.00132	0.00132	0.01	0.34	0.15
Bicarbonate Alkalinity (mg/L)	1	1	516	516	516	NS	NS	NS
Boron, diss (mg/L)	1	1	0.788	0.788	0.788	NS	NS	NS
Boron, total (mg/L)	1	1	1.41	1.41	1.41	NS	NS	NS
Cadmium, diss (mg/L)	1	1	0.000254	0.000254	0.000254	NS	NS	NS
Cadmium, total (mg/L)[2]	1	1	0.000274	0.000274	0.000274	0.005	Hardness Dependent	Hardness Dependent
Calcium, diss (mg/L)	1	1	260	260	260	NS	NS	NS
Carbonate Alkalinity (mg/L)	1	0	1	1	1	NS	NS	NS
Chloride (mg/L)	1	1	25	25	25	NS	NS	NS
Chromium, diss (mg/L)	1	0	0.000287	0.000287	0.000287	NS	NS	NS
Chromium, total (mg/L)[2]	1	0	0.00035	0.00035	0.00035	0.1	Hardness Dependent	Hardness Dependent
Copper, diss (mg/L)	1	1	0.000371	0.000371	0.000371	NS	NS	NS
Copper, total (mg/L)[2]	1	1	0.000989	0.000989	0.000989	1.3	Hardness Dependent	Hardness Dependent
Fluoride (mg/L)	1	1	1.05	1.05	1.05	4	NS	NS
Hydroxide alkalinity (mg/L)	1	0	1	1	1	NS	NS	NS
Iron, diss (mg/L)	1	0	0.00177	0.00177	0.00177	NS	NS	NS
Iron, total (mg/L)	1	1	0.999	0.999	0.999	NS	NS	1
Laboratory Conductivity (µS/cm)	1	1	5,920	5,920	5,920	NS	NS	NS
Laboratory pH (s.u.)	1	1	8.22	8.22	8.22	NS	NS	NS
Lead, diss (mg/L)	1	0	0.0000023	0.0000023	0.0000023	NS	NS	NS
Lead, total (mg/L)[2]	1	1	0.000469	0.000469	0.000469	0.015	Hardness Dependent	Hardness Dependent
Magnesium, diss (mg/L)	1	1	555	555	555	NS	NS	NS
Manganese, diss (mg/L)	1	1	0.011	0.011	0.011	NS	NS	NS
Manganese, total (mg/L)	1	1	0.047	0.047	0.047	NS	NS	NS
Mercury, diss (mg/L)	1	1	0.0000081	0.0000081	0.0000081	NS	NS	NS
Mercury, total (mg/L)	1	0	0.000008	0.000008	0.000008	0.00005	0.0017	0.00091
Nickel, diss (mg/L)	1	0	0.000661	0.000661	0.000661	NS	NS	NS

Table 8. Water Quality of Pond 7.

Parameter	Number of Samples	Number of Detections	Minimum	Median	Maximum	Human Health Standard	Aquatic Life Standard (acute)	Aquatic Life Standard (chronic)
Nickel, total (mg/L)[2]	1	0	0.000898	0.000898	0.000898	0.100	Hardness Dependent	Hardness Dependent
Nitrate+Nitrite (mg/L)	1	0	0.003	0.003	0.003	10	NS	NS
Orthophosphate as P (mg/L)	1	0	0.00616	0.00616	0.00616	NS	NS	NS
Potassium, diss (mg/L)	1	1	22.9	22.9	22.9	NS	NS	NS
Selenium, diss (mg/L)	1	1	0.000375	0.000375	0.000375	NS	NS	NS
Selenium, total (mg/L)	1	0	0.00057	0.00057	0.00057	0.05	0.02	0.005
Sodium, diss (mg/L)	1	1	489	489	489	NS	NS	NS
Sodium Absorption Ratio	1	1	3.92	3.92	3.92	NS	NS	NS
Sulfate (mg/L)	1	1	3,710	3,710	3,710	NS	NS	NS
Total Alkalinity (mg/L)	1	1	516	516	516	NS	NS	NS
Total Dissolved Solids (mg/L)	1	1	5,900	5,900	5,900	NS	NS	NS
Total Hardness (mg/L)	1	1	2,940	2,940	2,940	NS	NS	NS
Total Nitrogen (mg/L)	1	1	0.867	0.867	0.867	NS	NS	NS
Total Phosphate (mg/L)	1	1	0.0985	0.0985	0.0985	NS	NS	NS
Total Suspended Sediments (mg/L)	1	1	24.8	24.8	24.8	NS	NS	NS
Turbidity (NTU)	1	1	2.21	2.21	2.21	NS	NS	NS
Vanadium, diss (mg/L)	1	1	0.000817	0.000817	0.000817	NS	NS	NS
Vanadium, total (mg/L)	1	1	0.000968	0.000968	0.000968	NS	NS	NS
Zinc, diss (mg/L)	1	0	0.00547	0.00547	0.00547	NS	NS	NS
Zinc, total (mg/L)[2]	1	1	0.0582	0.0582	0.0582	7.4	Hardness Dependent	Hardness Dependent

Data collected in October 2016.
NS = no numeric standard.
diss = dissolved; µS/cm = micro Siemens/centimeter; s.u. = standard units; NTU = nephelometric turbidity units; mg/L = milligrams per liter.
[1] Aquatic Life Standards for Ammonia are temperature and pH dependent. No exceedances occurred during the monitoring period.
[2] Aquatic Life Standards for specific parameters are hardness dependent. No exceedances occurred during the monitoring period.
For less than detection limit concentrations, detection limit used to calculate summary statistics.
Concentrations in bold exceed noted standards.

Table 9. Water Quality of Pond 8.

Parameter	Number of Samples	Number of Detections	Minimum	Median	Maximum	Human Health Standard	Aquatic Life Standard (acute)	Aquatic Life Standard (chronic)
Acidity (mg/L)	21	0	1	1	1	NS	NS	NS
Aluminum, diss (mg/L)	21	19	0.00221	0.014	0.080	NS	0.75	0.087
Aluminum, total (mg/L)	21	21	0.021	0.1	0.505	NS	NS	NS
Ammonia, as N (mg/L)[1]	21	9	0.005	0.0274	**0.63**	NS	T/pH dependent	T/pH dependent
Arsenic, diss (mg/L)	21	21	0.000552	0.0030	0.00961	NS	NS	NS
Arsenic, total (mg/L)	21	21	0.000578	0.0030	**0.0116**	0.01	0.34	0.15
Bicarbonate Alkalinity (mg/L)	21	21	165	422	690	NS	NS	NS
Boron, diss (mg/L)	21	21	0.264	0.49	0.93	NS	NS	NS
Boron, total (mg/L)	21	21	0.285	0.52	1.3	NS	NS	NS
Cadmium, diss (mg/L)	21	6	0.0000352	0.0000858	0.000417	NS	NS	NS
Cadmium, total (mg/L)[2]	21	9	0.000032	0.0000949	0.000469	0.005	Hardness Dependent	Hardness Dependent
Calcium, diss (mg/L)	21	21	17	72	166	NS	NS	NS
Carbonate Alkalinity (mg/L)	21	21	57	92.8	254	NS	NS	NS
Chloride (mg/L)	21	21	6.4	15	37.1	NS	NS	NS
Chromium, diss (mg/L)	4	0	0.000228	0.000258	0.000287	NS	NS	NS
Chromium, total (mg/L)[2]	4	3	0.00035	0.000837	0.00145	0.1	Hardness Dependent	Hardness Dependent
Copper, diss (mg/L)	21	10	0.0000224	0.000589	0.00149	NS	NS	NS
Copper, total (mg/L)[2]	21	13	0.000199	0.000829	**0.0448**	1.3	Hardness Dependent	Hardness Dependent
Fluoride (mg/L)	21	20	0.00834	0.10	0.541	4	NS	NS
Hydroxide alkalinity (mg/L)	21	0	1	1	1	NS	NS	NS
Iron, diss (mg/L)	21	20	0.00115	0.0148	0.12	NS	NS	NS
Iron, total (mg/L)	21	21	0.050	0.22	**1.06**	NS	NS	1
Laboratory Conductivity (µS/cm)	21	21	2,100	2,990	6,010	NS	NS	NS
Laboratory pH (s.u.)	21	21	8.5	8.8	9.55	NS	NS	NS
Lead, diss (mg/L)	21	9	0.0000023	0.0000621	0.000629	NS	NS	NS
Lead, total (mg/L)[2]	21	14	0.0000122	0.000171	0.00104	0.015	Hardness Dependent	Hardness Dependent
Magnesium, diss (mg/L)	21	21	219	364	779	NS	NS	NS
Manganese, diss (mg/L)	21	21	0.00126	0.017	0.163	NS	NS	NS
Manganese, total (mg/L)	21	21	0.0080	0.0333	0.169	NS	NS	NS
Mercury, diss (mg/L)	4	0	0.0000080	0.000011	0.000023	NS	NS	NS
Mercury, total (mg/L)	4	0	0.0000080	0.000011	0.000023	0.00005	0.0017	0.00091
Nickel, diss (mg/L)	21	15	0.000661	0.00122	0.0030	NS	NS	NS

Table 9. Water Quality of Pond 8.

Parameter	Number of Samples	Number of Detections	Minimum	Median	Maximum	Human Health Standard	Aquatic Life Standard (acute)	Aquatic Life Standard (chronic)
Nickel, total (mg/L)[2]	21	12	0.000574	0.00133	0.00359	0.100	Hardness Dependent	Hardness Dependent
Nitrate+Nitrite (mg/L)	21	0	0.0030	0.0066	0.0151	10	NS	NS
Orthophosphate as P (mg/L)	4	0	0.00616	0.00616	0.00616	NS	NS	NS
Potassium, diss (mg/L)	21	21	3.77	15.0	32.5	NS	NS	NS
Selenium, diss (mg/L)	21	10	0.000125	0.000299	0.00134	NS	NS	NS
Selenium, total (mg/L)	21	9	0.00018	0.000521	0.0030	0.05	0.02	0.005
Sodium, diss (mg/L)	21	21	117	225	411	NS	NS	NS
Sodium Absorption Ratio	21	21	1.53	2.31	3.14	NS	NS	NS
Sulfate (mg/L)	21	21	890	1,350	3,690	NS	NS	NS
Total Alkalinity (mg/L)	21	21	386	565	773	NS	NS	NS
Total Dissolved Solids (mg/L)	21	21	1,780	2,770	6,180	NS	NS	NS
Total Hardness (mg/L)	21	21	1,100	1,630	3,610	NS	NS	NS
Total Nitrogen (mg/L)	21	21	0.641	1.39	3.14	NS	NS	NS
Total Phosphate (mg/L)	21	21	0.030	0.060	0.222	NS	NS	NS
Total Suspended Sediments (mg/L)	21	21	2.0	8.4	42	NS	NS	NS
Turbidity (NTU)	4	4	2.24	3.30	8.55	NS	NS	NS
Vanadium, diss (mg/L)	21	21	0.000745	0.00214	0.00705	NS	NS	NS
Vanadium, total (mg/L)	21	17	0.000362	0.00235	0.00770	NS	NS	NS
Zinc, diss (mg/L)	21	1	0.00146	0.00307	0.00682	NS	NS	NS
Zinc, total (mg/L)[2]	21	16	0.00109	0.00608	0.0420	7.4	Hardness Dependent	Hardness Dependent

Data collected between July 2016 and November 2023.
NS = no numeric standard.
diss = dissolved; µS/cm = micro Siemens/centimeter; s.u. = standard units; NTU = nephelometric turbidity units; mg/L = milligrams per liter.
[1] Aquatic Life Standards for Ammonia are temperature and pH dependent. The Aquatic Life Standard for Ammonia was exceeded once during the monitoring period.
[2] Aquatic Life Standards for specific parameters are hardness dependent. The Aquatic Life Standard for Copper was exceeded once during the monitoring period.
For less than detection limit concentrations, detection limit used to calculate summary statistics.
Concentrations in bold exceed noted standards.

Table 10. Water Quality of Pond 9.

Parameter	Number of Samples	Number of Detections	Minimum	Median	Maximum	Human Health Standard	Aquatic Life Standard (acute)	Aquatic Life Standard (chronic)
Acidity (mg/L)	21	0	1	1	1	NS	NS	NS
Aluminum, diss (mg/L)	21	20	0.00316	0.0198	0.063	NS	0.75	0.087
Aluminum, total (mg/L)	21	21	0.017	0.062	0.13	NS	NS	NS
Ammonia, as N (mg/L)[1]	21	12	0.005	0.0289	0.55	NS	T/pH dependent	T/pH dependent
Arsenic, diss (mg/L)	21	21	0.00132	0.0040	0.00609	NS	NS	NS
Arsenic, total (mg/L)	21	21	0.00172	0.0050	**0.0108**	0.01	0.34	0.15
Bicarbonate Alkalinity (mg/L)	21	21	163	307	416	NS	NS	NS
Boron, diss (mg/L)	21	21	0.34	0.93	1.26	NS	NS	NS
Boron, total (mg/L)	21	21	0.388	1.18	1.58	NS	NS	NS
Cadmium, diss (mg/L)	21	7	0.0000217	0.000079	0.000386	NS	NS	NS
Cadmium, total (mg/L)[2]	21	11	0.0000463	0.0000949	0.000719	0.005	Hardness Dependent	Hardness Dependent
Calcium, diss (mg/L)	21	21	73.2	117	179	NS	NS	NS
Carbonate Alkalinity (mg/L)	21	19	1.0	28.2	84.6	NS	NS	NS
Chloride (mg/L)	21	21	7.97	19.1	28.8	NS	NS	NS
Chromium, diss (mg/L)	4	2	0.000228	0.000322	0.000657	NS	NS	NS
Chromium, total (mg/L)[2]	4	3	0.00035	0.00111	0.00176	0.1	Hardness Dependent	Hardness Dependent
Copper, diss (mg/L)	21	9	0.0000224	0.000444	0.00162	NS	NS	NS
Copper, total (mg/L)[2]	21	12	0.0000678	0.000509	0.00706	1.3	Hardness Dependent	Hardness Dependent
Fluoride (mg/L)	21	20	0.00834	0.20	0.839	4	NS	NS
Hydroxide alkalinity (mg/L)	21	0	1	1	1	NS	NS	NS
Iron, diss (mg/L)	21	17	0.00155	0.00442	0.07	NS	NS	NS
Iron, total (mg/L)	21	21	0.0153	0.090	0.21	NS	NS	1
Laboratory Conductivity (µS/cm)	21	21	2,090	3,710	4,850	NS	NS	NS
Laboratory pH (s.u.)	21	21	8.2	8.5	8.98	NS	NS	NS
Lead, diss (mg/L)	21	8	0.0000023	0.0000621	0.000295	NS	NS	NS
Lead, total (mg/L)[2]	21	10	0.0000030	0.000116	0.00070	0.015	Hardness Dependent	Hardness Dependent
Magnesium, diss (mg/L)	21	21	210	467	571	NS	NS	NS
Manganese, diss (mg/L)	21	21	0.0019	0.019	0.169	NS	NS	NS
Manganese, total (mg/L)	21	21	0.017	0.0551	0.192	NS	NS	NS
Mercury, diss (mg/L)	4	0	0.0000080	0.000011	0.000023	NS	NS	NS
Mercury, total (mg/L)	4	0	0.0000080	0.000011	0.000023	0.00005	0.0017	0.00091
Nickel, diss (mg/L)	21	8	0.000661	0.000937	0.0030	NS	NS	NS

Table 10. Water Quality of Pond 9.

Parameter	Number of Samples	Number of Detections	Minimum	Median	Maximum	Human Health Standard	Aquatic Life Standard (acute)	Aquatic Life Standard (chronic)
Nickel, total (mg/L)[2]	21	8	0.000574	0.000939	0.014	0.100	Hardness Dependent	Hardness Dependent
Nitrate+Nitrite (mg/L)	21	1	0.0030	0.0066	0.251	10	NS	NS
Orthophosphate as P (mg/L)	4	0	0.00616	0.00616	0.00616	NS	NS	NS
Potassium, diss (mg/L)	21	21	7.48	16.5	25	NS	NS	NS
Selenium, diss (mg/L)	21	16	0.000171	0.000467	0.00114	NS	NS	NS
Selenium, total (mg/L)	21	16	0.000247	0.000588	0.00233	0.05	0.02	0.005
Sodium, diss (mg/L)	21	21	99.2	232	342	NS	NS	NS
Sodium Absorption Ratio	21	21	1.31	2.25	2.89	NS	NS	NS
Sulfate (mg/L)	21	21	1,010	2,140	2,920	NS	NS	NS
Total Alkalinity (mg/L)	21	21	205	317	441	NS	NS	NS
Total Dissolved Solids (mg/L)	21	21	1,760	3,740	4,550	NS	NS	NS
Total Hardness (mg/L)	21	21	1,080	2,140	2,650	NS	NS	NS
Total Nitrogen (mg/L)	21	21	0.57	0.904	1.27	NS	NS	NS
Total Phosphate (mg/L)	21	21	0.0139	0.0256	0.080	NS	NS	NS
Total Suspended Sediments (mg/L)	21	20	1	4	20	NS	NS	NS
Turbidity (NTU)	4	4	1.48	2.59	3.62	NS	NS	NS
Vanadium, diss (mg/L)	21	17	0.000153	0.000828	0.00355	NS	NS	NS
Vanadium, total (mg/L)	21	12	0.000182	0.000914	0.00396	NS	NS	NS
Zinc, diss (mg/L)	21	1	0.00146	0.00307	0.049	NS	NS	NS
Zinc, total (mg/L)[2]	21	16	0.00109	0.00851	0.098	7.4	Hardness Dependent	Hardness Dependent

Data collected between July 2016 and November 2023.
NS = no numeric standard.
diss = dissolved; µS/cm = micro Siemens/centimeter; s.u. = standard units; NTU = nephelometric turbidity units; mg/L = milligrams per liter.
[1] Aquatic Life Standards for Ammonia are temperature and pH dependent. No exceedances occurred during the monitoring period.
[2] Aquatic Life Standards for specific parameters are hardness dependent. No exceedances occurred during the monitoring period.
For less than detection limit concentrations, detection limit used to calculate summary statistics.
Concentrations in bold exceed noted standards.

Springs

Table 11. Water Quality of Spring 1.

Parameter	Number of Samples	Number of Detections	Minimum	Median	Maximum	Human Health Standard
Acidity (mg/L)	2	0	1	1	1	NS
Aluminum, diss (mg/L)	2	2	0.0234	0.0449	0.0664	NS
Ammonia, as N (mg/L)	2	2	0.0445	0.189	0.333	NS
Arsenic, diss (mg/L)	2	2	0.000942	0.00422	0.00749	0.01
Bicarbonate Alkalinity (mg/L)	2	2	690	749	807	NS
Boron, diss (mg/L)	2	2	0.323	0.382	0.44	NS
Cadmium, diss (mg/L)	2	2	0.0000215	0.0000693	0.000117	0.005
Calcium, diss (mg/L)	2	2	104	110	116	NS
Carbonate Alkalinity (mg/L)	2	0	1	1	1	NS
Chloride (mg/L)	2	2	11.2	11.4	11.6	NS
Copper, diss (mg/L)	2	2	0.00027	0.000302	0.000333	1.3
Fluoride (mg/L)	2	2	0.644	0.728	0.811	4
Hydroxide alkalinity (mg/L)	2	0	1	1	1	NS
Iron, diss (mg/L)	2	2	0.0574	0.789	1.52	NS
Laboratory Conductivity (µS/cm)	2	2	2,140	2,340	2,540	NS
Laboratory pH (s.u.)	2	2	8.22	8.25	8.28	NS
Lead, diss (mg/L)	2	1	0.0000023	0.0000067	0.0000111	0.015
Magnesium, diss (mg/L)	2	2	110	121	132	NS
Manganese, diss (mg/L)	2	2	0.589	0.626	0.662	NS
Nickel, diss (mg/L)	2	2	0.0030	0.00316	0.00331	0.1
Nitrate+Nitrite (mg/L)	2	0	0.0030	0.0030	0.0030	10
Potassium, diss (mg/L)	2	2	13.4	14.4	15.3	NS
Selenium, diss (mg/L)	2	2	0.000442	0.000786	0.00113	0.05
Sodium, diss (mg/L)	2	2	283	323	363	NS
Sulfate (mg/L)	2	2	468	618	767	NS
Total Alkalinity (mg/L)	2	2	691	749	807	NS
Total Dissolved Solids (mg/L)	2	2	1,560	1,610	1,660	NS
Total Hardness (mg/L)	2	2	712	773	833	NS
Vanadium, diss (mg/L)	2	2	0.00134	0.00219	0.00304	NS
Zinc, diss (mg/L)	2	0	0.00547	0.00547	0.00547	2

Data collected between July 2016 and October 2016.
NS = no numeric standard.
diss = dissolved; µS/cm = micro Siemens/centimeter; s.u. = standard units; mg/L = milligrams per liter.
For less than detection limit concentrations, detection limit used to calculate summary statistics.
Concentrations in bold exceed Human Health Standard for ground water.

Table 12. Water Quality of Spring 2.

Parameter	Number of Samples	Number of Detections	Minimum	Median	Maximum	Human Health Standard
Acidity (mg/L)	20	0	1	1	1	NS
Aluminum, diss (mg/L)	20	19	0.00316	0.025	0.144	NS
Ammonia, as N (mg/L)	20	13	0.0050	0.131	1.74	NS
Arsenic, diss (mg/L)	20	15	0.000143	0.00049	0.00174	0.01
Bicarbonate Alkalinity (mg/L)	20	20	416	464	566	NS
Boron, diss (mg/L)	20	20	0.692	1.04	1.32	NS
Cadmium, diss (mg/L)	20	7	0.000040	0.0000858	0.000577	0.005
Calcium, diss (mg/L)	20	20	153	185	228	NS
Carbonate Alkalinity (mg/L)	20	10	1.0	6.0	54	NS
Chloride (mg/L)	20	20	10.3	12.2	19.0	NS
Copper, diss (mg/L)	20	10	0.0000224	0.000526	0.00149	1.3
Fluoride (mg/L)	20	19	0.0054	0.20	0.889	4
Hydroxide alkalinity (mg/L)	20	0	1	1	1	NS
Iron, diss (mg/L)	20	20	0.00334	0.0294	0.268	NS
Laboratory Conductivity (µS/cm)	20	20	2,250	2,805	3,360	NS
Laboratory pH (s.u.)	20	20	8.0	8.3	8.5	NS
Lead, diss (mg/L)	20	6	0.0000023	0.0000633	0.000345	0.015
Magnesium, diss (mg/L)	20	20	261	323	437	NS
Manganese, diss (mg/L)	20	20	0.00491	0.0425	0.495	NS
Nickel, diss (mg/L)	20	15	0.000763	0.00170	0.004	0.1
Nitrate+Nitrite (mg/L)	20	19	0.0030	6.41	9.11	10
Potassium, diss (mg/L)	20	20	5.44	7.0	15.8	NS
Selenium, diss (mg/L)	20	20	0.00355	0.0169	0.032	0.05
Sodium, diss (mg/L)	20	20	55.5	77.7	131	NS
Sulfate (mg/L)	20	20	1,180	1,375	1,860	NS
Total Alkalinity (mg/L)	20	20	455	475	595	NS
Total Dissolved Solids (mg/L)	20	20	2,300	2,530	3,150	NS
Total Hardness (mg/L)	20	20	1,550	1,785	2,260	NS
Vanadium, diss (mg/L)	20	16	0.000353	0.000984	0.00271	NS
Zinc, diss (mg/L)	20	0	0.00146	0.00307	0.00682	2

Data collected between July 2016 and November 2023.
NS = no numeric standard.
diss = dissolved; µS/cm = micro Siemens/centimeter; s.u. = standard units; mg/L = milligrams per liter.
For less than detection limit concentrations, detection limit used to calculate summary statistics.
Concentrations in bold exceed Human Health Standard for ground water.

Table 13. Water Quality of Spring 3.

Parameter	Number of Samples	Number of Detections	Minimum	Median	Maximum	Human Health Standard
Acidity (mg/L)	21	0	1	1	1	NS
Aluminum, diss (mg/L)	21	19	0.00316	0.0174	0.035	NS
Ammonia, as N (mg/L)	21	21	0.0222	0.070	0.43	NS
Arsenic, diss (mg/L)	21	20	0.00033	0.00057	0.0020	0.01
Bicarbonate Alkalinity (mg/L)	21	21	498	608	694	NS
Boron, diss (mg/L)	21	21	0.0983	0.160	0.321	NS
Cadmium, diss (mg/L)	21	8	0.000040	0.0000858	0.000558	0.005
Calcium, diss (mg/L)	21	21	94.1	119	144	NS
Carbonate Alkalinity (mg/L)	21	8	1	1	72	NS
Chloride (mg/L)	21	21	3.91	5.0	8.0	NS
Copper, diss (mg/L)	21	11	0.0000224	0.000782	0.00149	1.3
Fluoride (mg/L)	21	20	0.0054	0.30	0.97	4
Hydroxide alkalinity (mg/L)	21	0	1	1	1	NS
Iron, diss (mg/L)	21	21	0.0654	0.53	5.25	NS
Laboratory Conductivity (µS/cm)	21	21	1,710	2,200	2,750	NS
Laboratory pH (s.u.)	21	21	8.0	8.21	8.6	NS
Lead, diss (mg/L)	21	7	0.0000023	0.000059	0.00040	0.015
Magnesium, diss (mg/L)	21	21	156	201	251	NS
Manganese, diss (mg/L)	21	21	0.041	0.121	0.768	NS
Nickel, diss (mg/L)	21	16	0.000763	0.00164	0.0030	0.1
Nitrate+Nitrite (mg/L)	21	9	0.0030	0.0066	0.037	10
Potassium, diss (mg/L)	21	21	6.0	7.55	9.0	NS
Selenium, diss (mg/L)	21	14	0.000095	0.000322	0.00076	0.05
Sodium, diss (mg/L)	21	21	104	149	199	NS
Sulfate (mg/L)	21	21	618	783	1,140	NS
Total Alkalinity (mg/L)	21	21	514	615	694	NS
Total Dissolved Solids (mg/L)	21	21	1,310	1,730	2,230	NS
Total Hardness (mg/L)	21	21	877	1,120	1,390	NS
Vanadium, diss (mg/L)	21	16	0.0000894	0.000528	0.00228	NS
Zinc, diss (mg/L)	21	6	0.00146	0.00438	0.010	2

Data collected between July 2016 and November 2023.
NS = no numeric standard.
diss = dissolved; µS/cm = micro Siemens/centimeter; s.u. = standard units; mg/L = milligrams per liter.
For less than detection limit concentrations, detection limit used to calculate summary statistics.
Concentrations in bold exceed Human Health Standard for ground water.

Table 14. Water Quality of Spring 4.

Parameter	Number of Samples	Number of Detections	Minimum	Median	Maximum	Human Health Standard
Acidity (mg/L)	21	0	1	1	1	NS
Aluminum, diss (mg/L)	21	19	0.00316	0.039	0.131	NS
Ammonia, as N (mg/L)	21	9	0.0050	0.0289	1.1	NS
Arsenic, diss (mg/L)	21	18	0.000278	0.000493	0.0020	0.01
Bicarbonate Alkalinity (mg/L)	21	21	504	566	644	NS
Boron, diss (mg/L)	21	21	0.68	0.74	1.01	NS
Cadmium, diss (mg/L)	21	9	0.0000467	0.000102	0.00107	0.005
Calcium, diss (mg/L)	21	21	283	304	335	NS
Carbonate Alkalinity (mg/L)	21	7	1	1	44	NS
Chloride (mg/L)	21	21	14.3	15.9	19.0	NS
Copper, diss (mg/L)	21	11	0.0000224	0.000904	0.00295	1.3
Fluoride (mg/L)	21	19	0.0054	0.30	2.08	4
Hydroxide alkalinity (mg/L)	21	0	1	1	1	NS
Iron, diss (mg/L)	21	18	0.00177	0.0173	0.745	NS
Laboratory Conductivity (µS/cm)	21	21	4,370	5,490	5,850	NS
Laboratory pH (s.u.)	21	21	8.0	8.25	8.4	NS
Lead, diss (mg/L)	21	8	0.0000023	0.0000621	0.000737	0.015
Magnesium, diss (mg/L)	21	21	472	508	544	NS
Manganese, diss (mg/L)	21	18	0.000214	0.0080	0.724	NS
Nickel, diss (mg/L)	21	12	0.000661	0.00132	0.00503	0.1
Nitrate+Nitrite (mg/L)	21	21	0.184	1.12	1.41	10
Potassium, diss (mg/L)	21	21	18	22	25.6	NS
Selenium, diss (mg/L)	21	21	0.00859	0.0128	0.017	0.05
Sodium, diss (mg/L)	21	21	456	515	591	NS
Sulfate (mg/L)	21	21	2,830	3,200	3,800	NS
Total Alkalinity (mg/L)	21	21	523	569	644	NS
Total Dissolved Solids (mg/L)	21	21	4,460	5,590	6,030	NS
Total Hardness (mg/L)	21	21	2,670	2,850	3,080	NS
Vanadium, diss (mg/L)	21	18	0.0000136	0.00101	0.00264	NS
Zinc, diss (mg/L)	21	2	0.00146	0.00307	0.00693	2

Data collected between July 2016 and November 2023.
NS = no numeric standard.
diss = dissolved; µS/cm = micro Siemens/centimeter; s.u. = standard units; mg/L = milligrams per liter.
For less than detection limit concentrations, detection limit used to calculate summary statistics.
Concentrations in bold exceed Human Health Standard for ground water.

Table 15. Water Quality of Spring 5.

Parameter	Number of Samples	Number of Detections	Minimum	Median	Maximum	Human Health Standard
Acidity (mg/L)	19	0	1	1	1	NS
Aluminum, diss (mg/L)	19	17	0.00316	0.0701	0.193	NS
Ammonia, as N (mg/L)	19	13	0.0050	0.108	3.17	NS
Arsenic, diss (mg/L)	19	17	0.000314	0.00101	0.0040	0.01
Bicarbonate Alkalinity (mg/L)	19	19	513	819	1,020	NS
Boron, diss (mg/L)	19	19	1.47	2.19	3.26	NS
Cadmium, diss (mg/L)	19	12	0.0000658	0.000213	0.0030	0.005
Calcium, diss (mg/L)	19	19	226	368	499	NS
Carbonate Alkalinity (mg/L)	19	5	1	1	49	NS
Chloride (mg/L)	19	19	11.7	29.9	56	NS
Copper, diss (mg/L)	19	15	0.0000224	0.00192	0.0070	1.3
Fluoride (mg/L)	19	16	0.0054	0.40	3.47	4
Hydroxide alkalinity (mg/L)	19	0	1	1	1	NS
Iron, diss (mg/L)	19	13	0.000688	0.00986	0.797	NS
Laboratory Conductivity (µS/cm)	19	19	6,680	10,200	13,800	NS
Laboratory pH (s.u.)	19	19	8	8.2	8.44	NS
Lead, diss (mg/L)	19	8	0.0000023	0.0000469	0.0034	0.015
Magnesium, diss (mg/L)	19	19	436	817	1,390	NS
Manganese, diss (mg/L)	19	19	0.01	0.0612	1.68	NS
Nickel, diss (mg/L)	19	11	0.000661	0.003	0.0242	0.1
Nitrate+Nitrite (mg/L)	19	18	0.0151	**35.9**	**165**	10
Potassium, diss (mg/L)	19	19	8.0	15	39.6	NS
Selenium, diss (mg/L)	19	19	0.0137	**0.062**	**0.098**	0.05
Sodium, diss (mg/L)	19	19	1,100	1,590	2,600	NS
Sulfate (mg/L)	19	19	3,980	6,470	9,810	NS
Total Alkalinity (mg/L)	19	19	550	819	1,040	NS
Total Dissolved Solids (mg/L)	19	19	6,760	11,500	14,500	NS
Total Hardness (mg/L)	19	19	2,360	4,320	6,970	NS
Vanadium, diss (mg/L)	19	16	0.000177	0.00154	0.00374	NS
Zinc, diss (mg/L)	19	4	0.00146	0.00547	0.0245	2

Data collected between July 2016 and November 2023.
NS = no numeric standard.
diss = dissolved; µS/cm = micro Siemens/centimeter; s.u. = standard units; mg/L = milligrams per liter.
For less than detection limit concentrations, detection limit used to calculate summary statistics.
Concentrations in bold exceed Human Health Standard for ground water.

Table 16. Water Quality of Spring 6.

Parameter	Number of Samples	Number of Detections	Minimum	Median	Maximum	Human Health Standard
Acidity (mg/L)	3	0	1	1	1	NS
Aluminum, diss (mg/L)	3	3	0.0544	0.129	6.51	NS
Ammonia, as N (mg/L)	3	2	0.0050	0.0282	0.072	NS
Arsenic, diss (mg/L)	3	3	0.00163	0.00214	0.00704	0.01
Bicarbonate Alkalinity (mg/L)	3	3	588	727	870	NS
Boron, diss (mg/L)	3	3	1.37	1.93	6.82	NS
Cadmium, diss (mg/L)	3	2	0.0000050	0.00101	0.00149	0.005
Calcium, diss (mg/L)	3	3	379	461	555	NS
Carbonate Alkalinity (mg/L)	3	0	1	1	1	NS
Chloride (mg/L)	3	3	52.9	59.4	95.7	NS
Copper, diss (mg/L)	3	1	0.000018	0.000041	0.0106	1.3
Fluoride (mg/L)	3	1	0.00834	0.00834	1.53	4
Hydroxide alkalinity (mg/L)	3	0	1	1	1	NS
Iron, diss (mg/L)	3	3	0.0101	0.681	6.41	NS
Laboratory Conductivity (µS/cm)	3	3	9,840	12,000	15,300	NS
Laboratory pH (s.u.)	3	3	8.11	8.20	8.22	NS
Lead, diss (mg/L)	3	0	0.0000023	0.0000023	0.0000040	0.015
Magnesium, diss (mg/L)	3	3	872	1,270	1,940	NS
Manganese, diss (mg/L)	3	3	0.237	0.281	6.38	NS
Nickel, diss (mg/L)	3	3	0.00445	0.0125	**6.4**	0.1
Nitrate+Nitrite (mg/L)	3	1	0.003	0.003	0.003	10
Potassium, diss (mg/L)	3	3	16.3	18	20.5	NS
Selenium, diss (mg/L)	3	3	0.000627	0.00131	0.00413	0.05
Sodium, diss (mg/L)	3	3	1,230	1,840	2,540	NS
Sulfate (mg/L)	3	3	6,150	8,670	12,200	NS
Total Alkalinity (mg/L)	3	3	588	727	870	NS
Total Dissolved Solids (mg/L)	3	3	10,600	14,800	18,400	NS
Total Hardness (mg/L)	3	3	4,530	6,390	9,380	NS
Vanadium, diss (mg/L)	3	2	0.000020	0.00115	0.00624	NS
Zinc, diss (mg/L)	3	1	0.00146	0.00547	**6.45**	2

Data collected between July 2016 and March 2017.
NS = no numeric standard.
diss = dissolved; µS/cm = micro Siemens/centimeter; s.u. = standard units; mg/L = milligrams per liter.
For less than detection limit concentrations, detection limit used to calculate summary statistics.
Concentrations in bold exceed Human Health Standard for ground water.

Table 17. Water Quality of Spring 7.

Parameter	Number of Samples	Number of Detections	Minimum	Median	Maximum	Human Health Standard
Acidity (mg/L)	21	0	1	1	1	NS
Aluminum, diss (mg/L)	21	20	0.00316	0.0184	0.193	NS
Ammonia, as N (mg/L)	21	13	0.0050	0.0289	0.428	NS
Arsenic, diss (mg/L)	21	21	0.0000804	0.00177	0.00977	0.01
Bicarbonate Alkalinity (mg/L)	21	21	532	708	932	NS
Boron, diss (mg/L)	21	21	0.0562	0.0852	0.19	NS
Cadmium, diss (mg/L)	21	4	0.0000050	0.0000703	0.000294	0.005
Calcium, diss (mg/L)	21	21	71	86.7	99.9	NS
Carbonate Alkalinity (mg/L)	21	9	1	1	91	NS
Chloride (mg/L)	21	20	0.0071	4.96	12	NS
Copper, diss (mg/L)	21	7	0.000018	0.000358	0.00195	1.3
Fluoride (mg/L)	21	21	0.10	0.20	0.585	4
Hydroxide alkalinity (mg/L)	21	0	1	1	1	NS
Iron, diss (mg/L)	21	21	0.00748	0.19	1.31	NS
Laboratory Conductivity (µS/cm)	21	21	1,140	1,500	2,090	NS
Laboratory pH (s.u.)	21	21	7.9	8.28	8.7	NS
Lead, diss (mg/L)	21	9	0.0000023	0.0000715	0.0014	0.015
Magnesium, diss (mg/L)	21	21	119	151	223	NS
Manganese, diss (mg/L)	21	21	0.010	0.11	0.286	NS
Nickel, diss (mg/L)	21	15	0.000763	0.00165	0.00492	0.1
Nitrate+Nitrite (mg/L)	21	0	0.0030	0.0066	0.0151	10
Potassium, diss (mg/L)	21	21	3.61	5.0	12.2	NS
Selenium, diss (mg/L)	21	14	0.000095	0.00076	**0.0534**	0.05
Sodium, diss (mg/L)	21	21	26	32	67	NS
Sulfate (mg/L)	21	21	116	217	438	NS
Total Alkalinity (mg/L)	21	21	556	711	992	NS
Total Dissolved Solids (mg/L)	21	21	810	988	1,540	NS
Total Hardness (mg/L)	21	21	664	846	1,150	NS
Vanadium, diss (mg/L)	21	18	0.0000136	0.00145	0.00406	NS
Zinc, diss (mg/L)	21	2	0.00146	0.00409	0.00682	2

Data collected between July 2016 and November 2023.
NS = no numeric standard.
diss = dissolved; µS/cm = micro Siemens/centimeter; s.u. = standard units; mg/L = milligrams per liter.
For less than detection limit concentrations, detection limit used to calculate summary statistics.
Concentrations in bold exceed Human Health Standard for ground water.

Table 18. Water Quality of Spring 8.

Parameter	Number of Samples	Number of Detections	Minimum	Median	Maximum	Human Health Standard
Acidity (mg/L)	9	0	1	1	1	NS
Aluminum, diss (mg/L)	9	9	0.00394	0.040	0.061	NS
Ammonia, as N (mg/L)	9	6	0.0073	0.0289	0.39	NS
Arsenic, diss (mg/L)	9	7	0.000314	0.000474	0.0020	0.01
Bicarbonate Alkalinity (mg/L)	9	9	129	425	498	NS
Boron, diss (mg/L)	9	9	0.58	0.71	1.01	NS
Cadmium, diss (mg/L)	9	1	0.0000658	0.000106	0.000294	0.005
Calcium, diss (mg/L)	9	9	344	370	457	NS
Carbonate Alkalinity (mg/L)	9	0	1	1	1	NS
Chloride (mg/L)	9	9	24	40	49	NS
Copper, diss (mg/L)	9	4	0.000358	0.000683	0.0050	1.3
Fluoride (mg/L)	9	8	0.0054	0.40	0.80	4
Hydroxide alkalinity (mg/L)	9	0	1	1	1	NS
Iron, diss (mg/L)	9	8	0.00286	0.03	0.32	NS
Laboratory Conductivity (µS/cm)	9	9	2,990	3,960	4,340	NS
Laboratory pH (s.u.)	9	9	7.9	8.2	8.3	NS
Lead, diss (mg/L)	9	2	0.0000332	0.0000665	0.000295	0.015
Magnesium, diss (mg/L)	9	9	272	400	468	NS
Manganese, diss (mg/L)	9	9	0.0090	0.071	0.316	NS
Nickel, diss (mg/L)	9	5	0.000764	0.000995	0.0080	0.1
Nitrate+Nitrite (mg/L)	9	9	0.51	1.71	7.93	10
Potassium, diss (mg/L)	9	9	6	12	34	NS
Selenium, diss (mg/L)	9	9	0.012	0.023	**0.053**	0.05
Sodium, diss (mg/L)	9	9	88	168	195	NS
Sulfate (mg/L)	9	9	1,870	2,400	2,660	NS
Total Alkalinity (mg/L)	9	9	129	425	498	NS
Total Dissolved Solids (mg/L)	9	9	2,950	4,150	4,620	NS
Total Hardness (mg/L)	9	9	1,980	2,590	3,060	NS
Vanadium, diss (mg/L)	9	7	0.000828	0.0012	0.00264	NS
Zinc, diss (mg/L)	9	0	0.00146	0.00307	0.00682	2

Data collected between October 2018 and March 2022.
NS = no numeric standard.
diss = dissolved; µS/cm = micro Siemens/centimeter; s.u. = standard units; mg/L = milligrams per liter.
For less than detection limit concentrations, detection limit used to calculate summary statistics.
Concentrations in bold exceed Human Health Standard for ground water.

Table 19. Water Quality of Spring 9.

Parameter	Number of Samples	Number of Detections	Minimum	Median	Maximum	Human Health Standard
Acidity (mg/L)	20	0	1	1	1	NS
Aluminum, diss (mg/L)	20	19	0.00316	0.023	0.186	NS
Ammonia, as N (mg/L)	20	16	0.0073	0.18	9.65	NS
Arsenic, diss (mg/L)	20	20	0.000998	0.00283	**0.0258**	0.01
Bicarbonate Alkalinity (mg/L)	20	20	330	490	993	NS
Boron, diss (mg/L)	20	20	0.20	0.389	0.732	NS
Cadmium, diss (mg/L)	20	6	0.000040	0.000091	0.00101	0.005
Calcium, diss (mg/L)	20	20	38.2	119	157	NS
Carbonate Alkalinity (mg/L)	20	17	1.0	18.1	183	NS
Chloride (mg/L)	20	20	2.0	6.70	34.4	NS
Copper, diss (mg/L)	20	7	0.0000224	0.000479	0.00149	1.3
Fluoride (mg/L)	20	19	0.00834	0.20	0.913	4
Hydroxide alkalinity (mg/L)	20	0	1	1	1	NS
Iron, diss (mg/L)	20	20	0.0146	0.185	2.98	NS
Laboratory Conductivity (µS/cm)	20	20	1,740	2,625	3,850	NS
Laboratory pH (s.u.)	20	20	8.2	8.4	9.22	NS
Lead, diss (mg/L)	20	9	0.0000023	0.0000589	0.000475	0.015
Magnesium, diss (mg/L)	20	20	122	185	296	NS
Manganese, diss (mg/L)	20	20	0.0191	0.438	1.23	NS
Nickel, diss (mg/L)	20	19	0.000961	0.00260	0.0102	0.1
Nitrate+Nitrite (mg/L)	20	4	0.0030	0.0066	1.32	10
Potassium, diss (mg/L)	20	20	7.83	15.0	77.1	NS
Selenium, diss (mg/L)	20	10	0.000095	0.000245	0.00658	0.05
Sodium, diss (mg/L)	20	20	171	277	459	NS
Sulfate (mg/L)	20	20	630	1,026	1,310	NS
Total Alkalinity (mg/L)	20	20	357	516	1,010	NS
Total Dissolved Solids (mg/L)	20	20	1,490	2,095	3,230	NS
Total Hardness (mg/L)	20	20	729	1,065	1,510	NS
Vanadium, diss (mg/L)	20	19	0.00066	0.00145	0.00652	NS
Zinc, diss (mg/L)	20	1	0.00146	0.00337	0.00682	2

Data collected between July 2016 and November 2023.
NS = no numeric standard.
diss = dissolved; µS/cm = micro Siemens/centimeter; s.u. = standard units; mg/L = milligrams per liter.
For less than detection limit concentrations, detection limit used to calculate summary statistics.
Concentrations in bold exceed Human Health Standard for ground water.

Table 20. Water Quality of Spring 10.

Parameter	Number of Samples	Number of Detections	Minimum	Median	Maximum	Human Health Standard
Acidity (mg/L)	21	0	1	1	1	NS
Aluminum, diss (mg/L)	21	18	0.00316	0.0123	0.0419	NS
Ammonia, as N (mg/L)	20	4	0.0050	0.0073	0.18	NS
Arsenic, diss (mg/L)	20	15	0.000136	0.000342	0.0011	0.01
Bicarbonate Alkalinity (mg/L)	21	21	364	429	476	NS
Boron, diss (mg/L)	21	21	0.05	0.07	0.09	NS
Cadmium, diss (mg/L)	19	6	0.000040	0.0000858	0.000521	0.005
Calcium, diss (mg/L)	21	21	56	65	70.9	NS
Carbonate Alkalinity (mg/L)	20	17	1	21.3	46	NS
Chloride (mg/L)	21	21	11	14	20	NS
Copper, diss (mg/L)	20	5	0.000018	0.000358	0.00149	1.3
Fluoride (mg/L)	21	21	0.10	0.10	0.421	4
Hydroxide alkalinity (mg/L)	21	0	1	1	1	NS
Iron, diss (mg/L)	21	21	0.013	0.085	0.827	NS
Laboratory Conductivity (µS/cm)	21	21	1,070	1,340	1,540	NS
Laboratory pH (s.u.)	21	21	8.2	8.4	8.6	NS
Lead, diss (mg/L)	20	6	0.0000023	0.0000605	0.000295	0.015
Magnesium, diss (mg/L)	21	21	110	129	159	NS
Manganese, diss (mg/L)	21	21	0.011	0.0239	0.118	NS
Nickel, diss (mg/L)	19	5	0.000763	0.000937	0.00231	0.1
Nitrate+Nitrite (mg/L)	21	9	0.0030	0.0066	0.32	10
Potassium, diss (mg/L)	21	21	4	5	6	NS
Selenium, diss (mg/L)	21	14	0.000135	0.000439	0.00207	0.05
Sodium, diss (mg/L)	21	21	40	48	57	NS
Sulfate (mg/L)	21	21	254	355	412	NS
Total Alkalinity (mg/L)	21	21	395	445	500	NS
Total Dissolved Solids (mg/L)	21	21	820	970	1,110	NS
Total Hardness (mg/L)	21	21	590	695	826	NS
Vanadium, diss (mg/L)	19	12	0.000266	0.000541	0.00224	NS
Zinc, diss (mg/L)	21	0	0.00146	0.00307	0.00682	2

Data collected between July 2016 and November 2023.
NS = no numeric standard.
diss = dissolved; µS/cm = micro Siemens/centimeter; s.u. = standard units; mg/L = milligrams per liter.
For less than detection limit concentrations, detection limit used to calculate summary statistics.
Concentrations in bold exceed Human Health Standard for ground water.

Table 21. Water Quality of Spring 11.

Parameter	Number of Samples	Number of Detections	Minimum	Median	Maximum	Human Health Standard
Acidity (mg/L)	14	0	1	1	1	NS
Aluminum, diss (mg/L)	14	11	0.00316	0.0149	0.157	NS
Ammonia, as N (mg/L)	14	7	0.0050	0.0204	0.23	NS
Arsenic, diss (mg/L)	14	12	0.000216	0.00059	0.000919	0.01
Bicarbonate Alkalinity (mg/L)	14	14	373	448	556	NS
Boron, diss (mg/L)	14	14	0.0899	0.165	0.22	NS
Cadmium, diss (mg/L)	14	4	0.0000588	0.000091	0.000566	0.005
Calcium, diss (mg/L)	14	14	63.4	76	89	NS
Carbonate Alkalinity (mg/L)	14	12	1	20.3	100	NS
Chloride (mg/L)	14	14	5	8.78	12	NS
Copper, diss (mg/L)	14	9	0.0000224	0.000770	0.00178	1.3
Fluoride (mg/L)	14	14	0.10	0.20	0.524	4
Hydroxide alkalinity (mg/L)	14	0	1	1	1	NS
Iron, diss (mg/L)	14	14	0.00421	0.050	0.70	NS
Laboratory Conductivity (µS/cm)	14	14	1,110	1,340	1,430	NS
Laboratory pH (s.u.)	14	14	8.2	8.4	8.8	NS
Lead, diss (mg/L)	14	2	0.0000023	0.0000605	0.000864	0.015
Magnesium, diss (mg/L)	14	14	107	130	141	NS
Manganese, diss (mg/L)	14	14	0.0031	0.084	0.806	NS
Nickel, diss (mg/L)	14	9	0.000763	0.00137	0.003	0.1
Nitrate+Nitrite (mg/L)	14	3	0.0030	0.0066	0.020	10
Potassium, diss (mg/L)	14	14	4.99	5.6	8.0	NS
Selenium, diss (mg/L)	14	11	0.000137	0.000828	0.0050	0.05
Sodium, diss (mg/L)	14	14	39.1	50.5	56	NS
Sulfate (mg/L)	14	14	277	328	364	NS
Total Alkalinity (mg/L)	14	14	393	480	572	NS
Total Dissolved Solids (mg/L)	14	14	830	980	1,050	NS
Total Hardness (mg/L)	14	14	597	734	804	NS
Vanadium, diss (mg/L)	14	10	0.000353	0.000828	0.00136	NS
Zinc, diss (mg/L)	14	1	0.00146	0.00307	0.00682	2

Data collected between March 2017 and May 2023.
NS = no numeric standard.
diss = dissolved; µS/cm = micro Siemens/centimeter; s.u. = standard units; mg/L = milligrams per liter.
For less than detection limit concentrations, detection limit used to calculate summary statistics.
Concentrations in bold exceed Human Health Standard for ground water.

Table 22. Water Quality of Spring 12.

Parameter	Number of Samples	Number of Detections	Minimum	Median	Maximum	Human Health Standard
Acidity (mg/L)	16	0	1	1	1	NS
Aluminum, diss (mg/L)	16	13	0.00316	0.0497	0.309	NS
Ammonia, as N (mg/L)	16	12	0.0050	0.135	13.2	NS
Arsenic, diss (mg/L)	16	14	0.000223	0.0010	0.00668	0.01
Bicarbonate Alkalinity (mg/L)	16	16	337	470	915	NS
Boron, diss (mg/L)	16	16	0.55	0.80	2.06	NS
Cadmium, diss (mg/L)	16	6	0.0000656	0.0000858	0.00137	0.005
Calcium, diss (mg/L)	16	16	237	286	511	NS
Carbonate Alkalinity (mg/L)	16	8	1	2.61	94	NS
Chloride (mg/L)	16	16	24.8	46.7	120	NS
Copper, diss (mg/L)	16	12	0.000133	0.00155	0.00453	1.3
Fluoride (mg/L)	16	10	0.0054	0.10	0.20	4
Hydroxide alkalinity (mg/L)	16	0	1	1	1	NS
Iron, diss (mg/L)	16	14	0.00442	0.0586	0.994	NS
Laboratory Conductivity (µS/cm)	16	16	3,800	5,255	10,200	NS
Laboratory pH (s.u.)	16	16	8.1	8.31	8.6	NS
Lead, diss (mg/L)	16	5	0.0000023	0.0000642	0.000695	0.015
Magnesium, diss (mg/L)	16	16	453	739	1,590	NS
Manganese, diss (mg/L)	16	16	0.017	0.284	3.16	NS
Nickel, diss (mg/L)	16	12	0.000763	0.0020	0.0104	0.1
Nitrate+Nitrite (mg/L)	16	11	0.0030	1.939	**42.9**	10
Potassium, diss (mg/L)	16	16	8	13.9	68	NS
Selenium, diss (mg/L)	15	15	0.0010	0.0040	**0.121**	0.05
Sodium, diss (mg/L)	16	16	180	298	727	NS
Sulfate (mg/L)	16	16	2,310	3,625	7,430	NS
Total Alkalinity (mg/L)	16	16	337	475	995	NS
Total Dissolved Solids (mg/L)	16	16	4,020	5,785	11,500	NS
Total Hardness (mg/L)	16	16	2,470	3,770	7,660	NS
Vanadium, diss (mg/L)	15	12	0.000421	0.00128	0.00424	NS
Zinc, diss (mg/L)	16	2	0.00146	0.00512	0.0130	2

Data collected between October 2016 and November 2023.
NS = no numeric standard.
diss = dissolved; µS/cm = micro Siemens/centimeter; s.u. = standard units; mg/L = milligrams per liter.
For less than detection limit concentrations, detection limit used to calculate summary statistics.
Concentrations in bold exceed Human Health Standard for ground water.

Table 23. Water Quality of Spring 13.

Parameter	Number of Samples	Number of Detections	Minimum	Median	Maximum	Human Health Standard
Acidity (mg/L)	8	0	1	1	1	NS
Aluminum, diss (mg/L)	8	8	0.014	0.023	0.056	NS
Ammonia, as N (mg/L)	8	6	0.0073	0.059	0.66	NS
Arsenic, diss (mg/L)	8	8	0.000841	0.00125	0.0030	0.01
Bicarbonate Alkalinity (mg/L)	8	8	648	676	796	NS
Boron, diss (mg/L)	8	8	0.36	0.49	1.61	NS
Cadmium, diss (mg/L)	8	1	0.0000858	0.000106	0.000573	0.005
Calcium, diss (mg/L)	8	8	119	144	221	NS
Carbonate Alkalinity (mg/L)	8	1	1	1	27	NS
Chloride (mg/L)	8	8	9.73	11.5	25.2	NS
Copper, diss (mg/L)	8	1	0.000358	0.000837	0.00457	1.3
Fluoride (mg/L)	8	8	0.20	0.20	0.903	4
Hydroxide alkalinity (mg/L)	8	0	1	1	1	NS
Iron, diss (mg/L)	8	8	0.030	0.94	5.69	NS
Laboratory Conductivity (µS/cm)	8	8	2,030	2,215	4,050	NS
Laboratory pH (s.u.)	8	8	8.0	8.1	8.3	NS
Lead, diss (mg/L)	8	3	0.0000332	0.0000924	0.000356	0.015
Magnesium, diss (mg/L)	8	8	247	269	417	NS
Manganese, diss (mg/L)	8	8	0.256	0.905	4.41	NS
Nickel, diss (mg/L)	8	7	0.000763	0.0035	0.021	0.1
Nitrate+Nitrite (mg/L)	8	0	0.0066	0.0066	0.0151	10
Potassium, diss (mg/L)	8	8	6	10	13	NS
Selenium, diss (mg/L)	8	6	0.00011	0.000279	0.000573	0.05
Sodium, diss (mg/L)	8	8	73	81.5	207	NS
Sulfate (mg/L)	8	8	718	886	1,790	NS
Total Alkalinity (mg/L)	8	8	648	683	796	NS
Total Dissolved Solids (mg/L)	8	8	1,820	1,920	3,780	NS
Total Hardness (mg/L)	8	8	1,360	1,475	2,270	NS
Vanadium, diss (mg/L)	8	6	0.000421	0.000759	0.00117	NS
Zinc, diss (mg/L)	8	0	0.00146	0.00682	0.00682	2

Data collected between June 2018 and November 2023.
NS = no numeric standard.
diss = dissolved; µS/cm = micro Siemens/centimeter; s.u. = standard units; mg/L = milligrams per liter.
For less than detection limit concentrations, detection limit used to calculate summary statistics.
Concentrations in bold exceed Human Health Standard for ground water.

Table 24. Water Quality of Spring 14.

Parameter	Number of Samples	Number of Detections	Minimum	Median	Maximum	Human Health Standard
Acidity (mg/L)	21	0	1	1	1	NS
Aluminum, diss (mg/L)	21	21	0.00493	0.0209	0.0370	NS
Ammonia, as N (mg/L)	20	12	0.0050	0.0309	0.27	NS
Arsenic, diss (mg/L)	19	15	0.000176	0.000361	0.00077	0.01
Bicarbonate Alkalinity (mg/L)	21	21	519	628	720	NS
Boron, diss (mg/L)	21	21	0.312	0.374	0.434	NS
Cadmium, diss (mg/L)	19	6	0.000040	0.0000962	0.000488	0.005
Calcium, diss (mg/L)	21	21	119	146	167	NS
Carbonate Alkalinity (mg/L)	21	12	1	18	61.8	NS
Chloride (mg/L)	21	21	12	13.5	64	NS
Copper, diss (mg/L)	19	6	0.0000224	0.000469	0.00149	1.3
Fluoride (mg/L)	21	21	0.2	0.2	2.5	4
Hydroxide alkalinity (mg/L)	21	0	1	1	1	NS
Iron, diss (mg/L)	21	21	0.0103	0.030	0.153	NS
Laboratory Conductivity (µS/cm)	21	21	2,430	2,780	3,110	NS
Laboratory pH (s.u.)	21	21	8.0	8.32	8.5	NS
Lead, diss (mg/L)	20	7	0.0000023	0.0000605	0.000295	0.015
Magnesium, diss (mg/L)	21	21	260	277	299	NS
Manganese, diss (mg/L)	21	21	0.012	0.093	0.192	NS
Nickel, diss (mg/L)	20	15	0.000763	0.00170	0.0030	0.1
Nitrate+Nitrite (mg/L)	21	3	0.0030	0.0066	0.080	10
Potassium, diss (mg/L)	21	21	7.17	9.0	11.6	NS
Selenium, diss (mg/L)	20	12	0.000135	0.00022	0.00076	0.05
Sodium, diss (mg/L)	21	21	153	178	201	NS
Sulfate (mg/L)	21	21	1,090	1,160	1,370	NS
Total Alkalinity (mg/L)	21	21	564	647	720	NS
Total Dissolved Solids (mg/L)	21	21	2,220	2,340	2,710	NS
Total Hardness (mg/L)	21	21	1,420	1,500	1,640	NS
Vanadium, diss (mg/L)	19	13	0.000353	0.000828	0.0040	NS
Zinc, diss (mg/L)	21	1	0.00146	0.00307	0.00682	2

Data collected between July 2016 and November 2023.
NS = no numeric standard.
diss = dissolved; µS/cm = micro Siemens/centimeter; s.u. = standard units; mg/L = milligrams per liter.
For less than detection limit concentrations, detection limit used to calculate summary statistics.
Concentrations in bold exceed Human Health Standard for ground water.

Baseline MPDES Quality Tables

Table 25. Water Quality of Outfall 005.

Parameter	Number of Samples	Number of Detections	Minimum	Median	Maximum	MPDES Limit
Aluminum, diss (mg/L)	2	0	0.03	0.03	0.03	NS
Aluminum, total (mg/L)	1	1	0.41	0.41	0.41	NS
Arsenic, total (mg/L)	2	1	0.001	0.0065	0.012	NS
Boron, total (mg/L)	2	2	0.116	0.209	0.302	NS
Cadmium, total (mg/L)	2	1	0.00003	0.0002	0.00037	NS
Calcium, diss (mg/L)	2	2	95	155.5	216	NS
Chloride (mg/L)	2	2	2	6.5	11	NS
Chromium, total (mg/L)	2	1	0.01	0.016	0.022	NS
Copper, total (mg/L)	2	2	0.003	0.0135	0.024	NS
Fluoride (mg/L)	2	2	0.6	0.7	0.8	NS
Iron, total (mg/L)	2	2	0.449	**11.0**	**21.5**	6
Laboratory Conductivity (µS/cm)	2	2	893	1547	2200	NS
Laboratory pH (s.u.)	2	2	7.7	7.7	7.7	6.0-9.0
Lead, total (mg/L)	2	2	0.0004	0.00995	0.0195	NS
Magnesium, diss (mg/L)	2	2	48	75.5	103	NS
Mercury, total (mg/L)	2	2	0.000012	0.000041	0.00007	NS
Nickel, total (mg/L)	2	1	0.002	0.0115	0.021	NS
Nitrate+Nitrite (mg/L)	2	2	0.8	1.235	1.67	NS
Oil & Grease (mg/L)	2	0	1	1	1	10
Selenium, total (mg/L)	2	2	0.002	0.0025	0.003	NS
Silver, total (mg/L)	2	0	0.0002	0.0002	0.0002	NS
Sodium, diss (mg/L)	2	2	37	92.5	148	NS
Sodium Absorption Ratio	2	2	0.77	1.43	2.08	NS
Solids, settleable (mL/L)	2	1	0.5	**2.5**	**4.5**	0.5
Sulfate (mg/L)	2	2	465	867.5	1270	NS
Total Dissolved Solids (mg/L)	2	2	694	1332	1970	NS
Total Nitrogen (mg/L)	2	2	0.8	4.2	7.6	NS
Total Phosphate (mg/L)	2	2	0.016	0.3425	0.669	NS
Total Suspended Sediments (mg/L)	2	2	56	**78.5**	**101**	70
Zinc, total (mg/L)	2	1	0.008	0.036	0.064	NS

Data collected between June 2023 and September 2023.
NS = no numeric standard.
diss = dissolved; µS/cm = micro Siemens/centimeter; s.u. = standard units; mg/L = milligrams per liter.
For less than detection limit concentrations, detection limit used to calculate summary statistics.
Concentrations in bold exceed noted standards.

Table 26. Water Quality of Outfall 009.

Parameter	Number of Samples	Number of Detections	Minimum	Median	Maximum	MPDES Limit
Aluminum, diss (mg/L)	1	0	0.03	0.03	0.03	NS
Aluminum, total (mg/L)	1	1	0.148	0.148	0.148	NS
Arsenic, total (mg/L)	1	0	0.001	0.001	0.001	NS
Boron, total (mg/L)	1	1	0.122	0.122	0.122	NS
Cadmium, total (mg/L)	1	0	0.00003	0.00003	0.00003	NS
Calcium, diss (mg/L)	1	1	66	66	66	NS
Chloride (mg/L)	1	1	2	2	2	NS
Chromium, total (mg/L)	1	0	0.01	0.01	0.01	NS
Copper, total (mg/L)	1	1	0.007	0.007	0.007	NS
Fluoride (mg/L)	1	1	0.4	0.4	0.4	NS
Iron, total (mg/L)	1	1	0.225	0.225	0.225	6
Laboratory Conductivity (µS/cm)	1	1	817	817	817	NS
Laboratory pH (s.u.)	1	1	7.7	7.7	7.7	6.0-9.0
Lead, total (mg/L)[1]	1	0	0.0003	0.0003	0.0003	NS
Magnesium, diss (mg/L)	1	1	52	52	52	NS
Mercury, total (mg/L)	1	0	0.000005	0.000005	0.000005	NS
Nickel, total (mg/L)	1	0	0.002	0.002	0.002	NS
Nitrate+Nitrite (mg/L)	1	1	0.98	0.98	0.98	NS
Oil & Grease (mg/L)	1	0	1	1	1	10
Selenium, total (mg/L)	1	1	0.004	0.004	0.004	NS
Silver, total (mg/L)	1	0	0.0002	0.0002	0.0002	NS
Sodium, diss (mg/L)	1	1	38	38	38	NS
Sodium Absorption Ratio	1	1	0.84	0.84	0.84	NS
Solids, settleable (mL/L)	1	0	0.5	0.5	0.5	0.5
Sulfate (mg/L)	1	1	411	411	411	NS
Total Dissolved Solids (mg/L)	1	1	585	585	585	NS
Total Nitrogen (mg/L)	1	1	1	1	1	NS
Total Phosphate (mg/L)	1	1	0.017	0.017	0.017	NS
Total Suspended Sediments (mg/L)	1	1	11	11	11	70
Zinc, total (mg/L)	1	0	0.008	0.008	0.008	NS

Data collected in June 2023.
NS = no numeric standard.
diss = dissolved; µS/cm = micro Siemens/centimeter; s.u. = standard units; mg/L = milligrams per liter.
For less than detection limit concentrations, detection limit used to calculate summary statistics.
Concentrations in bold exceed noted standards.

Baseline Ground Water Quality Tables

Table 27. Alluvium Water Quality.

Parameter	Number of Samples	Number of Detections	Minimum	Median	Maximum	Human Health Standard
Acidity (mg/L)	110	0	1	1	1	NS
Aluminum, diss (mg/L)	110	106	0.00817	0.0391	1.47	NS
Ammonia (mg/L)	110	63	0.005	0.0289	0.228	NS
Arsenic, diss (mg/L)	110	79	0.000035	0.00036	0.0030	0.01
Bicarbonate Alkalinity (mg/L)	110	110	309	413	710	NS
Boron, diss (mg/L)	110	110	0.30	0.43	0.86	NS
Cadmium, diss (mg/L)	110	34	0.000040	0.0000975	0.000514	0.005
Calcium, diss (mg/L)	110	110	154	202	299	NS
Carbonate Alkalinity (mg/L)	110	6	1	1	37	NS
Chloride (mg/L)	110	110	7	12.6	498	NS
Copper, diss (mg/L)	110	50	0.000018	0.000837	0.18	1.3
Fluoride (mg/L)	110	104	0.0054	0.30	**4.76**	4
Hydroxide Alkalinity (mg/L)	110	0	1	1	1	NS
Iron, diss (mg/L)	110	104	0.000688	0.040	4.24	NS
Laboratory Conductivity (µS/cm)	110	110	2,260	3,350	5,170	NS
Laboratory pH (s.u.)	110	110	7.6	8.1	8.4	NS
Lead, diss (mg/L)	110	36	0.0000023	0.000067	0.0034	0.015
Magnesium, diss (mg/L)	110	110	194	284	448	NS
Manganese, diss (mg/L)	110	97	0.000214	0.030	3.0	NS
Nickel, diss (mg/L)	110	63	0.000763	0.00141	0.0165	0.1
Nitrate+Nitrite (mg/L)	110	72	0.0030	0.115	2.31	10
Potassium, diss (mg/L)	110	110	9.0	13	22	NS
Selenium, diss (mg/L)	110	101	0.000095	0.0040	0.0265	0.05
Sodium, diss (mg/L)	110	110	159	322	568	NS
Sulfate (mg/L)	110	110	1,250	1,810	2,970	NS
Total Alkalinity (mg/L)	110	110	309	413	710	NS
Total Dissolved Solids (mg/L)	110	110	2,500	3,220	5,040	NS
Total Hardness (mg/L)	110	110	1,180	1,690	2,550	NS
Vanadium, diss (mg/L)	110	80	0.00002	0.000774	0.00352	NS
Zinc, diss (mg/L)	110	26	0.00146	0.00507	0.076	2

Data collected between February 2017 and September 2023 from WA-219, WA-222, WA-225, WA-226, WA-227, WA-230, WA-231, and WA-232.
NS = no numeric standard.
diss = dissolved; µS/cm = micro Siemens/centimeter; s.u. = standard units; mg/L = milligrams per liter.
For less than detection limit concentrations, detection limit used to calculate summary statistics.
Concentrations in bold exceed Human Health Standard for ground water.

Table 28. Overburden Water Quality.

Parameter	Number of Samples	Number of Detections	Minimum	Median	Maximum	Human Health Standard
Acidity (mg/L)	51	0	1	1	1	NS
Aluminum, diss (mg/L)	51	50	0.00817	0.0432	0.189	NS
Ammonia (mg/L)	51	33	0.0050	0.15	0.961	NS
Arsenic, diss (mg/L)	51	35	0.000035	0.000311	0.00121	0.01
Bicarbonate Alkalinity (mg/L)	51	51	363	639	935	NS
Boron, diss (mg/L)	51	51	0.20	0.391	1.11	NS
Cadmium, diss (mg/L)	51	30	0.000040	0.0000952	0.000688	0.005
Calcium, diss (mg/L)	51	51	162	260	368	NS
Carbonate Alkalinity (mg/L)	51	0	1	1	1	NS
Chloride (mg/L)	51	51	6.24	9.55	23.0	NS
Copper, diss (mg/L)	51	41	0.000018	0.00166	0.045	1.3
Fluoride (mg/L)	51	34	0.0054	0.20	**5.63**	4
Hydroxide Alkalinity (mg/L)	51	0	1	1	1	NS
Iron, diss (mg/L)	51	46	0.000688	0.41	3.21	NS
Laboratory Conductivity (µS/cm)	51	51	2,530	3,880	6,840	NS
Laboratory pH (s.u.)	51	51	7.72	8.0	8.3	NS
Lead, diss (mg/L)	51	32	0.0000023	0.000088	0.0019	0.015
Magnesium, diss (mg/L)	51	51	239	345	645	NS
Manganese, diss (mg/L)	51	48	0.0000867	0.0332	0.472	NS
Nickel, diss (mg/L)	51	27	0.000764	0.000937	0.022	0.1
Nitrate+Nitrite (mg/L)	51	26	0.0030	0.0151	1.71	10
Potassium, diss (mg/L)	51	51	8.0	11.9	17	NS
Selenium, diss (mg/L)	51	43	0.000135	0.000403	**0.0761**	0.05
Sodium, diss (mg/L)	51	51	143	436	951	NS
Sulfate (mg/L)	51	51	1,350	1,970	4,470	NS
Total Alkalinity (mg/L)	51	51	363	639	935	NS
Total Dissolved Solids (mg/L)	51	51	2,740	3,670	7,350	NS
Total Hardness (mg/L)	51	51	1,600	1,990	3,570	NS
Vanadium, diss (mg/L)	51	39	0.00002	0.000768	0.00652	NS
Zinc, diss (mg/L)	51	35	0.00146	0.0161	0.124	2

Data collected between February 2017 and September 2023 from WO-184, WO-185, WO-186, WO-187, and WO-192.
NS = no numeric standard.
diss = dissolved; µS/cm = micro Siemens/centimeter; s.u. = standard units; mg/L = milligrams per liter.
For less than detection limit concentrations, detection limit used to calculate summary statistics.
Concentrations in bold exceed Human Health Standard for ground water.

Table 29. Rosebud Water Quality.

Parameter	Number of Samples	Number of Detections	Minimum	Median	Maximum	Human Health Standard
Acidity (mg/L)	84	0	1	1	1	NS
Aluminum, diss (mg/L)	84	81	0.00817	0.0291	1.89	NS
Ammonia (mg/L)	84	73	0.0050	0.348	0.944	NS
Arsenic, diss (mg/L)	84	43	0.000035	0.00023	0.0020	0.01
Bicarbonate Alkalinity (mg/L)	84	84	294	481	749	NS
Boron, diss (mg/L)	84	84	0.18	0.43	1.3	NS
Cadmium, diss (mg/L)	84	43	0.000040	0.0000771	0.000412	0.005
Calcium, diss (mg/L)	84	84	32.8	124	250	NS
Carbonate Alkalinity (mg/L)	84	17	1	1	114	NS
Chloride (mg/L)	84	84	1	4	11.1	NS
Copper, diss (mg/L)	84	61	0.000018	0.00104	0.161	1.3
Fluoride (mg/L)	84	60	0.0054	0.075	2.05	4
Hydroxide Alkalinity (mg/L)	84	0	1	1	1	NS
Iron, diss (mg/L)	84	84	0.00518	0.060	5.68	NS
Laboratory Conductivity (µS/cm)	84	84	714	2,365	3,860	NS
Laboratory pH (s.u.)	84	84	7.8	8.15	8.51	NS
Lead, diss (mg/L)	84	42	0.0000023	0.000072	0.0032	0.015
Magnesium, diss (mg/L)	84	84	15.3	77	293	NS
Manganese, diss (mg/L)	84	84	0.00289	0.0647	0.65	NS
Nickel, diss (mg/L)	84	40	0.000764	0.000937	0.011	0.1
Nitrate+Nitrite (mg/L)	84	34	0.0030	0.0066	0.19	10
Potassium, diss (mg/L)	84	84	2	5.3	15	NS
Selenium, diss (mg/L)	84	35	0.000094	0.000171	0.0176	0.05
Sodium, diss (mg/L)	84	84	7.77	154	885	NS
Sulfate (mg/L)	84	84	70	973	1,970	NS
Total Alkalinity (mg/L)	84	84	294	481	749	NS
Total Dissolved Solids (mg/L)	84	84	470	2,030	3,610	NS
Total Hardness (mg/L)	84	84	145	632	1,780	NS
Vanadium, diss (mg/L)	84	72	0.000020	0.000595	0.00309	NS
Zinc, diss (mg/L)	84	51	0.00146	0.00495	0.125	2

Data collected between February 2017 and September 2023 from WR-231, WR-233, WR-234, WR-235, WR-237, WR-238, and WR-239.
NS = no numeric standard.
diss = dissolved; µS/cm = micro Siemens/centimeter; s.u. = standard units; mg/L = milligrams per liter.
For less than detection limit concentrations, detection limit used to calculate summary statistics.
Concentrations in bold exceed Human Health Standard for ground water.

Table 30. McKay Water Quality.

Parameter	Number of Samples	Number of Detections	Minimum	Median	Maximum	Human Health Standard
Acidity (mg/L)	112	0	1	1	1	NS
Aluminum, diss (mg/L)	112	107	0.00817	0.0382	0.616	NS
Ammonia (mg/L)	112	97	0.0050	0.423	1.23	NS
Arsenic, diss (mg/L)	112	60	0.000035	0.000199	0.000804	0.01
Bicarbonate Alkalinity (mg/L)	112	112	202	372	620	NS
Boron, diss (mg/L)	112	112	0.14	0.333	0.837	NS
Cadmium, diss (mg/L)	112	55	0.000040	0.0000858	0.000464	0.005
Calcium, diss (mg/L)	112	112	21.3	56.2	254	NS
Carbonate Alkalinity (mg/L)	112	62	1.0	2.14	26.2	NS
Chloride (mg/L)	112	112	1.0	4.0	17.9	NS
Copper, diss (mg/L)	112	100	0.000018	0.00127	0.030	1.3
Fluoride (mg/L)	112	105	0.0054	0.30	3.4	4
Hydroxide Alkalinity (mg/L)	112	0	1	1	1	NS
Iron, diss (mg/L)	112	108	0.000688	0.0669	2.59	NS
Laboratory Conductivity (µS/cm)	112	112	755	2,125	4,760	NS
Laboratory pH (s.u.)	112	112	8.0	8.3	8.6	NS
Lead, diss (mg/L)	112	53	0.0000023	0.0000715	0.00318	0.015
Magnesium, diss (mg/L)	112	112	6.82	31	355	NS
Manganese, diss (mg/L)	112	111	0.0000867	0.0296	0.148	NS
Nickel, diss (mg/L)	112	54	0.000763	0.0009805	0.015	0.1
Nitrate+Nitrite (mg/L)	112	67	0.0030	0.035	1.54	10
Potassium, diss (mg/L)	112	112	4.0	7.0	15.8	NS
Selenium, diss (mg/L)	112	54	0.000094	0.000173	0.0186	0.05
Sodium, diss (mg/L)	112	112	76	316	721	NS
Sulfate (mg/L)	112	112	76	833	2,700	NS
Total Alkalinity (mg/L)	112	112	213	372	620	NS
Total Dissolved Solids (mg/L)	112	112	510	1,600	4,750	NS
Total Hardness (mg/L)	112	112	84.2	264	2,090	NS
Vanadium, diss (mg/L)	112	86	0.0000136	0.000544	0.00713	NS
Zinc, diss (mg/L)	112	71	0.00146	0.00487	0.143	2

Data collected between February 2017 and September 2023 from WM-192, WM-193, WM-194, WM-195, WM-196, WM-197, WM-198, WM-199, and WM-208.
NS = no numeric standard.
diss = dissolved; µS/cm = micro Siemens/centimeter; s.u. = standard units; mg/L = milligrams per liter.
For less than detection limit concentrations, detection limit used to calculate summary statistics.
Concentrations in bold exceed Human Health Standard for ground water.

Table 31. Sub-McKay Water Quality.

