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The Chemical Company

2005 Mine Reclamation for Wildlife Summit

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BASF Pro VM Specialist

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BASF Environmental Resource Specialist

www.vmanswers.com

Journey herbicide

Agricultural Products

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Best Management Practices for Creating an Elk Landscape

PLANTED

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Proper No-till Seed Bed

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No-till Results

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Purdue Wildlife Area 1YAT

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No-till NWSG into Good Soil Structure

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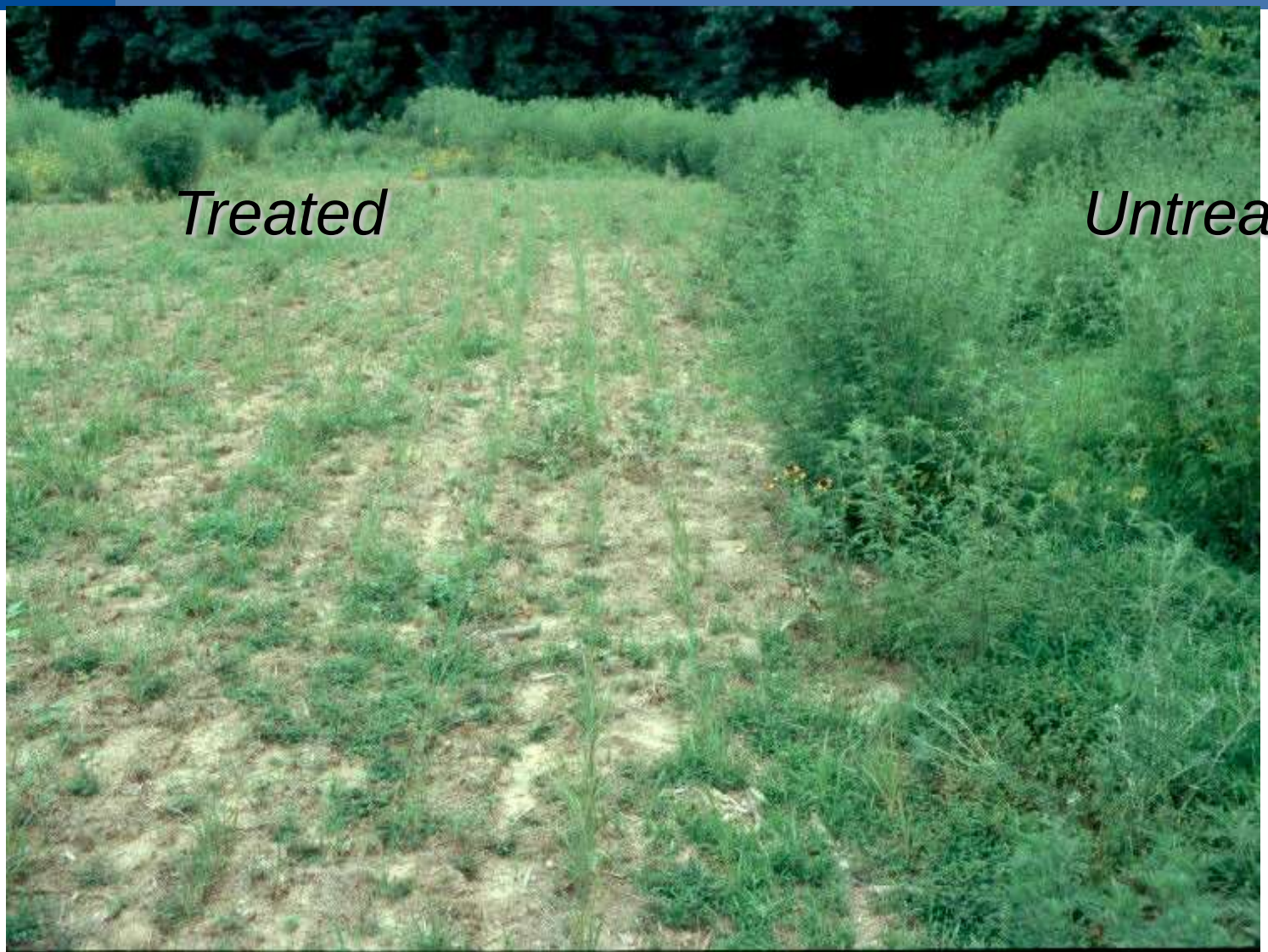
Control With 22 Ounce Rate of Journey



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Quality Native Grass Seedstock is a Must !!

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Spray Regrowth

POLARIS
Journey
herbicide

Journey™ herbicide

- ✓ **Combination of glyphosate and imazapic**
- ✓ **New haying and grazing verbiage to be added**
- ✓ **Provides residual for straight glyphosate users**
- ✓ **Provides applicators with an alternative to Plateau applications on non-governmental properties.**

Recommended Herbicide Mix

Use 10.7 to 32 ounces* Journey per acre

+ 16-32 oz. of glyphosate per acre
+ 1 quart of methylated seed oil per acre
+ 1 quart 28-0-0 liquid nitrogen fertilizer per acre or ammonium sulfate @17 pounds per 100 gallons of water.

Use a 10 to 25 gallon per acre spray rate.

*Depending upon seed mix to be planted. See Journey label for specific recommendations.

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Journey herbicide

Journey = Plateau + glyphosate					
Amount of Product			Amount of Active Ingredient		
Journey Rate product/A)	Plateau equivalent product/A)	Roundup Pro equivalent	Imazapic acid (lb)	Glyphosate isopropylamine salt (lb)	Glyphosate acid (lb)
4.0	1.5	2.0	0.023	0.063	0.047
5.3	2.0	2.7	0.031	0.084	0.063
8.0	**3.0**	**4.0**	0.047	0.125	0.094
10.0	3.8	5.0	0.059	0.156	0.117
10.7	4.0	5.3	0.063	0.166	0.125
12.0	**4.5**	**6.0**	0.070	0.188	0.141
16.0	6.0	8.0	0.094	0.250	0.188
20.0	7.5	10.0	0.117	0.313	0.234
21.3	8.0	10.7	0.125	0.334	0.250
24.0	**9.0**	**12.0**	0.141	0.375	0.281
26.7	10.0	13.4	0.156	0.419	0.313
28.0	10.5	14.0	0.164	0.438	0.328
32.0	**12.0**	**16.0**	0.188	0.500	0.375

Journey herbicide

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Glyphosate vs Plateau for Tall Fescue Eradication

Percent Tall Fescue Remaining Following Treatment

	Glyphosate	Plateau
Spray rate per acre	2 qts.	12 ozs. + MSO + 1 qt. 28%
Ave. across 10 sites	5.7%	1.6%
Comments	Tall fescue eliminated at 5 of 10 sites	Tall fescue eliminated at 8 of 10 sites

Applications were evaluated at 5 MAT.

Source: Barnes, T.G. and Washburn, Brian W., Eradicating Tall Fescue with Herbicide, Quail Unlimited Magazine

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Native Grass Stand 14 Weeks After Planting

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Native Grass/Forb Planting in First Growing Season

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Recommended Journey Rates for Weed Control

- **Rates vary by geography, weed pressure and soil type.**
  - 10.7 oz/a maximum rate when planting with forbs or legumes.
  - 10.7 – 32 oz/a in central & eastern corn belt and southeast.
  - 5.5 – 10.7 oz/a in western and plains states.
  - Use 5.5 oz rate on sandy, high pH soils in cool dry sites.
  - Use 22 – 32 oz/a in warmer, higher rainfall areas.
- **General rule of thumb:**
  - Lighter soil, lower rainfall, low weed pressure – Lower rate.
  - Heavy soil, higher rainfall, high weed pressure – Higher rate.

Consult the Journey label for specific recommendations.

In Summary, for Best Results

- **Plant in the spring/early summer with soil temperature above 65**
- **Use only high quality seed**
- **Plant into good soil structure**
- **To kill cool season grass sod:**
  - Spring burn
  - Apply Journey after 4 inches or more regrowth of vegetation
- **When no-till planting, remove residual accumulated litter, burning is best**
- **Pray for Rain**

Journey herbicide

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BASF appreciates your Support

Jeff Jarrett
Remarks
Reclaim the Future

Thanks for allowing me to speak to you this morning. It truly is my privilege to be here representing the Office of Surface Mining at this exciting event and I want to personally thank each and every one of you for attending. It is always good to see people I have worked with over the years, people I know well, people who have helped bring mine reclamation into the century.

Many of those people are here today but something else I noticed about this meeting is the number of new faces – all interested in the reclamation of mined land - that are here to exchange ideas. It is a pleasure to meet you, I welcome your input and I look forward to working with you!

At the Office of Surface Mining, we are tasked with implementing the Surface Mining Control and Reclamation Act of 1977 (SMCRA). In that Federal law, Congress gave us the task of implementing, through our State and Tribal Primacy partners, a complex mission: to strike a balance between the Nation's demand for coal as an essential energy source and the protection of the environment. Through that mission, Congress wanted to ensure that mining is a temporary use of the land and that following mining, the land is put to equal or better economic or public use.

As we look back over the past 28 years, you can't help but recognize the tremendous strides that have been made in coal mining and reclamation. Today, good reclamation is the standard and great reclamation is common place. Over the years, OSM has recognized operators who have taken innovative or extra steps to reclaim areas to post mining land uses which created sustainable environments and long-term benefits for the landowners and the local areas. Competition for our annual reclamation awards is fierce and highly coveted. Operators have recognized the value in being good neighbors.

Now, we see an opportunity to build upon these successes and take reclamation practices to the next level – an opportunity to change the way we look at reclamation and thereby the way we look at coal mining.

Typically, when a coal field community sees an operator come in to extract the minerals, the community appreciates the jobs and other economic stimulus brought into the local economy. Yet, the citizens know that once the energy mining created is used and the jobs it created are gone, the hope is that "nothing bad happened" to their community.

What if we could break that cycle? What if we could shift the paradigm from fearing what might be left to "Look at what we will be left with!" Put most simply, if we are turning the earth upside down, why not use this opportunity to create what we want?

We, the federal, state and tribal governments, coal operators, landowners, communities, and citizens who care about the environment, need to promote improved post-mining land uses in general, that will ensure that mine reclamation results in a sustainable environment, economy, and society. Collectively, we call this effort "Reclaiming the Future."

In furtherance of this effort, we have started looking at various post-mining land uses to determine whether our regulatory framework sufficiently encourages or creates unnecessary barriers to establishing the necessary variety of post-mining land uses, including creating high quality fish and wildlife habitat. For example, we recently evaluated our revegetation rules and realized that we might be discouraging the growth of trees and diverse plant life that make for good habitat.

When SMCRA was passed in 1977, the emphasis for reclamation was on correcting problems associated with stability and reduced rates of agricultural productivity. As a result of this emphasis, much of the reclamation that has been done to date has been for agricultural purposes involving significant grading and soil compaction and the establishment of fast vegetative cover designed to control erosion. The assumption was that if you reclaim sufficient to grow crops, it's going to be good enough to do anything else you would want to do with the land.

Now, almost 30 years later, we know that's not the case. The soil reconstruction you do for crops is different from what you would do for tree growth – the vegetation you need for agricultural purposes is different from the kind of plant diversity you would need for fish and wildlife habitat. Our rules don't provide incentives for coal operators or land owners to make the extra effort to condition the land and make it a desirable and self-sustaining habitat where diverse plants and animals can thrive. To address these deficiencies, we recently updated our revegetation rules and launched a new partnership to restore forests.

We need to start thinking about habitat from the ground up. If we're talking about "wildlife habitat," then let's talk about what kind of wildlife we want. Then we can talk about what's needed to sustain that habitat, like water, food and shelter. Then you have to step back from that and ask what do we need to do in terms of soil reconstruction and other measures to provide the needed habitat?

That's one of the things we're trying to accomplish with the changes we've proposed in our revegetation rule. You need diversity out there on the landscape. You need trees for shelter. You need vegetative cover for food. That dictates that you don't want uniform soil redistribution or monolithic culture like a soybean field rather than the diversity you need for fish and wildlife habitat.

Heretofore we've inadvertently stove-piped the choices available in post-mining land uses, pretty much forcing operators and landowners to choose just one use. Even if we have multiple uses on one site, we say "This over here is going to be reforestation and that over there is going to be wildlife habitat, this will be a park and that over there will be for recreation."

When we segregate post-mining land uses like that we're not paying attention to what we mean by fish and wildlife habitat. If we recreate a forest, isn't that wildlife habitat for something? The Fish and Wildlife Service says one of the things black bears need is vast contiguous areas of trees. So reforestation can also be habitat. So if we're working toward reforestation as a post-mining land use, we need to also have in mind a secondary focus of some kind of wildlife habitat which would guide us in better defining what we mean by "reforestation."

We already talk in generalities about creating “fish and wildlife habitat.” What I want us to start doing is thinking about what kind of fish, what kind of wildlife – what are their separate habitat needs? What elk need is different from what gamebirds need, which is different from what black bears need.

I want us to start addressing those issues. They’re issues that the states and the industry should be thinking about. And they should be working with communities and land owners to try to accommodate their wishes in post-mining land use.

We’re not talking about eliminating or reducing requirements. We’re talking about focusing those requirements more toward what we want to achieve – keeping in mind that the ultimate decision on post-mining land use is the land-owner’s and we’re not going to infringe on those rights. But, these days most of the land owners are coal companies or land-holding companies and we think those land-owners are willing to work with local communities.

After all, stewardship is everyone’s job. Certainly we don’t have the regulatory authority, or the interest, to dictate what specific post mining land use will be, but I think that together we have a responsibility as stewards over this aspect of land use to involve communities with land owners at an early point in the mining process to try and get a mutually beneficial result when mining is finished.

It’s our vision to see us stop thinking of reclamation as some kind of chore we have to do after mining. We ought to do more imagining about the possibilities. Look at it this way ….. mining creates the opportunity to put that land to the best possible use ….. for today and for the future. That’s what we’re getting at, “Reclaiming the Future.”

I don’t think we’re at the point yet where we know all the answers. But we are starting to ask the right questions. As we see it, the challenge is not just creating wildlife habitat; it’s bringing together the partners to make it happen – mining companies, private landowners, regulatory authorities, communities, academics, fish and wildlife experts. Its about asking how do we get organized to look at these issues and find out what impediments we may have created, how can we remove them and how to put some incentives in their place to give operators and landowners a reason to want to move beyond the pastureland into creating diverse, thriving habitat for wildlife?

While I may be biased, I think OSM is probably in the best position to bring the necessary people together to do it right. It’s not dissimilar from our reforestation initiative. Over time we realized that we needed to take a close look at our reforestation program and see if the law, regulations or our actions were creating impediments, what those impediments were and how to come up with new and better ways to have success in growing trees. To do that we tapped into the mining industry’s and regulatory authorities’ expertise- because they’re the ones who have to do it and had hands on experience with what works and doesn’t work. We contacted academics and environmental and conservation organizations who were in the best position to do research and identify the problems and suggest solutions.

When it comes to wildlife habitat the real expertise is in the fish and wildlife community. So this conference is to bring them into the fold. We have numerous fish and wildlife agencies and entities represented here who have something to say and advice to give us about the way we should approach this, the thought process we should go through and the technical expertise

we and the mining industry will need to develop to be successful. We look forward to that dialogue.

There's a better way to reclaim the land and that better way is giving more thought and planning to precisely what we're trying to accomplish and taking in to account not just the legal requirements for reclaiming the land, but to give more thought to what it is we really want to create for the future.

I think a culture shift is already occurring. There are a lot of great examples across the country in which the industry has worked with land owners and local communities to reclaim for wetlands, forests, commercial and recreational uses. By thinking about all the possibilities at a given reclamation site we have the opportunity to leave something for the land owner and the community. This initiative, and this meeting, is to put more focus and emphasis on what those possibilities are and to develop both a structure and a network of expertise that supports continuing advances in reclamation.