Parameter	Number of Samples	Number of Detections	Minimum	Median	Maximum	Human Health Standard
Acidity (mg/L)	98	0	1	1	1	NS
Aluminum, diss (mg/L)	98	95	0.00817	0.038	0.683	NS
Ammonia (mg/L)	98	84	0.0050	0.50	1.7	NS
Arsenic, diss (mg/L)	98	58	0.000035	0.00034	0.0020	0.01
Bicarbonate Alkalinity (mg/L)	98	98	231	408	890	NS
Boron, diss (mg/L)	98	98	0.17	0.274	0.855	NS
Cadmium, diss (mg/L)	98	48	0.000040	0.0000787	0.000704	0.005
Calcium, diss (mg/L)	98	98	6.94	47	302	NS
Carbonate Alkalinity (mg/L)	98	65	1.0	11.6	63	NS
Chloride (mg/L)	98	98	1.0	5.0	19	NS
Copper, diss (mg/L)	98	80	0.000018	0.0014	0.011	1.3
Fluoride (mg/L)	98	86	0.0054	0.50	**4.63**	4
Hydroxide Alkalinity (mg/L)	98	0	1	1	1	NS
Iron, diss (mg/L)	98	98	0.00351	0.135	5.7	NS
Laboratory Conductivity (µS/cm)	98	98	1,210	2,305	4,570	NS
Laboratory pH (s.u.)	98	98	7.8	8.4	8.7	NS
Lead, diss (mg/L)	98	54	0.0000023	0.0000715	0.0031	0.015
Magnesium, diss (mg/L)	98	98	2.0	22.6	350	NS
Manganese, diss (mg/L)	98	98	0.00058	0.025	0.10	NS
Nickel, diss (mg/L)	98	51	0.000763	0.000995	0.0349	0.1
Nitrate+Nitrite (mg/L)	98	68	0.0030	0.044	0.411	10
Potassium, diss (mg/L)	98	98	2.69	7.46	15	NS
Selenium, diss (mg/L)	98	44	0.000094	0.00017	0.0010	0.05
Sodium, diss (mg/L)	98	98	172	374	724	NS
Sulfate (mg/L)	98	98	332	786	2,210	NS
Total Alkalinity (mg/L)	98	98	239	422	890	NS
Total Dissolved Solids (mg/L)	98	98	976	1,590	4,410	NS
Total Hardness (mg/L)	98	98	25	211	2,180	NS
Vanadium, diss (mg/L)	98	76	0.000020	0.000584	0.00342	NS
Zinc, diss (mg/L)	98	61	0.00146	0.00577	0.073	2

Data collected between February 2017 and September 2023 from WD-187, WD-188, WD-189, WD-191, WD-192, WD-193, WD-194, and WD-210.
NS = no numeric standard.
diss = dissolved; µS/cm = micro Siemens/centimeter; s.u. = standard units; mg/L = milligrams per liter.
For less than detection limit concentrations, detection limit used to calculate summary statistics.
Concentrations in bold exceed Human Health Standard for ground water.

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Appendix 4 – BBC IMPLAN Analysis

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MEMORANDUM

To: Nicole DenHerder, ERO Resources Corporation

From: Doug Jeavons, BBC Research & Consulting

Re: IMPLAN Analysis of Economic and Fiscal Effects of the Rosebud Mine for the SEIS (including Economic and Fiscal Effects from Colstrip and Rosebud Power Plants)

Date: July 22, 2024 Update

For the Area F Supplemental EIS, BBC Research & Consulting (BBC) conducted an updated IMPLAN analysis to quantify the regional economic effects from mine operations under the SEIS alternatives. BBC also analyzed the indirect economic effects from coal supplied by Area F to the nearby Colstrip and Rosebud electric generating stations, which receive all of the coal they use to produce electricity from the Rosebud Mine (and are the mine's only customers).

The Rosebud coal mine is located in southeastern Montana. The mine's operations are primarily located in Rosebud County, with a portion of the mineable area extending into Treasure County.

BBC's analysis focuses on the current economic effects of these facilities, which are projected to remain approximately the same in future years, though the duration of the effects may differ depending on the SEIS alternative that is ultimately selected. Under the No Action Alternative, mining from Area F would cease after 2025. Under the Proposed Action (the current Federal mine plan also referred to as Alternative 4), mining from Area F would continue through 2039. Under the Partial Mining Alternative (also referred to as Alternative 5), mining from Area F would continue through 2030.

Methods for the Analysis

BBC used the IMPLAN regional economic modeling system to estimate the direct, indirect, and induced regional economic effects from the Rosebud Mine and the Colstrip and Rosebud power plants. IMPLAN is an input-output model, originally developed by the U.S. Forest Service that is now widely used for impact analysis by public and private sector economists throughout the United States. Input-output analysis is a means of examining relationships within an economy between businesses and between businesses and final consumers. The analysis captures all monetary market transactions for consumption in a given period. The resulting mathematical representation allows examination of the effect of a change in one or more economic activities on an entire economy with all other factors being constant. Input-output analysis also provides multipliers, which are used to estimate indirect and induced effects, or secondary effects.

In an input-output analysis, direct effects refer to the initial round of spending from the activity being studied (e.g., the payroll, and supplies, materials, and services purchased by the Rosebud Mine). Indirect effects refer to the economic activity which results from the purchase of goods and services by the other local businesses that receive payments from the directly affected operation (in this case, the Rosebud Mine). Induced effects refer to the economic activity which results from the purchase of household goods and services by employees of the mine and the indirectly affected businesses. Together, indirect and induced effects are sometimes referred to as "secondary" economic impacts, or "multiplier effects."

The IMPLAN model captures only the "backward linkages" (the interconnection of an industry to other industries from which it purchases its inputs in order to produce its output) from mine operations due to the mine's purchases, payroll, and other local expenditures. In this analysis, however, "forward linkages" from the mine are also important. The Rosebud Mine is the primary fuel supplier to the Colstrip Power Plant. Colstrip is the largest industrial facility in Montana and one of the largest coal-fired power plants in the western United States. Waste coal from the Rosebud Mine is burned at the much smaller Rosebud Power Plant.

To examine both the "backward linkages" and the "forward linkages" from the Rosebud Mine, BBC conducted separate IMPLAN analyses of the regional economic effects from mine operations and the regional economic effects from operations of the power plant. In this report, we initially present the regional economic effects from the mine, since the permitting decision would directly affect future mine operations. BBC then discusses the regional economic effects from the power plants, which may or may not be substantially affected by the mine permitting decision. Since the IMPLAN estimates of the economic contribution from the power plants include the economic effects from the operation of the mine (a "backward linkage" from the power plant), BBC removed the estimated economic contribution from the mine from the overall economic contribution of the power plants in order to assess the *additional* regional economic effects from the power plants (and to avoid double counting the economic effects from the generating facilities and the mine).

The IMPLAN model that BBC constructed for this analysis included Rosebud County, Big Horn County, and Treasure County, which are the three local counties most affected by mine operations. BBC used IMPLAN's multiregional analysis capabilities (based on estimated trade flows between the counties) to model how mine activities, primarily based in Rosebud County, affect the economies in the other two counties.

The IMPLAN model provides information on economic activity (employment, labor compensation, output, and other metrics) for the coal-mining sector in Rosebud County in 2022 (the most recent data available from IMPLAN). Employment and production at the Rosebud Mine vary from year to year. Currently (as of July 2024), a total of 320 people work at the Rosebud Mine. Given the impossibility of accurately forecasting year-to-year variability in mine employment, for purposes of this analysis we assumed constant employment of 320 workers from year 2024 through the end of production at the mine under each alternative.

BBC also considered the effects of mine operations on members of the Northern Cheyenne Reservation located primarily in Rosebud County as well as the effects on other Native American workers at the mine.

Estimated Effects on Regional Economy (2020 through 2045)

Direct effects from mine operations. The direct effects of the Rosebud Mine are the employment and output directly related to the mine's production. Since the Rosebud Mine is based in Rosebud County, all direct effects are assumed to occur in that county.

BBC estimates that Rosebud Mine operations currently support an annual average of approximately 320 direct jobs and $148 million in annual direct economic output. 46 of the 320 mine workers (14 percent) are members of the Northern Cheyenne Reservation. Another 30 of the 320 workers (9 percent) are Native Americans who are not members of the Northern Cheyenne tribe, likely predominantly members of the relatively nearby Crow tribe.

Figure 1. Annual Direct Effects by Location (Dollars in Thousands)

Area	Employment	Total Output
Rosebud County	320	$148,073
Big Horn County	0	$0
Treasure County	0	$0
Total	320	$148,073

Source: IMPLAN and BBC Research & Consulting, 2024.

Indirect effects from mine operations. Indirect effects (described earlier in the *Methods for the Analysis* section) occur beyond the geographic boundaries of the direct effects and impact the larger economic region as a whole. The estimated current indirect economic effects on the region from the Rosebud Mine are shown in Figure 2.

Indirect effects also likely occur outside of the three-county regional economic study area used in this analysis – particularly in Yellowstone County, which includes the City of Billings. Billings is the largest city and the primary regional trade center in southeastern Montana. The effects beyond the three-county study area are not captured in this analysis.

Figure 2. Indirect Effects by Location (Dollars in Thousands)

Area	Employment	Total Output
Rosebud County	49	$17,091
Big Horn County	1	$465
Treasure County	3	$819
Total	53	$18,375

Source: IMPLAN and BBC Research & Consulting, 2024.

BBC estimates that the Rosebud Mine currently supports approximately 53 indirect jobs. The mine also generates approximately $18 million annually in indirect economic output in the region.

Induced effects from mine operations. Figure 3 shows the estimated induced effects (described in the *Methods for the Analysis* section) of current Rosebud Mine operations within Rosebud, Big Horn, and Treasure counties.

Figure 3. Induced Effects by Location (Dollars in Thousands)

Area	Employment	Total Output
Rosebud County	58	$9,748
Big Horn County	6	$907
Treasure County	1	$84
Total	65	$10,379

Source: IMPLAN and BBC Research & Consulting, 2024.

The Rosebud Mine is estimated to currently support approximately 65 induced jobs and over $10 million in annual induced output across the three-county study area.

Total regional effects from mine operations. The total regional economic impact of the mine is the combination of the direct, indirect, and induced impacts. The majority of the economic effects occur at or near the mine; and Rosebud County is estimated to experience the largest economic impacts. However, since indirect and induced spending occurs across the larger regional economy, both Big Horn County and Treasure County experience some economic effects due to mine operations (Figure 4).

Figure 4. Total Annual Economic Effects by Location (Dollars in Thousands)

Area	Employment	Total Output
Rosebud County	427	$174,912
Big Horn County	7	$1,372
Treasure County	4	$904
Total	438	$177,188

Source: IMPLAN and BBC Research & Consulting, 2024.

The Rosebud Mine is estimated to currently support about 438 direct, indirect, and induced jobs throughout the three-county region and to stimulate about $177 million in annual economic output within the region. As noted previously, about 23 percent of the mine's direct workforce are members of the Northern Cheyenne tribe (14 percent) or other Native Americans (9 percent).

Current effects of mine operations on government revenues. Another important component of the mine's economic effects is the resulting fiscal revenues provided to local governments, the state of Montana and the federal government. BBC estimated the fiscal contributions from the Rosebud Mine based on the mine's employment level and corresponding economic output and tax revenues estimated using the IMPLAN model.

The Rosebud Mine is estimated to provide approximately $52 million in annual direct revenues to Rosebud County, the state of Montana and the federal government, as summarized in Figure

5. These revenues include federal and state royalties, severance taxes, resource indemnity trusts, gross proceeds taxes, and property taxes.

As shown in Figure 5, the Rosebud Mine directly generated approximately $32 million in annual state revenues in 2023. Local governments received approximately $11 million and the federal government received approximately $9 million in annual taxes and royalties.

Figure 5. Direct Governmental Revenues from the Rosebud Mine (Dollars in Thousands)

	Local Governments	State of Montana	Federal Government
Taxes	$10,643	$30,338	
Royalties	0	$2,003	$9,068
Total	$10,643	$32,341	$9,068

Source: Westmoreland Resources and BBC Research and Consulting, 2024.

In addition to the direct fiscal impacts, the indirect and induced economic activity generated by the mine throughout the region produces additional tax revenues. These effects include payroll and income taxes, property taxes and other fees. Induced fiscal effects are relatively small because there are no sales taxes in Montana that capture revenues from the induced increase in household spending.

As shown in Figure 6, the indirect and induced effects, combined with the direct effects shown in Figure 5, are estimated to generate approximately $12 million, $33 million, and $11 million in annual revenues in 2023 for local governments, the state of Montana, and the federal government, respectively.

Figure 6. Total Annual Governmental Revenues from Mine Operations (Dollars in Thousands)

	Local Governments	State of Montana	Federal Government
Direct	$10,643	$32,341	$9,068
Indirect	$750	$452	$918
Induced	$258	$236	$687
Total	$11,651	$33,029	$10,673

Source: IMPLAN and BBC Research & Consulting, 2024.

***Additional* Current Regional Economic Effects from Operations of Colstrip and Rosebud Power Plants.** As noted previously, the Colstrip Power Plant purchases virtually all of the coal produced by the Rosebud Mine except for waste coal that is burned at the Rosebud Power Plant. Since the retirement of Units 1 and 2 in early 2020, Colstrip has reduced its workforce and currently employs about 250 workers.

In total, BBC estimates that the Colstrip and Rosebud Power Plants currently support about $556 million dollars in annual economic output across the three-county region, and approximately 640 jobs. However, some of this output and jobs reflects the supporting operations of the Rosebud Mine described earlier. Figure 7 summarizes the current *additional* effects from power plant operations on annual economic output and employment in the three-

county region. The data shown in Figure 7 were adjusted to exclude the economic effects of the mine, reported previously in Figure 4.

Figure 7. *Additional* Economic Effects from Colstrip and Rosebud Power Plants (Dollars in Thousands)

	Employment	Total Output
Direct	255	$361,283
Indirect	44	$28,243
Induced	62	$13,369
Total	361	$402,895

Note: Excludes economic effects from mine operations shown previously in Figure 4.
Source: IMPLAN and BBC Research & Consulting, 2024

Power plant operations also produce substantial federal, state and local tax revenues. The Colstrip and Rosebud electric generating operations are estimated to directly produce about $42 million per year in direct revenues for state, local and the federal government. Figure 8 also depicts the total combined contribution to government revenues from Colstrip and Rosebud Power Plant operations and Rosebud Mine operations, including the direct, indirect and induced annual government revenues from mine operations reported previously in Figure 6. In total, the mine and the powerplants are estimated to produce about $97 million per year in revenues for the federal, state and local governments.

Figure 8. *Total* Government Revenues from Colstrip Generating Station and Rosebud Mine (Dollars in Thousands)

	Power Plant Revenues	Mine Revenues	Total Revenues
State and Local	$29,299	$44,680	$73,919
Federal	$12,591	$10,673	$23,264
Total	$41,890	$55,353	$97,243

Source: IMPLAN and BBC Research & Consulting, 2024.

Summary

For the SEIS, BBC has updated its previous economic and fiscal impact analysis regarding the economic contributions from the Rosebud Mine and the Colstrip and Rosebud power plants. Based on the latest information available information, BBC estimates that the mine supports a total of 438 local jobs and $177 million in annual economic output – primarily, though not exclusively, in Rosebud County. Approximately 23 percent of the mine's labor force are Native Americans, including about 14 percent of the workforce that are members of the Northern Cheyenne Tribe.

Operations of the Colstrip and Rosebud generating stations support an additional 361 local jobs and $403 million in annual economic output – excluding the economic contribution from the operations of the mine. On a combined basis, the three facilities support almost 800 local jobs (over 7 percent of total employment in the three-county region including Rosebud County, Big Horn County and Treasure County) and about $569 million in annual economic output (approximately 24 percent of total economic output in the three-county region).

Under the Proposed Action (Alternative 4), these annual economic contributions are anticipated to be supported by Area F coal mining through year 2039. Under the Partial Mining Alternative (Alternative 5) Area F coal production would help support the economic and fiscal contributions from the mine and powerplant through year 2030. Under the No Action Alternative, Area F mining operations would cease after 2025.

For this analysis, the Colstrip and Rosebud power plants are assumed to continue to operate as long as the mine is producing coal. Whether or not the powerplants could secure an alternative source of coal after mine operations cease and continue their operations is unknown.

Appendix 5 – Responses to Public Comments

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Introduction

This appendix contains the substantive comments[1] received on the *Rosebud Mine Area F Draft Supplemental Environmental Impact Statement* (Draft SEIS) and responses to those comments from the Office of Surface Mining and Enforcement (OSMRE).

Public Comment Period

The Draft SEIS was issued for a 46-day public comment period beginning on December 6, 2024, which was the date that the Environmental Protection Agency's (EPA's) Notice of Availability (NOA) was published in the *Federal Register*, and ending on January 21, 2025. Notice of the comment period was also provided in a separate OSMRE NOA that was also published in the *Federal Register* as well as on the OSMRE website (https://www.osmre.gov/laws-and-regulations/nepa/projects) and in a press release statement. Details on how to submit comments and attend the public comment meeting were included in both NOAs, in legal advertisements published in the *Billings Gazette* and the *Forsythe Independent Press*, and in letters sent to interested persons and elected officials on December 6, 2024.[2] A separate letter also was sent by OSMRE to members of the Senate Committee on Energy and Natural Resources, the House of Representatives Subcommittee on Energy and Mineral Resources (Committee on Natural Resources), and the Montana Congressional Delegation on December 9, 2024. As part of its obligation to consult with impacted tribes, OSMRE sent letters to tribes to re-initiate government-to-government consultation on December 6, 2024.

A public meeting (open-house format) was held at the Colstrip City Hall on January 8, 2025. OSMRE staff and representatives from the third-party consultant team were available during the open house to provide project information and to address questions from members of the public. Twenty-three people attended the open house.

Comment Analysis Process

A qualitative content analysis process, as described herein, was used to compile and organize similar public comments for response. The analysis process aimed to identify the issues raised, viewpoints communicated, and suggestions provided by the public, based on the correspondence received. All correspondence submitted during the comment period were evaluated and considered. Substantive comments (defined below) are responded to in this appendix (see **Response to Comments**).

During the comment period, 39 correspondences were received; see **Table 1** and detailed description of the number and nature of correspondences below under **Content Analysis**. Each correspondence was read, and specific comments in each unique correspondence were identified and categorized. The number

[1] A comment is a portion of text in a correspondence that addresses a single subject or issue such as water resources or mitigation measures. Each comment was assigned an issue code. See **Definition of Terms** for the definition of a substantive comment.

[2] The mailing list of interested persons was based on the original mailing list used for the 2018 Final EIS and updated as needed. It was comprised of elected officials, state and federal agencies, businesses, organizations, and interested individuals, including those that has submitted comments during prior public comment periods for this project.

of comments derived from each correspondence varied based on the content of the text. Some correspondences had one comment, while others provided multiple comments.

To organize comments, each comment was given a code to identify its general content and to group similar comments under categories (e.g., climate change, surface water, special status species). The coding structure was identified after an initial review of comments. Examples of codes developed for this project include: *4200 Special Status Species Analysis Area*, *6600 Surface Water Analysis*, and *2001 Suggested New Alternatives* (see also **Table 2** below).

Definition of Terms

The primary terms used during the analysis are defined below.

Correspondence: A correspondence is the entire document received from a commenter. Correspondence were submitted to OSMRE by postal mail, email, or in person at the public meeting. A correspondence may include one comment or several, depending on the content of the correspondence.

Comment: A comment is a portion of text in a correspondence that addresses a single subject such as "purpose and need" or "surface water quality." The comment could also question the accuracy of the information provided in the Draft SEIS or present mitigations or reasonable alternatives.

Substantiative Comment: A substantive comment is one that does one or more of the following:

- Question, with a reasoned basis related to the analysis, the accuracy of information in the EIS or EA.
- Question, with a reasoned basis related to the analysis, the adequacy of, methodology for, or assumptions used for the analysis.
- Present new information relevant to the analysis.
- Present reasonable alternatives or issues outside those analyzed in the EIS or EA, or those mentioned in the Notice of Intent.
- Present relevant additional issues for analysis in the EIS or EA.
- Prompt potential changes or revisions to one or more of the alternatives.

Code: A code is a means of organizing comments regarding a common subject or topic. The codes were developed during the comment analysis process and are used to track major issues. Codes were organized into one of several categories (**Table 2**).

Content Analysis

During the Draft SEIS public comment period, 39 correspondences[3] were received from interested individuals, nongovernmental organizations (NGOs), businesses, federal and state agencies, elected officials, one tribe, and the project proponent **Table 1**. Of the 39 correspondences, 35 were unique letters and four were a pro-Rosebud Mine form letter. Most comments were submitted by email to the project-specific email address; many correspondences submitted in this manner contained an attachment and are counted as a letter in **Table 1** below. A handful of correspondences (letters and one comment form) were sent through postal mail or handed to OSMRE staff in-person at the public meeting.

[3] In total, 47 correspondences were received, but 5 were duplicates of another correspondence (e.g., commenter sent identical correspondence via email and postal mail). After the close of the comment period, three correspondences were withdrawn by the commenters.

Most (29) correspondences were submitted by commenters in Montana. For six correspondences, the state of origin was unknown. Three correspondences were submitted by commenters from Colorado, and one each was submitted by commenters from West Virginia, New Mexico, North Carolina, and the District of Columbia.

Table 1. Correspondences by Number and Type.

Commenter Type	Correspondence Type				Total
	Comment Form	Email	Letter (sent via email, postal mail, or hand-delivery)	Form Letter	All Correspondences
Interested Individuals	1	15	4	0	20
NGO	0	2	4	1	7
Business	0	0	0	2	2
Tribe	0	0	1	0	1
Federal Agency	0	0	1	0	1
State Agency	0	0	2	0	2
Elected Official	0	1	3	1	5
Proponent	0	0	1	0	1
Total	**1**	**18**	**16**	**4**	**39**

From the 39 correspondences, 371 comments were coded (**Table 2**). Of these, 361 comments were coded from the 35 unique correspondences, and 10 comments were coded from the form letter. The most common issue topics raised in comments included the following: surface water, groundwater, water rights, socioeconomic conditions, climate change, special status species, and agency authority. Many comments also expressed support for or opposition to an alternative. A handful recommended changes to the assumptions used in one or more of the alternatives, recommended a new alternative, or recommended a new analysis issue. The complete distribution of comments by code is provided below in **Table 2.**

Table 2. Number of Comments Coded by Issue.

Code	Issue Topic	Number of Comments	Percent of all Comments
6600	Surface Water Analysis	48	12.87%
2200	Choose Alternative 4 (Proposed Action)	30	8.04%
7400	Socioeconomic Conditions Analysis	22	5.90%
6300	Climate Change Analysis	19	5.09%
3602	Surface Water Existing Condition	17	4.56%
6700	Groundwater Analysis	15	4.02%
2100	Choose Alternative 1 (No Action)	13	3.49%
1005	Public Comment Period	11	2.95%
7200	Special Status Species Analysis	10	2.68%
1301	DOI-ASLM or OSMRE Authority/Action	9	2.41%
6800	Water Rights Analysis	9	2.41%
1302	Authority/Action of Other Agencies (State)	8	2.14%
6602	Surface Water Cumulative Impacts	8	2.14%
8200	Analysis comment/suggestion	7	1.88%
1001	Power Plants as Connected Actions	6	1.61%
2301	Oppose Alternative 5 (Partial Mining)	6	1.61%
6000	Adequacy of SEIS Analysis	6	1.61%
1000	NEPA Process	5	1.34%
6200	Air Quality Analysis	5	1.34%
7202	Special Status Species Cumulative impacts	5	1.34%
1202	Reclamation/Bond phase of Other Rosebud Mine Permit Areas	4	1.07%
1300	Agency Authority (General)	4	1.07%
2201	Oppose Alternative 4 (Proposed Action)	4	1.07%
2302	Suggested Modification to Alternative 5 (Partial Mining)	4	1.07%
6400	Public Health and Safety Analysis	4	1.07%
7404	Socioeconomic Conditions Mitigation	4	1.07%
8202	Solid and Hazardous Waste Cumulative Impacts	4	1.07%
9100	Request for Document or Information	4	1.07%
2102	Suggested Modification to Alternative 1 (No Action)	3	0.80%
3702	Groundwater Existing Condition	3	0.80%

Code	Issue Topic	Number of Comments	Percent of all Comments
4102	Fish and Wildlife Resources Existing Condition	3	0.80%
7100	Fish and Wildlife Resources Analysis	3	0.80%
9200	Editorial Comment (e.g., typo)	3	0.80%
1002	Government-to-Government Consultation	2	0.54%
1102	Consider MT Constitution and "Right to Clean & Healthful Environment"	2	0.54%
1103	Demand for Coal	2	0.54%
1104	Requirements of the Court Order	2	0.54%
1303	Authority/Action of Other Agencies (Federal)	2	0.54%
1400	Applicable Regulatory Framework (e.g., ESA, CWA, etc.)	2	0.54%
2202	Suggested Modification to Alternative 4 (Proposed Action)	2	0.54%
6001	Suggested New Analysis or Method	2	0.54%
3601	Surface Water Analysis Area	2	0.54%
6100	Topography Analysis	2	0.54%
6603	Surface Water Monitoring	2	0.54%
6604	Surface Water Mitigation	2	0.54%
6702	Groundwater Cumulative Impacts	2	0.54%
7103	Fish and Wildlife Monitoring	2	0.54%
7700	Recreation Analysis	2	0.54%
7900	Access and Transportation Analysis	2	0.54%
1004	Public Meeting	1	0.27%
1100	Revise Purpose and Need Statement	1	0.27%
1101	Disagree with Purposed and Need for Project	1	0.27%
2000	Alternatives Development Process	1	0.27%
2001	Suggested New Alternative	1	0.27%
2300	Choose Alternative 5 (Partial Mining)	1	0.27%
3000	Suggested Analysis Issue	1	0.27%
3300	Suggested New Information (Climate Change)	1	0.27%
3600	Suggested New information (Surface Water)	1	0.27%
4201	Special Status Species Analysis Area	1	0.27%
4202	Special Status Species Existing Conditions	1	0.27%
4400	Suggested New Information (Socioeconomic Conditions)	1	0.27%
4401	Socioeconomic Conditions Analysis Area	1	0.27%
4702	Recreation Existing Condition	1	0.27%
4902	Access and Transportation Existing Condition	1	0.27%
5202	Land Use Existing Condition	1	0.27%
6302	Climate Change Cumulative Impacts	1	0.27%
6500	Geology Analysis	1	0.27%
6704	Groundwater Mitigation	1	0.27%
6805	Replacement Water	1	0.27%
6802	Water Rights Cumulative impacts	1	0.27%
6900	Vegetation Analysis	1	0.27%
7104	Fish and Wildlife Mitigation	1	0.27%
7102	Fish and Wildlife Cumulative impacts	1	0.27%
7203	Special Status Species Monitoring	1	0.27%
7300	Cultural and Historic Resources Analysis	1	0.27%
7500	Environmental Justice Analysis	1	0.27%
7502	Environmental Justice Cumulative impacts	1	0.27%
7904	Access and Transportation Mitigation	1	0.27%
8000	Solid and Hazardous Waste Analysis	1	0.27%
8002	Solid and Hazardous Cumulative impacts	1	0.27%
8204	Land Use Mitigation	1	0.27%
9000	Comment/Suggestion for Figures or Graphics	1	0.27%
9202	Outside scope of SEIS	1	0.27%
	Total Number of Comments Coded	**371**	**-**

A list of the correspondences submitted during the comment period (along with their affiliations, as applicable) is provided below in **Table 3** along with associated issue codes.

Table 3. List of Commenters by Document Identification Number.

Document ID #	Commenter Affiliation (if any)	Issue	Issue Topics
0001	Amphibian Refuge	4102 6300 7103 7404	Fish and Wildlife Resources Existing Condition Climate Change Analysis Fish and Wildlife Resources Monitoring Socioeconomic Conditions Mitigation
0002		2200	Choose Alternative 4 (Proposed Action)
0003		2200	Choose Alternative 4 (Proposed Action)
0004	International Brotherhood of Electrical Workers (IBEW) 1638	2200	Choose Alternative 4 (Proposed Action)
0005	Earthjustice	1005	Public comment period
0006 (0043 is a copy)	Mayor John Williams of Colstrip	2200 7400	Choose Alternative 4 (Proposed Action) Socioeconomic Conditions Analysis
0007		2200	Choose Alternative 4 (Proposed Action)
0008		2200 7400	Choose Alternative 4 (Proposed Action) Socioeconomic Conditions Analysis
0009		2200	Choose Alternative 4 (Proposed Action)
00010 (0045 is a copy)	Rosebud County Board of Commissioners: Ed Joiner, Robert E. Lee, and Scott Hein	2200 7400	Choose Alternative 4 (Proposed Action) Socioeconomic Conditions Analysis
0011	Southeastern Montana Development Corporation	2200 7404	Choose Alternative 4 (Proposed Action) Socioeconomic Conditions Mitigation
0012	Montana State Representative Gary Parry (District 35)	2200 7400	Choose Alternative 4 (Proposed Action) Socioeconomic Conditions Analysis
0013	Northern Cheyenne Tribe Administration	1005 1002	Public comment period Government-to-government consultation
0014		2100 7100 7104 9100	Choose Alternative 1 (No Action) Fish and Wildlife Resources Analysis Fish and Wildlife Resources Mitigation Request for document or information
0015		2100 2300 6300	Choose Alternative 1 (No Action) Choose Alternative 5 (Partial Mining) Climate Change Analysis
0016		1302 2100 3702 6700 6800	Authority/action of other agencies (State) Choose Alternative 1 (No Action) Groundwater Existing Condition Groundwater Analysis Water Rights Analysis
0017	Comment letter withdrawn by commenter		
0018	Earthjustice	1005 9100	Public comment period Request for document or information
0019	Northern Plains Resource Council	1000 1001 1103 1202 1300 1302 2000 2100 6300 6600 6800 7404	NEPA process (general) Analyze power plants as connected actions Demand for coal Reclamation/bond phase of other Rosebud Mine permit areas Agency authority (general) Authority/action of other agencies (State) Alternatives Development Process Choose Alternative 1 (No Action) Climate Change Analysis Surface Water Analysis Water Rights Analysis Socioeconomic Conditions Mitigation
0020	NRP (Operating) LLC	**Form Letter A** 1104 1301 2200 6300 6600 6602 7400	 Requirements of the Court Order DOI-ASLM or OSMRE authority/action Choose Alternative 4 (Proposed Action) Climate Change Analysis Surface Water Analysis Surface Water Cumulative impacts Socioeconomic Conditions Analysis
0021		2100 8200	Choose Alternative 1 (No Action) Land Use Analysis

Document ID #	Commenter Affiliation (if any)	Issue	Issue Topics
0022		2100 4102 4202 7100 7103 7203	Choose Alternative 1 (No Action) Fish and Wildlife Resources Existing Conditions Special Status Species Existing Conditions Fish and Wildlife Resources Analysis Fish and Wildlife Resources Monitoring; Special Status Species Monitoring
0023		1103 2200 2301 7400	Demand for coal Choose Alternative 4 (Proposed Action) Oppose Alternative 5 (Partial Mining) Socioeconomic Conditions Analysis
0024 (0040 is a copy)	Comment letter withdrawn by commenter		
0025		2200	Choose Alternative 4 (Proposed Action)
0026		1202 2201 6200 6800 7102 7900 8200 8202	Reclamation/bond phase of other Rosebud Mine permit areas Oppose Alternative 4 (Proposed Action) Air Quality Analysis Water Rights Analysis Fish and Wildlife Resources Cumulative impacts Access and Transportation Analysis Land Use Analysis Land Use Cumulative impacts
0027		2100 6702	Choose Alternative 1 (No Action) Groundwater Cumulative Impacts
0028		1102 2100 2201 6302	Consider MT Constitution and "right to clean & healthful environment" Choose Alternative 1 (No Action) Oppose Alternative 4 (Proposed Action) Climate Change Cumulative Impacts

Document ID #	Commenter Affiliation (if any)	Issue	Issue Topics
0029	Earthjustice on behalf of Sierra Club, Western Environmental Law Center, and Montana Environmental Information Center	1001	Analyze power plants as connected actions
		1002	Government-to-government consultation
		1005	Public comment period
		1100	Revise Purpose and Need Statement (specific)
		1101	Disagree with purpose and need for project
		1102	Consider MT Constitution and "right to clean & healthful environment"
		1202	Reclamation/bond phase of other Rosebud Mine permit areas
		1301	DOI-ASLM or OSMRE authority/action
		1302	Authority/action of other agencies (State)
		2001	Suggested New Alternative
		2100	Choose Alternative 1 (No Action)
		2102	Suggested Modification to Alternative 1 (No Action)
		2201	Oppose Alternative 4 (Proposed Action)
		2202	Suggested Modification to Alternative 4 (Proposed Action)
		3000	Suggested analysis issue/resource
		3600	Suggested new information (Surface Water)
		3601	Surface Water Analysis Area
		4201	Special Status Species Analysis Area
		4401	Socioeconomic Conditions Analysis Area
		6000	Adequacy of Analysis (general)
		6200	Air Quality Analysis
		6300	Climate Change Analysis
		6400	Public Health and Safety Analysis
		6600	Surface Water Analysis
		6602	Surface Water Cumulative impacts
		6603	Surface Water Monitoring
		6604	Surface Water Mitigation
		6700	Groundwater Analysis
		6702	Groundwater Cumulative impacts
		6800	Water Rights Analysis
		6805	Replacement Water
		7200	Special Status Species Analysis
		7202	Special Status Species Cumulative Impacts
		7300	Cultural and Historic Resources Analysis
		7400	Socioeconomic Conditions Analysis
		7404	Socioeconomic Conditions Mitigation
		7500	Environmental Justice Analysis
		8002	Solid and Hazardous Waste Cumulative impacts
		9100	Request for document or information
0030	Environmental Protection Agency (EPA)	1303	Authority/action of other agencies (Federal)
		6001	Suggested new analysis or method
		6300	Climate Change Analysis
		6600	Surface Water Analysis
0031	Great Northern Properties Limited Partnership	**Form Letter A**	
		1104	Requirements of the Court Order
		1301	DOI-ASLM or OSMRE authority/action
		2200	Choose Alternative 4 (Proposed Action)
		6300	Climate Change Analysis
		6600	Surface Water Analysis
		6602	Surface Water Cumulative impacts
		7400	Socioeconomic Conditions Analysis
0032	Montana Association of Oil, Gas, and Coal Counties	2200	Choose Alternative 4 (Proposed Action)
		7400	Socioeconomic Conditions Analysis
0033	Montana Coal Council	**Form Letter A**	
		1104	Requirements of the Court Order
		1301	DOI-ASLM or OSMRE authority/action
		2200	Choose Alternative 4 (Proposed Action)
		6300	Climate Change Analysis
		6600	Surface Water Analysis
		6602	Surface Water Cumulative impacts
		7400	Socioeconomic Conditions Analysis

Document ID #	Commenter Affiliation (if any)	Issue	Issue Topics
0034 (0047 is a copy)	Montana Congressional Delegation: Senator Steve Daines, Senator Tim Sheehy, Congressman Ryan Zinke, and Congressman Troy Downing	2200 7400	Choose Alternative 4 (Proposed Action) Socioeconomic Conditions Analysis
0035	Montana Department of Environmental Quality	1400 2102 2302 3602 3702 4702 4902 5202 6000 6001 6100 6400 6600 6602 6700 7502 9000 9200	Comment about applicable regulatory framework (e.g., ESA, CWA, etc.) Suggested Modification to Alternative 1 (No Action) Suggested Modification to Alternative 5 (Partial Mining) Surface water existing condition Groundwater existing condition Recreation existing condition Access and transportation existing condition Land use existing condition Adequacy of Analysis (general) Suggested new analysis or method Topography Analysis Public Health and Safety Analysis Surface Water Analysis Surface Water Cumulative Impacts Groundwater Analysis Environmental Justice Cumulative impacts Comment/suggestion for figures or graphics Editorial comment (e.g., typo)
0036	Montana Fish Wildlife and Parks	6603 6604 6704	Surface Water Monitoring Surface Water Mitigation Groundwater Mitigation
0037	Signal Peak Energy	1000 1301 2200	NEPA process (general) DOI-ASLM or OSMRE authority/action Choose Alternative 4 (Proposed Action)
0038 (0046 is a copy)	Westmoreland Rosebud Mining LLC	1000 1001 1104 1301 1302 2102 2200 2202 2301 2302 3300 3602 3702 4400 6000 6100 6200 6300 6400 6500 6600 6602 6700 6900 7200 7400 7700 8000 9200	NEPA process (general) (Do Not) Analyze power plants as connected actions Requirements of the Court Order DOI-ASLM or OSMRE authority/action Authority/action of other agencies (State) Suggested Modification to Alternative 1 (No Action) Choose Alternative 4 (Proposed Action) Suggested Modification to Alternative 4 (Proposed Action) Oppose Alternative 5 (Partial Mining) Suggested Modification to Alternative 5 (Partial Mining) Suggested new information (Climate Change) Surface water existing condition Groundwater existing condition Suggested new information (Socioeconomic Conditions) Adequacy of Analysis (general) Topography Analysis Air Quality Analysis Climate Change Analysis Public Health and Safety Analysis Geology Analysis Surface Water Analysis Surface Water Cumulative impacts Groundwater Analysis Vegetation Analysis Special Status Species Analysis Socioeconomic Conditions Analysis Recreation Analysis Solid and Hazardous Waste Analysis Editorial comment (e.g., typo)

Document ID #	Commenter Affiliation (if any)	Issue	Issue Topics
0039	Congressman Ryan Zinke (MT-01)	**Form Letter A** 1104 1301 2200 6300 6600 6602 7400	 Requirements of the Court Order DOI-ASLM or OSMRE authority/action Choose Alternative 4 (Proposed Action) Climate Change Analysis Surface Water Analysis Surface Water Cumulative impacts Socioeconomic Conditions Analysis
0040 (copy of 0024)	Comment letter withdrawn by commenter	See 0024	See 0024
41		2100 2201 2301	Choose Alternative 1 (No Action) Oppose Alternative 4 (Proposed Action) Oppose Alternative 5 (Partial Mining)
42		1004 2200 6200 7200	Public meeting Choose Alternative 4 (Proposed Action) Air Quality Analysis Special Status Species Analysis
43 (copy of 0006)	Mayor John Williams of Colstrip	See 0006	See 0006
44	Terratech Solutions	9202	Outside scope of SEIS
45 (copy of 0010)	Rosebud County Board of Commissioners: Ed Joiner, Robert E. Lee, and Scott Hein	See 0010	See 0010
46 (copy of 0038)	Westmoreland Rosebud Mining LLC	See 0038	See 0038
47 (copy of 0034)	Montana Congressional Delegation: Senator Steve Daines, Senator Tim Sheehy, Congressman Ryan Zinke, and Congressman Troy Downing	See 0034	See 0034

Response to Comments

At the time that OSMRE offered public comment on the Draft SEIS, the OSMRE National Environmental Policy Act (NEPA) Handbook was OSMRE's current NEPA guidance. Pursuant to the OSMRE *NEPA Handbook*, Section 10.4, a Final SEIS must include copies of substantive comments on the Draft SEIS, responses to those comments, and changes in or additions to the text of the SEIS in response to comments. On the final day of public comment, the President issued Executive Order (EO) 14154, "Unleashing American Energy" (January 20, 2025) and a Presidential Memorandum, "Ending Illegal Discrimination and Restoring Merit-Based Opportunity" (January 21, 2025) that required the U.S. Department of the Interior (DOI) to strictly adhere to NEPA, 42 United States Code (U.S.C.) §§ 4321 et seq. Consistent with EO 14154, the Council on Environmental Quality (CEQ) repealed its NEPA regulations (90 *Federal Register* 10610 [February 25, 2025]) and directed that, while agencies review their own NEPA-implementing regulations for consistency with EO 14154, agencies could voluntarily consider CEQ's 2020 NEPA regulations as guidance. Then, on July 3, 2025, DOI partially rescinded its regulations implementing NEPA and published a separate *NEPA Handbook* containing DOI's revised NEPA procedures that apply to the internal processing of NEPA analyses (516 DM 1). Current DOI guidance indicates that agencies do not need to respond to nonsubstantive comments and that options for addressing substantive comments include modifying one or more of the alternatives; developing and evaluating suggested alternatives not previously given serious consideration by the bureau; supplementing, improving, or modifying the analysis; making factual corrections; or explaining why the comments do not warrant further bureau response, citing sources, authorities, or reasons to support the bureau's position.

All substantive comments received on the Draft SEIS are included in this appendix and responded to individually or collectively, as appropriate. Responses to substantive comments are provided in this appendix using two methods:

- *Side-by-side response*: For correspondence with extensive substantive comments or that were representative examples of correspondence with similar comment themes, letters were reproduced in their entirety and included beside OSMRE's responses. See the **Side-by-Side Response to Comments** section below.
- *Collective response*: For other comments, it was more efficient to group similar comments by category and respond to them collectively. Responses to these grouped comments are in the **Consolidated Response to Comments** section below beginning on page 5-79.

Side-by-Side Response to Comments

The correspondences listed below in **Table 4** received side-by-side comment responses from OSMRE. The pages in this section are arranged in three columns. In the left-hand column, each comment in a correspondence is numbered according to the document identification number and the sequence of the comment in the correspondence (e.g., 0013-3 would be the third comment in Correspondence 0013). The issue code for each comment is also in the left column in parentheses. Images of the correspondence pages are in the second column, and responses, which are also numbered) are in the third (righthand) column.

Table 4. Comment Documents with Side-by-Side Responses

Document ID #	Name and Affiliation of Commenter	Appendix 5 Page Number
0013	Northern Cheyenne Tribe (Gene Small)	Page 5-11
0019	Northern Plains Resource Council (Edward Barta)	Page 5-12
0029	Earthjustice (Shilo Hernandez)	Page 5-20
0030	EPA (Melissa McCoy)	Page 5-42
0035	MT DEQ (Dan Walsh)	Page 5-47
0036	MT FWP (Brad Schmitz)	Page 5-60
0038	Westmoreland (Jeremy Cottrell)	Page 5-62

Comment # (Issue Code)	Document #0013-Northern Cheyenne Tribe	Response

SEIS 0013

-WOHEHIV-
The Morning Star

NORTHERN CHEYENNE TRIBE
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The Morning Star

January 13, 2025

Roberta Martínez-Hernández
OSMRE Regions 5, 7-11
P.O. Box 25065
Denver, CO 80225-0065
rmartinezhernandez@osmre.gov
rosebudmineareafseis@eroresources.com

Dear Ms. Martínez-Hernández,

0013-1 (1005) As the elected President of the Northern Cheyenne Tribe, I am writing this letter to express my support for the January 2, 2025 request by multiple conservation organizations for a 30-day extension of the public comment period for the draft supplemental environmental impact statement (DSEIS) for the Area F expansion of the Rosebud Mine.

0013-2 (1002) The Northern Cheyenne Tribe has a unique interest in this project, given that proposed expansion will occur on our aboriginal land, approximately 15% of the mine's employees are Northern Cheyenne, and air pollution from combustion of the coal will most impact the Northern Cheyenne Reservation.

0013-3 (1005) The Area F expansion of the mine is an extensive operation, with significant impacts to air, water, land, and cultural resources. The material in the DSEIS is highly technical and additional time will be required to review and provide appropriate comments. As such the additional time requested is appropriate.

Thank you for your consideration of this request.

Sincerely,

Gene Small
President
Northern Cheyenne Tribe

LITTLE WOLF AND MORNING STAR - Out of defeat and exile they led us back to Montana and won our Cheyenne homeland that we will keep forever.

Comment Response 0013-1: OSMRE considered but did not extend the public comment period. OSMRE responded to this comment period extension request on January 28, 2025, noting that any comments or concerns the Northern Cheyenne Tribe wish to present to OSMRE regarding the Rosebud Mine Area F Draft Supplemental EIS (Draft SEIS) would be considered in government-to-government consultation with the Northern Cheyenne Tribe and would not be subject to the January 21, 2025, comment period deadline. OSMRE received a comment letter from the Northern Cheyenne Tribe on April 28, 2025 as part of the government-to-government consultation process.

Comment Response 0013-2: OSMRE acknowledges the Tribe's unique interest in the project and sincerely appreciates its valued participation.

Comment Response 0013-3: See Comment Response 0013-1.

Comment # (Issue Code)	Document #0019-Northern Plains Resource Council	Response

SEIS 0019

Roberta Martínez Hernández
OSMRE Western Region 5, 7-11
P.O. Box 25065
Lakewood, CO 80225-0065

Submitted electronically to: rosebudmineareafseis@eroresources.com

ATTN: Rosebud Mine Area F Mining Plan Modification SEIS

January 21, 2025

Dear Ms. Hernández:

On behalf of Northern Plains Resource Council (Northern Plains) and its members, I am submitting the following comments to the Office of Surface Mining Reclamation and Enforcement (OSMRE) in response to the December 2024 draft supplemental environmental impact statement (SEIS) (SEIS-010-08-000-1732112584) written to address the deficiencies in the 2018 Western Energy Area F Final Environmental Impact Statement (2018 Final EIS) as identified by the United States District Court for the District of Montana (*Montana Env't Info. Ctr. v. Haaland*, No. CV 19-130-BLG-SPW, 2022 U.S. Dist. LEXIS 179417). These environmental analyses concern Western Energy's [now Westmoreland Rosebud's] proposed permit expansion into Area F at the existing Rosebud Mine (Montana permit # C2011003F), which surrounds the town of Colstrip, Montana.

Specifically, the Court remanded the Final EIS back to OSMRE and ordered it to remedy the following: (1) inadequate surface water cumulative impacts analysis, (2) inadequate greenhouse gas emissions analysis, (3) inadequate analysis of indirect effects of mine expansion on water withdrawals from the Yellowstone River, and (4) failure to analyze a reasonable range of alternatives in violation of NEPA [National Environmental Policy Act]. This SEIS purports to address the deficiencies identified by the Court and also supplements the 2018 Final EIS pursuant to NEPA.

Northern Plains is a grassroots conservation and family agriculture non-profit organization based in Billings, Montana. Northern Plains organizes Montana citizens to protect our water quality, family farms and ranches, and unique quality of life. Northern Plains is dedicated to providing the information and tools necessary to give citizens an effective voice in decisions that affect their lives.

Northern Plains formed in 1972 over the issue of coal strip mining and its impacts on private surface owners who own the land over federal and state mineral reserves as well as the environmental and social impacts of mining and transporting coal. We have many members who

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Comment # (Issue Code)	Document #0019-Northern Plains Resource Council	Response

SEIS 0019

live and own ranches in the Colstrip area. Those members' livelihoods depend entirely on clean air and water, native soils and vegetation, and lands that remain intact.

Northern Plains and, in particular, its local members have been involved with the issues at Colstrip involving coal mining and the Colstrip Generating Plant (the destination of the coal mined at the Rosebud Mine) for more than 50 years.[1] This participation and the comments submitted on issues surrounding the projects at Colstrip were not only for those that OSMRE is responsible for but also to the Bureau of Land Management (BLM) concerning coal leases and coal lease modifications, the Environmental Protection Agency (EPA) concerning toxic coal ash contamination of the area's aquifers, the Montana Department of Environmental Quality (DEQ) and the Department of Natural Resources and Conservation concerning their responsibilities for permitting, monitoring, protecting, and preserving natural resources, especially water resources – the area's aquifers, springs, and surface waters as well as the water rights associated with those sources – and ensuring reclamation of lands following coal strip mining.

0019-1 (1300)

Northern Plains has repeatedly submitted detailed organizational comments and members have testified again and again at public hearings in all of these public processes. Northern Plains has initiated meetings with state and federal agencies on issues of concern in the Colstrip area in an attempt to find solutions to our concerns. Northern Plains has researched and prepared reports and presentations on the toxic coal ash contamination issues and the economic achievability of responsibly transitioning the Colstrip labor force from the mine and the aging and polluting coal-fired generation plants there to other, cleaner (less-polluting) energy industries. Because the coal at the Rosebud Mine is exclusively mined to use at the remaining Colstrip Generating Plants, the significant connected issues with the Colstrip Generating Plants cannot be divorced from coal mining at Area F of the Rosebud Mine.

0019-2 (1001)

In all our comments and work, we have repeatedly focused primarily on water resources, both surface waters and the aquifers that are critically important to area ranching operations. And, we have also long focused on ensuring that appropriate and sufficient reclamation – as promised by the Surface Mining Control and Reclamation Act (SMCRA) – is fully and adequately completed in a timely manner.

0019-3 (1300)

While we understand that the Court's decision in the 2022 case that resulted in this SEIS is focused on the four main issues listed above, we continue to believe that many of our original comments concerning aquifer depletion and contamination as well as reclamation remain valid. In this SEIS, OSMRE defers those issues to Montana DEQ as their responsibility. However, in the response to our comments on these issues submitted in 2018 to Montana DEQ on its Acceptability Determination for the proposed permit expansion into Area F (a connected action), the state essentially dismissed those concerns.

[1] Colstrip and the Rosebud Mine were first established in the early 1920s to supply bituminous coal for Northern Pacific Railway steam locomotives. The mine shut down and the town waned in the late 1950s when diesel locomotives were introduced. In the 1970s, Montana Power Company purchased the rights to the mine and the town and resumed mining operations with their plans to build coal-fired electrical generation plants on site to meet the Pacific Northwest's growing energy needs.

2

Comment Response 0019-1: Commenter's long history of participation in public involvement periods for Colstrip area NEPA and MEPA processes is noted.

Comment Response 0019-2: As disclosed in SEIS Chapter 1 under the heading, **Connected Actions**, OSMRE evaluated the project and the Colstrip Power Plant and determined that they are not connected actions. Although the Colstrip Power Plant is currently exclusively using coal from the Rosebud Mine, the power plant could purchase coal from other sources. Westmoreland can and has shipped coal (as recently as 2010) from the Rosebud Mine to other customers.

Comment Response 0019-3: Commenter's concerns related to the Colstrip-area aquifer (depletion and contamination) and reclamation of permit areas of the Rosebud Mine pursuant to the Surface Mining Control and Reclamation Act (SMCRA) are noted and were considered in the 2018 Final EIS and reevaluated in the SEIS analyses (see **Section 2.2.2, Existing Disturbance and Reclamation** and hydrology analyses in **Sections 4.7–4.9** and **5.3.6–5.3.8)**. OSMRE verified that Westmoreland Rosebud has no unabated or unremedied violations of SMCRA in the Applicant Violator System (AVS) for any permit areas of the Rosebud Mine. However, pursuant to ARM 17.24.1204, any person may request an inspection of the Rosebud Mine by submitting a signed statement, or an oral report followed by a signed statement, to DEQ giving the department reason to believe that a violation of the Montana Strip and Underground Mine Reclamation Act (MSUMRA) exists. Issues related to DEQ-oversight and noncompliance with SMCRA can also be raised through a Citizen Complaint to the OSMRE Field Office in Casper, Wyoming.

Comment # (Issue Code)	Document #0019-Northern Plains Resource Council	Response
	SEIS 0019	**Comment Response 0019-4:** See Comment Response 0019-3 (purpose and need/OSMRE's role). In response to the comment related to Signal Peak Energy's Bull Mountains Mine, this topic is beyond the scope of the SEIS .
0019-4 (1302)	Unfortunately, we have little faith in Montana DEQ – neither in their assessments of the depletion and harm to water resources nor in their enforcement of the law with regard to water quality and quantity degradation and depletion or in reclamation. Our experiences with that agency at Colstrip as well as at the Signal Peak Mine in the Bull Mountains and at other Montana coal mines have shown us that all the promises in the world have not averted, lessened, corrected, or mitigated the problems we have repeatedly raised and, subsequently, seen and experienced on the ground.	
0019-5 (1300)	To us, it seems clear that none of the federal or state agencies responsible for protecting the natural resources (especially the ground and surface waters) and the economic viability of the people who have lived on the land for generations are doing their job. Because all of these natural and human resources are in the way of industrial demand, the agencies are simply "passing the buck" back and forth and pointing fingers at their counterparts for responsibility.	**Comment Response 0019-5:** See Comment Response 0019-3 (purpose and need/OSMRE's role), Comment Response 0019-4 (OSMRE enforcement), and Comment Response 0029-41 (non-SMCRA permit violations).
0019-6 (6800)	As a case in point, it appears to us that there has been no baseline assessment of water quality and quantity in Area F, which is of great and obvious concern to us when it comes to any hope of enforcement in years to come. And, Section 4.7.3.1 of the SEIS states: "Based on Western Energy's groundwater model, the groundwater table will take more than 50 years after site reclamation to be reestablished (PAP, Appendix O). Presently, in areas reclaimed 40 years ago, the groundwater table in the spoil is still recovering. In addition, it may take hundreds of years for the bedrock (overburden and Rosebud Coal) aquifers to recover to near pre-mining conditions (Nicklin 2017)." During the public hearing on this project held in Colstrip on January 8, 2025, an OSMRE representative was specifically asked about this assessment. That representative responded that Montana DEQ is responsible for mitigation and is required to ensure water replacement.	**Comment Response 0019-6:** Please refer to Appendix 3 of the Final SEIS for a summary of the Area F baseline data for surface water and groundwater. The stated groundwater table recover times are for full recovery. As predicted by DEQ in the Area F CHIA, 90 percent recovery would occur 66 years after mining, and less than 5 feet of drawdown remaining 58 years after mining.
0019-7 (1302)	In the past, as OSMRE is well aware, Montana DEQ has not protected Montana's waters. For example, as a result of mining at Peabody Energy's Big Sky Mine (immediately south of the Rosebud Mine) when water at Miller Coulee Spring "recovered," the sulfate levels were 30 times the lethal level for cattle consumption (and killed some cattle); Montana DEQ's solution was to fence off the water. Even though the toxic coal ash ponds at Colstrip Generating Plants 3 & 4 were leaking 400,000 gallons of toxic water per day into the aquifer for nearly 40 years, the only reason Montana DEQ initiated clean-up measures was due to the loss of two lawsuits; their "solution" is to simply pump the polluted groundwater back into the holding ponds, a forever effort. It was only after local Colstrip resident Don Bailey sued Montana DEQ for allowing illegal discharges from the Peabody Energy's Big Sky Mine to drain down Lee Coulee and contaminate and ruin his hay meadows that any acknowledgement was finally given; he was simply compensated with a large monetary award. These are only a few local examples of how Montana DEQ is not fulfilling its legally mandated responsibilities to protect water resources.	**Comment Response 0019-7:** See Comment Response 0019-3 (purpose and need/OSMRE's role) and Comment Response 0029-41 (non-SMCRA permit violations). Peabody Energy's Big Sky Mine is no longer an active mine permit area and has been released from jurisdiction by DEQ following bond release for Phases I, II, III, and IV. The phases of bond release and the thresholds that must be met for their release are described in the 2018 Final EIS in **Section 1.6, Financial Assurance**. For Phase IV bond release to have been approved, "water supplies adversely affected by mining and reclamation operations must be replaced and must function in accordance with MSUMRA, its implementing rules, and the approved permit" and "the essential hydrologic functions and agricultural productivity on alluvial valley floors must be reestablished" among other requirements pursuant to ARM 17.24.1116(6)(d).
0019-8 (1302)	And, as OSMRE well knows, Northern Plains and its members have filed numerous citizen complaints about what Montana DEQ is ***not*** doing with regard to Signal Peak Energy's operations at the Bull Mountains Mine. That mine is currently impacting water quantity and quality in ground and surface waters of adjacent landowners, and those impacts and any replacement claims have been ignored or minimally dealt with – and then only after repeated complaints.	**Comment Response 0019-8:** See Comment Response 0019-4 (OSMRE actions for Signal Peak Energy's Bull Mountains Mine). Any alleged impacts on the Bull Mountains Mine are not relevant for the environmental impacts analysis at the Rosebud Mine.
	3	

Comment # (Issue Code)	Document #0019-Northern Plains Resource Council	Response
	SEIS 0019	
0019-9 (1300)	The point of raising these issues that are "beyond the scope" of Area F of the Rosebud Mine is that Northern Plains and its members living and ranching next to or near mining operations (and who were there long before industrial mining was initiated) have no confidence in Montana DEQ's ability or will to protect Montana resources or to protect the interests of the property rights and water rights of adjacent landowners or the general public. Our experience with all coal mining in Montana is that water quality is permanently damaged by mining even when – or if – the quantity recovers. So, for us, it appears that OSMRE is ignoring the "elephant in the room" by passing the buck on truly examining the actual and the connected and cumulative impacts that approving mining in Area F would mean. All OSMRE can do is point the finger at Montana DEQ and say "it is their job to take care of these things," despite the fact that that agency has a long track record of shirking or ignoring their regulatory responsibilities. In fact, on January 6th of this year, OSMRE issued a Ten-Day Notice (TDN) to Montana DEQ in response to a complaint submitted by Northern Plains concerning the Bull Mountains Mine. The complaint alleged that Montana DEQ had violated both SMCRA and the Montana Strip and Underground Mine Reclamation Act (MSUMRA), specifically as it pertains to the agency's failure to protect water resources as required by those Acts. The issuance of the TDN implies that OSMRE has "reason to believe" that Montana DEQ has violated the law. It is therefore insufficient for OSMRE to operate under the assumption that Montana DEQ will fulfill their obligations under the law when it comes to Area F of the Rosebud Mine.	**Comment Response 0019-9:** SMCRA requires operators to fully comply with all permit requirements, and OSMRE analyzed the anticipated environmental impacts of this project based on adherence to the terms and conditions of the mine permit approved by Montana DEQ. See also Comment Response 0019-3 (purpose and need/OSMRE's role).
0019-10 (1000)	In reviewing the numerous comments that our organization and members have submitted to the various state and federal agencies on all the issues related to the Rosebud Mine and the Colstrip Generating Plants, we despair. Each of the agencies concerned with their focused and particular piece of the whole only looks at that specific piece of the whole. What is the value in restating our same concerns – again – as those concerns are simply ignored and/or papered over, despite the fact that on-the-ground evidence shows our concerns to be valid? The purpose of an EIS (and SEIS) is to disclose all the information and fully analyze and evaluate that information so that the environmental consequences of a project are fully disclosed to the public and for consideration by decision makers. Those consequences (costs) are to be weighed against the benefits of the proposed project in the final analysis. While we continue to believe in this important public process, it is more and more evident to us that the significance of the costs are never truly weighed against the immediate and short-term benefits of the projects. Please ensure that our comments are entered into the public record.	**Comment Response 0019-10:** Federal and state agency decision making is governed by each agency's laws, including statutes, rules, and regulations that form the legal basis for the conditions that the project must meet to obtain necessary permits, approvals, or licenses. These laws also set forth the conditions under which each agency could deny Westmoreland Rosebud the necessary permits or approvals. The regulatory framework governing OSMRE's decisions are described in **Section 1.4, Agency Authority and Actions** in both the Draft and Final SEIS and the 2018 Final EIS.
0019-11 (6600)	**The Specific Issues Raised by the Court** Inadequate surface water cumulative impacts analysis The SEIS details in 4.7.3.1 that "[i]t is anticipated that under Alternative 4 (as for Alternative 2 in the 2018 Final EIS), the greatest impacts on surface waters would be: the loss of tributaries and upper McClure Creek within the mining footprint during mining; the loss of some existing springs and stock ponds within the mine disturbance boundary; and the reduction or	**Comment Response 0019-11:** OSMRE relied on the best available information to disclose the anticipated hydrology impacts at the Rosebud Mine. As noted in the Draft SEIS, **Section 4.9.3.3, Replacement Water Sources and Replacement Process**, SMCRA requires that Westmoreland Rosebud provide a suitable replacement water source, as needed, for water rights that become unusable as a result of mining.
	4	

Comment # (Issue Code)	Document #0019-Northern Plains Resource Council	Response
	SEIS 0019	
0019-11 continued (6600)	elimination of stream flows, spring flows, and water supply to stock ponds where the source of water is from the Rosebud and/or McKay Coal aquifers. As explained above, based on past experiences with coal mining in (and beyond) the Colstrip area, we expect that the surface water impacts in Area F will be much greater than described, and we doubt that any true mitigation or correction would occur. Any such actions would also likely require great effort on any affected landowner(s) part to ensure it happens.	
0019-12 (1001)	Inadequate greenhouse gas emissions analysis The greenhouse gases emitted by the Colstrip Generating Plant are of significant concern – and are a connected action – as this is the primary destination of almost all the Rosebud Mine coal. Colstrip Units 1 & 2 were shut down in 2022 due to non-compliance with air quality standards after years of lawsuit efforts. Colstrip Units 3 & 4 continue to operate but are more than 40 years old and often shut down due to constant maintenance issues. The emissions from those aging generation units rate as one of the worst (most polluting) remaining coal-fired generating plants in the nation. In December 2024, the Montana Supreme Court upheld the August 2023 ruling by District Judge Kathy Seeley that the State of Montana's failure to consider greenhouse gas emissions from energy and mining projects violates the state constitution because it does not protect Montanans' right to a clean and healthful environment and the state's natural resources from unreasonable depletion (*Held vs. Montana*). This significant decision means that the connected action – Rosebud Mine supplying coal to the Colstrip Generating Plants – **must** be more fully analyzed in this SEIS.	**Comment Response 0019-12:** See also Comment Response 0019-2. OSMRE has determined that the Colstrip Power Plant and the proposed action considered in the SEIS are not connected actions. The indirect effects to climate change due to combustion of Area F coal in the Colstrip Power Plant, including the Social Cost of greenhouse gases (GHGS), have been fully evaluated and were disclosed in the Draft SEIS for all alternatives. See **Section 4.4.3.2, Indirect Impacts (Climate Change)** and **Section 4.4.7, Social Cost of GHGs**.
0019-13 (6300)	The federal coal program is a significant contributor to the United States' greenhouse gas emissions. In fact, according to the U.S. Geological Survey, burning fossil fuels from federal lands is the single largest source of carbon pollution in the country, and 60% of those emissions come from federal coal. As the effects of climate change take hold in the Northern Great Plains and the West, our summers have become drier and our fire seasons longer and more destructive.	**Comment Response 0019-13:** Climate and emission trends at global, national, and state scales were described in **Section 3.4, Climate and Climate Change** of the Draft SEIS along with existing GHG emissions from the Rosebud Mine, Colstrip Power Plant, and Rosebud Power Plant. Impacts of the Proposed Action (Alternative 4) on global, national, and state emissions trends were disclosed in **Section 4.4.6** of the Draft SEIS and the social cost of GHGs were disclosed in **Section 4.4.7**. Cumulative impacts of climate change, including wildland fire were disclosed in **Section 5.3.3** of the Draft SEIS.
0019-14 (6300)	And these facts have led to an issue related to coal mining and emissions that is not fully or comprehensively dealt with in this SEIS – coal seam fires. These fires have not only destroyed hundreds of thousands of acres of ranch and range land in southeastern Montana in recent years (*e.g.*, the Richard Springs fire in the Colstrip area in 2021, the McGhee and Remington fires in the Tongue and Otter Creek areas of southeast Montana in 2024) but are also contributing to climate-changing emissions. These destructive and uncontrollable surface fires start when exposed coal seams are ignited by either lightning or other causes. In southeast Montana, more than 77% of the coal resources are owned by the federal government, which leases the coal to developers. But 83% of the surface is owned by private individuals who pay the price for this coal mining effect.	**Comment Response 0019-14:** Discussions of wildfire in the Final SEIS have been clarified and/or expanded, as needed, to include a discussion of coal seam fires, including in **Section 5.2, Past, Present, and Reasonably Foreseeable Future Actions**. Wildfire smoke, regardless of source, was already accounted for in the air quality modeling completed for the air quality analysis in the 2018 Final EIS. Pursuant to NEPA, Section 106(3)(B), attempting to calculate specific climate impacts due to uncertain and unpredictable coal seam fires would not be "essential to a reasoned choice among alternatives," and "the overall costs and time frame of obtaining it" would be "unreasonable."
	5	

Comment # (Issue Code)	Document #0019-Northern Plains Resource Council	Response
0019-14 continued (6300)	SEIS 0019 Coal seam fires are becoming bigger and more frequent. According to data obtained from the State of Montana, in the 11 years from 2000 to 2010, the Montana Department of Natural Resources and Conservation recorded 14 coal seam fires in seven counties in southeastern Montana. In the 11 years from 2011 to 2022, they've recorded 200 – a 1400% increase. As more coal seams are exposed to the elements because of coal strip mining, they become prone to ignition by lightning or other sources, and existing underground coal seam fires are able to spread to the surface. The SEIS does mention the 2021 Richard Springs Fire, which began in a coal seam and eventually burned 171,130 surface acres. However, OSMRE has failed to evaluate the role that coal strip mining plays in the ignition and spread of coal seam fires or the resultant climate-changing emissions. <u>Inadequate analysis of indirect effects of mine expansion on water withdrawals from the Yellowstone River</u> The Court determined that water withdrawals from the Yellowstone River must be considered in the environmental analysis because this water is required for coal combustion and are, thus, not beyond the scope of the impacts of coal mining in Area F. As an indirect effect of the proposed action, these water withdrawals "are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable." The Colstrip Generating Plant burns the coal to boil water to produce electricity, and that water – between 22,000 and 50,000 acre-feet – is withdrawn annually from the Yellowstone River. This water is piped more than 30 miles south of the Yellowstone River to the Colstrip Generating Plants.	
0019-15 (6800)	But, in order to use this water, the Colstrip Generating Plant had to obtain rights. It is our understanding that years ago, there were no available water rights for Yellowstone River water, so the company negotiated with the Crow Tribe to purchase water rights that they had in the Big Horn River (which flows into the Yellowstone River many miles east of the Colstrip intake). A key question we raise is what will happen to these purchased water rights (now controlled by the owners/operators of the Colstrip Generating Plant) if and when the Colstrip Generating Plant shuts down. Can the company market these water rights far beyond the area for profit to the corporation?	**Comment Response 0019-15:** See also Comment Response 0029-54. Key information on the referenced water right is available from the Montana Department of Natural Resources and Conservation (DNRC) Water Rights Query System. This surface water right (42KJ 94423-00) with a maximum flow rate of 69.27 cfs is sourced from the Yellowstone River and is used for industrial and municipal purposes. The water right is currently owned by seven entities including Avista Corporation, City of Colstrip, Northwestern Corporation, Pacific Power & Light Co, Portland General Electric Co, Puget Sound Power & Light Co, and Talen Montana LLC. The ultimate ownership and use of the water right is under DNRC jurisdiction and subject to the current owners' choices. Adjudicating water rights is not part of OSMRE's responsibility. **Sections 3.9.2, Existing Water Rights** and **4.9.3.4, Indirect Impacts, Water Rights** have been updated in the Final SEIS to incorporate this information.
0019-16 (6600)	As has been seen across the West, especially in the Colorado River basin in recent years, but also here in Montana and in the Pacific Northwest, climate change is affecting river flows. Not only is the amount of snow falling in the high country less than "normal," but when that snow falls and the timing of snow melt is changing. This affects the volume of water flowing in the streams and rivers. Because of climate change, our part of the country is drying, and one of the ultimate effects of this is the lack of water in our rivers. While smaller streams and rivers are the first to exhibit problems with flow volume, the Yellowstone River is not exempt. Primacy in water rights and the oncoming fights over who gets to use the water are going to become more prevalent. Water is a precious resource in this semi-arid region of the state. Ranchers and other residents who live in this area rely on surface waters for irrigation and agricultural production – producing food for our nation. Piping water from a major water source more than 30 miles to 6	**Comment Response 0019-16:** The SEIS **Section 4.7.3.3, Indirect Impacts, Surface Water Hydrology** analyzes indirect effects to the Yellowstone River considering a range of flow types (low, average, and peak) over a range of hydrologic year types (dry, average, and wet), which provides decision makers and the public with a robust understanding of potential indirect impacts on surface water hydrology under a wide range of circumstances. Pursuant to NEPA, Section 106(3)(B), attempting to calculate additional effects that may occur due to climate change would not be "essential to a reasoned choice among alternatives," and "the overall costs and time frame of obtaining it" would be "unreasonable."

Comment # (Issue Code)	Document #0019-Northern Plains Resource Council	Response
	SEIS 0019	**Comment Response 0019-17:** As defined in the DOI *NEPA Handbook*, Section 6.1(t), reasonable alternatives mean a reasonable range of alternatives that are technically and economically feasible, meet the purpose and need for the proposed action, are within the jurisdiction of the bureau, and, where applicable, meet the goals of the applicant. The alternatives presented in the SEIS represent a spectrum of possible impacts and are intended to help OSMRE and the ASLM make an informed decision.
0019-16 continued (6600)	support the combustion of the most climate-changing, detrimentally polluting source of energy production is not rational. This is a critical piece in this complicated puzzle of how we are using our nation's natural resources. In our opinion, use of the Yellowstone River water is not fully examined with the long-view of where our climate is going. As our region dries, this major water resource is going to become more important and critical to all the multitude of uses not tied to an antiquated energy production facility.	
0019-17 (2000)	Failure to analyze a reasonable range of alternatives in violation of NEPA We no longer know what a "reasonable range of alternatives" is. When the option is between "no action" – which is never chosen – and a series of alternatives that all have some degree of the same impact and when there is never any true prevention of harm or mitigation if harm occurs, it is truly a Hobson's choice.	**Comment Response 0019-18:** Trends in U.S. coal production (as compared to production data used in the 2018 Final EIS) were disclosed in the Draft SEIS. Please see SEIS **Section 3.4.2.1, Climate and Emission Trends, Coal Production**. Similarly, SEIS **Section 1.2.2.1, Colstrip Power Plant** discloses ownership changes and describes the legislation from Oregon and Washington that has impacted the ownership of and market for power from the Colstrip Power Plant. See also Comment Response 0029-37 (reasonable assumptions about future operation of the power plant).
	Conclusion The proposed expansion of the Rosebud Mine into Area F has been acknowledged to only extend the operational life of the mine by eight (8) years. A 2018 Montana Legislative Services Division study completed for the Montana Environmental Quality Council (at the request of the 2017 Montana Legislature) confirms what has been apparent to many for years, "Coal-fired power generation is in decline as inexpensive natural gas and cheaper renewables fuel more electricity production."	
0019-18 (1103)	The Colstrip Generating Plant, which burns 85% of the coal mined at the Rosebud Mine was, at the time the original EIS was written, majority owned by entities in the states of Washington and Oregon. Both states have divested (or will divest) themselves of ownership in the Colstrip Generating Plant due to concerns about the use of coal to generate electricity and the resulting climate-changing emissions. These states are purchasing rights to wind-powered electric generation facilities in Montana and elsewhere.	**Comment Response 0019-19:** Thank you for your comment; natural gas and renewable energy markets are beyond the scope of analysis for the SEIS. See also Comment Response 0019-18.
0019-19 (7404)	As less and less coal is used for electrical generation and as more and more electricity entities and customers are switching to natural gas and renewable energy sources, there is less reason to permit new coal mines – or expand old ones. The change in energy sources and use will continue across the nation, and mine workers and communities need to begin planning for the transition.	**Comment Response 0019-20:** Thank you for your comments. **Table 2.2-4** of the Final SEIS discloses the phased bond releases by area, which is an indication of the reclamation performed.
0019-20 (6800)	This proposed mine expansion would permanently remove the Rosebud coal aquifer - an aquifer that currently sustains working ranches, which are also part of the area's economic base. The proposed mine expansion, if granted, ignores the lack of significant reclamation at the current mine. As one of the stewards of our public resources, OSMRE has an obligation to protect the water resources of this area as it is evidenced that the state agency charged with this task is not doing its job. OSMRE, as well, must ensure that reclamation of the Rosebud Mine proceeds in a faster manner than it currently is happening as the state agency charged with this	**Comment Response 0019-21:** See also Comment Response 0029-44 (reclamation of the hydrologic balance). Regarding the status of reclamation at the Rosebud Mine, Westmoreland Rosebud submits an Annual Mining Report for Area F to DEQ pursuant to its operating permit (OSMRE receives a copy) showing progress pursuant to its approved Reclamation Plan. The most recent report available for the SEIS covered mining, disturbance, and reclamation through December 2023; SEIS **Table 2.2-4** updated the reclamation and bonding numbers provided in **Table 5** in the 2018 Final EIS. Of note, Permit Area E has been reclaimed completely since 2018. The numbers presented in **Table 2.2-4** are not static, and Westmoreland continues to both disturb and reclaim the permit areas that make up the Rosebud Mine.
0019-21 (1202)		
	7	

Comment # (Issue Code)	Document #0019-Northern Plains Resource Council	Response
0019-21 continued (1202) **0019-22 (2100)**	SEIS 0019 task is not doing its job. Reclamation is required and must be completed in order to fulfill legal mandates under SMCRA. Northern Plains urges OSMRE to re-evaluate granting the Rosebud Mine the right to mine coal in Area F and to deny this expansion of the mine. Thank you for considering our comments. Sincerely, Edward Barta Chair, Northern Plains Resource Council cc: Montana Department of Environmental Quality 8	**Comment Response 0019-22:** Commenter's preference for Alternative 1 (No Action) is noted; the rationale provided for this preference will be considered by the decision maker.

Comment # (Issue Code)	Document #0029-Shilo Hernandez, Earthjustice	Response

SEIS 0029

EARTHJUSTICE

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January 21, 2025

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Re: Rosebud Mine Area F Mining Plan Modification SEIS

To whom it may concern:

Please accept the following comments on behalf of the Montana Environmental Information Center, Sierra Club, and Western Environmental Law Center (Conservation Groups). The Conservation Groups urge OSM to carefully analyze the issues addressed below and select either the no action alternative or the partial mining alternative. They are the ethically, economically, and environmentally preferable options. OSM cannot justify selecting the continued mining alternative (Alternative 4).

0029-1 (2201)

Comment Response 0029-1: Commenter's preference for Alternative 1 (No Action) is noted; the rationale provided for this preference will be considered by the decision maker.

I. SOCIAL COST OF GHGS

Please explain how the agency can justify greenlighting coal mining within Rosebud Area F when—based on the agency's own analysis—the costs to the public from such mining dwarf the public benefits. OSM estimates that the costs to society from direct and indirect greenhouse gas (GHG) emissions for the preferred alternative would total between $32 to $79 billion dollars. DSEIS at 4-35. However, with respect to social and economic benefits, OSM calculates that the mine will provide only about $177 million in annual economic output within the region and about $52 million per year in revenues for the federal, state, and local governments. *Id.* at 4-139. In other words, the public costs dramatically outweigh the public benefits.

0029-2 (6300)

Comment Response 0029-2: As discussed in SEIS **Section 1.4, Agency Authority and Actions**, OSMRE, in accordance with 30 CFR 746.1 through 746.18, reviews DEQ's approval of State Operating Permit C2011003F, considers other applicable Federal laws and information, and recommends approval, disapproval, or conditional approval of the mining plan modification to the DOI ASLM. OSMRE's rationale for the preferred alternative is provided in **Section 2.8.1** of the Final SEIS. The DOI ASLM will have several considerations when making a decision regarding the Federal mining plan modification, including the potential for a "taking" and direction in recent Executive Orders (EO), including EO 14154, *Unleashing American Energy*, EO 14156, *Declaring a National Energy Emergency*, and EO 14261, *Reinvigorating America's Beautiful Clean Coal Industry and Amending Executive Order 14241.*

In light of these numbers, please explain how permitting Area F can be characterized as anything but arbitrary and capricious agency action.

Please also explain how a decision is compatible with the Montana Supreme Court's recent holding that "climate change is a serious threat to [Montanans'] constitutional guarantee of a clean and healthful environment in Montana." *Held v. State*, 2024 MT 312, ¶ 36.

0029-3 (1102)

Comment Response 0029-3: Montana's constitutional provision for a clean and healthful environment applies to decisions made by the state of Montana and by state agencies. The scope of the SEIS is limited to federal decision making and specifically to the ASLM's decision regarding the federal mining plan modification. See **Section 1.4, Agency Authority and Actions** in the SEIS and in the 2018 Final EIS for a discussion of state and federal decision-making responsibilities and authorities.

Comment # (Issue Code)	Document #0029-Shilo Hernandez, Earthjustice	Response

SEIS 0029

II. ECONOMIC AND SOCIAL IMPACTS

0029-4 (7400)

OSM's analysis of economic and social impacts suffers from numerous deficiencies. First, the economic and social benefits analysis that OSM relies on assumes that the Colstrip and Rosebud power plants will "continue to operate as long as the mine is producing coal." DSEIS, App'x 2 at 7. It is not clear whether this is a reasonable assumption. Indeed, OSM elsewhere admits that it is "unclear how the Colstrip Power Plant will comply with the new MATS" requirements, and that Colstrip may be forced to "close the remaining two units (Units 3 and 4)." DSEIS at 3-6. This is particularly important because OSM's DSEIS recently admitted that, due to circumstances the agency failed to foresee in its 2018 EIS, Colstrip Units 1 and 2 closed in 2020, which meant the the agency's 2018 EIS "overestimate[d]" the socioeconomic benefits of mining coal from Rosebud Area F. DSEIS at 4-136.

Thus, OSM should explain and justify its assumption that the Colstrip and Rosebud power plants will continue operating until closure of the Rosebud mine.

Comment Response 0029-4: See Comment Response 0029-37 (reasonable assumptions in lieu of complete information). The language regarding Units 3 and 4 has been removed from **Section 3.3.1.1, Regulatory Framework** to clarify the assumptions used in the SEIS analysis.

OSM also states that, regarding its analysis of the socioeconomic benefits associated with mining at Rosebud Area F:

> The analysis in this EIS assumes, based on information from Westmoreland, that employment and annual coal production would remain the same through the end of mine life under any alternative. It should be noted that ceasing production in Area F earlier than 2039 (either 2025 under Alternative 1 or 2030 under Alternative 5), would cause Westmoreland Rosebud to shift mining operations to other approved permit areas, such as Area B, potentially leading to increased production rates for those permit areas and potential closure of the Rosebud Mine earlier than 2045; however, the sequence of events and mine production rates in this scenario are uncertain.

0029-5 (7400)

4-137. In light of this statement, please:

1. Provide the "information from Westmoreland" upon which OSM bases its assumption that employment and annual coal production would remain the same through the end of the mine life under any alternative.

2. Explain OSM's assumption that Westmoreland could mine the exact same amount of coal annually without mining within Area F.

Comment Response 0029-5: BLM estimates there are sufficient leased coal reserves within the Federal subsurface mineral estate to meet forecasted production levels (112.5 million tons) at the Rosebud Mine through 2060 (BLM 2024a); however, not all of the Federal coal is currently permitted. Westmoreland estimates that it could maintain current production levels for approximately 18 months without Area F coal (Wooley 2024) using currently permitted areas. Beyond that timeframe, there is uncertainty regarding production capacity. Westmoreland estimates that production capacity from the Rosebud Mine could drop as much as 50 percent without Area F based on currently permitted areas (Wooley2024). Westmoreland has indicated that "if mining in Area F must cease, Westmoreland will be forced to reassign both draglines currently in reclamation to uncovering coal" in other permit areas (Wooley 2024). For analysis purposes, OSMRE needed to make certain reasonable assumptions considering incomplete or uncertain information. In the SEIS, the Rosebud Mine is assumed to continue operations through 2045, regardless of the status of Area F. See also Comment Response 0029-37 (reasonable assumptions in lieu of complete information).

0029-6 (1101)

3. Explain the urgency of permitting coal mining within Area F if—taking this statement at face value—Westmoreland Rosebud could mine the same amount of coal and provide the same socioeconomic

Comment Response 0029-6: See Comment Response 0029-5.

2

Comment # (Issue Code)	Document #0029-Shilo Hernandez, Earthjustice	Response
	SEIS 0029 benefits in the near-term even if mining within Area F was *not* permitted.	**Comment Response 0029-7:** Referenced language (4-142) was in **Section 4.13, Environmental Justice**. Pursuant to EO 14154, *Unleashing American Energy* (January 20, 2025) and a Presidential Memorandum*, Ending Illegal Discrimination and Restoring Merit-Based Opportunity* (January 21, 2025), **Section 4.13, Environmental Justice** is no longer needed in the SEIS and has been removed. Regarding the statement that production would be moved to other permit areas of the mine if mining in Area F ceases, a reference (Wooley 2024) has been added to the SEIS in other sections where this is discussed. For example, see **Section 2.2.6, Life of Operations.**
0029-7 (2102)	Please also explain OSM statement that, under the No Action alternative, mine closure would "likely be earlier than 2045 since other permit areas would need to increase production to compensate for lost production in Area F." DSEIS at 4-142. Please provide factual support for the agencies assumption that other permit areas could not support continued coal mining until 2045.	
0029-8 (7404)	Further, please explain OSM's statement that the preferred alternative would "delay the onset of the adverse impacts discussed under the No Action alternative …, possibly allowing time for other sectors such as agriculture and renewable energy projects to develop and mitigate some of the effects of its closure." DSEIS at 4-142. Is it rational for the agency to rely on a vague "possibl[e]" future solution to mitigate impacts of mine closure on the region? Rather than kicking the can on community socioeconomic transition from coal mining, OSM should seek to mitigate impacts of mine closure by examining mitigation measures in the form of a community transition plan away from coal mining.	**Comment Response 0029-8:** See Comment Response 0029-7. Additionally, the development of a community plan to transition away from coal mining is not within the scope of this environmental analysis.
0029-9 (6000)	**III. FISH AND WILDLIFE** OSM's review of indirect impacts on fish and wildlife from coal combustion at the Colstrip and Rosebud power plants, as well as from water withdrawals from the Yellowstone River by the Colstrip Power Plant is flawed in several respects.	**Comment Response 0029-9:** Responses to comments regarding indirect effects analyses in the SEIS are addressed below in response to resource-specific comments. Importantly, on May 29, 2025, the Supreme Court issued a unanimous decision in *Seven County Infrastructure Coalition v. Eagle County*, Colorado, 145 S. Ct. 1497 (2025) (*Seven County*), holding that an agency is entitled to "substantial deference" in determining when an EIS has complied with NEPA "[s]o long as the EIS addresses environmental effects from the project at issue," and that NEPA does not require an agency to evaluate the environmental effects of activities separate in time or place from the agency's proposed action.
0029-10 (3601)	First, OSM limited its indirect effects analysis area regarding impacts to surface waters to below the Cartersville Dam "because it is a barrier to fish passage and likely precludes pallid sturgeon above the dam." DSEIS 4-53. However, it is nonsensical for OSM to limit consideration of indirect impacts to *all* species simply because the pallid sturgeon may not be present in those areas. OSM must consider indirect impacts to *all* areas impacted by coal combustion at the Colstrip and Rosebud power plants and from the Colstrip power plant's water withdrawals from the Yellowstone River, including areas above the Cartersville Dam.	**Comment Response 0029-10:** The upstream extent of the indirect effects analysis area on the Yellowstone River was expanded from Cartersville Dam upstream to the location of the Colstrip Power Plant diversion near the confluence of Armells Creek and the Yellowstone River. Indirect effects analyses have been updated in the Final SEIS to reflect this change.
0029-11 (7200)	Second, while OSM acknowledges that "combined background levels and expected deposition for chromium, lead, and mercury exceed the impacts to fish and wildlife from chromium, lead, and mercury exceed … ecological screeding values" for birds," the agency sweeps these impacts under the rug because the Colstrip and Rosebud Power Plant emissions are "minor … over the long term." DSEIS 4-120. Similarly, the agency acknowledges that "for mammals, the combined background levels and 3	**Comment Response 0029-11:** Trace metal concentrations and ecological screening values for birds and mammals are disclosed in **Table 4.12-2** in the Draft SEIS, **Section 4.12.3.2, Indirect Impacts; Birds** and **Table 4.12-3** in the Draft SEIS, **Section 4.12.3.2, Indirect Impacts; Mammals**. **Tables 4.12-2** and **4.13-3** disclose and quantify the background concentrations, total deposition over the period of operations, total expected concentrations (background + deposition), ecological screening value, percentage of deposition relative to background, and percentage of deposition relative to ecological screening value. (response continued on next page)

Comment # (Issue Code)	Document #0029-Shilo Hernandez, Earthjustice	Response

0029-11 continued (7200)

expected deposition for antimony and chromium exceed the ecological screening values" for mammals but dismisses such impacts for the same reason. *Id.* OSM must meaningfully evaluate and disclose the resulting cumulative impacts on birds and mammals.

0029-12 (6600)

Astoundingly, OSM's indirect effects analysis regarding indirect impacts to surface waters appears to omit any discussion of impacts on fish and other aquatic life. DEQ must conduct an indirect-effects analysis for fish and other aquatic life. *See id.*

IV. SPECIAL STATUS SPECIES IS FLAWED

0029-13 (7200)

OSM's review of impacts on special status species is insufficient, first, because OSM improperly tiered its analysis of impacts on the northern long-eared bat, pallid sturgeon, monarch butterfly, and western regal fritillary to the agency's biological assessment, which the agency has not provided for public review. DSEIS at 6-2. This omission is particularly egregious because OSM's 2018 EIS for the Area F expansion was found unlawful, in part, due to the agency's decision to unlawfully tier to a document not provided to the public. OSM *must* provide its biological assessment to the public for review and initiate another public review and comment period on the agency's DSEIS.

0029-14 (1005)

A. Northern Long-eared Bat

OSM's analysis regarding direct impacts to the northern long-eared bat, listed as endangered under the Endangered Species Act (ESA) is also flawed because the agency concluded—without citation—that "[n]o northern long-eared bat populations have ever been documented within the direct or indirect analysis areas…." DSEIS at 4-125. However, at least one recent survey has found and recorded the sound of long-eared bats within Area F. (Robbins analysis attached) This finding is particularly concerning because OSM has found that, if northern long-eared bats were in the area, "potential direct effects could include loss of foraging and roosting habitat due to vegetation removal and indirect effects from power-plan emissions impacts on vegetation." DSEIS at 4-125. About 4,288 acres of vegetation would be removed during mining. *Id.*

0029-15 (7200)

OSM analysis of indirect impacts to the northern long-eared bat suffers from the same flaw, which the agency must correct. *See* 4-125. Moreover, OSM failed to rationally consider the cumulative impacts on bats from selenium deposition from coal combustion at the Colstrip and Rosebud Power plants. OSM admits that "a portion of Powder River County falls within the indirect effects analysis area," DSEIS 4-130, which "is included in the area of influence for the northern long-eared bat…," *id.* OSM next asserts that coal combustion at the Colstrip and Rosebud Power plants "would only be a small percentage of the total concentrations," and "the indirect effects from power plant emissions on vegetation that could provide habitat for this species would likely be minor." DSEIS at 4-130. However, OSM

0029-16 (7202)

Comment Response 0029-11 Continued: The cumulative effects discussion in **Section 5.3.11** has been updated to reference **Tables 4.12-2** and **4.12-3** and clarify that additional sources of trace metals could contribute to cumulative effects. As noted above, cumulative effects are no longer required by any regulation or guidance. OSMRE decided to not substantially revise this SEIS to remove the cumulative effects analysis because a draft of this NEPA analysis containing this unnecessary and excessive information was already published for public comment, it ensures compliance with the Court's order in *Montana Environmental Information Center* (even though that order preceded *Seven County*), and removal of the unnecessary material would be an inefficient use of agency resources and cause unnecessary delay given the complexity of the analysis, especially in light of the need to quickly address the Nation's energy supply (see, e.g., EO 14156, "Declaring a National Energy Emergency").

Comment Response 0029-12: Indirect effects on aquatic species (fish, amphibians, and aquatic invertebrates) were disclosed in the Draft SEIS **Section 4.12.3.2, Indirect Impacts, Fish and Wildlife Resources**. No related changes were made to the Final SEIS narrative.

Comment Response 0029-13: OSMRE disclosed that it was engaged in Section 7 consultation with the U.S. Fish and Wildlife Service (USFWS) in the Draft SEIS but did not tier to the document as suggested by the comment. The BA was completed on May 15, 2025; the 2025 Final BA and USFWS concurrence letter are included in the SEIS in Appendix 7 – ESA Section 7 Consultation Documentation.

Comment Response 0029-14: The 2024 BA was a draft when the Draft SEIS was issued, and OSMRE was actively consulting with the USFWS regarding the BA's findings pursuant to Section 7 of the Endangered Species Act. The 2024 BA was erroneously referenced as a final document. OSMRE has provided the 2025 Final BA in SEIS Appendix 7 – ESA Section 7 Consultation Documentation.

Comment Response 0029-15: The Final SEIS has been revised to clarify that no direct effects on northern long-eared bat are expected because the project area is not within the mapped range of the species. The audio recordings cited by the commenter (Robbins 2019) were provided to the USFWS, which subsequently provided the report to MNHP staff. MNHP staff conducted a review of these existing echolocation data recordings for four sites within 62 miles (100 kilometers) of the project area. MNHP found that the acoustic data provide no convincing evidence that would support a reasonable conclusion that the species was present in the area of interest during the time these data were collected. MNHP also found that northern long-eared bats are unlikely to occupy the project area as the project area lacks suitable habitat and connectivity to occupied and potentially occupied habitat (Bachen and McEwan 2025).

Comment Response 0029-16: See Comment Response 0029-11 above. The cumulative effects discussion in **Section 5.3.12** has been updated to reference **Tables 4.12-2** and **4.12-3** and clarify that additional sources of trace metals could contribute to cumulative effects.

Comment # (Issue Code)	Document #0029-Shilo Hernandez, Earthjustice	Response
	SEIS 0029 entirely failed to consider or evaluate the *cumulative* impacts of elevated selenium levels on northern long-eared bats from selenium deposition from the power plants in conjunction with other sources of selenium pollution. OSM must correct this oversight. **B. Pallid Sturgeon** The DSEIS also makes numerous errors in its analysis of impacts to pallid sturgeon. First, OSM limited the indirect effects analysis area to below the Cartersville Dam "because it is a barrier to fish passage and likely precludes pallid sturgeon above the dam." DSEIS 4-53; *id.* at 4-67–4-68. However, elsewhere, OSM admits that "sturgeon can navigate upstream over the [Cartersville Diversion Dam] during some flow conditions," DSEIS at 3-77, and that "migration over the [Cartersville Diversion Dam] was documented in 2024," *id.* at 3-79. OSM's two statements are incompatible. Having acknowledged that sturgeon can and do navigate over the Cartersville Dam, it was improper for OSM to limit its analysis of indirect impacts to pallid sturgeon to impacts occurring only downstream of the Cartersville dam on the basis that sturgeon migration of the dam was "likely preclude[d]." Accordingly, OSM's indirect effects analysis must also consider impacts upstream of the Cartersville Dam. This includes consideration of indirect impacts to pallid sturgeon *both* from decreases in water quality caused by coal combustion from the Colstrip and Rosebud power plants *and* from water withdrawals by the Colstrip Power Plant.	
0029-17 (4201)		**Comment Response 0029-17:** Pursuant to consultation with the USFWS, the upstream extent of the indirect effects analysis area was expanded upstream in the BA to the location of the Colstrip Power Plant diversion based on the information that a sturgeon had been documented in the Yellowstone River upstream of Cartersville Diversion Dam. While drafts of the BA contained this expanded analysis area, the Draft SEIS was not updated because consultation was still ongoing. The Final SEIS has been updated with the expanded indirect analysis area that includes the reach of the Yellowstone River between the point of diversion and the Carterville Dam. Similarly, the indirect effects analysis in the Final SEIS has been updated to be consistent with the BA.
0029-18 (7200)	Second, even within its underinclusive indirect effects analysis area, OSM's analysis exhibits flaws. First, OSM improperly dismissed indirect effects to pallid sturgeon from water withdrawals by the Colstrip Power Plant because "[t]he amount of water diverted … is insignificant in comparison to daily fluctuations that occur in the Yellowstone River in the vicinity of the diversion." DSEIS at 4-68. OSM also dismissed impacts to pallid sturgeon from Area Fs "eliminat[ion] of all perennial, intermittent, and ephemeral streamflow that originates from the from the 22-square-mile" mine-disturbance area because corresponding effects "on Yellowstone River surface water hydrology would be negligible." *Id.* at 4-69. However, OSM failed to consider the cumulative impacts of the Colstrip Power Plan withdrawals *in conjunction* with impacts from the mine's elimination of streamflow within the mine disturbance area. *See id* at 4-68–4-69. Moreover, OSM's streamflow impacts analysis entirely fails to consider reductions to water flow caused by climate change. *See id.* OSM must correct these oversights.	**Comment Response 0029-18:** As disclosed in **Section 4.7.3.3, Indirect Impacts, Surface Water Quality**, the diversion associated with Colstrip Power Plant withdraws 69 cfs, and the average reduction in the Yellowstone River associated with the decreased streamflow in the Armells Creek watershed was estimated to be 0.3 cfs. Based on the response to Comment 0030-5 (6600), the surface water analysis may be updated, but likely this number will not change substantially. With day-to-day fluctuations in the Yellowstone River calculated to be 541 cfs on average, any change to the hydrograph in the Yellowstone River would not be discernable and would not result in measurable effects on sturgeon at any life stage. The analysis included in the Draft SEIS is also described further in the BA and supports the finding of negligible effects on pallid sturgeon.
0029-19 (7202) **0029-20 (7200)**		**Comment Response 0029-19:** See Comment Response 0029-18. If the reductions in flow in the Yellowstone River from the diversion and from the reductions in streamflow in Armells Creek watershed are combined to equal 69.3 cfs on average, the resulting change in the Yellowstone River would still be minimal in comparison to the daily fluctuations in the Yellowstone River and would not be discernable. Effects on pallid sturgeon would be negligible. **Comment Response 0029-20:** Regarding climate impacts on streamflow in the Yellowstone River, impacts of climate change were described in the BA and have been pulled into the Final SEIS (**Table 5.3 11, Special Status Species: Summary of Cumulative Effects**). See also Comment Response 0019-16.
0029-21 (7202)	Third, OSM similarly failed to consider the above-described impacts to stream flows in conjunction with corresponding diversions from other water rights holders. While the agency stated that the Colstrip diversions "would not adversely affect other water rights within the indirect effects analysis area," it did not consider whether such diversions, combined with the above-described impacts, might cause adverse impacts to pallid sturgeon. OSM must consider all potential impacts from various 5	**Comment Response 0029-21:** Water has been diverted to supply the Colstrip Power Plant for many decades in conjunction with the other diversions, and only accounts for 5 percent of the maximum diversion potential and less than 1 percent of the flows in the Yellowstone River. Continuing to divert this water in conjunction with the other water rights would not have foreseeable effects on pallid sturgeon. Many of the water rights are associated with diversions to support agriculture, which are referenced in **Table 5.3-7**).

Comment # (Issue Code)	Document #0029-Shilo Hernandez, Earthjustice	Response
	SEIS 0029	**Comment Response 0029-22:** As stated in the SEIS (**Section 4.7.3.2, Indirect Impacts, Surface Water Quality**), percent mercury deposition from the power plants is less than 3 percent of all mercury deposition at that location from all atmospheric sources, and the Yellowstone River is approximately 25 miles away from the power plants, indicating that mercury deposition would decrease over that distance. Any mercury reaching the Yellowstone River would also be immediately diluted from the high flows there. Stating that any effects would not be measurable was intended to convey that any contribution of mercury to the Yellowstone River from the power plants through atmospheric deposition would be so minimal based on the factors discussed and compared to what is contributed from other sources that it would not cause any detectable increase in mercury concentrations in the Yellowstone River if measured. This indicates that effects on mercury deposition on mercury concentrations in surface water or mercury concentrations in pallid sturgeon tissues in the Yellowstone River would not be significant, leading to the conclusion that there would be no indirect effects on pallid sturgeon.
	causes of diminishing surface waters on pallid sturgeon in its cumulative effects analysis.	
0029-22 (7200)	Fourth, OSM improperly dismissed impacts to pallid sturgeon from mercury deposition from coal combustion at the Colstrip and Rosebud powerplants on the basis that "the effects of mercury deposition from the two power plants are not expected to be measurable compared to worldwide atmospheric deposition sources to the Yellowstone River." DSEIS at 4-130. Please explain what it means to not be measurable "compared to" worldwide atmospheric deposition sources. Does OSM mean that such impacts would not be "significant?" Moreover, it appears OSM has not examined impacts to pallid sturgeon from the combination of mercury deposition from the Colstrip and Rosebud power plans *and* worldwide atmospheric deposition sources. Please confirm if that is the case—and if OSM has *not* considered the cumulative impacts to pallid sturgeon of mercury deposition from all deposition sources, it must do so.	
0029-23 (7202)		**Comment Response 0029-23:** Extensive air quality and trace metal deposition modeling was conducted for the 2018 Final EIS. As no indirect effects are expected to occur to pallid sturgeon based on mercury deposition associated with the power plants, cumulative impacts to pallid sturgeon from atmospheric deposition from other sources were not analyzed further.
	C. **Monarch Butterfly**	
0029-24 (7200)	OSM provides very little information regarding impacts on monarch butterflies. Instead, OSM concludes that "direct impacts on adult monarch butterflies are unlikely because of the mobility of this species." DSEIS at 4-126. To the extent OSM suggests that the agency may disregard the displacement impact that mining at Area F will have on the monarch butterfly, this conclusion is incorrect. OSM must consider the displacement impact of mining on monarch butterflies.	**Comment Response 0029-24:** As stated in the SEIS, direct effects on monarch butterflies will be avoided because clearing and grubbing activities will occur from September 1 through June 1, avoiding the monarch butterfly active season from June through August.
0029-25 (7200)	OSM also states that the effects of mining at area F will be negligible overall because the total loss of potential monarch habitat … is a relatively small part of the species range; noxious weeds would be controlled and managed to reduce their spread; and seed mixes used during revegetation efforts would include flowering plants and milkweed." DSEIS at 4-126. However, OSM provides no analysis to support its summary conclusions or the efficacy of the mitigation measures it requires. *See id.* Without such analysis, it is impossible for the public to examine and comment on the agency's conclusions. OSM must provide analysis, not just summary conclusions.	**Comment Response 0029-25:** As stated in the SEIS, the loss of potential monarch habitat (4,288 acres) would be less than 0.4 percent of the analysis area and would be an insignificant part of the species overall range, which includes most of North America. Westmoreland Rosebud has a Noxious Weed Control Plan for active permit areas of the Rosebud Mine, which has been approved by the Rosebud County Weed Board in accordance with the Montana County Noxious Weed Control Act, Sections 7-22-2101 through 7-22-2153, MCA, as amended. The purpose of the plan is to control the existing population and prevent new establishment of noxious weeds on all lands within the project area until Phase IV bond release. See also **Section 2.4.4.9, Noxious Weed Control** in the 2018 Final EIS. The seed mixes to be used in Area F are in **Appendix C** of the 2018 Final EIS and include perennial forbs and shrubs that provide nectar sources for monarchs and other butterflies.
0029-26 (7202)	Additionally, OSM dismisses impacts on monarch butterflies from selenium deposition from coal combustion at the Colstrip and Rosebud Power Plants because selenium contributions "would only be a small percentage of the total concentrations." DSEIS at 4-130. OSM appears not to have considered impacts to monarch butterflies from selenium depositions from the Colstrip and Rosebud Power Plants *cumulatively* with other sources of selenium depositions. OSM must do so.	**Comment Response 0029-26:** See Comment Response 0029-11 above. The cumulative effects discussion in **Section 5.3.12** has been updated to clarify that additional sources of trace metals could contribute to cumulative effects.
	6	

Comment # (Issue Code)	Document #0029-Shilo Hernandez, Earthjustice	Response
	SEIS 0029	
	V. OSM'S UNLAWFUL REVIEW OF IMPACTS TO SURFACE WATERS	**Comment Response 0029-27:** See Comment Response 0029-10.
0029-27 (3601)	Judge Waters' 2022 Order finding OSM's 2018 EIS unlawful found that the agency violated NEPA when it refused to analyze the indirect effects of the mine expansion on water withdrawals from the Yellowstone River. While OSM's DSEIS purports to examine such impacts, it's analysis is flawed because OSM arbitrarily limited the indirect effects area only to "the Yellowstone River from Cartersville Dam … downstream to the confluence of the Tongue River." Draft SIES at 4-53. OSM justifies analyzing only indirect impacts downstream from the Cartersville dam because the dam "is a barrier to fish passage and likely precludes pallid sturgeon of the dam." *Id.* It is arbitrary for OSM to limit its NEPA analysis of indirect impacts from Yellowstone River diversions only to areas OSM believes to be occupied by pallid sturgeon: OSM must consider *all* environmental impacts from the Yellowstone River diversions, not just those in areas used by pallid sturgeon.	
0029-28 (6600)	OSM's analysis of impacts on water resources suffers from numerous other flaws. First, OSM's indirect effects analysis was arbitrary because it restricted its air quality modeling—intended to examine potential effects of atmospheric deposition of pollutants from the Colstrip and Rosebud Power plans on stream water quality within the indirect effects analysis area—to examining only mercury, selenium, and copper. *Id.* In doing so the agency refused to evaluate other metals "because the deposition areas for antimony, arsenic cadmium, chromium, and lead were predicted to be very small." However, it is unclear from OSM's draft EIS whether actual *levels* of these metals were low, or whether—within the small "deposition areas"—levels of such metals would be high enough to impact the environment. Moreover, OSM further justifies its decisions to limit its analysis to mercury and selenium because "the most stream water quality data were available in the analysis area" for those metals. *Id.* However, to the extent OSM decided to restrict air quality modeling to mercury and selenium simply because more water quality analysis for those metals were available, this decision makes no sense. OSM should conduct air quality modeling for the other metals identified by OSM *precisely because* fewer water quality data had been collected. It is inappropriate for OSM to turn a blind eye to impacts from other metals simply because the agency had *already* failed to examine such metals.	**Comment Response 0029-28:** The referenced statements included in the 2024 Draft SEIS were not altered from what was originally included in the 2018 Final EIS. Air quality modeling of coal combustion emissions and deposition was completed for all eight metals listed in the comment as described in **Section 4.3.3.2, Indirect Impacts of Coal Combustion**. Indirect effects analysis of surface water quality from metals deposition was limited to mercury and selenium due to their relatively large areas of deposition as compared to the very limited areas of deposition associated with the remaining metals. The Final SEIS has been revised to provide corresponding clarification.
0029-29 (6600)	Second, analysis of impacts from groundwater discharged at the edge of the coal assumed—without justification—that "all runoff from disturbed lands were effectively captured and treated before release to any of the unmined streams in the analysis area, and all discharges at MPDES Permit outfalls met effluent limitations." DSEIS at 4-54. On this assumption, OSM concludes that "adverse effects on stream water quality should be minimal and beneficial uses should be protected." *Id.* However, OSM provides no justification for assuming perfect capture of polluted runoff and perfect compliance at MPDES Permit outfalls. Indeed, the water quality data from around the mine demonstrates that surface waters have been substantially impaired, *see e.g.*, Montana DEQ: Water Quality Standards	**Comment Response 0029-29:** The assumptions stated in the surface water analysis are reasonable and justifiable. As stated by DEQ in the Area F CHIA, "[p]rotection from point source pollution will be ensured by the MPDES discharge permit, which will incorporate effluent limitations and other conditions that the authorized discharges must meet in order to maintain the beneficial uses of the water. Such effluent limits and conditions will be designed to protect the beneficial uses of the receiving water and downstream water quality."
	7	

Comment # (Issue Code)	Document #0029-Shilo Hernandez, Earthjustice	Response

Attainment Record for East Fork Armells Creek (attached)—which further renders OSM's assumptions confounding and improper. Rather than assuming perfect functioning of the system—against evidence to the contrary—OSM's DSEIS should base its analysis upon real on-the-ground evidence.

0029-29 continued (6600)

Third, OSM also blindly relied on Westmoreland Rosebud's promise to mitigate "the general lack of water in the vicinity of the project area" by "captur[ing] water when available and us[ing] it to enhance habitat for wildlife and livestock and to establish wetlands." DSEIS at 4-54. To accomplish this, Westmoreland Rosebud plans to dig holes:

> These features would be in the form of small depressions that would store water following runoff events, thereby providing water resources, promoting establishment of wetland species, and diversifying the postmining habitat types within the project area. These small depressions would also help retain sediment with the project area.

0029-30 (6604)

DSEIS at 4-54. However, OSM has apparently conducted no analysis into whether these depressions would perform as advertised. Indeed, prior attempts to create wetlands at mine sites in Montana have failed—the depressions have failed to retain water and instead quickly went dry. OSM must analyze whether these mitigation measures would actually function as planned.

VI. IMPACTS OF MINE CLOSURE

0029-31 (7400)

The DSEIS does not but must disclose the ultimate impacts of mine closure on the community. Even if Area F is approved in full, when the coal is mined out the mine and plant will be closed, with resulting impacts to the community. This is a significant concern for the public. The 1973 EIS (attached) for the Colstrip Power Plant noted that the Colstrip Plant and Mine would likely lead to a boom and bust, and that pollution from the operation would leave the community worse off than it was in the first instance. In the absence of any transition planning—which is currently non-existent, it is clear that this result will occur. Moreover, it is also clear that the area will be worse off than before due to pollution from the mine and power plant: namely, the local water supply has been contaminated by the plant's leaking ash ponds, accessible near-surface water supplies over nearly 40,000 acres have been dewatered by the mine (and they will likely never recovery, according to statement of DEQ's former hydrologist Martin Van Oort (deposition attached), and all surface waters (East Fork Armells, West Fork Armells, Rosebud Creek, and Sarpy Creek) are impaired. There are, of course, helpful analogues. The Absaloka, Decker, Big Sky, and Savage Mines have either closed or ceased virtually all operation. In none of these cases have the mines left much behind and in most cases, it seems that water pollution from the mining operation has continued and regulators have ignored it (see the attached letter regarding uncontrolled

0029-32 (6702)

0029-33 (1302)

Comment Response 0029-30: The "general lack of water in the vicinity of the project area" is a result of the regional climate. In the Area F CHIA, DEQ notes that "[t]he approved postmine topography (PMT) provides the framework to meet an approximate contour interval, in addition to the requirements of 82-4-232(1), MCA and ARM 17.24.501. This PMT framework defines the postmine landscape at a large or gross scale. DEQ actively promotes inclusion of topographic diversity in reclamation, examples of topographic diversity include small depressions and additional dendritic tributary establishment, complex side slopes, over-steep outcropping in headwaters reaches, and inclusion of incised tributary (dry wash) reaches, as appropriate compared to reference reaches. Inclusion of these features allows reclamation to function in a similar capacity to native or undisturbed areas with regard to sediment transport, development of microclimate or microhabitat suitable for vegetation and wildlife, and aids in reclamation tie-in with the surrounding landscape."

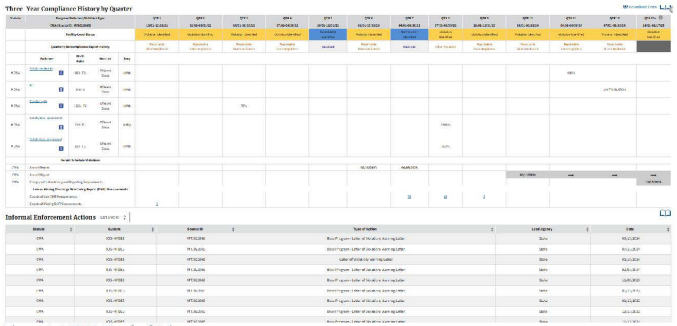
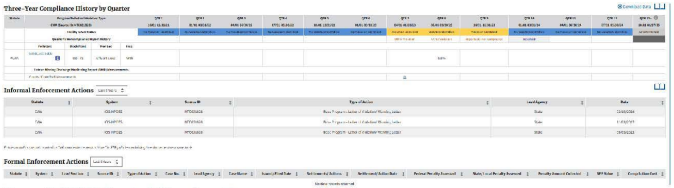
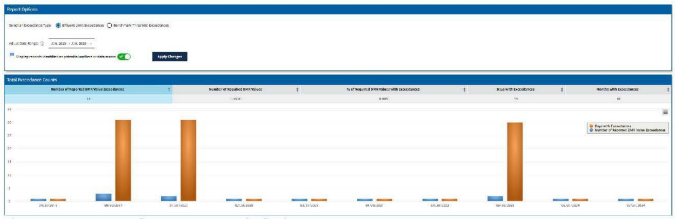
Comment Response 0029-31: The Draft SEIS includes an updated analysis of the socioeconomic impacts of the Area F alternatives. It was assumed that under Alternative 1, Area F mining would end in 2025; under Alternative 4, Area F mining would end in 2039; and under Alternative 5, Area F mining would end in 2030. It was also assumed that Westmoreland could continue mining other approved permit areas, such as Area B, potentially leading to increased production rates in those permit areas and potential closure of the Rosebud Mine earlier than 2045; however, the sequence of events and mine production rates in this scenario are uncertain. The socioeconomic impacts of the Rosebud Mine closure are disclosed in the 2018 Final EIS in **Section 4.15.2**, **Socioeconomic Impacts of Mine Closure**. The socioeconomic impacts associated with the closure of the Rosebud Mine, whether in 2045 or earlier, would be similar, with the exception of timing. In addition, pursuant to EO 14154, the discussions and analyses related to environmental justice were removed from the Final SEIS. Information regarding environmental justice can still be found in the 2018 Final EIS in **Sections 3.16**, **4.16**, and **5.3.15**.

Comment Response 0029-32: Thank you for your comment. No additional changes were made to the Final SEIS narrative.

Comment Response 0029-33 is on the following page.

Comment # (Issue Code)	Document #0029-Shilo Hernandez, Earthjustice	Response
0029-33 continued (1302)	SEIS 0029 discharges from Decker, MDEQ's enforcement action regarding expanding salinity pollution and material damage from Absaloka, and DEQ's letter to Peabody noting that salinity pollution has expanded from Big Sky Mine, which would constitute material damage, but refusing to enforce the law). Given the track records at other mines in Montana, there is no reason to believe that anything different (a bust and legacy pollution) will occur at Colstrip.	**Comment Response 0029-33 Continued:** Issues related to DEQ-oversight and non-compliance with SMCRA can be raised through a Citizen Complaint to the OSMRE Field Office in Casper, Wyoming. See also Comment Responses 0019-3 (purpose need/OSMRE's role) and 0019-7 (Big Sky Mine).
0029-34 (1301)	VII. OSM MUST DISCLOSE THE FEDERAL LEASES FOR PUBLIC INSPECTION The DSEIS repeatedly states, including in the purpose and need statement that the purpose of the mine plan modification is to allow Westmoreland to obtain the benefit of its "legal rights" from federal coal leases. DSEIS at 1-18. But there is no indication that the leases mandate coal mining, regardless of the consequences. Federal coal leases are supposed to be for the benefit of the public and if the harm associated with development of the lease is excessive, then the agency has authority to cancel the lease or refuse development. This determination can only be made upon public inspection of the lease. Consequently, OSM must disclose the lease. Further, to allow the public to weigh in on the lease, OSM must reopen the public comment period after disclosure. Further, OSM must include a neutral statement of the purpose and need that acknowledges the public interest elements of federal law an the environmental protection mandates of, among other statutes, NEPA.	**Comment Response 0029-34:** MTM 082186 is subject to the conditions of diligent development and continued operation. Further, failure to produce coal in commercial quantities would result in termination of the lease, pursuant to Section 7 of the Mineral Leasing Act. As a lease stipulation, the lessor (the BLM) reserved the right to seek damages against the operator/lessee (Westmoreland) in the event the operator/lessee fails to achieve maximum economic recovery (MER) as defined at 43 CFR 3480.0-5(a)(21) of the recoverable coal reserves.
0029-35 (1005)		**Comment Response 0029-35:** Relevant information from the lease was disclosed in the Draft SEIS; in addition, the lease document is included in a new appendix to the Final SEIS (**Appendix 6**). Other information related to the lease, "shall be closed to inspection by the public in accordance with the Freedom of Information Act U.S.C. 552" while this lease remains in effect.
0029-36 (1100)	VIII. THE COLSTRIP POWER PLANT IS A CONNECTED ACTION	**Comment Response 0029-36:** The purpose and need statement in **Section 1.3** of the Draft SEIS is consistent with guidance in DOI's NEPA regulations in effect at the time, specifically 43 CFR 46.420(a), as well as the guidance in the OSMRE *NEPA Handbook* Section 8.2. Section 2.2 of DOI's recently updated *NEPA Handbook* reaffirms that the purpose and need for a proposed action should be based on the bureau's statutory authority and, where the proposed action concerns a bureau's duty to act on an application for authorization, the purpose and need for the proposed action should also be informed by the goal of the applicant. No changes were made to the statement in the Final SEIS.
0029-37 (1001)	OSM must consider the Colstrip Power Plant as a connected action. It is clear that the plant cannot exist without the mine and the mine cannot exist without the plant. As noted in the DSEIS, the mine only serves the power plant and Rosebud plant. It appears that no infrastructure exists to export the coal elsewhere and shipping it by truck would be prohibitive. Nor is there infrastructure for the power plant to obtain coal from other sources, and construction of any such infrastructure would be prohibitively expensive. This point was made by the plant owners themselves in their filings in Westmoreland's bankruptcy proceeding (attached). Further, the plant's air permit requires it to obtain coal from the Rosebud seam. While the plant already exists, there are numerous decisions pending about whether to extend the life of the plant. All owners from the Pacific Northwest are existing the plant, and the remaining owners are deciding whether to keep the plant running. The coal contract between the mine and the power plant for post 2025 has not been finalized. Further, it is dubious that the power plant can operate without the Area F expansion. As the DSEIS notes, the majority of the coal burned comes from Area F. Westmoreland states that this is because the coal in Area F is shallower and much cheaper to strip-mine than their other coal reserves in Area B (see Wooley declaration attached). There is currently no mining in Areas A or C. It 9	**Comment Response 0029-37:** See also Comment Response 0019-2 (Connected Actions) and 0019-12 (Climate Change Indirect Effects). OSMRE has determined that the Colstrip Power Plant and the prosed action considered in the SEIS are not connected actions. The indirect effects to climate change due to combustion of Area F coal in the Colstrip Power Plant, including the Social Cost of GHGs, have been fully evaluated and were disclosed in the Draft SEIS for all alternatives. The SEIS makes reasonable assumptions about future operation of the power plant and the availability of coal from other sources, including other permit areas of the Rosebud Mine, based on currently available information. Future operations of either the power plant or other permit areas are dependent on a few factors, including the state and federal regulatory environment, which can and have changed; the market for coal-based energy, which can and has changed; and the ownership of the power plant, which can and has changed. Considering this uncertainty, the analysis disclosed in the SEIS was based on reasonable assumptions to estimate potential impacts of Area F, including combustion of Area F coal, which is consistent with NEPA, Section 106(3)(B) (see, e.g., **Section 1.2.2., Coal Combustion** and **Section 2.2.6, Life of Operations**). Pursuant to the DOI *NEPA Handbook*, Section 3.7, when a bureau is evaluating an action's reasonably foreseeable significant effects on the human environment, and there is incomplete or unavailable information that cannot be obtained at a reasonable cost or the means to obtain it are unknown, the bureau will make clear in the relevant environmental document that such information is lacking and the bureau has decided not to rely on such data or information.

Comment # (Issue Code)	Document #0029-Shilo Hernandez, Earthjustice	Response
0029-38 (6602) 0029-39 (6603)	SEIS 0029 seems extremely unlikely that Colstrip could continue to operate for more than a few years without Area F, certainly not until 2043. **IX. CUMULATIVE IMPACTS TO WATER** The cumulative impacts analysis for water resources is inadequate. Specifically, the analysis details some contributing sources of cumulative impacts, but at no point does the analysis discuss or disclose the total cumulative impacts to surface water, groundwater, and water rights from the numerous different sources of cumulative impacts. That is what is required, not the balkanized analysis in the DSEIS. **X. OSM MUST DISCUSS WESTMORELAND'S REPEATED VIOLATIONS OF THE LAW** The DSEIS repeatedly assumes that impacts to water resources will be identified by monitoring and avoided by MPDES limits on Westmoreland. OSM, may not, however, simply assume compliance with the law, given Westmoreland's repeated violations of discharge limits and monitoring requirements. The Montana Supreme Court has observed that Westmoreland has a "long and documented history of monitoring non-compliance." *Montana Env't Info. Ctr. v. Dep't of Env't Quality*, 2019 MT 213, ¶ 82, 397 Mont. 161, 451 P.3d 493. Since the court made that finding, Westmoreland has continued to violate monitoring requirements and pollution limits. In 2022, DEQ brought an enforcement action against Westmoreland's Absaloka operation for over 1,500 monitoring violations (see attached). Worse, Westmoreland's Absaloka operation appears to be currently causing material damage outside the permit area, due to spreading salinity pollution (see attached enforcement report by DEQ). EPA's Enforcement and Compliance Online database notes numerous additional monitoring and reporting violations, including continuing violations (see Detailed Facility Report | ECHO | US EPA and Detailed Facility Report | ECHO | US EPA). 10	**Comment Response 0029-38**: The analysis of cumulative effects in the Draft SEIS was initially drafted in accordance with DOI's NEPA regulations 43 CFR 46.115, in effect at the time of publication of the DEIS. **Section 5.3.6, Water Resources – Surface Water** and **Section 5.3.8, Water Resources – Water Rights** of the Draft SEIS provide a substantial expansion of the qualitative and quantitative analyses of cumulative effects as compared to the 2018 Final EIS. Corresponding narratives provide individual summaries of cumulative effects from each of ten Actions within the cumulative effects analysis area. **Sections 5.3.6** and **5.3.8** of the Final SEIS have each been updated to include a qualitative summary of total cumulative effects to surface water and water rights from the numerous corresponding sources of cumulative effects (Actions). However, after the close of the public comment period, changes to NEPA implementing regulations and guidance and a Supreme Court decision dramatically changed how agencies should conduct NEPA analyses, including the removal of any requirement to include a cumulative effects analysis (see the SEIS Executive Summary for a full discussion of these changes). In light of these changes, OSMRE determined that this NEPA analysis contains significantly more analysis and information on environmental effects than is required under NEPA because of DOI's new regulations and *NEPA Handbook* and the Supreme Court's decision in *Seven County*. Nonetheless, OSMRE decided to not substantially revise this SEIS because a draft of this NEPA analysis containing this unnecessary and excessive information was already published for public comment, it ensures compliance with the Court's order in Montana Environmental Information Center (even though that order preceded *Seven County*), and removal of the unnecessary material would be an inefficient use of agency resources and cause unnecessary delay given the complexity of the analysis, especially in light of the need to quickly address the Nation's energy supply (see, e.g., EO 14156, "Declaring a National Energy Emergency"). **Comment Response 0029-39: Section 3.7.1.1, Regulatory Framework (Surface Water)** of the Draft SEIS provides substantial detail on federal, state, and local laws and regulations associated with the protection of surface water quantity and quality and the prevention of material damage, as well as descriptions of the responsibilities for corresponding monitoring, reporting, mitigation, compliance, and enforcement activities. DEQ is responsible for enforcing compliance with most water quality laws on lands in the state. **Table 5.3-6, Water Resources – Surface Water: Summary of Cumulative Effects** includes a summary of past violations of water quality effluent limitations within the cumulative effects analysis area that have been identified through established monitoring programs. Draft SEIS **Section 2.2.2.2, Area F Operations and Development** describes the established monitoring program and mitigation plans associated with Area F operations. **Section 4.5, Public Health and Safety, Surface Water and Groundwater Quality** of the Draft SEIS notes that "With monitoring and mitigation activities, increased risk to public health from exposure to water because of Alternative 4 is not likely. In the event that water quality standards are violated, the mine operators would be required to mitigate and remediate the violations and are subject to penalties for violating the terms of the permit." No related changes were made to the Final SEIS narrative.

Comment # (Issue Code)	Document #0029-Shilo Hernandez, Earthjustice	Response
0029-39 continued (6603)	SEIS 0029  *Figure 1: ECHO Rosebud Mine*  *Figure 2: ECHO Rosebud Mine Area F* DEQ has issued over a dozen warning letters to Westmoreland and the company has exceeded pollution limits on 99 days in the past decade:  *Figure 3: ECHO Exceedance Report Rosebud Mine* 11	**Comment Response 0029-39 is on the previous page.**

Comment # (Issue Code)	Document #0029-Shilo Hernandez, Earthjustice	Response
	SEIS 0029	**Comment Response 0029-40:** As disclosed in the SEIS, combined coal production from Areas C and F is limited to 8 million tons per year per MAQP #1570-09, with an Area F–specific production cap of 4 million tons per year. Westmoreland had a violation of its air quality permit in 2023 due to a production overage of 0.6 million tons for Area F. DEQ investigated the violation, which was due to a calculation error by Westmoreland Rosebud. DEQ is working with Westmoreland Rosebud to prevent future exceedances. The SEIS air quality impacts analysis (**Section 4.3**) considered this violation of MAQP #1570-09.
0029-40 (6200) **0029-41 (1301)**	Further the DSEIS notes that Westmoreland violated its air quality permit by mining .6 million ton of coal more than it was permitted in 2023. Has the coal company repeated this violation in 2024? Given these repeated and ongoing violations, OSM may not simply assume compliance with pollution limits and monitoring requirements. Furthermore, OSM must disclose these violations and assure the ongoing violations are remedied, because they are violating the Montana program. ARM 17.24.631, 633. Further, until Westmoreland remedies these violations, OSM may not approve further mining. Mont. Code Ann. § 82-4-227(11). Furthermore, OSM must and is requested here to investigate these ongoing violations.	**Comment Response 0029-41:** OSMRE has considered past violations of air quality and water quality standards in the SEIS analyses completed pursuant to NEPA; see Comment Responses 0029-39 (water quality violations) and 0029-40 (air quality permit violations). Enforcement of water quality and air quality standards have been delegated to DEQ by the EPA. Please see Comment Response 0019-3 (purpose and need/OSMRE's role) related to OSMRE's regulatory oversight. OSMRE's role for Permit Area F is to review the proposed federal mining plan modification to ensure it complies with the terms of the coal lease, the Mineral Leasing Act, NEPA, and other Federal laws and regulations pursuant to the State-Federal Cooperative Agreement codified in 30 CFR 926.30. OSMRE, in accordance with 30 CFR 746.1 through 746.18, reviews DEQ's permit, considers other applicable Federal laws and information, and recommends approval, disapproval, or conditional approval of the federal mining plan modification to the DOI ASLM. See the discussion in **Section 1.4, Agency Authority and Actions** in the SEIS.
0029-42 (6600)	**XI. OSM MUST DISCLOSE THAT THE COLSTRIP POWER PLANT IS CURRENTLY DISCHARGING POLLUTION INTO EAST FORK ARMELLS CREEK IN VIOLATION OF THE CLEAN WATER ACT** NEPA regulations require agencies to disclose whether approval of the proposed action will lead to violations of "relevant Federal, State, Tribal, or local laws or other requirements or be inconsistent with Federal, State, Tribal, or local policies designed for the protection of the environment" 40 C.F.R. § 1501.3. Here, the DSEIS inaccurately states that the Colstrip Power Plant, where virtually all coal from the mine will be burned, is a "zero discharge" facility. DSEIS at 1-13. If this means that the plant does not have a discharge permit, it is accurate. But it is not accurate to say the plant is not discharging pollution into East Fork Armells Creek. Indeed, the DSEIS states elsewhere that the plant's ponds are discharging to the creek: > At the Colstrip Power Plant, numerous lined ponds are used for various purposes, including disposal of coal combustion products, evaporation of wastewater, and storm water runoff (Hydrometrics 2015). The ponds were designed and constructed to minimize seepage losses; however, over the period of operations, seepage from various ponds has occurred, resulting in measurable impacts on groundwater beneath the plant site and on nearby surface water in the East Fork Armells Creek. Spills to the East Fork Armells Creek from Colstrip Power Plant pipelines have also occurred. The power plant operator has collected and continues to collect numerous surface water samples from the creek starting just west of the power plant to about 3 miles north of the power plant. The water quality of the East Fork Armells Creek near the Colstrip Power Plant has been impacted by plant operations but has improved, likely due to capture of contaminated groundwater, better water management, and BMPs implemented at the power plant (Hydrometrics 2015). Indeed, the most recent synoptic run from Hydrometics (2023) shows that constituents associated with the plant's ponds, like boron and bromide, continue to discharge into the stream at high levels (see attached). OSM must acknowledge these ongoing violations of the law. 12	**Comment Response 0029-42:** See also Comment Responses 0029-52, 0029-66, 0035-9, 0035-38, and 0035-46. The following sections of the Final SEIS have been revised to be consistent with information contained in the referenced documentation: **Section 1.2.2.1, Colstrip Power Plant**; **Table 2.8-1, Summary of Direct and Indirect Environmental Impacts; Section 4.7.1.1, Analysis Methods, Indirect Effects (Surface Water)**; and **Section 4.7.3.3, Indirect Impacts, Surface Water Quality**.

Comment # (Issue Code)	Document #0029-Shilo Hernandez, Earthjustice	Response
	SEIS 0029	**Comment Response 0029-43:** See also Comment Responses 0019-21 (current reclamation status), 0024-9 (long-term use of haul road and mine support facilities), and 0029-44 (reclamation of the hydrologic balance). The numbers presented in **Table 2.2-4** are based on 2023 data but are not static. Westmoreland has continued to both disturb and reclaim the permit areas that make up the Rosebud Mine, including Area F where reclamation is already occurring but is not reflected in 2023 bond release data.
	XII. OSM SHOULD DENY THE MINE EXPANSION BECAUSE WESTMORELAND HAS FAILED TO COMPLETE CONTEMPORANEOS RECLAMATION AND THE DSEIS INDICATES THAT RECLAMATION CANNOT BE ATTAINED.	
0029-43 (1202)	In order to mine coal, a company must demonstrate that reclamation can be accomplished and such reclamation must occur contemporaneously. 30 U.S.C. § 1202(c), (e). Reclamation means the land is restored to support the uses it could support prior to mining or higher uses. Mont. Code Ann. § 82-4-203(48). Here, the DSEIS indicates that reclamation is occurring extremely slowly. DSEIS at 2-4. This refutes the statement that reclamation is occurring "contemporaneously." *Cf.* DSEIS at 2-19. Such inaccurate statements are arbitrary and indefensible. Moreover, it is hard to see how reclamation can occur contemporaneously: the DSEIS admits that groundwater destroyed by the strip-mine will not recover for "hundreds of years." DSEIS at 4-55. Further even after mine pits re-saturate, the spoil water will be significantly elevated in salts and other pollutants, potentially forever: the DSEIS recognizes that the pollution levels in the spoils may not decline even after multiple pore volumes pass through the spoils. *See* DSEIS at 4-81. Indeed, as noted in the deposition of former DEQ hydrologist Martin Van Oort, DEQ assumes that the salinity levels in spoils water will never improve and will be polluted perpetually. (See attached). This is an admission that reclamation cannot be achieved. This reality is demonstrated, as noted, by the Absaloka, Decker, and Big Sky Mines. OSM must acknowledge this.	**Comment Response 0029-44:** Water quality or quantity impacts from mining activities are allowed as long as the resulting post-reclamation quality and quantity of the water still supports the uses it supported prior to mining. Reclamation is feasible and tied to the phased reclamation process. **Table 2.2-4** of the Final SEIS lists the acres released per permit area based on the bond release process. 30 U.S.C. 1202(e) requires that adequate procedures are undertaken to reclaim surface areas as "contemporaneously as possible with the surface coal mining operations." Reclamation of the hydrologic balance is in accordance with MSUMRA requirements for Phase IV bond release (ARM 17.24.1116(6)(d).
0029-44 (6700)		
	XIII. OSM MUST DISCLOSE HISTORIC USE OF COAL ASH	
0029-45 (8002)	The DSEIS notes that DEQ has ended use of coal ash at the mine. DSEIS at 2-5. Please disclose historic use of coal ash at the mine and associated impacts.	**Comment Response 0029-45:** Historic uses of coal ash at the mine were disclosed in the 2018 Final EIS in **Section 3.21.2.2** and the Final SEIS incorporates this section by reference under **Section 3.21.2, Waste Disposal Practices**. The solid and hazardous waste cumulative effects section of the Final SEIS has been updated to recognize past use of bottom ash and the contribution that Area F waste impacts would add to past uses.
	XIV. OSM MUST DISCLOSE DOCUMENTS ON WHICH IT RELIES THAT ARE NOT PUBLICLY AVAILABLE.	
0029-46 (1005)	The DSEIS repeatedly relies on documents, such as annual hydrology reports from Westmoreland, which are not available to the public. OSM must disclose these documents to the public and then open the DSEIS for further comments.	**Comment Response 0029-46:** Documents and reporting related to Westmoreland's Rosebud Mine operating permits (Area F and other permit areas), such as the annual mining reports and annual hydrology reports, previously were publicly available on DEQ's Coal Program website. Though no longer on the DEQ website, they can easily be obtained by the public through DEQ's public records portal: **https://deq.mt.gov/about/public-records**.
	XV. OSM MUST DISCUSS IMPACTS OF ORANGE CLOUDS FROM INCOMPLETE COMBUSTION OF EXPLOSIVES	
0029-47 (6200)	Residents of the area have complained about giant orange clouds appearing on the horizon following blasts at the mine. Please disclose the impacts of such clouds.	**Comment Response 0029-47:** Pursuant to ARM 17.24.1204, any person may request an inspection of the Rosebud Mine by submitting a signed statement, or an oral report followed by a signed statement, to DEQ giving the department reason to believe that a violation of MSUMRA exists. DEQ investigates complaints as they are filed and has investigated a Citizen Complaint related to air quality as recently as December 2023 but found no violation. SEIS **Section 3.3, Air Quality** discloses current air quality and emissions from the Rosebud Mine. Impacts are disclosed in **Section 4.3, Air Quality**.
	13	

Comment # (Issue Code)	Document #0029-Shilo Hernandez, Earthjustice	Response

SEIS 0029

XVI. CONTINUED MINING BYPASSING THE MCKAY COAL VIOLATES COAL CONSERVATION REQUIREMENTS

0029-48 (2001)

The DSEIS notes both that the McKay Coal seam, located approximately 50 feet below the Rosebud seam is mineable (DSEIS at 2-8), that Westmoreland is bypassing this coal seam, and that the law requires "maximum economic recovery" of coal. DSEIS at 2-37; Mont. Code Ann. § 82-4-227(10). OSM writes that partial mining is not acceptable because it will not lead to maximum economic recovery and that the coal lease necessitates development. DSEIS at 2-48. If that is the case, then Westmoreland should be required to mine the McKay Coal. This is critical because the DSEIS also acknowledges that after reclamation of mining, it may not be possible to mine the McKay seam at a later date. DSEIS at 4-50. If nothing else, OSM must assess the economic feasibility of mining the McKay seam.

0029-49 (3000)

XVII. HYDROLOGY IMPACTS

0029-50 (2202)

The DSEIS incorrectly states that the mine will not disturb drainages. DSEIS at 2-35. That is incorrect, however, as maps demonstrate that mining passes will destroy the intermittent section of McClure Creek below Spring 10. This violates the Buffer Zone Rule, ARM 17.24.651, and must be corrected and removed from the mine plan.

0029-51 (6600)

OSM must disclose the impacts to surface water from the Colstrip Power Plant. As it is, the DEIS inaccurately states that the plant does not affect stream flow. However, the surge pond, Castle Rock Lake, discharges water to East Fork Armells Creek, which must be addressed. Also, the DSEIS must include more information about the pollution from the mine and power plant to East Fork Armells Creek. The most recent synoptic report from Hydrometics indicates that high levels of salinity are entering the creek from above the town in the area of the mine. (See Hydrometics report attached). It also shows high levels of pollutants associated with the power plants ash ponds entering the stream as well. Please disclose and discuss the impacts. Please also address the fate and transport of these pollutants, including their impacts downstream at the confluence of the East and West Forks of Armells Creek. Please also discuss the cumulative impacts of the mine on water quality and quantity in Armells Creek below the confluence. Please discuss also the impacts to stream quality once the power plant closes, as the leakage from the surge pond is having the impact of diluting the pollution in the creek, but that dilution will end once the plant shuts down, whether that be in 2027 or 2043. (see 1983 Area B FEIS projecting significant impacts to stream from mine and power plant ponds). This is significant because the East and West Forks are already impaired for multiple pollutants (the DSEIS incorrectly attributes the aluminum impairment to mining—it should be salinity). Continue pollution of these streams and then the removal of the Yellowstone water could lead to grave impacts, as foresee in the Area B FEIS.

0029-52 (6600)

0029-53 (6602)

0029-54 (6600)

14

Comment Response 0029-48: The 2018 Final EIS in **Section 3.6.2, Analysis Area Geology** disclosed the inferior quality and unmarketability of the McKay coal seam. In the BLM Resource Recovery and Protection Plan (R2P2), these issues were further explored pursuant to 43 CFR 3482.1(c)(7): "The power plants cannot accept and burn low quality coal due to their air quality permits. No McKay coal can be burned in the power plants. The thin beds in the upper portion of the Rosebud seam also have low BTU values and high sulfur values making them unacceptable to the Colstrip Station. Efforts to market low quality coal have been investigated but failed, except for the limited tonnage of waste coal that gets shipped to the Rosebud Power plant north of town. This is a very small tonnage generally provided from Area A or Area B due to a much shorter haul cycle. Hauling waste coal from Area C is a backup for some waste coal sales. The haul distance from Area F is prohibitive as compared to the other areas of the mine." Based on BLM approval of the R2P2 on September 1, 2017, an alternative that includes mining of McKay seam is not economically feasible and, therefore, not a reasonable alternative (see Section 6.1(t) in the DOI *NEPA Handbook*). As disclosed in SEIS **Table 2.2-8**, approximately 2.5 million tons of coal (out of 71.3 million total tons) would not be mined from MTM 082186 due to poor quality.

Comment Response 0029-49: See Comment Response 0029-48. Based on BLM approval of the R2P2 on September 1, 2017, an alternative that explores mining of McKay seam is not economically feasible.

Comment Response 0029-50: This comment is referring to the tributary to McClure Creek where Spring 10 discharge forms Wetland C. Wetland C occurs within the drainage bottom below Spring 10 and extends about 1,000 feet downstream. Perennial seepage from a spring and the formation of a wetland does not by itself define the McClure Creek as a perennial drainage/stream/creek. Numerous comments concerning this distinction have been made and the Final SEIS has been edited to better clarify that the Area F drainages/streams/creeks are ephemeral even though some reaches of a drainage/stream/creek may have isolated areas of surface water present in the form of a wetland sourced from a spring.

Comment Response 0029-51: See also Comment Response 0029-62. Castle Rock Lake's inflow is primarily limited to raw water pumped into the lake from the Yellowstone River and backwash from the Colstrip potable water treatment plant (WTP) discharged into the lake under the facility's MPDES Permit MT-0030422. Lake outflow is primarily limited to water conveyed from the lake to the Colstrip Power Plant (for a closed-loop process water/scrubber system) and to the City of Colstrip (for municipal water supply purposes).

Comment Response 0029-51 continues on the following page.

Comment Responses 0029-52 through 0029-54 are on the following page.

Comment Response 0029-51 continued: Surface water discharge from the lake to the East Fork Armells Creek watershed is primarily limited to dam seepage and releases from the lake's emergency spillway, neither of which are known to be monitored for water quantity. As noted in the Draft SEIS, **Table 5.3-6, Water Resources – Surface Water: Summary of Cumulative Effects**, approximately 180 acre-feet per year (0.25 cfs) of water seeps continuously from Castle Rock Lake, contributing to a negligible increase in flow of East Fork Armells Creek. The drainage area contributing natural surface water inflow to the lake is limited to 0.89 square miles, and releases from the lake's emergency spillway are anticipated to be infrequent as a result of rare significant precipitation events within the relatively small watershed draining to the lake, contributing to infrequent increases in flow of East Fork Armells Creek during high flow periods. **Section 4.7.3.3, Indirect Impacts (Surface Water Hydrology)** has been updated in the Final SEIS to incorporate this information.

Comment Response 0029-52: See also Comment Responses 0029-42, 0029-66, 0035-9, 0035-38, and 0035-46. The following sections of the Final SEIS have been revised to be consistent with information contained in the referenced documentation: **Section 1.2.2.1, Colstrip Power Plant**; **Table 2.8-1, Summary of Direct and Indirect Environmental Impacts**; **Section 4.7.1.1, Analysis Methods, Indirect Effects (Surface Water)**; and **Section 4.7.3.3, Indirect Impacts (Surface Water Quality)**.

Comment Response 0029-53: See also Comment Responses 0029-56 and 0029-57. **Table 5.3-6, Water Resources – Surface Water: Summary of Cumulative Effects**, in the "Water uses and discharges: Rosebud Mine" section has been updated with additional qualitative language corresponding to cumulative effects on surface water quantity and quality in the Armells Creek basin.

Comment Response 0029-54: See also Comment Responses 0019-15, 0029-51, and 0029-62. The surge pond (i.e., Castle Rock Lake) is a multi-use water storage facility used to receive raw water from the Yellowstone River and backwash from the Colstrip potable water treatment plant (WTP) and to supply industrial water to the Colstrip Power Plant and municipal water to the City of Colstrip. Pursuant to MCA §75-8-110, Talen Montana on behalf of the six Colstrip Steam Electric Station power plant owners (Talen Montana, Portland General Electric Company, Avista Corporation, PacifiCorp, Puget Sound Energy, and Northwestern Energy) completed a 2022 Water Feasibility Study that evaluates "options to ensure access to a water supply for the City of Colstrip public water system post retirement of the Colstrip Power Plant." The evaluation includes "an inventory and assessment of the water system infrastructure from the Yellowstone River to the City of Colstrip water treatment plant" including "the Nichols Pump Station at the Yellowstone River, the transmission pipelines and appurtenances from Nichols to Castle Rock Lake, the surge pond (i.e., Castle Rock Lake), and the City of Colstrip water treatment plant." Study documentation includes "the historical and projected water use for industrial, agricultural and municipal water uses" and "future uses projected through the anticipated duration of the proposed remediation efforts following the closure." DEQ has determined that the Study is "complete as submitted on November 1, 2022, based on the factors outlined in § 75-8-110, MCA" recognizing a "continued commitment by the Colstrip Steam Electric Station owners to work in conjunction with the City toward agreements for infrastructure transition, infrastructure maintenance and reconfiguration, refined cost estimates based on City resources, and responsibility of costs; liability concerns for assuming responsibility for the infrastructure; and additional details on water rights access or updates." This process remains active where related surface water quality effects are currently unknown. **Section 4.7.3.3, Indirect Impacts (Surface Water Quality)** has been updated in the Final SEIS to incorporate this information.

See also Comment Responses 0035-11 and 0038-50. The layout of **Table 3.7-3** in the Draft SEIS included row lines that inadvertently implied correlation between impairments, causes, and sources. The table has been edited in the Final SEIS to remove the row lines, which corrects the referenced inconsistency.

Comment # (Issue Code)	Document #0029-Shilo Hernandez, Earthjustice	Response
0029-55 (6300)	SEIS 0029 The DSEIS must also assess the impacts of climate change on surface and groundwater quantity, quality, and use. Increased temperatures from climate change are worsening summer drought in the Northern Great Plains. (See Fifth National Climate Assessment attached and at available at Fifth National Climate Assessment). Increased temperatures cause greater evapotranspiration, which reduces water supplies in the summer. This in turn leads to increased water withdrawals from groundwater, which can lead to conflicts. (See Griswold study attached).	**Comment Response 0029-55:** Detailed climate trends, including precipitation, for global-, national-, and state-level (Montana) scales are provided in **Section 3.4** in the 2018 Final EIS. Climate conditions, including precipitation, are also described in the hydrology sections of the 2018 Final EIS (See **Sections 3.7.2, Climate** as well as **Section 3.7, Water Resources – Surface Water; Section 3.8, Water Resources – Groundwater;** and **Section 3.9, Water Resources – Water Rights**). Each of these sections were evaluated for changed conditions when the Draft SEIS was prepared and updated accordingly. As stated in SEIS **Section 3.4.2, Climate Conditions**, the trends disclosed in 2018 are consistent with current trends. See also Comment Response 0019-16 (climate impacts to the Yellowstone River).
0029-56 (6602)	The DSEIS must also more completely assess the impacts of retention of water in the mine and reduced peak flows in the Armells Creek basin. The document calculates reduced peak flows as a function of, principally, "drainage area." DSEIS at 4-58. OSM must assess the cumulative impact of reduced flows on the entire Armells Creek basin, in light of the significant mining activities in Areas A, B, C, D, E, and F. Since the calculation principally relies on drainage area and the amount of disturbed areas in both basis are know with precision, OSM must disclose the cumulative reduce in peak flows in the Armells Crek basin. This is important because, as the DSEIS notes, reduced peak flows have important impacts on fluvial morphology and water storage. DSEIS at 4-59. The DSEIS must also assess the	**Comment Response 0029-56:** See also Comment Responses 0029-53 and 0029-57. **Table 5.3-6, Water Resources – Surface Water: Summary of Cumulative Effects** in the "Water uses and discharges: Rosebud Mine" section has been updated with additional qualitative language corresponding to cumulative effects on surface water quantity and quality in the Armells Creek basin.
0029-57 (6602)	impacts of water retention in settling ponds will have on surface water quality in the entirety of the basin. Prior studies by DEQ (Erbs attached) noted that retention of precipitation and snow melt in ponds led to a significant increase (approximately 50%) in TDS in East Fork Armells Creek. (The evaporation of water from settling ponds concentrates salts and other pollutants.) OSM must assess and disclose the combined impacts of water retention from all mining in the Armells Creek basin.	**Comment Response 0029-57:** See also Comment Responses 0029-53 and 0029-56. **Table 5.3-6, Water Resources – Surface Water: Summary of Cumulative Effects** in the "Water uses and discharges: Rosebud Mine" section has been updated with additional qualitative language corresponding to cumulative effects on surface water quantity and quality in the Armells Creek basin.
0029-58 (6700)	Also, the DSEIS repeatedly relies on the groundwater model prepared by Michael Nicklin, however, this model has been found to be significantly flawed. (See Area F model review attached.)	**Comment Response 0029-58:** Modeling of the regional groundwater system is an iterative process using the best available data obtained during each modeling run. The draft Area F model review referenced in the comment is dated November 15, 2012, and does not acknowledge the iterative refinements made as part of the eight deficiency letters addressed to Western Energy Company from DEQ concerning their acceptability review of the Area F application. The groundwater model reviewed in 2012 is not the same model updated and relied on in the 2018 Final EIS. The model reviewed in 2012 was based on the October 2011 groundwater model and the 2018 Final EIS references the 2016 updated model finalized in 2018.
0029-59 (3600)	The DSEIS also states that there is insufficient surface water baseline data. Of course since SMCRA was promulgated in the 1970s, regulators and Westmoreland were required to obtain baseline data. There have been a half a dozen CHIAs and numerous EISs prepared for the mine, with many dating to the 1970s and 1980s. Please review them and disclose the baseline surface water quality data. Also note, that review by DEQ scientists have determined that surface water chemistry in East Fork Armells Creek is so impacted by mining operations that there is not a comparable stream like it in Montana. (See Suplee emails and report attached). Please note that this demonstrates that the stream has been significantly impacted chemically by the strip-mine. Note also that this corresponds with state regulators' predictions that mining would have significant harmful impacts on the stream. (See 1983 Area B FEIS attached). 15	**Comment Response 0029-59:** The comment does not indicate where in the Draft SEIS it states that surface water baseline data are insufficient, and OSMRE does not agree with this characterization. Water quality baseline data are summarized in **Appendix 3**. Given that the Area F permit application was submitted on November 2, 2011, it is not reasonable to require baseline data collection starting in the 1970s and 1980s. For the SEIS, as noted in **Section 3.7.6.1, Water Quality in the Direct Effects Analysis Area**, the SEIS data summarized in **Appendix 3** are for data collected after the 2018 Final EIS was published so the 2018 Final EIS should be referenced for baseline data collected prior to the SEIS. The commenter should refer to the Final SEIS **Section 3.7.6, Surface Water Quality** and **Section 3.8.5, Groundwater Quality** for the data range of baseline samples collected for each sample type.

Comment # (Issue Code)	Document #0029-Shilo Hernandez, Earthjustice	Response
	SEIS 0029	**Comment Response 0029-60:** Water will be replaced as needed, and as such, the magnitude cannot be quantified at this time. Area F stream flows are ephemeral, therefore, replacements based on water flows rates/volumes from precipitation events is not justified.
0029-60 (6805)	Also, the DSEIS speaks regularly about replacing impacted water. The document, however, fails to disclose the magnitude of water replacement that will be required. This must include all stream flows for the area for the at least 100 years before baseflow returns. (If such flows are not restored, reclamation is not accomplished.) Is there sufficient, legally available water from other sources to replace this water? Is it of similar water quality? Will this water be available one the additional water needs caused by the end of water withdrawals from the Yellowstone River (which will have to occur in the next 100 years) are calculated?	**Comment Response 0029-61:** See Comment Response 0019-16.
0029-61 (6600)	Regarding the Yellowstone River, please also assess the impacts of water withdrawals in light of expected climate impacts (especially on summer flows) and increased climate-related water withdrawals. (See Griswold report attached and incorporated here).	**Comment Response 0029-62:** See also Comment Response 0029-51. As noted in the Draft SEIS, **Table 5.3-6 Water Resources – Surface Water: Summary of Cumulative Effects**, backwash from the Colstrip potable water treatment plant (WTP) is discharged into Castle Rock Lake under the facility's MPDES Permit MT-0030422. WTP discharges into the lake are tested only for aluminum, chlorine, and total suspended solids (not mercury). There are no other known MPDES permits and no other known regular water quality testing activities associated with lake discharge. **Section 4.7.3.3, Indirect Impacts (Surface Water Quality)** has been updated in the Final SEIS to incorporate this information.
0029-62 (6600)	Regarding mercury deposition, the DSEIS states that there has been no mercury sampling for Castle Rock Lake. This cannot be accurate. The document notes that there is at least one MPDES discharge permit for the lake. That must have required an assessment of receiving water quality. Since that data is available, please include it in the DSEIS.	**Comment Response 0029-63:** The referenced statements included in the 2024 Draft SEIS **Section 4.7.3.3, Indirect Impacts (Surface Water Quality)** were not altered from that originally included in the 2018 Final EIS. The Final SEIS has been revised to clarify deposition of coal combustion emissions on surface waters within the indirect effects analysis area.
0029-63 (6600)	Also, the DSEIS states that nitrogen deposition in East Fork Armells is negligible because it constitutes less than 10% of deposition. Where does that figure come from? What is its basis? Since the stream is impaired for nitrogen, the impacts cannot be considered negligible, as multiple courts have explained. Is there any individual source of nitrogen deposition that is larger? The same concern applies to mercury deposition. Please clarify.	**Comment Response 0029-64:** See also Comment Responses 0029-42, 0029-52, 0029-66, 0035-9, 0035-38, and 0035-46. **Section 4.7.5, Irreversible and Irretrievable Commitment of Resources** of the Final SEIS has been revised as appropriate to be consistent with those comment responses.
0029-64 (6600)	The DSEIS's statement about irreversible impacts must also include impacts to EFAC from the mine and power plant.	**Comment Response 0029-65:** See Comment Response 0029-46.
0029-65 (9100)	The DSEIS repeatedly cites the 2024 annual hydrology report. This report, however, is not publicly available. Please disclose.	**Comment Response 0029-66:** See also Comment Responses 0029-42, 0029-52, 0035-9, 0035-38, and 0035-46. The following sections of the Final SEIS have been revised to be consistent with information contained in the referenced documentation: **Section 1.2.2.1, Colstrip Power Plant**; **Table 2.8-1, Summary of Direct and Indirect Environmental Impacts**; **Section 4.7.1.1, Analysis Methods, Indirect Effects (Surface Water)**; and **Section 4.7.3.3, Indirect Impacts (Surface Water Quality)**.
0029-66 (6800)	The DSEIS incorrectly states that the pollution from the leaking ash ponds are "being remediated via capture wells, preventing off-site migration," 4-83, but this is clearly inaccurate as demonstrated by the 2023 synoptic run. Please correct and note that this is a legal violation. Similarly, the statement that there are no impacts from the power plant and its ponds on water rights cannot be accurate. The leakage has poisoned all shallow groundwater in the area, necessitating replacement water from Castle Rock Lake. Please clarify.	
	XVIII. STATEMENTS THAT THE MINE COULD USE COAL FROM OTHER SOURCES ARE UNSUPPORTED AND INACCURATE.	
	16	

Comment # (Issue Code)	Document #0029-Shilo Hernandez, Earthjustice	Response

0029-67 (1001)

The DSEIS states that the mine could use coal from other sources, DSEIS at 2-38, but that is incorrect, as the plant owners have stated. It is economically infeasible for the plant to obtain coal from other sources. (see attached brief from Westmoreland bankruptcy). Further, as noted above, coal from Area B is much more expensive than coal from Area F. (see Wooley declaration). Please correct.

Comment Response 0029-67: See also Comment Response 0029-37. Future operations of the power plant (and the source of coal that it uses) are dependent on a few factors; the analysis disclosed in the SEIS was based on reasonable assumptions to estimate potential impacts.

XIX. OSM'S ANALSYIS OF GHG EMISSIONS AND CLIMATE CHANGE IS IRRATIONAL AND INSUFFICIENT

0029-68 (6300)

OSM states that the mine's GHG emissions would be negligible relative to other sources, but the statement is misleading and uninformed. The DSEIS acknowledges that, using the social cost of carbon, the harm caused by full mining in Area F would be $32-79 billion. This magnitude of impact cannot be considered negligible. As small part of an enormous problem can also be enormous. Further, while the emissions from Area F are small compared to global emissions, it is also the case that there are only a handful of larger point sources of GHG emissions in the United States. The EPA FLIGHT tool, which the DSEIS cites, indicates that the Colstrip Power Plant is among the top 15 largest sources of GHGs in the nation.

Comment Response 0029-68: Language in **Table 2.8-1, Summary of Direct and Indirect Effects** has been revised in the Final SEIS to more accurately reflect effects analyses in **Section 4.4, Climate Change.** Under all alternatives, annual GHG emissions from direct sources (e.g., mining, crushing, hauling, and conveying Area F coal) and indirect sources (e.g., Area F coal combustion and worker commutes) would contribute incrementally to climate change.

2024 – U.S. – Total Reported Emissions by Facility in Metric Tons of CO2e

Facility	City	State	Total Reported Emissions	Sectors
James H Miller Jr	Quinton	AL	16,558,381	Power Plants
Labadie	LABADIE	MO	15,398,715	Power Plants
Con J M Gavin	GISSMO	OH	13,457,474	Power Plants
Martin Lake	Tatum	TX	12,737,949	Power Plants
EXXONMOBIL Bt Site	BAYTOWN	TX	12,693,547	Refineries, Chemicals
Oak Grove	FRANKLIN	TX	12,278,194	Power Plants
PRAIRIE STATE GENERATING STATION	MARISSA	IL	11,456,295	Power Plants, Other
Monroe	MONROE	MI	11,413,247	Power Plants
Harrison Power Station	HAYWOOD	WV	11,179,958	Power Plants
Laramie River	WHEATLAND	WY	10,979,532	Power Plants
Colstrip	COLSTRIP	MT	10,957,111	Power Plants
Us Steel Corp – Gary Works	GARY	IN	10,928,016	Waste, Metals

Figure 4:
https://ghgdata.epa.gov/ghgp/main.do#/listFacility/?q=Find%20a%20Facility%20or%20Location&st=&bs=&et=&fid=&sf=11001100&lowE=20000&highE=23000000&g1=1&g2=1&g3=1&g4=1&g5=1&g6=0&g7=1&g8=1&g9=1&g10=1&g11=1&g12=1&s1=1&s2=1&s3=1&s4=1&s5=1&s6=1&s7=1&s8=1&s9=

0029-69 (6300)

Further, as the DSEIS notes, the Colstrip Power Plant and Rosebud Mine account for approximately 30% of GHG emissions from Montana. That is not negligible.

Comment Response 0029-69: See Comment Response 0029-68. See **Table 4.4-6** in the SEIS. Under Alternative 4, direct and indirect emissions from the project would account for 21.7 percent of total Montana GHG emissions and 33.2 percent of emissions due to BLM-authorized Federal coal, oil, and gas development in Montana.

0029-70 (6300)

OSM must also disclose the mortality impacts of climate change and the likelihood of catastrophic impacts from climate tipping points. (See reports on the mortality cost of climate and global tipping points).