I am looking forward to the day's events and to the day when everyone recognizes that reclamation is not a chore; it's an opportunity – one we can't afford to squander!

-30-

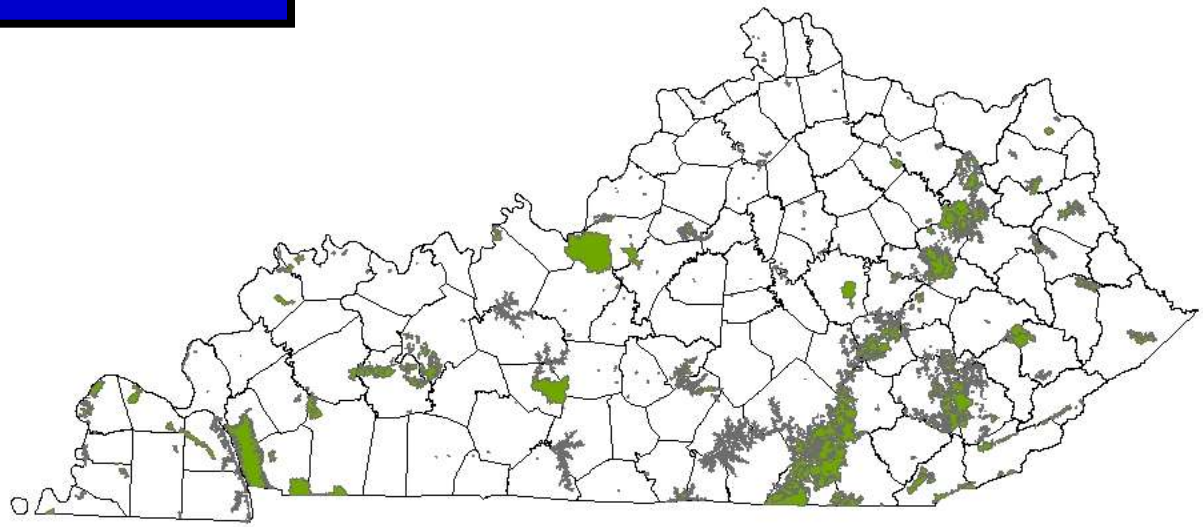
Partnerships, Incentives, and Wildlife Management on Kentucky's Mined Lands

Mission Statement

We are the stewards of Kentucky's fish & wildlife resources and their habitats. We manage for the perpetuation of these resources and their use by present and future generations. Through partnerships, we will enhance wildlife diversity and promote sustainable use, including hunting, fishing, boating and other nature related recreation.

Kentucky is 94% Privately Owned

Kentucky Contains 26 Million Acres



Private Land = 24.4 Million Acres

Public Land = 1.6 Million Acres

KDFWR Biologists Assist Kentucky Landowners

- Habitat Improvement Program
- Conservation Reserve Enhancement Program
- KY Business Conservation Partners
- Partners for Wetland Wildlife
- Buffers for Bobwhites
- Appalachian Wildlife Initiative

Partnerships are Critical to Our Mission

- DU, NWTF, RMEF, QU, TU, TNC, Audubon…
- East KY Power
- American Electric Power
- Peabody Coal
- KY Business Conservation Partners
- And many others

Wildlife Needs Green Space

Kentucky Loses 47,000 acres/year

- Riparian corridors
- Wetlands
- Forestlands

Wildlife Management Needs Sportsmen & Women

- 149,000 Kentucky citizens didn't fish
- 128,000 Kentucky citizens didn't hunt
- 18,300 Kentucky citizens didn't watch wildlife
- While stable now, we've lost 2%/year since 1988

BECAUSE THEY HAD NO PLACE TO GO!

2000 Bluegrass Poll

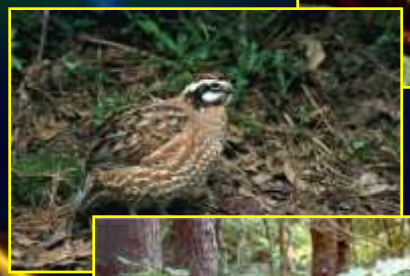
Coal Field Lands Offer Landscape Level Wildlife Habitat Opportunities

Mined Lands Support Tremendous Wildlife Diversity

- Neotropical migrant songbirds
- Popular native wildlife
- Restored species
- Rare animals

Peabody Wildlife Management Area

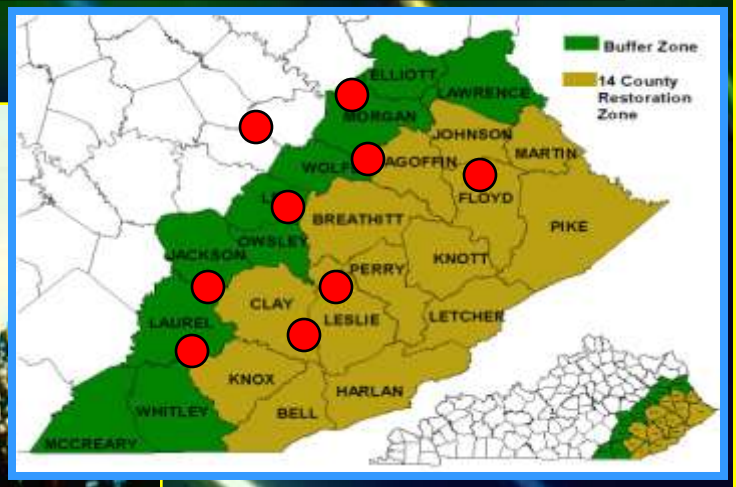
"Kentucky's Largest WMA"



Starfire WMA

- Fishing
- Hunting
- Wildlife Watching
- Demo Coal Mine
- Forestry Research
- Wildlife Research
- Water Quality Research

The Beginning of KY's Elk Restoration Project: 12/17/1997



Technical Reclamation Memorandum (TRM 21)

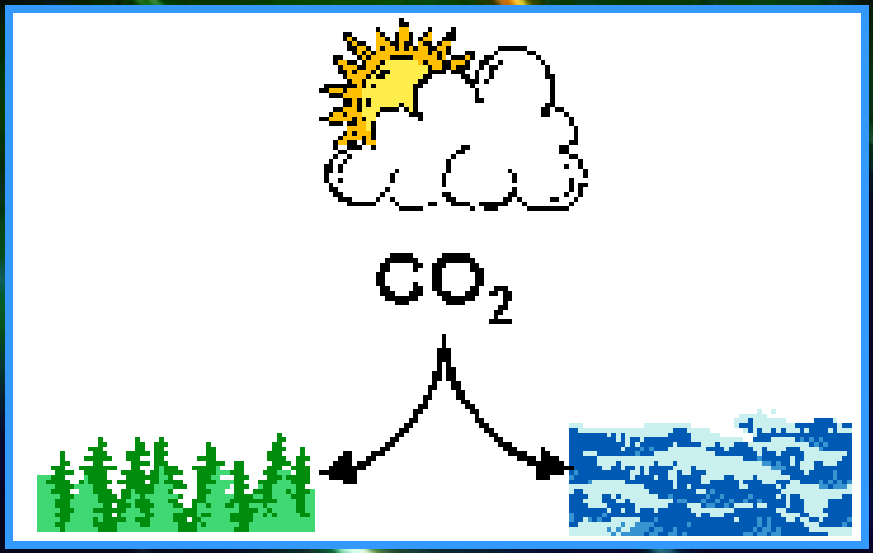
- Joint Product: KDFWR, DNR, SMRE, & Forestry
- Guidance for "Fish & Wildlife Option"
- Needs to be more "user-friendly"
  - wildlife grasses, shrubs, & trees
  - wildlife planning on the front end
  - cost-share incentives
  - recognition of good stewards

Reclamation Advisory Memorandum (RAM 124)

- TRM group + U.S.OSM, UK Extension, Industry & NGOs
- Guidelines to establish commercial forests
- Reduces excessive compaction
  - promotes tree growth
  - reduces run-off

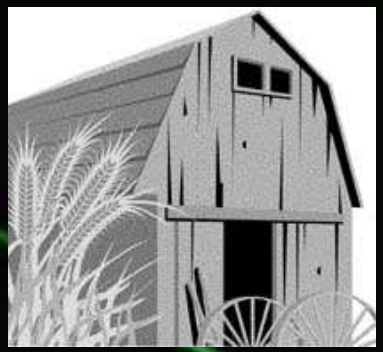
Carbon Sequestration

- Partnership to acquire lands & plant forests
- Carbon “credits” for public land.
- 5 WMAs involved
- 1,030 acres of new forest
- 70-year agreements



Sustainable Use: Incentives for Good Land Stewardship

- Pillar of KDFWR Mission & North American Model for Wildlife Management
- Science says: “Can’t stockpile wildlife”
- Habitat loss = wildlife & recreation loss



Farm Bill Strategy
("Food Security Act")

- USDA's Farm Bill = billions for wildlife habitat
- Relatively stable long-term funding
- Broad support from taxpayers, farmers, sportsmen, & environmentalists
- Enhances wetlands, grasslands, forests, & crop field edges
- Dollars for farmers because affordable food is vital to citizen well-being.
- Isn't affordable energy of similar importance?

Mined Lands Conservation Program? ("Energy Security Act")

- Promote proven wildlife habitat reclamation
- Provide economic incentives for stewardship
- Recognize wildlife-friendly operators
- Provide incentives to allow public use

Final Thoughts

- Wildlife needs ample, connected habitat at the landscape scale.
- Need user-friendly reclamation laws that benefit the Industry and create fish & wildlife habitat.
- Carbon Sequestration holds promise, but we need more tools in the tool box.
- Industry needs incentives (perhaps a Farm Bill approach) to make it cost-effective to do wildlife friendly reclamation.

The Importance of Wildlife Habitat as a Post-Mining Land Use for State Wildlife Agencies

Surface mining reclamation offers wildlife managers the ultimate opportunity to practice habitat development for wildlife enhancement. More importantly it gives the designer of the reclamation plan an opportunity to have an impact on habitat development on large expanses of mostly privately owned property. Through better reclamation we would hope to increase wildlife utilization of mined areas and reduce impacts to aquatic resources while meeting regulatory criteria.

West Virginia has over 100 billion tons of recoverable bituminous coal with reserves found in 44 of the state's 55 counties. As early as the 1800's West Virginia was one of the nations top coal producing areas with the majority of the coal coming from deep mining activities. It wasn't until after World War II that strip mining using the contour method began to be utilized. As an extension of contour mining mountaintop removal or area mining gained popularity in the 80's. West Virginia annually accounts for about 16 % of the nation's coal production. Land use estimates in 2000 found that over 300,000 acres have been disturbed by some type of mining activity. A portion of this was pre-SMRCA and had no form of reclamation. Current WVDEP permit records indicate that since SMRCA was passed there has been over 300,000 acres of land permitted to be mined. The majority (over three quarters) of current permitted mining activity takes place a 14 county region of the state that lies in the Appalachian Plateau of south and southwestern West Virginia. This portion of the state is almost entirely in private ownership dominated by large land holding companies and is nearly 90% forested. The average size for current mining operations fall into the 400-700 acre range

with the larger mountaintop mines averaging just over 1,700 acres. Although leasing of these private lands has increased in recent years the majority of this area is considered open to public hunting.

There are numerous private land wildlife initiatives by both state and federal wildlife agencies. These programs are mostly aimed at private landowners, usually small farmers, and include some sort of monetary incentives. These programs are normally limited in scope and are restricted by budgetary restraints. Since the mining region is nearly 90 % forested and has very little agriculture these programs are not very active in this region.

With over 300,000 acres of land having been permitted in WV alone it is obvious to see the potential for wildlife habitat development during reclamation. This potential was realized by our agency after the passing of SMRCA in 1977 and resulted in the formation of our Mining Coordination Program in 1981. This program which will be described later in today's program was designed to promote wildlife habitat on reclaimed mined lands. To date we have designed wildlife revegetation plans for over 160,000 acres of mined lands. Unfortunately it is impossible to tell exactly how much of this has been implemented. Perhaps more unfortunately is the fact that recent influences have resulted in companies choosing wildlife less often as a post mining land use. The program began by averaging 12-13,000 acres a year but has fallen to averaging around 5,000 acres yearly. We feel that this has been the result of a lack of understanding rather than a genuine problem with wildlife reclamation. Past plans have been limited by regulatory and implementation constraints and the resulting plans have admittedly been

less than ideal but better than the open grassland alternatives that were often chosen in the 70's, 80's, and early 90's.

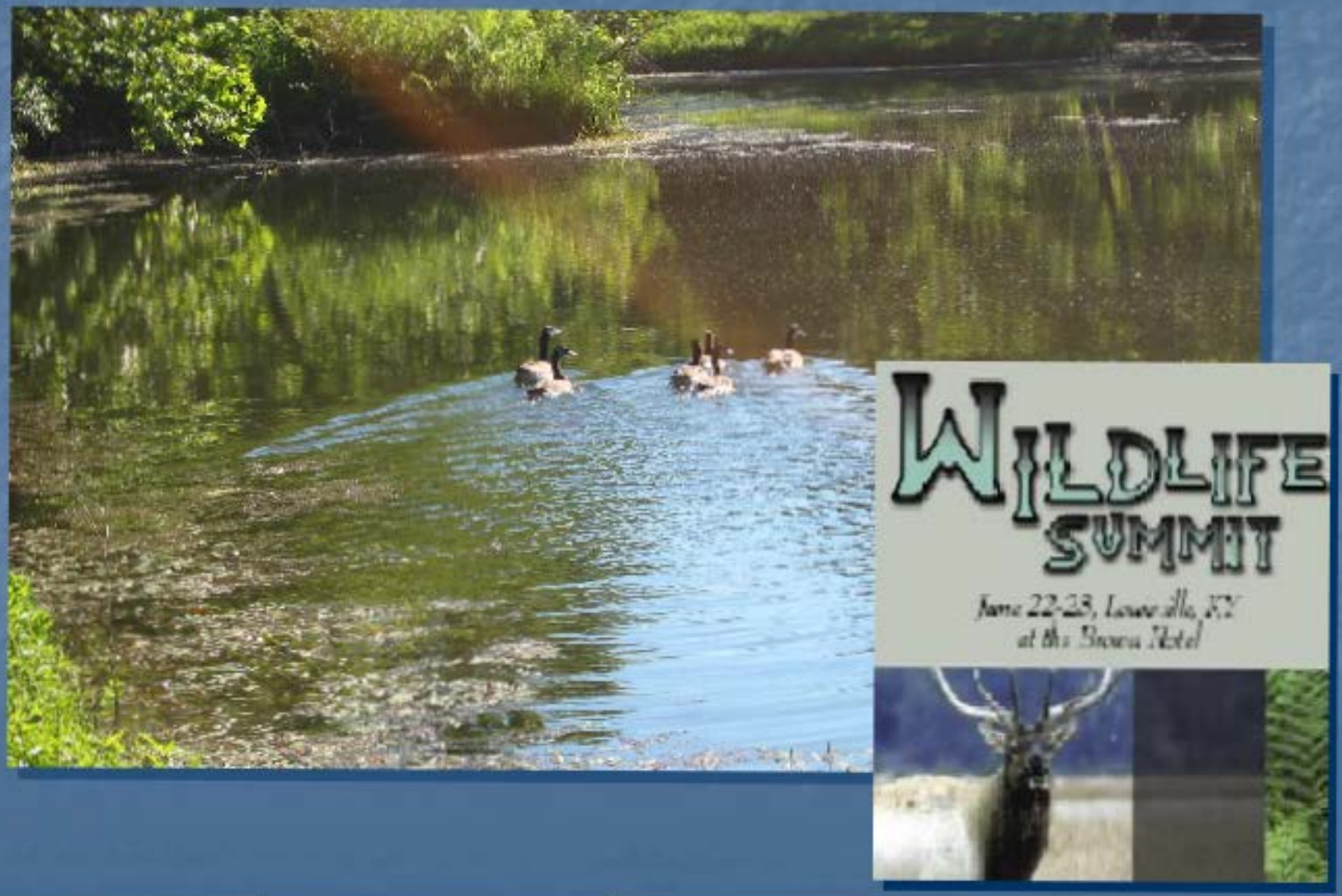
Our agency manages over 1.4 million acres in the state for public use but only a small % of this lies in the coal region and very little of it gives us the opportunity to impact wildlife habitat like reclamation on a mined site. Participation in hunting and fishing by the public is critical to any state agencies well being. With increased job pressures and increased travel cost it is imperative that we make quality hunting and fishing as easily available as possible to all the sporting public. The ability to improve open private land for wildlife becomes increasingly important when it comes to retaining our participants. The start from scratch opportunity that exists on a mine gives the biologist the ability to design reclamation plans that can be species specific and limited only by his /her imagination. The fact that this will be done on private land where we would other wise be unable to affect change on such a large scale is significant. Recent changes in reclamation practices have allowed us to improve wildlife plans. This improvement is only the first step: now we can only hope that meetings like this will once again bring wildlife habitat to the top of the reclamation list.

WILDLIFE RECLAMATION OPPORTUNITIES
FIVE DECADES OF DIVERSITY

Jack Nawrot
Senior Scientist

Coop Wildlife Research Lab
Southern Illinois University
Carbondale Illinois

MINED LAND RECLAMATION: OPPORTUNITIES FOR FISH AND WILDLIFE HABITAT ENHANCEMENT


WILDLIFE
SUMMIT
June 22-23, Louisville, KY
at the Brown Hotel

PYATTS RESEARCH AREA
1954

PYRAMI
STATE PAR

Report on a Survey of Potential Recreational Utilization of Illinois Strip-Mined Lands

STRIP-LAND WILDLIFE RESEARCH AREA

COOPERATORS

Cooperative Wild Life Research Laboratory

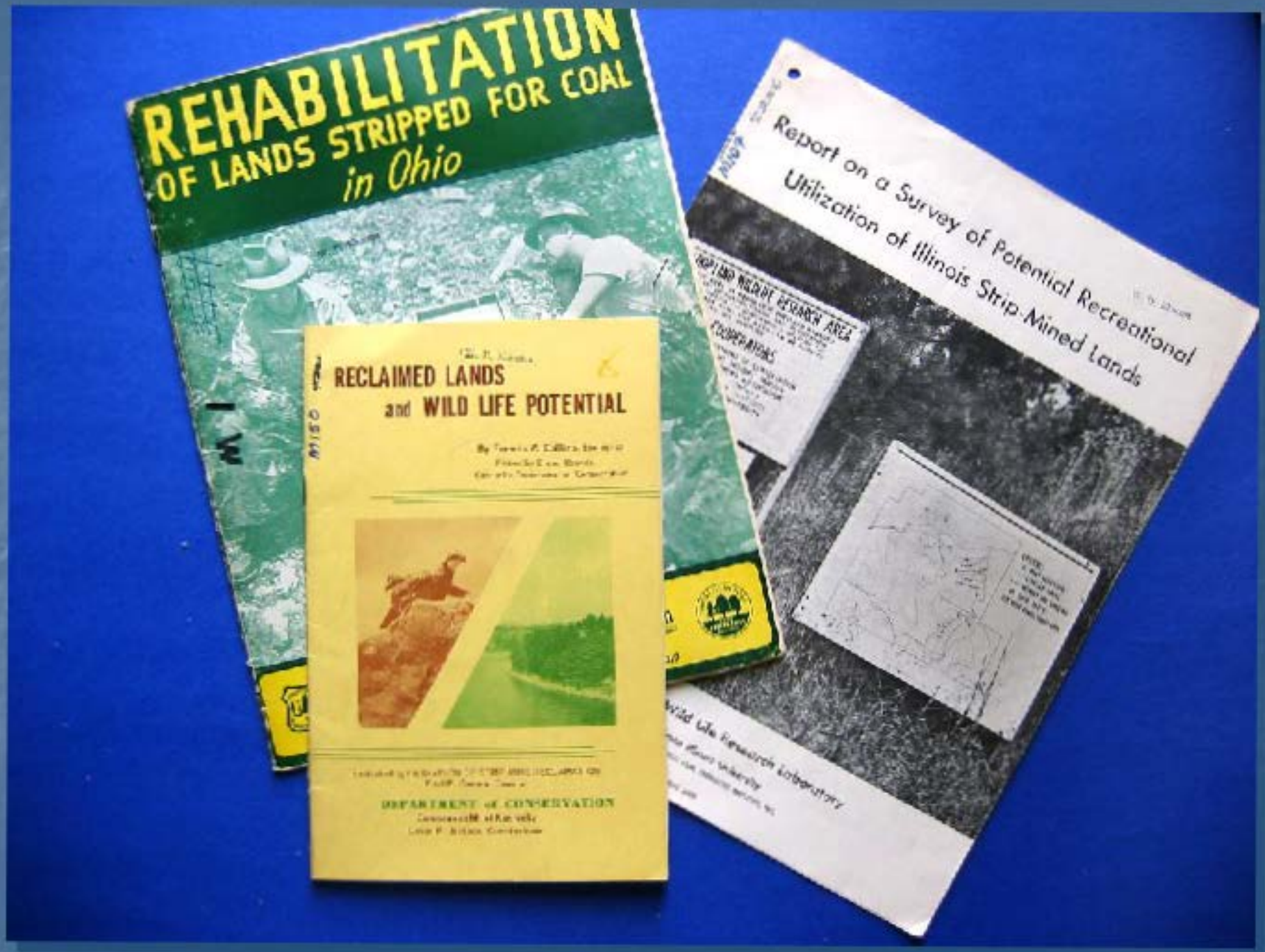
Southern Illinois University

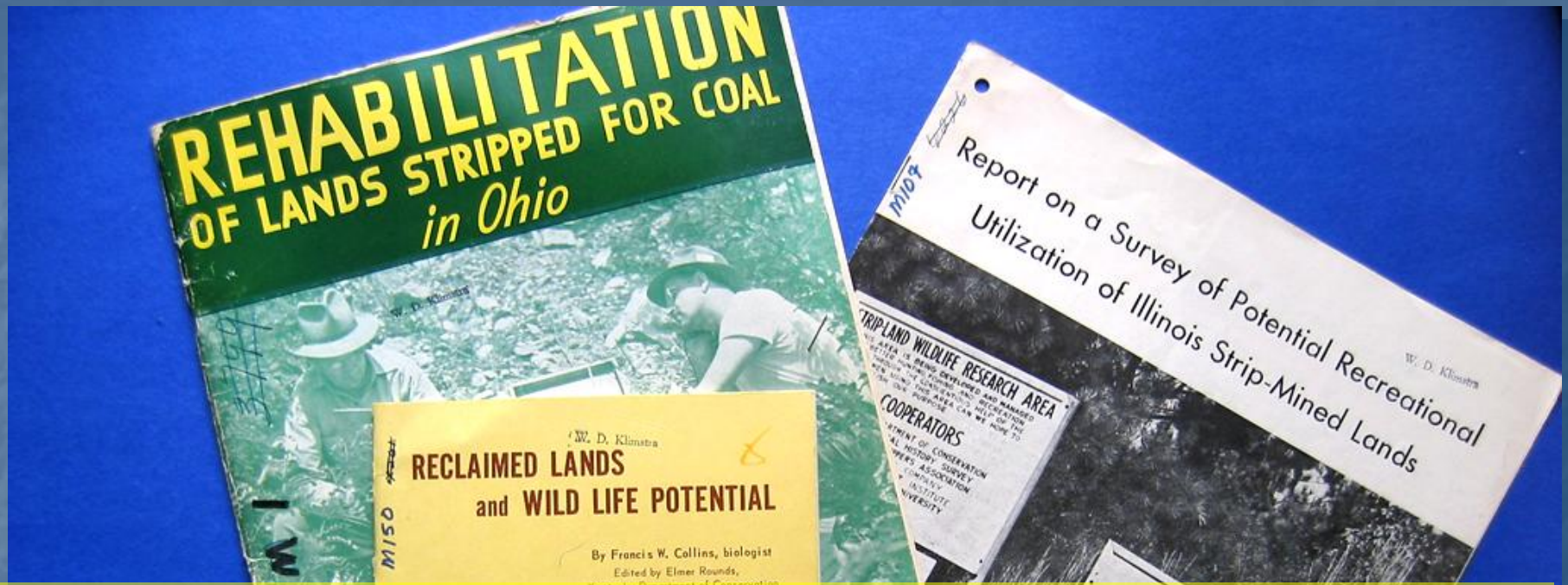
Biological Services Program

A GUIDE FOR ENHANCEMENT OF FISH AND WILDLIFE ON ABANDONED MINE LANDS IN THE EASTERN UNITED STATES

and Wildlife Service

U.S. Department of the Interior


REHABILITATION
OF LANDS STRIPPED FOR COAL
in Ohio
RECLAIMED LANDS
and WILD LIFE POTENTIAL
DEPARTMENT of CONSERVATION
Report on a Survey of Potential Recreational
Utilization of Illinois Strip-Mined Lands

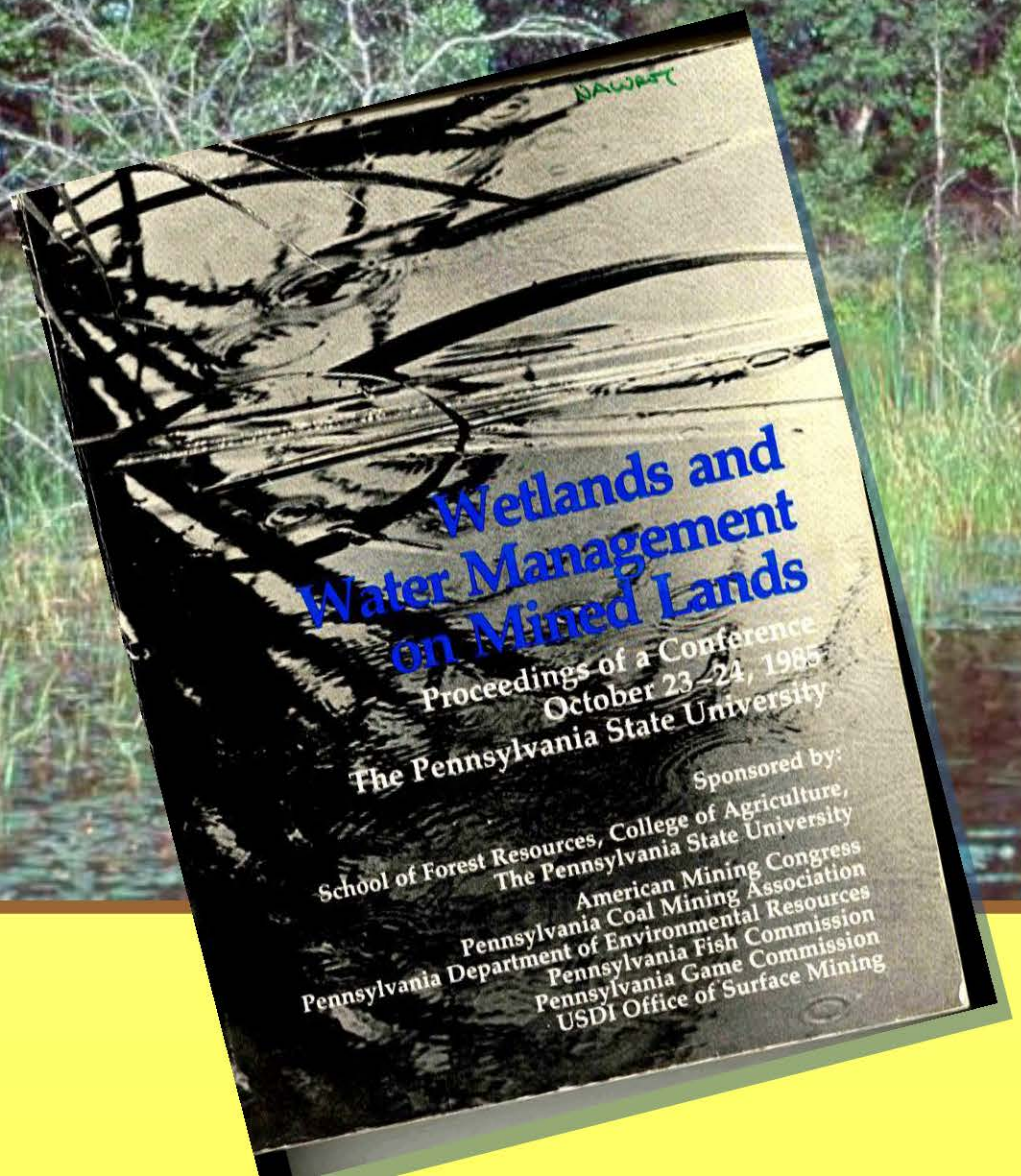


"New mined lands.....opportunities for wildlife.....
How.....?

The first is the mine OPERATOR. He owns the land

The second is the State Division.....responsible to the people to see that the maximum usage is gained in restoring a natural resource."

HABITAT RESTORATION NOTES FOR MINED LAND
WILDLIFE
USER GUIDE
For
Mining and
Reclamation
PRACTICES FOR PROTECTING AND ENHANCING FISH AND WILDLIFE ON COAL SURFACE-MINED LAND IN THE SOUTHERN CENTRAL U.S.
Biological Services Program
COAL SURFACE MINING RECLAMATION AND FISH AND WILDLIFE RELATIONSHIPS IN THE EASTERN UNITED STATES
A GUIDE FOR VEGETATING SURFACE-MINED LANDS FOR WILDLIFE IN EASTERN KENTUCKY AND WEST VIRGINIA
REVEGETATING SURFACE MINE
IN TEXAS
SURFACE MINE RECLAMATION FOR WILDLIFE
Planning and Management of Mine-Cut Lakes at Surface Coal Mines
BEST CURRENT PRACTICES FOR FISH AND WILDLIFE ON SURFACE-MINED LANDS IN THE
A GUIDE FOR ENHANCEMENT OF FISH AND WILDLIFE ON ABANDONED MINE LANDS IN THE EASTERN UNITED STATES
PRACTICES FOR PROTECTING AND ENHANCING FISH AND WILDLIFE ON COAL SURFACE-MINED LAND IN CENTRAL AND SOUTHERN
SURFACE MINING AND FISH/WILDLIFE NEEDS IN THE EASTERN UNITED STATES
Proceedings of a Symposium


Wetlands and
Water Management
on Mined Lands
Proceedings of a Conference
October 23–24, 1985
The Pennsylvania State University
Sponsored by:
School of Forest Resources, College of Agriculture,
The Pennsylvania State University
American Mining Congress
Pennsylvania Coal Mining Association
Pennsylvania Department of Environmental Resources
Pennsylvania Fish Commission
Pennsylvania Game Commission
USDI Office of Surface Mining

From floodplain to farming to coal mining to freshwater marsh—Banner Marsh State Fish and Wildlife Area has transformed into a unique wildlife area along the Illinois River.

Metamorphosis of the Landscape

Thirty years after the area was surface-mined for coal, Banner Marsh State Fish and Wildlife Area has developed into a premier wetland, drawing a variety of birds, including killdeer, great blue herons and ring-billed gulls.

Story By Kathy Andrews
Photos By Adele Hodde

Frank Bellrose was not known for having idle time.

This world-renowned biologist, who died earlier this year at 88, studied the habits and habitats of Illinois River valley waterfowl since 1948, and spent hours driving the reaches of the valley between Havana and Peoria.