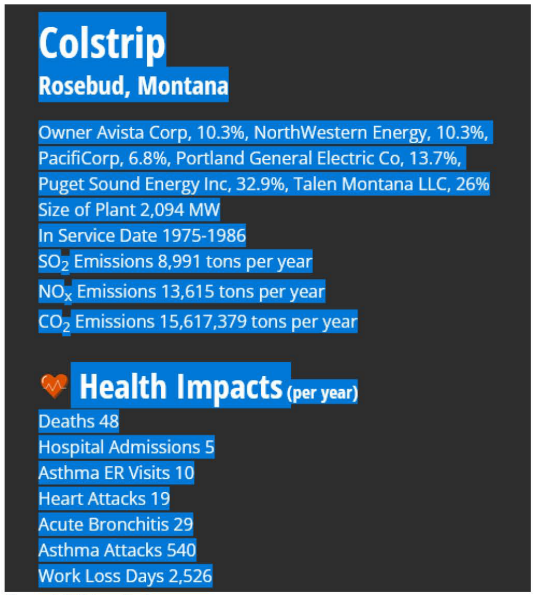
Comment Response 0029-70: OSMRE estimated the GHG SCC using 2023 EPA methods (see SEIS **Appendix 2**). Pursuant to NEPA, Section 106(3)(B), calculating additional mortality costs would not be "essential to a reasoned choice among alternatives," and "the overall costs and time frame of obtaining it" may be "unreasonable."

0029-71 (6300)

OSM's statement that it cannot determine significance is irrational. The cost of the mine's GHGs are billions, the window to keep global warming to 1.5 C is fast

Comment Response 0029-71: As shown in **Table 4.4 5, Summary of Potential Annual GHG Emissions from the Project by Alternative**, indirect effects of Area F (e.g., coal combustion and worker commutes) are far larger sources of GHG emissions than direct effects. These impacts are disclosed so that the differences among alternatives can be considered by decision makers; note, however, that other sources of coal would be available to the power plants if Area F coal is not.

Comment # (Issue Code)	Document #0029-Shilo Hernandez, Earthjustice	Response
0029-72 (1005) 0029-73 (6300) 0029-74 (7300) 0029-75 (1002) 0029-76 (9100) 0029-77 (7400) 0029-78 (7500) 0029-79 (7400) 0029-80 (4401) 0029-81 (1001) 0029-82 (7400) 0029-83 (6400)	 closing, and the mine/power plant are one of the 15 largest point sources in the United States. If that is not a basis for significance, nothing is. Please also note that many of the executive orders that the DSEIS cites have now been rescinded. This changes OSM's analysis and will require further public comment. Note also that the carbon budget discussed inexplicably ignores 1.5 C target. **XX. CULTURAL RESOURCES** The DSEIS improperly limits its analysis of cultural resources to the direct impact area. Please correct. The DSEIS states that only 4 of the 18 sites that are eligible for listing on the historical register are being excavated. Please explain why. Has OSM discussed this with the Northern Cheyenne or Crow historic preservation officers. Please produce the programmatic agreement for public review. **XXI. SOCIOECONOMIC IMPACTS** The analysis of socioeconomic impact analysis is misleading and flawed because it does not include the impacts of externalities, especially climate impacts and health impacts from air pollution. These impacts are significant (see attached studies on externalized impacts.) Note that the DSEIS has inconsistent statements about the percentage of Northern Cheyenne members employed at the mine. Please correct. The analysis also fails entirely to disclose the significant negative impacts that the mine and power plant have had on the Northern Cheyenne. Please correct. (See Power report and masters thesis attached.) Also, the DSEIS's unemployment numbers do not appear to include the closure of the Absaloka Mine. Please correct. The coal economics are regional and must be assessed on that level. Please also note that the assumption that power plant will continue to operate in all alternatives is incorrect for the reasons stated above regarding connected actions. Please also identify the tax cuts that have benefitted the mine (e.g., gross proceeds taxes for new surface mines), but reduced public revenues. Also, the economic analysis about plant closure fails to include an assessment of the likely beneficial impacts of clean energy citing. Please include a discussion about the Grid United line and Clear Water wind farm on regional economics. **XXII. PUBLIC HEALTH** The public health impact assessment needs to recognize that the air quality in the area is compromised (see ALA State of the Air Report) and that the power plant's pollution has killed hundreds of people and continues to kill people (see Byron Declaration and Public Health Reports and CATF Toll from Coal: https://www.tollfromcoal.org/#/map/(title:none//detail:none//map:none/US)). 	**Comment Response 0029-72:** Commenter is correct that a number of EOs have been issued in 2025 under the new administration. Many of these relate to climate and environmental justice. Although rescinded EOs have been removed from the Final SEIS, these topics were already analyzed and the impacts disclosed for public comment in the Draft SEIS. A new public comment period is not warranted. **Comment Response 0029-73:** As noted in SEIS **Section 4.4.6.3, Carbon Budget**, "[w]hile a global carbon budget does exist, a comparison of Alternative 4 emissions to the global carbon budget would not be useful given the relative size of the global carbon budget. This SEIS, however, includes a discussion of the global carbon budget for background." Emissions reductions needed to keep global emissions within this carbon budget would require dramatic reductions in all United States sectors, as well as from the rest of the world. **Comment Response 0029-74:** As described in SEIS **Section 6.1.3**, Section 106 and tribal consultation processes have already occurred for the project. As there are no changed conditions since the 2018 Final EIS that would substantially change the analysis; the limits of direct impact were maintained as the area of analysis. As stated in the SEIS in **Section 3.14.3**, the additional eligible sites have been avoided and do not require excavation at this time. The programmatic agreement (PA), which is **Appendix H** to the 2018 Final EIS, also includes stipulations about how to treat unanticipated discoveries during mining operations. **Comment Response 0029-75:** The Northern Cheyenne and Crow were sent a letter in December 2024 reinitiating consultation. No response from the Crow has been received. A response was received during the public comment period from the Northern Cheyenne (0013), and consultation with the Northen Cheyenne is ongoing. **Comment Response 0029-76:** The PA is publicly available; it is **Appendix H** to the 2018 Final EIS. **Comment Response 0029-77: Table 5.3-13** summarizes the related past, present, and reasonably foreseeable actions (described and quantified where possible in **Table 5.2-1**) that have directly or indirectly affected or will affect socioeconomic resources in the analysis area. **Table 5.3-13, Socioeconomics: Summary of Cumulative Effects.** **Comment Response 0029-78:** The Draft SEIS and **Appendix 4 - Updated BBC Area F Economic Report** state that "46 of the 320 mine workers (14 percent) are members of the Northern Cheyenne Reservation. Another 30 of the 320 workers (9 percent) are Native Americans who are not members of the Northern Cheyenne tribe, likely predominantly members of the relatively nearby Crow tribe." OSMRE did not find any inconsistencies in either the Draft SEIS or **Appendix 4**. Without a specific reference to an error, OSMRE cannot correct any inconsistencies called out by the commenter. In addition, pursuant to EO 14154, the discussions and analyses related to environmental justice were removed from the Final SEIS. Information regarding environmental justice can still be found in the 2018 Final EIS in **Sections 3.16, 4.16**, and **5.3.15**. **Comment Responses 0029-79 through 0029-83 are on the following page.**

Comment # (Issue Code)	Document #0029-Shilo Hernandez, Earthjustice	Response
0029-84 (6400)	SEIS 0029  *Figure 5: Toll from Coal* Please also discuss how the influx of nonnative people to the area with the power plant has brought drugs and crime to tribal communities. Please discuss the black lung impacts on mine workers. The US Department of Labor notes numerous black lung claims in Montana (800), which is as large as the current mine work force in the state. Black Lung Program Statistics | U.S. Department of Labor) 19	**Comment Response 0029-79:** Only resources for which there are substantial new circumstances or information relevant to environmental concerns and bearing on the SEIS alternatives are described in detail in the SEIS. Unemployment statistics were disclosed in the 2018 Final EIS but were not updated in the Draft SEIS because conditions had not substantially changed. Within the analysis area, the December 2024 unemployment rates are lower than the 2015 unemployment rates disclosed in the 2018 Final EIS. In Rosebud County, the unemployment rate decreased from 5.6 percent in 2015 to 3.0 percent in 2024. In Treasure County, the unemployment rate decreased from 4 percent in 2015 to 2.1 percent in 2024. In Big Horn County, the unemployment rate decreased from 10 percent in 2010 to 4.7 percent in 2024. (Local Area Unemployment Statistics (LAUS) program). These changes in unemployment rates would not substantially change the analyses previously disclosed. **Comment Response 0029-80:** The Area F analysis area was defined in the 2018 Final EIS. (The rationale for using this analysis area is provided in **Section 3.15.1.2** of the 2018 Final EIS beginning on page 353.) **Comment Response 0029-81:** See Comment Response 0029-37 (reasonable assumptions in lieu of complete information). **Comment Response 0029-82:** Tax and royalty data can be found in **Section 4.15.2.5, Impacts on Government Revenues – All Alternatives**. The 2018 Final EIS data were updated in the Draft SEIS and can be found on **Table 4.15-5**. A discussion of Alternative Energy and Transmission Development and Infrastructure, including a description of Grid United and Clearwater Wind projects can be found on **Tables 5.2-1** and **5.3-13**. **Comment Response 0029-83:** Regional air quality is detailed in **Section 3.3.4, Existing Regional Air Pollutant Sources and Emissions**. Further information on environmental health can be found in the 2018 Final EIS, **Section 3.5.2**, beginning on page 173. The American Lung Association (ALA) State of the Air Report does not include data for Rosebud County, Treasure County, or Big Horn County. Additionally, the references cited do not provide evidence linking deaths in the analysis area to pollution from the Colstrip or Rosebud power plants. **Comment Response 0029-84:** Recent changes to the population and demographics within the analysis area are described in **Section 3.15.2**. Analysis of drugs and crime is not within of the scope of this environmental review. Respiratory illnesses are included in the 2018 Final EIS –**Sections 3.5.2, Environmental Health; 3.5.2.2, Primary Contaminants and Exposure Pathways; 3.5.2.3, Air Quality;** and SEIS **Section 4.5, Public Health and Safety** and **Section 5.3.2, Public Health and Safety**. In the Final SEIS, a discussion of black lung has been included in the public health and safety sections (**Sections 3.5, 4.5,** and **5.3.4**). Pursuant to EO 14154, the discussions and analyses related to environmental justice were removed from the Final SEIS. Information regarding environmental justice can still be found in the 2018 Final EIS **in Sections 3.16, 4.16,** and **5.3.15**.

Comment # (Issue Code)	Document #0029-Shilo Hernandez, Earthjustice	Response

SEIS 0029

Black Lung Program Statistics

Division of Coal Mine Workers' Compensation (DCMWC)

Distributions of Part C Black Lung Claims and Disbursements, by State
FY 2021

Distributions of Part C Black Lung Claims and Disbursements, by State
FY 2021

State	Total Received[1]	MBO[2]	Claims in Payment[3]	Dollars Paid[4]
ALASKA	151	0	3	25,822.65
ALABAMA	37,431	0	405	3,486,057.79
ARKANSAS	3,874	0	18	154,935.90
MISSISSIPPI	383	0	8	68,860.40
MONTANA	872	0	8	68,860.40
NORTH CAROLINA	4,145	1	206	1,773,155.32
NORTH DAKOTA	164	0	2	17,215.10
NEBRASKA	135	0	3	25,822.65
NEW HAMPSHIRE	27	0	1	8,607.55

(see also Black Lung studies attached).

XXIII. CUMULATIVE EFFECTS

The cumulative effects analyses are insufficient. They cite individual cumulative actions, but they do not assess the total cumulative impacts. A mere listing is not enough. Water impacts are not given a magnitude. Cumulative water impacts from the power plant do not include leaking ash ponds. The cumulative impacts analysis of other areas of the mine is perfunctory and lacks any quantitative analysis, which OSM could do, given information possessed. The statement that impacts from Area F are not measurable at the confluence is not supported (see Gardner reports).

20

0029-85 (6602)

Comment Response 0029-85: See Comment Responses 0029-38 and 0029-53.

Comment # (Issue Code)	Document #0029-Shilo Hernandez, Earthjustice	Response
	SEIS 0029	
	XXIV. OTHER POINTS	
0029-86 (1005)	The Conservation Groups repeat their objection to OSM's failure to provide additional time to review this document, especially given that numerous documents relied upon were not made available to the public. Conservation Groups further incorporate by reference their prior and related comments which are attached hereto.	**Comment Response 0029-86:** OSMRE considered a request from Earthjustice for a 30-day extension to the comment period (correspondence 0005) but respectfully declined the request on January 15, 2025. See also Comment Response 0029-46 (documents available through DEQ public portal) and Comment Response 0029-14 (Section 7 Consultation)
0029-87 (2100)	Please address the foregoing issues and select the no action alternative. Sincerely, Shiloh Hernandez Shiloh Hernandez Senior Attorney Northern Rockies Office P.O. Box 4743 Bozeman, MT 59772-4743 T: 406.586.9692 ext. 1929 F: 406.586.9695 earthjustice.org	**Comment Response 0029-87:** Commenter's preference for Alternative 1 (No Action) is noted; the rationale provided for this preference will be considered by the decision maker.
	21	

Comment # (Issue Code)	Document #0030-EPA	Response
0030-1 (1303)	SEIS 0030 REGION 8 DENVER, CO 80202 **January 21, 2025** Ref: 8EJC-NE David Berry, Regional Director Office of Surface Mining Reclamation and Enforcement, Regions 5, 7-11 PO Box 25065 Denver, Colorado 80225-0065 Attn: Rosebud Mine Area F Draft Supplemental EIS Dear Regional Director Berry: The U.S. Environmental Protection Agency has reviewed the Office of Surface Mining Reclamation and Enforcement's December 2024 Draft Supplemental Environmental Impact Statement (SEIS) for the Rosebud Mine, Area F (project). The stated purpose of the Draft SEIS is to address the deficiencies in OSMRE's 2018 Western Energy Area F Final Environmental Impact Statement (2018 Final EIS) identified by the United States District Court for the District of Montana in *Montana Environmental Information Center v. Haaland, No. CV 19-130-BLG-SPW*. Specifically, the Court ordered OSMRE to remedy the following: (1) inadequate surface water cumulative impacts analysis, (2) inadequate greenhouse gas emissions analysis, (3) inadequate analysis of indirect effects of mine expansion on water withdrawals from the Yellowstone River, and (4) failure to analyze a reasonable range of alternatives in violation of the National Environmental Policy Act (NEPA). The purpose of the 2018 Final EIS was to respond to the mine permit application package for Westmoreland Rosebud Mining LLC (formerly Western Energy) which would expand the company's existing coal mining operations near Colstrip, Montana into the 6,773-acre Area F permit area (Area F). Area F encompasses Federal Coal Lease MTM 082186 (a 947.6-acre area out of the 6,773-acre total mine permit area), triggering the original need for OSMRE to develop the 2018 Final EIS under NEPA. The EPA has reviewed the above-referenced Draft SEIS pursuant to NEPA and Section 309 of the Clean Air Act (CAA). The CAA Section 309 role is unique to the EPA. It requires the EPA to review and comment publicly on any proposed federal action subject to NEPA's environmental impact statement requirement. While the EPA is not a cooperating agency on the Draft SEIS, the EPA was invited by OSMRE to collaborate as a participating agency during an August 2024 early administrative draft review of the SEIS. This opportunity allowed for the EPA to raise our feedback for OSMRE early and to effectively communicate issues to OSMRE staff which has resulted in an overall more effective SEIS for the public to review and comment on during this open public review period. Between the administrative draft	**Comment Response 0030-1:** OSMRE recognizes EPA's statutory obligation to review the Draft SEIS pursuant to NEPA and Section 309 of the Clean Air Act. OSMRE appreciates EPA's review of the internal draft and the feedback provided. All efforts were made to address EPA's comments on the internal draft.

Comment # (Issue Code)	Document #0030-EPA	Response
0030-2 (1303)	SEIS 0030 review and the present, the EPA has noticed clear improvements to the Draft SEIS, including the description of the project alternatives and monetization of emissions. We recognize and appreciate the efforts that OSMRE has taken to incorporate our feedback and create an effective public communications tool in these sections of this SEIS. *EPA CAA Section 309 Review Summary* Through our review of the Draft SEIS, the EPA identified concerns with the impacts analysis that we recommend addressing in the Final Supplemental EIS. For example, we identified some ways that water resources- and emissions-related impacts and general impact intensity thresholds could be better communicated and more fully disclosed. Our detailed recommendations are attached in the enclosure of this letter for your consideration. We appreciate your time and attention regarding our comments. If further explanation of these comments is desired, please contact me at (303) 312-6155 or mccoy.melissa@epa.gov. You may also contact Carolyn Gleason, the NEPA Lead Reviewer for the project, at (303) 312-6641 or gleason.carolyn@epa.gov. Sincerely, Melissa W. McCoy, Ph.D., J.D. Manager, NEPA Branch Environmental Justice, Community Health, and Environmental Review Division Enclosure 1. EPA Comments on the Rosebud Mine Area F Draft Supplemental Environmental Impact Statement 2	**Comment Response 0030-2:** All efforts were made to address EPA's comments on the public Draft SEIS. See responses below to resource-specific comments and how OSMRE has addressed EPA's detailed recommendations in the Final SEIS.

Comment # (Issue Code)	Document #0030-EPA	Response
0030-3 (6001)	SEIS 0030 **ENCLOSURE – EPA Comments on the Rosebud Mine Area F Draft Supplemental EIS** **General Comments** Impact and Intensity Thresholds While we recognize that the Draft SEIS is incorporating by reference impact and intensity threshold reference tables from the 2018 Final EIS while discussing resource impacts for consistency, for greater clarity we recommend disclosing how these tables classify these impacts relative to the beneficial use of the resource in the text of Chapter 4. For example, the direct impacts to spring flows in Section 4.7.3.2 are summarized as "moderate" because for impacts to be "major" as described in Table 127 of the 2018 Final EIS, they must "permanently preclude existing land uses and/or beneficial uses of surface water." Not including this framework for how the Draft SEIS is reporting relative impact in the Draft SEIS' text makes the nature and scale of these impacts less clear to the reader of the supplemental analysis. In this example, the scope and scale of the impacts to spring flows described in Section 4.7.3.2 could be considered "major" rather than "moderate" from an environmental perspective because there are measurable and distinguishable changes to spring hydrology, water quality, and availability under the action alternatives, yet these changes are not given weight under the Table 127 classification system. In this way, the scope and scale of the impacts reported throughout Chapter 4 are weighed against the existing beneficial use of these resources rather than the outlook that could come from a broader range of perspectives (e.g., ecologist, stream hydrologist, future land user, etc.) and should be clearly disclosed in the Final SEIS. We recommend summarizing the underlying assumptions/framework used to classify the relative impacts for each resource in Chapter 4 of the Draft SEIS rather than solely incorporating this information by reference. **Water Resources** Stream Flows The discussion on the irreversible and irretrievable commitment of resources related to stream flows in Section 4.7.5 is appreciated. The relative impacts discussion for stream flows as a result of the action alternatives in Section 4.7 could confuse readers by solely reporting impacts as offset by mitigation and reclamation methods rather than directly disclosing the scale of those impacts before mitigation or reclamation is completed. As described above, Section 4.7 already weighs the scale of impacts to surface water resources against their beneficial uses using the criteria from Table 127 of the 2018 Final EIS, therefore reporting these weighted impacts less the expected benefits from reclaiming the area after mining minimizes the scale of these impacts in the environmental analysis. We recommend reporting the relative impacts to stream flow before reclamation/mitigation and then discussing how reclamation and mitigation efforts will offset these impacts in Section 4.7 rather than rolling these unique concepts into one conclusion. This discussion is especially important if mitigation and reclamation goals are never realized within Area F.	**Comment Response 0030-3:** The impact and intensity threshold tables for the five analysis resources that were substantially updated in the Draft SEIS (see the list in SEIS **Table 3.1-1**) have now been included in the Final SEIS in **Chapter 4**. These tables were provided in the 2018 Final EIS but only cited in the Draft SEIS. Surface water and groundwater impact and intensity thresholds are clearly described in those corresponding tables with the distinction between 'moderate' and 'major' impact intensities based on whether the action would preclude existing land uses and/or beneficial uses of surface water and groundwater. That distinction is supported by impact and intensity thresholds associated with surface water and groundwater rights with the distinction between 'moderate' and 'major' impact intensities based on whether a suitable replacement water source would be provided by Westmoreland Rosebud per ARM 17.24.648 ('moderate') or no replacement water supply would be available ('major'). Thus, surface water and groundwater impact and intensity thresholds are somewhat unique from other resource areas based on water replacement provisions, which are required (not optional) for the mine permit application process under MSUMRA (see **Section 4.9.3.3, Replacement Water Sources and Replacement Process**). Therefore, surface water and groundwater impact and intensity threshold tables initially developed for the 2018 Final EIS have not been revised in the Final SEIS. To provide further clarification, the Final SEIS narratives in **Chapter 4** associated with surface water, groundwater, and water rights impact and intensity thresholds have been updated with additional detail to capture the information provided above. See also Comment Response 0030-4.
0030-4 (6600)		**Comment Response 0030-4:** See also Comment Response 0030-3. Mitigation (design features) and reclamation goals/plans are part of the permit application process. As such, they are not optional aspects of the permit, but rather requirements that are to be completed as conditions of the Operating Permit and/or MPDD. Therefore, discussing impacts based on the mitigations and reclamation goals/plans is an appropriate level of analysis.
0030-5 (6600)	The EPA also noticed a potentially significant assumption regarding the surface hydrology indirect impacts analysis on page 4-69. The Draft SEIS estimates that impacting 6% of the total Armells Creek watershed area would lead to a 6% maximum flow reduction to surface waters within the stream, yet drainage within a watershed is not equal throughout it. Most surface water originates higher in the watershed due to higher precipitation, steeper slopes, higher snowpack, etc.; therefore, it matters 3	**Comment Response 0030-5:** See also Comment Response 0035-52. **Section 4.7.3.3, Indirect Impacts, Surface Water Hydrology** has been revised in the Final SEIS with updated hydrologic analyses that account for the relationship between geographic, topographic, and temporal factors that may influence streamflow in Armells Creek and the relative hydrologic contributions from its ephemeral tributaries within the Area F permit boundary.

Comment # (Issue Code)	Document #0030-EPA	Response
0030-5 continued (6600)	SEIS 0030 more where in the watershed the 6% (22 square mile) project area of impact is than how large that area is relative to the total size of the watershed. In this case, the 22 square mile mining area (including land upstream of the mining area) is some of the highest and wettest land area in the Armells Creek watershed, and likely contributes a significantly higher percentage of the streamflow than other similarly sized portions of the 370 square mile watershed. Furthermore, these high elevation areas contribute a disproportionate amount of streamflow during the low flow portions of the year when they may be the only contributing portions of the watershed. To account for this difference, the U.S. Geological Survey uses regression equations to estimate drainage area ratios and it put together some of these analyses for Montana in 2015. Although the USGS did not develop reliable regression equations for most of eastern Montana, a review of the valid, analogous regressions that were developed[1] suggests that flows within the area of impact may account for closer to 8-10% of the overall surface water hydrology with even greater potential contributions during periods of low flow. For this reason, we recommend re-working Section 4.7.3.3 to capture these regression-based impacts to stream flow and using that analysis to inform conclusions about the project's overall indirect impacts to the Yellowstone River.	
0030-6 (6600)	Surface Water Quality Page 4-70 mentions a nitrate + nitrite impairment of unknown origin within the East Armells Creek portion of the project's indirect effects analysis area yet it is widely supported that blasting and coal oxidation or saturation while mining can often result in higher nitrate concentrations in surface waters.[2] We recommend clarifying whether chemical explosives such as ammonium nitrate will be used in Area F and further examining what impacts the mining within Area F may have on nitrate concentrations within the East Armells Creek and Yellowstone River watersheds in Section 4.7.3.3. This section should also relate the mine's potential water quality impacts to the Clean Water Act Section 303(d) listed water bodies and discuss how the Area F expansion may impact any Total Maximum Daily Loads that have been developed within the indirect effects analysis area. This will be important for discussing mitigation that avoids contributing to water quality standards violations.	**Comment Response 0030-6: Section, 4.7.3.3 Indirect Impacts, Surface Water Quality** has been updated with additional discussion on potential indirect effects of surface water quality from Area F blasting materials.
0030-7 (6300)	**Monetizing Emissions** In Appendix 2 we noticed a units mismatch between the reported emissions which are measured in tons, and the SC-GHG values in Tables 1-3 which are reported in metric tons. Before multiplying these two values to monetize the emissions changes associated with the project alternatives, it is important for the units to be consistent. We recommend updating the values reported in Tables 7 through 10 of Appendix 2 and in Section 4.4.7 of the Draft SEIS to reflect a common unit.	**Comment Response 0030-7:** Thank you for pointing out this error. The values reported in Tables 7 through 10 of **Appendix 2** and in SEIS **Section 4.4.7** were corrected in the Final SEIS.
0030-8 (6300)	In the summary tables discussed in Section 4.4.7[3] and in the final rows of Tables 7 through 10 in Appendix 2, the total monetized emissions impacts over time for each alternative is summarized. However, it appears that these values were summed across the different mining time periods (e.g., 2020-2025, 2020-2039, 2020-2030) without adjustment. We recommend instead putting the value of impacts occurring over different time periods in equal terms before comparing. In this case, the	**Comment Response 0030-8:** Thank you for pointing out this error. The values reported in the final rows of Tables 7 through 10 of **Appendix 2** and in the summary tables in SEIS **Section 4.4.7** were corrected in the Final SEIS.

[1] *See* Montana StreamStats, Chapter G, 2015: https://pubs.usgs.gov/sir/2015/5019G/sir20155019G.pdf.
[2] *See* https://doi.org/10.1016/j.scitotenv.2023.165822.
[3] *See* Tables 4.4-8, 4.4-10, 4.4-12 and 4.4-13 in the Draft SEIS.
4

Comment # (Issue Code)	Document #0030-EPA	Response
	SEIS 0030 monetized values of emission changes should be discounted back to a common year for comparison. This effort would make the comparisons across alternatives equivalent in these tables. 5	

Comment # (Issue Code)	Document #0035-Dan Walsh, MT DEQ	Response

SEIS 0035

DEQ
Montana Department of Environmental Quality

January 21, 2025

Office of Surface Mining Reclamation and Enforcement
Attn: Roberta Martinez Hernández
P.O. Box 25065
Lakewood, CO 80225-0065

Sent via e-mail to: rosebudmineareafseis@eroresources.com

Re: Comments on Draft Supplemental Environmental Impact Statement (SEIS) for the Rosebud Mine Area F Mining Plan Modification for Federal Coal Lease MTM 082186

Dear Ms. Hernández,

Thank you for the opportunity to comment on the Draft Supplemental Environmental Impact Statement (SEIS) published December 2023 for the Rosebud Mine Area F Federal Coal Lease (SEIS-010-08-000-1732112584). The Montana Department of Environmental Quality (MDEQ) has identified areas where additional clarification within the SEIS is warranted and some correction to the substance of material referenced is needed.

General

0035-1 (2102/6000)

MDEQ has several concerns related to the characterization of the hydrology in Area F and the amount of disturbance analyzed in the various alternatives. In general, the analysis of Alternative 1 – No Action does not adequately consider the potential impacts of denying mining of the federal leases. Analysis of potential impacts from Alternative 1 – No Action is needed as a baseline to compare the effects other alternatives may have on the human environment. Typically, a No Action alternative provides a benchmark. However, in the context of this SEIS, Alternative 1 is not just a benchmark, but is itself an alternative that may cause unique impacts to the human environment. Thus, the SEIS should more thoroughly consider the potential impacts to the human environment of Alternative 1- No Action.

0035-2 (6600)

Overall, the SEIS is not clear on the distinction between the springs and wetlands within various basins and the actual stream channels or drainageways that make up the creek bottoms. For instance, the distinction between springs and wetlands found within the Robbie Creek basin are different hydrologically from Robbie Creek. Often within the SEIS, the basin and the creek appear to be considered one in the same. The SEIS should clarify the various classifications of hydrologic features. As it is currently written, the SEIS implies that the drainages through the permit area have greater quantities of surface water than has been observed or measured. MDEQ's Cumulative Hydrologic Impact Assessment (CHIA), attached to MDEQ's written findings

Comment Response 0035-1: As disclosed in the SEIS **Section 2.4, Alternative 1 – No Action**, it is assumed that Area F mining would not occur beyond 2025 because the following information is unknown: (1) if Westmoreland would find it economically viable to mine private coal only and (2) if, after an analysis of impacts pursuant to MSUMRA and MEPA, DEQ would approve a modification of State Operating Permit C2011003F to allow mining of private coal only. Even if OSMRE assumed both to be true, it would be a difficult (and a potentially subjective) exercise to quantify the area and acreage of surface disturbance associated with mining private coal only without a proposal from Westmoreland. Considering this uncertainty, the analysis disclosed in the SEIS for Alternative 1 was based on reasonable assumptions to estimate potential impacts. Pursuant to the DOI *NEPA Handbook* (Sections 3.1 and 3.7), assumptions used when there is incomplete or unavailable information have been explained in the SEIS. Another reasonable assumption is that if Westmoreland were to pursue mining private coal only and if DEQ approved an operating permit revision for this, any impacts would be as intense or less than those described for Alternative 4. Clarification has been added to Alternative 1 effects analyses to qualitatively describe the potential for impacts under such a scenario.

Comment Response 0035-2: The narrative of the Final SEIS has been revised to better describe the drainages and the presence/absence of water and to more closely follow these definitions and how they pertain to Area F streams.

Comment # (Issue Code)	Document #0035-Dan Walsh, MT DEQ	Response
	SEIS 0035 MDEQ Comments on SEIS for the Rosebud Mine Area F Mining Plan Modification January 21, 2025 for the approval of the Area F permit, contains a detailed description of the hydrogeology of the area and the probable impacts from coal mining. This document is referenced in some of the comments below where MDEQ's analysis would be a beneficial reference.	
0035-3 (6600)	Multiple unit conversion errors were found within the SEIS's hydrologic assessment sections resulting in significant mischaracterizations of water quantity and stream flow regimes in Area F. The cited numbers should be confirmed to ensure the values comport with the recorded values. MDEQ compared some values against those provided in the Rosebud Mine's Annual Hydrology Reports and the Area F permit's baseline hydrologic data. MDEQ identified specific instances where discrepancies were observed which are provided below under Specific Document Comments.	**Comment Response 0035-3:** See responses below to specific DEQ comments and how they were addressed in the Final SEIS.
0035-4 (2102/2302)	**Impact on Existing and Approved Mining Disturbances** The SEIS should include additional analyses to address potential impacts related to disturbance of the federal coal lease tracts caused by mining non-Federal coal in adjacent tracts. In particular, Alternative 1 and Alternative 5 contemplate a mining disturbance that is fully reclaimed per an approved reclamation plan that covers the federal coal lease tracts and adjacent tracts. However, Alternative 1 – No Action ignores the cohesive plan approved under Montana Strip and Underground Mine Reclamation Act (MSUMRA). As a result, Alternative 1 – No Action has potential additional direct and indirect effects that are not considered in the SEIS. For example, while Federal coal may not be mined without approval by the Assistant Secretary for Lands and Minerals Management (ASLM), non-Federal coal mining has already been approved. Thus, in areas that contain Federal coal, but private surface rights, non-mining layback of the surface would be allowed for access to adjacent non-Federal coal. Thus, Alternative 1 and Alternative 5 will have impacts that should be included in the SEIS. Page **2** of **13**	**Comment Response 0035-4:** See also Comment Response 0035-1. Neither Alternative 1 nor Alternative 5 ignores "the cohesive plan approved under . . .MSUMRA." Both alternatives, explicitly acknowledge that State Operating Permit C2011003F (including a reclamation plan), would need to be revised to be consistent with Alternative 1 or 5 before Westmoreland could proceed with mining private coal only (see **Section 2.4, Alternative 1 – No Action** and **Section 2.6, Alternative 5 – Partial Mining Alternative**). To approve a revision, DEQ would need to consider requirements of MSUMRA and potentially analyze impacts under MEPA. In the SEIS, it would be a difficult (and a potentially subjective) exercise to quantify the area and acreage of surface disturbance associated with mining private coal only under either Alternative 1 or 5 without a proposal from Westmoreland. It would also be speculative to assume that DEQ would approve a change to the operating permit and the approved reclamation plan. Considering this uncertainty, the analysis disclosed in the SEIS for these alternatives was based on reasonable assumptions to estimate potential impacts, which is consistent with NEPA, Section 106(3)(B). Another reasonable assumption is that if Westmoreland were to pursue mining private coal only and if DEQ approved an operating permit revision for this, any impacts would be as intense or less than those described for Alternative 4. The Alternative 1 and Alternative 5 effects analyses have been clarified in the Final SEIS; they now qualitatively describe the potential for impacts under such a scenario.

Comment # (Issue Code)	Document #0035-Dan Walsh, MT DEQ	Response
0035-5 (9000)	SEIS 0035 MDEQ Comments on SEIS for the Rosebud Mine Area F Mining Plan Modification January 21, 2025 **Specific Document Comments** The following specific concerns were identified by MDEQ within the SEIS. Figure 1.1-2 (p. 1-7) (All figures showing mine permit boundaries) The permit boundaries shown are no longer accurate. Area B AM5 was approved in 2022, and this area should be shown as incorporated into the Area B permit boundary at minimum in the legend. Small changes to the permit boundary have also happened to other parts of Area A, Area B, Area D, and Area F due to incidental boundary changes and bond releases. Updated permit boundaries can be found on MDEQ's public permit boundary at the following web location: https://gis.mtdeq.us/portal/home/item.html?id=0ec1d6d3b5424618a0ac08129f7ac045	**Comment Response 0035-5:** The Draft SEIS included the following note about data used in the SEIS in **Chapter 2**: "To move forward with SEIS analyses, a data cut-off date of December 31, 2023, was implemented to provide a snapshot in time of mine operations that would be consistent throughout the environmental review process. Westmoreland Rosebud prepares annual mine reports. The most recent annual reports were issued in 2024 and cover the January 1, 2023, through December 31, 2023, reporting period." A similar note has been provided in Chapter 1 for the first discussion of **Figure 1.1-2**. This approach is consistent with guidance in CEQ 2025: "Agencies must prioritize efficiency and certainty over any other policy objectives that could add delays and ambiguity to the permitting process." Regarding the different hatch that was used in **Figure 1.1-2** for Area B AM5, it was useful for some discussions in the SEIS to differentiate AM5 from the rest of Area B because it is the most recent addition to the mine.
0035-6 (9200)	Table 2.2-10 (p. 2-30) The Rosebud Mine's Annual Hydrology Report contains data collected over the water year: October 1st from the previous year to September 31st of the reporting year and not January through December. The data intervals reported in the table should be updated.	**Comment Response 0035-6: Table 2.2-10** was revised in the Final SEIS as suggested in the comment.
0035-7 (6001)	Section 2.6.3 Power Plants (p. 2-48) The SEIS states that coal from Area F is blended to produce the required quality at the power plants. The SEIS should address how blended coal would be sourced if the federal mine plan is altered, i.e. how would the loss of Area F coal affect the ability of the power plant to blend coal for the appropriate consistency?	**Comment Response 0035-7:** Text in the Final SEIS has been clarified to more clearly identify potential sources of coal for the Colstrip Power Plan (both from the Rosebud Mine and other sources). Westmoreland has indicated that they could supply the quantity and quality of coal needed for the Colstrip Power Plant to operate for approximately 18 months without Area F coal (Wooley 2024). Beyond that timeframe, there is uncertainty regarding production capacity and quality; Westmoreland estimates that production capacity from the mine could drop as much as 50 percent based on currently permitted areas (Wooley 2024). As discussed in SEIS **Section 2.2.6, Life of Operations**, the BLM estimates there are sufficient leased coal reserves within the Federal subsurface mineral estate to meet forecasted production levels (112.5 million tons) at the Rosebud Mine through 2060 (BLM 2024a); however, not all of the Federal coal is currently permitted. The Colstrip Power Plant could also use coal from sources other than the Rosebud Mine, but any alternative source of coal would need to meet the mercury, sodium, and BTU content requirements of the operator and the air quality permit.
0035-8 (6700)	Table 2.8-1, Row "Water Resources-Groundwater", Column "Alternative 4" (p. 2-56) An impact is listed as the reduction in baseflow for perennial and intermittent reaches of the major tributaries. The table should be updated to cite an authoritative source that identifies which tributaries are designated as intermittent or perennial. MDEQ's Area F CHIA only identified ephemeral drainageways within the Area F permit area (see CHIA Section 7.1.1).	**Comment Response 0035-8:** Based on the comment, the impact summary has been updated in the Final SEIS to better clarify groundwater impacts.
0035-9 (6600)	Table 2.8-1. Row "Water Resources – Surface Water", Column "Alternative 4" (p 2-56) The SEIS should be updated to note that stream flow may be indirectly affected by remedial activities associated with the Colstrip Power Plant. MDEQ is currently reviewing required Colstrip Power Plant remediation plans that are being implemented by the Colstrip Power Plant operator (Talen Montana) and overseen by MDEQ to remove surface water diversions and restore surface water flow in the former drainage area of Colstrip Units 1 & 2 Stage One Evaporation Ponds and Stage Two Evaporation Ponds. These changes may impact overland and stormwater flow into East Fork Armells Creek.	**Comment Response 0035-9:** See also Comment Responses 0029-42, 0029-52, 0029-66, 0035-38, and 0035-46. The following sections of the Final SEIS have been revised to be consistent with information contained in the referenced documentation: **Section 1.2.2.1, Colstrip Power Plant**; **Table 2.8-1, Summary of Direct and Indirect Environmental Impacts**; **Section 4.7.1.1, Analysis Methods, Indirect Effects (Surface Water)**; and **Section 4.7.3.3, Indirect Impacts (Surface Water Quality)**.
0035-10 (1400)	State Requirements, paragraph 1 (p. 3-30) The statement regarding protections afforded by the Montana Water Quality Act (MWQA) should be updated. MWQA prevents degradation from all sources. The last sentence in the paragraph should be clarified to: "The Montana Water Quality Act, which prevents degradation Page 3 of 13	**Comment Response 0035-10:** The suggested edit was incorporated into the Final SEIS.

Comment # (Issue Code)	Document #0035-Dan Walsh, MT DEQ	Response
	SEIS 0035 MDEQ Comments on SEIS for the Rosebud Mine Area F Mining Plan Modification January 21, 2025 of surface waters and groundwaters, including from discharges of mine wastewater and storm water, is also applicable."	
0035-11 (3602)	Table 3.7-3 (p. 3-33) The layout of Table 3.7-3 implies correlation between the sources, causes, and impairments although no such attribution has been made by MDEQ. The table should be edited to remove the row lines or otherwise alter to clarify that there is no established association between sources and causes; these associations will be determined during the Total Maximum Daily Load (TMDL) process.	**Comment Response 0035-11:** See also Comment Response 0038-50. The layout of **Table 3.7-3** in the Draft SEIS included row lines that inadvertently implied correlation between impairments, causes, and sources. The table has been edited in the Final SEIS to remove the row lines, which corrects the referenced inconsistency.
0035-12 (1400)	Surface Water Quantity and Quality, paragraph 2 (p. 3-34) The sentence stating "Neither SMCRA nor the applicable Federal rules provide a definition of material damage…" should be changed to "Neither SMCRA nor the applicable Federal rules provide a definition of material damage to the hydrologic balance…". There are SMCRA definitions for other types of material damage.	**Comment Response 0035-12:** The suggested edit was incorporated into the Final SEIS.
0035-13 (6600)	Table 3.7-4, Rows "Total Nitrogen" and "Total Phosphorus" (p. 3-36). DEQ-12A is still in effect for non-ephemeral streams and should be used as the standard for total nitrogen and phosphorous where applicable.	**Comment Response 0035-13:** The Final SEIS has been revised to include corresponding references to DEQ-12A.
0035-14 (6600)	Section 3.7.5.1 (p. 3-46) Please clarify that the flow data for springs may be a mix of groundwater discharge and surface runoff for some spring sites. The influence of surface runoff is evident in the spring flow datasets when short, large pulses of water are seen in otherwise low and steady discharge rates. Many of the springs monitored in the Area F vicinity are in ephemeral drainageways and therefore spring discharge measurement devices also record ephemeral runoff. Separation of the measured events into groundwater discharge vs a mix of discharge and runoff may be a better representation of the dataset and the actual conditions at these sites.	**Comment Response 0035-14:** The Final SEIS has been revised to better reflect the potential for a mixture of waters measured at spring sites.
0035-15 (6600)	Section 3.7.5.1 (p. 3-46) Montana has specific definitions and regulations for types of surface water. High quality waters are defined in Section 75-5-103, Montana Code Annotated, as state waters except those having zero flow or surface expression for more than 270 days during most years. Therefore, greater detail on the surface expression at these springs would be beneficial for determining the nature of these springs as defined under Montana's Clean Water Act.	**Comment Response 0035-15:** The Final SEIS has been revised to provide greater detail, where known, on the surface expression of springs.
0035-16 (6600)	Trail Creek (p. 3-47) Spring 7's dataset is an example where the surface water quantity measurements recorded a mix of groundwater discharge and runoff. DEQ's dataset indicates that the spring has a discharge rate between 1 to 3 gpm. The reported 11.4 gpm is likely an event where groundwater discharge co-mingled with ephemeral runoff and not a measurement of enhanced discharge from the spring. Therefore, the statement that "Spring 7 is always flowing with Page 4 of 13	**Comment Response 0035-16:** Thank you for your insight concerning Spring 7. The WE database noted two flow values of 11.4 gpm for Spring 7, one recorded January 10, 2022, with noted conditions of "40's and sunny," and one recorded April 20, 2023, with noted conditions of "30's and sleet." Both may be a reflection of conditions that created a mixture of surface water and groundwater for the Spring 7 flow that was measured and it is assumed DEQ is commenting on both measurements. The Final SEIS has been revised to reflect the additional data provided by DEQ for Spring 7 as well as general statement that the contribution of surface water runoff for a spring flow measurement is uncertain.

Comment # (Issue Code)	Document #0035-Dan Walsh, MT DEQ	Response
	SEIS 0035 MDEQ Comments on SEIS for the Rosebud Mine Area F Mining Plan Modification January 21, 2025 quantifiable flow up to 11.4 gpm" should be qualified to separate spring discharge from runoff measurements.	
0035-17 (3602)	McClure Creek (p. 3-48) The SEIS states" The Wetland Delineation Report found two wetlands on McClure Creek…". This should be changed to "The Wetland Delineation Report found two wetlands within the McClure Creek basin…" as the wetlands are on separate tributary branches.	**Comment Response 0035-17:** The Final SEIS has been revised accordingly.
0035-18 (3602)	McClure Creek (p. 3-48) The SEIS cites the PAP, Appendix B, Attachment B-P for references to wetland size and species. The permit's Appendix B, Attachment B-P is a copy of Administrative Rules of Montana (ARM) 17.30.1006, Groundwater Classification and Beneficial Uses and is not the appropriate citation. The aquatic survey data was initially submitted to MDEQ as Appendix R.	**Comment Response 0035-18:** The Final SEIS has been revised accordingly.
0035-19 (3602)	Robbie Creek (p. 3-48) CG-101 is stated as having peak flows of 36 cfs in May 2015. The hydrologic records submitted to MDEQ indicate a 36 gpm, not cfs, flow on May 5, 2015. CG-101 is also stated as having the highest recorded flow of 49 cfs in March 2020. The hydrologic records submitted to MDEQ indicate a 49 gpm instantaneous estimate on March 5, 2020.	**Comment Response 0035-19:** The Final SEIS has been revised with corresponding unit corrections.
0035-20 (3602)	Robbie Creek (p. 3-48) Crest gage sites (CG prefixed monitoring station names) cannot be used to characterize the duration of flow at a monitoring site. Crest gages measure only the peak flow over a period of time, and data at the Area F crest gages are generally only recorded monthly. Therefore, the presence of monthly crest gage marks should be used to state that at least one flow was measured during the monthly observational period. Crest gages should not be used as a basis for statements regarding constant flowing conditions. Hydrologic records submitted to MDEQ indicate that while crest gage readings were routinely recorded at CG-101, most site visits also observed dry, wet, or frozen conditions during the monthly visit.	**Comment Response 0035-20:** The Final SEIS has been revised to clarify the use of crest gage data.
0035-21 (3602)	Robbie Creek (p. 3-48) The observation of small fish in the 2013 Cedar Creek Associates Wetland Report at Wetland D is not supported by other baseline data. Fish species were not listed, and no photo of the fish were provided in the wetland report. The aquatic survey (ERM, 2015) did not find fish or any evidence of organism assemblages reliant on flowing water for a portion of their lifecycle at Wetland D. It was also noted in the wetland report that a road culvert essentially acted as a fish barrier.	**Comment Response 0035-21:** Thank you for the background information. The referenced sentence included in the 2024 Draft SEIS **Section 3.7.5.2, Streams in the Direct Effects Analysis Area** was not altered from that originally included in the 2018 Final EIS. The Final SEIS has been revised to incorporate this information.
0035-22 (3602)	Donley Creek (p. 3-49) SW-89 is stated as having peak flows of 16.6 cfs in June 2014. Continuous recorder data from June 2014 measured no flow at SW-89, but a site observation on June 9, 2014 recorded an estimate of 16.6 gpm based on an observed water depth. SW-89 is also stated as having a flow Page 5 of 13	**Comment Response 0035-22:** The Final SEIS has been revised with corresponding unit corrections.

Comment # (Issue Code)	Document #0035-Dan Walsh, MT DEQ	Response
	SEIS 0035 MDEQ Comments on SEIS for the Rosebud Mine Area F Mining Plan Modification January 21, 2025 of 3.7 cfs in October 2019. The hydrologic records submitted to MDEQ indicate an estimated flow of 3.7 gpm on October 7, 2019 and October 15, 2019.	
0035-23 (3602)	Donley Creek (p. 3-49) SW-90 is stated as having peak flows of 265 cfs in February 2014 and 2,032 cfs in March 2023. The hydrologic records submitted to MDEQ indicate an estimated flow of 265 gpm on February 18, 2014 and 2,633 gpm on March 14, 2023.	**Comment Response 0035-23:** The Final SEIS has been revised with corresponding unit corrections.
0035-24 (3602)	Donley Creek (p. 3-50) SW-200 is stated as having peak flows of 109 cfs in March 2023. The hydrologic records submitted to MDEQ indicate this flow was measured as 109 gpm on March 20, 2023.	**Comment Response 0035-24:** The Final SEIS has been revised with corresponding unit corrections.
0035-25 (3602)	Donley Creek (p. 3-50) CG-106 is stated as having peak flows of 24.7 cfs in March 2021. The hydrologic records submitted to MDEQ indicate this flow was measured as 24.7 gpm on March 3, 2021.	**Comment Response 0035-25:** The Final SEIS has been revised with corresponding unit corrections.
0035-26 (3602)	Black Hank Creek (p. 3-50) CG-100 is stated as having peak flows of 96.3 cfs in February 2021. The hydrologic records submitted to MDEQ indicate this flow was measured as 96.3 gpm on February 22, 2021.	**Comment Response 0035-26:** The Final SEIS has been revised with corresponding unit corrections.
0035-27 (6600)	Section 3.7.5.4 (p. 3-52) For the USGS gages, mean annual flow may not adequately characterize the flow due to the ability of high runoff events to skew the mean. At site 06294995, the 1994 mean annual flow was highly skewed by five days of exceptional flows. Removal those 5 days from the dataset adjusts the annual mean for 1994 from 17.4 cfs to 3 cfs. Rather than reporting mean annual flows, a better characterization method would be to compile the data and compute a median flow or simply show the recorded flow data as a graph without the use of summary statistics.	**Comment Response 0035-27:** The Final SEIS has been revised to include median flow statistics.
0035-28 (6600)	Section 3.7.6.1 (p. 3-54) Ephemeral drainageways are not subject to the numeric criteria of DEQ-7. Therefore aquatic life standards should not be compared to water quality data collected at the CG and SW stream monitoring sites stations which exhibit ephemeral characteristics.	**Comment Response 0035-28:** See also Comment Response 0035-63. **Appendix 3** tables (1, 2, 3, 25, and 26) and **Section 3.7.6.1, Water Quality in the Direct Effects Analysis Area, Streams in the Project Area** have been updated in accordance with the comment. **Section 3.7.1.1, Classifications and Standards** of the Final SEIS has been updated to summarize why the SEIS takes a different approach from the Area F CHIA for the application of water quality standards for ephemeral streams.
0035-29 (3602)	Section 3.7.6.1 (p. 3-55) When listing water quality exceedances for ponds and springs, please include a discussion of the likely sources of the exceedance.	**Comment Response 0035-29:** The Final SEIS has been revised to include brief statements of likely sources of exceedances where possible.
0035-30 (3602)	Effluent from MPDES Outfalls in the Project Area (p. 3-60) The SEIS notes that there was no effluent data for the November 2018 Federal Environmental Impact Statement. This statement could be clarified that Montana Pollutant Discharge Elimination System (MPDES) outfalls were not approved until June 1, 2020 with the approval of MPDES permit MT0031828. Page **6** of **13**	**Comment Response 0035-30:** The Final SEIS has been revised to include the requested statement.

Comment # (Issue Code)	Document #0035-Dan Walsh, MT DEQ	Response
	SEIS 0035 MDEQ Comments on SEIS for the Rosebud Mine Area F Mining Plan Modification January 21, 2025	
0035-31 (3602)	Effluent form MPDES Outfalls in the Project Area (p. 3-60) It should be noted that the June 2023 discharges were associated with a greater than 10-year, 24-hour storm event and therefore MPDES compliance criteria are for precipitation driven discharges greater than the 10-year, 24-hour storm. Any water quality comparisons to MPDES limits should likewise be adjusted in Appendix 3.	**Comment Response 0035-31:** The Final SEIS has been revised to include discussion about the level of storm event and corresponding MPDES compliance criteria.
0035-32 (3702)	Section 3.8.2.1, paragraph 1 (p. 3-64) The statement "some [springs] maintain perennial or intermittent reaches of streams" should include a reference to where the hydrologic condition of each spring and each stream is described within the SEIS. The MSUMRA statutory definition of stream conditions, contained within ARM 17.24.301, should also be cited in categorizing stream flow regimes. MDEQ's Area F CHIA describes each spring and stream condition within and adjacent to the Area F permit in detail.	**Comment Response 0035-32:** The quoted statement has been deleted from the Final SEIS since it does not provide relevant information regarding groundwater. In its place a reference to the surface water section is provided in case the reader wants additional context regarding spring contribution to stream reaches.
0035-33 (4702)	Table 3.18-1 (p. 3-107) An additional change to recreation in the analysis area was the approval of TR3 in 2020 for the Area A permit. This postmine land use change allowed for potential future undeveloped recreational use through a portion of the Area A permit.	**Comment Response 0035-33: Table 3.18-1** was revised as suggested by the commenter.
0035-34 (4902)	Table 3.20-1 (p. 3-109); Figure 4.7-1 (p. 4-61) The location of the county road and approved haul road configuration has changed since the 2018 EIS. As listed in Table 2.2-6, MR 15 and MR17 in 2022 revised road alignments to reduce hazards and environmental impacts.	**Comment Response 0035-34: Table 3.20-1** and **Figure 4.7-1** have been revised to reflect the changes from MR 15 and MR 17.
0035-35 (5202)	Table 3.23-1 (p. 3-112) Two additional changes to land use have occurred. TR3 was approved for Area A in 2020 for land use changes for recreation and industrial uses. TR2 was approved for Area D in 2021 for land use changes for industrial use.	**Comment Response 0035-35: Table 3.23-1** has been updated in the Final SEIS to include TR3 and TR2. Note that TR2 was discussed in the Draft SEIS in **Table 5.2-1** in the context of the Clearwater to Colstrip Transmission Line Project, which was considered in cumulative land use impacts.
0035-36 (6100)	Section 4.2.4, 4.6.4, and 4.6.5 (p. 4-5, 4-51) With regards to the long-term effects of differential erosion, DEQ does not believe that buttes would be likely to form where there are currently unmined drainage bottoms in the permit due to the forces of dynamic equilibrium. Drainages, even if their locations move over time, are unlikely to create a buttes due to the erosional forces that will maintain grade between unmined upstream and downstream drainages.	**Comment Response 0035-36:** The reference to differential erosion has been removed from the Final SEIS.
0035-37 (6400)	Surface Water and Groundwater Quality, paragraph 4 (p. 4-41) The mechanism for how recharge would be affected by mining and therefore how Total Dissolved Solids (TDS) would increase requires more explanation because these statements seem to contradict other statements about protection and minimization of impacts in the 2018 Page 7 of 13	**Comment Response 0035-37:** This section of the Final SEIS has been updated to incorporate the stated mechanisms from the Area F CHIA impacting hydrology to better support the conclusion that TDS would increase.

Comment # (Issue Code)	Document #0035-Dan Walsh, MT DEQ	Response
	SEIS 0035 MDEQ Comments on SEIS for the Rosebud Mine Area F Mining Plan Modification January 21, 2025 EIS. As discussed in the 2018 EIS, groundwater recharge areas have specific protection and reclamation requirements.	
0035-38 (6600)	Section 4.7.1.1, Indirect Effects, paragraph 3 (p. 4-53) Please update pond evaluation data or condition the statement to reflect changes since 2015. Using data from 2015 is outdated for evaluation of the current indirect impact from the operation and remediation activities under MDEQ's Major Facilities Siting Act (MFSA) certificate and the associated Administrative Order on Consent (AOC). Since 2018, Units 1&2 boilers/operations at the Colstrip Power Plant have been permanently retired (January 2020), operational dry disposal was implemented for the Units 3&4 boiler operations in 2022, and all three AOC areas of remediation have implemented groundwater capture and treatment systems and source controls that have affected groundwater and surface water quality data. MDEQ receives an Annual Hydrologic and Remediation Progress Report that includes data and data trend evaluations and can provide the 2023 data to EPA to update the EIS evaluation of the on-site disposal of coal combustion residuals and the remedial activities that have changed potential surface water impacts and known seepage to groundwater since 2015.	**Comment Response 0035-38:** See also Comment Responses 0029-42, 0029-52, 0029-66, 0035-9, and 0035-46. The following sections of the Final SEIS have been revised to be consistent with information contained in the referenced documentation: **Section 1.2.2.1, Colstrip Power Plant**; **Table 2.8-1, Summary of Direct and Indirect Environmental Impacts**; **Section 4.7.1.1, Analysis Methods, Indirect Effects (Surface Water)**; and **Section 4.7.3.3, Indirect Impacts (Surface Water Quality)**.
0035-39 (6600)	Sections 4.7.2 and 4.7.3.1 (p. 4-54, 4-55) The statement that areas reclaimed 40 years ago are still recovering is not necessarily pertinent to the discussion of Area F due to different hydrogeologic factors. Instead, site specific estimates may be more applicable. MDEQ's Area F CHIA made predictions about recovery at Area F (page 67): "Considering only the more reliable predictions, 90% recovery occurs in 66 years, and less than 5 feet of drawdown remains in 58 years."	**Comment Response 0035-39:** The sentence that the comment is referring to was located in five locations within the Draft SEIS. For the Final SEIS, the sentence has been replaced with DEQ's Area F CHIA prediction.
0035-40 (6600)	Section 4.7.2 (p. 4-54) The statement that flows may be eliminated in the following statement should be adjusted to be more specific about the exact location being discussed: "Stream flow from the upstream areas of the Black Hank Creek tributaries may be reduced or may not flow through the reclaimed area as some or all surface flow may infiltrate into the spoil rather than flowing to the lower portion of the watershed. Black Hank and Donley Creek stream flows in the project area would be reduced and may be eliminated except at locations upstream of the areas to be mined, resulting in a long-term, minor to moderate, and adverse impact." Upstream areas of Black Hank Creek outside of the permit area will not be affected by mining, and the mine plan is designed to minimize impacts on the creek bottom through the mine area therefore having little to no impact on flow through the permit from upstream sources to downstream sources. Since these drainages are ephemeral through the permit area, there is no baseflow that will be affected by mining. Tributaries that will be created in reclamation within the permit area will have different infiltration and runoff properties from premine drainages, but these unnamed tributaries should be discussed separately from the main channels themselves. The SEIS's Table 4.7-1 shows the theoretical reduction in flow from mining and demonstrates that flow will not be eliminated from the drainage basins during mining. Page **8** of **13**	**Comment Response 0035-40:** The Final SEIS has been revised to include more specificity of potential corresponding impact locations.

Comment # (Issue Code)	Document #0035-Dan Walsh, MT DEQ	Response
	SEIS 0035 MDEQ Comments on SEIS for the Rosebud Mine Area F Mining Plan Modification January 21, 2025	
0035-41 (6600)	Sections 4.7.2 and 4.7.3.2 Ponds (p. 4-54, 4-63) MDEQ's records indicate that Pond 4 has had a recordable water depth for 8 of 152 monthly visits with the predominant condition of the pond being dry. Therefore, the impacts to Pond 4 from mining upstream are likely minor and insignificant instead of the stated minor to moderate and adverse.	**Comment Response 0035-41:** The Final SEIS has been revised to include the monitoring details for Pond 4.
0035-42 (6600)	Section 4.7.3.1 (p. 4-55) The SEIS states that streams that will be affected that have Rosebud and/or McKay coal aquifer sources. Please include a reference to the locations of streams that have baseflow sourced from these units. As stated in MDEQ's Area F Cumulative Hydrologic Impact Assessment (page 43): "Streams within Area F, and generally continuing downstream from the disturbance and mine boundaries, flow ephemerally."	**Comment Response 0035-42:** The Final SEIS has been revised to remove the alluvium source noted. The spring source has been retained since some springs are shown to be impacted and the removal of this source would affect stream flows.
0035-43 (6600)	Section 4.7.3.2 Springs (p. 4-56) Impacts, if any, from county road construction on Spring 2 and 12 should be quantifiable since the road was constructed in 2022 and the SEIS uses data through 2023. Spring 13 is upstream from the county road relocation and was not directly affected by its construction. Spring 8 is within the life of mine disturbance boundary, but this spring remains undisturbed and it is therefore unlikely to be disturbed by mining activities in the future. It may however experience secondary impacts from mining upgradient of the spring.	**Comment Response 0035-43:** Thank you for the background information. The Final SEIS has been revised to incorporate additional corresponding detail on the referenced springs.
0035-44 (6600)	Table 4.7-1 (p. 4-58) MDEQ would recommend comparing the theoretical peak flows for the 2-year recurrence event prior to mining to measured peak flows from baseline monitoring stations. Additionally, peak flow reductions at the 100-year storm are likely overestimated since most mining ponds are not designed to retain the 100-year storm event. The assumptions in creating Table 4.7-1 should be given in detail including the area of each watershed assumed to be removed from contributing during mine operations.	**Comment Response 0035-44:** The Final SEIS has been revised to incorporate additional corresponding detail on the referenced watersheds and peak flows.
0035-45 (6600)	Section 4.7.3.2 Streams (p. 4-59) A citation to (DEQ 2015e) is given but this reference is not in the citation list. The citations should be updated to include a citation to DEQ 2015e. Greater detail on the specific hydrogeologic conditions where surface water flow was captured by groundwater infiltration at the Big Sky Mine should be given, in order to provide a comparison to the conditions at Area F.	**Comment Response 0035-45:** DEQ 2015e citation was part of the 2018 Final EIS and has been added to the Final SEIS. This is in regard to a telephone conference with Martin Van Oort, Pete Schade, Emily Hinz, and Jen Lane at DEQ with Barbara Galloway and Mike Galloway at ERO Resources Corporation. No additional information was provided.
0035-46 (6600)	Section 4.7.3.3, Surface Water Quality, last paragraph (p. 4-70) The analysis of total nitrogen would benefit from inclusion of water quality and flow measurements that MDEQ receives data from the Colstrip Power Plant operator, Talen Montana, annually. These reports include direct measurements of water quality and flow conditions in East Fork Armells Creek within EPA's modeled area. Trends in water quality and Page 9 of 13	**Comment Response 0035-46:** See also Comment Responses 0029-42, 0029-52, 0029-66, 0035-9, and 0035-38. The following sections of the Final SEIS have been revised to be consistent with information contained in the referenced documentation: **Section 1.2.2.1, Colstrip Power Plant; Table 2.8-1, Summary of Direct and Indirect Environmental Impacts; Section 4.7.1.1, Analysis Methods, Indirect Effects**; and **Section 4.7.3.3, Indirect Impacts, Surface Water Quality**.

Comment # (Issue Code)	Document #0035-Dan Walsh, MT DEQ	Response
	SEIS 0035 MDEQ Comments on SEIS for the Rosebud Mine Area F Mining Plan Modification January 21, 2025 flow can be provided for EPA evaluation of indirect effects from the 2023 Annual Hydrologic and Remedial Progress Report, Appendix L East Fork Armells Creek Synoptic Run Report 2023.	**Comment Response 0035-47:** The Final SEIS has been revised to incorporate additional corresponding details on the potential surface water interaction between the referenced spring and pond. **Comment Response 0035-48:** The referenced data included in the 2024 Draft SEIS was not altered from that originally included in the 2018 Final EIS but has been revised accordingly in the Final SEIS.
0035-47 (6600)	Ponds, paragraph 1 (p. 4-63) Pond 8 also likely receives a contribution of its water from Spring 14.	**Comment Response 0035-49:** The Final SEIS has been revised to summarize information contained in the referenced documents.
0035-48 (6600)	Floodplains (p. 4-64) The hydrologic records submitted to MDEQ indicate that the continuous recorder at SW-90 recorded a 360 cfs event in May 2013 for a maximum of 20 minutes and then was down to 45 cfs (May 18, 2013), not the 400 cfs reported in the text. The daily average flow from that event was 24 cfs.	**Comment Response 0035-50:** Spring 8 is located outside of the mine disturbance area. However, in **Table 4.8-1**, Spring 8 is not listed as being eliminated by mining; it is listed as the source of water (Rosebud or possibly clinker) being removed by mining since mining is happening upgradient of the spring. Although the Area F CHIA does recognize that at the time of its publication that mining would eliminate Spring 8 (current configuration would not eliminate the spring), the CHIA also notes "Avoidance of impacts at Spring 8 is not possible, as mining adjacent cuts would impact the water bearing source for this spring." Some uncertainty exists regarding mining impacts to Spring 8, but given that the source of water is possibly Rosebud and the source would be mined upgradient of the spring, the Final SEIS has been updated to indicate the possibility of the spring being impacted during mining. Spring 9 is located directly downgradient of, but not within, the mining footprint. The Final SEIS has been updated to reflect this and similar text used for Spring 8 has been applied to Spring 9 to recognize the possibility of impact due to the water source being mined.
0035-49 (6600)	Surface Water Quality Impacts (p. 4-64) MDEQ has discussed surface water impacts in detail for areas A, B, C, D, and E in previous Cumulative Hydrologic Impact Assessments (CHIAs). The most recent CHIAs were for Area B amendments 4 and 5, and these documents would provide an evaluation of impacts that could be used in this SEIS.	
0035-50 (6700)	Table 4.8-1 (p. 4-65) Due to the current configuration of the mine disturbance area, it is unlikely Spring 8 will be eliminated by mining. Spring 9 is located outside of the life of mine disturbance boundary and is likewise not predicted to be eliminated by mining. These springs may experience indirect impacts as mining commences around them.	
0035-51 (6700)	Streams (p. 4-66) MDEQ's CHIA for Area F discusses the impact from spoils on alluvial groundwater quality for each drainage and made predictions on the extent that impacts would be measurable. Alluvial water level measurements indicate that alluvium does not contribute to stream baseflow within the permit area.	**Comment Response 0035-51:** The Final SEIS has been revised to clarify that alluvial groundwater does not contribute to stream flow. The CHIA predictions for impacts from spoils to alluvial groundwater quality were added to the Final SEIS for each drainage analyzed.
0035-52 (6600)	Surface Water Hydrology, top paragraph continued from previous page (p. 4-69) The calculation of a 6% loss in the Armells Creek streamflow should be included and explained in detail. Since the drainages within the Area F permit boundary are ephemeral, it is unlikely that mining in Area F would significantly affect baseflow in the downstream sections of Armells Creek that are intermittent or perennial.	**Comment Response 0035-52:** See also Comment Response 0030-5. **Section 4.7.3.3, Indirect Impacts, Surface Water Hydrology** has been revised in the Final SEIS with updated hydrologic analyses that account for the relationship between geographic, topographic, and temporal factors that may influence streamflow in Armells Creek and the relative hydrologic contributions from its ephemeral tributaries within the Area F permit boundary.
0035-53 (6600)	Surface Water Quality, last paragraph (p. 4-70) The SEIS should be clarified to identify that the total nitrogen standard comes from DEQ-12A.	**Comment Response 0035-53:** The Final SEIS has been revised to include a corresponding reference to DEQ-12A.
0035-54 (6600)	Mining Period, paragraph 2 (p. 4-76)	
Comment is on next page	Page 10 of 13	

Comment # (Issue Code)	Document #0035-Dan Walsh, MT DEQ	Response
0035-54 continued (6600)	SEIS 0035 MDEQ Comments on SEIS for the Rosebud Mine Area F Mining Plan Modification January 21, 2025 MDEQ's Area F CHIA describes the hydrogeology within the permit area and no stream reaches within the permit area were identified as meeting the MSUMRA statutory definition of an intermittent or perennial stream. The SEIS contains statements that there are streams with baseflow within the permit boundary. The locations of baseflow streams should be identified on a map. The SEIS should be updated to align the stream classification with the statutory definitions.	**Comment Response 0035-54: Figure 3.7-1, Surface Water Direct Effects Analysis Area; Section 3.7.5.2, Streams in the Direct Effects Analysis Area**; and the sections noted in the comment have been revised accordingly in the Final SEIS to describe the hydrologic condition and statutory definition of each stream.
0035-55 (6600)	Surface Water Hydrology, paragraph 4 (p. 4-68); Streams, paragraph 1 (p. 4-66); Section 4.7.3.2 Streams (p. 4-57); Postmining Period, paragraph 3 (p. 4-79) MDEQ's Area F CHIA describes each stream condition within and adjacent to the Area F permit in detail, and MDEQ concluded that within the permit the stream condition is ephemeral. Descriptions of intermittent and perennial stream flow should include a reference back to elsewhere in the SEIS where the hydrologic condition of each stream is described and include a map showing the streams that have been designated as intermittent or perennial. The MSUMRA statutory definition of stream conditions, contained within ARM 17.24.301, should also be cited in categorizing stream flow regimes.	**Comment Response 0035-55:** See Comment Response 0035-54.
0035-56 (6700)	Groundwater Quality (p. 4-81) MDEQ's Area F CHIA looked at spoil wells elsewhere in the Colstrip area and provides an analysis of spoil recovery that could be used in this SEIS. The CHIA stated, on page 68, "Early data from wells often fluctuates in water quality, as initial resaturation occurs, but many wells appear to maintain a fairly consistent water quality after that time. Twenty-two spoil wells from throughout the mine have a history of water quality sampling and show relatively stable TDS concentrations." DEQ's Area F CHIA also makes quantitative predictions on the impact of spoil water on alluvial water quality that would be beneficial to cite when discussing changes in alluvial water quality.	**Comment Response 0035-56:** The text noted in the comment has been incorporated into the Final SEIS.
0035-57 (6700)	Table 4.8-2 (p. 4-82) Samples with abnormally high values that are extreme outliers from the rest of the dataset should be noted in the water quality summary table. Some extreme outliers can be linked to sampling or well integrity problems that are not representative of the overall hydrologic condition. For instance, the sample at WS-107 from 9/13/2019 which had an ammonia concentration of 22.9 mg/L also had field notes reporting strong odor and a black color, which was a singular event. Additionally, spoil water quality changes with time, and Table 4.8-2 should be changed to show individual spoil wells through time, which would be a more substantive representation of how spoil quality changes with time and water levels. The wells used in the statistical analysis should be listed.	**Comment Response 0035-57:** The wells used in **Table 2.8-2** have been added. The intent of the table was to summarize the existing data collected to date. The average number of samples evaluated for a given parameter is about 270. Individually removing or clarifying specific data points for such a large dataset misses the point of the table and has the potential to bias the summary statistics. Both minimum and maximum values have the potential to be outliers, however, they still inform the reader as to the potential water quality that may be achieved upon reclamation of Area F mining. In the Final SES narrative some additional text has been added to reflect spoil water quality changes with time, however, given the long-term impact for groundwater recovery of greater than 50 years, the summary of spoils data collected from 1978 to 2023 is considered commensurate. Concerning the specific sample result commented on, water with a black color and strong odor, presumably an odor indicating anaerobic conditions, has the potential to result in the nitrogen in the water taking the form of ammonia. Without field information indicating the sample integrity had been compromised following collection, it is assumed the data is representative of the well sampled at the time of collection. The benefit to the reader of listing the 25th, and 75th percentile along with the median, minimum, and maximum is that the reader can assess the skew of the data.
0035-58 (6700)	Section 4.8.3.2, Indirect Impacts, paragraph 2 (p. 4-83) Please revise the statement "Impacted groundwater is limited to the Colstrip Power Plant site" to clarify that impacted groundwater is not only directly beneath the Colstrip Power Plant Site. EPA may consider the following language, "Impacted groundwater is beneath the Colstrip Page 11 of 13	**Comment Response 0035-58:** The revisions noted have been incorporated into the Final SEIS.

Comment # (Issue Code)	Document #0035-Dan Walsh, MT DEQ	Response
	SEIS 0035 MDEQ Comments on SEIS for the Rosebud Mine Area F Mining Plan Modification January 21, 2025	
0035-58 continued (6700)	Power Plant Site, and previously extended beneath the adjacent properties within the City of Colstrip east of the Colstrip Power Plant Site. Groundwater contamination is also present on Colstrip Power Plant property beneath the former Units 1&2 Stage One Evaporation Pond and Stage Two Evaporation Ponds, and beneath the Units 3&4 Evaporation Holding Ponds. The MDEQ Administrative Order on Consent addresses the remediation and source control measures necessary to cleanup these groundwater areas." Section 4.8.3.2, Indirect Impacts, paragraph 3 (p. 4-83) The SEIS states "The groundwater impacts at the Colstrip Power Plant have been characterized, and groundwater impacts are currently being remediated via capture wells, preventing off-site migration. As a result of seepage from ponds to groundwater, the Colstrip Power Plant has modified its operations to use ponds with clay liners for only storm water runoff. CCR is currently being stored in synthetically lined ponds." MDEQ would like the statement revised to reflect the different types of remedial activities included in the cleanup of impacted groundwater from the Colstrip Power Plant. The MDEQ-selected remedies include operational changes for dry disposal activities at operational Units 3&4, along with groundwater capture and treatment in all three Administrative Order on Consent (AOC) areas in addition to source removal or mitigation and dewatering activities. Remedies will also likely include monitored natural attenuation and/or permeable reactive barriers to be employed in targeted areas in the future. Also, please see the comment from Page 4-53, Section 4.7.1.1. Analysis Methods, Indirect Effects, Paragraph 3.	
0035-59 (6700)		**Comment Response 0035-59:** The Final SEIS text has been revised accordingly.
0035-60 (6602)	Table 5.3-6, column "Cumulative Effects" (p. 5-25) It should be noted that the Big Sky Mine is now fully bond released. Additionally, the Absaloka mine, in the Sarpy Creek basin, should be included in the cumulative effects list under Other Coal Mines as it is an active coal mine within the analysis area. Additional pre-law coal mining areas also exist within the cumulative effects area.	**Comment Response 0035-60:** The Final SEIS has been revised to include corresponding statements on the requested mine areas.
0035-61 (7502)	Table 5.3-14, row "Operation of the power plants", column "Cumulative Effects" (p. 5-49) Please note additional potential adverse effects for drinking water access. Each alternative may adversely affect the City of Colstrip's water supply. Drinking water is supplied by the Colstrip Power Plant to Castle Rock Lake, which is also an operational surge pond under the operational MFSA certificate. The water in Castle Rock Lake is conveyed with Colstrip Power Plant infrastructure and under their owners' water rights. The removal of the Colstrip Power Plant could adversely affect the community's access to their drinking water supply since the City of Colstrip does not own the infrastructure or water rights. Please see Water Feasibility Study from November 2022 at the following link under "Coal Fired Generating Unit Remediation Act" and "Water Feasibility Study Final Study". https://deq.mt.gov/cleanupandrec/Programs/colstrip	**Comment Response 0035-61:** Pursuant to EO 14154, the discussions and analyses related to environmental justice were removed from the Final SEIS. Information regarding environmental justice can still be found in the 2018 Final EIS in **Sections 3.16**, **4.16**, and **5.3.15**. The potential adverse effects to drinking water access for the City of Colstrip have been included in the Final SEIS on **Table 5.3-4, Public Health and Safety: Summary of Cumulative Effects**. See also Comment Response 0029-54.
0035-62 (6600)	Appendix 3 Water Quality Tables The field notes and site conditions for those observations should be checked when extreme outliers are listed. The exceptionally high Spring 6 zinc and nickel values come from a July 26, Page **12** of **13**	**Comment Response 0035-62:** Compared to the other two Spring 6 samples analyzed in the SEIS dataset (October 2016 and March 2017), the July 2016 metals results are higher for some analytes like aluminum, boron, iron, manganese, nickel, and zinc while for other analytes like arsenic, cadmium, copper, lead, and selenium similar results are observed. In this instance, only the high results associated with nickel and zinc exceed applicable human health standards. Metals analysis by the laboratory are typically taken from a single sample bottle so selectively eliminating only certain analytes from a laboratory analysis run can be problematic. All July 26, 2016, Spring 6 data were reported in the Area F CHIA without any qualification or notes questioning the validity of the samples, identifying potential outliers, or noting the differences in relationship to the other sample results for certain metals results. The Final SEIS was not updated based on this comment.

Comment # (Issue Code)	Document #0035-Dan Walsh, MT DEQ	Response
0035-63 (6600)	SEIS 0035 MDEQ Comments on SEIS for the Rosebud Mine Area F Mining Plan Modification January 21, 2025 2016 sample that also has abnormally high Total Dissolved Solids. The condition of the spring at the time of the sample should be noted for this sample event. Appendix 3, Tables 1 through 3 Numeric water quality criteria in DEQ-7 and DEQ-12A do not apply to ephemeral drainageways. Water quality data from ephemeral stream sampling sites should not be compared to numeric standards in Table1, Table 2, or Table 3. Similarly, outfall discharge data should not be compared to DEQ-7 and DEQ-12A standards in receiving waters that are classified as ephemeral. Sincerely, Dan Walsh Air, Energy and Mining Division Administrator Montana DEQ Phone: (406) 444-6791 Email: dwalsh@mt.gov CC: Sonja Nowakowski Eric Dahlgren Page 13 of 13	**Comment Response 0035-63:** See also Comment Response 0035-28. **Appendix 3** tables (1, 2, 3, 25, and 26) and **Section 3.7.6.1, Water Quality in the Direct Effects Analysis Area, Streams in the Project Area** have been updated in accordance with the comment. **Section 3.7.1.1, Classifications and Standards** of the Final SEIS has been updated to summarize why the SEIS takes a different approach from the Area F CHIA for the application of water quality standards for ephemeral streams.

Comment # (Issue Code)	Document #0036-MT FWP	Response

SEIS 0036

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THE **OUTSIDE** IS IN US ALL.

Region 7
P.O. Box 1630
Miles City, MT 59301
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January 21, 2025

Rosebud Mine Area F Mining Plan Modification SEIS
C/O: Roberta Martinez Hernandez, OSMRE Western Regions 5, 7-11
P.O. Box 25065
Denver, CO 80225-0065

RE: Rosebud Mine Area F Mining Plan Modification Supplemental EIS

Dear Ms. Martinez Hernandez,

Thank you for the opportunity to respond to your request for scoping comments concerning the Rosebud Mine Area F Mining Plan Modification Supplemental EIS. Montana Fish, Wildlife & Parks (FWP) staff has reviewed the information provided.