That travel time gave him time to watch the biologically rich valley change. Where backwater lakes and backyard timber once stood, supporting handfuls of hunt clubs and an abundant commercial fishery, miles of levees were constructed and field tiles placed, allowing a blanket of corn and soybeans to cover the land.

One particular area caught his eye, as within the levered area an active coal mining operation developed.

Passing the miles and days driving Route 24, an idea began to form. Consulting with George Arthur, a waterfowl biologist with the Illinois Department of Conservation, and Gene Allen, the agency's supervisor of land reclamation, he his approached Director Bill Lodge with an idea—restore the mined land to a fish and wildlife area.

"The coalhundies of Peoria and Pekin were growing steadily," Bellrose explained in January. "Illinois leaders accepted the fact that the proposal would be good for wildlife and provide a valuable, nearby recreational area for citizens."

Mined from 1969 to 1974 by United Illinois Coal Company (now Freeman United Coal Mining Company), purchase of the Fulton County property that became Banner Marsh State Fish and Wildlife Area began in 1976.

"There were no, or very limited, reclamation laws in place prior to the mid 1970s," explained Dean Spandel, soil scientist with the Department of Natural

MINED LAND RECLAMATION

- Pre-Law (1866 - 1962)
  - Forestry
  - Wildlife
  - Recreation

- Post-Law (>1962, 1977)
  - Agriculture
    - Pasture
    - Row crop
  - Forestry
  - Wildlife

REFORESTATION

- Pre-Law "Opportunities"
  - Soil Structure
  - Moisture

- Post-Law "Challenges"
  - Compaction
  - Competition
  - Disincentives

RECLAMATION STANDARDS

- Grading
  - Strike-Off
  - Original Contour

RECLAMATION STANDARDS: Wildlife - Wetlands

- Pre-Law
  - Unplanned
  - "By-Products"
- Post-Law
  - Plans
    - Public Input
    - Review and Approval

WETLAND WILDLIFE PLANNING

Stream Restoration

- Pre-Law
  - Channelization
  - Diversion
- Post-Law
  - Restoration
    - Riffle/Pool
    - Meanders
    - Riparian Forest

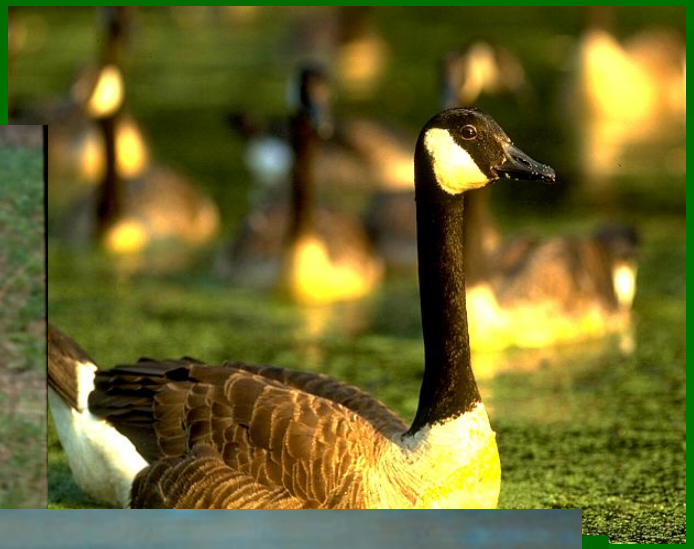
Snakey Point: Patoka F & W Mgt Area

Deer Ridge - Indiana

WILDLFE HABITAT: Values

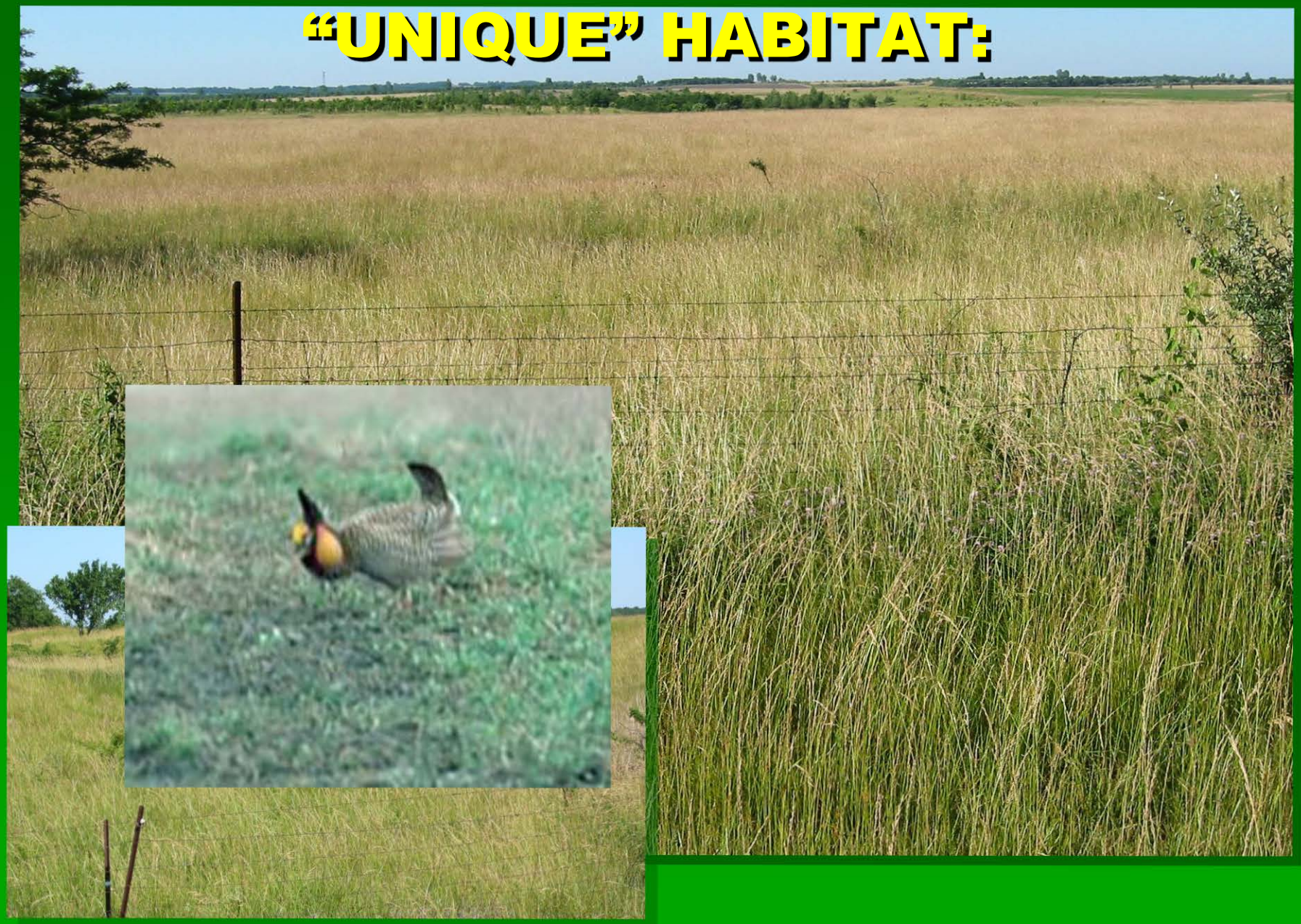
- Diverse Habitat
  - River Otter
  - Beaver
  - Bobcat
  - White-Tailed Deer
  - Elk
  - Bear
  - Turkey

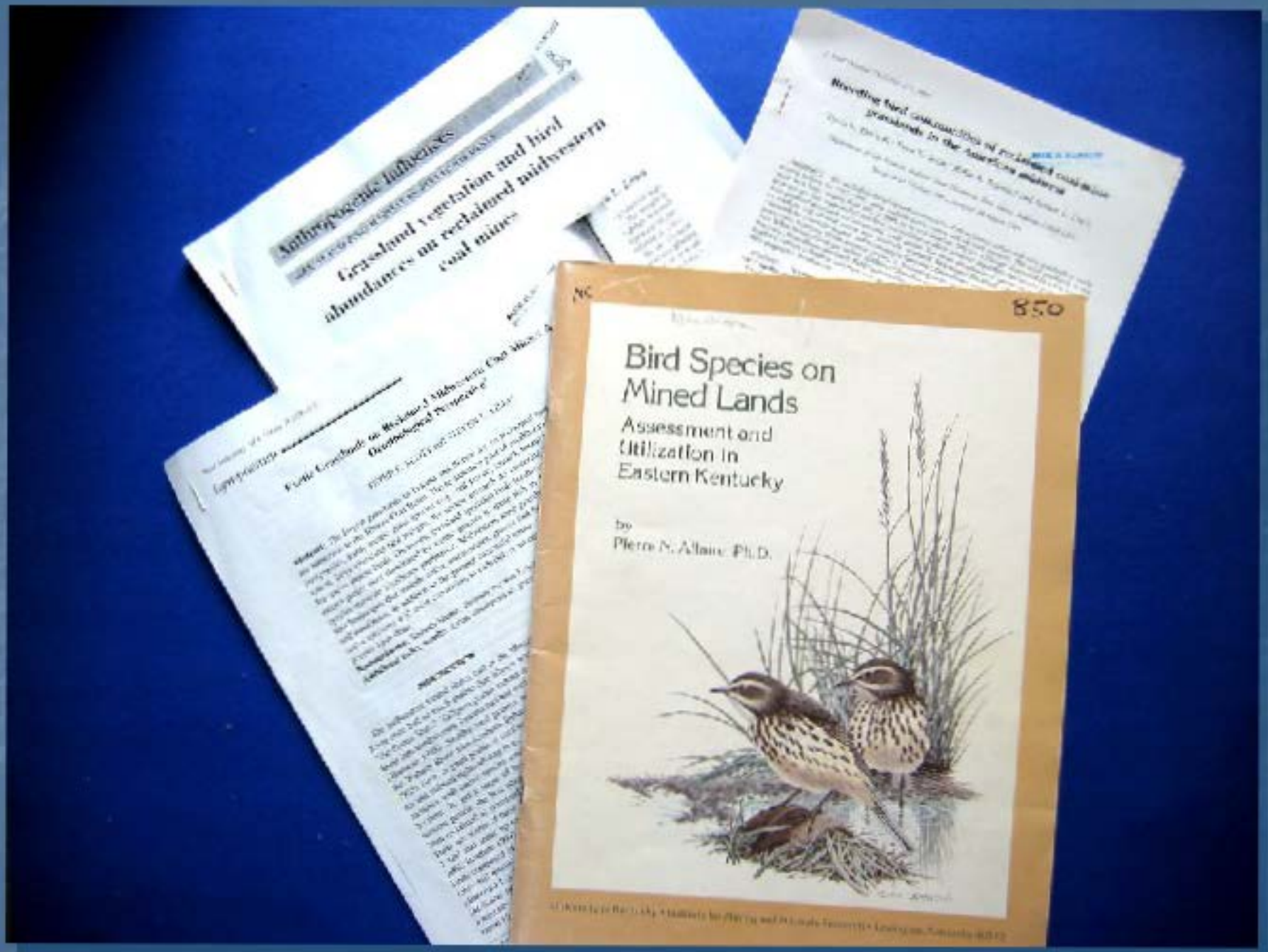
WILDLFE HABITAT: Values



- Unique Species – Avian
  - Bald Eagle
  - Osprey
  - Least Bittern
  - Trumpeter Swan
  - Canada Goose
  - Short-eared Owl
  - Whooping Crane
  - Henslow's Sparrow

“UNIQUE” HABITAT:




Anthropogenic influences
Grassland vegetation and bird abundances on reclaimed midwestern coal mines
Public Gratitude to Reclaimed Midwestern Coal Mines
Breeding bird communities of reclaimed coal mine grasslands in the American midwest
850
Bird Species on Mined Lands
Assessment and Utilization in Eastern Kentucky
by
Pierre N. Allaire, Ph.D.

"UNIQUE GRASSLAND ECOSYSTEMS"

Anthropogenic Influences

GRASSLAND BIRD HABITAT IN RECLAIMED MINES

Grassland vegetation and bird abundances on reclaimed midwestern coal mines

Peter E. Scott, Travis L. DeVault, Robb A. Bajema, and Steven L. Lima

Abstract Reclamation of surface coal mines in the midwestern United States has produced large grasslands, which support both obligate and ... characterize vegetation and determine whether ... ed to vegetation as they do in other kinds of ... teristics on 9 Indiana mine grasslands and re... rence of 6 common bird species. Eur... arundinacea) and smooth brome (*Bromus i...* decades earlier, comprised 64% of canopy c... coven by naive invaders such as goldenrod ... eclamation. Despite a superficial appearan... ...d sufficiently to affect local abundance... ...l and were correlated with at least 1 ... ...ous) were negatively associated wi... ...adowlarks (*Sturnella magna*) an... ...negatively associated with ve... ...e of dickcissels (*Spiza ame...* ...yellowthroat abundance ...ensity. Occurrence o... ...ed with 5 variable ...nd yellowthroat... ...eas Henslow's ...mer. Thus,... ...rasses ove... ...al natu... ...al d...

J. Field Ornithol. 73(2):268–275, 2002

Breeding bird communities of reclaimed coal-mine grasslands in the American midwest

Travis L. DeVault,[1] Peter E. Scott,[2] Robb A. Bajema,[2] and Steven L. Lima

Department of Life Sciences, Indiana State University, Terre Haute, Indiana 47809 USA

Received 15 February 2001; accepted 24 August 2001

ABSTRACT. We studied the breeding bird communities of 15 reclaimed surface coal... western Indiana in 1997–1998, using roadside point counts and off-road tra... ...udy were large, ranging from 1.0 to 3180 ha in area (median, 59... grass species, they supported diverse bird communities in which ... with grassland-associated and successional scrub ... or roadside and off-road counts were ... Meadowlarks (*Sturnella magna*) ... point count locations, ... mon Yellow...

JACK R. SAWIOT

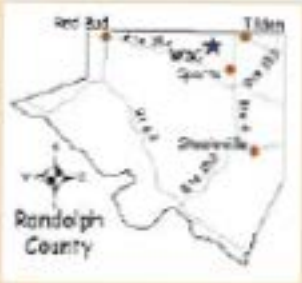
RECREATION OPPORTUNITIES

- Pre-Law
  - Undeveloped
  - Private Clubs
  - Industry - Free Access

- Post-Law
  - Private Development
  - Commercial
  - Limited Access
  - State Acquisition

New Sparta-based facility will provide an economic, employment and recreation boost to Illinois.