0036-1 (6604 and 6704)

Based on observed degradation of water quality from mine seepage or pumping into Tongue River Reservoir at the East and West Decker Mines 30 years after initial mining activities in the 1970s, the following water quality concerns should be implemented for the Rosebud Mine Area F. Ensure pooling of surface water and ground water seepage (generally high in salinity) from or within the mined area is not allowed to discharge or seep (via subsurface clinker, sand, or gravel seems) into adjoining ephemeral creeks. As a proactive measure, through conditional permitting, require coal company to collect baseline water quality measurements at established monitoring sites in the following ephemeral streams within 5 creek miles downstream of the mine area. Water data should be collected for life of the mine or until mine reclamation is completed. Water quality data must be submitted to Montana DEQ as a condition of permitting for the mine. Water quality and quantity sampling should occur during active or just after active runoff events during spring months (March-May) and again in August during low or minimal surface water conditions. Water quality measurements should occur before mining occurs and at five-year intervals to monitor for changes in water quality and quantity. If water quality declines, or if increased flows occur downstream of

0036-2 (6603)

Comment Response 0036-1: Additional clarification has been added to the Final SEIS to better discuss the lack of interaction between groundwater and ephemeral streams/creeks. Ephemeral streams are located above the groundwater table and do not receive groundwater.

Comment Response 0036-2: Section 2.2.2.2, Area F Operations and Development of the Draft SEIS describes the established monitoring program and mitigation plans associated with Area F operations. **Section 3.7.1.2, Analysis Area (Surface Water)** of the Draft SEIS notes that "measurable direct effects are not expected to extend beyond the watersheds of Trail Creek, McClure Creek, Robbie Creek, Donley Creek, and Black Hank Creek."

Appendix 3 of the 2018 Final EIS provides a summary of the Area F baseline data for monitoring sites located within the five watersheds noted above including:
- Trail Creek (Pond 9; Spring 7)
- McClure Creek (Pond 8; Springs 10, 11, and 14)
- Robbie Creek (CG-101 and CG-102; Springs 2, 3, 12, and 13)
- Donley Creek (CG-106, SW-89, SW-90, and SW-200; Ponds 5 and 7; Springs 4, 5, 6, and 9)
- Black Hank Creek (CG-100, CG-103, and CG-105; MPDES Outfalls 005 and 009; Ponds 1, 2, and 4; Springs 1 and 8)

Sections 3.7.5.2, Streams in the Direct Effects Analysis Area; **3.7.5.3, Ponds in the Direct Effects Analysis Area;** and **3.7.6.1, Water Quality in the Direct Effects Analysis Area** provide detailed descriptions of corresponding monitoring activities. **Section 4.5, Public Health and Safety (Surface Water and Groundwater Quality)** of the Draft SEIS notes that "In the event that water quality standards are violated, the mine operators would be required to mitigate and remediate the violations and are subject to penalties for violating the terms of the permit." **Section 4.9.3.3, Replacement Water Sources and Replacement Process** of the Draft SEIS notes that "if a surface water right were to become unusable for its specified purpose due to flow or water quality changes, a suitable replacement source would be provided by Westmoreland Rosebud." No related changes were made to the Final SEIS narrative.

Comment # (Issue Code)	Document #0036-MT FWP	Response
0036-2 continued (6203)	SEIS 0036 mining activities, or if new saline seeps develop, the coal company must mitigate for any degraded water quality conditions. Following are priority sites downstream of the proposed mine area to monitor for the life of the mine: • Trail Creek, including Hayes Reservoir at 45.93892 -106.95745, and unnamed reservoir at 45.94170 -106.93363. • McClure Creek, including unnamed reservoir at 45.93028 -106.92868. • Robbie Creek. • Donley Creek. • Horse Creek. Thank you for inviting FWP to provide input on this project, and for your concern for Montana's wildlife resources. If you have further questions or need any additional consultation, please contact our regional Fisheries Manager, Mike Backes, at (406) 234-0925 or MiBackes@mt.gov. Thank you, Brad Schmitz FWP Region 7 Supervisor	**Comment Response 0036-2 Continued:** See the list of monitoring sites on the prior page.

Comment # (Issue Code)	Document #0038-Westmoreland	Response

SEIS 0046
Copy of SEIS 0038

WESTMORELAND

January 21, 2025

ATTN: Rosebud Mine Area F Mining Plan Modification SEIS
C/O: Roberta Martínez Hernández
OSMRE Western Regions 5, 7-11
P.O. Box 25065
Denver, CO 80225-0065
Email: rosebudmineareafseis@eroresources.com

RE: Westmoreland Rosebud Mining LLC's Comments on the Rosebud Mine Area F Draft Supplemental Environmental Impact Statement

Dear Ms. Hernández:

0038-1 (2200) This letter provides Westmoreland Rosebud Mining LLC's ("Westmoreland") formal public comments on the Rosebud Mine Area F Draft Supplemental Environmental Impact Statement (the "Draft SEIS"). As the permit holder, Westmoreland appreciates the Office of Surface Mining Reclamation and Enforcement's ("OSMRE") thorough analysis of the environmental impacts of ongoing Area F mining. Westmoreland supports OSMRE's proposed action, which would permit the company to continue mining its existing federal leases in Area F. **0038-2 (1301)** Westmoreland strongly opposes Alternative 1 (no action) and Alternative 5 (the 5-year mine plan alternative), which fail to meet OSMRE's statutory obligations to ensure maximum economic recovery of the coal resource and would amount to an unconstitutional taking of Westmoreland's lease rights. **0038-3 (6000)** Westmoreland also submits comments on several resource issues to provide additional information in support of OSMRE's National Environmental Policy Act ("NEPA") approach and requests refinement or clarification of some areas of the Draft SEIS. Westmoreland requests that this comment letter, attachments, and referenced materials be included as part of the administrative record in this matter.

The Draft SEIS Addresses in Full All NEPA Deficiencies Identified by the U.S. District Court.

0038-4 (1104) OSMRE completed the original EIS for the Area F mine plan in 2018. The purpose of the Supplemental EIS is to correct NEPA deficiencies identified by the U.S. District Court relating to four areas: (1) cumulative surface water impacts; (2) greenhouse gas emissions ("GHGs"); (3) power plant water withdrawals from the Yellowstone River; and (4) the lack of a "middle-ground" mining alternative. *See MEIC v. Haaland*, 2022 U.S. Dist. LEXIS 179417 (D. Mont. Sept. 30, 2022). The Draft SEIS addresses each of the deficiencies, as articulated by the court, and demonstrates full compliance with NEPA's environmental review and disclosure requirements.

0038-5 (6602) **Cumulative surface water impacts.** The District Court's concern regarding the 2018 surface water cumulative impact analysis was its lack of detailed discussion. The court noted that the EIS listed multiple actions that would cumulatively affect surface water, but that the impact analysis itself was limited to three conclusory sentences. *Id.* at *17-20. The court held that OSMRE could not rely on the detailed analysis prepared in the Montana Department of

1

P.O. Box 99, Colstrip, Montana 59323

Comment Response 0038-1: Commenter's preference for Alternative 4 (Proposed Action) is noted; the rationale provided for this preference will be considered by the decision maker.

Comment Response 0038-2: Commenters' opposition to Alternative 1 (No Action) and Alternative 5 (Partial Mining) is noted; the rationale provided by the commenter will be considered by the decision maker. The SEIS discloses in **Sections 2.4** and **2.6**, that under either Alternative 1 or 5 "Westmoreland Rosebud would not fully develop or maximize economic recovery of coal from Federal coal lease MTM 082186."

Comment Response 0038-3: Thank you for comments. Responses to each of the issues raised in your comments are in this appendix. All correspondences received during the public comment, include attachments and exhibits provided by commenters will be added to the project record.

Comment Response 0038-4: Comment noted. As discussed in **Section 1.3, Purpose and Need**, the SEIS was prepared "to fully analyze the environmental impacts associated with the proposed Federal mining plan modification for Rosebud Mine Area F. This analysis addresses the deficiencies identified by the United States District Court for the District of Montana, and updates other relevant information and analysis."

Comment Response 0038-5: Thank you for your comment. No related changes were made to the Final SEIS narrative.

Comment # (Issue Code)	Document #0038-Westmoreland	Response

WESTMORELAND

Environmental Quality's Cumulative Hydrological Impact Assessment ("CHIA") because the final CHIA was issued after the 2018 EIS and, therefore, the CHIA could not be incorporated by reference. *Id.* at 21-24.

Those errors are corrected now in the Draft SEIS. The cumulative impact analysis now properly incorporates the CHIA, which was issued prior to the Draft SEIS. Draft SEIS at 5-21. The CHIA itself concludes that the surface water impacts of Area F mining will not extend outside the cumulative impact area, which is defined approximately to include the West Fork Armells Creek drainage. Area F CHIA, at 19 ("As described, no measurable impacts to surface water are expected beyond the area identified as the cumulative hydrologic impact area."), 80 (conclusion reflecting same determination), attached as Exhibit 1. In other words, there will be no interaction of Area F surface water effects with other mine areas in the East Fork Armells Creek drainage. Westmoreland requests that OSMRE add a discussion in the Final SEIS that explains the limited extent of direct surface water impacts from mining. Moreover, the discussion of cumulative surface water impacts provides far more detail regarding the surface water impacts of other past, present, and reasonably foreseeable activities in the vicinity of the Rosebud Mine, including detailed discussions and quantification, where possible. Draft SEIS at 5-21 to 5-28.

Greenhouse gas emissions. The court's finding of error relating to the GHG impact analysis was limited to its determination that if an agency elects to quantify the benefits of a proposed action, it must also quantify the costs (or offer a non-arbitrary reason for deciding not to do so). *MEIC v. Haaland*, at * 25-27. While the court did not mandate that OSM apply the social cost of carbon ("SCC") methodology to quantify the costs of GHG emissions, it held that given the availability of quantification methodologies, the agency should have quantified the costs in some manner. *Id.* at 27-30. The Draft SEIS now includes a detailed and quantified analysis of direct and indirect GHG emissions in the context of emissions goals, the carbon budget, and through application of the SCC metric. Draft SEIS at 4-29 to 4-36, Appendix 2.

Yellowstone River water withdrawals. The court held that OSMRE erred in deciding not to analyze the environmental effects of the Colstrip Power Plant water withdrawals from the Yellowstone River. *MEIC v. Haaland*, at *30. The District Court Judge's decision was based on the findings and recommendations of Magistrate Judge Cavan, who reasoned, over the government's and Westmoreland's objection, that water withdrawals by the power plant (owned and operated by a separate entity and regulated by other state and federal agencies) were *indirect* effects of Area F mining. *MEIC v. Haaland*, Proposed Findings and Recommendations, No. 19-cv-00130-SPW-TJC, ECF No. 177 (D. Mont. Feb. 11, 2022). This finding was based on the Council on Environmental Quality ("CEQ") regulatory definition of indirect effects (40 C.F.R. § 1508.8(b) (2018)) and a constrained reading of U.S. Supreme Court binding precedent in *Dep't of Transp. v. Public Citizen*, 541 U.S. 752, 767 (2004).

Both the regulations and the judiciary's overly expansive treatment of "indirect effects" have recently come under scrutiny. In November 2024, the D.C. Circuit Court of Appeals held that CEQ lacks statutory authority to promulgate mandatory NEPA rules, calling into question the validity of the regulatory definition of indirect effects, among other regulatory constructs. *Marin Audubon Society v. Federal Aviation Administration*, 121 F.4th 902 (D.C. Cir. Nov. 12,

P.O. Box 99, Colstrip, Montana 59323

0038-5 continued (6602)

0038-6 (6600)

0038-7 (6602)

0038-8 (6300)

0038-9 (1000)

Comment Response 0038-6: As noted in **Section 3.7.1.2, Analysis Area** of the Draft SEIS, measurable direct effects are not expected to extend beyond the watersheds of Trail Creek, McClure Creek, Robbie Creek, Donley Creek, and Black Hank Creek. **Section 4.7.3.2, Direct Impacts, Surface Water Hydrology Impacts Streams** of the Final SEIS has been updated with this statement.

Comment Response 0038-7: Thank you for your comment. No related changes were made to the Final SEIS narrative.

Comment Response 0038-8: A detailed analysis of the social costs of GHG emissions was provided in Draft SEIS **Section 4.4.7.** EO 14154, *Unleashing American Energy* withdrew guidance, instructions, recommendations, and documents issued by the Interagency Working Group on the Social Cost of Greenhouse Gases, including the protocols for estimating social cost of carbon referenced in the Draft SEIS.

Comment Response 0038-9: OSMRE is aware of the November 12, 2024, decision in *Marin Audubon Society v. Federal Aviation Administration, No. 23-1067* (D.C. Cir. Nov. 12, 2024). EO 14154, *Unleashing American Energy* (January 20, 2025), and a Presidential Memorandum, *Ending Illegal Discrimination and Restoring Merit-Based Opportunity* (January 21, 2025), require the DOI to strictly adhere to NEPA 42 U.S.C. 4321 *et seq*. Further, such Order and Memorandum repeal EOs 12898 (February 11, 1994) and 14096 (April 21, 2023). Because EOs 12898 and 14096 have been repealed, complying with such EOs is a legal impossibility. OSMRE verifies that it has complied with the requirements of NEPA, 42 U.S.C. 4321 et seq.; DOI's regulations and procedures implementing NEPA at 43 CFR 46 the Departmental Manual (516 DM 1), and the President's January 2025 Order and Memorandum. See also CEQ 2025 Memorandum and February 25, 2025 CEQ rulemaking, which removed the CEQ NEPA regulations from the CFR (90 Federal Register 10610).

Comment # (Issue Code)	Document #0038-Westmoreland	Response

SEIS 0046
Copy of SEIS 0038

WESTMORELAND

2024).[1] Further, the very question of the scope of an agency's obligation to consider downstream environmental effects over which the agency lacks jurisdiction or control is before the U.S. Supreme Court this term in *Seven County Infrastructure Coalition, et al. v. Eagle County, et al*., No. 23-975, 2024 U.S. LEXIS 2764 (U.S. 2024). That decision could reaffirm that OSMRE is not required to consider impacts under the jurisdiction of other state and federal agencies.

0038-10 (6700)

Regardless of legal questions over the proper scope of OSMRE's indirect effects analysis, OSMRE has now included a detailed discussion of Yellowstone River water withdrawals in the Draft SEIS. OSMRE provides data to show that power plant water use is miniscule compared to the overall Yellowstone River flows at the point of diversion, amounting to an average of 0.7% of total river flow. Draft SEIS at 4-67 to 4-68. Indeed, daily natural fluctuations in river flow are generally greater than the water withdrawal for the power plant making water use "insignificant" to the overall flow and largely undetectable in the Yellowstone River. *Id*. Thus, OSMRE also concludes that "any resulting indirect effects of the diversion on [pallid] sturgeon would likely not be discernable." *Id*. at 4-123; *see also id.* at 4-131.

0038-11 (7200)

"Middle-ground" mine alternative. The final NEPA error identified by the court was OSMRE's failure to analyze a "middle-ground" mine alternative in the EIS. The court held that the two action alternatives were too similar, that a "middle-ground" alternative "was in-fact feasible," and that OSMRE should have considered it in detail. *MEIC v. Haaland*, at *32-39. OSMRE has now remedied that error by including a detailed analysis of Alternative 5 (the 5-year mine plan alternative) in the SEIS. Though Westmoreland strongly objects to the alternative because it fails to meet the agency's purpose and need and violates the company's lease rights (discussed in more detail in the next section), Alternative 5 fulfills the agency's NEPA obligation as interpreted by the Montana District Court.

0038-12 (2301)

* * *

0038-13 (1000)

In addition to addressing the four specific deficiencies identified by the court, OSMRE states that the Draft SEIS "updates and supplements analyses related to potential impacts on the other resources as determined necessary by OSMRE." Draft SEIS at 1-2. To the extent that OSMRE has engaged in analysis of resources and issues that were not found lacking by the court, that extra effort was unnecessary. Other than the four NEPA errors identified, no other analyses were deficient, and no additional or updated review was required. OSMRE's voluntary decision to update analyses that went unchallenged or were upheld in the 2018 EIS are not new bases for challenge by environmental groups. The SEIS is not an opportunity for a second bite-at-the-apple to challenge issues and analyses that were previously found to be adequate or on which prior argument was waived.

Support for the Proposed Action (Alternative 4).

0038-14 (2200)

Westmoreland supports OSMRE's selection of the proposed action (Alternative 4) as the preferred alternative in the Final SEIS and for implementation in the Record of Decision. The proposed action is the only alternative that meets the agency's purpose and need, is consistent

[1] Both the petitioner and the government sought rehearing *en banc* by the full D.C. Circuit.

3

P.O. Box 99, Colstrip, Montana 59323

Comment Response 0038-10: Thank you for your comment. No additional changes were made to the Final SEIS narrative.

Comment Response 0038-11: Yes, based on the hydrologic analysis presented in the SEIS and detailed further in the BA, the conclusion was that any indirect effects of the diversion continuing to operate would not have discernable effects on pallid sturgeon.

Comment Response 0038-12: OSMRE agrees that Alternative 5 fulfills the requirements of the court order to analyze a reasonable range of alternatives in compliance with NEPA. See Comment Response 0038-20 (Fifth Amendment).

Comment Response 0038-13: OSMRE was required by the 2022 court order to remedy certain resource-specific impacts analyses associated with approval of a Federal mining plan modification through a remedial NEPA analysis. OSMRE used its discretion to make these corrections in a supplemental EIS and determined that it was also appropriate to evaluate if there were new circumstances or information relevant to environmental concerns and bearing on the proposed action or its effects. The SEIS discloses changes to the proposed action and spectrum of alternatives in **Chapter** 2 and updates circumstances or information, as relevant, in **Chapters 3** and **4**. As noted in the SEIS Executive Summary, recent regulatory and caselaw changes indicate that this NEPA analysis now contains significantly more analysis and information on environmental effects than is required under NEPA because of DOI's new regulations and *NEPA Handbook* and the Supreme Court's decision in *Seven County*.

Comment Response 0038-14: Commenter's preference for Alternative 4 (Proposed Action) is noted; the rationale provided for this preference will be considered by the decision maker.

Comment # (Issue Code)	Document #0038-Westmoreland	Response

WESTMORELAND

with state laws for full resource recovery, and avoids an unconstitutional taking of Westmoreland's property rights in pre-existing federal coal leases. While Westmoreland understands that OSMRE was compelled to include Alternative 5 (the 5-year mine plan alternative) in the SEIS, it is not legally available for selection as a reasonable alternative for the following reasons.

0038-15 (2301)

First, OSMRE's choice of alternatives must be guided by its purpose and need. 42 U.S.C. § 4332(2)(C)(iii). The "purpose and need" must "briefly summarize the underlying purpose and need for the proposed agency action." *Id.* § 4336a(d). An agency's definition of purpose and need is subject to a "rule of reason." *Citizens Action Coal. of Ind. v. FERC*, 2025 U.S. App. LEXIS 246, *7 (D.C. Cir. Jan. 7, 2025). Where the agency is responding to a private proposal, it "may accord substantial weight to the preferences of the applicant and/or sponsor." *City of Grapevine v. Dep't of Transp.*, 17 F.3d 1502, 1506 (D.C. Cir. 1994). The agency must also incorporate "the views of Congress, expressed . . . in the agency's statutory authorization to act, as well as in other congressional directives." *Citizens Against Burlington v. Busey*, 938 F.2d 190, 196 (D.C. Cir. 1991).

0038-16 (1301)

Here, OSMRE's purpose and need must reflect its statutory obligation under the Surface Mining Control and Reclamation Act ("SMCRA"), which directs the agency that "no mining operating plan shall be approved which is not found to achieve the *maximum economic recovery* of the coal within the tract." 30 U.S.C. § 201(a)(3)(C) (emphasis added); *see also* 30 C.F.R. § 816.59 ("Surface mining activities shall be conducted so as to maximize the utilization and conservation of the coal, while utilizing the best appropriate technology currently available to maintain environmental integrity, so that re-affecting the land in the future through surface coal mining operations is minimized."). OSMRE must include this statutory obligation among the bases for its choice among alternatives (*see* Draft SEIS at 1-18, Section 1.4.1.1) and, ultimately, the requirement to maximize coal recovery must guide the agency's recommendation to the Department of the Interior Assistant Secretary for Lands and Minerals. Alternative 5, which would artificially and unnecessarily cut off the mine plan in 2030, leaving millions of tons of federal coal in the ground and failing to meet the standard to "maximize the utilization and conservation of the coal," does not meet OSMRE's statutory obligation or purpose and need.

0038-17 (2301)

Second, OSMRE's statutory obligation to maximize coal utilization is entirely consistent with Montana law that requires Westmoreland to implement a coal conservation plan ensuring development of "all the mineable and marketable coal." ARM 17.24.322. The Montana mine plan permit must achieve this benchmark and limiting the mine plan to five years and foregoing development of "all the mineable and marketable coal" in Area F would violate this standard.[2] Alternative 5, which deliberately leaves millions of tons of mineable and marketable coal in the ground, cannot be squared with Montana law. This means that even if OSMRE were to choose

0038-18 & footnote[2] (1302)

0038-19 (2301)

[2] Exceptions to Montana's requirement to mine all mineable and marketable coal apply if (1) the coal cannot be mined based on the method of operation and marketability, or (2) it is necessary to leave coal in the ground to comply with the Montana State Underground Mining and Reclamation Act (e.g., if mining would damage the hydrologic balance outside the permit area). ARM 17.24.322(2)(b). Indeed, this is precisely the reason the MDEQ determined in 2019 that it would not permit mining on a 74-acre area withheld from the Area F final permit—MDEQ found that mining there would damage the hydrologic balance outside the permit area. No similar determination exists for the remainder of Area F.

P.O. Box 99, Colstrip, Montana 59323

Comment Response 0038-15: Commenter's opposition to Alternative 5 (Partial Mining) is noted; the rationale provided for this preference will be considered by the decision maker.

Comment Response 0038-16: The purpose and need statement in **Section 1.3** of the Draft SEIS is consistent with guidance in DOI's NEPA regulations in effect at the time of publication of the Draft SEIS, specifically 43 CFR 46.420(a), as well as the guidance in the OSMRE *NEPA Handbook* Section 8.2. Additionally, Section 2.2. of DOI's recently updated *NEPA Handbook* reaffirms that the purpose and need for a proposed action should be based on the bureau's statutory authority and, where the proposed action concerns a bureau's duty to act on an application for authorization, the purpose and need for the proposed action should also be informed by the goal of the applicant. No changes were made to the statement in the Final SEIS. See also Comment Response 0019-17 (reasonable range of alternatives) and Comment Response 0029-36 (purpose and need).

Comment Response 0038-17: Commenter's opposition to Alternative 5 (Partial Mining) is noted; the rationale provided for this preference will be considered by the decision maker.

Comment Response 0038-18: See also Comment Response 0038-16. OSMRE agrees that state and federal laws are consistent regarding maximum economic recovery of coal. As disclosed in **Section 1.4, Agency Authority and Actions** in both the 2018 Final EIS and the Draft SEIS, "Under Section 1273(c) of SMCRA, a state with a permanent regulatory program approved by the DOI Secretary, such as DEQ, can elect to enter into a cooperative agreement for state regulation of surface coal mining and reclamation operations on Federal lands within the state . . . DEQ regulates permitting and operation of surface coal mines on Federal lands within Montana under the authority of MSUMRA, Section 82-4-221, MCA . . . The state-Federal Cooperative Agreement (Agreement) between DEQ and OSMRE is codified in 30 CFR § 926.30."

Comment Response 0038-19: Commenter's opposition to Alternative 5 (Partial Mining) is noted; the rationale provided for this preference will be considered by the decision maker.

Comment # (Issue Code)	Document #0038-Westmoreland	Response
0038-20 (1301)	SEIS 0046 Copy of SEIS 0038 WESTMORELAND it, it is highly questionable whether the Montana Department of Environmental Quality ("MDEQ") could even permit it. Third, related to the purpose and need, OSMRE cannot ignore Westmoreland's pre-existing and valid federal lease rights in its final decision. The Bureau of Land Management issued valid leases for Area F that are currently held by Westmoreland. Draft SEIS at 1-14. OSMRE claims in the Draft SEIS that its decision requires "selection of an action that meets the legal rights of Westmoreland," Draft SEIS at 1-18, but the agency fails to explain that any decision to arbitrarily limit access to five years and shut down mining in 2030 amounts to an unconstitutional taking of a Westmoreland's property interest, in violation of the Fifth Amendment.	**Comment Response 0038-20:** See also Comment Response 0019-17 (reasonable range of alternatives). The SEIS discloses in **Sections 2.4** and **2.6**, that under either Alternative 1 or 5 "Westmoreland Rosebud would not fully develop or maximize economic recovery of coal from Federal coal lease MTM 082186." SEIS **Section 1.3, Purpose and Need**, discloses that "Westmoreland's need for the action is to exercise its valid existing rights granted by the Bureau of Land Management (BLM) under Federal coal lease MTM 082186 to access and mine undeveloped Federal coal resources located in the project area." The DOI ASLM, acting on behalf of the Secretary of Interior, has broad authority to place conditions on a Federal mining plan. Whether the conditions outlined in Alternative 5 are legally enforceable would be a decision for the courts. This issue does not affect the validity of Alternative 5 for consideration and analysis in the SEIS.
0038-21 & footnote[3] (1301)	OSMRE attempts to avoid the constitutional implications of Alternative 5 by acknowledging that even if it were to choose the 5-year mine plan alternative, it cannot cancel or extinguish Westmoreland's rights to mine the whole of Area F and Westmoreland could re-apply for a permit to mine beyond 2030. Draft SEIS at 2-47 to 2-48. While it may be true that Westmoreland could re-apply, OSMRE cannot impose an arbitrary time limit on mining for the sole purpose of pushing forward administrative policy goals to end coal mining or to achieve artificial emissions goals that fulfill political promises. Nowhere does SMCRA authorize the agency to ignore its statutory obligation to maximize economic recovery under the pretext of climate change. Requiring Westmoreland, which has already submitted the necessary information to obtain both state and federal approval to mine Area F in its entirety,[3] to resubmit the same information in five years for another round of NEPA review not only causes costly disruption, delay, and uncertainty in the mining operations, but it is the height of agency inefficiency.	**Comment Response 0038-21:** See Comment Response 0039-20.
0038-22 (2200)	For all of these reasons, Westmoreland strongly urges OSMRE to choose Alternative 4 (the proposed action) as the preferred alternative in the Final SEIS and implement Alternative 4 in the Record of Decision. Neither Alternative 1 (no action) nor Alternative 5 (the 5-year mine plan alternative) meet the purpose and need or honor Westmoreland's lease rights. And both would lead to premature mine closure,[4] as discussed in more detail in the section regarding socioeconomic effects below.	**Comment Response 0038-22:** Commenter's preference for Alternative 4 (Proposed Action) is noted; the rationale provided for this preference will be considered by the decision maker.
0038-23 (2302)	**The 5-Year Mine Plan Alternative (Alternative 5) Under-Reports Impacts By Failing to Account for Reasonably Likely Substitution.** OSMRE's impact analysis for Alternative 5 (the 5-year mine plan alternative) is based on the false premise that if Area F coal becomes unavailable, the Colstrip Power Plant, which currently buys all of its coal from the Rosebud Mine, will quit operating. Thus, the impact	**Comment Response 0038-23: Comment response is on the following page.**
0038-24 footnote[4] (1000)	[3] Excepting the 74-acre area that was not permitted based on MDEQ's finding of damage to the hydrologic balance outside of the permit area. [4] OSMRE acknowledges throughout the Draft SEIS that shutting down Area F mining in 2025 or 2030 is likely to lead to premature mine closure. And yet recently, the Bureau of Land Management Miles City Office relied heavily on a Rosebud Mine closure date of 2060 as a basis for choosing to eliminate future federal coal leasing in its Resource Management Plan. Draft SEIS at 3-15, 3-96. The federal agencies appear to be inconsistent in their view of the life of the mine, with BLM citing the long-term mining potential as a reason to foreclose mining elsewhere and OSMRE in this Draft SEIS considering alternatives that would shorten the life of the mine by decades. 5 P.O. Box 99, Colstrip, Montana 59323	**Comment Response 0038-24:** As discussed in SEIS **Section 2.2.6, Life of Operations**, the BLM estimates there are sufficient leased coal reserves within the Federal subsurface mineral estate to meet forecasted production levels (112.5 million tons) at the Rosebud Mine through 2060 (BLM 2024a); however, not all of the Federal coal is currently permitted. SEIS Alternatives 1 and 5 consider scenarios where maximum economic recovery of the leased coal reserves in Federal coal lease MTM 082186 would not occur. Future production from the Rosebud Mine, and therefore the life of operations, will depend on several factors, including market conditions and permitting of federal coal.

Comment # (Issue Code)	Document #0038-Westmoreland	Response
0038-23 continued (2302) 0038-25 (1001) 0038-26 (6300) 0038-27 (6000) 0038-28 (6200)	SEIS 0046 Copy of SEIS 0038 WESTMORELAND analysis wrongly assumes that water withdrawals, GHG emissions, and other impacts of power plant operations will immediately cease when Area F mining ends. This result, however, is not reasonably foreseeable, and OSMRE must clarify that the Rosebud Mine could supply coal from other mine areas for approximately 18 months and, beyond that, the Colstrip Power Plant would likely procure coal from another mine to continue operations regardless of the fate of Area F. The background to support the Colstrip Power Plant's likely survival is already set out in the Draft SEIS. The Draft SEIS explains that the Rosebud Mine and the Colstrip Power Plant are not inextricably linked. As recently as 2010, Westmoreland shipped coal by rail to other power customers. Draft SEIS at 1-11, 2-2. And the Colstrip Power Plant no longer needs a permit amendment to buy and burn coal from other mines. *Id.* at 1-13. The Colstrip Power Plant could shift to other coal if the Rosebud Mine shutters, as acknowledged repeatedly in the SEIS. Draft SEIS at 2-38, 2-43, 2-48. Indeed, current power plant owners intend to keep the plant open until at least 2042 (Draft SEIS at 1-12), and will undoubtedly pursue alternative coal sources, if necessary. While obtaining supply from another coal mine might take time as the Colstrip Power Plant retools its units and upgrades its infrastructure, the power plant and its operational impacts will not end with Area F coal. Ironically, if Area F closes, the impacts of power plant operations will likely be greater. First, the Rosebud Mine can supply coal to the Colstrip Power Plant from other mine areas for approximately 18 months. However, that coal has much greater strip ratios, meaning the mine must move more overburden to recover this different coal, causing greater GHG emissions to mine the same amount of coal. After 18 months, capacity at the Rosebud Mine drops dramatically and the mine likely cannot meet the blended coal requirements at the power plant. This means that the power plant will be forced to import different, more costly coal from another area of the country and possibly outside of Montana to continue operations. Such a shift would involve significant transportation costs, and more importantly, additional GHG emissions, as coal would need to be transported by rail or truck over long distances. As explained in the expert declaration of Dr. Timothy Considine in litigation over the 2019 Area F mine plan authorization, such a scenario would have the unintended, but real consequence of further increasing the environmental impacts of power plant operations. *See* Considine Decl. ¶ 9, *MEIC v. Haaland*, No. 19-cv-00130-SPW-TJC, ECF No. 73-4 (Sept. 18, 2020), Exhibit 2. Post-Area F operations of the Colstrip Power Plant, including increased GHG emissions from transporting coal, are not addressed in the impact analysis for Alternative 1 or Alternative 5. This creates an artificial difference in impacts for comparison among alternatives that does not actually exist. Consider the following resources. • **Air Quality.** The analysis assumes that under Alternative 5 emissions of criteria and hazardous air pollutants will end in 2030 with Area F. Draft SEIS at 2-55, 4-21 to 4-22; *see also id.* at 4-7 (same for Alternative 1). While this may be true for direct effects of mining in Area F, the Colstrip Power Plant will continue to operate and indirect effects of coal combustion on air quality will continue. The claim that impacts to visibility and air quality of Alternative 5 will be 9 years shorter than under the proposed action is false. *See id.* at 4-21. 6 P.O. Box 99, Colstrip, Montana 59323	**Comment Response 0038-23:** Commenter misinterprets the Alternative 5 indirect effects analyses in the SEIS. OSMRE does not assume that water withdrawals, GHG emissions and other impacts of power plant operations will immediately cease when Area F mining ends. Rather, the SEIS notes that those indirect impacts would no longer be attributable to combustion of Area F coal once mining in Area F ends. The SEIS assumes that the Colstrip Power Plant would continue to operate through 2042, including any associated impacts. See also Comment Response 0029-37 (reasonable assumptions about future operation of the power plant). The language describing Alternative 1 and Alternative 5 indirect impacts has been clarified in the SEIS to ensure the impact meaning is conveyed. **Comment Response 0038-25:** The SEIS assumes that the Colstrip Power Plant would continue to operate through 2042, including any associated impacts. See Comment Response 0029-37 (reasonable assumptions about future operation of the power plant). **Comment Response 0038-26:** For analysis purposes, OSMRE needed to make certain reasonable assumptions considering incomplete or uncertain information, which is consistent with NEPA, Section 106(3)(B). In the SEIS, it is assumed that the Colstrip Power Plant would continue to operate through 2042, regardless of whether Area F coal is available or not. The SEIS discloses that the power plants could use alternative sources to Area F, including coal from other permit areas of the Rosebud Mine or other mines. To analyze GHG emissions of shipping coal seems speculative given that there is still coal available from the Rosebud Mine (that is permitted) and additional lease reserves that could be permitted. See also Comment Response 0029-37 (reasonable assumptions about future operation of the power plant) and Comment Response 0038-23 (Alternative 5 indirect effects). **Comment Response 0038-27:** See Comment Response 0038-26. **Comment Response 0038-28:** See also Comment Response 0038-23 (Alternative 5 indirect effects). OSMRE does not assume that air quality impacts of the power plants will end after mining in Area F ceases. Rather, the SEIS notes that those indirect impacts would no longer be attributable to combustion of Area F coal once mining in Area F ends. The SEIS assumes that the Colstrip Power Plant would continue to operate through 2042, including any associated impacts. The language describing Alternative 1 and Alternative 5 indirect impacts has been clarified in the Final SEIS to ensure the impact meaning is conveyed.

Comment # (Issue Code)	Document #0038-Westmoreland	Response
0038-29 (6300)	SEIS 0046 Copy of SEIS 0038 WESTMORELAND • **Climate Change.** Similar to air quality, the climate change analysis assumes that Units 3 and 4 at the Colstrip Power Plant will shut down as soon as Area F becomes unavailable. *Id.* at 2-55, 4-27, 4-36. This error is highlighted in OSMRE's SCC calculation for indirect GHG emissions, which falls to zero at the point where Area F shuts down under each alternative. *See id.* at 4-34 (Table 4.4-10, calculating SCC only for emissions during years Area F is mined), 4-36. OSMRE relies on this unwarranted assumption to claim emissions from Alternative 5 will be half of those for Alternative 4. *Id.* at 4-36. OSMRE also points to this assumption as one basis for its conclusion that Alternative 1 (no action) would not contribute to additional global GHG emissions and is therefore the environmentally preferred alternative.[5] *Id.* at 2-53. These claims can only be credited if the agency wholly ignores the reasonably foreseeable indirect effect of shutting down Area F—the power plant will obtain its coal elsewhere and continue to operate with even greater emissions.	**Comment Response 0038-29:** See also Comment Response 0038-23 (Alternative 5 indirect effects) and Comment Response 0029-37 (reasonable assumptions about future operation of the power plant). OSMRE does not assume that climate impacts (e.g., GHG emissions, etc.) of the power plants will end after mining in Area F ceases. Rather, the SEIS notes that those indirect impacts would no longer be attributable to combustion of Area F coal once mining in Area F ends. The SEIS assumes that the Colstrip Power Plant would continue to operate through 2042, including any associated impacts. The language describing Alternative 1 and Alternative 5 indirect impacts has been clarified in the Final SEIS to ensure the impact meaning is conveyed.
0038-30 (6600)	• **Surface Water.** The indirect impact analysis for surface water includes impacts of Colstrip Power Plant operations based on water withdrawals from the Yellowstone River and depositional impacts of air emissions. Again, OSMRE declares that Alternative 5 will have fewer impacts by assuming that the power plant will shut down when Area F does. *See id.* at 4-55 (Yellowstone withdrawals and trace metal deposition on surface waters are assumed to stop in 2025 under Alternative 1), 4-73 (assumed to stop in 2030 for Alternative 5). This is incorrect.	**Comment Response 0038-30:** See also Comment Response 0038-23 (Alternative 5 indirect effects) and Comment Response 0029-37 (reasonable assumptions about future operation of the power plant). OSMRE does not assume that impacts associated with Colstrip Power Plant's water withdrawals from the Yellowstone River will end after mining in Area F ceases. Rather, the SEIS notes that those indirect impacts would no longer be attributable to combustion of Area F coal once mining in Area F ends. The SEIS assumes that the Colstrip Power Plant would continue to operate through 2042, including any associated impacts. The language describing Alternative 1 and Alternative 5 indirect impacts has been clarified in the Final SEIS to ensure the impact meaning is conveyed.
0038-31 (6000)	OSMRE's analysis must focus on reasonably foreseeable actions and effects. Here, closure of Area F does not mean the power plant will close, and the Final SEIS should incorporate analysis that acknowledges that ongoing power plant operations are reasonably foreseeable regardless of Area F mining. Indirect effects of power plant operations should continue under all alternative scenarios.	**Comment Response 0038-31:** See also Comment Response 0038-23 (Alternative 5 indirect effects) and Comment Response 0029-37 (reasonable assumptions about future operation of the power plant). Commenter misinterprets the indirect effects analyses in the SEIS. The language describing Alternative 1 and Alternative 5 indirect impacts has been clarified in the Final SEIS to ensure the impact meaning is conveyed.
0038-32 (7400)	Conversely, if OSMRE is going to assume all impacts of power plant operations cease with Area F mining, it is obligated to also disclose the significant and devastating effects of power plant closure on over 500 employees that work there, on the community of Colstrip, and on the reliability for the regional power grid, which will be compromised without Colstrip's baseload power. OSMRE cannot have it both ways—claiming all environmental impacts of power plant operations end in 2030 under Alternative 5, but that the beneficial socioeconomic effects will continue.	**Comment Response 0038-32:** For consistency throughout the SEIS, the same timeframes were used to analysis each resource. It was assumed that under Alternative 1, Area F mining would end in 2025; under Alternative 4, Area F mining would end in 2039; and under Alternative 5, Area F mining would end in 2030. It was also assumed that the operational life of the Rosebud Mine would end in 2045 because Westmoreland could continue mining other currently approved permit areas. There is no claim in the SEIS that all environmental impacts of power plant operations end in 2030 under Alternative 5, only that the indirect impacts of combustion could not be attributed to Area F coal after mining ceases. NorthWestern Energy has indicated that Units 3 and 4 would operate through at least 2042 (Ernst 2024). The socioeconomic impacts associated with Area F can be found in **Section 4.15, Appendix 4 - Updated BBC Area F Economic Report** and **Table 5.3-13, Socioeconomics: Summary of Cumulative Effects.** **Comment Response 0038-33 is on the next page.**
0038-33 Footnote[5] (2102)	[5] Westmoreland also takes issue with OSMRE's claim that the No Action alternative would result in fewer ground disturbing impacts and associated impacts on soils, vegetation, etc. *See* Draft SEIS at 2-53. Even if federal coal is unavailable in Area F, Westmoreland may pursue mining of private coal within Area F and in adjacent areas. Mining around the federal coal would arguably create just as much disturbance of topography, vegetation, and wildlife habitat, and the mining would proceed far less efficiently, increasing the GHG emissions associated with recovery of every ton of coal. 7 P.O. Box 99, Colstrip, Montana 59323	

Comment # (Issue Code)	Document #0038-Westmoreland	Response
0038-34 (6300)	SEIS 0046 Copy of SEIS 0038 WESTMORELAND **Specific Comments By Resource.** **Climate Change and Social Cost of Carbon** In response to the court's order to quantify the costs of GHG emissions, the Draft SEIS now applies the Social Cost of Carbon (or Social Cost of Greenhouse Gases) metric to calculate the economic costs associated with direct emissions from mining Area F and indirect emissions of combusting Area F coal. Draft SEIS at 4-31 to 4-36, Appendix 2. OSMRE describes the SCC methodology as the "best available" and an "appropriate and valuable metric," but largely fails to place into context the massive uncertainties and unsupported assumptions that undermine the utility of the SCC methodology to assess the significance of GHG emissions. The uncertainties associated with SCC and enormous variability in results were highlighted in the expert report of Dr. Timothy Considine as part of Westmoreland's comments on the 2018 Draft EIS and are also attached here as Exhibit 3. As Dr. Considine stated, these factors "cast considerable doubt on the practicality and usefulness of estimating the social cost of greenhouse gas emissions for [Area F]." Ex. 3 at 2. These uncertainties should be better documented in the Final SEIS.	**Comment Response 0038-33:** See also Comment Response 0035-1. For DEQ to approve an operating permit revision that would allow mining private coal only, DEQ would need to consider the requirements of MSUMRA and potentially analyze impacts under MEPA. In the SEIS, it would be a difficult (and potentially subjective) exercise to quantify the area and acreage of surface disturbance (and the tons of coal) associated with mining private coal only under Alternative 1 without a proposal from Westmoreland. It would also be speculative to assume that DEQ would approve a change to the operating permit and the approved reclamation plan. Considering this uncertainty, the analysis disclosed in the SEIS for these alternatives was based on reasonable assumptions to estimate potential impacts, which is consistent with NEPA, Section 106(3)(B) and Section 3.7 of the DOI *NEPA Handbook* (see also **Section 1.2.2, Coal Combustion** and **Section 2.2.6, Life of Operations).** **Comment Response 0038-34:** See Comment Response 0038-8 (2025 SCC guidance).
0038-35 (3602)	**Surface Water** The Draft SEIS correctly notes that the first order headwater drainages within the Project Area—Trail Creek, McClure Creek, Robbie Creek, Donley Creek, and Black Hank Creek—are "considered ephemeral." Draft SEIS at 3-31 to 3-35, 3.7.5.2. A wealth of data and analysis in the Permit Application Package ("PAP")—surveyed pre-mine channel cross-sections; geomorphic characteristics such as drainage area, slope, length, relief, stream length, and channel sinuosity; on-the-ground reconnaissance; monitoring data; and well bores (showing the local water table to be well below the channel bottoms)—support and confirm this conclusion. Despite this, the Draft SEIS discussion on springs repeatedly presents a competing narrative that, despite the drainages being ephemeral, spring flow within the drainages creates and/or contributes to perennial stream flow. *See e.g.*, Draft SEIS at 3-64, 3.8.2.1 ("Springs are typically located along a near drainages, and some maintain perennial or intermittent reaches of streams."); *see also* 4-57, 4.7.3.2 ("During mining, perennial and intermittent stream flows in the project area in sections of McClure, Robbie, and Donley Creeks would be reduced and may be eliminated […].").	**Comment Response 0038-35:** The narrative of the Final SEIS has been revised to better describe the drainages and the presence/absence of water and to more closely follow these definitions and how they pertain to Area F streams.
0038-36 (3702)	It is well established that intermittent and perennial stream flow cannot exist in a drainage that is always above the local groundwater table. That is, intermittent and perennial stream flow requires, at a minimum, the occasional intersection of the local groundwater table and the stream channel (*i.e.*, a gaining reach). *See e.g.*, *id.* at 3-31 (defining "Intermittent stream" as "a stream or reach of a stream that is *below the local water table for at least some part of the year* and obtains its flow from both groundwater discharge and surface runoff." An ephemeral drainage – such as those present in the Project Area – has no such intersection of the local groundwater table (*i.e.*, a losing reach) and "flows only in response to precipitation in the immediate watershed or in response to the melting of a cover of snow or ice and is *always above the local water table*." *Id.* (emphasis added). 8 P.O. Box 99, Colstrip, Montana 59323	**Comment Response 0038-36:** The clarification noted in the comment is important information for the reader and the narrative of the Final SEIS has been updated to more closely follow these definitions and how they pertain to Area F.

Comment # (Issue Code)	Document #0038-Westmoreland	Response
0038-36 continued (3702)	SEIS 0046 Copy of SEIS 0038 WESTMORELAND Here, the genesis of spring and seep flow within the Project Area is not owed to an intersection of the local groundwater table and the stream channel, but rather, results from a well-documented hydrologic phenomenon whereby surface recharge encounters impervious mudstone, migrates horizontally to form a surface expression point(s) at the mudstone terminus (often in the vicinity of a first order drainage head cut), before again infiltrating into substrata. Wellbore logs in the PAP confirm the existence of mudstones caps immediately below each spring issue point. While these spring and seep expressions are often referred to as perched groundwater in scientific literature and common parlance, they differ from and are not an indication of the local groundwater table. Leonhart, L. S. (2005). Perched Groundwater, *Groundwater Hydrology*.	**Comment Response 0038-36 Continued:** See response on the proceeding page.
0038-37 (3602)	Moreover, the Draft SEIS severely overstates the quantity and consistency of spring flow within the Project Area. *See e.g.*, *id.* at 3-46 to 3-47, 3.7.5.1 ("Data presented in the 2018 Final EIS (2011 through 2016 monitoring events) indicated that most of the springs were nearly always flowing, with quantifiable flow observed at Springs 1 through 5, 7, 10, and 11 […]."). The presentation of spring flow in the Project Area being "quantifiable" overstates and/or misstates the monitoring data. By way of example, Westmoreland has monitored the flow of Spring 10 since 2015. Despite the wetted lands below the Spring 10 indicating the existence of moving water, the minimal flow and broad issue point of Spring 10 (owing to the mudstone phenomenon discussed above) created insufficient flow or depth to allow for measurement. Monitoring forms in the PAP show Spring 10 flow is so diffuse and lacking as to be immeasurable throughout 2015. Beginning in 2016, Westmoreland (in coordination with MDEQ) physically manipulated the surface of the land below Spring 10 to funnel the diffuse expression to a single point where flow could be collected and measured with a portable weir. In the absence of this exercise, Spring 10 flow was simply not measurable or quantifiable. Even then, monitoring forms in the PAP show that Spring 10 flow, while thereafter measurable, had a depth of only 0.05 feet (*i.e.*, less than half an inch as collected and measured at the portable weir), translating to a miniscule flow rate that is hardly reconcilable with the Draft SEIS's characterization of "perennial stream flow" below Spring 10. This reality—that spring flow is diffuse, inconsistent, and often immeasurable—is true across the Project Area, and the Draft SEIS's presentation of spring flow as consistent, quantifiable, and the genesis of perennial stream flow is not supported by the data and analysis. The misnaming of ephemeral drainages as perennial streams is important because the lack of active flow generally means that surface water impacts of mining are extremely limited in their ability to propagate "downstream." Consistency in nomenclature/presentation regarding ephemeral/perennial stream reaches eliminates potential ambiguities regarding the nature of the surface water resources in the Project Area and their respective regulation under the law.	**Comment Response 0038-37:** The measurement of spring flow is understandably difficult and sometimes the funneling of flow is problematic but often the best a field technician can do for springs that broadly emerge and diffuse over an area. However, a flow value, even one that has accuracy issues, at a minimum informs the data reviewer that flow is occurring. The presence of water helps corroborate that flow is occurring, however diffuse it may be. Trends, as wells as maximums and minimums in the data for a given spring may not be informative given the accuracy issues concerning diffuse springs. The Final SEIS has been revised to remove "quantifiable" from the description, however, the values reported in the database for the mine have been retained as these are the best available data that has been provided for a given spring.
0038-38 (7400)	**Socioeconomic Conditions** The socioeconomic impacts for all alternatives are improperly presumed to be equal. *See* Draft SEIS at 2-57 (Table 2.8-1 summarizing identical impacts under all alternatives); 4-137. OSMRE reaches this result by focusing on the annual direct and indirect economic output from Area F mining, which is reportedly the same for all alternatives. *Id.* at 4-137 to 4-139. While 9 P.O. Box 99, Colstrip, Montana 59323	**Comment Response 0038-38:** See Comment Responses 0029-5 and 0029-31.

Comment # (Issue Code)	Document #0038-Westmoreland	Response

WESTMORELAND

the economic output of mining in Area F may be approximately the same each year, there is no analysis of the fact that under Alternative 1 the mine would forego 14 years of mining in Area F and under Alternative 5 the mine would forego 9 years of mining in Area F. In addition to the economic loss to the company of being unable to mine and sell Area F coal, this difference is critical because without Area F, the mine will close.

0038-39 (7400)

In court filings in early 2024, Westmoreland explained that if Area F were to shut down, the mine would have approximately 18 months of coal remaining in other mine areas to supply the quantity and quality of coal required by the Colstrip Power Plant. Declaration of Ken Wooley, *MEIC v. Haaland*, No. 19-cv-00130-SPW, ECF No. 211-1, ¶ 21 (D. Mont. Jan. 26, 2024), attached as Exhibit 4. That timeframe is roughly the same today. In other words, within about 18 months of closing Area F, the Rosebud Mine will also close. Even the Draft SEIS repeatedly recognizes the very real possibility that closure of Area F could cause mine closure. *See* Draft SEIS at 2-38 (Alt 1 description), 2-43 (Alt. 4 description), 2-48 (Alt. 5 description).

0038-40 (7400)

For Alternative 1, the socioeconomic impacts of losing 320 jobs in Colstrip in 2025 is not discussed. And for Alternative 5, the loss of 320 jobs in 2030 is not addressed. According to the 2018–2022 American Community Survey 5-Year Estimates, the median household income in Colstrip, Montana, is $90,923, which is the highest median household income in the entire state of Montana, where the median household income for the same period is $66,341. This reflects the vital role the Rosebud Mine and Colstrip Power Plant play in supporting not only the 320 direct jobs at the mine but also the livelihoods of those employed at the Power Plant and the many businesses in Colstrip and surrounding communities. Each job represents the livelihood of an individual or family and together they support the vitality of the Colstrip community. That loss is not disclosed in the SEIS, and the difference between the security of a high-paying job until 2039 and losing that job next year has a massive impact for these 320 individuals and their families, with ripple effects far beyond the direct jobs lost. Westmoreland cannot just switch to mining another area given quality and blending requirements at Colstrip. *See* Draft SEIS at 2-7. Similar to the Environmental Justice analysis, *see id.* at 4-143, OSMRE must disclose that the proposed action (Alternative 4) would delay the onset of these adverse impacts for 14 years (compared to Alternative 1) and 9 years (compared to Alternative 4).

Minor Comments and Edits

Please consider the following additional edits to the Draft SEIS.

0038-41 (4400)

Page, paragraph, line	Proposed change or edit	Additional information
1-12, first paragraph of 1.2.2.1	Westmoreland understands that NorthWestern Energy intends to gain a greater ownership stake in the remaining Units 3 and 4 at the Colstrip Power Plant. The planned acquisition will give NorthWestern a majority ownership of the plant.	https://www.northwesternenergy.com/clean-energy/where-does-your-energy-come-from/electric-generation/colstrip-generating-plant#

10

P.O. Box 99, Colstrip, Montana 59323

Comment Response 0038-39: See Comment Responses 0029-5 and 0029-31.

Comment Response 0038-40: The socioeconomic impacts of all alternatives are described in **Section 4.15.2.1, Direct Impacts – All Alternatives**, this includes the No Action and Alternative 5. Similar to the analysis in the 2018 Final EIS, the annual economic effects associated with continued operation of the Rosebud Mine would be the same for **Alternative 1 – No Action, Alternative 4 – Proposed Action, and Alternative 5 – Partial Mining Alternative**, with the exception of duration. Additionally, **Section 4.15.2** acknowledges that the "difference among alternatives is that selection of Alternatives 4 or 5 would extend the life of operations for Area F (and the annual direct, indirect, and induced socioeconomic effects) beyond the No Action alternative by 14 years or 5 years, respectively (see **Section 2.2.6, Life of Operations**)." See also Comment Response 0029-31.

Comment Response 0038-41: The following information has been added to **Section 1.2.2.1**: Effective January 1, 2026, NorthWestern Energy will acquire, at no cost, Puget Sound Energy's 370-megawatt share and Avista's 222-megawatt share of the Colstrip Plant. Following these acquisitions, NorthWestern Energy will own 55 percent of the Colstrip Plant. Majority ownership allows NorthWestern Energy to effectively guide investments in operation and maintenance of the Colstrip Plant, ensuring the plant continues to provide on-demand, 24/7 cost-effective generation for our Montana customers until viable, equivalent, carbon-free energy resources are commercially available.

Comment # (Issue Code)	Document #0038-Westmoreland	Response

SEIS 0046
Copy of SEIS 0038

WESTMORELAND

Page, paragraph, line	Proposed change or edit	Additional information
		https://montanafreepress.org/2024/07/31/northwestern-energy-announces-deal-to-acquire-larger-share-of-colstrip-power-plant/
2-1, 5th bullet under 2.1.1	Contrary to the Draft SEIS, Alternative 5 is not "consistent with the approved DEQ operating permit C2011003F." The state permit covers the entirety of the mining period for Area F, with review periods every 5 years. Please remove reference to consistency with the MDEQ permit and clarify that the MDEQ permit would need to be amended under Alternative 5.	
2-5, last paragraph	The Draft SEIS states that Westmoreland's annual report is generally submitted in June or July of the following year. This is incorrect. The reports are submitted by March 31 each year.	
2-6, Table 2.2-6	This table lists minor revisions to the mine plan. Please remove MR10, which has been withdrawn.	
2-9, Table 2.2-8	Footnote 1 to the table cites to "SurvCadd." This should be replaced with "Carlson," which is the updated software.	
2-48, 2.6.2	Regarding the state operating permit, the Draft SEIS states that Alternative 5 "may require" permit revision. This is not correct. Alternative 5 absolutely would require a permit revision as the state permit would be invalid if the federal permit only authorizes 5 years of mining. Change this language to "will require."	Note that MDEQ may decline to authorize a permit for just 5 years, if it fails to meet Montana state requirements for coal conservation.
2-56, Table 2.8-1, Geology	The description of geology impacts for Alternative 4 states, "Rock-outcrop features of historical significance would also be lost." This broad generalization does not capture mitigation requirements and Westmoreland's commitment to avoid disturbance of rock outcrop features whenever possible. Only outcrops that are not considered for mitigation are lost.	The summary over-emphasizes the loss of rock outcrops.
2-58, Table 2.8-1, Recreation / 4-151, Section 4.18.3.1	The summary of recreation impacts to hunting is misleading. It is important to point out that almost the entirety of the Area F surface is privately owned—there are no federal lands available for hunting (some state sections exist, but are not publicly accessible). Westmoreland has surface use agreements or leases with all private surface owners in Area F that minimize the impacts to private landowner uses, including hunting. The single local ranch that is hunted by outfitters has the	

11

P.O. Box 99, Colstrip, Montana 59323

0038-42 (2302)

Comment Response 0038-42: Language was removed as suggested by the commenter. Text in **Section 2.1.1** was revised in the Final SEIS to state that "Alternative 5 would limit the term of the Federal mining plan to 5 years."

0038-43 (9200)

Comment Response 0038-43: Text in the Final SEIS was revised as suggested in the comment.

0038-44 (2202)

Comment Response 0038-44: Table 2.2-6 was updated in the Final SEIS to indicate that MR10 was withdrawn.

0038-45 (9200)

Comment Response 0038-45: Table 2.2-8 was revised in the Final SEIS as suggested in this comment.

0038-46 (2302)

Comment Response 0038-46: Text in **Section 2.6.2, State Operating Permit C2011003F** was revised in the Final SEIS to address this comment.

0038-47 (6500)

Comment Response 0038-47: The term "of historical significance" has been removed from the Final SEIS. As noted in **Section 4.2, Topography**, rock-outcrop features may be created with DEQ approval from sandstone rock piles and with highwall-reduction techniques to mitigate the loss of sandstone outcrops and cliffs/bluffs.

0038-48 (7700)

Comment Response 0038-48: In the Final SEIS, text in the sections cited by the commenter was revised to make clear that the surface of Area F is entirely privately owned and that impacts would be to private land hunting. OSMRE understands that Westmoreland Rosebud has surface use agreements or leases with all private surface landowners in Area F.

Comment # (Issue Code)	Document #0038-Westmoreland	Response

SEIS 0046
Copy of SEIS 0038

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Page, paragraph, line	Proposed change or edit	Additional information
	use of tens of thousands of acres outside Area F that are undisturbed for hunting, and Westmoreland works with the rancher to allow continued hunting in undisturbed areas of Area F.	
3-20, Section 3.4.2.2	This section describes the conveyor that moves coal from the mine to the Colstrip Power Plant as a source of exhaust from mobile and stationary engines. The crusher conveyor is electrically powered and does not result in direct GHG emissions.	
3-33, Table 3.7-3	The table states that aluminum is present in both the West Fork Armells Creek and East Fork Armells Creek. The fact that it is derived from natural sources in the West Fork suggests that aluminum in the East Fork may also be natural, but the Draft SEIS attributes the presence of aluminum to mining. Please address this inconsistency.	
4-2, last sentence	This sentence states that under Alternative 1 and 5, early closure of Area F may result in "potential closure of the Rosebud Mine earlier than 2045." Unfortunately, closing Area F will most definitely result in early mine closure given Area F's critical importance to meeting Colstrip Power Plant demand. Correct this statement and incorporate the mine closure into the socioeconomic impact analysis.	
4-5, Section 4.2.3.2, second paragraph	Please delete this paragraph. The Draft SEIS states that avoidance of mining in drainage basins would result in topographic inversion "over an unknown geologic time" as softer backfilled areas in recontoured landscapes are eroded. This possibility, which may not occur for thousands of years is not useful. Rather, OSMRE should focus on Westmoreland's commitment under its reclamation plan, as approved by MDEQ, to return the surface to its pre-existing contour, allow for pre-existing uses, and restore vegetation communities and the hydrologic balance. Musings over impacts spanning geologic time are not relevant.	
4-26, Section 4.4.3.2, second paragraph	The analysis states that "Colstrip Units 3 and 4 and the Rosebud Power Plant are conservatively assumed to burn only coal from Area F during the period of the Proposed Action." This is incorrect. Currently, coal is supplied from both Area F and Area B to meet Colstrip Power	

12

P.O. Box 99, Colstrip, Montana 59323

0038-49 (3300)

0038-50 (3602)

0038-51 (7400)

0038-52 (6100)

0038-53 (6300)

Comment Response 0038-49: Discussions of the conveyors were clarified in the Final SEIS to indicate that the conveyors are electrically powered. PM_{10} emissions, which are considered in the air quality analysis in **Section 4.3**, are associated with the conveyors (see **Table 4.3-2, Estimated Emissions Due to Project Area**). Reference to the conveyors was removed from **Section 3.4.2.2, Rosebud Mine GHG Emissions** in the Final SEIS.

Comment Response 0038-50: See also Comment Response 0035-11. The layout of **Table 3.7-3** in the Draft SEIS included row lines that inadvertently implied correlation between impairments, causes, and sources. The table has been edited in the Final SEIS to remove the row lines, which corrects the referenced inconsistency.

Comment Response 0038-51: See Comment Response 0038-32.

Comment Response 0038-52: The reference to differential erosion has been removed from the Final SEIS.

Comment Response 0038-53: As stated in the SEIS **Section 4.4.3.2**, "The total annual emissions are *conservatively assigned* to indirect effects of Alternative 4; that is, Colstrip Units 3 and 4 and the Rosebud Power Plant are *conservatively assumed to burn only coal from Area F* during the period of the Proposed Action (**Table 4.4-3**)." All emissions were attributed to Area F to present a worst-case scenario; this approach is consistent with the air quality and deposition modeling that was completed for the 2018 Final EIS. As noted in the SEIS, production sometimes differs from the estimated production tables, and operational shifts have been made in the past between permit areas. Attributing all emissions to Area F ensures that impacts are not underreported in the SEIS.

Comment # (Issue Code)	Document #0038-Westmoreland	Response

SEIS 0046
Copy of SEIS 0038

WESTMORELAND

Page, paragraph, line	Proposed change or edit	Additional information
	Plant blending requirements. Only 4.5 million tons of over 7 million tons delivered in 2023 were from Area F.	
4-27, Section 4.4.3.2	A portion of the indirect emissions attributed to the facilities is for daily worker commutes. Under Alternative 1 and 5, if Area F closes and leads to mine closure, those workers will be required to commute much farther, causing increased emissions, to find new employment.	
4-41, third paragraph, Section 4.5.3	The Draft SEIS states that "Groundwater contamination in Areas A, B, and C, including increased concentrations of metals and nutrients, has been documented, and similar impacts would be expected under Alternative 4 (see Section 4.8, Water Resources – Groundwater below)." This is a gross generalization that fails to account for several factors influencing groundwater quality in the East Fork Armells Creek drainage and the mitigation measures committed for Area F mining. Additional information and clarification should be included. Review of Table 4.8-2 shows that parameters for all but 5 constituent elements remain within numeric standards for human health and water quality.	
4-80, Section 4.8.3.1	The Draft SEIS provides, "The water quality of the spoil in Areas A, B, and C when monitored between 1978 and 2023 had exceedances in arsenic, cadmium, lead, nitrate, and zinc groundwater standards (Table 4.8-2)." However, a detailed review of Table 4.8-2 shows that median concentrations of the detected constituents are far below standards and the sentence highlights solely the maximum documented concentration. Additional context and discussion are necessary to place this sentence in context.	
4-97, last paragraph, last two sentences	This vegetation analysis suggests that loss of riparian areas and wetlands will lead to an increase in noxious and nonnative species along drainages. It should be noted that Westmoreland is required to identify drainage basins and mitigate any impacted areas.	
5-54, Table 5.3-19	The first row in this table describes the cumulative effects of mining in other areas of the Rosebud Mine to solid and hazardous waste. It mistakenly states that bottom ash used from burning coal within the project area would likely be used in other permit areas of the mine for construction purposes. This is incorrect. Westmoreland no longer uses bottom ash for any purpose within the mine.	

13

P.O. Box 99, Colstrip, Montana 59323

0038-54 (6300)

Comment Response 0038-54: Comment noted. The method used to calculate GHG emissions for worker commutes in the SEIS used conservative estimates. For example, the distance travelled used an average, but in reality, workers may live closer than the average distance. Similarly, emission rates for light trucks were used, but not all workers drive trucks and may perhaps drive vehicles with lower emission rates, such as small cars.

0038-55 (6400)

Comment Response 0038-55: The quoted statement was not altered from that originally stated in the 2018 Final EIS and it supports the concluding statement noting that containment, monitoring and mitigation of groundwater contamination would occur to avoid impacts to groundwater quality. The Final SEIS has been updated to more generally note that groundwater quality has been impacted in Areas A, B, and C and the possibility that if contamination were to occur, that containment, monitoring and mitigation would be required.

0038-56 (6700)

Comment Response 0038-56: The commenter is correct that exceedances of water quality standards are often a result of the highest concentrations detected for a given location. However, exceedances of water quality standards are not based on statistical values such as median or mean. Therefore, although a median or mean value may not exceed water quality standards, it does not negate the fact that individual data results have at times exceeded the standard. The water quality summary tables are simply used to disclose the data collected. In the context of the SEIS, past monitoring results help to predict the potential for future impacts. Discussion of the maximum values that exceeded water quality standards is important information for the reader to assess the constituents that have a greater potential to be exceeded in the future due to Area F mining. No additional changes were made to the Final SEIS narrative.

0038-57 (6900)

Comment Response 0038-57: Comment noted, but no changes were necessary to the SEIS text.

0038-58 (8000)

Comment Response 0038-58: The Final SEIS has been updated to remove statement concerning the current use of bottom ash within other permit areas.

Comment # (Issue Code)	Document #0038-Westmoreland	Response

SEIS 0046
Copy of SEIS 0038

WESTMORELAND

Conclusion

Thank you for considering Westmoreland's comments on the Rosebud Mine Area F Draft SEIS. If you have any questions about these comments, please contact me.

Sincerely,

Jeremy Cottrell
General Counsel and Secretary
Westmoreland Rosebud Mining LLC

14

P.O. Box 99, Colstrip, Montana 59323

Consolidated Response to Comments

For some comments, it was most efficient to group similar comments by categories and respond to them collectively. Correspondences listed in **Table 5** were responded to collectively by OSMRE.

Table 5. Comment Documents with Consolidated Responses.

Document ID #	Commenter Affiliation (if any)	Issue	Issue Topics
0001	Amphibian Refuge	4102 6300 7103 7404	Fish and Wildlife Resources Existing Condition Climate Change Analysis Fish and Wildlife Resources Monitoring Socioeconomic Conditions Mitigation
0002		2200	Choose Alternative 4 (Proposed Action)
0003		2200	Choose Alternative 4 (Proposed Action)
0004	International Brotherhood of Electrical Workers (IBEW) 1638	2200	Choose Alternative 4 (Proposed Action)
0005	Earth Justice	1005	Public comment period
0006	Mayor John Williams of Colstrip	2200 7400	Choose Alternative 4 (Proposed Action) Socioeconomic Conditions Analysis
0007		2200	Choose Alternative 4 (Proposed Action)
0008		2200 7400	Choose Alternative 4 (Proposed Action) Socioeconomic Conditions Analysis
0009		2200	Choose Alternative 4 (Proposed Action)
00010	Rosebud County Board of Commissioners: Ed Joiner, Robert E. Lee, and Scott Hein	2200 7400	Choose Alternative 4 (Proposed Action) Socioeconomic Conditions Analysis
0011	Southeastern Montana Development Corporation	2200 7404	Choose Alternative 4 (Proposed Action) Socioeconomic Conditions Mitigation
0012	Montana State Representative Gary Parry (District 35)	2200 7400	Choose Alternative 4 (Proposed Action) Socioeconomic Conditions Analysis
0014		2100 7100 7104 9100	Choose Alternative 1 (No Action) Fish and Wildlife Resources Analysis Fish and Wildlife Resources Mitigation Request for document or information
0015		2100 2300 6300	Choose Alternative 1 (No Action) Choose Alternative 5 (Partial Mining) Climate Change Analysis
0016		1302 2100 3702 6700 6800	Authority/action of other agencies (State) Choose Alternative 1 (No Action) Groundwater Existing Condition Groundwater Analysis Water Rights Analysis
0017	Comment letter withdrawn by commenter		
0018	Earth Justice	1005 9100	Public comment period Request for document or information
0020	NRP (Operating) LLC	**Form Letter A** 1104 1301 2200 6300 6600 6602 7400	 Requirements of the Court Order DOI-ASLM or OSMRE authority/action Choose Alternative 4 (Proposed Action) Climate Change Analysis Surface Water Analysis Surface Water Cumulative impacts Socioeconomic Conditions Analysis
0021		2100 8200	Choose Alternative 1 (No Action) Land Use Analysis
0022		2100 4102 4202 7100 7103 7203	Choose Alternative 1 (No Action) Fish and Wildlife Resources Existing Conditions Special Status Species Existing Conditions Fish and Wildlife Resources Analysis Fish and Wildlife Resources Monitoring; Special Status Species Monitoring

Document ID #	Commenter Affiliation (if any)	Issue	Issue Topics
0023		1103	Demand for coal
		2200	Choose Alternative 4 (Proposed Action)
		2301	Oppose Alternative 5 (Partial Mining)
		7400	Socioeconomic Conditions Analysis
0025		2200	Choose Alternative 4 (Proposed Action)
0026		1202	Reclamation/bond phase of other Rosebud Mine permit areas
		2201	Oppose Alternative 4 (Proposed Action)
		6200	Air Quality Analysis
		6800	Water Rights Analysis
		7102	Fish and Wildlife Resources Cumulative impacts
		7900	Access and Transportation Analysis
		8200	Land Use Analysis
		8202	Land Use Cumulative impacts
0027		2100	Choose Alternative 1 (No Action)
		6702	Groundwater Cumulative Impacts
0028		1102	Consider MT Constitution and "right to clean & healthful environment"
		2100	Choose Alternative 1 (No Action)
		2201	Oppose Alternative 4 (Proposed Action)
		6302	Climate Change Cumulative Impacts
0031	Great Northern Properties Limited Partnership	**Form Letter A**	
		1104	Requirements of the Court Order
		1301	DOI-ASLM or OSMRE authority/action
		2200	Choose Alternative 4 (Proposed Action)
		6300	Climate Change Analysis
		6600	Surface Water Analysis
		6602	Surface Water Cumulative impacts
		7400	Socioeconomic Conditions Analysis
0032	Montana Association of Oil, Gas, and Coal Counties	2200	Choose Alternative 4 (Proposed Action)
		7400	Socioeconomic Conditions Analysis
0033	Montana Coal Council	**Form Letter A**	
		1104	Requirements of the Court Order
		1301	DOI-ASLM or OSMRE authority/action
		2200	Choose Alternative 4 (Proposed Action)
		6300	Climate Change Analysis
		6600	Surface Water Analysis
		6602	Surface Water Cumulative impacts
		7400	Socioeconomic Conditions Analysis
0034	Montana Congressional Delegation: Senator Steve Daines, Senator Tim Sheehy, Congressman Ryan Zinke, and Congressman Troy Downing	2200	Choose Alternative 4 (Proposed Action)
		7400	Socioeconomic Conditions Analysis
0037	Signal Peak Energy	1000	NEPA process (general)
		1301	DOI-ASLM or OSMRE authority/action
		2200	Choose Alternative 4 (Proposed Action)
0039	Congressman Ryan Zinke (MT-01)	**Form Letter A**	
		1104	Requirements of the Court Order
		1301	DOI-ASLM or OSMRE authority/action
		2200	Choose Alternative 4 (Proposed Action)
		6300	Climate Change Analysis
		6600	Surface Water Analysis
		6602	Surface Water Cumulative impacts
		7400	Socioeconomic Conditions Analysis
41		2100	Choose Alternative 1 (No Action)
		2201	Oppose Alternative 4 (Proposed Action)
		2301	Oppose Alternative 5 (Partial Mining)
42		1004	Public meeting
		2200	Choose Alternative 4 (Proposed Action)
		6200	Air Quality Analysis
		7200	Special Status Species Analysis

NEPA Process

Additional comment responses related to the NEPA process can be found above in the **Side-by-Side Response to Comments** for correspondences 0013, 0019, 0029, 0038.

1000 NEPA Process (general)

37-1 This letter is written to show support for the approval of the Rosebud Mine Area F Supplemental Environment Impact Statement. OSMRE has needlessly delayed all Montana Coal EIS work during the Biden Administration. Rural Montana jobs and reliable power generation depend on these coal mines continued operation. OSMRE continue to delay the review of these critical projects for no environmental benefit.

Response: Please also see Comment Response 0038-13 above in Correspondence 0038. OSMRE was required to prepare a SEIS to address deficiencies identified in the 2022 court order, including failure to analyze a reasonable range of alternatives. The alternatives development process, which has been one of the more time-consuming steps in the SEIS process, was a necessary and important step to address the court order.

1004 Public meeting

42-1 I attended the public meeting held on 1-8-2025 at Colstrip City Hall to ask questions about this draft SEIS and was impressed with the resource specialists' professionalism and knowledge. However, I do have some questions on data presented that made me question certain areas of this draft

Response: Thank you for attending the public meeting on January 8, 2025. Responses to your questions are in this appendix under the following headings: **Air Quality** and **Special Status Species**.

1005 Public comment period

5-2 I respectfully request a 30-day extension of the public comment period for the Draft Supplemental Environmental Impact Statement (DSEIS) for the Rosebud Mine Area F Project. Public participation is one of the fundamental goals of the National Environmental Policy Act (NEPA). The law "guarantees that the relevant information will be made available to the larger audience that may also play a role in both the decisionmaking process and the implementation of that decision." Robertson v. Methow Valley Citizens Council, 490 U.S. 332, 349 (1989). Accordingly, the public is entitled to comment on any draft environmental impact statement. 42 U.S.C. § 4336a(c). "[A]gencies shall allow at least 45 days for comments on draft statements." 40 C.F.R. § 1506.10(d). Agencies may allow longer periods for public comment. Here, the DSEIS was released on December 6, 2024, and the 45-day comment period will end on January 21, 2025. Notice of Availability of the Draft Supplemental Environmental Impact Statement Federal Mining Plan Modification for Federal Coal Lease MTM 082186 at the Rosebud Mine Area F; Rosebud Mine Area F Mining Plan Modification SEIS, 89 Fed. Reg. 97,067, 97,068 (Dec. 6, 2024). A 30-day extension of time is necessary for the Civic Groups to adequately review and comment on the proposed strip-mine expansion. The existing 45-day comment period included the holiday season, which effectively shortened the period. More importantly, the DSEIS is a voluminous document: 547-pages, including multiple appendices. The DSEIS cites nearly a hundred additional documents and incorporates by reference hundreds of pages of additional materials. The information is highly technical and will require the Civic Groups to obtain expert assistance. Accordingly, the Civic Groups respectfully request that OSMRE extend the public comment period by 30 days. The Civic Groups also respectfully request that OSMRE respond to this request as promptly as possible.

18-1 Thank you for the response, Mr. Calle. The unavailability of this information will materially impair our and the public's ability to comment on the DSEIS. We cannot meaningfully comment on the DSEIS if materials on which the analysis relies are not made available until the final document is published. If you could correct this, it would be appreciated

18-2 Extend the public comment period to allow the public to review the BA and submit comments. Thank you for your consideration of this issue. Given the short time remaining in the public comment period, I respectfully request a response as soon as possible.

Response: OSMRE considered a request from Earthjustice for a 30-day extension to the comment period (correspondence 0005) but respectfully declined the request on January 15, 2025. In follow-up correspondence, Earthjustice asked for the Draft Biological Assessment (BA) to be made publicly available and again asked for the comment period to be extended (correspondence 0018). The 2024 BA was a draft document at the time the Draft SEIS was issued and OSMRE was actively consulting with the USFWS regarding the BA's findings pursuant to Section 7 of the Endangered Species Act. The 2024 BA was erroneously referenced as a final document. Now that Section 7 consultation has been completed, OSMRE has provided the 2025 Final BA and USFWS concurrence letter in SEIS **Appendix 7 – ESA Section 7 Consultation Documentation**.

Purpose and Need

Additional comment responses related to the project's Purpose and Need can be found above in the **Side-by-Side Response to Comments** for correspondences 0019, 0029, 0038.

1102 Consider MT Constitution and "right to clean & healthful environment"

28-1 The Montana Supreme Court ruled that we are granted a clean and healthy environment. this mine does not consider this constitutional right that i have. Instead it is a give away to coal interests that are destroying the planet and life as we know it.

Response: Montana's constitutional provision for a clean and healthful environment applies to decisions made by the state of Montana and by state agencies. The scope of the SEIS is limited to federal decision making and specifically to the ASLM's decision regarding the federal mining plan modification. See **Section 1.4, Agency Authority and Actions**, in the SEIS and in the 2018 Final EIS for a discussion of state and federal decision-making responsibilities and authorities.

1103 Demand for coal

23-1 Montana mines are some of the safest and cleanest burning coal producers in the entire world. Montanans and Americans overwhelming support and understand that sound energy policy must use coal and other fossil fuels.

Response: Comment noted. Environmental impacts of mining and combusting Area F coal is provided in the SEIS. The regulatory framework for coal and coal mining in the U.S. was provided in the Draft SEIS and updated, as relevant, in the Final SEIS.

1104 Requirements of the Court Order

Form Letter A — First, I am pleased that the SEIS addresses all deficiencies identified by the U.S. District Court in its prior review of the original Environmental Impact Statement (EIS). The updated analysis thoroughly examines the cumulative impacts on surface water, greenhouse gas emissions, and water withdrawals from the Yellowstone River, while also incorporating a "middle-ground" alternative for evaluation. The conclusions reached in the SEIS demonstrate that mining operations in Area F will have minimal adverse environmental effects, all of which are mitigated through measures outlined in the mine plan and supporting documentation.