A World-Class Opportunity for Illinois



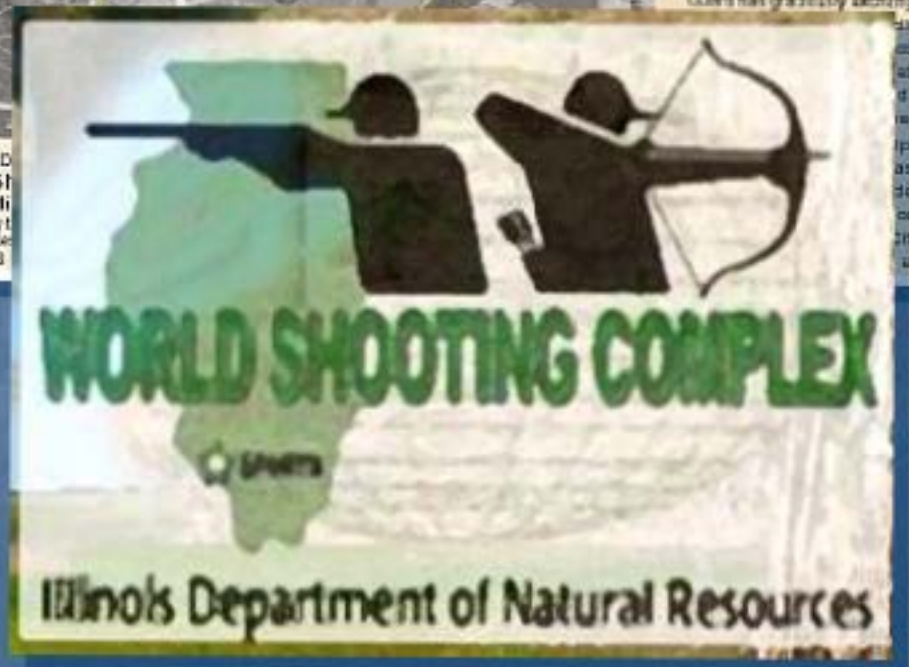
Story By Kathy Andrews

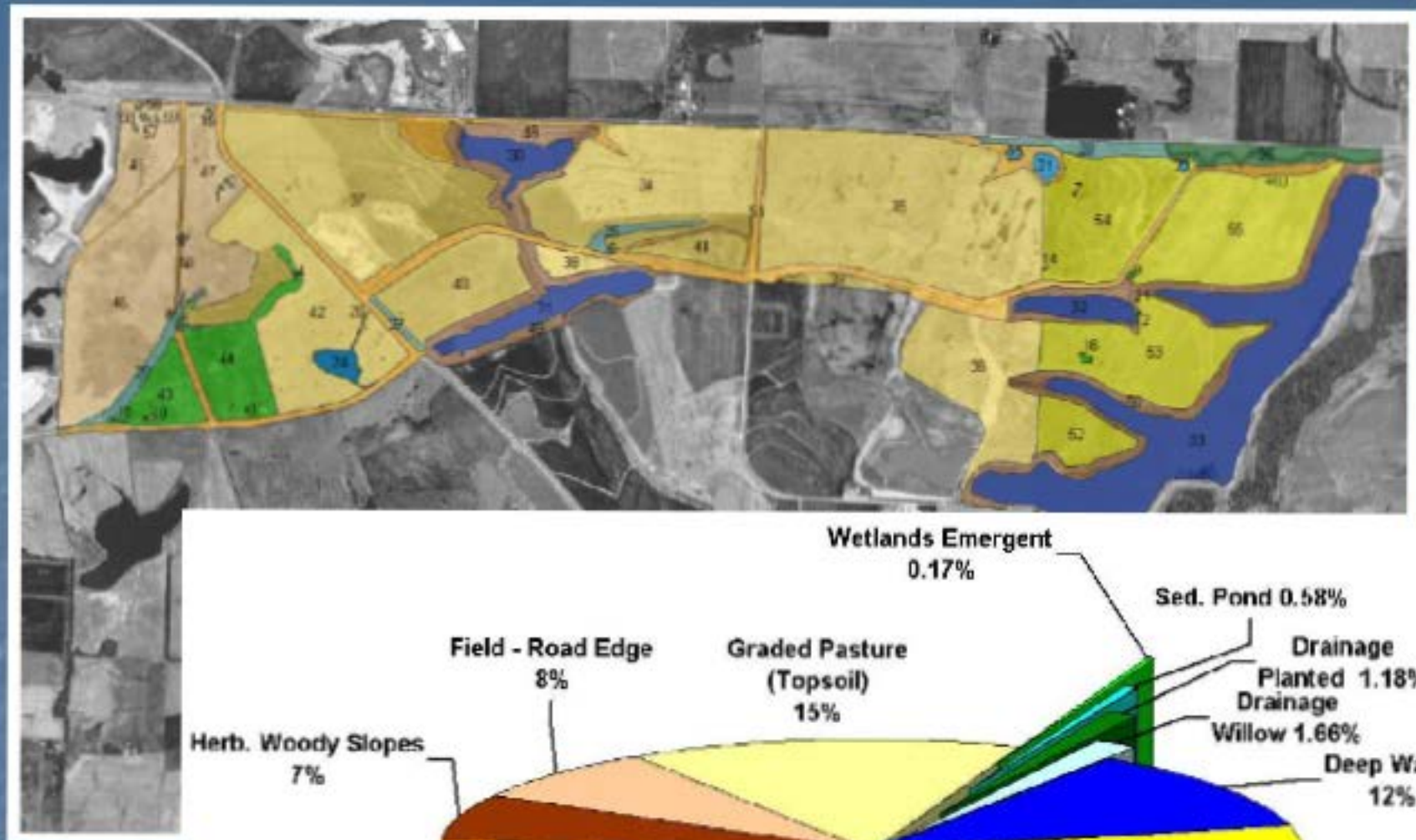
Brunswold and area officials broke

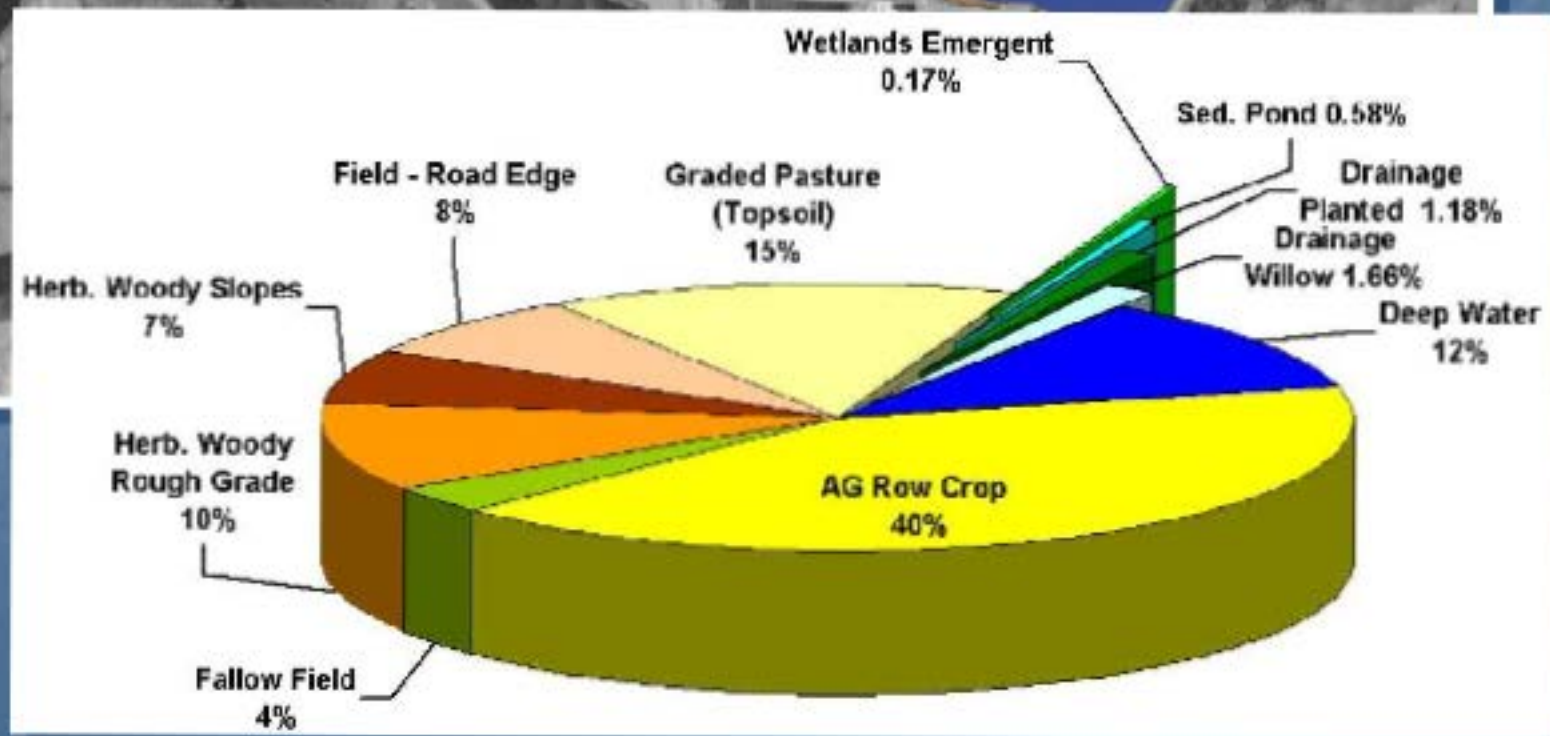
structures will include a multi-use recreation center and a building to house exhibitors, vendors, concessions and restrooms.

For the first time ever, the Illinois state park system will have a site capable of hosting large numbers of campers. Under the initial development phase, 600 full-service RV campsites will be constructed, with adequate space existing to expand with several hundred additional spaces. Additional tent campsites will be developed around a large lake. Construction of cabins similar to those found in other state parks is also under consideration.

While the DNR is coordinating development of the project and will ultimately manage the facility, a project of this size cannot be accomplished without partners. The Illinois National Guard has graciously exchanged a par-





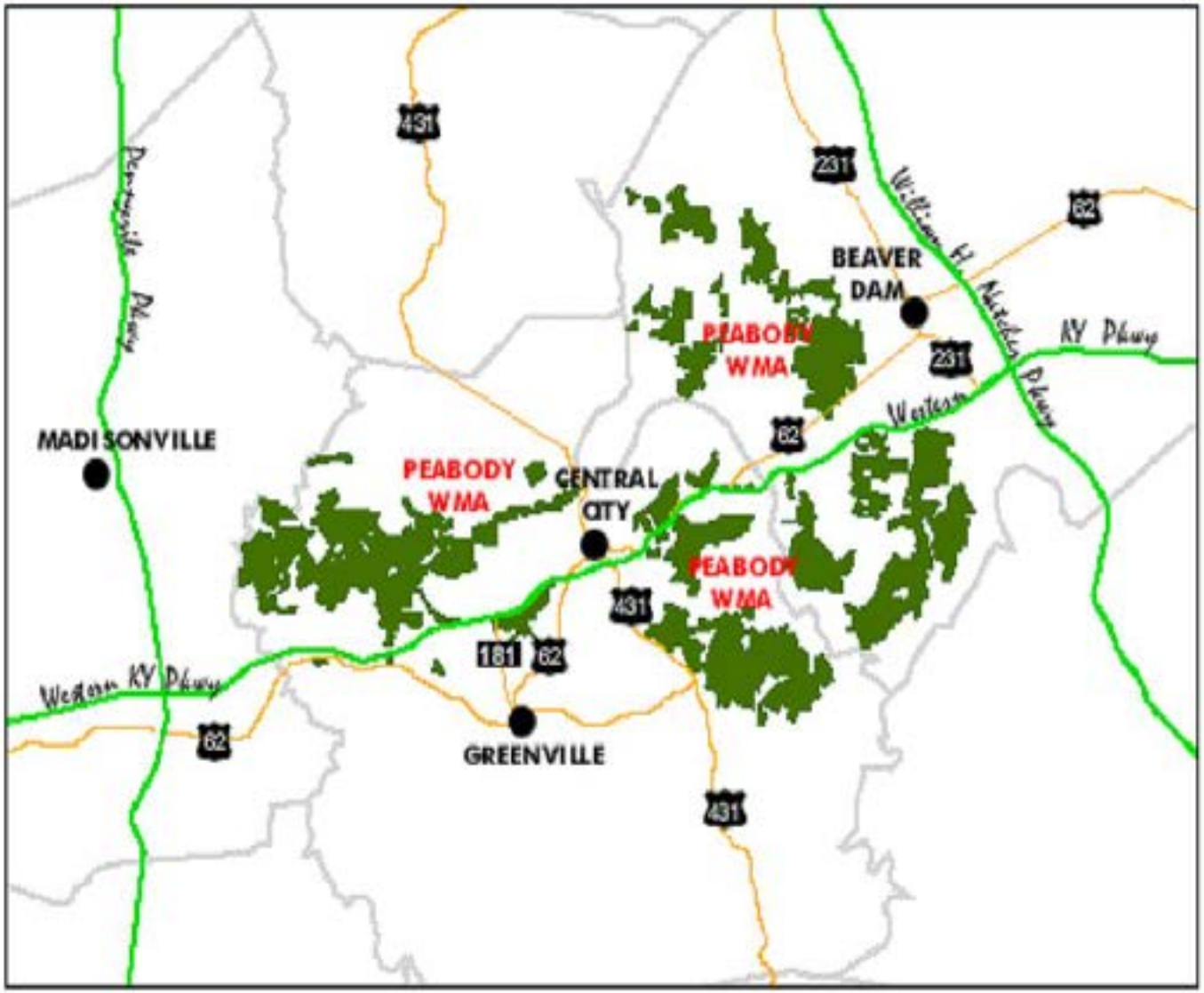

Wetlands Emergent
0.17%
Sed. Pond 0.58%
Drainage
Planted 1.18%
Drainage
Willow 1.66%
Deep Water
12%
Field - Road Edge
8%
Graded Pasture
(Topsoil)
15%
Herb. Woody Slopes
7%
Herb. Woody
Rough Grade
10%
AG Row Crop
40%
Fallow Field
4%