Response: Comment noted. As discussed in **Section 1.3, Purpose and Need**, the SEIS was prepared "to fully analyze the environmental impacts associated with the proposed Federal mining plan modification for Rosebud Mine Area F. This analysis addresses the deficiencies identified by the United States District Court for the District of Montana, and updates other relevant information and analysis."

Reclamation and Financial Assurance

Additional comment responses related to reclamation and financial assurance for the Rosebud Mine can be found above in the **Side-by-Side Response to Comments** for correspondences 0019, 0029, and 0038.

1202 Reclamation/bond phase of other Rosebud Mine permit areas

26-1 — The Rosebud mine also has thousands of open and disturbed acres of land that are not being mined or reclaimed and previous reclamation processes by the mine have shown to be inadequate and useless to use and thus should not be allowed to proceed with new mining efforts when there is already so much in the process of being mined.

Response: See also Comment Responses 0019-21 and 0024-9, which can be found above in the **Side-by-Side Response to Comments.** OSMRE will prepare and submit to the ASLM a decision document recommending approval, disapproval or conditional approval of the mining plan modification based on the criteria in 30 CFR 746.13.

Agency Authority

Additional comment responses related to agency authority can be found above in the **Side-by-Side Response to Comments** for correspondences 0019, 0029, 0030, 0035, 0038.

1301 DOI-ASLM or OSMRE authority/action

37-1 OSMRE needs to consider the legal repercussions of arbitrarily selecting a 5 year mine plan as one of the alternatives. These 5 year mine plans amount to an unconstitutional taking of the federal lease rights. Such action will only invite costly litigation but also contradict OSMRE's stated obligation to respect valid existing rights.

Form Letter A Second, it is important to note that the SEIS's Alternative 4 meets OSMRE's statutory requirements to ensure the maximum economic recovery of coal resources. The proposed action allows for the responsible development of all mineable and marketable coal in Area F, consistent with both federal law and Montana's coal conservation standards. By contrast, Alternative 5- the 5-year mine plan- arbitrarily limits operations and leaves substantial coal reserves unmined, violating SMCRA's directive to maximize resource utilization.

Form Letter A Additionally, Westmoreland Rosebud Mining LLC's existing federal leases confer legal rights to access and recover coal resources within Area F. Limiting mining operations through arbitrary timeframes, as proposed in Alternative 5, would amount to an unconstitutional taking of these lease rights. Such an action would not only invite costly litigation but also contradict OSMRE's stated obligation to respect valid existing rights.

Response: See also Comment Response 0019-17 (reasonable range of alternatives) and Comment Response 0038-20 (Fifth Amendment). SEIS **Section 2.5** discloses that "Under Alternative 4, Westmoreland Rosebud would diligently develop and maximize economic recovery of coal in the Federal coal lease MTM 082186." The SEIS also discloses in **Sections 2.4** and **2.6**, that under either Alternative 1 or 5 "Westmoreland Rosebud would not fully develop or maximize economic recovery of coal from Federal coal lease MTM 082186." The DOI ASLM, acting on behalf of the Secretary of Interior, has broad authority to place conditions on a Federal mining plan. Whether the conditions outlined in Alternative 5 would be a "taking" pursuant to the Fifth Amendment would be a decision for the courts. This issue does not affect the validity of Alternative 5 for consideration and analysis in the SEIS. The DOI ASLM will have several considerations when making a decision regarding the Federal mining plan, including the potential for a "taking" and direction in recent EOs, including EO 14154, *Unleashing American Energy* and EO 14156, *Declaring a National Energy Emergency,* and EO 14261, *Reinvigorating America's Beautiful Clean Coal Industry and Amending Executive Order 14241*.

1302 Authority/action of other agencies (State)

16-1 One of my Great Grandads homesteads was in Miller Coulee, a spring fed tributary to Rosebud Creek. Miller Coulee was mined by Peabody Coal Co. in the 1970's and 80's, and surfaced reclaimed sometime after that. In time, the water from the spring began to surface, and ultimately resulted in killing cattle. The Montana Department of Environmental Quality (MTDEQ) was notified about the contamination. The DEQ's solution was to fence cattle off of the water source. The issue was that the sulfate level of this water was 30 times the lethal amount to kill a cow. In order for the mining company to receive bond release, the law states that hydrologic balance shall be reached. Fencing off a spring that once was a vibrant and high- quality water source in no way should be construed to reach "hydrologic balance." An attempt was made to pipe water in for cattle, but these pipelines were placed in reclaimed land that is constantly settling, and the pipes are constantly breaking. This is NOT water replacement, and it is NOT hydrologic balance! I asked the Peabody Mine manager and a Sr. DEQ representative about the pre-mine baseline information on Miller Coulee. He said there was none (whether baseline was done and they couldn't find it, or it was lost and they couldn't find it, or it wasn't done at all) and that "The water in Miller Coulee never was any good anyway" I was livid. I have photographs of a sheep shearing under arbors in the bottom of Miller Coulee in the late 1880's. The shearing arbors had cottonwood and ash tree limbs laying on top of the arbor for shade. We also have a photo of a branding at the same place in the 1930's. In plain sight are

cottonwood and ash trees. These trees would not be present if the water quality was as bad as the state and mine representatives had claimed. The DEQ's public responsibility was to enforce the law and protect adjacent landowners. They failed.

16-2 A neighbor, Don Bailey, started haying one summer at the mouth of Lee Coulee. Lee Coulee is a tributary to Rosebud Creek. His swather, a piece of equipment that cuts hay and lays in it a windrow, sunk to the frame. His hay meadows, the most valuable acreage on a ranch, was saturated by a long-term illegal discharge by, once again, Peabody Coal Company, that was up Lee Coulee. This discharge was no accident, Peabody knew it was illegal, and the MTDEQ also was aware of it. Once again, landowners expected the MTDEQ to regulate and enforce the law and protect adjacent landowners. They

Response: See Comment Response 0019-3 (purpose and need/OSMRE's role), Comment Response 0019-7 (Peabody Energy's Big Sky Mine), and Comment Response 0029-41 (non-SMCRA permit violations). It is important to note that Peabody Energy's Big Sky Mine is no longer an active mine permit area and has been released from jurisdiction by DEQ following bond release for Phases I, II, III, and IV. The phases of bond release and the thresholds that must be met for their release are described in the 2018 Final EIS in **Section 1.6, Financial Assurance**.

16-3 Preventing an aquifer from being impacted should be the focus of the DEQ, not punting the hard decisions down the road. This is comparable to telling a suicidal person to point a pistol at his head and pull the trigger, we will deal with the aftermath later. The DEQ's responsibilities lay with mitigating negative impacts to the public, specifically adjacent landowners water quality and water rights. Once Again, they have failed.

In conclusion, The MTDEQ has been compromised, they are not regulating the mining industry or representing the best interest of the public, or upholding Montana law, and the requirements of SMCRA. The MTDEQ is making a mockery out of their public trust responsibilities, which is immoral, unethical, and may be illegal. The EIS hearing process is designed to gather impacts of a project, mitigate those impacts and represent the public interest. The DEQ has made a mockery of this process, and treats it as a formality.

Response: See Comment Response 0019-3 (purpose and need/OSMRE's role). Pursuant to ARM 17.24.1204, any person may request an inspection of the Rosebud Mine by submitting a signed statement, or an oral report followed by a signed statement, to DEQ giving the department reason to believe that a violation of MSUMRA exists. Issues related to DEQ oversight and noncompliance with SMCRA can also be raised through a Citizen Complaint to the OSMRE Field Office in Casper, Wyoming.

Alternatives Development

Comment responses related to the alternatives considered in the SEIS and the assumptions underlying those alternatives can be found above in the **Side-by-Side Response to Comments** for correspondences 0029, 0035, and 0038.

Preference for Alternatives

Additional comments expressing preference for an alternative can be found above in the **Side-by-Side Response to Comments** for correspondences 0019, 0029, and 0038.

2100 Choose Alternative 1 (No Action)

14-1 I am intimately familiar with Booth Ranch and the proposed expansion and prefer Alternative #1. The reason is as I read this proposal I see no EIS concerning the wildlife in the area.

15-1	I'm writing in support of Alternative 1 to end the excavation of coal in the Rosebud Mine.
16-3	Given the awful mitigation and regulatory track record mentioned above, The OSMRE and the DEQ have no choice than to choose the No Action
21-1	This email is inform that I am against all plans for area F. That is a major pasture for winter grounds and calving and also a good hay ground to provide for winter pasture.
22-1	I respectfully ask you again to consider only option #1 for this mine expansion.
27-1	Alternative 1 is the only on that should be chosen.
28-1	Give your kids and future generations a break and say no. We need to radically change our burning of fossil fuels now. Montana has become so much warmer, over 7 degrees since I moved here . At what point will it take you to say no? do you job and say no.. if you get fired because of it , it is a good sacrifice to make. We need to change and you do too. Kill this expansion now. our addiction is killing us and it is killing you too.
29-21	Please address the foregoing issues and select the no action alternative.
41-1	Manage for Alt. #1 and tell locals to quit whining about "forever jobs" and get a life that doesn't pollute.
41-1	For over 20 years citizens with atmospheric and toxic aerosol concerns have been trying to move our society away from the mining/burning of fossil fuels. Technically, OSM should manage for Alternative 1 and stop mining this year.

Response: Comments expressing preference for Alternative 1 (No Action) are noted; the rationale provided for these preferences will be considered by the decision maker.

2200 Choose Alternative 4 (Proposed Action)

2-1	I am all in for this Project. I wish you the best of luck and God speed in getting an approval.
3-1	I fully support mining of all kinds and I support this mining operation. I urge you to make this process as easy as possible for the mining companies.
4-1	IBEW 1638 supports alternative 4, mining would end in 2039 during the 20 year mine life, about 71.3 million tons of coal would be mined and approximately 4,288 acres would be disturbed in the project area.

6-1	Colstrip citizens deserve to continue making a living in the energy industry for as long as it is feasible to do so. OSMRE should adopt Alternative 4 and allow mining in Area F through 2039.
6-1	The City of Colstrip encourages the OSMRE to adopt Alternative 4 as the Preferred Alternative for the Rosebud Mine Area F Supplemental Environmental Impact Statement. This would allow mining in Area F to continue until 2039.
7-1	To whom it may concern, I am for the area f mining plan modification.
8-1	I support the expansion of Rosebud Mine Area F to keep the town of Colstrip going and to keep jobs for the people here.
9-1	I favor maximum coal recovery as proposed in Alternative 4.
10-1	The Rosebud Mine has received many reclamation awards and continues to perform to a very high standard. We are all proud of the work they do, the jobs they create and being able to keep energy production up for hopefully many more years to come. Common sense, energy demands, and economic benefits make this an easy choice for us. Again, we support Alternative 4 for the benefit of many tax payers, energy dependability, and jobs in our area.
10-1	On behalf of the Rosebud County Commissioners, we would like to make a comment on the SEIS and to say that we endorse Alternative 4. The mine is a very important part of not only our county, but to a great number of the energy producers that are necessary to supply energy to many homes and businesses in the northwest United States. We favor Alternative 4 not only for the economic boost it adds to our County and State revenues, but to help ensure affordable, dependable energy to all of the customers depending on this service.
11-1	I am strongly endorsing your Alternative# 4 - Mining through 2039 and remove 71.3 million tons of coal in Area F
11-1	I am strongly endorsing your Alternative # 4- Mining through 2039 in Area F.
11-1	While Montana has some of the strongest environmental regulations in the US, I feel we can and will need to Mine and Generate Power using Colstrip Coal for at least 15-20 years.
12-1	I strongly encourage the selection of Alternative 4 as the preferred Alternative for the Rosebud Mine Area F Supplemental Environmental Impact Statement. Montana is projecting significant shortfalls in electrical generation over the next six to ten years and will be working diligently to secure dependable power generation. Utilizing Alternative 4 for the Supplemental Environmental Impact Statement will allow the Rosebud Mine to produce until, at least, 2039, which will ease the crisis somewhat and allow more time to identify alternative sources of power generation
12-2	For the sake of the energy requirements of the Northwest, the ratepayers of Montana and the employees that serve to fulfill these needs, I urge you to adopt Alternative 4 to keep the lights on through 2039.
23-1	Please approve the Proposed Action and please select Alternative 4 with issuance of the ROD.
23-1	I am writing in support of the Office of Surface Mining Reclamation and Enforcement (OSMRE) approving the Proposed Action (Alternative 4).

	The proposed action allows for the responsible development of all mineable and marketable coal in Area F, and Alternative 4 meets OSMRE's requirement to ensure the maximum economic recovery of coal resources.
25-1	I would like to encourage the continuation of mining operations in the Area F permit Area to continue under Alternative 4. Thank you for this opportunity to comment.
32-1	After a thorough review of the SEIS, we strongly urge the Office of Surface Mining Reclamation and Enforcement (OSMRE) to adopt Alternative 4 as the preferred alternative. Alternative 4 provides a balanced approach to meeting the region's energy needs while ensuring long-term economic benefits for Montana's communities and providing stability in the region and for the surrounding energy markets.
32-2	For these reasons, we believe that Alternative 4, which allows for the maximum economic recovery of coal resources, represents the most pragmatic and balanced approach to fulfilling OSMRE's statutory obligation to maximize the area's coal potential responsibly. We appreciate OSMRE's efforts in developing a comprehensive SEIS and encourage the adoption of Alternative 4 to support Montana's communities, economy, and environment.
34-1	We write today to urge the Office of Surface Mining Reclamation and Enforcement (OSMRE) to support Proposed Alternative 4, Proposed Current Federal Mining Plan, in the Department of the Interior's Draft Environmental Impact Statement for the Rosebud Mine. This proposed alternative would allow the Rosebud Mine to extract the approximately 71.3 million tons of coal located within Area F and provide vital energy to tens of thousands of Montanans.
34-2	We urge you to move forward with Proposed Alternative 4 to support continued operations at the Rosebud Mine. The United States leads the world in safe mining practices and environmental standards and these operations are key to the prosperity of our rural communities, Montana as a whole, and American security interests.
37-1	OSRME should select Alternative 4 as the preferred alternative for Area F and quickly issue a Record of Decision and quit playing games with hard working Montanans livelihoods.
42-2	Rosebud Mine has a good record of being a responsible mining company and should be allowed to continue this project under Alt. #4 coal lease MTM 082186.
Form Letter A	I am writing to express my support for the Office of Surface Mining Reclamation and Enforcement's (OSMRE) proposed action to approve the modification of the mining plan for Area Funder Alternative 4 in the Final Supplemental Environmental Impact Statement (SEIS). This decision would represent the best balance of legal, economic, and environmental considerations while fulfilling OSMRE's statuto1y obligations under the Surface Mining Control and Reclamation Act (SMCRA).
Form Letter A	In conclusion, once OSMRE has issued its final SEIS, I urge it to proceed to issue a Record of Decision ("ROD") selecting Alternative 4 as the preferred alternative for Area F. This decision reflects a thoughtful, legally compliant approach that maximizes coal recovery, supports economic and community well-being, and responsibly manages environmental impacts.

Response: Comments expressing preference for Alternative 4 (Proposed Action) are noted; the rationale provided for these preferences will be considered by the decision maker.

2201 Oppose Alternative 4 (Proposed Action)

26-1 Overall, there are many serious issues with this mining plan that ought to be taken into account by the mine, the state and federal governments. The harm done does not balance with the "good" the mine is proposing.

28-1 please accept these comments on the terrible rosebud mine expansion proposal. why are you doing this? how can you justify it?

41-1 Alt. #4 is ludicrous for its climate impact.

Response: Comments expressing opposition to Alternative 4 (Proposed Action) are noted; the rationale provided for these preferences will be considered by the decision maker.

2300 Choose Alternative 5 (Partial Mining)

15-1 If not Alternative 1, then Alternative 5, keeping the mine open until 2030 as a middle way. However, there is no middle way with our environment as we see in Los Angeles now.

Response: Comments expressing preference for Alternative 5 (Partial Mining) are noted; the rationale provided for these preferences will be considered by the decision maker.

2301 Oppose Alternative 5 (Partial Mining)

23-1 Alternative 5 appears to be a carefully crafted partisan alternative proposed to appease extremist groups that want to close American coal mines. This new kind of alternative is not justified or reasonable and is likely illegal. OSM should not allow small, well-funded groups to drive US energy policy with extremely one-sided ideology.

41-1 Is there any job guaranteed for life in the United States? Absolutely not; unless you’re a compliant federal worker; but no private firm offers permanence. People working around Rosebud Complex have known this (and have been warned of this for years). Alt. #5 would offer 37.1 million tons more employment and thereby inflict a huge burden on society.

Response: Comments expressing opposition to Alternative 5 (Partial Mining) are noted; the rationale provided for these preferences will be considered by the decision maker.

Suggested Analysis Issue

3000 Suggested analysis issue/resource

Comment responses related to analysis issues can be found above in the **Side-by-Side Response to Comments** for correspondences 0029.

6000 Adequacy of SEIS Analysis (general)

Comment responses related to the adequacy of the SEIS analysis as can be found above in the **Side-by-Side Response to Comments** for correspondences 0029, 0035, and 0038.

6001 Suggested new analysis or method

Comment responses related to suggested new analysis or method can be found above in the **Side-by-Side Response to Comments** for correspondence 0030.

Topography

6100 Topography > Analysis comment/suggestion

Comment responses related to topography can be found above in the **Side-by-Side Response to Comments** for correspondences 0035 and 0038.

Air Quality

Additional comment responses regarding air quality can be found above in the **Side-by-Side Response to Comments** for correspondences 0029, and 0038.

6200 Air Quality > Analysis comment/suggestion

26-1	An unfortunate side effect that would be worsened if this plan is allowed to continue is the blatant lack of dust control in the mining areas, causing health and safety concerns to people and animal life.

Response: As disclosed in SEIS **Section 2.2.2.2, Area F Operations and Development**, measures to control fugitive dust in Area F are being implemented as described in the 2018 Final EIS **Section 2.4.3.4**. Westmoreland Rosebud currently maintains a Fugitive Dust Control Plan in accordance with Administrative Rules of Montana (ARM) 17.24.761 and the work practice standards and Best Available Control Technology established within its current MAQP #1570-09. Impacts related to fugitive dust are disclosed in the SEIS in **Sections 4.3, Air Quality** and **4.5, Public Health and Safety**.

42-2	Air quality information - I visited with resource specialist at meeting and was concerned with answer she gave me on Rosebud Mine 2023 air quality monitors that spike in particulate readings. Years recorded before/after 2023 showed no real changes. Was this due to malfunctioning equipment/records for the year? Does draft SEIS factor in "act of nature" wildlife events like the Richard Springs fire in the summer of 2023 that burned/threatened mine, power plant, and evacuation of town of Colstrip? The smoke, particulate from this fire and other large fires from Canada to California blanket this affected area and have to "skew" readings on air quality monitors negatively in this area. Rosebud Mine/Colstrip Power Plant should not be penalized for these spikes. I was told it could have been a "wind event."

Response: Annual emissions from the Rosebud Mine are reported by Westmoreland to Montana DEQ. As disclosed in SEIS **Section 3.3.24.1** and shown in **Table 3.3-2,** annual emissions of criteria air pollutants (CAP), including PM_{10} and $PM_{2.5}$, from the Rosebud Mine are generally consistent with the annual CAP emissions described in the 2018 Final EIS. For PM_{10} and $PM_{2.5}$, annual emissions from the Rosebud Mine have actually declined between 2017 (last data year used in the 2018 Final EIS) and 2022. This decrease in CAP emissions is likely due to decreased production at the Rosebud Mine (see **Section 2.2.1, Past and Existing Production**). CAP emissions in 2023 were higher than those for years 2017 through 2022, because production was higher in 2023 than the immediately proceeding years. The mine's 2023 CAP emissions were still lower, though, than emissions for 2010 through 2016 when production rates were higher. CAP emissions from wildfires, such as the Richard Springs fire were considered in the air quality modeling completed for the 2018 Final EIS (see **Appendix D** in the 2018 Final EIS and **Section 3.3.5, Regional Air Quality** in the Final SEIS.

Climate Change

Additional comment responses regarding climate change can be found above in the **Side-by-Side Response to Comments** for correspondences 0019, 0029, 0030, and 0038.

6300 Climate Change > Analysis comment/suggestion

1-1	Coal is a fossil fuel that produces greenhouse gases and contributes to global warming.
15-1	Coal warms the planet, and unless we get that under control, we should not expand the mine.
Form Letter A	Greenhouse gas emissions have been carefully quantified, and the social cost of carbon methodology has been appropriately applied to provide additional transparency.

Response: Climate and emission trends at global, national, and state scales were described in **Section 3.4, Climate and Climate Change** of the Draft SEIS along with existing GHG emissions from the Rosebud Mine, Colstrip Power Plant, and Rosebud Power Plant. Impacts of the Proposed Action (Alternative 4) on global, national, and state emissions trends were disclosed in **Section 4.4.6** of the Draft SEIS and the social cost of GHGs were disclosed in **Section 4.4.7**.

6302 Climate Change > Cumulative impacts

28-1 I look at this winter. It is the warmest and driest in since I moved here in 1978. i see wild fires burning all year long. i see LA burning. i see the giant fire in Boulder in the winter recently.... and you are planning to do more harm. how can you sleep at night? Do you have kids? You are adding to the hell they will be living in do to your actions. There is total responsibility on your hands if this terrible plan is finalized.

Response: Impacts of the Proposed Action (Alternative 4) on global, national, and state emissions trends were disclosed in **Section 4.4.6** of the Draft SEIS and the social cost of GHGs were disclosed in **Section 4.4.7**. Cumulative impacts of climate change, including wildland fire were disclosed in **Section 5.3.3** of the Draft SEIS.

Public Health and Safety

6400 Public Health and Safety > Analysis comment/suggestion

Comment responses related to public health and safety can be found above in the **Side-by-Side Response to Comments** for correspondences 0029, 0035, and 0038.

Geology

6500 Geology > Analysis comment/suggestion

Comment responses related to geology can be found above in the **Side-by-Side Response to Comments** for correspondence 0038.

Surface Water

Additional comment responses regarding surface water can be found above in the **Side-by-Side Response to Comments** for correspondences 0019, 0029, 0030, 0035, 0036, and 0038.

6600 Surface Water > Analysis comment/suggestion

Form Letter A Additionally, water withdrawals from the Yellowstone River for the Colstrip Power Plant are shown to be negligible, representing only 0.7% of total river flow at the point of diversion. These findings underscore the soundness of the proposed action.

Response: Thank you for your comment. Commenter's preference for Alternative 4 (Proposed Action) is noted. No related changes were made to the Final SEIS narrative.

6602 Surface Water > Cumulative impacts

Form Letter A Specifically, the analysis confirms that cumulative surface water impacts are confined to the immediate area of West Fork Armells Creek, with no measurable impacts outside this zone.

Response: See Comment Response 0038-6.

Groundwater

Additional comment responses regarding groundwater can be found above in the **Side-by-Side Response to Comments** for correspondences 0029, 0035, 0036, and 0038.

3702 Groundwater > Comment about existing condition of affected environment

16-1 The one reason my family is still here is because of abundant and good quality water. We have 16 springs on our operation, all of which come from coal seams, as the seams are the most porous layer beneath the ground. Every seam also has a thick layer of clay directly underneath which holds the water from seeping downward. We are very fortunate to have the abundance of shallow aquifers in this fairly arid landscape. Water, both surface and groundwater, both quality and quantity, are one of the most valuable resources we have.

Response: Thank you for your comment. No additional changes were made to the Final SEIS narrative.

6700 Groundwater > Analysis comment/suggestion

16-3 Moving towards the Area F EIS Process, I retrieved my Area F testimony submitted during the scoping process in 2013. In it, I very clearly stated that before a permit was granted for Area F, that meaningful water quality analysis needed to be collected both within the mine permit, and on the adjacent agricultural lands. Specifically, this pre-mine baseline needed to be for water quality and quantity, both surface water and groundwater. The reason I testified specifically to water quality, is to avoid the mistakes of the Peabody mine mentioned above, and have that information for reference, if needed, at a later date. I was shocked and angered to read in the SEIS document in Section 4.7.3.1 That states: "Based on Western Energy's groundwater model, the groundwater model will take MORE THAN 50 YEARS AFTER RECLAMATION TO BE RE-ESTABLISHED" (emphasis added).

Response: Thank you for your comment. Additional water quality monitoring has occurred since 2013 for Area F. No additional changes were made to the Final SEIS narrative.

6702 Groundwater > Cumulative impacts

27-1 This seis admits that the water at Colstrip is not recovering from mining after 40 years. Do not commit any more land to this failed mining method and cease spreading desertification in Montana.

Response: Thank you for your comment. Water quality or quantity impacts from mining activities are allowed as long as the post reclamation resulting quality and quantity of the water still supports the uses it could support prior to mining. No additional changes were made to the Final SEIS narrative.

Water Rights

Additional comment responses regarding water rights (including replacement water) can be found above in the **Side-by-Side Response to Comments** for correspondences 0019 and 0029.

6800 Water Rights > Analysis comment/suggestion

16-1 Nearly 50 years after my great grandfather settled here, Colstrip was founded, mining coal for coal fired steam engines, and it didn't take long to realize that the mining activity was negatively impacting agricultural water rights that adjacent landowners had obtained years prior. My family has been involved in these coal mining caused water impact problems. This is nothing new to me. The coal mining industry has been raising hell with our

Response: Commenter's concerns related to mining and water resources are noted. See response to the continuation of this comment below (16-3).

16-3 Again, I testified during scoping that Water quality analysis should be done PRIOR TO THE PERMIT BEING GRANTED! Has this baseline been completed? If it has not been completed, hasn't the DEQ had ample time since 2013 to gather that data? During the public meeting in Colstrip on January 8th, this quote was displayed at the groundwater information desk. When I asked what would happen if agricultural water, surface and ground, quality and quantity would be impacted. The answer Is that the MTDEQ would require WATER REPLACEMENT!! From where? For 50 years, or in perpetuity at no cost to the landowner? This agricultural impact should have been addressed and mitigated during the EIS process, and evidently was ignored by the

16-3 Area F encompasses over 10 square miles, the amount of agricultural water impacts that this massive permit would entail would be staggering, and would set a precedence of future permit areas.

16-4 I am not opposed to coal mining, I believe it can be done responsibly, but there is not much in the water section of the EIS process of Area F that mitigates negative issues. The cost of coal production should not be passed on to adjacent landowners, and in order for that to happen, the MTDEQ needs to step up and do their job. The mining of coal should not burden adjacent landowners. All we are asking for is to keep the status quo, keep our water quality and quantity in place, don't pass on the cost of coal production to others, and for the coal companies to practice responsible development that we hear so much about. This request is fair and reasonable. Waiting 50 years for an aquifer to recharge is unacceptable. We can do better.

Response: The Draft SEIS provides significant detail on analyses of potential impacts to surface water and groundwater quantity and quality in **Chapter 4** Environmental Consequences, Direct and Indirect Impacts, and specifically in **Sections 4.7, Water Resources – Surface Water; 4.8 Water Resources – Groundwater;** and **4.9, Water Resources – Water Rights**. Also, please refer to **Appendix 3** of the Final SEIS for a summary of the Area F baseline data associated with surface water and groundwater resources. If a surface water right were to become unusable for its specified purpose due to flow or water quality changes, a suitable replacement source would be provided by Westmoreland Rosebud as described in the Draft SEIS S**ection 4.9.3.3, Replacement Water Sources and Replacement Process**. No related changes were made to the Final SEIS narrative.

26-1 There is also an issue of blasting vibrations that are causing issues to our nearby wells, causing a need for continuous maintenance and impacting our reliability for necessary water sources for our cattle and the surrounding wildlife who also use these wells and water tanks.

Response: As disclosed in the 2018 Final EIS **Section 2.4.3.7, Blasting**, Westmoreland Rosebud is required to publish notice of blasting at least 10 days, but not more than 20 days, before beginning a blasting program and must republish the notice at least every 12 months (ARM 17.24.623(3)). The blasting schedule is published in the *Independent Press* and copies are distributed to local governments, public utilities, and each residence within 0.5 mile of the project area. Pursuant to ARM 17.24.622, notified residents are also provided with information advising the owner or resident on how to request a pre-blasting survey. The purpose of a pre-blasting survey would be to determine and document the pre-blasting condition and other physical factors potentially affected by blasting. Special attention would be given to the condition of wells and other water systems used for human, animal, or agricultural purposes and to the quantity and quality of the water. To date, DEQ is not aware of anyone

in the vicinity of Area F requesting a pre-blast survey. Pursuant to ARM 17.24.1204, any person may request an inspection of the Rosebud Mine by submitting a signed statement, or an oral report followed by a signed statement, to DEQ giving the department reason to believe that a violation of MSUMRA exists. DEQ has not received any substantiated claims in recent years regarding blasting impacts on wells in the vicinity of the Rosebud Mine or Area F, in particular. DEQ did issue two Notices of Noncompliance to Westmoreland Rosebud on March 10, 2025, for failure to publish an updated blasting schedule (one for Area F and another for Area B). Westmoreland Rosebud will have 30 days to abate the violation. Abatement is to provide proof of publication of a blasting schedule for both permit Area F and Area B.

Vegetation

6900 Vegetation > Analysis comment/suggestion

Comment responses related to vegetation can be found above in the **Side-by-Side Response to Comments** for correspondence 0038.

Fish and Wildlife Resources

Additional comment responses regarding fish and wildlife can be found above in the **Side-by-Side Response to Comments** for correspondence 0029.

4102 Fish and Wildlife Resources > Comment about existing condition of affected environment

1-1 Amphibian populations are declining worldwide, and amphibians are experiencing high extinction rates due to habitat loss, chytrid fungus, pollutants, pesticides, invasive species, and climate change. Amphibians are the most threatened class of vertebrates. Amphibians may occur in riparian habitat, which is present within and near the project area. Two Montana Natural Heritage Program species of concern, the Great Plains toad and northern leopard frog, may be present.

Response: These species are addressed in the SEIS in **Section 3.13.3, MNHP Species of Concern** and in **Section 3.13.3.5, Amphibians**. No edits were made to the Final SEIS text.

22-1 Besides the ungulate big game animals that call the Booth Ranch home, it is also important black bear mountain lion, bobcat and possibly Lynx habitat.

Response: Direct impacts on mountain lion and bobcat are addressed in the SEIS, **Section 4.12.3.1, Direct Impacts; Carnivores**. Indirect impacts are disclosed in the SEIS, **Section 4.12.3.2, Indirect Impacts; Mammals**. Lynx have not been documented in the project area.

22-1 At one point in my career I was responsible for several ranches and the management of 10,000 elk on three different ranches in two different states. Out of all these properties the Booth Ranch was the absolute wildlife gem of all the lands I got to be a part of! Some of the largest elk in the west have been taken here. The mule deer are the best in MT.

Response: Direct impacts on elk and mule deer are disclosed in the SEIS, **Section 4.12.3.1, Direct Impacts; Big Game Animals**. Indirect impacts are disclosed in the SEIS, **Section 4.12.3.2, Indirect Impacts; Mammals**. As described in the SEIS, monitoring of reclaimed habitat near active

portions of the Rosebud Mine indicates that large game animals have continued to inhabit areas adjacent to active mining areas throughout the duration of mining activities.

7100 Fish and Wildlife Resources > Analysis comment/suggestion

14-1 There currently is a county road that runs generally east and west near Horse Creek, currently there are no fences to encumber wildlife as they freely move north to south. The proposed expansion of proposal #4 and #5 means that haul trucks and machinery will continually disrupt the free movement and any migratory wildlife.

22-1 It pains me to see all this potentially interrupted by haul roads and mine pits on this side of the ranch. Elk,deer and antelope travel corridors will be cut off from their normal travel routes.

Response: Impacts on wildlife movements are disclosed in the SEIS, **Section 4.12.3.1, Direct Impacts; Big Game Animals**. As described in the SEIS, monitoring of reclaimed habitat near active portions of the Rosebud Mine indicates that large game animals have continued to inhabit areas adjacent to active mining areas throughout the duration of mining activities.

7102 Fish and Wildlife Resources > Cumulative impacts

26-1 It should also be noted that along with a serious impact to cattle, there will be a worsening impact to the wildlife in the area that has already been disturbed and uprooted in previous years and is still adjusting to. These animals include native elk, deer, turkeys, pheasants, grouse, antelope, black bears, mountain lions, bobcats and more. This poses a distinct effect upon the ecosystem in this area that is still reeling due to previous mining disturbances. The proposed mining area is also a natural migration path for the wildlife in this area which would cause further distress to the animals.

Response: Impacts on wildlife movements are disclosed in the SEIS **Section 4.12.3.1, Direct Impacts, Big Game Animals**. As described in the SEIS, monitoring of reclaimed habitat near active portions of the Rosebud Mine indicates that large game animals have continued to inhabit areas adjacent to active mining areas throughout the duration of mining activities. Cumulative impacts on fish and wildlife are expected during the life of the mine and are disclosed in **Section 5.3.11** of the SEIS. As discussed in the SEIS, monitoring of reclaimed habitat near active portions of the Rosebud Mine indicates that wildlife has continued to inhabit areas adjacent to active mining areas throughout the duration of mining activities. Wildlife species would be expected to return to reclaimed areas after mining is complete.

7103 Fish and Wildlife Resources > Monitoring

1-1 Amphibian Refuge recommends delineating an area of riparian habitat for amphibian protection and implementing a long-term amphibian population monitoring program.

22-1 Before any expansion of this permit is approved I would like to see deer and elk collared so we can determine travel routes and be assured this road and mine expansion is not interrupting this important habitat.

Response: Westmoreland has conducted annual wildlife monitoring surveys of the Rosebud Mine since 1973. Although wildlife surveys focus on big game species and birds, other species, including amphibians, are recorded when encountered during all field surveys. Movement studies of collared deer and elk have not been conducted, and the intensity of impacts does not warrant such monitoring (see response below for issue code 7104).

7104 Fish and Wildlife Resources > Mitigation

14-1 As a potential alternative to not impede the mining operations and making alternative #4 and #5 a possibility, I would suggest an over the road wildlife crossing corridor across the haul roads.

Response: Impacts on wildlife movements are disclosed in the SEIS, **Section 4.12.3.1, Direct Impacts, Big Game Animals**. As described in the SEIS, monitoring of reclaimed habitat near active portions of the Rosebud Mine indicates that large game animals have continued to inhabit areas adjacent to active mining areas throughout the duration of mining activities. The intensity of impacts does not warrant a mitigation, such as a wildlife overpass.

Special Status Species

Additional comment responses regarding special status species can be found above in the **Side-by-Side Response to Comments** for correspondences 0029 and 0038.

4202 Special Status Species > Comment about existing condition of affected environment

22-1 Also I wanted you all to be aware that the proposed grizzly bear recovery area is now included in this area. No known grizzly sightings in modern years, but the habitat is prime for that species and is now part of the recovery plan.

Response: Comment is noted. Grizzly bears are not known to occur in the project area and this species was not addressed in the biological assessment that was prepared for the project in consultation with the USFWS pursuant to Section 7 of the Endangered Species Act. See SEIS **Section 6.1.2, Section 7 Consultation Process with the U.S. Fish and Wildlife Service**.

7200 Special Status Species > Analysis comment/suggestion

42-1 Endangered species - listed shovel nose sturgeon (1 sighting)?? Within 50 mile zone of Area F. Is this sighting/observation via Armells Creek/West Fork A.C.; flows north to discharge into Yellowstone River just west of Forsythe Mt. There are several agricultural diversion dams on Y. R. both east and west of town of Forsythe and I'm curios how this particular sturgeon observed in this study was able to traverse this body of water/dams to be included in this SEIS. I would like further clarification/information on this as resources specialist was not able to fully address at public meeting.

Response: The Draft SEIS does not mention a sighting of shovelnose sturgeon within the 50 mile zone of Area F. Shovelnose sturgeon are present in the Yellowstone River and were federally listed as threatened in 2010 because pallid sturgeon were being misidentified as shovelnose sturgeon and were harvested because of the similarity in appearance. If this comment is referencing the recent data that indicated that a pallid sturgeon was

documented through telemetry data upstream of the Cartersville Diversion Dam and the Colstrip Power Plant diversion in 2024, then flow conditions were apparently favorable to allow passage over that dam (see SEIS **Section 3.13.2.2, Pallid Sturgeon**). Cartersville Diversion Dam is expected to continue to be a fish passage barrier under most flow conditions, but now that fish passage over the Intake Diversion Dam has been opened up, more pallid sturgeon can move upstream to the Cartersville Diversion Dam and have the potential to move upstream over the dam when flow conditions are appropriate. Passage over the dam is likely only possible during high flow conditions. Pallid sturgeon are not expected to become entrained in the Colstrip Power Plant diversion.

7203 Special Status Species > Monitoring

22-1 I believe some houndsmen and hair samples DNA would determine if Lynx are present in this area.

Response: Lynx are not known to be present in the project area and it is not suitable habitat for this species. Lynx have not been detected during annual wildlife monitoring conducted at the Rosebud mine since 1973 and this species was not addressed in the biological assessment that was prepared for the project in consultation with the USFWS pursuant to Section 7 of the Endangered Species Act. See SEIS **Section 6.1.2, Section 7 Consultation Process with the U.S. Fish and Wildlife Service**.

Cultural and Historic Resources

7300 Cultural and Historic Resources > Analysis comment/suggestion

Comment responses related to cultural and historic resources can be found above in the **Side-by-Side Response to Comments** for correspondence 0029.

Socioeconomic Conditions

Additional comment responses regarding socioeconomic conditions can be found above in the **Side-by-Side Response to Comments** for correspondences 0019, 0029, and 0038.

7400 Socioeconomic Conditions > Analysis comment/suggestion

6-1 The City of Colstrip relies on the Rosebud Mine and Colstrip Power Plant, which together employ more than 500 workers, for its survival. The Mine and Power Plant are, far and away, the primary industries in Colstrip. Nearly all the remaining employers in Colstrip - education, retail, dining, medial, government, etc. - support the families that reside in Colstrip because of the Mine & Power Plant. Beyond Colstrip and Rosebud County, the Mine and Power Plant provide vital electricity to the Northern Plains of Montana, which regularly experience sub-zero winter temperatures. Northwestern Energy reports having over 750,000 customers in Montana, South Dakota, and Nebraska, over 400,000 of with those customers from Montana alone. Northwestern Energy serves customers in Butte, Billings, Bozeman, Missoula, Great Falls, and Helena. In short, coal from the Rosebud Mine supplies Montana with affordable power, plain and simple. The Rosebud Mine also supports the state and local coffers through excise taxes. Coal taxes provided tens of millions of dollars to state and local governments each year. Without the Rosebud Mine and Colstrip Power Plant, those tax dollars would disappear.

8-1 The state of Montana relies on the tax base generated by the mine and the power plant at Colstrip. As a resident of Colstrip, we ask that you please consider keeping this mine operating as long as possible.

10-1 As you may know the coal mined from Rosebud Mine goes directly to units 3&4 of the Colstrip Power Plant units. Without the coal, the plant could also shut down. If the plant were to shut down this would leave many people in the dark. And energy demands are only going to increase through out the upcoming years. During these times of growth and energy demands we can not afford to be shutting down any more energy sources, and this is the

12-2 The Rosebud Mine supplies coal that supports over 400,000 customers in Montana with reliable power and generates energy for delivery to adjacent States in the Northwestern United States. These reserves are critical to that continued reliance on dependable energy, especially during the hard winter months when temperatures drop well below zero for extended periods of time.

23-1 It is my understanding that both Alternative 1 and Alternative 5 could result in sudden or near term closure of the mine, which would needlessly harm the Colstrip community and Rosebud County.

32-1 The Rosebud Mine, operated by Westmoreland Mining LLC, has been a vital component of Montana's energy infrastructure for decades. Located near Colstrip, Montana, the mine supplies coal exclusively to the Colstrip Power Plant, which generates reliable and affordable electricity for Montana and neighboring states.

32-1 The mine has also historically provided substantial economic benefits to the region and its continued operation is critical for sustaining the local economy and the livelihoods of the over 300 workers that are employed by the mine. This is further demonstrated by the 2018-2022 American Community Survey 5-Year Estimates, which show that the median household income in Colstrip, Montana, is $90,923—the highest median household income in the entire state of Montana, where the median household income for the same period is $66,341. These well-paying jobs provide stable incomes for Montana families and contribute significantly to the tax base that funds essential public services such as education and infrastructure projects.

32-2 Communities in the area also rely heavily on tax revenue generated by the Rosebud Mine. The premature closure of the mine—a likely outcome is either Alternative 1 or Alternative 5 were selected—would devastate the local economy and have far-reaching consequences across the state.

34-1 The Rosebud Mine is a driving economic factor in Rosebud County and vital to the prosperity of Montana's rural communities. Supporting approximately 300 full-time employees and providing an estimated total payroll of $32 million annually, it is the lifeblood of families in communities throughout Rosebud County and surrounding area. With the mine's employee salaries averaging nearly 3 times the per capita income in Montana, Rosebud County cannot afford to lose these high-quality jobs. If the mine is forced to shut down, the State of Montana will also lose an estimated $27 million through the Coal Severance Tax program, negatively impacting schools, public safety, and infrastructure. The result of OSMRE pursuing another proposal or arbitrarily closing the mine would place an unacceptable burden and strain upon Rosebud County and the entire state. Action must be taken

34-1 The Rosebud Mine supplies approximately 4 million tons of coal annually to the Colstrip Power Plant. Continued operation of the plant is essential to ensure that the lights stay on in Montana and will help foster energy independence and strengthen our national security. It is imperative the Rosebud

Mine be allowed to mine the entirety of its leased coal in Area F over a 20-year mine life. Choosing another alternative will have severe consequences for the local community, leading to fewer jobs, reduced tax revenue and the early closure of the mine.

Form Letter A — The economic and social benefits of approving Alternative 4 cannot be overstated. According to the 2018- 2022 American Community Survey 5-Year Estimates, the median household income in Colstrip, Montana, is $90,923, which is the highest median household income in the entire state of Montana, where the median household income for the same period is $66,341. This reflects the vital role the Rosebud Mine and Colstrip Power Plant play in supporting not only the 320 direct jobs at the mine but also the livelihoods of those employed at the Power Plant and the many businesses in Colstrip and surrounding communities. A closure of the Rosebud Mine would negatively and irreparably impact the entire town, as well as outlying communities, creating a cascading economic crisis that extends far beyond the mine itself. Premature closure of the mine, as would occur under Alternative 1 or Alternative 5, would devastate the Colstrip community, lead to widespread economic hardship, and disrupt the regional power grid's reliability. The SEIS's acknowledgment that Alternatives 1 and 5 could result in mine closure within 18 months underscores the importance of selecting Alternative 4 to ensure continued economic stability for the region.

Response: The socioeconomic conditions and associated effects of each alternative can be found in **Section 3.15, Socioeconomic Conditions** and **Section 4.15, Socioeconomic Conditions**. Additional information on the local and regional economic effects can be found in **Appendix 4 - Updated BBC Area F Economic Report (July 2024)**.

12-1 — Additionally, this resource provides significant Severance Tax dollars into the Operating Budget for the State of Montana. The loss of this revenue would realize marked reductions in dollars required to provide services to the citizens of Montana. Currently, there are no identifiable replacement avenues for those losses. The communities within the area also receive a large part of their operating income from the taxes associated with the Rosebud Mine and the generating stations that utilize these resources. Premature shutdown to this operation would have a devastating impact on the counties and communities that rely on these dollars

Response: Thank you for your comment. The direct, indirect, and induced effects of a premature shutdown are disclosed in **Section 4.15.2, All Alternatives**. Additional information on the local and regional economic effects can be found in **Appendix 4 - Updated BBC Area F Economic Report (July 2024)**.

7404 Socioeconomic Conditions > Mitigation

1-1 — We recommend developing a long-term plan to shift economic activity in southeastern Montana and northeastern Wyoming from coal mining to sustainable energy industries, such as solar, wind, and battery storage.

11-1 — As identified in our Colstrip Diversification strategy, EMDC supports a strong Pro-Active Effort now to move forward with additional Value-Added Energy Opportunities in Southeastern Montana. Four Technical Studies were completed by SEMDC in 2023 showing the positive economic feasibility of mall Modular (Nuclear) Reactors (SMRs), Hydrogen, Graphene, regional SE Montana power transmission projects, Rare Earth Element Development and Flue-Gas Capture/ Commercialization and 3) SEMDC feels that these Value-Added Energy Opportunities, many which could use Coal as a feedstock, have already started to evolve Colstrip and Rosebud County into an Energy Hub, with Coal.

Response: Thank you for your comment. Development of a regional long-term plan to shift economic activities from coal mining to sustainable energy is not within the scope of this environmental analysis.

Environmental Justice

7500 Environmental Justice > Analysis comment/suggestion

Comment responses related to environmental justice can be found above in the **Side-by-Side Response to Comments** for correspondences 0013, 0029, and 0035.

Recreation

Comment responses related to recreation can be found above in the **Side-by-Side Response to Comments** for correspondences 0035 and 0038.

Access and Transportation

Additional comment responses regarding access and transportation can be found above in the **Side-by-Side Response to Comments** for correspondence 0035.

7900 Access and Transportation > Analysis comment/suggestion

26-? Another issue is that if the area F plan were to proceed, Booth Land and Livestock would lose access to all of our southern pastures of the ranch, impeding our employees' jobs. This would also be the second time the mine has rerouted the public county road in recent years and would result in us losing even more land for cattle and hay in order to make way for the new road.

Response: Westmoreland Rosebud is mining and reclaiming the Rosebud Mine permit areas, including Area F, according to its approved operating permits. There are areas within the permit boundary but outside of current active operations where activities can be safely conducted; in these areas, Westmoreland allows surface owners to continue to use the property for hunting and ranching (Batie 2025). Land use impacts on private lands, including loss of pastureland used for livestock, in Area F and in the cumulative effects analysis area, which includes other permit areas of the mine, were disclosed in the 2018 Final EIS and the SEIS in **Section 4.23, Land Use** and **Section 5.3.22, Land Use (Cumulative Impacts)**.

Westmoreland Rosebud has agreements in place with all Area F surface landowners and coordinates access through the permit areas of the mine with local ranchers (Batie 2025). Westmoreland recently constructed a ranch access road in the Black Hank Creek drainage to facilitate the surface owner’s ranching operations in Area F (Batie 2025). Impacts related to rerouting of the county road were disclosed in the 2018 Final EIS in **Section 4.20, Access and Transportation**. See also Comment Response 0038-48 (agreements with surface landowners).

Solid and Hazardous Waste

Comment responses related to solid and hazardous waste can be found above in the **Side-by-Side Response to Comments** for correspondences 0029 and 0038.

Land Use

Additional comment responses regarding land use can be found above in the **Side-by-Side Response to Comments** for correspondence 0035.

8200 Land Use > Analysis comment/suggestion

21-1	Booth land and livestock utilizes that pasture yearly as it is an ideal location for winter and produces much needed hay for the livestock.
26-1	This plan would go directly through an area of the ranch called Unit 5, which we are actively looking into refurbishing the housing already there, making the area uninhabitable and useless for human living.
26-1	As a resident near the area F permit, there are many concerning elements to this plan proposed by Rosebud area mine that I would like to bring to attention. My first issue is the detrimental economic impact this plan would have on Booth Land and Livestock due to forcing us to sell 400 pairs of cattle.
26-1	The second issue is a serious loss of hay acreage that is the source of food for our remaining cattle. We would be forced to lose over 300 acres of hay fields in culmination with hundreds of acres that have already been taken from us in recent years. This would force us to buy more hay from outside sources, also further worsening the economic impact to the ranch.

Response: Land use impacts to private lands, including loss of pastureland used for livestock and other pre-mine uses of Area F, were disclosed in the 2018 Final EIS and the SEIS in **Section 4.23, Land Use.** Information about the pre-mine uses of the project area was included in **Section 3.23, Land Use (Affected Environment)** of the Final SEIS. This information has been pulled into **Section 3.23, Land Use (Affected Environment)** in the Final SEIS and additional information and/or clarifications have been made to both this section and the effects analyses in **Section 4.23, Land Use**, as needed. After mining operations are complete, the land must be restored to a condition capable of supporting its pre-mining uses, which directly impacts the land appraisal value (and market value) of mined land by requiring companies to restore the land to a usable state. Westmoreland is required to reclaim the land to the postmine land uses detailed in State Operating Permit C2011003F. As disclosed in **Table 169** in the 2018 Final EIS, these land uses include: grazing land (3,930 acres), cropland (318 acres), and fish and wildlife habitat (9 acres). See also the response above to issue code 7900 (Access and Transportation).

8202 Land Use > Cumulative impacts

26-1 This is especially detrimental given the fact that in previous years we have had to already reduce our herd numbers by over 500 pairs in losing land to other areas of the mine.

Response: Cumulative impacts to pre-mine lands uses, including other permit areas of the mine, were disclosed in the 2018 Final EIS and the Draft SEIS in **Section 5.3.22, Land Use (Cumulative Impacts).** In the Final SEIS, additional information and/or clarifications have been made to **Section 5.3.22, Land Use (Cumulative Impacts)**, as needed. See also the response above to issue code 8200 (Land Use).

Other Miscellaneous Topics

9000 Figures > Comment/suggestion for figures or graphics

Comment responses related to figures can be found above in the **Side-by-Side Response to Comments** for correspondence 0035.

9100 Request for Document or information

Additional responses to comments requesting documents and information can be found above in the **Side-by-Side Response to Comments** for correspondence 0029.

14-1 I would like to see the wildlife EIS on the proposals to further comment.

Response: Wildlife and special status species are analyzed in both the 2018 Final EIS and the SEIS. In the SEIS, please see **Sections 3.12, 3.13, 4.12, 4.13, 5.3.11**, and **5.3.12**. A BA was prepared to analyze impacts to threatened and endangered species and was submitted to the USFWS for consultation pursuant to Section 7 of the Endangered Species Act. See also SEIS **Section 6.1.2, Section 7 Consultation Process with the U.S. Fish and Wildlife Service**. The 2025 Final BA and USFWS concurrence letter are provided in SEIS **Appendix 7 – ESA Section 7 Consultation Documentation.**

9200 Editorial comment (e.g., typo)

Comment responses related to typos and other editorial mistakes can be found above in the **Side-by-Side Response to Comments** for correspondences 0035 and 0038.

9202 Outside scope of SEIS

44-2 We specialize in soil stabilization and injection grouting. We have the unique ability to interact with soils without the need for heavy equipment or any excavation. We also have advanced ground penetrating radar that can allow us to see into soils up to 130 feet deep.
I am reaching out to get in touch with someone for mine shaft abandonment, subsurface structure, and tunnel abandonment. We can detect and fill old

mines and structures with minimal manpower and minimal guidance. We can ensure that the abandonment is structural and permanent. If the relative location is known, we can do the rest. Do you have anyone that I can get in touch with to talk about this?

Response: This comment is outside the scope of the SEIS.

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Appendix 6 – Federal Coal Lease MTM 082186 Documentation

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UNITED STATES

Serial Number: MTM 82186

DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Date of Lease: September 1, 1966

COAL LEASE READJUSTMENT

PART I. LEASE RIGHTS GRANTED

This lease, entered into by and between the United States of America, hereinafter called the lessor, through the Bureau of Land Management, and

Western Energy Company
P. 0. Box 99
Colstrip, Montana 59323

hereinafter called lessee, is readjusted, September 1, 2006, for a period of 10 years and for so long thereafter as coal is produced in commercial quantities from the leased lands, subject to readjustment of lease terms at the end of each 10-year lease period.

Sec. 1. This lease readjustment is subject to the terms and provisions of the Mineral Leasing Act of February 25, 1920, as amended, 41 Stat. 437, 30 U.S.C. 181-287, hereinafter referred to as the Act; and to the regulations and formal orders of the Secretary of the Interior which are now or hereafter in force, when not inconsistent with the express and specific provisions herein.

Sec. 2. Lessor, in consideration of any rents and royalties to be paid, and the conditions and covenants to be observed as herein set forth, hereby grants and leases to lessee the exclusive right and privilege to drill for, mine, extract, remove or otherwise process and dispose of the coal deposits in, upon, or under the following described lands:

T. 2 N., R. 38 E., P.M.M.
Sec. 12: S½NW¼, SW¼, SW¼SE¼
Sec. 24: All
T. 1 N., R. 39 E., P.M.M.
Sec. 2: Lots 1-4, S½NE¼
T. 2 N., R. 39 E., P.M.M.
Sec. 28: S½SW¼
Sec. 30: All
Sec. 32: NE¼, N½NW¼, SE¼NW¼
Sec. 34: N½, E½SW¼, SE¼
T. 1 N., R. 40 E., P.M.M.
Sec. 2: SW¼
Sec. 10: NE¼, NE¼SW¼, SW¼SW¼, NW¼SE¼
Sec. 14: N½

Rosebud and Treasure Counties, Montana

containing 3521.80 acres, more or less, together with the right to construct such works, buildings, plants, structures, equipment and appliances; and the right to use such on-lease rights-of-way which may be necessary and convenient in the exercise of the rights and privileges granted, subject to the conditions herein provided.

PART II. TERMS AND CONDITIONS

Sec. 1. (a) RENTAL RATE - Lessee shall pay lessor rental annually and in advance for each acre or fraction thereof during the continuance of the lease at the rate of $3 for each lease year.

(b) RENTAL CREDITS - Rental shall not be credited against either production or advance royalties for any year.

Sec. 2. (a) PRODUCTION ROYALTIES - The royalty shall be 12.5 percent of the value of the coal produced by strip or auger methods and 8.0 percent of the value of the coal produced by underground mining methods as set forth in the regulations. Royalties are due to lessor the final day of the month succeeding the calendar month in which the royalty obligation accrues.

(b) ADVANCE ROYALTIES - Upon request by the lessee, the authorized officer may accept, for a total of not more than 10 years, the payment of advance royalties in lieu of continued operation, consistent with the regulations. The advance royalty shall be based on a percent of the value of a minimum number of tons determined in the manner established by the advance royalty regulations in effect at the time the lessee requests approval to pay advance royalties in lieu of continued operation.

Sec. 3. BONDS - Lessee shall maintain in the proper office a lease bond in the amount of $1,900,000. The authorized officer may require an increase in this amount when additional coverage is determined appropriate.

Sec. 4. DILIGENCE - This lease is subject to the conditions of diligent development and continued operation, except that these conditions are excused when operations under the lease are interrupted by strikes, the elements, or casualties not attributable to the lessee. The lessor, in the public interest, may suspend the condition of continued operation upon payment of advance royalties in accordance with the regulations in existence at the time of the suspension. Lessee's failure to produce coal in commercial quantities at the end of 10 years from September 1, 2006, shall terminate the lease, pursuant to Section 7 of the Act.

The lessor reserves the power to assent to or order the suspension of the terms and conditions of this lease in accordance with, inter alia, Section 39 of the Mineral Leasing Act, 30 U.S.C. 209.

Sec. 5. LOGICAL MINING UNIT (LMU) - Either upon approval by the lessor of the lessee's application or at the direction of the lessor, this lease shall become an LMU or part of an LMU, subject to the provisions set forth in the regulations.

The stipulations established in an LMU approval in effect at the time of LMU approval will supersede the relevant inconsistent terms of this lease so long as the lease remains committed to the LMU. If this LMU of which this lease is a part is dissolved, the lease shall then be subject to the lease terms which would have been applied if the lease had not been included in an LMU.

Sec. 6. DOCUMENTS, EVIDENCE AND INSPECTION - At such times and in such form as lessor may prescribe, lessee shall furnish detailed statements showing the amount and quality of all "products removed and sold from the lease, the proceeds therefrom, and the amount used for production purposes or unavoidably lost.

Lessee shall keep open at all reasonable times for the inspection of any duly authorized officer of lessor, the leased premises and all surface and underground improvements, works, machinery, ore stockpiles, equipment, and all books, accounts, maps, and records relative to operations, surveys, or 1nvestigations on or under the leased lands.

Lessee shall allow lessor access to and copying of documents reasonably necessary to verify lessee compliance with terms and conditions of the lease.

While this lease remains in effect, information obtained under this section shall be closed to inspection by the public in accordance with the Freedom of Information Act (5 U.S.C. 552).

Sec. 7. DAMAGES TO PROPERTY AND CONDUCT OF OPERATIONS - Lessee shall comply at its own expense with all reasonable orders of the Secretary, respecting diligent operations, prevention of waste, and protection of other resources.

Lessee shall not conduct exploration operations, other than casual use, without an approved exploration plan. All exploration plans prior to the commencement of mining operations within an approved mining permit area shall be submitted to the authorized officer.

Lessee shall carry on all operations in accordance with approved methods and practices as provided in the operating regulations, having due regard for the prevention of injury to life, health, or property, and prevention of waste, damage or degradation to any land, air, water, cultural, biological, visual, and other resources, including mineral deposits and formations of mineral deposits not leased hereunder, and to other land uses or users. Lessee shall take measures deemed necessary by lessor to accomplish the intent of this lease term. Such measures may include, but are not limited to, modification to proposed siting or design of facilities, timing of operations, and specification of interim and final reclamation procedures. Lessor reserves to itself the right to lease, sell, or otherwise dispose of the surface or other mineral deposits in the lands and the right to continue existing uses and to authorize future uses upon or in the leased lands, including issuing leases for mineral deposits, not covered hereunder, and approving easements or rights-of-way. Lessor shall condition such uses to prevent unnecessary or unreasonable interference with rights of lessee as may be consistent with concepts of multiple use and multiple mineral development.

Sec. 8. PROTECTION OF DIVERSE INTERESTS AND EQUAL OPPORTUNITY - Lessee shall: pay when due all taxes legally assessed and levied under the laws of the State or the United States; accord all employees complete freedom of purchase; pay all wages at least twice each month in lawful money of the United States; maintain a safe working environment in accordance with standard industry practices; restrict the workday to not more than 8 hours in any 1 day for underground workers, except in emergencies; and take measures necessary to protect the health and safety of the public. No person under the age of 16 years shall be employed in any mine below the surface. To the extent that laws of the state in which the lands are situated are more restrictive than the provisions in this paragraph, then the State laws apply. Lessee will comply with all provisions of Executive Order No. 11246 of September 24, 1965, as amended, and the rules, regulations, and relevant orders of the Secretary of Labor. Neither lessee nor lessee's subcontractors shall maintain segregated facilities.

Sec. 9. (a) TRANSFERS - This lease may be transferred in whole or in part to any person, association or corporation qualified to hold such lease interest.

Transfers of record title, working or royalty interest must be approved in accordance with the regulations.

(b) RELINQUISHMENT - The lessee may relinquish in writing at any time all rights under this lease or any portion thereof, as provided in the regulations. Upon lessor's acceptance of the relinquishment, lessee shall be relieved of all **future** obligations under the lease or the relinquished portion thereof, whichever is applicable.

Sec. 10. DELIVERY OF PREMISES, REMOVAL OF MACHINERY, EQUIPMENT, ETC. - At such time as all portions of this lease are returned to lessor, lessee shall deliver up to lessor the land leased, underground timbering, and such other supports and structures necessary for the preservation of the mine workings on the leased premises or deposits and place all workings in condition for suspension or abandonment. Within 180 days thereof, lessee shall remove from the premises all other structures, machinery, equipment, tools, and materials that it elects to or as required by the authorized officer. Any such structures, machinery, equipment, tools, and materials remaining on the leased lands beyond 180 days, or approved extension thereof, shall become the property of the lessor, but lessee

shall either remove any or all such property or shall continue to be liable for the cost of removal and disposal in the amount actually incurred by the lessor. If the surface is owned by third parties, lessor shall waive the requirement for removal, provided the third parties do not object to such waiver. Lessee shall, prior to the termination of bond liability or at any other time when required and in accordance with all applicable laws and regulations, reclaim all lands the surface of which has been disturbed, dispose of all debris or solid waste, repair the offsite and onsite damage caused by lessee's activity or activities incidental thereto, and reclaim access roads or trails.

Sec. 11. PROCEEDINGS IN CASE OF DEFAULT - If lessee fails to comply with applicable laws, existing regulations, or the terms, conditions, and stipulations of this lease, and the noncompliance continues for 30 days after written notice thereof, this lease shall be subject to cancellation by the lessor only by judicial proceedings. This provision shall not be construed to prevent the exercise by lessor of any other legal and equitable remedy, including waiver of the default. Any such remedy or waiver shall not prevent later cancellation for the same default occurring at any other time.

Sec. 12. HEIRS AND SUCCESSORS-IN-INTEREST - Ea.ch obligation of this lease shall extend to and be binding upon, and every benefit hereof shall inure to, the heirs, executors, administrators, successors, or assigns of the respective parties hereto.

Sec. 13. INDEMNIFICATION - Lessee shall indemnify and hold harmless the United States from any and all claims arising out of the lessee's activities and operations under this lease.

Sec. 14. SPECIAL STATUTES - This lease is subject to the Clean Water Act (33 U.S.C. 1252 et seq.), the Clean Air Act (42 U.S.C. 4247 et seq.), and to all other applicable laws pertaining to exploration activities, mining operations, and reclamation, including the Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1201 et seq.)

Sec. 15. SPECIAL STIPULATIONS - See Exhibit A attached).

The United States of America

By
(Signature)

Rebecca Spurgin, Acting

Chief, Branch of Solid Minerals
Montana State Office

(Date)

EXHIBIT A

Sec. 15. SPECIAL STIPULATIONS - In addition to observing the general obligations and standards of performance set out in the current regulations, the lessee shall comply with and be bound by the following stipulations. These stipulations are also imposed upon the lessee's agents and employees. The failure or refusal of any of these persons to comply with these stipulations shall be deemed a failure of the lessee to comply with the terms of the lease. The lessee shall require his agents, contractors and subcontractors involved in activities concerning this lease to include these stipulations in the contracts between and among them. These stipulations may be revised or amended, in writing, by the mutual consent of the lessor and the lessee at any time to adjust to changed conditions or to correct an oversight.

CULTURAL RESOURCES -

(1) Before undertaking any activities that may disturb the surface of the leased lands, the lessee shall conduct a cultural resource intensive field inventory in a manner specified by the Authorized Officer of the BLM (hereinafter referred to as the Authorized Officer) on portions of the mine plan area, or exploration plan area, that may be adversely affected by lease-related activities and which were not previously inventoried at such a level of intensity. Cultural resources are defined as a broad, general term meaning any cultural property or any traditional lifeway value, as defined below:

> Cultural property: a definite location of past human activity, occupation, or use identifiable through field inventory (survey), historical documentation, or oral evidence. The term includes archaeological, historic, or architectural sites, structure, or places with important public and scientific uses, and may include traditional cultural or religious importance to specified social and/or cultural groups. Cultural properties are concrete, material places, and things that are classified, ranked, and managed through the system of inventory, evaluation, planning, protection, and utilization.
>
> Traditional lifeway value: the quality of being useful in or important to the maintenance of a specified social and/or cultural group's traditional systems of (a) religious belief, (b) cultural practice, or (c) social interaction, not closely identified with definite locations. Another group's shared values are abstract, nonmaterial, ascribed ideas that one cannot know about without being told. Traditional lifeway values are taken into account through public participation during planning and environmental analysis.

The cultural resources inventory shall be conducted by a qualified professional cultural resource specialist; i.e., archaeologist, anthropologist, historian, or historical architect, as appropriate and necessary, and approved by the Authorized Officer (BLM if the surface is privately owned). A report of the inventory and recommendations for protection of any cultural resources identified shall be submitted to the Assistant Director of the Western Support Center of the Office of Surface Mining (hereinafter referred to as the Assistant Director) by the Authorized Officer. Prior to any on-the-ground cultural resource inventory, the selected professional cultural resource specialist shall consult with the BLM, the Northern Cheyenne Cultural Protection Board, and the Crow Historic and Cultural Committee. The purpose of this consultation will be to guide the work to be performed and to identify cultural properties or traditional lifeway values within the immediate and surrounding mine plan area. The lessee shall undertake measures, in accordance with instructions from the Assistant Director to protect cultural resources on the leased lands. The lessee shall not commence the surface-disturbing activities until permission to proceed is given by the Assistant Director in consultation with the Authorized Officer.

(2) The lessee shall protect all cultural resource properties within the lease area from lease related activities until the cultural resource mitigation measures can be implemented as part of an approved mining and reclamation plan or exploration plan.

(3) The cost of carrying out the approved site mitigation measures shall be borne by the lessee.

(4) If cultural resources are discovered during operations under this lease, the lessee shall immediately bring them to the attention of the Assistant Director, or the Authorized Officer if the Assistant Director is not available. The lessee shall not disturb such resources except as may be subsequently authorized by the Assistant Director. Within two (2) working days of notification, the Assistant Director will evaluate or have evaluated any cultural resources discovered and will determine if any action may be required to protect or preserve such discoveries. The cost of data recovery for cultural resources discovered during lease operations shall be borne by the surface managing agency unless otherwise specified by the Authorized Officer.

(5) All cultural resources shall remain under the jurisdiction of the United States until ownership is determined under applicable law.

PALEONTOLOGICAL RESOURCES -

If a paleontological resource, either large and conspicuous, and/or of significant scientific value is discovered during construction, the find will be reported to the Authorized Officer immediately. Construction will be suspended within 250 feet of said find. An evaluation of the paleontological discovery will be made by a BLM approved professional paleontologist within five (5) working days, weather permitting, to determine the appropriate action(s} to prevent the potential loss of any significant paleontological value. Operations within 250 feet of such discovery will not be resumed until written authorization to proceed is issued by the Authorized Officer. The lessee will bear the cost of any required paleontological appraisals, surface collection of fossils, or salvage of any large conspicuous fossils of significant interest discovered during the operation.

PUBLIC LAND SURVEY PROTECTION -

The lessee will protect all survey monuments, witness corners, reference monuments, and bearing trees against destruction, obliteration, or damage during operations on the lease areas. If any monuments, corners or accessories are destroyed, obliterated or damaged by this operation, the lessee will hire an appropriate county surveyor or registered land surveyor to reestablish or restore the monuments, corners, or accessories at the same locations, using surveying procedures in accordance with the "Manual of Surveying Instructions for the Survey of Public Lands of the United States." The survey will be recorded in the appropriate county records, with a copy sent to the Authorized Officer.

RESOURCE RECOVERY AND PR6TECTION PLAN (R2P2) -

Notwithstanding the approval of a resource recovery and protection plan (R2P2) by the BLM, lessor reserves the right to seek damages against the operator/lessee in the event (i) the operator/lessee fails to achieve maximum economic recovery (MER) [as defined at 43 CFR 3480.0-5.2(21)] of the recoverable coal reserves or (ii)·the operator/lessee is determined to have caused a wasting of recoverable coal reserves. Damages shall be measured on the basis of the royalty that would have been payable on the wasted or unrecovered coal.

The parties recognize that under an approved R2P2, conditions may require a modification by the operator/lessee of that plan. In the event a coal bed or portion thereof is not to be mined or is rendered unmineable by the operation, the operator shall submit appropriate justification to obtain approval by the Authorized Officer to leave such reserves unmined. Upon approval by the Authorized Officer, such coal beds or portions thereof shall not be subject to damages as described above. Further, nothing in this section shall prevent the operator/lessee from exercising its right to relinquish all or a portion of the lease as authorized by statute and regulation.

In the event the Authorized Officer determines that the R2P2 as approved will not attain MER as the result of changed conditions, the Authorized Officer will give proper notice to the operator/lessee as required under applicable regulations. The Authorized Officer will order a modification if necessary, identifying additional reserves to be mined in order to attain MER. Upon a final administrative or judicial ruling upholding such an ordered modification, any reserves left unmined (wasted) under that plan will be subject to damages as described in the first paragraph under this section.

Subject to the right to appeal hereinafter set forth, payment of the value of the royalty on such unmined recoverable coal reserves shall become due and payable upon determination by the Authorized Officer that the coal reserves have been rendered unmineable or at such time that the lessee has demonstrated an unwillingness to extract the coal.

The BLM may enforce this provision either by issuing a written decision requiring payment of the MMS demand for such royalties, or by issuing a notice of non-compliance. A decision or notice of non-compliance issued by the lessor that payment is due under this stipulation is appealable as allowed by law.

MULTIPLE MINERAL DEVELOPMENT -

Operations will not be approved which, in the opinion of the Authorized Officer, would unreasonably interfere with the orderly development and/or production from a valid existing mineral lease issued prior to this one for the same lands.

The BLM realizes that coal mining operations conducted on Federal coal leases issued within producing oil and gas fields may interfere with the economic recovery of oil and gas; just as Federal oil and gas leases issued in a Federal coal lease area may inhibit coal recovery. BLM retains the authority to alter and/or modify the R2P2 for coal operations on those lands covered by Federal mineral leases so as to obtain maximum resource recovery.

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Montana State Office, Law Enforcement Staff
5001 Southgate Drive
Billings, Montana 59101-4669
www.blm.gov/mt

In Reply Refer

MTM82186
3451 (MT921.9.kd) June 10, 2015

NOTICE

Western Energy Company
P. O. Box 99 COAL
Colstrip MT 59323

Coal Lease Readjustment Waived

Federal coal lease MTM 82186 was issued effective September 1, 1966, and the lease was subsequently readjusted effective September 1, 1996 and September 1, 2006.

The Federal Coal Leasing Amendments Act of 1976 (FCLAA) mandates 10-year readjustment intervals for all Federal coal leases, regardless of whether or not a prior lease readjustment has been waived. The 10-year readjustment date for Federal coal lease MTM 82186 is due on September 1, 2016.

The Miles City Field Office has informed this office that the existing terms and conditions attached to the lease readjustments dated September 1, 2016, is sufficient to cover resource concerns and does not need to be readjusted.

Should you have any questions, please feel free to contact Connie Schaff of this office at telephone (406) 896-5060.

/s/ Phillip C. Perlewitz

Phillip C. Perlewitz
Chief, Branch of Solid Minerals

cc:
Field Manager, Miles City Field Office (MT-C020)

bc:
Timothy Howell, Mining Engineer (MT-921)
Greg Fesko, Coal Coordinator (MT-921)

921.9:KDowdle:6/10/2015:readj:MTM 82186 readj waived

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Montana State Office
5001 Southgate Drive
Billings, Montana 59101-4669
www.blm.gov/montana-dakotas

In Reply Refer *To:*

3482 (mp) ROSE September 1, 2017

REF: Area F Resource Recovery and Protection Plan, LMU MTM 83589

Mr. Russell J. Batie, P.E.
Engineering Manager, Rosebud Mine
P.O. Box 99
Colstrip, MT 59323

Dear Mr. Batie:

On March 3, 2017, this office received your application for a Resource Recovery and Protection Plan (R2P2) for the Rosebud Mine Area F. This office has completed its review and has determined that the R2P2 does conform to the Mineral Leasing Act of 1920, as amended, for development, production, maximum economic recovery, the applicable regulations of 43 CFR 3480, and to the terms and conditions of the Federal coal lease contained within. Therefore, this R2P2 for the Rosebud Mine is approved, effective September 1, 2017.

This office still requests that the R2P2s for the areas be combined into a singular R2P2 covering the Rosebud Mine in its entirety.

If you have any questions or concerns, please contact Con B. Trumbull, Minerals Mine Inspector, at ctrumbul(@,blm.gov or 307-261-7611.

Sincerely,

/s/ Phillip C. Perlewitz

Phillip C. Perlewitz
Chief, Branch of Solid Minerals

cc: Lauren Mitchell
Office of Surface Mining Reclamation and Enforcement
1999 Broadway, Suite 3320
Denver, CO 80202

Chris Yde
Section Supervisor
Coal Section
Coal and Opencut Mining Bureau
Department of Environmental Quality
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Helena, MT 59601-0901

Appendix 7 – ESA Section 7 Consultation Documentation

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Montana Ecological Services Field Office
585 Shephard Way, Suite 1
Helena, Montana 59601–6287

In Reply Refer to:
File: M.26 OSM (I)
2025-0092510

May 15, 2025

Memorandum

To: Natural Resources Specialist, Office of Surface Mining Reclamation and Enforcement

From: Office Supervisor, U.S. Fish and Wildlife Service, Montana Ecological Services *for* Amity Bass

Subject: Concurrence regarding Rosebud Mine Area F Biological Assessment

This memorandum is in response to the April 2025 Final Biological Assessment (BA) that the Office of Surface Mining Reclamation and Enforcement (OSMRE) prepared relative to the subject project (Project) and your accompanying letter requesting U.S. Fish and Wildlife Service (USFWS) concurrence with the *may affect, not likely to adversely affect* determinations for the endangered pallid sturgeon (*Scaphirhynchus albus*) and northern long-eared bat (*Myotis septentrionalis*) presented therein. OSMRE determined in the BA that the Project is *not likely to jeopardize the continued existence of* the proposed threatened monarch butterfly (*Danaus plexippus*) and western regal fritillary (*Argynnis idalia occidentalis*) and the proposed endangered Suckley's cuckoo bumblebee (*Bombas suckleyi*). The BA and the accompanying letter were received in this office via electronic mail on May 1, 2025. This response is provided by the USFWS under the authority of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531-1543), and the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.).

Western Energy (now Westmoreland Rosebud Mining, LLC, a subsidiary of Westmoreland Mining, LLC) submitted a mine permit application package on November 2, 2011, to the Montana Department of Environmental Quality (DEQ) for a new permit area (C2011003F), known as Area F (Project area), at the Rosebud Mine, an existing surface coal mine consisting of Areas A, B, C, and D, that surrounds the city of Colstrip and the Colstrip Steam Electric Station (Colstrip Power Plant) in Rosebud and Treasure Counties, Montana. The Project area is located in Township 2 North, Range 38 and 39 East; and Township 1 North, Range 39 East, and would expand the mine to the west into Treasure County. The surface of the Project area is entirely privately owned, but the subsurface is both privately (3,479 acres) and federally (3,294 acres)

owned. Westmoreland Rosebud Mining, LLC (Westmoreland Rosebud) holds leases for Federal (M82186) and private coal (1001 and 1001-A) in the Project area.

DEQ and OSMRE each issued a Record of Decision for the Project in 2019 after preparing the joint Western Energy Area F Final Environmental Impact Statement (Final EIS). The Mine Plan Decision Document was signed by the U.S. Department of Interior (DOI) on July 15, 2019, authorizing the Federal mining plan for Federal Coal Lease M82816, which encompasses 947.6 acres in Area F. In 2019, Westmoreland Rosebud began developing the Project area, according to state operating permit C2011003F issued by DEQ in 2019 and the Federal mine plan approved by the DOI. After subsequent litigation, the United States District Court for the District of Montana Billings Division issued a Court Order on September 30, 2022, that deemed insufficient several aspects of the Final EIS and remanded the Final EIS to OSMRE. OSMRE has prepared the Rosebud Mine Area F Supplemental Environmental Impact Statement (SEIS) and has initiated Section 7 consultation with the USFWS through preparation of the April 2025 BA.

Under the proposed action, it is assumed that approximately 71.3 million tons of coal from Federal and private coal leases and approximately 4,288 acres would be disturbed in Area F over the 20-year life of the mine. Mining (including disturbance, coal recovery, and production rates); fugitive dust control; protection of the hydrologic balance; monitoring; and mitigation are expected to continue until 2039. Westmoreland Rosebud would maximize recovery of coal in the Federal coal lease M82186. Once mining has ceased, reclamation of disturbed areas (4,288 acres) in the Project area would occur according to Westmoreland Rosebud's approved reclamation plan. Changes to production rates, additions of other mine permit areas, reduced mining in Area F, or changed market conditions may influence the operational life of the Rosebud Mine as a whole or of individual permit areas; however, per the Area F Operating Permit (C2011003F MR 16) from DEQ and the Federal mine plan approved by DOI (Federal Coal Lease M82816), activities specific to Area F, and therefore subject to this consultation, would not continue beyond 2039.

As part of the proposed action, water will continue to be diverted from the Yellowstone River near Nichols, Montana and transferred via pipeline approximately 30 miles to the Colstrip Power Plant and the City of Colstrip for industrial and municipal uses. This water right (42KJ 94423-00) is for 69.27 cubic feet per second (cfs), with a maximum annual volume estimated at 50,151 acre-feet per year. The water right has a priority date of December 16, 1970. Water uses include make-up water, cooling water, pollution control, screen cleansing, domestic water for the community, and other auxiliary uses.

As with other permit areas of the Rosebud Mine, all coal produced under the Project would be sold and combusted locally at two power plants—the Colstrip and Rosebud Power Plants. These power plants could also use coal from sources other than the Rosebud Mine. The Colstrip Power Plant would continue to divert up to 69.27 cfs of water from the Yellowstone River for the uses described above through 2039 using Project area coal; any operations beyond that period would be attributable to other permit areas of the Rosebud Mine or other sources. The April 2025 BA provides further discussion of the elements and effects of the Project, including Project conservation measures and monitoring to minimize potential Project effects to terrestrial and aquatic species and habitats.

The BA determined that implementation of the proposed Project would result in insignificant or discountable effects to, and consequently *may affect, but is not likely to adversely affect*, the endangered northern long-eared bat:

- The Project footprint (Area F permit area) occurs approximately 30 miles outside (west) of USFWS-modeled northern long-eared bat range/potential habitat and 190 miles from the closest documented northern long-eared bat occurrence in Montana. No northern long-eared bat hibernacula have been documented in Montana. Neither general landscape effects within USFWS-modeled northern long-eared bat summer/migration/hibernating range, nor specific effects to or within USFWS-modeled potential northern long-eared bat summer habitat would occur within the Project footprint. Effects to individual northern long-eared bats from proposed Project construction and operational activities within the Project footprint are therefore not expected.
- The Project action area defined in the BA, which includes the Project footprint plus a buffer to account for OSMRE-modeled potential trace metal deposition in conjunction with coal combustion at the Colstrip and Rosebud power plants, intersects roughly 13,000 acres of USFWS-modeled northern long-eared bat summer habitat 30 miles east of the Project footprint (i.e., within the modeled deposition buffer), east of Rosebud Creek. Preliminary results from 2023 and 2024 acoustic northern long-eared bat surveys, including this same patch of potential habitat, conducted in accordance with USFWS northern long-eared bat survey protocols (U.S. Fish and Wildlife Service 2023, 2024) for a separate proposed transmission line project have identified no northern long-eared bat calls (Voth pers. comm.). The action area perimeter occurs approximately 115 miles from the closest documented northern long-eared bat occurrence in Montana. No northern long-eared bat hibernacula have been documented in Montana.
- Atmospheric dispersion and deposition of selected trace metals (e.g., antimony, arsenic, cadmium, chromium, copper, lead, selenium, and mercury), which would be emitted from Project area coal combustion in the Colstrip and Rosebud Power Plants, were modeled by OSMRE. These metals were selected for modeling by OSMRE because they are commonly emitted from coal-fired power plants and are primary ecological risk indicators. Modeling results were compared to Environmental Protection Administration ecological soil-screening levels (Eco-SSLs) and background concentrations to determine expected deposition of trace metals (and associated impacts) due to combustion of Project area coal. Per the BA, operation of the Colstrip and Rosebud Power Plants during the 20-year Project coal-combustion period would not result in trace metal deposition exceeding Eco-SSLs for plants, invertebrates, birds, or mammals. Consequently, if northern long-eared bats were present in this modeled potential habitat area, Project coal combustion-related effects to northern long-eared bats within the Project action area, including potential summer/hibernacula habitat and foraging, are expected to be discountable and/or insignificant. Additionally, recent (2023 and 2024) USFWS protocol-level acoustic surveys in the area have not revealed the presence of northern long-eared bats; the action area perimeter occurs approximately 115 miles from the closest documented northern long-eared bat occurrence in Montana.

The BA determined that implementation of the proposed Project would result in insignificant or discountable effects to, and consequently *may affect, but is not likely to adversely affect*, the endangered pallid sturgeon:

- Yellowstone River flow metrics evaluated in the BA for wet, dry, and average water years were minimally impacted by water withdrawals for the Colstrip Power Plant (0.1–1.8% reduction). The amount of water diverted cannot be differentiated from the day-to-day streamflow variability observed from 2000–2023.
- Water withdrawals for the Colstrip Power Plant are expected to reduce stream flows in the Yellowstone River by less than two percent, such that impacts on stream water temperature, dissolved oxygen level, and chemical concentrations would likely not be discernable.
- Entrainment or impingement of pallid sturgeon at the water intake associated with the Colstrip Power Plant is unlikely for the following reasons:
    - Only one telemetered pallid sturgeon has been detected upstream of the Cartersville Diversion Dam and in the vicinity of the water intake site.
    - Trash racks (8.5-inch spacing) and traveling screens (0.25-inch mesh) in front of the water intake site, in combination with low flow velocities in the area and pallid sturgeon swimming capabilities, are expected to preclude entrainment or impingement of adult and juvenile individuals.
    - Pallid sturgeon eggs, free embryos, and larvae will not encounter the water intake unless spawning occurs in upstream habitats. Currently, only 56 miles of habitat is accessible to pallid sturgeon upstream of the Cartersville Diversion Dam due to the Yellowstone Diversion Dam. Pallid sturgeon spawning has not previously been detected in this area.
    - Entrainment or impingement of eggs would only occur if pallid sturgeon were to spawn immediately upstream of the water intake site because eggs adhere to channel substrates within a few hundred meters downstream of the spawning location.
    - Entrainment or impingement of drifting free embryos is unlikely because the water intake is located more than 400 feet from the main channel in a man-made backwater area. Pallid sturgeon free embryos predominately drift in the lower strata of the thalweg (deepest part of the channel) where they are unlikely to encounter the backwater area or the water intake. Further, pallid sturgeon free embryos exhibit a “swim-up and drift” behavior that facilitates movement toward the higher velocities in the Yellowstone.
    - Pallid sturgeon free embryos drift and disperse for long distances downstream of spawning locations (183–328 miles; Braaten et al. 2012) prior to settling into benthic habitats as larvae. Because multiple channel-wide diversion structures exist within approximately 100 miles upstream of the water intake site and only one telemetered pallid sturgeon has been detected upstream of the Cartersville Diversion Dam, it is unlikely that spawning pallid sturgeon would access and utilize spawning habitats far enough upstream of the water intake site for effects to settled larvae to be possible.

Conclusion

Upon review of the BA, the USFWS concurs with OSMRE's determination that the proposed action *may affect, but is not likely to adversely affect* the endangered northern long-eared bat and pallid sturgeon. The USFWS bases its concurrence with your determinations on the information and analysis in the April 2025 BA and information in our files.

OSMRE provided analyses and determinations for the proposed threatened monarch butterfly and western regal fritillary, and the proposed endangered Suckley's cuckoo bumblebee. Analyses of project effects on proposed species are limited to whether the project jeopardizes the species (50 C.F.R. § 402.10). Pursuant to the requirements of 7(a)(4) of the Act and 50 C.F.R. § 402.10, OSMRE assessed the effects of their proposed action and determined that the Project *will not likely jeopardize the continued existence of* the monarch butterfly, western regal fritillary, or Suckley's cuckoo bumblebee. We reviewed the BA and concur with your determinations. Pursuant to language at 50 CFR 402.12(k), a conference is not required.

As agreed to among the three parties and documented in the BA, Westmoreland (or any subsequent owner), OSMRE, and USFWS will meet at least once every four years to discuss any changes in the status of pallid sturgeon and other listed species, any changes in power plant or mine operations, or any other new information that might warrant an update to this effects analysis. Any of the parties may also request an ad hoc meeting if they become aware of new information warranting discussion.

This concludes informal consultation pursuant to the regulations implementing section 7(a) (2) of the Endangered Species Act, 50 C.F.R. 402.13. This Project should be re-analyzed if new information reveals effects of the action that may affect listed species or designated critical habitat in a manner or to an extent not considered in this consultation; if the action is subsequently modified in a manner that causes an effect to a listed species or designated critical habitat that was not considered in this consultation; and/or, if a new species is listed or critical habitat is designated that may be affected by this Project.

We appreciate your continued efforts to ensure the conservation of threatened and endangered species as part of our joint responsibilities under the Act. If you have further questions about this consultation or your responsibilities under the Act, please contact Jacob Martin or Austin McCullough, of my staff, at (406) 430-9007 or (406) 430-9008, respectively.

Literature Cited

Braaten P. J., D. B. Fuller, R. D. Lott, M. P. Ruggles, T. F. Brandt, R. G. Legare, and R. J. Holm. 2012. An experimental test and models of drift and dispersal processes of pallid sturgeon (*Scaphirhynchus albus*) free embryos in the Missouri River. Environmental Biology of Fishes 93:377–392.

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United States Department of the Interior
OFFICE OF SURFACE MINING
RECLAMATION AND ENFORCEMENT
Regions 5 & 7-11
P.O. Box 25065
Lakewood, CO 80225-0065

April 28, 2025

Jacob Martin
Deputy Field Supervisor
Montana Ecological Services
U.S. Fish and Wildlife Service
585 Shephard Way, Suite 1
Helena, MT 59601

Dear Mr. Martin,

I am requesting your written concurrence of our determination concerning effects on the federally listed and proposed species contained in the enclosed Biological Assessment (BA) for Westmoreland Rosebud Mining, LLC's (Rosebud), federal mining plan in Area F of the Rosebud Mine (Proposed Action) in Treasure and Rosebud Counties, Montana.

The Montana Department of Environmental Quality (DEQ) and the OSMRE each issued a Record of Decision for the Proposed Action in 2019 after preparing the *Western Energy Area F Final Environmental Impact Statement* (2018 Final EIS) and informally consulting with the U.S. Fish & Wildlife Service (USFWS) in accordance with Section 7 of the Endangered Species Act (ESA). The federal mining plan was signed by the U.S. Department of Interior (DOI) Assistant Secretary for Land and Minerals Management (ASLM) on July 15, 2019, authorizing the federal mining plan for Federal Coal Lease M82816, which encompasses 947.6 acres in Area F of the Rosebud Mine. In 2019, Rosebud began developing the leased coal, according to state operating permit C2011003F issued by Montana DEQ in 2019, and the federal mining plan approved by the DOI ASLM. After subsequent litigation, the United States District Court for the District of Montana Billings Division issued a Court Order on September 30, 2022, for case No. CV 19-130-BLG-SPW. The Court Order deemed several aspects of the 2018 Final EIS insufficient and remanded the Final EIS to OSMRE. OSMRE has prepared the Rosebud Mine Area F Supplemental Environmental Impact Statement (SEIS) and is reinitiating Section 7 consultation with the USFWS through preparation of this BA.

Previous informal consultation with the USFWS occurred during development of the 2018 Final EIS. OSMRE (Frank Bartlett) contacted the USFWS Ecological Services Montana Field Office (Brent Esmoil) in Helena, MT on June 9, 2014, to discuss the Proposed Action. The OSMRE informed USFWS they would be recommending a "no effect" determination. USFWS advised that if OSMRE was making a "no effect" determination, then no further USFWS consultation was required (OSMRE 2015).

Due to changes in the list of potentially occurring threatened and endangered species in the Proposed Action area, and the need to consider indirect effects of coal combustion, OSMRE informally consulted with USFWS again in 2017. In 2017, OSMRE again determined that the Proposed Action would have "no effect" on federally listed threatened and endangered species based on their conclusion that no species or critical habitat occurred within the direct or indirect effects analysis areas (OSMRE 2017). Under Section 7 of the ESA, an agency is not required to obtain written concurrence from the USFWS if the Proposed Action will have no effect on listed species or critical habitat. USFWS did not dispute the OSMRE determination of "no effect" (B. Esmoil, personal communication, February 21, 2017).

In 2022, OSMRE began preparing the Rosebud Mine Area F SEIS (the Project) to address the 2022 Court Order. In December 2022, OSMRE staff and the NEPA contractor met with USFWS staff (Jeff Berglund, Jacob Martin, Austin McCullough) to discuss the need to prepare a BA for the Project. A USFWS Information for Planning and Consultation (IPaC) search was conducted to identify federally listed species that could potentially exist in the project area on June 10, 2024.

On May 22, 2024, OSMRE staff and NEPA contractor held a virtual BA strategy meeting to discuss the Proposed Action and potential impacts with USFWS staff (Jeff Berglund, Jacob Martin, and Austin McCullough). Discussions concluded that the BA prepared for the Project should address northern long-eared bat, pallid sturgeon, and monarch butterfly since other listed and candidate species are not likely to occur in the Proposed Action area. Western regal fritillary was proposed for listing as threatened in August 2024 and is also addressed in this BA. An official IPaC list was obtained by OSMRE on September 18, 2024 (USFWS 2024a).

The enclosed BA analyzed how the Proposed Action may affect threatened, endangered, and proposed species and designated critical habitat. That BA was prepared in accordance with legal requirements set forth under Section 7 of the ESA (16 United States Code 1536 (c)). Two endangered and three proposed species have been identified as having the potential to occur in Treasure and Rosebud Counties based on the IPaC report generated for Treasure and Rosebud Counties in April 2025.The species considered in this BA include the following:

Northern long-eared bat	*Myotis septentrionalis*	Endangered
Pallid sturgeon	*Scaphirhynchus albus*	Endangered
Monarch butterfly	*Danaus plexippus*	Proposed
Suckley's cuckoo bumble bee	*Bombus suckleyi*	Proposed
Western regal fritillary	*Arygynnis idalia occidentalis*	Proposed

We have determined the Proposed Action "may effect but is not likely to adversely affect" the Northern long-eared bat and Pallid sturgeon as the effects are insignificant and discountable for the reasons stated in our assessment. Additionally, the OSMRE is requesting conferencing for the proposed species Monarch butterfly, Western regal fritillary, and Suckley's cuckoo bumble bee. OSMRE has determined the Proposed Action "is not likely to jeopardize the continued existence" of the proposed species. If you agree with these determinations, please send your written concurrence to us at your earliest convenience.

We appreciate your thorough review and assistance in this consultation process as we are committed to the conservation of federally listed species in Montana. Please contact Erica Trent (OSMRE: etrent@osmre.gov / 253-380-3525) if you have any questions regarding this request.

Sincerely,

Marcelo Calle
Program Support Division
Office of Surface Mining Reclamation and Enforcement
Interior Regions 5 & 7-11
U.S. Department of the Interior

Encl: Biological Assessment
Concurrence Letter

ROSEBUD MINE AREA F
BIOLOGICAL ASSESSMENT

April 2025

Prepared for

Office of Surface Mining Reclamation and Enforcement
Interior Regions 5, 7-11
One Denver Federal Center Bldg. 41
Lakewood, Colorado 80225

Prepared by

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TABLE OF CONTENTS

1.0 INTRODUCTION 1
1.1 Purpose of this Biological Assessment 1

2.0 CONSULTATION HISTORY 2

3.0 PROPOSED ACTION 5
3.1 Background 5
Rosebud Mine Operations 5
Coal Combustion 6
3.2 Description of Proposed Action 7
3.3 Conservation Measures 12
Monitoring 12
Mitigation 13

4.0 ACTION AREA DESCRIPTION 14

5.0 SPECIES CONSIDERED AND EVALUATED 18

6.0 EVALUATED SPECIES INFORMATION 18
6.1 Northern Long-Eared Bat 18
Species Status and Biology 18
Field Reconnaissance 19
6.2 Pallid Sturgeon 20
Species Status and Biology 20
Field Reconnaissance 22
6.3 Monarch Butterfly 23
Species Status and Biology 23
Field Reconnaissance 24
6.4 Western Regal Fritillary 24
Species Status and Biology 24
Field Reconnaissance 25
6.5 Suckley's Cuckoo Bumble Bee 25
Species Status and Biology 25
Field Reconnaissance 25

7.0 ENVIRONMENTAL BASELINE 26
7.1 Previous Consulation with the USFWS in the Action Area 26
7.2 Past and Current Activites in the Action Area 26

8.0 EFFECTS ON EVALUATED SPECIES AND DETERMINATIONS 27
8.1 Federally Listed and Proposed Species 27
Northern Long-Eared Bat 28
Pallid Sturgeon 29
Monarch Butterfly 35
Western Regal Fritillary 36
Suckley's Cuckoo Bumble Bee 37
8.2 Effects Determination Summary 38

9.0 NEED FOR REASSESSMENT BASED ON CHANGED CONDITIONS 39

10.0 LITERATURE CITED 39

LIST OF FIGURES

Figure 1. Rosebud Mine Area F and Surrounding Area. 4
Figure 2. Location of Mine Facilities and Permit Areas. 10
Figure 3. Proposed Action. 11
Figure 4. Action Area. 17

LIST OF TABLES

Table 1. Components of the Proposed Action. 7
Table 2. Proposed Action estimated annual production and acres disturbed. 8
Table 3. Overview of Parameters Monitored in the Project Area. 12
Table 4. Threatened, endangered, or proposed, species with the potential to occur in the action area. 18
Table 5. Flow metrics calculated for the effects analysis to characterize potential impacts on flows on the Yellowstone River from the water withdrawals associated with the Colstrip Power Plant diversion. Metrics were calculated from data from 2000 – 2023 from USGS gage data for the Yellowstone River at Forsythe (#06295000). 30
Table 6. Effects determination summary for the Proposed Action. 39

1.0 INTRODUCTION

The Endangered Species Act (ESA or Act) of 1973 (16 United States Code 153 et seq.), as amended in Section 7(a)(1) directs federal agencies to conserve and recover listed species and use their authorities in the furtherance of the purposes of the Act by carrying out programs for the conservation of endangered and threatened species so that listing is no longer necessary (50 Code of Federal Regulations [CFR] §402). Furthermore, the Act in Section 7(a)(2) directs federal agencies to consult (referred to as Section 7 consultation) with the U.S. Fish and Wildlife Service (USFWS) when their activities "may affect" a listed species or designated critical habitat.

1.1 PURPOSE OF THIS BIOLOGICAL ASSESSMENT

This biological assessment (BA) analyzes the potential effects of the proposed Rosebud Mine Area F Project (Project; **Figure 1**) on federally listed threatened, endangered, proposed, or candidate species (wildlife, invertebrates, and fish); plant species; and critical habitats, pursuant to Section 7(a)(2) of the ESA.

Western Energy (now Westmoreland Rosebud Mining, LLC, a subsidiary of Westmoreland Mining LLC) submitted a mine permit application package (PAP) on November 2, 2011, to the Montana Department of Environmental Quality (DEQ) for a new permit area (C2011003F), known as Area F (project area), at the Rosebud Mine, an existing surface coal mine consisting of Areas A, B, C, and D, that surrounds the city of Colstrip and the Colstrip Steam Electric Station (Colstrip Power Plant) in Rosebud and Treasure Counties, Montana (MT). The project area is located adjacent to the western boundary of Area C (**Figure 1**) in Township 2 North, Range 38 and 39 East; and Township 1 North, Range 39 East, and would expand the mine to the west into Treasure County (**Figure 1**). The surface of the project area is entirely privately owned, but the subsurface is both privately (3,479 acres) and federally (3,294 acres) owned. Westmoreland Rosebud Mining, LLC (Westmoreland Rosebud) holds leases for federal (MTM 082186) and private coal (1001 and 1001-A) in the project area.

DEQ and the Office of Surface Mining Reclamation and Enforcement (OSMRE) each issued a Record of Decision for the Project in 2019 after completing informal Section 7 consultation with the USFWS and preparing the joint *Western Energy Area F Final Environmental Impact Statement* (2018 Final EIS; OSMRE and DEQ 2018). The Mine Plan Decision Document was signed by the U.S. Department of Interior (DOI) Assistant Secretary for Land and Minerals Management (ASLM) on July 15, 2019 (DOI 2019), authorizing the federal mining plan for Federal Coal Lease M82816, which encompasses 947.6 acres in Area F. In 2019, Westmoreland Rosebud began developing the project area, according to state operating permit C2011003F issued by DEQ in 2019 and the federal mine plan approved by the DOI ASLM. After subsequent litigation, the United States District Court for the District of Montana Billings Division issued a Court Order on September 30, 2022 for case No. CV 19-130-BLG-SPW. The Court Order deemed insufficient several aspects of the 2018 Final EIS (OSMRE and DEQ 2018) and remanded the Final EIS to OSMRE.[1] OSMRE has prepared the Rosebud Mine Area F Supplemental Environmental Impact Statement (SEIS) and has reinitiated Section 7 consultation with the USFWS through preparation of this BA.

[1] Only OSMRE's decision and the mine plan for federal coal are impacted by the Court Order. Westmoreland is currently mining in Area F, pursuant to its approved state operating permit (C2011003F) and approved federal mine plan.

2.0 CONSULTATION HISTORY

Previous informal consultation with the USFWS occurred during development of the 2018 Final EIS. OSMRE (Frank Bartlett) contacted the USFWS Ecological Services Montana Field Office (Brent Esmoil) in Helena, MT on June 9, 2014, to discuss the Project. OSMRE informed USFWS that they would be recommending a no effect determination. USFWS advised that if OSMRE is making a no effect determination, then no further USFWS consultation is needed (OSMRE 2015).

Due to changes in the list of potentially occurring threatened and endangered species in the action area, and the need to consider indirect effects of coal combustion, OSMRE informally consulted with USFWS again in 2017. In 2017, OSMRE determined that the Rosebud Mine Area F would have "no effect" on federally listed threatened and endangered species based on their conclusion that no species or critical habitat occurred within the direct or indirect effects analysis areas (OSMRE 2017). Under Section 7 of the ESA, an agency is not required to obtain written concurrence from the USFWS that the Proposed Action will have no effect on listed species or critical habitat; however, information was provided to USFWS on January 31, 2017 which disclosed federally listed threatened and endangered species that could be present in Rosebud, Treasure and Bighorn Counties and any potential effects on species or habitat that could result from the proposed Project. USFWS did not dispute the OSMRE determination of "no effect" (B. Esmoil, personal communication, February 21, 2017).

In 2022, OSMRE began preparing the Rosebud Mine Area F SEIS to address the 2022 Court Order issued case No. CV 19-130-BLG-SPW. In December 2022, OSMRE staff and contractors met with USFWS staff (Jeff Berglund, Jacob Martin, Austin McCullough) to discuss the need to prepare a BA for the Project. A USFWS Information for Planning and Consultation (IPaC) search was conducted to identify federally listed species that could potentially exist in the project area on June 10, 2024.

On May 22, 2024, OSMRE staff and contractors held a virtual BA strategy meeting to discuss the Proposed Action and potential impacts for the Area F SEIS with USFWS staff (Jeff Berglund, Jacob Martin, and Austin McCullough). Discussions indicated that the BA prepared for the Project should address northern long-eared bat, pallid sturgeon, and monarch butterfly since other listed and proposed species are not likely to occur in the action area. USFWS noted the potential for black-footed ferret range to minimally overlap the action area.

An unofficial list of federally listed species and designated critical habitat in the action area was obtained from the USFWS Information for Planning and Conservation (IPaC) website on June 10, 2024, and September 18, 2024, and updated on January 17, 2025 (USFWS 2025a). Using this list, in addition to informal discussion with USFWS staff on May 22, 2024, OSMRE determined which species and critical habitats had potential to occur in the action area (**Table 4**). Black-footed ferret is not on the IPaC list and, thus, does not occur in the action area and is not addressed further in this BA. Two species were added to this BA based on the September 2024 and January 2025 IPaC updates: Western regal fritillary was proposed for listing as threatened in August 2024, and Suckley's cuckoo bumble bee was proposed for listing as an endangered species in December 2024. The status of monarch butterfly in the BA was updated from candidate to proposed threatened species based on 89 Federal Register 100716, December 2024.

During the public comment period for the Area F Draft SEIS (December 2024 through January 2025), a bat echolocation report prepared by an independent contractor was submitted to OSMRE as part of a public comment. OSMRE provided the report and associated echolocation data files to USFWS, which subsequently provided the report to staff at the Montana National Heritage Program (MNHP). MNHP conducted a review of the report and echolocation data recordings for four sites within 62 miles (100

kilometers) of the project area (Bachen and McEwan 2025) (see discussion in Section 6.1 Northern Long-Eared Bat).

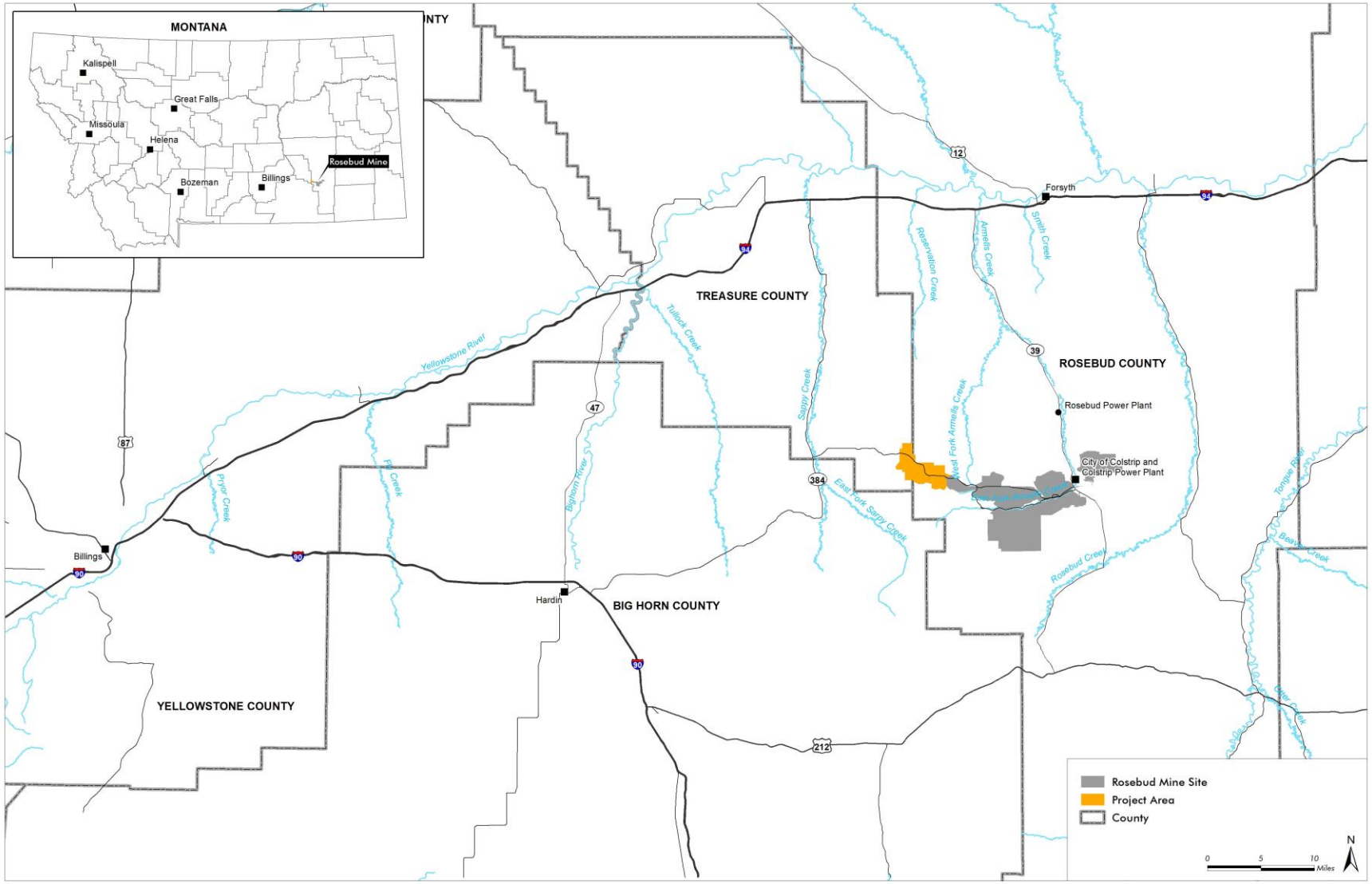

Figure 1. Rosebud Mine Area F and Surrounding Area.

3.0 PROPOSED ACTION

3.1 BACKGROUND

ROSEBUD MINE OPERATIONS

Coal has been mined at Colstrip for more than 90 years. The Northern Pacific Railway established the city of Colstrip and its associated mine in the 1920s to access coal from the Fort Union Formation. The Montana Power Company began production at the Rosebud Mine in 1968 to serve the Colstrip Power Plant. In 2001, Westmoreland Coal Company purchased the Rosebud Mine; Western Energy, a subsidiary of Westmoreland Coal Company operated the mine. In 2019, Westmoreland Coal Company sold the Rosebud Mine to its creditors as part of bankruptcy proceedings. The mine is now operated by Westmoreland Rosebud Mining, LLC, a subsidiary of Westmoreland Mining LLC. Currently, four active mine areas at the Rosebud Mine operate under permits issued by DEQ: Area A (permit C1986003A), Area B (permit C1984003B), Area C (permit C1985003C), and Area F (permit C2011003F, which is analyzed in this BA). Area D (permit C1986003D) is no longer actively mined and is being reclaimed. Area E (permit C1981003E), a former permit area, has received full bond release and is no longer a permitted coal mine. As of 2023, the Rosebud Mine includes 40,127 permitted and bonded acres within five permit areas (A, B, C, D, and F), of which 19,062 acres are currently disturbed. Past and current mine operations are described in detail in **Section 2.2, Description of Past and Existing Mine and Reclamation Operations** of the SEIS and is summarized below.

Although the Rosebud Mine has shipped coal by rail as recently as 2010, all coal currently produced by the mine is consumed locally at the Colstrip Power Plant and the Rosebud Power Plant. Between 1975 and 2023, just under 514 million tons of coal were recovered from the mine Permit Areas A, B, C, D, E, and F (Westmoreland Rosebud 2024). Production from the Rosebud Mine is limited by the conditions of the DEQ-issued air quality permits, but actual production rarely reaches the limit levels of the air quality permits. Montana Air Quality Permit (MAQP) #1483-09 limits annual combined coal production from Areas A, B, and D to 13 million tons per year. Combined coal production from Areas C and F is limited to 8 million tons per year per MAQP #1570-09 with an Area F–specific production cap of 4 million tons per year.[2] In recent years, total mine production has ranged from a low of approximately 5.4 million tons in 2022 (Peterson 2022) to a high of approximately 7.1 million tons in 2023 (Westmoreland Rosebud 2024). Future production from the Rosebud Mine will depend on a number of factors, including market conditions (see additional discussion in **Section 2.2.6, Life of Operations** and **Section 4.3.3.1, Direct Impacts** [Air Quality] in the SEIS). Westmoreland Rosebud has three Montana Pollutant Discharge Elimination System (MPDES) permits, which regulate point source discharges of pollutants to state surface waters to protect the beneficial uses of the receiving waterbodies (see additional discussion in **Section 2.2.3, Other Existing Permits** in the FEIS).

- MPDES Permit MT-0023965 (Modification 2) regulates discharges of mine drainage and drainage from coal preparation plant and coal preparation plant associated areas, as those terms are defined at 40 CFR Part 434, including Areas A, B, C, and D. MT-0023965 became effective on August 1, 2021 (expires July 31, 2026) and provides effluent limits, monitoring requirements, and other special conditions for discharges from 153 outfalls. The receiving waters include East Fork Armells Creek, Stocker Creek, Lee Coulee, West Fork Armells Creek, Black Hank Creek, Donley Creek, Cow Creek, Spring Creek, and Pony Creek.

[2] Note that 2023 production in Area F (approximately 4.6 million tons, as shown in **Table 2.2-2** in the **SEIS**) was greater than the production limit (4 million tons) in MAQP #1570-09. Westmoreland Rosebud is working with DEQ to prevent future exceedances. Overall production was still below the combined limit for Areas C and F.

- MPDES Permit MT-0031828, effective June 1, 2020 (expires May 31, 2025) regulates discharges of mine drainage from 55 outfalls associated with Area F, the project area. The receiving waters include Black Hank Creek, Donley Creek, Robbie Creek, McClure Creek, and Trail Creek.
- MPDES Permit MT-0032042 (Modification 2), effective October 1, 2022 (expires September 30, 2027), regulates discharges of mine drainage from 18 outfalls associated with Area B AM5. Receiving waters include Lee Coulee and Richard Coulee, which are both tributaries to Rosebud Creek.

COAL COMBUSTION

Although the Rosebud Mine has shipped coal by rail as recently as 2010, all coal currently produced by the mine is sold and consumed locally at the Colstrip Power Plant and the Rosebud Power Plant (**Figure 2**). Coal mined in the project area would be burned in Units 3 and 4 of the Colstrip Power Plant and in the Rosebud Power Plant. Operational information about the two power plants is summarized below.

COLSTRIP POWER PLANT

The Colstrip Power Plant, a four-unit coal-fired facility, is located in Colstrip and, currently, is operated by Talen Energy, one of several owners. Talen Montana now has a 30 percent ownership stake in Unit 3 and a 0 percent ownership stake in Unit 4; the remaining ownership stake in both units is currently held by five other owners: Puget Sound Energy Inc., Portland General Electric Company, Avista Corporation, PacifiCorp, and NorthWestern Energy. None of the six co-owners has a majority stake in the Colstrip Power Plant. Power generated by the Colstrip Power Plant currently serves the customers of the owners in MT (NorthWestern Energy), Washington (Avista and Puget Sound Energy Inc.), and Oregon (Portland General Electric and PacificCorp).

Colstrip Units 1 and 2, which each had 307 megawatts (MW) of generating capacity, were constructed in 1972; began operating in 1975 and 1976, respectively; and were retired from use on January 2, 2020, and January 3, 2020, respectively.

Colstrip Units 3 and 4, which each have approximately 740 MW of generating capacity, started operating in 1984 and 1986, respectively, and are currently generating power. The Colstrip Power Plant and the operations of its associated facilities (such as a paste plant and ponds) are governed by a certificate issued by DEQ under the Major Facility Siting Act (MFSA), 75-20-101, Montana Code Annotated (MCA) et seq. (Certificate). Emissions from the Colstrip Power Plant, which is a major source pursuant to Title V, are regulated by the applicable requirements outlined in Title V operating permit OP0513-18 and MAQP #0513-16. Additional information regarding power plant operations is provided in **Section 1.2.2.1, Colstrip Power Plant** in the SEIS.

Water is diverted from the Yellowstone River near Nichols, MT and transferred via pipeline approximately 30 miles to the Colstrip Units and Colstrip for industrial and municipal uses. This water right (identified as 42KJ 94423-00) is for 69.27 cubic feet per second (cfs) with a maximum annual volume estimated at 50,151 acre-feet per year. It has a priority date of December 16, 1970. Water use includes make-up water, cooling water, pollution control, screen cleansing, domestic water for the community, and other auxiliary uses. Colstrip can use up to 2 cfs of the water right.

ROSEBUD POWER PLANT

The Rosebud Power Plant is a 24-MW coal-fired power plant located approximately 6 miles north of Colstrip that has been operating since May 1990. The Rosebud Power Plant was designed to burn low-British thermal unit "waste coal" from the Rosebud Mine, which is coal not suitable for use at the Colstrip Power Plant due to the high sulfur content and low calorific value. This waste coal is typically found in the first 1-foot layer and the very bottom of the Rosebud Coal deposit. Coal from permit areas A, B, and C is currently used in the plant. Pursuant to MAQP #2035, up to 364,000 tons of coal per year can be burned at the Rosebud Power Plant. The Rosebud Mine trucks 300,000 tons of coal annually to the

Rosebud Power Plant using a fleet of five covered haul trucks. Three of the five trucks operate daily, with each truck delivering an average of 6.5 loads, for an average total of 19.5 loads daily.

3.2 DESCRIPTION OF PROPOSED ACTION

Area F, the project area, is located adjacent to the western boundary of Area C (**Figure 2**) in Township 2 North, Range 38 and 39 East, and Township 1 North, Range 39 East, and has expanded the Rosebud Mine to the west into Treasure County. Situated in the northern Powder River Basin, the Rosebud Mine is generally east and north of the Little Wolf Mountains. Tributaries of Horse Creek and West Fork Armells Creek, including Black Hank Creek, Donley Creek, Robbie Creek, and McClure Creek (all of which lie within the drainage of the Yellowstone River), drain into the project area. A ridge in the western portion of the project area divides the Horse Creek and West Fork Armells Creek drainages. Components of the Proposed Action are shown in **Table 1**.

Table 1. Components of the Proposed Action.

Component	Proposed Action
Area F operational life[1]	20 years Coal removal began in 2020 and would end in 2039.
Last year of mining	2039
Area F permit area[2]	6,773 acres
Area F total disturbance area[3]	4,288 acres
Coal recovery[4]	71.3 million tons
Use of bottom ash	None
Drainages disturbed by mining operations or other related disturbance	None; in addition, 74 acres of federal coal (1.9 million recoverable tons) in the northwestern part (Section 12, T2N, R38E,) of the permit area (in the Trail Creek drainage) would be excluded from mining to prevent material damage to the hydrologic balance outside the permit area.
Permitted discharges	55 outfalls (MPDES MT-0031828)
Surface ownership (permit area)	6,773 acres privately owned
Subsurface mineral estate ownership (permit area)	3,479 acres privately owned and 3,294 acres federally owned
Ownership of coal leases to be mined[3]	Federal (MTM 082186) and private coal (1001 and 1001a)

[1] Based on C2011003F Minor Revision (MR) 16.
[2] An incidental boundary change was approved by DEQ in MR13; this boundary change took 27 acres in federal coal ownership from the Area C permit area and assigned them to the Area F permit area. All 27 acres of federal coal have either been previously mined as part of Area C operations or would not be mined under Alternative 1, 4, or 5.
[3] Based on Table 303-1 from C2011003F MR16. Acreages are rounded to the nearest whole number.
[4] Based on Table 303-2 from C2011003F MR16.

Approval in 2019 of the Area F permit (C2011003F) and federal mine plan added 6,773 acres[3] to the Rosebud Mine. As previously noted, Westmoreland Rosebud is currently developing Area F pursuant to its approved state operating permit and approved federal mine plan. As of December 2023, Westmoreland Rosebud has disturbed 582 acres in the project area; 494 acres of that disturbance is due to active mining, and the remainder is due to site development, such as roads and soil and/or spoil stockpiles. Approximately 8.5 million tons of coal have been produced in the project area within this timeframe (Westmoreland Rosebud 2024) and sold to the Colstrip Power Plant and the Rosebud Power Plant.

[3] Since issuance of the permit in 2019, Westmoreland Rosebud has made 20 minor revisions, including adjusting the acreage of the permit area from 6,746 to the currently-approved 6,773-acre permit area. See **Section 2.2.2.2, Area F Operations and Development** in the SEIS for a detailed discussion of how the currently approved operating permit differs from the original one issued in 2019 (analyzed as Alternative 2 in the 2018 Final EIS).

The Proposed Action analyzed in this BA is Alternative 4 -Proposed Action (Current Federal Mine Plan)[4] as described in the SEIS. The Proposed Action incorporates the conditions of the approved federal mine plan for Area F and would be consistent with the approved DEQ operating permit C2011003F. Under Alternative 4, Westmoreland Rosebud would continue mining Area F, as described in **Section 2.2.2.2, Area F Operations and Development** in the SEIS, until 2039.

Under the Proposed Action, it is assumed that approximately 71.3 million tons of coal from federal and private coal leases and approximately 4,288 acres would be disturbed in Area F over a 20-year mine life that began in 2019 and would end in 2039 (see **Table 1** and **Table 2**). Mining (including disturbance, coal recovery, and production rates); fugitive dust control; protection of the hydrologic balance; monitoring; and mitigation would proceed, as described in the 2018 Final EIS **Section 2.4, Alternative 2 – Proposed Action** and in the SEIS in **Section 2.2.2.2, Area F Operations and Development**, until 2030. It is assumed that mining would occur in the project area, as shown on **Figure 3**. Under Alternative 4, Westmoreland Rosebud would maximize recovery of coal in the federal coal lease MTM 082186. Once mining has ceased (assumed to be by December 31, 2039), reclamation of disturbed areas (4,288 acres) in the project area would occur according to Westmoreland Rosebud's approved reclamation plan and post-mine topography, which are similar to those described for Alternative 2 in the 2018 Final EIS, **Section 2.4.4, Reclamation Plan**; modifications since 2018 are described in **Section 2.2.2.2, Area F Operations and Development** in the SEIS. Under the Proposed Action, the operational life of Area F would end in 2039, according to the timetable in Westmoreland Rosebud's approved operating permit (**Table 2**).

With implementation of the Proposed Action, it is estimated that the Rosebud Mine would continue operations through 2045, with Area F operations continuing through 2039 and Area B operations continuing through 2045. During this time, the mine is expected to produce up to 112.5 million tons of coal.[5] Changes to production rates, additions of other mine permit areas, reduced mining in Area F, or changed market conditions may influence the operational life of the Rosebud Mine as a whole or of individual permit areas.

Table 2. Proposed Action estimated annual production and acres disturbed.

Operation Year	Tons (×1,000)	Annual Acres Disturbed	Total Acres Disturbed
1 (2020)	0.2	35.70	35.7
2	0.9	26.40	62.1
3	4.0	614.88	676.9
4	4.0	114.8	791.7
5	4.0	114.80	906.5
6 (2025)	4.0	114.80	1,021.2
7	4.0	114.80	1,136.0
8	4.0	514.80	1,650.8
9	4.0	614.80	2,265.6
10	4.0	114.80	2,380.4
11 (2030)	4.0	114.8	2,495.2
12	4.0	114.80	2,609.9
13	4.0	114.80	2,724.7

[4] Alternative 4 is a new proposed action analyzed in the SEIS. While very similar to Alternative 2 –Proposed Action from the 2018 Final EIS, Alternative 4 is consistent with the approved DEQ operating permit C2011003F and the 2019 ASLM–approved federal mine plan; see **Section 2.2.2.2, Area F Operations and Development** in the SEIS.

[5] Bureau of Land Management (BLM) developed reasonably foreseeable development scenarios (based on a 17-year time horizon) for the Rosebud Mine in its recent *Miles City Field Office Final Supplemental Environmental Impact Statement and Resource Management Plan Amendment* (BLM 2024a). BLM estimates there are sufficient leased coal reserves in the federal subsurface mineral estate to meet forecasted production levels (112.5 million tons) at the Rosebud Mine through 2060 (BLM 2024a); however, not all of the federal coal is currently permitted. BLM would reevaluate land use allocations at the end of the planning period in 2038. For Westmoreland to mine all of its coal leases, it is assumed that additional permitting would be needed. For additional discussion of the BLM SEIS, see **Table 5.2.-1** in **Chapter 5**.

Table 2. Proposed Action estimated annual production and acres disturbed.

Operation Year	Tons (×1,000)	Annual Acres Disturbed	Total Acres Disturbed
14	4.0	414.80	3,139.5
15	4.0	364.80	3,504.3
16	4.0	114.80	3,619.1
17	4.0	114.80	3,733.9
18	4.0	114.80	3,848.6
19	4.0	193.50	4,042.1
20 (2039)	1.6	245.90	**4,288.0**

Source: Table 303-2 from Area F Operating Permit C2011003F MR 16
Note: Acres disturbed and tons mined per year are estimates only. Actual production and disturbance may vary. See discussion in **Section 2.2.2.2, Area F Operations and Development** of the SEIS.

As with other permit areas of the Rosebud Mine, all coal produced under the Proposed Action would be sold and combusted locally at two power plants – the Colstrip and Rosebud Power Plants (see **Section 1.2.2, Coal Combustion**). Under the Proposed Action, Area F coal would be available for combustion in the Colstrip Power Plant and the Rosebud Power Plant for a total of 20 years (2019 to 2039). Once Area F coal is no longer available, the power plants would burn coal from other Rosebud Mine permit areas (thereby potentially changing the rate at which those areas are mined). The power plants could also use coal from sources other than the Rosebud Mine. The Colstrip Power Plant would continue to divert water from the Yellowstone River for the uses described above through 2039 using project area coal; any operations beyond that period would be attributable to other permit areas of the Rosebud Mine or other sources.

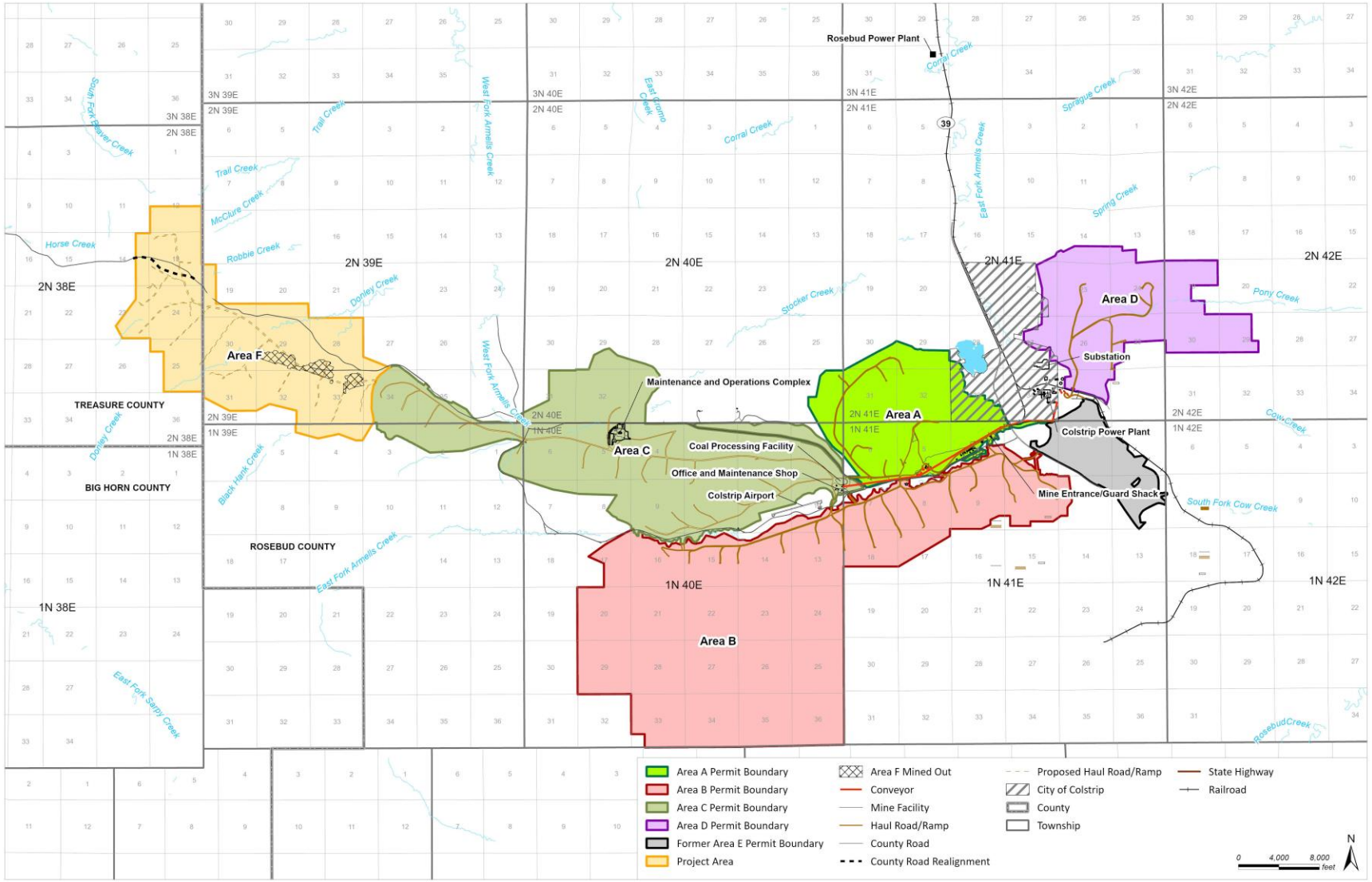

Figure 2. Location of Mine Facilities and Permit Areas.

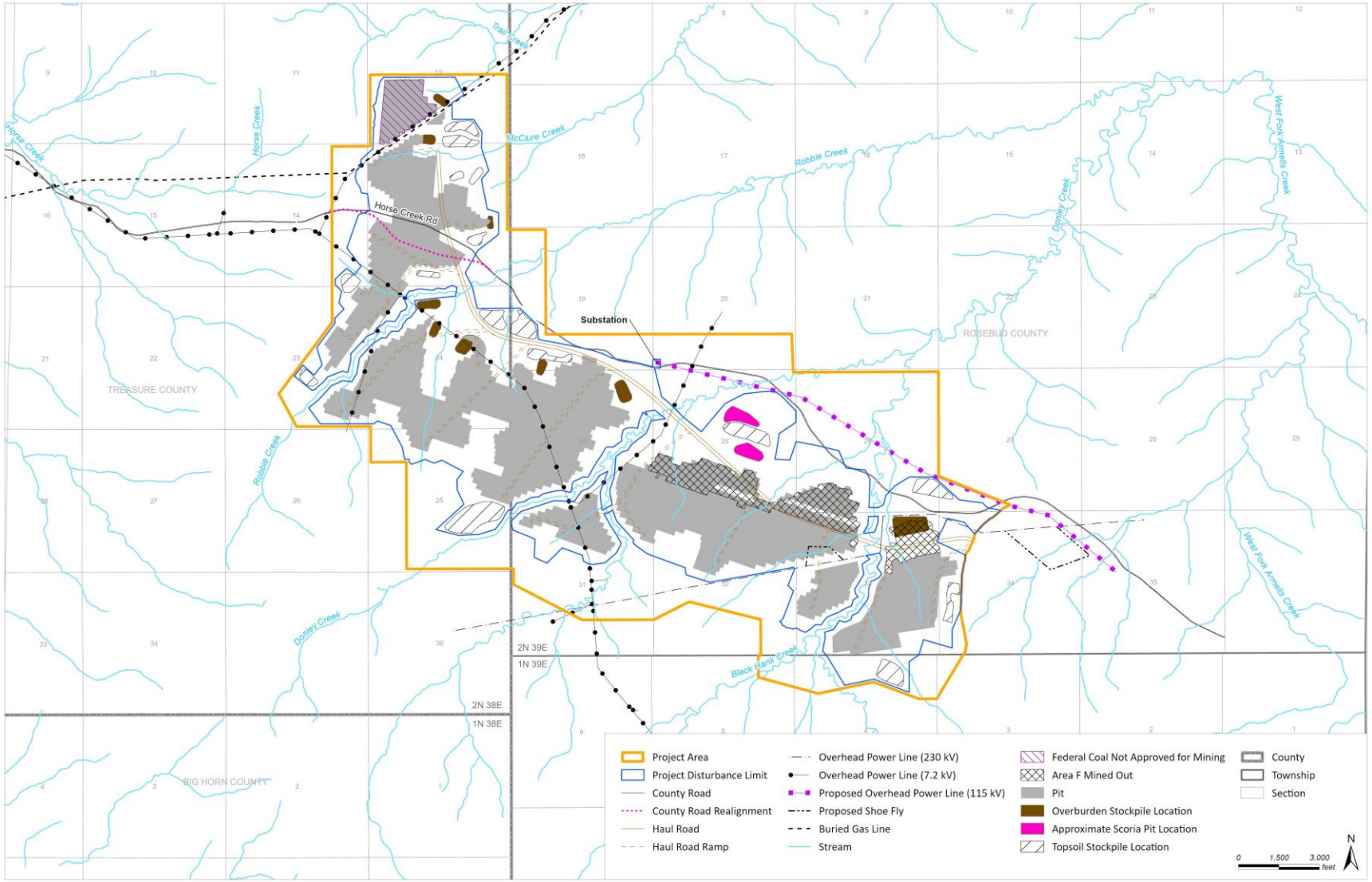

Figure 3. Proposed Action.

3.3 CONSERVATION MEASURES

In order to minimize or compensate for the effects of the action on the listed species under review, the following conservation measures will be implemented as an integral part of the Proposed Action.

MONITORING

Westmoreland Rosebud developed and is currently implementing the following monitoring programs for soil, vegetation, wildlife, hydrology, air resources, and contaminated areas (**Table 3**). These are summarized below, and the full plans are available in the permit application. For all monitoring activities, vehicular access is completed by existing roads and trails, with occasional light overland travel by light utility vehicles and with motor equipment for repair of roads and trails. To the extent possible, travel occurs during dry conditions.

Table 3. Overview of Parameters Monitored in the Project Area.

Monitoring Type	Description	Relevant Plan	Report/ Reporting Interval
Stream monitoring	Surface water monitoring (**Figure 2.2-7** in the SEIS) is undertaken in drainages, including drainages that contain wetlands (Robbie Creek, Trail Creek, and Donley Creek). At all surface water monitoring sites, flow, field parameter data, and crest gage readings are collected monthly. Water quality samples are taken on a quarterly, event-based basis. Sediment samples are collected monthly and after major precipitation and snowmelt events.	Monitoring and Quality Assurance Plan	Annual Hydrology Report (October 1 from the previous year to September 30 of the reporting year)
Pond monitoring	Pond monitoring (**Figure 2.2-7** in the SEIS) includes monitoring of Pond 5, which feeds wetland F049. Water level measurements are collected monthly throughout the year, and field parameters are collected monthly from March through November. Water quality samples are collected semiannually.	Monitoring and Quality Assurance Plan	Annual Hydrology Report (October 1 from the previous year to September 30 of the reporting year)
Spring monitoring	Springs, including those that feed wetlands, are monitored monthly (**Figure 2.2-7** in the SEIS). Spring flow data and field parameter data are collected monthly from March through November. During winter months, springs are typically frozen. Water quality samples are collected semiannually. The frequency of spring sampling increases to quarterly once mining commences in the drainage in which the spring is located.	Monitoring and Quality Assurance Plan	Annual Hydrology Report (October 1 from the previous year to September 30 of the reporting year)
Ground water monitoring	Ground water monitoring wells are located throughout the project area (**Figure 2.2-7** in the SEIS) including upgradient and downgradient of the proposed disturbance area. Water level measurements are collected quarterly, except for the majority of alluvial wells where measurements are taken monthly.	Monitoring and Quality Assurance Plan	Annual Hydrology Report (October 1 from the previous year to September 30 of the reporting year)

Table 3. Overview of Parameters Monitored in the Project Area.

Monitoring Type	Description	Relevant Plan	Report/ Reporting Interval
	Water quality samples are collected semiannually, annually, or every third year, depending on well characteristics.		
Wildlife surveys	Annual wildlife monitoring for Rosebud Mine, including the project area, is undertaken for big game, upland game birds, raptors, and songbirds. The annual report would be submitted to DEQ by March 1 of the year following completion of the annual data collection. • The wildlife survey area includes the entire project area and a surrounding 1-mile perimeter. • Survey forms would be developed by Western Energy (now Westmoreland Rosebud) and approved by DEQ prior to the respective surveys. All pertinent information and data would be recorded on the survey forms. All surveys would be conducted by a professional wildlife biologist. This person would have a sound understanding of the wildlife species inhabiting the project area and would be able to properly observe and identify the various wildlife species—particularly the songbirds.	Wildlife Monitoring Plan	Annual Wildlife Report (January 1-December 31)
Aquatic macroinvertebrate surveys	Aquatic macroinvertebrate surveys undertaken in 2023 during the permit renewal cycle. Surveys followed the 2012 DEQ protocol, *Sample Collection, Sorting, Taxonomic Identification, and Analysis of Benthic Macroinvertebrate Communities Standard Operating Procedure*.	Area F Benthic Macroinvertebrate Monitoring Report	2023

MITIGATION

- Mining would be prohibited in 74 acres of federal coal in Section 12, T2N, R38E (Trail Creek drainage) to prevent material damage[6] to the hydrologic balance outside the permit area.[7]

[6] Material damage is defined in 82-4-203, MCA, as "with respect to protection of the hydrologic balance, degradation or reduction by coal mining and reclamation operations of the quality or quantity of water outside of the permit area in a manner or to an extent that land uses or beneficial uses of water are adversely affected, water quality standards are violated, or water rights are impacted. Violation of a water quality standard, whether or not an existing water use is affected, is material damage."

[7] Pursuant to Administrative Rules of Montana 17.24.405(6)(c), DEQ cannot approve a permit application if the hydrologic consequences and cumulative hydrologic impacts would result in material damage to the hydrologic balance outside of the permit area. As described in Section 9.6.5 of the *Cumulative Hydrologic Impact Analysis for Area F* (DEQ 2019b), which is also referred to as the CHIA in the SEIS, DEQ determined that the proposed mine plan (Alternative 2), if implemented in Section 12, T2N, R38E, would likely result in a change in water quality in the Rosebud Coal outside the permit boundary, which could result in material damage. To remove the potential for material damage, DEQ did not approve mine passes in that area (DEQ 2019a). The surface acreage remained in the

Westmoreland Rosebud, however, would still be able to disturb the surface above the 74 acres of federal coal for mining-related activities (e.g., spoil and topsoil stockpiles). Westmoreland Rosebud estimates that approximately 1.9 million tons of recoverable coal (based on modeling using expected coal thickness and quality) will not be mined in Section 12, T2N, R38E. Westmoreland Rosebud may, at any time, reapply to OSMRE and DEQ to mine the excluded 74 acres of federal coal provided they affirmatively demonstrate that no material damage would occur.

- Mitigation measures for air quality would be as described in Westmoreland Rosebud's Fugitive Dust Control Plan (applicable to the entire mine) and as required by the MAQP #1570-09.
- The mine plan includes measures to avoid, minimize, and mitigate impacts on wetlands, as described in **Section 2.4.8.5, Wetland Mitigation Plan** in the 2018 Final EIS.
- The reclamation plan (see **Section 2.4.4, Reclamation Plan** in the 2018 Final EIS) would avoid and lessen potential wetland impacts through the following measures:
    - Reclamation of mined lands would approximate pre-mining conditions, particularly along the principal stream courses, and minimize the disturbance to scoria zones to mitigate the effects of mining on recharge capacity.
- Direct effects on monarch butterfly and Suckley's cuckoo bumble bee will be avoided because clearing and grubbing activities will occur from September 1 through June 1, avoiding the monarch butterfly active season from June through August (USFWS 2023a).
- Noxious weeds will be controlled and managed to reduce their spread by timing weed spraying to avoid the monarch butterfly breeding season and Suckley's cuckoo bumble bee active season (June through August), when feasible, and conducting spot spraying to limit impacts on flowering nectar plants.
- Westmoreland Rosebud will work with USFWS to implement additional conservation measures to protect Suckley's cuckoo bumble bee from impacts of managed bee colonies when recommendations are developed.

4.0 ACTION AREA DESCRIPTION

The project area is the Area F permit area (C2011003F), known as Area F, at the existing Rosebud Mine. The project area is located in Rosebud and Treasure Counties adjacent to existing Permit Area C, approximately 12 miles west of Colstrip. The surface lands of the project area are privately owned, but the subsurface lands (coal) are owned by both federal and private entities and leased to Western Energy (now Westmoreland Rosebud). Current land uses include grazing land, pastureland, cropland, and wildlife habitat. Tributaries of Horse Creek and West Fork Armells Creek, which lie within the Yellowstone River watershed, drain the project area. The area of disturbance in the project area would be 4,288 acres under the Proposed Action. Of these, 2,175 acres would be disturbed by mining; the remainder would be disturbed by highwall reduction, soil storage, scoria pits, haul-road construction, and other miscellaneous disturbances.

permit and disturbance boundary and may still be disturbed for stockpiles and project-related surface disturbances. Westmoreland Rosebud may, at any time, reapply to mine the excluded coal provided they affirmatively demonstrate no material damage would occur.

The action area is defined as all areas where threatened, endangered, proposed, or candidate species may be directly or indirectly affected by the Proposed Action. The action area for direct impacts on terrestrial species (northern long-eared bat, monarch butterfly, and western regal fritillary) is the project area plus a 15-mile perimeter buffer that includes portions of Rosebud and Treasure Counties. Indirect impacts on terrestrial species were assessed within the operational boundaries of the Colstrip and Rosebud Power Plants plus a buffer that includes the drainages of Sarpy, Armells, and Rosebud Creeks (**Figure 3**). This indirect analysis area was determined as a result of trace-metal deposition modeling completed for the 2018 Final EIS and air-quality modeling (see **Section 4.3, Air Quality** of the SEIS, for a discussion of modeling methods and results). Water is supplied to the Colstrip Power Plant by a diversion on the Yellowstone River near Nichols, MT. As a result, the action area also includes the section of the Yellowstone River from the diversion point downstream to the confluence of the Yellowstone River and Tongue River. This reach of the Yellowstone River is approximately 57 miles long and provides habitat for the pallid sturgeon. The Cartersville Diversion Dam is located approximately 6.5 miles downstream from the diversion that supplies the Colstrip Power Plant and 235 miles upstream of the mouth of the Yellowstone River (USACE 2015). The Cartersville Diversion Dam is a barrier to fish passage under most flow conditions; however, pallid sturgeon can navigate upstream over the dam during some flow conditions. The downstream extent of the action area on the Yellowstone River was designated at the Tongue River confluence as any potential impact from water withdrawal that would be negated by flow contributions from the Tongue River, as well as by multiple other smaller tributaries. The Tongue River contributes more than 400 cfs of water on average to the Yellowstone River in comparison to the approximately 69 cfs of water that is diverted to supply the Colstrip Power Plant.

Land use in the action area includes mining, residential, commercial, industrial, and open space areas in and around Colstrip. Land uses surrounding Colstrip include agricultural crop production, grasslands, forest/grazing, open grazed sparse woods, and irrigated land. Multiple diversions, mostly for agricultural and irrigation purposes, on the Yellowstone River also exist in the reach of the river between the Cartersville Diversion Dam and the Tongue River confluence as well as further upstream on the Yellowstone River (USACE and Yellowstone River Conservation District Council [YRCDC] 2016). The Cartersville Diversion at the upstream extent of the action area diverts approximately 425 cfs of water for irrigation purposes (Dowl HKM et al. 2010). Historically and currently, irrigated agriculture is the primary land use in the vicinity of the Yellowstone River in the action area; an active railroad line and an abandoned line are also in the river corridor. The total estimated amount of water withdrawn for irrigation in the Yellowstone River basin in 2000 was 4,679 cfs (USACE and YRCDC 2016) compared to the approximately 69 cfs of water that is currently and will continue to be diverted from the Yellowstone River under the Proposed Action.

Vegetation in the Area F project area boundary was surveyed in 2005 and 2007, and surveys were updated in 2014 (Cedar Creek Associates, Inc. 2014). Vegetation and land types mapped in the project area boundary primarily include upland grasslands, conifer/sumac, sagebrush communities, pasturelands, woody draws, and agricultural fields. The grassland community is the dominant vegetation type in the project area, covering approximately 35 percent of land cover. This community is a mixture of tallgrass and shortgrass species, with sagebrush also present (PAP; Appendix E). Common grass species include Japanese brome (*Bromus japonicus*), needle-and-thread (*Stipa comata*), prairie junegrass (*Koeleria cristata*), western wheatgrass (*Agropyron smithii*), and blue grama (*Bouteloua gracilis*). The most common woody species are silver sagebrush (*Artemisia cana*) and winterfat (*Ceratoides lanata*) (PAP; Appendix E). Ponderosa pine (*Pinus ponderosa*) and skunkbush sumac (*Rhus trilobata*) dominate the overstory of the conifer/sumac community, with woody and herbaceous species in the understory. The dominant species in the sagebrush communities are big sagebrush (*Artemisia tridentata*) and silver sagebrush (*Artemisia cana*). Dominant grass species in the pastureland community include native thickspike wheatgrass (*Agropyron dasystachyum*), introduced crested wheatgrass (*Agropyron cristatum*),

and Japanese brome. Common species in the mixed shrubland community include skunkbush sumac, yucca (*Yucca glauca*), and snakeweed (*Gutierrezia sarothrae*). The woody draw community occurs along riparian corridors and includes species such as chokecherry (*Prunus virginiana*), and skunkbush sumac, American plum (*Prunus americana*), Arkansas rose, silver sagebrush, box elder (*Acer negundo*), and fleshy hawthorn (*Crataegus succulenta*).

Vegetation communities in the larger action area (**Figure 4**), based on MNHP mapping, include a diversity of vegetation types, as described in Section 3.10 of the 2018 Final EIS (OSMRE and DEQ 2018). Vegetation community and land types in the action area are generally similar to the project area and include prairie grassland, conifer dominated forest, sagebrush, and smaller amounts of agricultural lands and riparian areas.

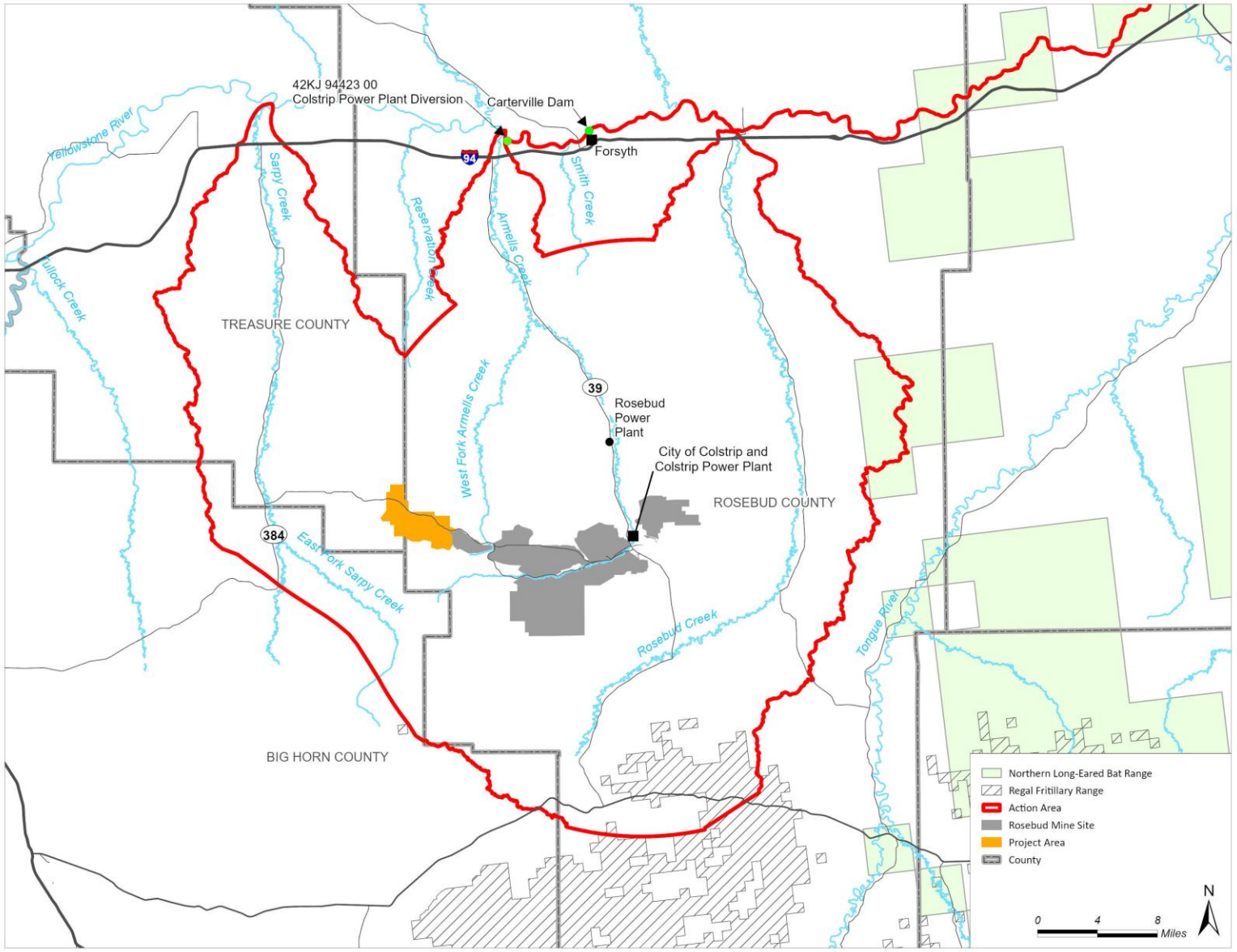

Figure 4. Action Area.

5.0 SPECIES CONSIDERED AND EVALUATED

An unofficial list of federally listed species and designated critical habitat in the action area was obtained from the USFWS IPaC website on June 10, 2024, and September 18, 2024, and updated on January 17, 2025. Using this list, in addition to informal discussion with USFWS staff on May 22, 2024, the OSMRE determined which species and critical habitats had potential to occur in the action area (**Table 4**). Species not known or with no potential of occurring in the action area will not be discussed in this BA.

Table 4 gives a summary of federally listed and proposed species, designated and proposed critical habitat, species habitat requirements, and known occurrence information of species that are known or may occur in the action area.

Table 4. Threatened, endangered, or proposed, species with the potential to occur in the action area.

Species Common and Scientific Name	Status[1]	Potential to Occur	Critical Habitat	Rationale for Exclusion	Habitat Description and Range in Action Area and Notes
MAMMALS					
Northern long-eared bat (*Myotis septentrionalis*)	E	Yes	No	Included	Winter hibernation occurs in caves; summer roosts occur under loose tree bark or tree cavities. Rarely roosts in structures. The range of northern long-eared bat only overlaps the action area in a small sliver of the action area east of Rosebud Creek.
FISH					
Pallid sturgeon (*Scaphirhynchus albus*)	E	Yes	No	Included	Large turbid rivers, including accessible reaches of the Yellowstone River, with diverse habitat and natural hydrographs.
INSECTS					
Monarch butterfly (*Danaus plexippus*)	PT	Yes	No	Included	Requires milkweed (*Asclepias* spp.) as larval host plants; meadow and riparian habitats support spring/summer breeding and late-season migration.
Western regal fritillary (*Argynnis idalia occidentalis*)	PT	Yes	No	Included	Tallgrass prairies, including dry upland, mesic, or wet areas. Requires violet species (*Viola* sp.) as a larval host plant. The range of western regal fritillary only overlaps the action area in a small area at the southern edge of the action area.
Suckley's cuckoo bumble bee (*Bombus suckleyi*)	PE	Yes	No	Included	Various habitats including prairies, grasslands, meadows, and woodlands between 6,000 and 10,500 feet in elevation where host species are present.

The USFWS species list (USFWS 2025a) was obtained from the IPaC website on June 10, 2024, and September 18, 2024, and updated on January 17, 2025. Species/critical habitat not having the potential to occur were excluded from further review with a no effect determination with the below rationale:

[1] **Status Codes**: **T**=federally listed threatened, **E**=federally listed endangered, **PT=**Proposed Threatened, **PE**=Proposed Endangered.

As indicated in **Table 4**, five federally listed threatened, endangered, or proposed species (northern long-eared bat, pallid sturgeon, monarch butterfly, western regal fritillary, and Suckley's cuckoo bumble bee) have the potential to occur (i.e., habitat is present) in the action area. Therefore, only those species will be addressed hereafter in this BA. No critical habitats have been identified in the Action Area (USFWS 2025a).

6.0 EVALUATED SPECIES INFORMATION

6.1 NORTHERN LONG-EARED BAT

SPECIES STATUS AND BIOLOGY

The northern long-eared bat was listed as endangered with an effective date of March 31, 2023 (88 Federal Register 4908-4910, January 26, 2023). The northern long-eared bat is found across much of the eastern and north central United States, including 37 states, and all Canadian provinces from the Atlantic

coast west to the southern Northwest Territories and eastern British Columbia. All currently known hibernacula are in eastern North America (USFWS 2022).

Northern long-eared bats spend winter hibernating in caves and mines of various sizes with constant temperatures, high humidity, and no air currents (USFWS 2022). During the summer, bats roost singly or in colonies underneath bark in cavities or in crevices of live trees or dead trees. This bat, rarely, has also been found roosting in structures such as barns and sheds.

Breeding begins in late summer or early fall when males begin swarming near hibernacula. In the spring, pregnant females migrate to summer ranges where they roost in small colonies and give birth to a single pup. Maternity colonies with young generally have 30 to 60 bats, although larger maternity colonies have been observed. Most females in a maternity colony give birth around the same time, which may occur from late May or early June to late July, depending on where the colony is located within the species range (USFWS 2022).

The greatest current threat to this species is white-nose syndrome which has caused declines of up to 99 percent from previous levels at many hibernation sites (USFWS 2022). No evidence currently exists of northern long-eared bat populations recovering as compared to other bat species. Additional threats to this species include wind power related mortality, climate change, and habitat loss. Types of habitat loss include impacts on hibernation sites and loss or degradation of summer habitat. The 2022 Species Status Report for the northern long-eared bat ranked the relative threat from white-nose syndrome as very high, the threat from wind power mortality as medium, and the threat from climate change and habitat loss as low (USFWS 2022).

FIELD RECONNAISSANCE

Montana is on the western edge of northern long-eared bat range. One hibernating individual was discovered in 1978, and two active individuals were documented in 2016 in northeastern MT (Richland and Roosevelt Counties), approximately 190 miles north of the project area (MNHP 2017). A study of the presence, range, and status of northern long-eared bats in eastern MT from 2016 through 2019 confirmed the presence of the species in the northeastern portion of the state (Bachen 2019). Numerous northern long-eared bats have been captured in Montana; however, all these captures have been in or along the Missouri River drainage or along the Yellowstone River downstream of Glendive. In addition to areas known to be occupied, habitat modeling by the USFWS (USFWS 2024a) shows the only potential habitat in the action area occurs east of Rosebud Creek and does not intersect the project area (**Figure** 4). Although northern long-eared bat habitat includes both coniferous and riparian forests, surveys in eastern MT found them only in riparian forests along the Missouri River and its tributaries.

No northern long-eared bat individuals or populations have been documented in the action area (MNHP 2023). Summer range and hibernacula are only considered to potentially be present within the USFWS-modeled range of the species (USFWS 2024a), which only occurs within a sliver of the action area east of Rosebud Creek and does not overlap the project area.

During the public comment period for the Area F Draft SEIS (December 2024 through January 2025), a bat echolocation report prepared by an independent contractor was submitted to OSMRE as part of a public comment. OSMRE provided the report and associated echolocation data files to USFWS, which subsequently provided the report to MNHP staff. MNHP staff conducted a review of these existing echolocation data recordings for four sites within 62 miles (100 kilometers) of the project area (Bachen and McEwan 2025). This review found that the acoustic data provide no convincing evidence that would support a reasonable conclusion that the species was present in the area of interest during the time these data were collected. MNHP also found that northern long-eared bats are unlikely to occupy the project

area as it lacks suitable habitat and connectivity to occupied and potentially occupied habitat (Bachen and McEwan 2025).

6.2 PALLID STURGEON

SPECIES STATUS AND BIOLOGY

The pallid sturgeon was listed as endangered by the USFWS in September 1990 (USFWS 2021). This long-lived species is native to portions of the Missouri and Mississippi River drainages, including the Yellowstone River. Historically, pallid sturgeon were documented as far upstream in the Yellowstone River drainage as the Tongue River (Brown 1971; Rugg et al. 2023), at the downstream extent of the action area. Since 1994, recovery efforts for the pallid sturgeon have included a propagation program that has released high numbers of age-0 and age-1 plus pallid sturgeon in the Missouri and Yellowstone Rivers (USACE 2020; USFWS 2021; Braaten et al. 2022); however, wild pallid sturgeon numbers have remained low. Despite extensive recovery efforts, recruitment of pallid sturgeon was not detected until recently in the lower Missouri River (USFWS 2014). Within the lower Yellowstone River, spawning success has been documented but no evidence of recruitment has been detected (A. McCullough, USFWS, personal communication, August 19, 2024). The limited reproduction and lack of recruitment is partially attributable to the life history of this fish; females reach sexual maturity at 14 to 18 years of age (Holmquist et al. 2018), and individuals do not spawn annually. Insufficient drift distance for the early life stages of pallid sturgeon, as described below in more detail, is also a primary factor impacting larval survival and thus recruitment (Jaeger et al. 2005; Pallid Sturgeon Recovery Program 2013; Braaten et al. 2022; Rugg et al. 2023).