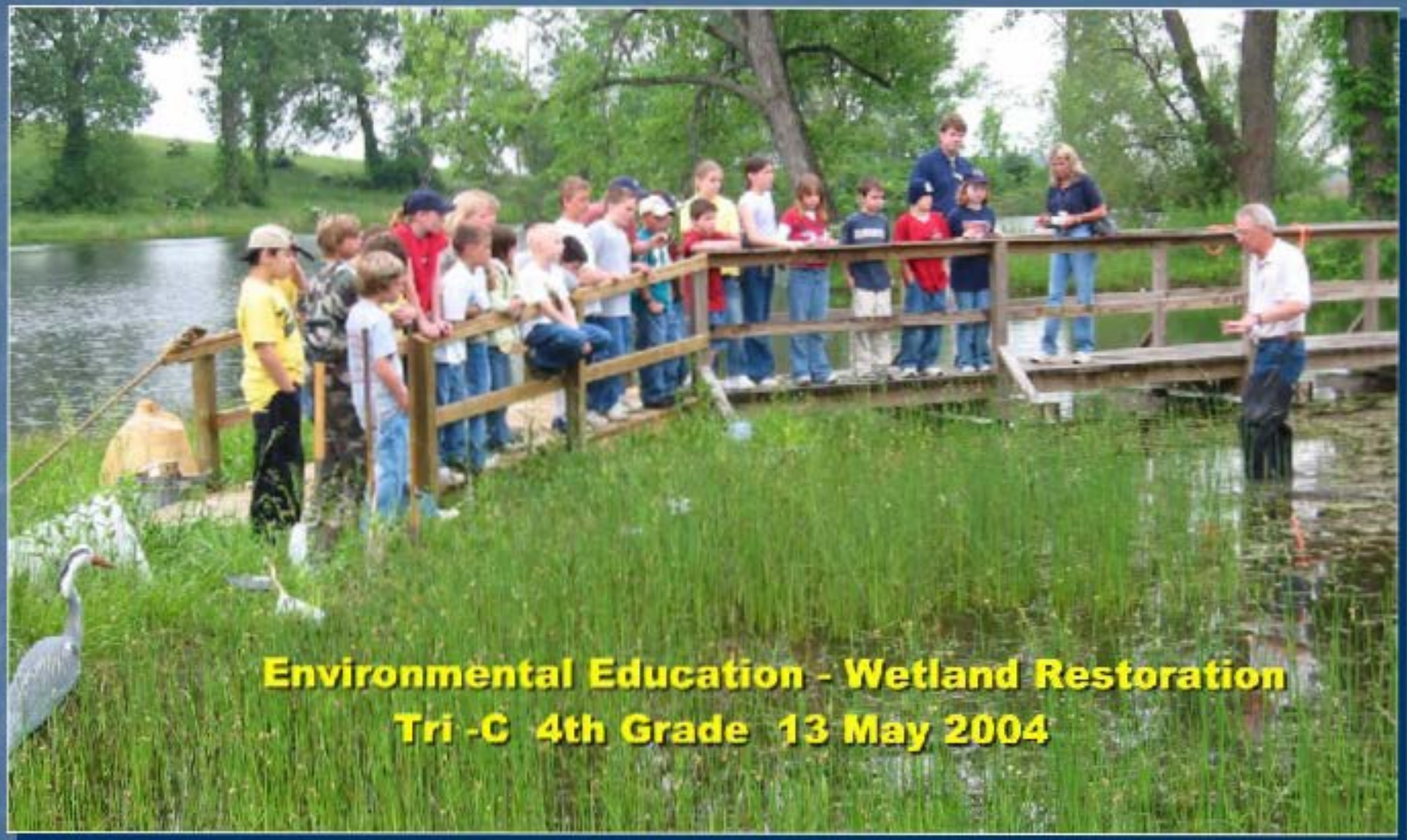
RECLAIMED CROPLAND CONVERSION

WETLAND MITIGATION

SPOILBANK CONSTRUCTION

Peabody Fish And Wildlife Management Area

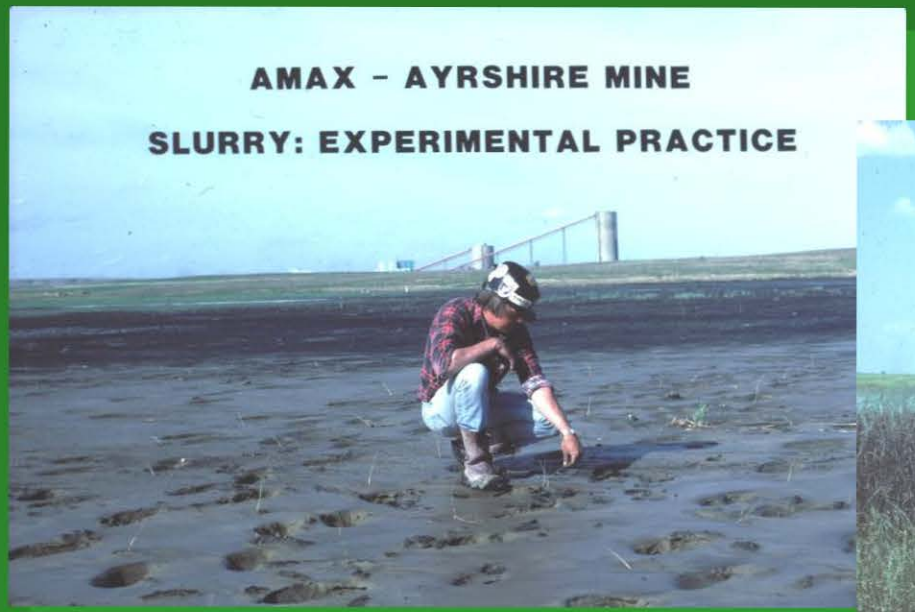



Environmental Education - Wetland Restoration
Tri -C 4th Grade 13 May 2004

Coal Tailings

- Soil Cover
  - "Cosmetic" Approach

- Alkaline Amendment
  - Geochemical Process
  - Wetland Soil Reconstruction


AMAX - AYRSHIRE MINE
SLURRY: EXPERIMENTAL PRACTICE

PERMIT REQUIREMENTS
"EQUALLY EFFECTIVE" (AS 4 - FOOT)
SOILS
VEGETATION
WATER

ARCH OF ILLINOIS - CAPTAIN MINE
SLURRY: EXPERIMENTAL PRACTICE

Vegetative Cover - Upland

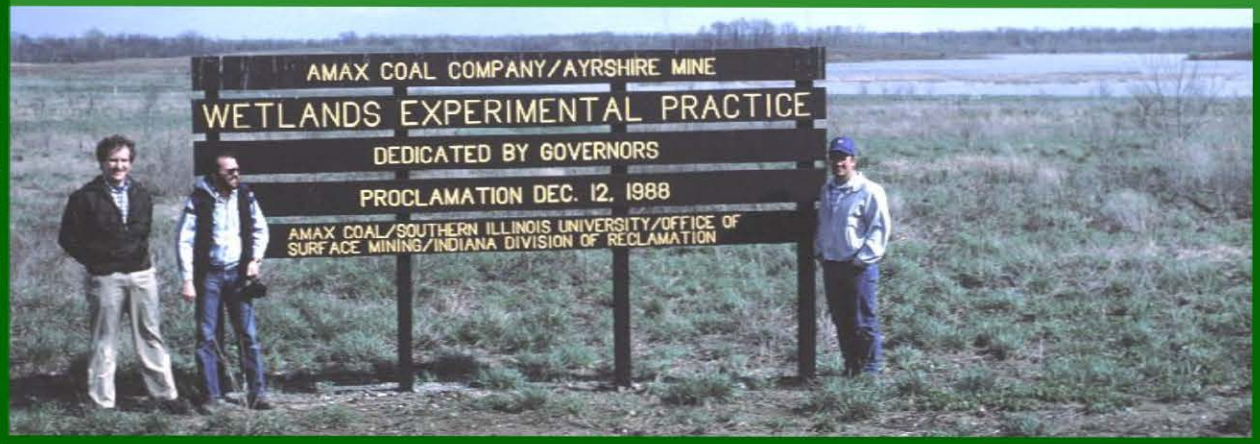
Indian grass

Big Bluestem

Switch grass

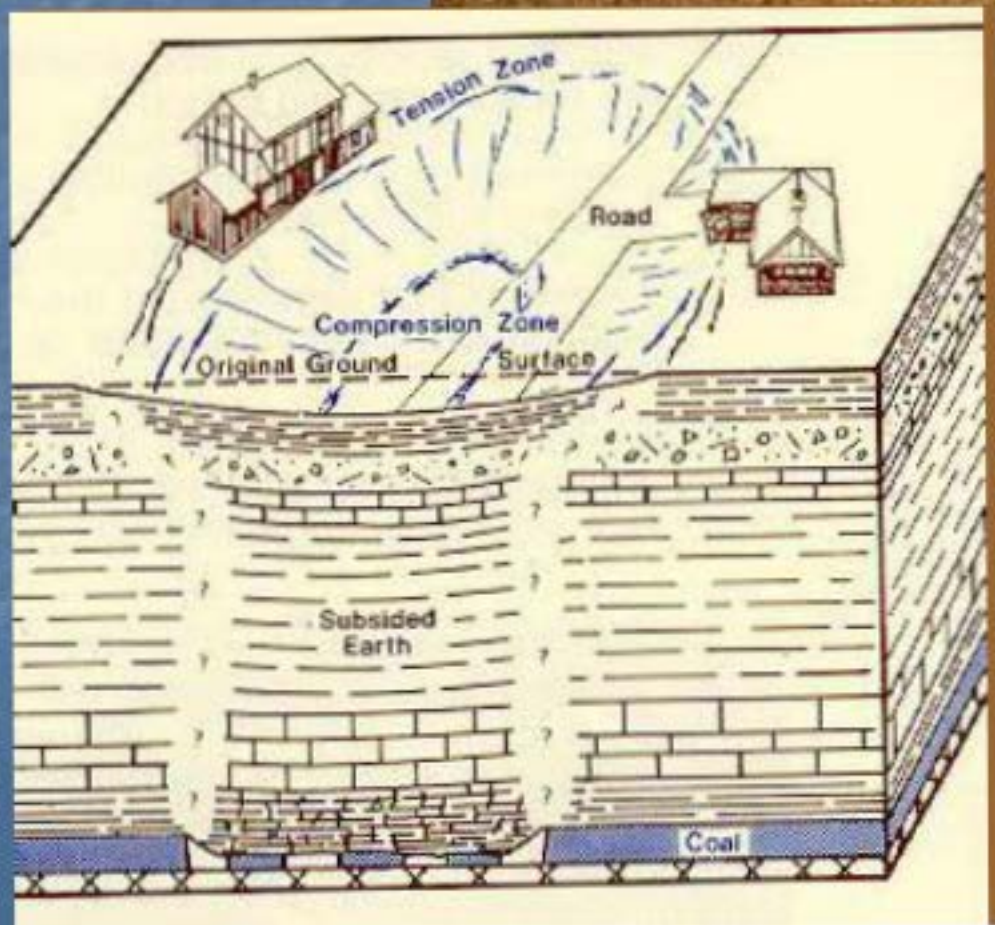
Little Bluestem

BLUE GRASS
FISH AND WILDLIFE AREA
DEPT. OF NATURAL RESOURCES
DIV. OF FISH AND WILDLIFE


AMAX COAL COMPANY/AYRSHIRE MINE
WETLANDS EXPERIMENTAL PRACTICE
DEDICATED BY GOVERNORS
PROCLAMATION DEC. 12. 1988
AMAX COAL/SOUTHERN ILLINOIS UNIVERSITY/OFFICE OF
SURFACE MINING/INDIANA DIVISION OF RECLAMATION

SUBSIDENCE WETLANDS:

UNIQUE OPPORTUNITIES

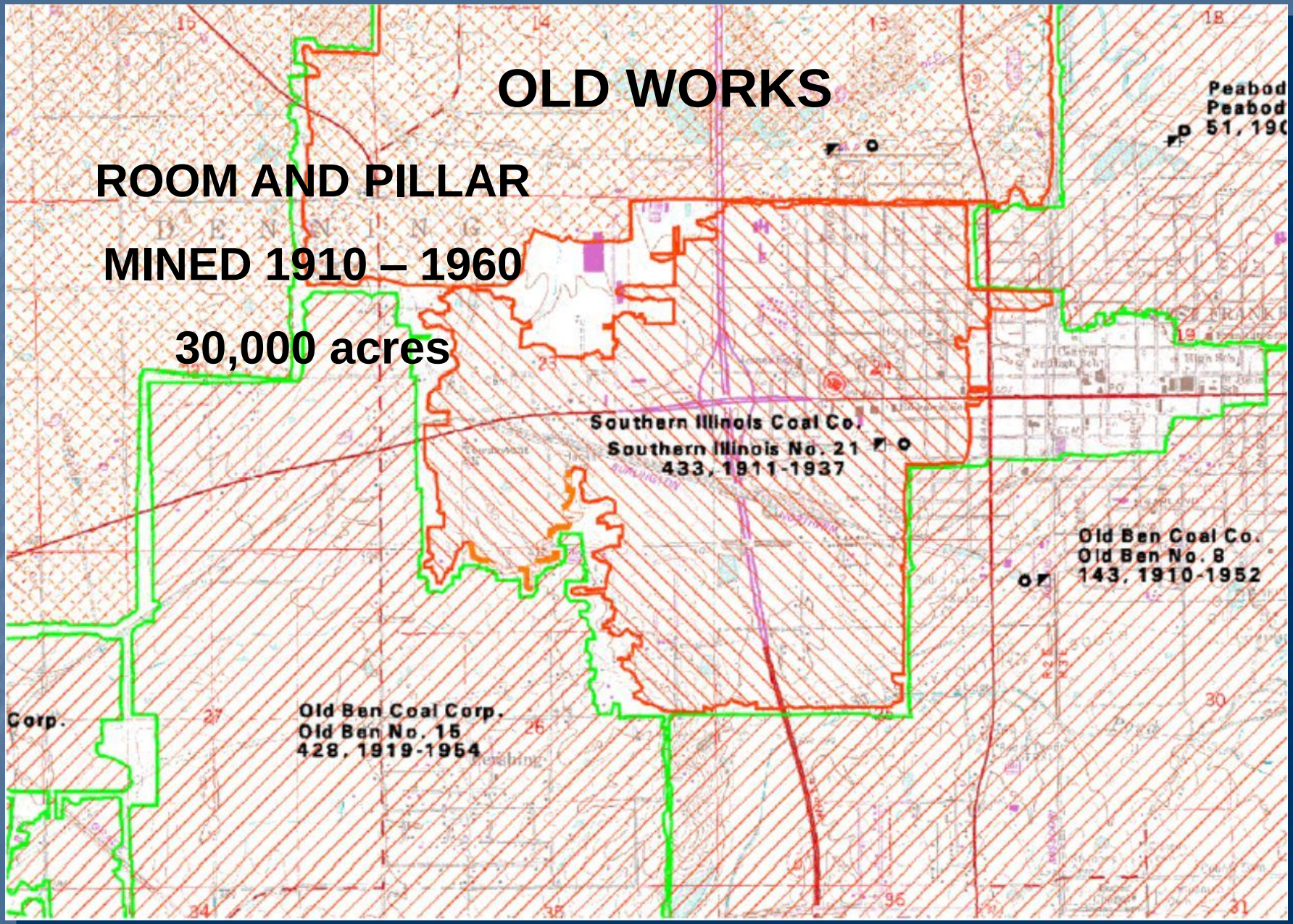

Tension Zone
Road
Compression Zone
Original Ground
Surface
Subsided
Earth
Coal

OLD WORKS

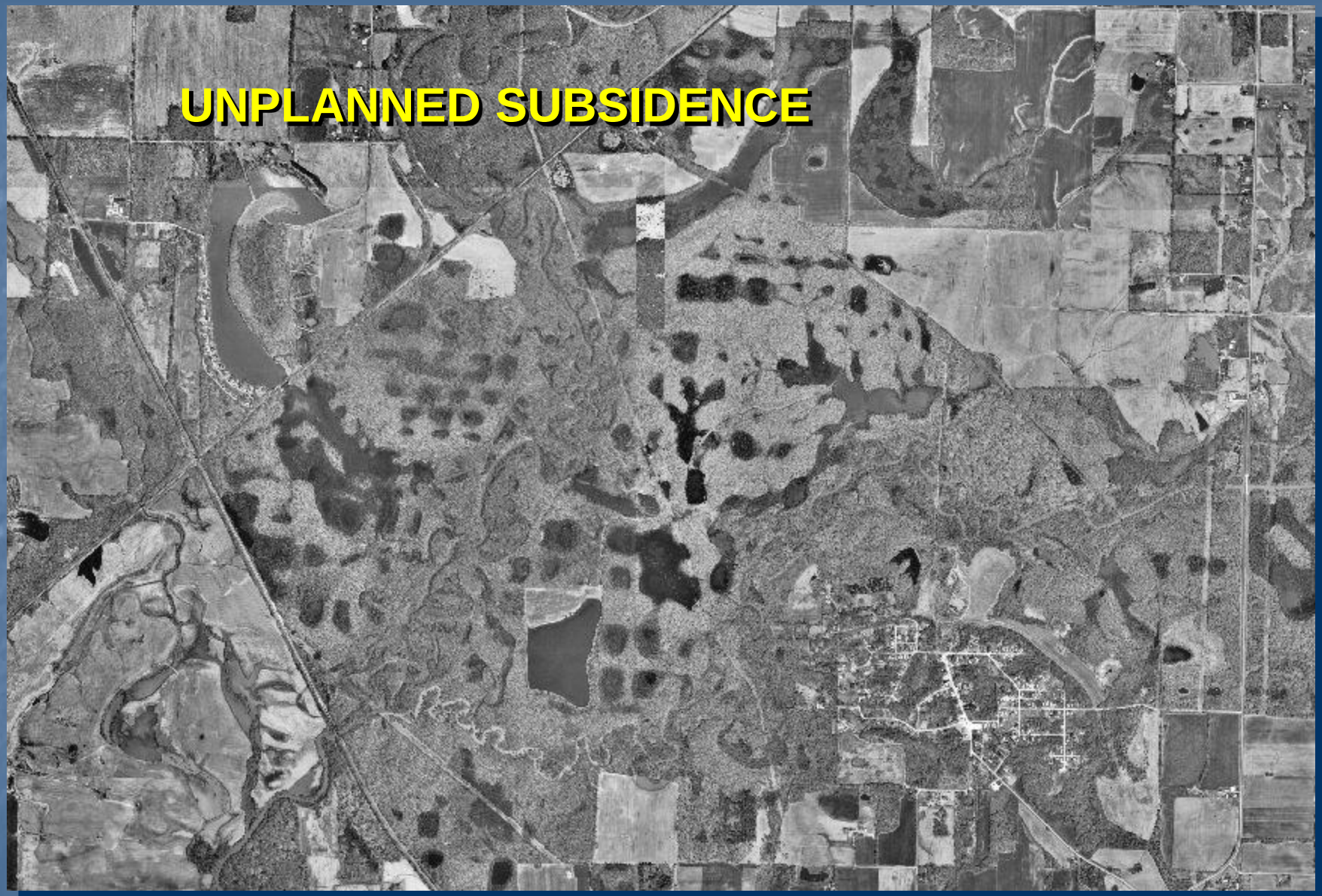
ROOM AND PILLAR

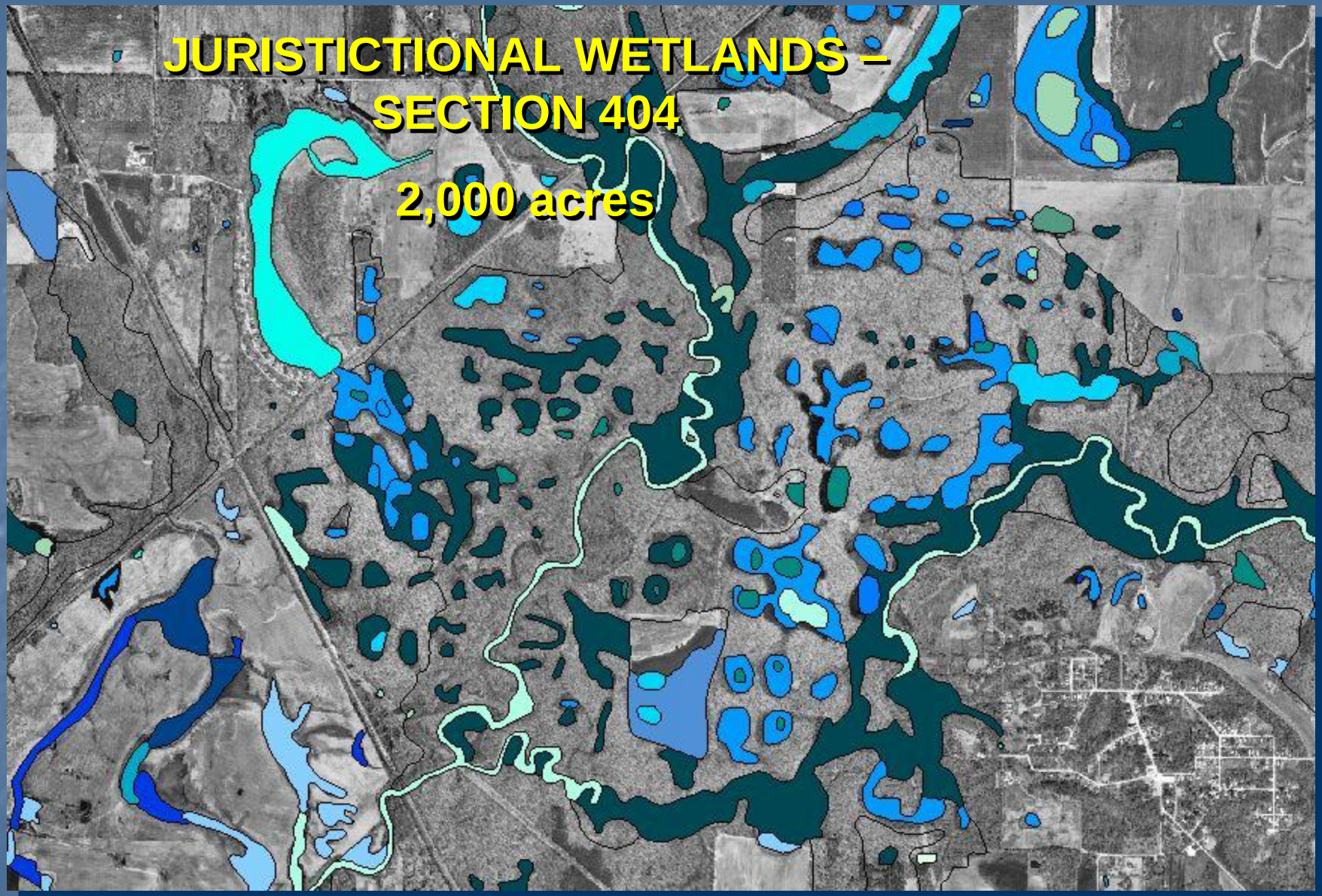
MINED 1910 – 1960

30,000 acres



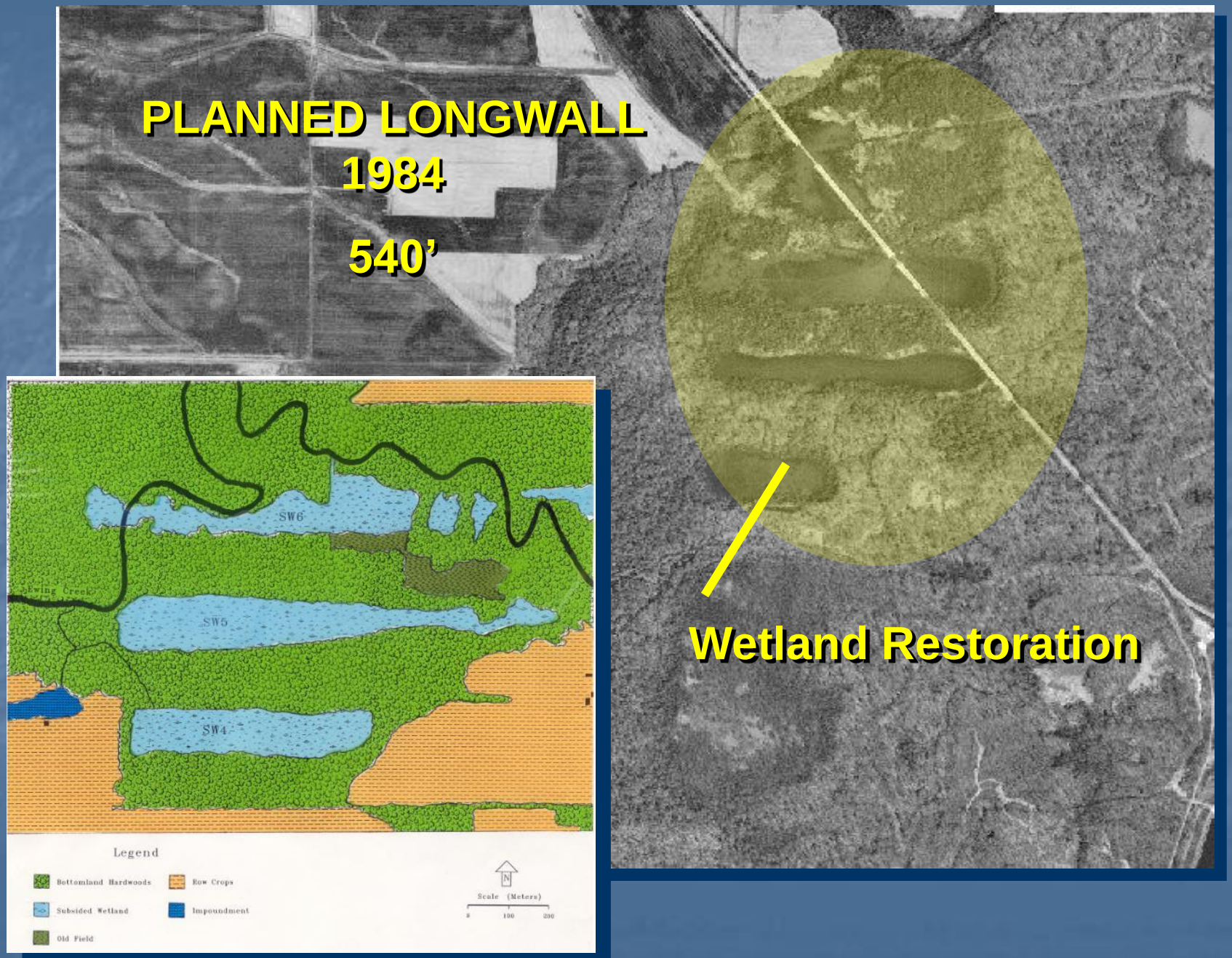
UNPLANNED SUBSIDENCE




JURISTICTIONAL WETLANDS –
SECTION 404
2,000 acres

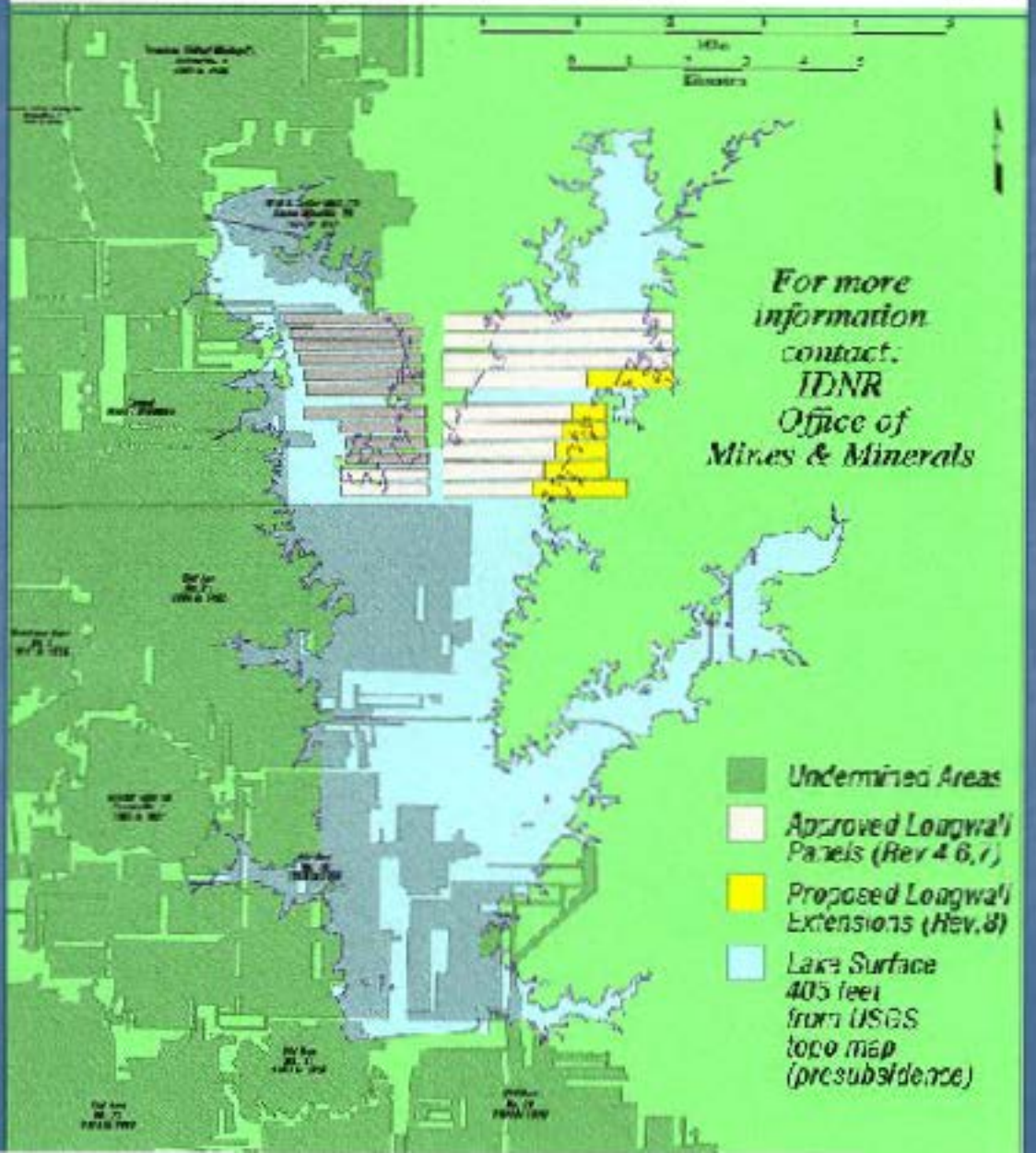
FUTURE MINING
Can't restore the functions and values….
of subsidence wetlands
Sahara 16
~1988

PLANNED
UNPLANNED

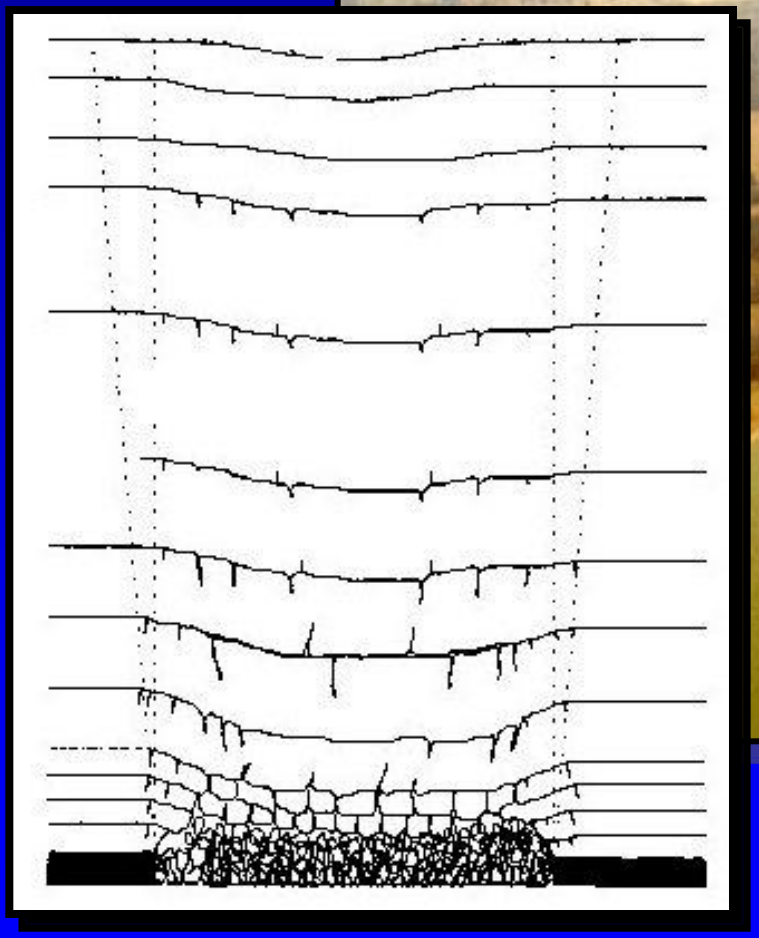

PLANNED LONGWALL
1984
540’
Wetland Restoration
SW6
SW5
SW4
Ewing Creek
Legend
Bottomland Hardwoods
Row Crops
Subsided Wetland
Impoundment
Old Field
N
Scale (Meters)
0
100
200