Threats to pallid sturgeon at the time of listing included the following primary factors:

- Habitat alterations from channelization, impoundments, and altered flow regimes;
- Decreased water quality;
- Entrainment into diversions and ditches, particularly with age-0 and juvenile fishes;
- Water temperature changes related to climate change;
- Habitat fragmentation and development in the river corridors; and
- Overexploitation and overharvest. This is primarily caused by similarities in the appearances of pallid sturgeon and shovelnose sturgeon (*S. platorynchus;* USFWS 2021). The shovelnose sturgeon was federally listed as threatened in 2010 for this reason to protect pallid sturgeon from being harvested through misidentification as shovelnose sturgeon (USFWS 2010).

Additional threats to pallid sturgeon recovery include potential impacts of predators and pathogens, inadequate regulatory mechanisms, invasive species, hybridization with shovelnose sturgeon, and other indirect impacts from climate change. No critical habitat has been designated for this species. The pallid sturgeon has a recovery prioritization categorization of "2c," indicating that the species is "facing a high degree of threat and a high recovery potential" (USFWS 2021).

Pallid sturgeon prefer large, turbid river systems with natural hydrographs and a diversity of available habitat types, such as sand and gravel bars, islands, and braided channels that provide variable depths and velocities (USFWS 2021). Rugg et al. (2021) stated that the conditions in the Yellowstone River are important to the recovery effort of pallid sturgeon given that the hydrograph and the resulting temperature and sediment regimes are relatively natural, creating the dynamic habitat conditions upon which this species depends. The diets of juvenile and adult pallid sturgeon are generally comprised of fish and macroinvertebrates, with an increasing tendency toward piscivory as sizes increase (USFWS 2014). The limited data on feeding habitats of fry that have transitioned to external food sources suggest that zooplankton and small invertebrates make up much of their diets, with mayfly and midge larvae being important.

While pallid sturgeon were previously thought to overwinter in the Missouri River; continued monitoring has indicated that they are dispersed throughout the Missouri River and the Yellowstone River throughout the year (A. McCullough, USFWS, personal communication, August 19, 2024). Pallid sturgeon begin spawning migrations early, reaching the Yellowstone River from April through June (DeLonay et al. 2016). Prior to 2022, spawning was documented in the lower Yellowstone River and occurred in June, mainly downstream of the Intake Diversion Dam and often near the confluence with the Missouri River in reaches with swift-flowing water with interspersed sand and gravel substrates and depths of approximately 5 to 18 feet (DeLonay et al. 2016; Elliot et al. 2020; .A. McCullough, USFWS, personal communication, January 8, 2025). Post-spawn, pallid sturgeon typically begin moving downstream in late June and July.

Prior to 2022, pallid sturgeon passage upstream over the Intake Diversion Dam, built in 1909, was very limited under most flow conditions. The rock-filled timber crib structure is located approximately 70 miles upstream of the confluence of the Yellowstone and Missouri Rivers (Rugg et al. 2023). The structure spanned the width of the river, and pallid sturgeon were only able to move upstream in high water years when a flooded side channel allowed them to bypass the dam (French 2019). Construction of a bypass channel was completed in 2022; the bypass opened an additional 165 miles of the Yellowstone River to the Cartersville Diversion Dam and the Powder and Tongue Rivers to spawning (Rugg et al. 2023). With passage around the Intake Diversion Dam now possible, migration barriers are absent from the Yellowstone River up to the Cartersville Diversion Dam. (USACE 2015). Cartersville Dam likely continues to be a migration barrier under some flow conditions, but migration over the dam was documented in 2024 (A. McCullough, USFWS, personal communication, August 19, 2024).

Prior to the construction of the bypass, the presence of low numbers of pallid sturgeon free embryos directly downstream from the documented spawning areas below the Intake Diversion Dam indicated spawning occurred downstream of the dam in some years (Elliot et al. 2020). USACE (2020) reported that one to four free embryos drifting downstream were observed in small numbers in 2012, 2013, 2015, and 2017, approximately 9.5 miles upstream of the confluence of the Yellowstone and Missouri Rivers. Limited spawning at locations upstream of the Diversion Dam was also documented for the first time in 2014 (DeLonay et al. 2016). However, recruitment of age-1 pallid sturgeon was not documented.

Pallid sturgeon broadcast demersal eggs into deep, turbulent, and swift-flowing areas near the bed of the river over coarse substrates, with the eggs becoming adhesive within minutes (Chojnacki et al. 2020). Studies that specifically incorporated conditions in the Yellowstone River indicated that eggs are likely to be concentrated near the substrate but may drift in suspension in the water column for up to hundreds of meters dependent on flow conditions until they adhere to the bed or within the interstitial spaces of course substrates and incubate (Chojnacki et al. 2020). Incubation rates for pallid sturgeon eggs vary, but laboratory studies indicate they hatch in 5 to 7 days (USFWS 2014). Free embryos immediately emerge from the substrate post-hatch and disperse, drifting passively as free embryos for 5 to 15 days, dependent on water temperatures, before settling into benthic habitats (Braaten et al. 2022). Drift of free embryos occurs within the lower strata of the water column and primarily in the thalwag in mid-channel or outside meander bends where the fast, deep areas are located (Braaten et al. 2012, 2022; Mrnak 2019; Chojnacki et al. 2023). For successful survival, the larval pallid sturgeon must drift for a sufficient distance downstream, estimated to be 150 to 330 miles (USFWS 2014). Within the Yellowstone and Missouri River drainages, impoundments often do not allow for sufficient drift distances. For example, prior to the construction of the weir and bypass channel at the Intake Diversion Dam, drift distance in the Yellowstone River was limited. Drift of larval pallid sturgeon was terminated early, prior to the larvae developing self-sustaining swimming capabilities, resulting in the larvae settling in the anoxic Lake Sakakawea and dying, limiting recruitment (Jaeger et al. 2005; Pallid Sturgeon Recovery Program 2013; Rugg et al. 2023). While the stream mileage that constitutes a sufficient drift distance specific for the

conditions present in the Yellowstone River system has not been determined, the passage of pallid sturgeon using the bypass over the Intake Diversion Dam has increased the potential drift distance substantially.

Climate change is listed as a threat that affects the habitat and range of pallid sturgeon (USFWS 2014, 2021). Climate change will increase the risk of pallid sturgeon encountering reaches with fluctuating or increased stream temperature. As fish have specific temperature ranges that are determined directly by the temperatures that support efficient metabolism, reproductive stress, and disease resistance (Ficke et al. 2005), changes to stream temperatures will affect sturgeon and other fish through multiple pathways. Changes in precipitation and weather patterns resulting from climate change will alter the timing, duration, and interannual variability of peak and low flows, with earlier and potentially larger runoff flows and lower, later season flows expected to occur (Ficke et al. 2005; USFWS 2014). These changes will likely impact pallid sturgeon through altered spawning behavior, reduced larval and young-of-year survival, and reduced availability of suitable habitat during the low flow and over-wintering time periods (USFWS 2014). Additionally, the expected increase in stream temperatures directly results in both decreases in dissolved oxygen (DO) levels and increased oxygen demand as metabolic rates increase. No studies were located that focused on the effects of climate change specifically on pallid sturgeon, but Embke et al. (2023) studied the effects on a related species, the Lake Sturgeon (*Acipenser fulvescens*). Embke et al. (2023) predicted that changes to the hydrograph and the associated increases in temperature and temperature fluctuations expected with climate change would result in adverse effects on this species through changes to activity patterns, survival, and prey availability and impacts on the suitability of spawning and nursery habitat.

Climate change could conversely result in some beneficial effects on pallid sturgeon. Decreased streamflows would slow dispersal rates of free embryos, with increased water temperatures concurrently promoting faster development. These factors could potentially result in increases in survival of this life stage to the larval stage (A. McCullough, USFWS, personal communication, January 8, 2025). Specific to Atlantic sturgeon, Embke et al. (2023) also indicated some beneficial effects could potentially occur to pallid sturgeon if higher temperatures increased activity and movement of Atlantic sturgeon in some areas, increased growth rates of juvenile or adult fish, and extended spawning seasons as earlier snowmelt and peak flows occurred. Similar effects of climate change could also benefit pallid sturgeon.

FIELD RECONNAISSANCE

No supplemental field surveys were conducted for this assessment; however, Montana Fish Wildlife and Parks (MFWP) maintains a publicly assessable statewide database (the Fisheries Information System) that can be searched by waterbody and species to provide information on survey efforts. Of note, this database may be focused on trammel netting surveys and not include telemetry detections of pallid sturgeon (MFWP 2024). This database was accessed on September 28, 2022, and June 17, 2024, to provide information on pallid sturgeon occurrences in the Yellowstone River. Occurrences of pallid sturgeon in the Yellowstone River, including a small number of pallid sturgeon that accessed reaches of the Yellowstone River in the action area, were also documented in other sources (Bureau of Reclamation 2020; French 2019; USACE 2020; French 2022; Rugg et al. 2023; A. McCullough, USFWS, personal communication, August 19, 2024).

Pallid sturgeon were documented in the database as being observed in the Yellowstone River in most years from 2009 through 2023, but most locations were downstream of the action area and the Intake Diversion Dam. As noted previously, the dam largely prohibited upstream movement of pallid sturgeon until 2022 when fish passage was improved (French 2022). However, some pallid sturgeon, both of wild and hatchery origin, were observed using the side channel to get over the dam when flows were high (French 2019; Bureau of Reclamation 2020), and translocation efforts also relocated pallid sturgeon upstream of the dam in some years (Jaegar et al. 2005; USACE 2020; A. McCullough, USFWS, personal

communication, August 19, 2024). Once upstream of the dam, some of these fish continued migrating upstream in the Yellowstone River and into the Powder River. A single hatchery-raised fish moved upstream to the Cartersville Diversion Dam in the action area in 2018 (French 2019; Bureau of Reclamation 2020). In 2019, a dozen pallid sturgeon were translocated upstream of the Intake Diversion Dam, with two of these fish entering the Powder River and a third male moving upstream almost as far as the Cartersville Diversion Dam (USACE 2020). Additionally, the MFWP database documented a pallid sturgeon in the action area near Forsythe, approximately 12 miles downstream of the diversion point. Of note, multiple pallid sturgeon that were translocated upstream of the Intake Diversion Dam in 2018 and 2019 remained upstream of the dam.

Since passage around the Intake Diversion Dam was improved, pallid sturgeon have been observed using the bypass channel, and pallid sturgeon have been frequently observed on a year-round basis upstream of the Intake Diversion Dam, as well as a single fish included in a telemetry study that was detected even further upstream of the Cartersville Dam and the diversion (A. McCullough, USFWS, personal communication, August 19, 2024). Upstream passage around the Intake using the bypass channel in 2022 was 2.2 times higher than the previous annual rate. Multiple fish traveled upstream to and/or into the Powder River; a female fish that traveled upstream on the Powder River appeared to have spawned there (Rugg et al. 2023). Prior to the observation of the single pallid sturgeon upstream of the Cartersville Dam in 2024, six pallid sturgeon were also documented traveling upstream past the Tongue River confluence and as far upstream as the Cartersville Diversion Dam. A male was also observed entering the Tongue River in 2022 which denotes the downstream border of the action area. Results of the 2023 surveys have not yet been formally reported, but USFWS communicated that spawning was documented in the Tongue River in 2023 (A. McCullough, USFWS, personal communication, July 10, 2024). Also of interest, as observed to an extent in 2018 and 2019, some telemetered pallid sturgeon in 2021 also remained above the Intake Diversion Dam through 2022 (Rugg et al. 2023), indicating that a sub-set of the pallid sturgeon could be considered a resident population. Of note, only about 30 percent of the pallid sturgeon population are included in the telemetry studies, so likely a higher number of pallid sturgeon than those documented in the telemetry study also remained upstream of the Intake Diversion Dam (A. McCullough, USFWS, personal communication, August 19, 2024). Nonreproductive pallid sturgeon were also observed using the bypass to access reaches of the Yellowstone River, upstream of the dam, outside of the spawning season based on discussions with the USFWS (A. McCullough, USFWS, personal communication, May 22, 2024).

In summary, pallid sturgeon were documented in the action area in limited numbers prior to the fish passage improvements being completed at the Intake Diversion Dam in 2022. Because of these improvements, the number of pallid sturgeon moving into reaches further upstream in the Yellowstone River, including as far upstream as the Cartersville Diversion Dam, has increased and is expected to increase further. The Cartersville Diversion Dam, approximately 6.5 miles downstream of the diversion associated with the Colstrip Power Plant, continues to inhibit fish passage under most flow conditions, but a single pallid sturgeon was documented in a telemetry study upstream of the Cartersville Diversion Dam and the Intake Diversion Dam in 2024.

6.3 MONARCH BUTTERFLY

SPECIES STATUS AND BIOLOGY

The monarch butterfly was designated as proposed threatened in December 2024 (89 Federal Register 100716, December 2024) due to widespread drought, habitat loss, fragmentation, and low population abundance. North America contains two migratory populations of the monarch butterfly separated by the Rocky Mountains. The largest migratory population breeds across the central and eastern parts of the continent and winters in Mexico. A smaller migratory population breeds in western North America and

winters primarily along the California coast, south into Baja California, Mexico. During the summer breeding season, monarchs live from two to five weeks, during which time they mate and lay the eggs that become the next generation. The last generation of the year does not become reproductive and is said to be in "reproductive diapause." These are the butterflies that migrate to Mexico or California where they overwinter. These butterflies become reproductive in February and March as they move north, laying eggs on milkweeds as they progress northward into the United States.

Larval food plants include several species of *Asclepias* (milkweed - the primary host plant genus), *Apocynum*, *Calotropis*, *Matelea*, and *Sarcostemma*; adults feed on nectar from a variety of flowers (MNHP 2022a). Common places where milkweed occurs include shortgrass and tallgrass prairies, livestock pastures, agricultural margins, roadsides, wetland and riparian areas, sandy areas, and gardens in addition to deserts, open forests, and woodlands. The species is known to occur throughout Montana during summer and fall months at elevations between 2,000 and 3,000 feet in open places, native prairie, foothills, open valley bottoms, open weedy fields, roadsides, pastures, marshes, and suburban areas (MNHP 2022a).

The primary threats to this species include loss of milkweed from herbicide use, conversion of grasslands to other uses, and loss of overwintering sites (USFWS 2020b). Additional threats include loss of nectar food sources in breeding and migration habitats, insecticide exposure, and climate change effects such as increasing storm frequency and intensity in overwintering sites (USFWS 2020b).

FIELD RECONNAISSANCE

No field reconnaissance for monarch butterflies has been conducted to date in the action area. Potential habitat occurs in the action area, but no critical habitat has been designated. The nearest known occurrences of this species to the action area are documented along the Yellowstone River and Smith Creek, north and west of Forsythe, in Rosebud and Custer Counties (MNHP 2022b).

6.4 WESTERN REGAL FRITILLARY

SPECIES STATUS AND BIOLOGY

The western regal fritillary was proposed for listing as a proposed threatened species in August 2024 (89 Federal Register 63888-63909, August 6, 2024). The regal fritillary is a large butterfly consisting of two subspecies found in the native grasslands of the central and northern Great Plains and portions of the Midwest (the western regal fritillary), and a single location in eastern Pennsylvania (the eastern regal fritillary) (USFWS 2024b). Regal fritillary habitat is composed of grasslands with necessary components of native violets (*Viola* spp.) for larvae to eat and nectar sources for adults (USFWS 2023b). The life history of this species is described in the *Regal Fritillary Species Status Assessment* (USFWS 2023b) and summarized here. The species has one annual generation. Egg-laying occurs in late summer and fall when individual females may lay hundreds to thousands of eggs in native grassland habitats. The species overwinters as first instar larvae in grassland vegetation, emerging in spring to search for violets (*Viola* spp.), their only larval food. The larvae pupate within the grasslands and emerge as adult butterflies beginning in late May through mid-July depending on their regional location (USFWS 2023b).

The western regal fritillary currently occupies portions of 14 states, from Indiana to Colorado and from North Dakota to Oklahoma (USFWS 2023b). States on the western and southern fringes of the regal fritillary's range are relatively sparsely occupied, with regal fritillaries occurring only in portions of those states, near their borders with adjacent occupied states (USFWS 2023b).

The primary threats to this species are the expected continued loss and fragmentation of large, intact native grasslands through conversion by agriculture and development; invasive plants and woody

vegetation; the reduction of violets and nectar sources from the broadcast application of herbicides; and periodic disturbances from fire, mowing, and haying (USFWS 2024b).

FIELD RECONNAISSANCE

No field reconnaissance has been conducted for western regal fritillary to date in the action area. Montana is at the western periphery of the western regal fritillary range. The species account on the USFWS Environmental Conservation Online (ECOS) website lists the species as known or believed to occur in Rosebud County, but not in Treasure County, Montana (USFWS 2024c). Habitat modeling by the USFWS (USFWS 2024c) shows the only potential habitat in the action area occurs east of Rosebud Creek, on the southern edge of the action area, and does not intersect the project area (**Figure** 4). Past vegetation surveys have not identified extensive areas of native violets in the project area (Cedar Creek Associates 2014, 2015). An unidentified violet species (*Viola* sp.) was documented in woody draw habitat in 2006; however, no violets were identified in grassland or other habitats (Cedar Creek Associates 2015).

6.5 SUCKLEY'S CUCKOO BUMBLE BEE

SPECIES STATUS AND BIOLOGY

Suckley's cuckoo bumble bee was proposed for listing as a proposed endangered species in December 2024 (89 Federal Register 102074-102091, December 17, 2024). The species has a broad distribution across most of western North America and can be found in various habitats such as prairies, grasslands, meadows, and woodlands between 6,000 and 10,500 feet in elevation (NatureServe 2025; USFWS 2024d). There are no confirmed records of the species in the eastern United States, but there are some verified records just to the north in eastern Canada and, therefore, many range maps extend south into the far northeastern portions of the U.S. This eastern population is poorly understood and does not appear to connect to the western portion of the range, while the western population extends south to Arizona, east to Nebraska and Minnesota, and north through the Yukon in Canada and has many confirmed observations (USFWS 2024d).

Suckley's cuckoo bumble bee is a generalist pollinator that is also an obligate parasitic bumble bee that invades the nests of other bees in the genus *Bombus*, including the western bumble bee (*Bombus occidentalis*) (USFWS 2024d). Female bees emerge from hibernation in the spring and take over the nests of a suitable host colony, where the original host workers will then help raise the Suckley's cuckoo bumble bee young instead of their own (USFWS 2024d). Suckley's cuckoo bumble bees cannot reproduce without available host colonies and declines in host species such as the western bumble bee are one potential threat resulting in the species' decline.

Additional threats include competition with managed and introduced bee species; pathogen and parasite spread such as fungal infections, protozoan, mite, and nematode parasites; RNA viruses; pesticide application; habitat conversion and fragmentation caused by development, agriculture, and grazing; climate change including increased temperatures, drought, and wildfire; and additional early spring frosts (USFWS 2024d).

FIELD RECONNAISSANCE

No field reconnaissance for Suckley's cuckoo bumble bee has been conducted to date in the action area. Foraging habitat for Suckley's cuckoo bumble bees includes a variety of nectar-producing plant species, which are present in the action area. MNHP habitat modeling shows the action area as moderate to low potential Suckley's cuckoo bumble bee habitat (MNHP 2022c). There is some uncertainty about the range of Suckley's cuckoo bumble bee due to potential misidentification and limited verification of records (USFWS 2024d). In Montana, this species is believed to occur throughout the state (Koch et al. 2012; USFWS 2025b). The species' account on the USFWS ECOS website lists the species as known or

believed to occur in Rosebud and Treasure Counties (USFWS 2025b). The most recent documented occurrence of this species in the MNHP database is from 2009 in Cascade County, about 300 miles from the analysis area (MNHP 2025). The closest known occurrence is about 155 miles northwest in Petroleum County from 1957 (MNHP 2025).

7.0 ENVIRONMENTAL BASELINE

As defined under the ESA, the environmental baseline includes past and present impacts of all federal, state, and private actions in the action area; the anticipated impacts of all proposed federal actions in the action area that have undergone formal or early Section 7 consultation; and the impact of state and private actions that are contemporaneous with the Section 7 consultation process. Future actions and their potential effects are not included in the environmental baseline.

7.1 PREVIOUS CONSULATION WITH THE USFWS IN THE ACTION AREA

Past informal consultation for the Area F Mine is described in **Section 2.0, Consultation History**.

7.2 PAST AND CURRENT ACTIVITES IN THE ACTION AREA

The surface of the land in the action area is privately owned. Past and current actions in the action area include mining, grazing, agriculture, and private recreational use, primarily hunting. Past fires and timber harvest in the action area have resulted in changes to the forest structure. These past and current activities likely have affected the species addressed in this BA directly and indirectly by habitat alteration such as removal and degradation of nesting, foraging, and sheltering habitats. These activities could negatively affect movement corridors, increase fragmentation, increase noise, and result in other human disturbance that may have resulted in displaced animals, causing increased stress and mortality, and negatively affected reproduction.

The Yellowstone River provides a valuable opportunity for pallid sturgeon recovery. Compared to some other occupied or potential habitats, the Yellowstone River has a more natural hydrograph and relatively pristine conditions (Rugg et al. 2023). The following past and current activities in the action area are or have the potential to directly and indirectly affect pallid sturgeon and their habitat in the Yellowstone River in the action area.

As discussed in **Section 3.1**, the water withdrawals at the diversion that supplies the Colstrip Power Plant and Colstrip have occurred since the priority date in 1970. Altered flow regimes, which can result from water withdrawals of sufficient magnitude and duration, are listed as a threat to pallid sturgeon (USFWS 2021). The effects analysis in **Section 8.0** addresses the pathways through which altered flow regimes could affect pallid sturgeon. While this discussion is directed towards the continuation of the water withdrawals through 2039 under the Proposed Action, the potential for such effects to occur in those additional years of operation is the same as under current conditions and, thus, are not discussed in detail here.

Other past and current activities in the action area that are likely affecting pallid sturgeon directly and indirectly include the operations of other diversions and reservoirs (USACE and YRCDC 2016) which result in the creation of fish barriers as well as altered hydrology and the associated habitat changes. The Cartersville Diversion Dam that denotes the upstream boundary of the action area is a major barrier to upstream migration of pallid sturgeon under most flow conditions. Cartersville Diversion Dam was completed in 1934 and has a water right for approximately 426 cfs of water for irrigation purposes (Dowl

HKM 2010). Construction of the bypass around the Intake Diversion Dam further downstream opened up 165 additional miles of stream to pallid sturgeon and other native fishes, providing additional habitat and the potential for adequate larval drift distances to improve survival rates. The bypass channel has not been operational for a sufficient time span to fully evaluate the benefits for pallid sturgeon, but those benefits are expected to be substantial.

Current and historical land use in the reach of the Yellowstone River bracketed by the Bighorn and Powder River confluences is predominantly agricultural with little change since the 1950s (USACE and YRCDC 2016). Consumptive water use for agricultural irrigation in the Yellowstone River in MT was estimated at 660,000 acre-feet per year. While multiple diversions exist in the Yellowstone River, no major reservoirs are present in the mainstem. Reservoirs are present in the tributaries, which affect flows in the Yellowstone River. For example, the Yellowtail Dam on the Bighorn River is operated for hydroelectric power and flood control and has a substantial impact on the magnitude of flows downstream of the Bighorn River confluence. The reach of the Yellowstone River that is affected by these operations includes the reaches in the action area (USACE and YRCDC 2016).

There are abandoned and active railroads that follow the Yellowstone River for more than 100 miles. The railroad grades downstream of Forsyth are located particularly close to the stream channel, and they have disconnected the floodplain from the river in this location (USACE and YRCDC 2016). Banks are also armored, mostly with riprap, for protection of agricultural land, the rail line, and some urban areas. Armored banks can directly and adversely affect pallid sturgeon and other native fish by reducing habitat complexity and altering sediment transport dynamics.

Currently, water quality in the Yellowstone River from the Cartersville Diversion Dam to the Powder River is impacted and may be affecting pallid sturgeon. This segment is listed as not fully supporting aquatic life due to the following probable causes (and probable sources): alteration in streamside or littoral vegetative covers (agriculture); copper (irrigated crop production); lead (municipal point source discharges); nitrate+nitrite (natural sources); sediment (post-development erosion and sedimentation); total dissolved solids (rangeland grazing); zinc (unknown source); and pH (streambank modifications/destabilization). Webb et al. (2019) conducted a screening level hazard assessment throughout the range of pallid sturgeon habitat and reported exceedances of benchmarks or criteria of some of these same parameters in surface water and/or sediment in the Yellowstone River as well as some additional parameters. Exceedances in the Yellowstone River included arsenic, chromium, copper, lead, selenium, zinc, total nitrogen, total phosphorus, and chlorophyll α. Most exceedances were reported downstream of the action area closer to the mouth of the Yellowstone River, but arsenic exceedances were reported in the action area. Sources of contaminants could not always be identified, but current and historic mining operations, energy extraction, and electricity generation were reported to be contributing activities. The specific effects on pallid sturgeon health in the Yellowstone River were not assessed, but contaminants have been linked to adverse health effects in other studies (Webb et al. 2019). Limited data on stream temperatures, DO, and other parameters were available from the U.S. Geological Survey (USGS) gage at Forsythe (#06295000) monthly or less frequently from 2000 through 2013. The maximum stream temperature recorded was 26°C in August 2006, and DO levels remained above 7.0 milligrams/Liter (mg/L).

8.0 EFFECTS ON EVALUATED SPECIES AND DETERMINATIONS

8.1 FEDERALLY LISTED AND PROPOSED SPECIES

NORTHERN LONG-EARED BAT

DIRECT AND INDIRECT EFFECTS

If northern long-eared bats were to occur in the analysis area, potential direct effects could include loss of foraging and roosting habitat due to vegetation removal and indirect effects from potential power-plant emissions impacts on vegetation. Impacts from habitat loss are unlikely to occur because the species is not likely to be present in the analysis area. Range-wide, habitat loss is not considered the primary threat to northern long-eared bat populations. The Proposed Action will have no effect on white-nose syndrome and wind power development, which are the main threats to northern long-eared bats. Impacts on hibernation sites are highly unlikely because the mapped northern long-eared bat range does not overlap the project area (**Figure 4**).

Tree removal in mined areas, specifically removal of trees that provide roosting habitat, could negatively affect tree roosting bat species such as northern long-eared bats if they were to occur in the project area. However, because the project area is not within the range of northern long-eared bat, impacts from tree removal are not expected.

A possible indirect effect on species in the action area, including northern long-eared bats, is toxicity due to hazardous metals from coal dust and deposition of trace metals from combustion of project area coal in the Colstrip and Rosebud Power Plants. Coal dust contains a number of hazardous metals (e.g., antimony, arsenic, chromium, lead, mercury, and selenium), and emission of coal dust suspends these compounds in the air. Suspended fugitive coal dust can impact human health and ecosystems through inhalation or deposition to soil and waterbodies. Based on modeling conducted for the project (OSMRE and DEQ 2018), the maximum annual average air concentration and annual deposition of PM_{10} fugitive coal dust emissions would be 0.15 micrograms per cubic meter and 153.1 kilograms per hectare, respectively, and would occur within the boundaries of the project area, while falling off rapidly with distance from the mine.

As described in the 2018 EIS (OSMRE and DEQ 2018), atmospheric dispersion and deposition of selected trace metals (e.g., antimony, arsenic, cadmium, chromium, copper, lead, selenium, and mercury), which would be emitted as a result of the combustion of project area coal in the Colstrip and Rosebud Power Plants, were simulated by applying the AERMOD model. These metals were selected for modeling because they are commonly emitted from coal-fired power plants and are primary ecological risk indicators. Modeling results were compared to EPA ecological soil-screening levels (Eco-SSLs) and background concentrations to determine expected deposition of trace metals (and associated impacts) due to combustion of project area coal (see **Section 4.3.3.2, Indirect Impacts of Coal Combustion** of the FEIS). Impacts on northern long-eared bat would be insignificant and discountable because indirect effects on northern long-eared bats from power plant emissions are unlikely to occur because deposition modeling results (see **Section 4.3, Air Quality** and **Section 4.13.1.2** of the FEIS) indicate that the operation of the Colstrip and Rosebud Power Plants during the project area coal-combustion period (20 years) would not result in deposition over the Eco-SSLs for invertebrates (such as northern long-eared bats food sources), birds, or mammals and, thus, would be unlikely to result in adverse effects on northern long-eared bats. Impacts on northern long-eared bat habitat would be insignificant because the deposition of trace metals around the Colstrip and Rosebud Power Plants would not cause concentrations of trace metals to increase more than 1 percent compared to the existing background soil concentrations, and deposition of trace metals would be less than the Eco-SSLs for plants, mammals, and soil invertebrates.

CUMULATIVE EFFECTS

Under the ESA, cumulative effects are reasonably foreseeable future state, private, and tribal activities only and do not consider the effects of past or future federal actions. Reasonably foreseeable future actions in the action area include mining, grazing, agriculture, and private recreational use, primarily

hunting. Wildland fires are also likely to occur in the future in the action area and could result in changes to forest structure. While these future activities could affect northern long-eared bat directly and indirectly by habitat alteration such as removal and degradation of nesting, foraging, and sheltering habitats of the species were to occur, only a small amount of USFWS-modeled northern long-eared bat habitat is present in the action area east of Rosebud Creek, so cumulative effects from these activities in the action area would be insignificant. The future spread of white-nose syndrome and future climate change could also adversely affect this species. White-nose syndrome has caused dramatic population reductions in this species in other parts of its range, and it is reasonably foreseeable that similar reductions could occur to western populations in the future.

INTERRELATED AND INDEPENDENT ACTIONS AND THEIR EFFECTS

Interrelated activities are parts of the Proposed Action that depend on the action for their justification, and interdependent activities have no independent utility apart from the action. There are no interrelated or interdependent actions associated with the Proposed Action; therefore, there are no anticipated adverse effects on northern long-eared bat.

EFFECT DETERMINATION

For the northern long-eared bat, the OSMRE has determined the Proposed Action ***may affect, but is not likely to adversely affect*** the species. No direct effects on northern long-eared bat are expected because the project area is not within the mapped range of the species. Potential indirect effects associated with the Proposed Action include effects from potential power-plant emissions impacts on vegetation. The effects of the Proposed Action on the species are insignificant and discountable because: (1) the Proposed Action will have no effect on white-nose syndrome and wind power development, which are the main threats to northern long-eared bats; (2) northern long-eared bats are not likely to occur in the action area; (3) no direct habitat loss will occur, based on the project area limits and current mapped range of the species; and (4) indirect effects on northern long-eared bats from power plant emissions are expected to be insignificant and discountable.

PALLID STURGEON

DIRECT AND INDIRECT EFFECTS

Any potential effects on pallid sturgeon from the Proposed Action would occur from the continued diversion of 69.27 cfs of water from the Yellowstone River to supply the Colstrip Power Plant through 2039. No change will occur in the magnitude of the diversion compared to current conditions, only an extended duration. As briefly discussed in **Section 7.2**, water withdrawals directly impact the hydrograph, which, in turn, has the potential to affect pallid sturgeon through multiple pathways. To evaluate the potential for and the magnitude of any direct or indirect effects of the water withdrawals to occur on pallid sturgeon, multiple flow metrics were calculated. Of the alternatives evaluated in addition to the Proposed Action, all would result in the water withdrawals occurring for a decreased timeframe, lessening the number of years in which any predicted impacts would occur to pallid surgeon in turn.

Flow metrics were calculated using data from the USGS gage approximately 6 miles downstream of the diversion and immediately upstream of the Cartersville Dam at Forsythe (#06295000). A gage is also in Billings, MT (USGS #06214500), upstream of the diversion. Data from this gage were not used in the analysis, as the Billings gage is approximately 100 miles upstream of the diversion and upstream of the confluence with the Bighorn River. Multiple other smaller tributaries also contribute flow to the Yellowstone River between Billings and the analysis area, and irrigation withdrawals and returns also occur throughout these reaches. No major tributaries are present between the diversion point and the Forsythe gage, although irrigation return flows and pumps are within the reach (USACE and YRCDC 2016). Based on this, data from the Forsythe gage was determined to be representative of streamflow downstream of the diversion; the amount of water withdrawn to supply the Colstrip Power Plant was then

added to the gage data to provide a reasonably accurate approximation of the magnitude of flows upstream of the diversion.

Average daily, monthly, and annual flow data were available and finalized for the Yellowstone River gage at Forsyth from October 1977 through April 2024; data from 2000 through 2023 were used in this analysis to represent current conditions (**Table 5**). Data were summarized in the flow metrics to provide a comprehensive analysis of changes to the flow regime on the daily, monthly, and annual time scales. The focus of the monthly flow metrics were on the months of February and June, to represent monthly data when flows were typically at their lowest and highest values, respectively. For most of the flow metrics, a subset of data representing the five years with the highest and lowest values for each metric were also used to represent any effects in a typically wet (above average) or dry (below average) flow year.

Table 5. Flow metrics calculated for the effects analysis to characterize potential impacts on flows on the Yellowstone River from the water withdrawals associated with the Colstrip Power Plant diversion. Metrics were calculated from data from 2000 – 2023 from USGS gage data for the Yellowstone River at Forsythe (#06295000).

Flow Metrics cfs)	Year Type	Flow at Forsythe	Estimated Flow Upstream of the Diversion (cfs)	Proportion Diverted (%)
Mean Annual Flow	Average	10,354	10,423	0.7
	Dry	6,761	6,830	1.0
	Wet	15,838	15,907	0.4
Mean Peak Flow	Average	49,396	49,465	0.1
	Dry	32,080	32,149	0.2
	Wet	66,560	66,629	0.1
Mean February Flow	Average	5,210	5,279	1.3
	Dry	3,875	3,944	1.8
	Wet	7,058	7,127	1.0
Mean June Flow	Average	32,000	32,069	0.2
	Dry	18,128	18,197	0.3
	Wet	48,408	48,477	0.1

Based on average annual flow data for the Forsythe gage (**Table 5**), the diversion associated with the Colstrip Power Plant currently withdraws an average of 0.7 percent of the estimated Yellowstone River flows, with a slightly higher (1.0) and lower (0.4) proportion of the total flow withdrawn in dry and wet years, respectively. Even in dry years, mean annual flows in the Yellowstone River near the diversion point were almost 16,000 cfs compared to the diversion removing approximately 69 cfs. The other metrics demonstrated similar patterns. The proportional impact of the water withdrawals on peak flows was 0.1 to 0.2 percent (**Table 5**). In February, typically the month in which the Yellowstone River has the lowest flows on average, the water withdrawals would result in a 1.0 to 1.8 percent decrease in flows based on the year type. As also noted in the analysis of peak flows, the impact of the diverted water in June, the wettest month on average, would be a decrease in streamflow of 0.3 percent or less. When the single individual day with the lowest flow within the period of record from 2000 through 2023 was analyzed (2,019 cfs on August 30, 2001), the water withdrawal accounted for 3 percent of the estimated total flow in the Yellowstone River, upstream of the diversion point.

To view the water withdrawal amount from a different perspective, daily flow fluctuations at the Forsythe gage averaged 541 cfs and ranged from 0 to 27,000 cfs. The maximum fluctuation occurred in mid-June 2022 during the record-breaking flooding event that year with a similar fluctuation near that magnitude also occurring in May of 2011. Out of these data, 73 percent of the day-to-day fluctuations were greater than the diversion amount of approximately 69 cfs. The amount of water diverted to supply the Colstrip Power Plant is insignificant in comparison to daily fluctuations that occur in the Yellowstone River in the vicinity of the diversion. The proportion of flow diverted for the Colstrip Power Plant would be further

muted as the drainage area increases and tributaries continue to contribute water to the Yellowstone River.

Based on these analyses, streamflow in the Yellowstone River is minimally impacted by the water withdrawals for the Colstrip Power Plant with each flow metric in average, dry, or wet years decreasing by less than 2 percent. The amount of water diverted cannot be differentiated from the natural variability in flow observed from day to day based on data from 2000 to 2023. Hydrologic alteration from water withdrawals could potentially affect pallid sturgeon through multiple pathways; potential effects would depend on the magnitude and duration of the alterations. Potential effects are discussed below in terms of the actual diversion amount and the assumption that, under the Proposed Action, water withdrawals will continue until 2039.

The specific timing of pallid sturgeon spawning in spring is cued by streamflows, temperature, and day length (USFWS 2014). If water withdrawals result in a delay in peak flows due to early spring withdrawals, pallid sturgeon could be affected directly through altered spawning movements and behavior. Peak flows also influence sediment transport and, therefore, formation and maintenance of aquatic habitat (USFWS 2014); alterations to flow could, therefore, result in indirect effects on the quantity or quality of sturgeon habitat. Pallid sturgeon are also adapted to turbid environments (Blevins 2011; USFWS 2014), and reduced sediment transport resulting from a reduction in peak flows can decrease turbidity. Decreased turbidity can adversely affect feeding efficiency in pallid sturgeon, potentially because juvenile and adult fish possess a predatory advantage through concealment (USFWS 2014). The high turbidity is also thought, in turn, to camouflage free-drifting pallid sturgeon embryos and larvae from predators (Blevins 2011). As the water withdrawals associated with the Colstrip Power Plant only comprise 0.3 percent or less of the average peak flows and the average monthly June flows (**Table 5**), any direct effect on the timing or success of pallid sturgeon migrations and spawning would not be discernable over the additional years of water withdrawals through 2039. In addition, spawning has not yet been confirmed in the Yellowstone River in the action area, although, with the bypass around the Intake Diversion Dam now allowing for fish passage, spawning in this reach is increasingly likely to occur over the years of this Project.

Streamflow decreases associated with diversions can also adversely affect fish movements and habitat availability during low flow periods. In the Yellowstone River in the action area, data from the USGS gage at Forsythe indicated flows typically decrease substantially between July and August and remain low through the fall and winter months. Most pallid sturgeon would be expected to reside in the Missouri River, downstream of the Yellowstone River confluence, during the winter months (USFWS 2014); however, in recent years, adult and juvenile pallid sturgeon have been documented above the Intake Diversion Dam year-round (USFWS 2014; Bragg et al. 2023). Extremely low streamflows can reduce depths in riffles so that fish avoid them; this can prevent fish movement. Modest decreases in winter streamflow could directly impact pallid sturgeon by limiting availability of desirable overwintering habitats. The minimum daily flow at the Forsythe gage between 2000 and 2023 was 1,950 cfs. This flow would cause shallower depths and reduced access to edge habitats with and without water withdrawals that supply the Colstrip Mine and Power Plant. However, pallid sturgeon would likely still be able to move unimpeded in the center of the channel. Mean February flows, the month with the lowest average flows, were estimated to decrease by less than 2 percent as a result of the water withdrawal. At most, very small decreases in the depths of overwintering habitat could occur in dry years, and such decreases would be within the range observed naturally and would likely have an insignificant effect on juvenile and adult pallid sturgeon.

Reductions in streamflows as a result of diversions or other factors can also result in increased summer water temperatures, decreased DO levels, and increased concentration of pollutants (American Fisheries Society 2024). As noted, water temperatures in spring act as a cue for spawning, concurrent with the

rising hydrograph. Water temperatures also directly affect pallid sturgeon by influencing incubation rates, fish growth, and age of reproductive maturity (Blevins 2011; USFWS 2014; Mrnak 2019). Warmer temperatures can also increase the vulnerability of fish to parasites and diseases (Franke et al. 2024), but USFWS (2014) indicated that, while some pathogens have been identified that can affect pallid sturgeon, no reduction in the numbers of this species due to disease has been noted. Miller et al. (2016) studied thermal tolerances of pallid sturgeon and concluded that both larval and juvenile pallid sturgeon exposed to stream temperatures greater than 28°C likely experienced stress and increased mortality, although Miller et al. (2016) further stated that thermal regimes in the Yellowstone River rarely resulted in exceedances of this threshold. Warmer stream temperatures can cause depressed DO levels, which can directly affect pallid sturgeon survival and growth in all life stages (Blevins 2011; USFWS 2014). Literature on the specific tolerance of pallid sturgeon to low DO levels was not located, but other species of sturgeon were adversely affected with mortality increasing when DO levels decreased to 3 mg/L or less (Blevins 2011; USFWS 2014). While limited, the data collected at the USGS gage in Forsythe (described in **Section 7.2**) indicate that stream temperatures and DO levels did not approach physiologically stressful thresholds from 2000 through 2013. As also described in **Section 7.2**, water quality in the Yellowstone River in and downstream of the action area is impacted by multiple sources, although most of the data that indicated exceedances of benchmarks or criteria in Webb et al. (2019) occurred downstream of the action area.

Under the Proposed Action, 69 cfs would continue to be diverted from the Yellowstone River through 2039; as noted, withdrawal of this amount is substantially less than the average daily fluctuations in the Yellowstone River in the action area. Based on this, effects on stream temperature, DO levels, and chemical concentrations would likely not be discernable, and related effects on pallid sturgeon would be insignificant. The current change in flows is less than 2 percent, even under dry conditions, and the current lack of effects supports the prediction of insignificant effects.

Entrainment of pallid sturgeon has the potential to indirectly affect the pallid sturgeon while water withdrawals continue to occur. Entrainment in irrigation and other structures was noted to be a limiting factor for pallid sturgeon (USFWS 2014), and, prior to the installation of fish screens at the Intake Diversion Dam, an estimated 400,000 to 800,000 fish of multiple species were entrained each irrigation cycle.

While the potential exists with any diversion structure, multiple factors reduce the risk of entrainment of pallid sturgeon in the Colstrip Power Plant diversion structure, including limited observations of adult pallid sturgeon successfully navigating the Cartersville Diversion Dam and no observations confirming that pallid sturgeon spawning has occurred upstream of the dam. While lack of observed activity does not preclude spawning occurring unobserved, it suggests that such activity is either not occurring or occurring on a limited basis. Entrainment of eggs, free embryos, or larval pallid sturgeon cannot occur in the diversion structure unless spawning occurs upstream of or adjacent to the Colstrip Power Plant diversion structure and the Cartersville Diversion Dam as all early life stages drift downstream. However, pallid sturgeon are expected to increasingly access the reaches within the action area immediately downstream of the Cartersville Diversion Dam now that the bypass around the Intake Diversion Dam is operational. The Cartersville Diversion Dam currently inhibits upstream movement under most flow conditions, but, as previously noted, a telemetered pallid sturgeon was detected upstream of the Cartersville Diversion Dam in 2024 (A. McCullough, USFWS, personal communication, August 19, 2024). With increased numbers of pallid sturgeon observed between the Cartersville Diversion Dam and Intake Diversion Dam year-round, there is increased opportunity for additional pallid sturgeon to successfully navigate the Cartersville Diversion Dam (when flow conditions allow) and to potentially spawn or reside there. Once pallid sturgeon move upstream past the Cartersville Diversion Dam, an additional 56 miles of the Yellowstone River are available until the fish encounter the Yellowstone Diversion Dam. There are also three more irrigation diversion dams upstream of the Yellowstone Diversion Dam, including the

Rancher's Ditch, Waco-Custer, and Huntley diversions (Dowl HKM 2010). While the Huntley Diversion has a side channel for fish passage, the other three diversion dams are likely partial fish barriers that are only navigable at high flows.

If pallid sturgeon spawning occurs upstream of the diversion, eggs, free embryos, or larval fish could potentially drift downstream and become entrained or impinged within the Colstrip Power Plant diversion. Traveling screens with a mesh size of 0.25 inch are present in the diversion structure itself, with these screens located approximately 18 feet from the entrance of the structure. Trash racks are also present in front of the traveling screens, with 8.5-inch spacing in the trash racks. Pallid sturgeon eggs are approximately 0.10 inch (2.6 millimeters) in diameter, and free embryos range from 0.28 inch (7 millimeters) to 0.75 inch (19 millimeters) long in the first 10 days post-hatch (Chojnacki and DeLonay 2016; Chojnacki et al. 2020). While no information was located that evaluated the diameter of the free embryos, eggs and younger free embryos would be small enough to pass through the traveling screens. Older and larger larval, juvenile, and adult pallid sturgeon would be too large to be entrained.

While entrainment and impingement could occur associated with the Colstrip Power Plant diversion, other characteristics of the diversion structure itself and of the pallid sturgeon early life stages act to negate or minimize this risk. The proportion of flow diverted from the Yellowstone River in June when spawning and embryo drift would be occurring was 0.3 percent or less. While other factors also influence entrainment rates, studies have shown a relationship between the proportion of flow diverted and entrainment rates, with lower diversion inflows correlated with lower entrainment rates (Moyle and Isreal 2005; Kennedy et al. 2009; Walters et al. 2012).

In addition, the placement of the Colstrip Power Plant diversion reduces the entrainment risk. Most pallid sturgeon eggs and free embryos drift in the deepest part of the thalweg in the lower strata of the water column (Braaten et al. 2012; DeLonay et al. 2016). The Colstrip Power Plant diversion structure is located in a manmade channel that mimics a backwater habitat and is located on the western channel bank in a generally straight reach of the Yellowstone River that is approximately 320 feet across. This part of the channel has not been mapped, but the deepest areas where the free embryos or eggs would be expected to be observed most frequently in a straight reach would likely be nearer the center of the channel and some distance from the mouth of the backwater feature. The backwater feature is situated at a slight angle almost perpendicular to the Yellowstone River channel, and the diversion structure is more than 400 feet from the mouth of the backwater. Site-specific velocity data in the backwater feature are not available, but observations indicate that low velocities are present (R. Olsen, Talen Energy, personal communication, November 11, 2024), as would be expected based on the structure and location of the feature. Based on this, the backwater feature likely functions as a lentic habitat. Due to the location of the diversion structure, which is well offset from the Yellowstone River, as well as the angle of and flow conditions in the backwater feature, pallid sturgeon eggs or free embryos in the Yellowstone River would be unlikely to drift into and through the backwater feature and into the diversion structure.

Other factors specific to the various life stages of pallid sturgeon further decrease the entrainment risks relative to the diversion structure, as well as impingement risks. As described in Section 6.2, pallid sturgeon broadcast their eggs into deep and swift-flowing areas near the bed of the river, and these eggs only drift for a short period of time as they are both demersal and adhesive (Chojnacki et al. 2020). The entrainment and impingement risk for fish species with demersal eggs is far lower than those for species with buoyant eggs that remain in the water column longer. Once the eggs hatch and free embryos emerge from the substrate, they drift from 5 to 15 days and up to several hundred miles before settling into the benthic substrates (Braaten et al. 2012, 2022; Mrnak 2019; Chojnacki et al. 2023). During the passively drifting stage, the free embryos would be unlikely to enter that intake and encounter the diversion structure based on its location in a backwater of the Yellowstone River, the distance between the diversion structure and the main channel in the backwater, and the low velocities in the backwater. As

described in Chojnacki et al. (2023) and Mrnak (2019), pallid sturgeon free embryos also exhibit a "swim-up and drift" behavior and negative rheotaxis, which together could facilitate movement toward the higher velocities in the Yellowstone River. Based on the number of days and typical drifting distances of the free embryos, if spawning occurred in the 56 miles of the Yellowstone River between the Yellowstone and Cartersville Diversion Dams, surviving free embryos would passively drift past the backwater feature housing the Colstrip Power Plant diversion for a substantial distance before settling into the substrate to initiate their exogenous feeding and develop self-sustaining swimming capabilities. Therefore, this larval life stage would not be at risk.

While juvenile and adult pallid sturgeon and other fish can become impinged on such screens or could become entrained dependent on mesh size, the larger size of these life stages, combined with the low velocity present in the backwater created by the intake channel, suggest that the swimming abilities of juvenile and adult pallid sturgeon would allow them to avoid the intake of the diversion structure. In addition, juvenile and adult pallid sturgeon are infrequently observed, using lentic off-channel habitats (USFWS 2014) and, thus, would be unlikely to enter the backwater feature at all. While not formally documented, no pallid sturgeon have been observed in the backwater structure even though entering is possible (R. Olsen, Talen Energy, personal communication, November 11, 2024).

As spawning has not been documented above Cartersville Diversion Dam and only a single pallid sturgeon has been observed to date above this dam and in the vicinity of the Colstrip Power Plant diversion, entrainment or impingement of any life stage of pallid sturgeon in the diversion is unlikely to occur during current conditions. The low proportion of total flow withdrawn from the Yellowstone River during spring spawning, combined with the low number of pallid sturgeon expected to successfully navigate the dam and the anticipated spatial patterns in egg and larval drift, all limit the risk of entrainment or impingement in the action area. Continued diversion of water through 2039 would be expected to have an insignificant effect on pallid sturgeon.

CUMULATIVE EFFECTS

Reasonably foreseeable future actions in the action area include the potential for wildland fires to impact riparian areas in the action area and result in contribution of sediment and nutrients/pollutants to the Yellowstone River. Agriculture and irrigation, and the associated diversions, will continue to be a dominant land use in the action area. Natural and anthropogenic changes to flow regime and water quality have the potential to harm pallid sturgeon.

The purchase of the North Wildcat Coulee Wildlife Management Area in Rosebud County was approved in November 2023 (Eggert 2023; State of Montana Newsroom 2024). The intent of this purchase is to expand public access along the Yellowstone River in Rosebud County in the action area to provide additional access to the river for hikers, anglers, hunters, and rafters (Eggert 2023; Lower Yellowstone River Corridor Advisory Committee 2021). Increased recreational use resulting from this purchase could have the potential to adversely affect pallid sturgeon if fishermen are not educated to differentiate between pallid sturgeon, which are not recreationally fished, and shovelnose sturgeon. Fishing regulations in MT require that shovelnose sturgeon more than 40 inches long be released to minimize such occurrences, so effects would be expected to be minimal. In addition, if recreational boating and use increase substantially as a result of this purchase, the increase in activity could disrupt spawning and refuging fish.

An environmental assessment and alternatives analysis has been completed and submitted to Montana Fish, Wildlife and Parks for fish passage over the Cartersville Diversion Dam by MT (Dowl HKM 2010). As noted previously, a telemetered pallid sturgeon was detected upstream of the Cartersville Diversion Dam in 2024 (A. McCullough, USFWS, personal communication, August 19, 2024), but fish passage

over the dam can only occur during certain flow conditions. If construction of a structure that allowed for consistent fish passage over the Cartersville Diversion Dam was completed, the pallid sturgeon range would be extended, with a total distance of 300 miles of the Yellowstone River available to pallid sturgeon and other native fish from the Bighorn River confluence downstream to the mouth (USACE 2015). However, three diversion dams upstream of the Cartersville Diversion Dam are also likely only navigable by pallid sturgeon under certain flow conditions. No recent updates on the status of this Project were publicly available.

INTERRELATED AND INDEPENDENT ACTIONS AND THEIR EFFECTS

Interrelated activities are part of the Proposed Action that depend on the action for their justification, and interdependent activities have no independent utility apart from the action. There are no interrelated or interdependent actions associated with the Proposed Action; therefore, there are no anticipated adverse effects on pallid sturgeon.

EFFECT DETERMINATION

The OSMRE has determined the Proposed Action ***may affect, but is not likely to adversely affect*** the pallid sturgeon. Any potential effects on pallid sturgeon from the Proposed Action would occur from the continued diversion of 69.27 cfs of water from the Yellowstone River up through 2039. No change will occur in the magnitude of the diversion, only an extended duration. Based on multiple flow metrics that were calculated, the diverted water currently accounts for less than 2 percent of the flow in the Yellowstone River in the action area, even in the driest years and months; this would not change if the diversion period were extended to 2039. Average daily fluctuations within the Yellowstone River substantially exceed the amount of water withdrawn. Based on this, while very small changes to streamflows will occur, these would be well within the range of observed variability and, thus, indiscernible. Hydrologic alteration can impact pallid sturgeon through multiple pathways, but all direct and indirect effects on pallid sturgeon from the very small changes in streamflow were determined to be insignificant based on the magnitude of the diversion.

MONARCH BUTTERFLY

DIRECT AND INDIRECT EFFECTS

Mining and associated land clearing and vegetation removal activities could affect monarch butterflies due to foraging habitat loss and potential loss of breeding habitat on approximately 4,288 acres. Foraging habitat for adult monarchs includes a variety of nectar-producing plant species, and foraging habitat for this species is present throughout the action area. Larval food plants, *Asclepias* spp., occur in the grassland, sagebrush, and woody draw vegetation communities (Cedar Creek Associates 2016). If avoidance and minimization measures are not implemented, direct impacts could occur on larval butterflies or larval food plants during land clearing activities. Monarch butterflies could breed in the action area, and milkweeds could be removed in portions of the project area. Individual monarch larvae or eggs could be destroyed if milkweeds are removed during breeding and migration which could result in reduced fecundity or reproductive failure. These direct effects will be avoided because clearing and grubbing activities will occur from September 1 through June 1, avoiding the monarch butterfly active season from June through August (USFWS 2023a). Noxious weeds could also invade areas disturbed by the Proposed Action and degrade habitat. Noxious weeds will be controlled and managed to reduce their spread by timing weed spraying to avoid the monarch butterfly breeding season (June through August), when feasible, and conducting spot spraying to limit impacts on flowering nectar plants. Direct impacts on adult monarch butterflies are unlikely because of the mobility of this species. After reclamation and restoration of plant communities, it is possible that monarch butterfly habitat would be reestablished.

As described above for northern long-eared bats, indirect effects from power plant emissions are unlikely to occur because deposition modeling results (see **Section 4.3, Air Quality** and **Section 4.13.1.2** of the FEIS) indicate that the operation of the Colstrip and Rosebud Power Plants during the project area coal-

combustion period (20 years) would not result in deposition over the Eco-SSLs for invertebrates and, thus, would be unlikely to result in adverse effects on monarch butterflies. Because the deposition of trace metals around the Colstrip and Rosebud Power Plants would not reach 1 percent of the background soil concentrations, would be significantly less than the Eco-SSLs for plants, or would be only a small percentage of the total concentrations (for selenium), the indirect effects from power-plant emissions on vegetation that provides habitat for this species would likely be negligible.

CUMULATIVE EFFECTS

The action area will continue to experience habitat disturbance from mining and from development in the form of roads, houses, and utility lines. Development will reduce habitat, degrade habitat quality (i.e., exotic plants), and/or increase fragmentation of monarch butterfly habitat. Noxious weed introduction from area disturbances is the greatest threat to monarch butterfly habitat. Wildland fires may also temporarily degrade habitat. Revegetation with native nectar plants and milkweeds, if possible, will reduce cumulative effects from the Proposed Action.

INTERRELATED AND INDEPENDENT ACTIONS AND THEIR EFFECTS

Interrelated activities are part of the Proposed Action that depend on the action for their justification, and interdependent activities have no independent utility apart from the action. There are no interrelated or interdependent actions associated with the Proposed Action; therefore, there are no anticipated adverse effects on monarch butterfly.

EFFECT DETERMINATION

OSMRE has determined that the Proposed Action ***will not jeopardize the continued existence*** the monarch butterfly. Potential direct and indirect effects associated with the Proposed Action include: (1) disturbance of foraging habitat on nectar plants and milkweed in the project area from vegetation removal during mining; (2) destruction of larvae or eggs on milkweeds during the breeding season (July through September); (3) potential introduction of exotic plants contributing to habitat degradation; and (4) indirect effects from deposition from power plant emissions. The effects of the Proposed Action on the species are insignificant and discountable because: (1) direct impacts to eggs and larvae will be avoided by implementing timing restrictions on land clearing activities during the monarch breeding season; (2) the total loss of potential monarch butterfly habitat will be approximately 4,288 acres, which is less than 0.4 percent of the available habitat in the action area and is a relatively small part of the species range, which includes a large portion of North America; (3) noxious weeds will be controlled and managed to reduce their spread; (4) seed mixes used during revegetation efforts will include flowering plants and milkweed; and (5) indirect effects on monarch butterflies from power plant emissions are unlikely to occur.

WESTERN REGAL FRITILLARY

DIRECT AND INDIRECT IMPACTS

Direct impacts on western regal fritillary are not expected because suitable tallgrass prairie habitat with an abundance of native violets (*Viola* spp.) does not occur in the project area. Regal fritillary larvae will not survive without the presence and adequate supply of violets (USFWS 2023b). Because of the lack of larval food plants for this species, western regal fritillaries are not likely to breed in the project area, and direct impacts on eggs or larvae are unlikely. In addition, the timing restrictions described above for monarch butterflies will avoid and minimize impacts on any regal fritillary adults, larvae, or eggs, if they were to occur in the project area.

As described above for monarch butterfly, indirect effects from power plant emissions are unlikely to occur because deposition modeling results (see **Section 4.3, Air Quality** and **Section 4.13.1.2** of the FEIS) indicate that the operation of the Colstrip and Rosebud Power Plants during the project area coal-combustion period (20 years) would not result in deposition over the Eco-SSLs for invertebrates and, thus, would be unlikely to result in adverse effects on regal fritillary. Because the deposition of trace

metals around the Colstrip and Rosebud Power Plants would not reach 1 percent of the background soil concentrations, would be significantly less than the Eco-SSLs for plants, or would be only a small percentage of the total concentrations (for selenium), the indirect effects from power-plant emissions on vegetation that provides habitat for this species would likely be negligible.

CUMULATIVE EFFECTS

Reasonably foreseeable future actions in the action area include mining, grazing, agriculture, and private recreational use, primarily hunting. Wildland fires are also likely to occur in the future in the action area and could result in changes to forest structure. While these future activities could affect western regal fritillary directly and indirectly by habitat alteration, the action area contains limited habit for this species, so cumulative effects from these activities in the action area would be insignificant.

INTERRELATED AND INDEPENDENT ACTIONS AND THEIR EFFECTS

Interrelated activities are part of the Proposed Action that depend on the action for their justification, and interdependent activities have no independent utility apart from the action. There are no interrelated or interdependent actions associated with the Proposed Action; therefore, there are no anticipated adverse effects on the western regal fritillary.

EFFECT DETERMINATION

OSMRE has determined that the Proposed Action ***will not jeopardize the continued existence*** of the western regal fritillary. The effects of the Proposed Action on the species are insignificant and discountable because: (1) suitable habitat for the species is not present in the project area; (2) in the unlikely event that the species were to occur, direct impacts on eggs and larvae will be avoided by implementing timing restrictions on land clearing activities during the breeding season; and (3) indirect effects on western regal fritillary from power plant emissions are unlikely to occur.

SUCKLEY'S CUCKOO BUMBLE BEE

DIRECT AND INDIRECT IMPACTS

As previously described, there are no known occurrences of Suckley's cuckoo bumble bee in the action area, and MNHP modeling predicts that the action area is moderate- to low-quality habitat for this species. If Suckley's cuckoo bumble bee were to occur in the action area, mining and associated land clearing and vegetation removal activities could adversely affect the species due to foraging habitat loss and potential loss of breeding habitat on approximately 4,288 acres. Foraging habitat for Suckley's cuckoo bumble bees includes a variety of nectar-producing plant species, and nectar-producing plants are present in the action area as previously described.

The USFWS has not developed recommended conservation measures for this species as of January 2025. Permanent conversion of Suckley's cuckoo bumble bee habitat will be avoided because after reclamation and restoration of plant communities, native vegetation will be reestablished. Direct effects will be avoided because the timing restrictions described above for monarch butterflies will limit clearing and grubbing activities to occur from September 1 through June 1. These timing restrictions will also avoid and minimize impacts on any Suckley's cuckoo bumble bee adults, larvae, and eggs, if they were to occur in the project area. Noxious weeds could also invade areas disturbed by the Proposed Action and degrade habitat. As described above for monarch butterflies, noxious weeds will be controlled and managed to reduce their spread by timing weed spraying to avoid the monarch butterfly breeding season (June through August), when feasible, and conducting spot spraying to limit impacts on flowering nectar plants. These measures would also reduce the possibility of impacts from pesticides on Suckley's cuckoo bumble bee and their principal known hosts, the western bumble bee. Direct impacts on adult Suckley's cuckoo bumble bees are unlikely because of the mobility of this species. The introduction of managed bee colonies has also been identified as a threat to this species from competition and introduction of diseases. To reduce these threats, Westmoreland Rosebud will work with the USFWS to implement additional

conservation measures to protect Suckley's cuckoo bumble bee from impacts of managed bee colonies, when recommendations are developed.

As described above for monarch butterfly and western regal fritillary, indirect effects from power plant emissions are unlikely to occur because deposition modeling results (see **Section 4.3, Air Quality** and **Section 4.13.1.2** of the FEIS) indicate that the operation of the Colstrip and Rosebud Power Plants during the project area coal-combustion period (20 years) would not result in deposition over the Eco-SSLs for invertebrates and, thus, would be unlikely to result in adverse effects on Suckley's cuckoo bumble bee. Because the deposition of trace metals around the Colstrip and Rosebud Power Plants would not reach 1 percent of the background soil concentrations, would be significantly less than the Eco-SSLs for plants, or would be only a small percentage of the total concentrations (for selenium), the indirect effects from power-plant emissions on vegetation that provides habitat for this species would likely be negligible.

CUMULATIVE EFFECTS

The action area will continue to experience habitat disturbance from mining and from development in the form of roads, houses, and utility lines. Development will reduce habitat, degrade habitat quality (i.e., exotic plants), and increase fragmentation of Suckley's cuckoo bumble bee habitat. Noxious weed introduction from area disturbances will also continue to be a threat to habitat. Wildland fires may also temporarily degrade habitat. Revegetation with native nectar plants, if possible, will reduce cumulative effects from the Proposed Action.

INTERRELATED AND INDEPENDENT ACTIONS AND THEIR EFFECTS

Interrelated activities are part of the Proposed Action that depend on the action for their justification, and interdependent activities have no independent utility apart from the action. There are no interrelated or interdependent actions associated with the Proposed Action; therefore, there are no anticipated adverse effects on the Suckley's cuckoo bumble bee.

EFFECT DETERMINATION

OSMRE has determined that the Proposed Action ***will not jeopardize the continued existence*** of Suckley's cuckoo bumble bee. The effects of the Proposed Action on the species will be insignificant and discountable because: (1) there are no records of the species occurring in the action area; (2) if the species were to occur, impacts on eggs and larvae will be avoided by implementing timing restrictions on land clearing activities during the breeding season; (3) the total loss of potential habitat will be approximately 4,288 acres, which is less than 0.4 percent of the available habitat in the action area and is a relatively small part of the species' range, which includes a large portion of North America; (4) noxious weeds will be controlled and managed to reduce their spread, and pesticide use will be carefully targeted to reduce the possibility of impacts from pesticides on Suckley's cuckoo bumble bee and their principal known hosts, the western bumble bee; (5) seed mixes used during revegetation efforts will include flowering plants; (6) USFWS-recommended measures will be implemented to reduce risks from managed bee populations; and (7) indirect effects on the species from power plant emissions are unlikely to occur.

8.2 EFFECTS DETERMINATION SUMMARY

Table 6 summarizes the effects determination for listed species from the Proposed Action. Consultation with the USFWS will occur to gain concurrence on these effects.

Table 6. Effects determination summary for the Proposed Action.

Species	Status	Determination of Effects[1]
Northern long-eared bat	Endangered	NLAA
Pallid sturgeon	Endangered	NLAA
Monarch butterfly	Threatened	NLAA
Western regal fritillary	Proposed Threatened	NJ
Suckley's cuckoo bumble bee	Proposed Endangered	NJ

[1] ESA determinations: NLAA = May affect, not likely to adversely affect; NJ = Will not jeopardize the continued existence.

9.0 NEED FOR REASSESSMENT BASED ON CHANGED CONDITIONS

This BA and the findings above are based on the best current data and scientific information available. A new analysis and revised BA must be prepared if one or more of the following occurs: (1) new species information (including, but not limited to, a newly discovered activity area or other species information) reveals effects on threatened, endangered, proposed, or candidate species or designated/proposed critical habitat in a manner or to an extent not considered in this BA; (2) the action is subsequently modified or it is not fully implemented as described herein, which causes an effect that was not considered in this BA; or (3) a new species is listed or critical habitat is designated that may be affected by the action that was not previously analyzed herein. Westmoreland (or any subsequent owner), OSMRE, and USFWS will meet at least once every 4 years (either in-person or virtually) to discuss any changes in the status of pallid sturgeon and other listed species, any changes in power plant or mine operations, or any other new information that might warrant an update to this effects analysis. Any of the parties may also request an ad hoc meeting if they become aware of new information warranting discussion.

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Montana Ecological Services Field Office
585 Shephard Way, Suite 1
Helena, MT 59601-6287
Phone: (406) 449-5225 Fax: (406) 449-5339

In Reply Refer To: 05/01/2025 18:15:58 UTC
Project Code: 2024-0146259
Project Name: Rosebud Area F

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological

evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

https://www.fws.gov/sites/default/files/documents/endangered-species-consultation-handbook.pdf

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts, see https://www.fws.gov/program/migratory-bird-permit/what-we-do.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures, see https://www.fws.gov/library/collections/threats-birds.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/partner/council-conservation-migratory-birds.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Bald & Golden Eagles
- Migratory Birds
- Wetlands

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Montana Ecological Services Field Office
585 Shephard Way, Suite 1
Helena, MT 59601-6287
(406) 449-5225

PROJECT SUMMARY

Project Code: 2024-0146259
Project Name: Rosebud Area F
Project Type: Subsurface Extraction - Coal
Project Description: Coal mining
Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@45.94829815,-106.76004789012468,14z

Counties: Montana

ENDANGERED SPECIES ACT SPECIES

There is a total of 5 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Endangered

FISHES

NAME	STATUS
Pallid Sturgeon *Scaphirhynchus albus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7162	Endangered

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9743	Proposed Threatened
Suckley's Cuckoo Bumble Bee *Bombus suckleyi* Population: No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10885	Proposed Endangered
Western Regal Fritillary *Argynnis idalia occidentalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/12017	Proposed Threatened

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

BALD & GOLDEN EAGLES

Bald and Golden Eagles are protected under the Bald and Golden Eagle Protection Act [2] and the Migratory Bird Treaty Act (MBTA) [1]. Any person or organization who plans or conducts activities that may result in impacts to Bald or Golden Eagles, or their habitats, should follow appropriate regulations and consider implementing appropriate avoidance and minimization measures, as described in the various links on this page.

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1. The Bald and Golden Eagle Protection Act of 1940.
2. The Migratory Birds Treaty Act of 1918.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

There are Bald Eagles and/or Golden Eagles in your project area.

Measures for Proactively Minimizing Eagle Impacts
For information on how to best avoid and minimize disturbance to nesting bald eagles, please review the National Bald Eagle Management Guidelines. You may employ the timing and activity-specific distance recommendations in this document when designing your project/ activity to avoid and minimize eagle impacts. For bald eagle information specific to Alaska, please refer to Bald Eagle Nesting and Sensitivity to Human Activity.

The FWS does not currently have guidelines for avoiding and minimizing disturbance to nesting Golden Eagles. For site-specific recommendations regarding nesting Golden Eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

If disturbance or take of eagles cannot be avoided, an incidental take permit may be available to authorize any take that results from, but is not the purpose of, an otherwise lawful activity. For assistance making this determination for Bald Eagles, visit the Do I Need A Permit Tool. For assistance making this determination for golden eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

Ensure Your Eagle List is Accurate and Complete
If your project area is in a poorly surveyed area in IPaC, your list may not be complete and you may need to rely on other resources to determine what species may be present (e.g. your local FWS field office, state surveys, your own surveys). Please review the Supplemental Information on Migratory Birds and Eagles, to help you properly interpret the report for your specified location, including determining if there is sufficient data to ensure your list is accurate.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to bald or golden eagles on your list, see the "Probability of Presence Summary" below to see when these bald or golden eagles are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Dec 1 to Aug 31
Golden Eagle *Aquila chrysaetos* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1680	Breeds Dec 1 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

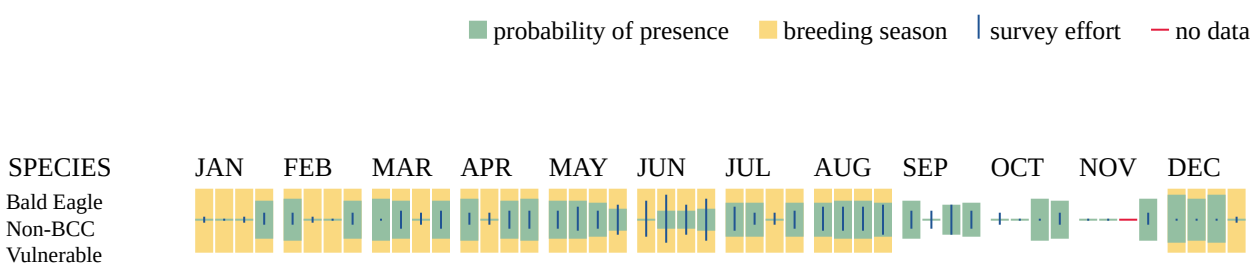
Probability of Presence (■)

Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

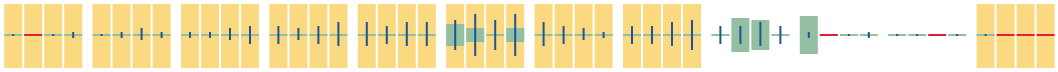
Breeding Season (■)
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (–)
A week is marked as having no data if there were no survey events for that week.



Golden Eagle
Non-BCC
Vulnerable



Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

MIGRATORY BIRDS

The Migratory Bird Treaty Act (MBTA) [1] prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the Department of Interior U.S. Fish and Wildlife Service (Service). The incidental take of migratory birds is the injury or death of birds that results from, but is not the purpose, of an activity. The Service interprets the MBTA to prohibit incidental take.

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1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the "Probability of Presence Summary" below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Baird's Sparrow *Centronyx bairdii* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/5113	Breeds May 20 to Aug 15
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Dec 1 to Aug 31

NAME	BREEDING SEASON
Black Tern *Chlidonias niger surinamenisis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3093	Breeds May 15 to Aug 20
Black-billed Cuckoo *Coccyzus erythropthalmus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399	Breeds May 15 to Oct 10
Bobolink *Dolichonyx oryzivorus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9454	Breeds May 20 to Jul 31
California Gull *Larus californicus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10955	Breeds Mar 1 to Jul 31
Ferruginous Hawk *Buteo regalis* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/6038	Breeds Mar 15 to Aug 15
Franklin's Gull *Leucophaeus pipixcan* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10567	Breeds May 1 to Jul 31
Golden Eagle *Aquila chrysaetos* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1680	Breeds Dec 1 to Aug 31
Grasshopper Sparrow *Ammodramus savannarum perpallidus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/8329	Breeds Jun 1 to Aug 20
Lark Bunting *Calamospiza melanocorys* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9451	Breeds May 10 to Aug 15
Lesser Yellowlegs *Tringa flavipes* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere

NAME	BREEDING SEASON
Mountain Plover *Charadrius montanus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3638	Breeds Apr 15 to Aug 15
Northern Harrier *Circus hudsonius* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/8350	Breeds Apr 1 to Sep 15
Pinyon Jay *Gymnorhinus cyanocephalus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9420	Breeds Feb 15 to Jul 15
Prairie Falcon *Falco mexicanus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/4736	Breeds Mar 1 to Jul 31
Red-headed Woodpecker *Melanerpes erythrocephalus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9398	Breeds May 10 to Sep 10
Thick-billed Longspur *Rhynchophanes mccownii* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/11901	Breeds May 1 to Aug 15
Western Grebe *aechmophorus occidentalis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/6743	Breeds Jun 1 to Aug 31
Willet *Tringa semipalmata* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10669	Breeds Apr 20 to Aug 5

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

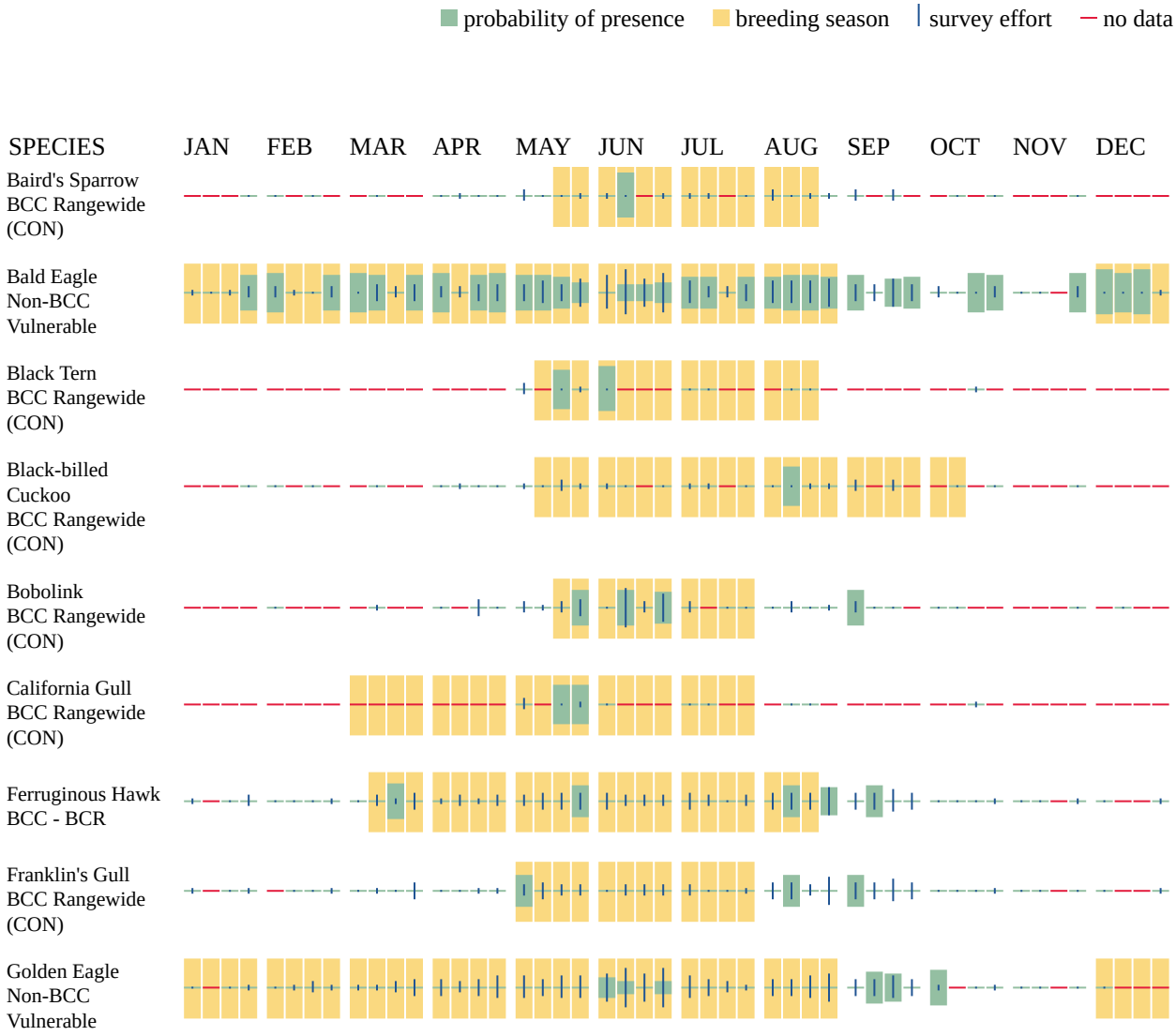
Probability of Presence (■)

Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (▪)
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (–)
A week is marked as having no data if there were no survey events for that week.



Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

WETLANDS

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

Due to your project's size, the list below may be incomplete, or the acreages reported may be inaccurate. For a full list, please contact the local U.S. Fish and Wildlife office or visit https://www.fws.gov/wetlands/data/mapper.HTML

FRESHWATER POND

- PABGb
- PABFh
- PABKx
- PABGh
- PABF
- PABFx
- PABFb

FRESHWATER EMERGENT WETLAND

- PEM1A

LAKE

- L1UBHh
- L2UBFh
- L1UBKx

IPAC USER CONTACT INFORMATION

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Zip:	80225
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