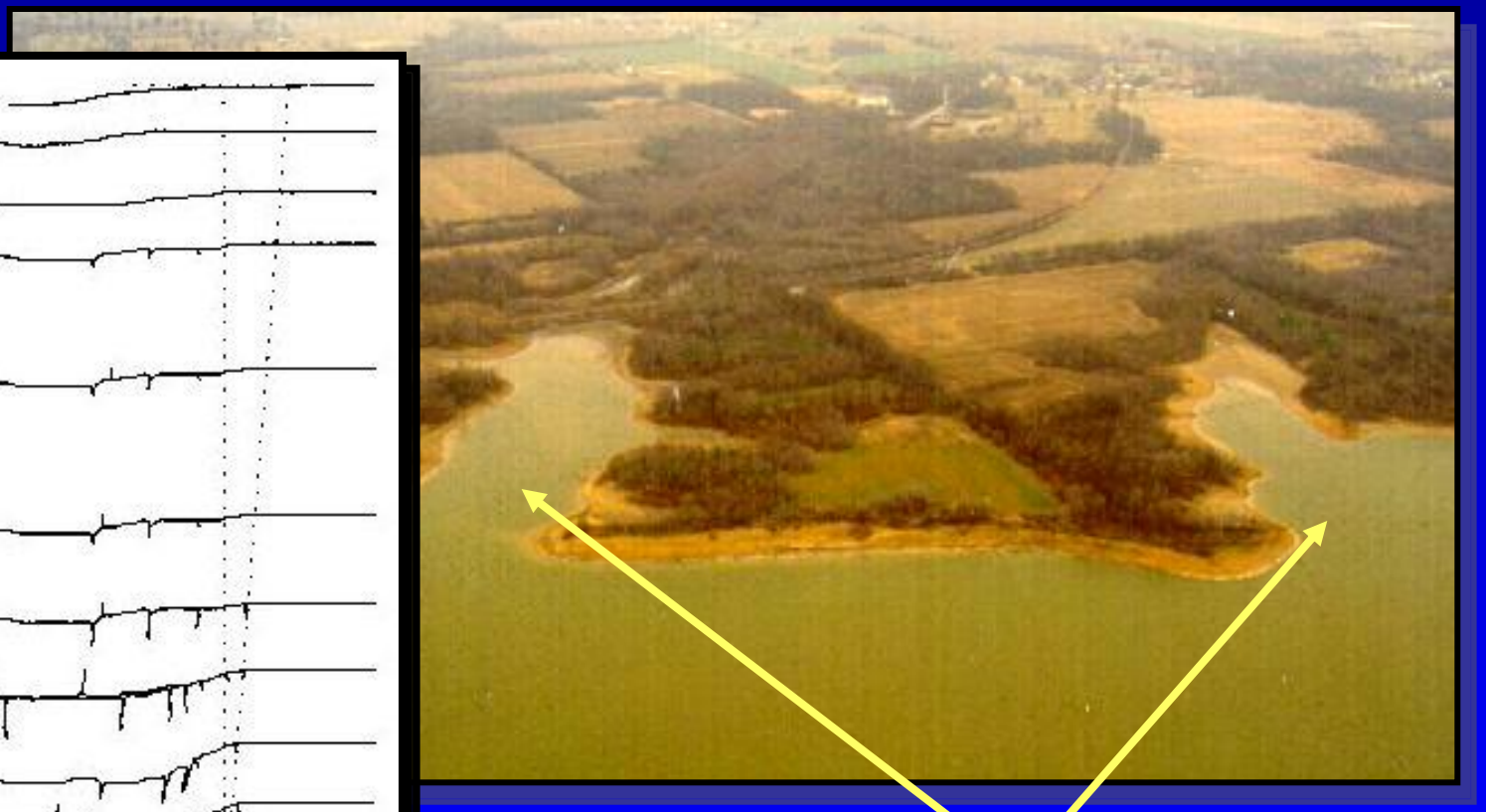
PFO1A

Underground Coal Mining at Rend Lake



Cross Section
Subsidence Panel





Subsidence Basins

WARD BRANCH

SUBSIDENCE PROBLEM ?

WARD BRANCH
TICKS
HUNTERS ATTENTION
NON-TOXIC STEEL SHOTGUN SHELLS
REQUIRED
NOTICE
All waterfowl hunters must register daily before hunting and record kill after each day's hunt.
Rend Lake Fishing Regulations
Species
Length Limit
Daily Limit
WETLAND RECREATION ASSET ?

Birding Field Trip Scheduled

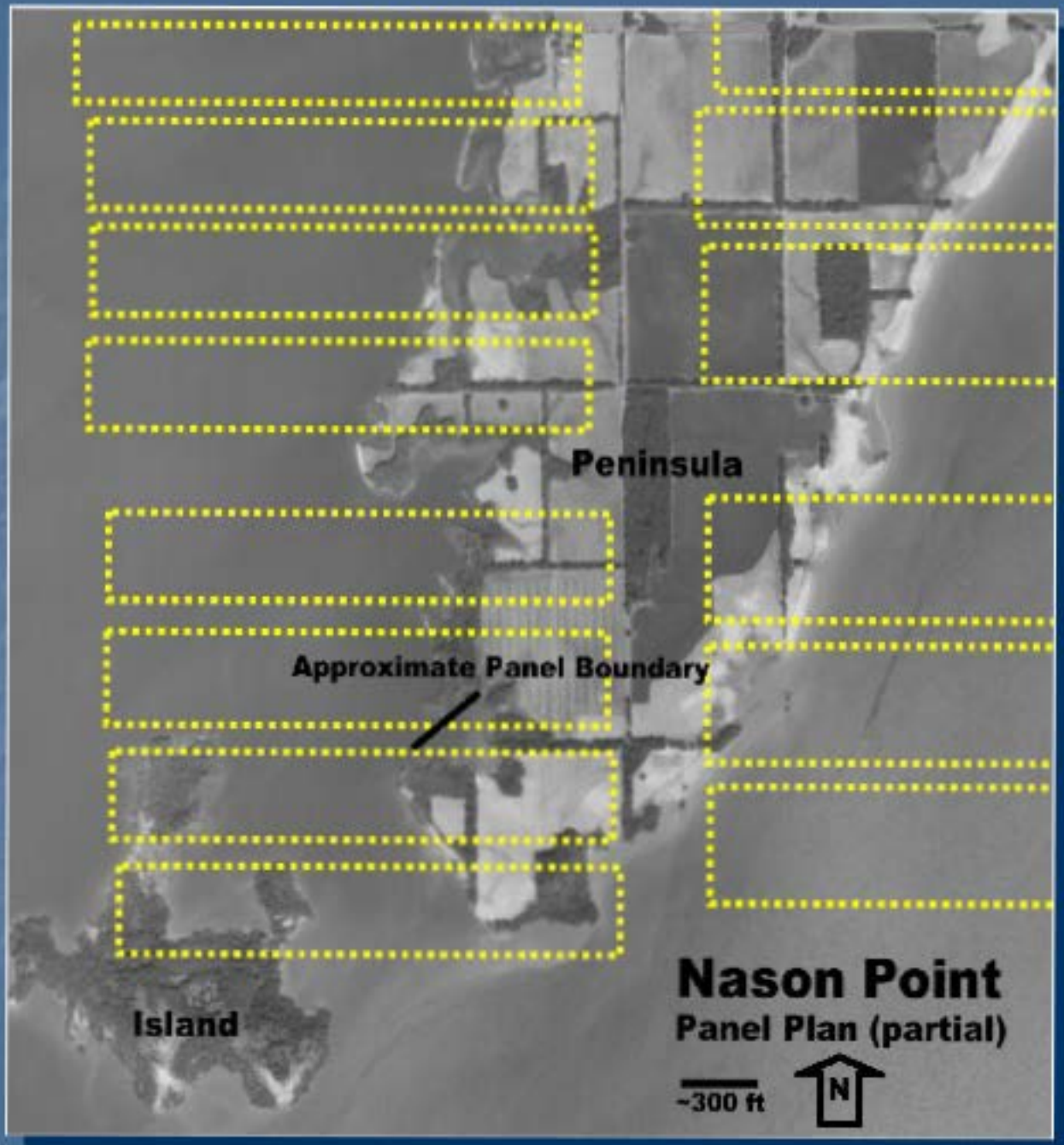
The Shawnee Audubon Society, a chapter of Illinois Audubon Society, is planning a shorebird identification field trip at Ward Branch Wetland area on Rend Lake.

Interested bird watchers are asked to meet in the back of the artisan center parking lot off exit 77 of I-57 Aug. 18 at 8 a.m.

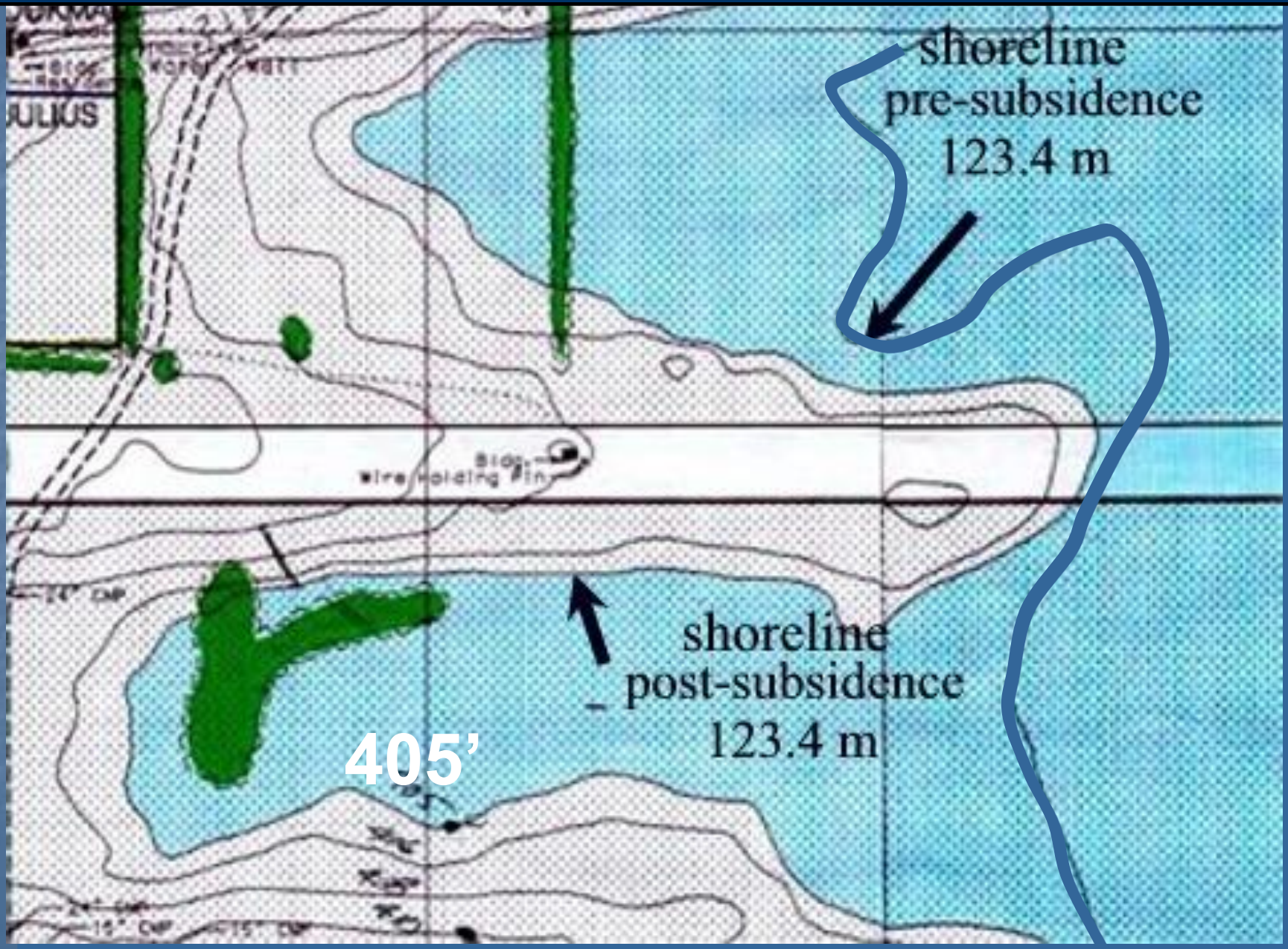
Participants are advised to dress for warm weather and a walk to the mud flats. There is no fee. Beginning birders are especially invited to attend this field trip.

Call 618-564-2079 for further information. The field trip will conclude around noon.

REND LAKE
STATE FISH AND WILDLIFE AREA


Peninsula
Approximate Panel Boundary
Island
Nason Point
Panel Plan (partial)
~300 ft
N

Nason Point: Planned Subsidence



SHORELINE DIVERSITY

WATERFOWL FOOD

PLANNED SUBSIDENCE WETLANDS

A Section 404 Mitigation Alternative ?

Potential Wetland Bank ?

LIABILITY ?
$20,000 / ACRE ASSET

WETLAND SUBSIDENCE RESTORATION?
“YOU DIDN’T DO MUCH”

WETLAND ESTABLISHMENT

“WHAT ARE WE GOING TO DO WHEN THE COAL IS GONE?”

THE TITLE OF MY PRESENTATION IS, “WHAT ARE WE GOING TO DO WHEN THE COAL IS GONE?”

EARLY IN MY COAL CAREER, I WORKED FOR A MARTIN COUNTY, KY MINING COMPANY. SOME WOULD HAVE SAID IT WAS A TULSA, OKLAHOMA COMPANY, BUT IF YOU LOOK AT DOLLARS SPENT, IT LOOKED LIKE A MARTIN COUNTY COMPANY TO ME.

THE COAL INDUSTRY HAD AN ANTAGONIST IN MARTIN COUNTY NAMED HOMER MARCUM WHO OWNED THE LOCAL “NEWSPAPER”. IN TYPICAL SMALL-TOWN-NEWSPAPER FASHION, IT USED FILLERS TO FILL IN AT END OF STORIES SO THERE WOULD NOT BE WHITE SPACE. HOMER’S FAVORITE FILLER WAS: “WHAT ARE WE GOING TO DO WHEN THE COAL IS GONE”? HIS SECOND FAVORITE WAS “SADNESS IS A PAMPER IN A TREE”.

I NEVER REALLY THOUGHT MUCH ABOUT THE FILLER WHILE WORKING FOR THE MINING COMPANY BECAUSE WE JUST LEASED THE LAND AND RECLAIMED IT AND WHEN THE COAL WAS GONE AND RECLAMATION COMPLETE, WE WOULD END THE LEASE AND GO SOMEWHERE ELSE TO MINE.

WE WOULD LEAVE MORE FLAT LAND THAN COULD BE FOUND IN THE REST OF THE COUNTY COMBINED. LEAVE AN ORCHARD – A PIG FARM – A CHICKEN FARM – ELECTRIC POWER –

ROADS – LAKES. IT WOULD BE UP TO THE LANDLORD, THE NORFOLK-SOUTHERN RAILROAD, TO DETERMINE WHAT TO DO WITH THE LAND, LONG-TERM.

THEN IN 1990, I MOVED TO THE OTHER SIDE OF THE BUSINESS AND BECAME THE PRESIDENT OF A COAL LAND-HOLDING COMPANY. I BECAME PRESIDENT OF WESTERN POCAHONTAS PROPERTIES, WHICH FORMERLY BELONGED TO THE OTHER RAILROAD, CSX. WE HAD 1 BILLION TONS OF COAL, 600,000+ ACRES IN THE APPALACHIAN BASIN – NORTH, CENTRAL AND SOUTH, PLUS INDIANA; 200,000 ACRES OF HARDWOOD TIMBER AND I BEGAN TO THINK ABOUT THAT FILLER.

IN 1992, WE PURCHASED 22 BILLION TONS OF COAL RESERVES ON 4.75MM ACRES IN MONTANA, NORTH DAKOTA; WYOMING, WASHINGTON AND ILLINOIS AND 300,000 ACS. SURFACE PRIMARILY IN EASTERN MONTANA. IT WAS PRAIRIE RANCHLAND.

THEN IN 2002, WE PUT OUR PRODUCING PROPERTIES WITH ARCH COAL'S COAL PROPERTIES AND FORMED NATURAL RESOURCE PARTNERS. OUR ROLE CHANGED FROM PRIVATE COMPANY TO A PUBLIC MASTER LIMITED PARTNERSHIP. SINCE THEN, WE HAVE COMPLETED 10 ACQUISITIONS TOTALING NEARLY A BILLION TONS OF COAL.

NOW WHEN I THINK ABOUT THE FILLER, I HAVE MORE STAKEHOLDERS TO CONSIDER.

I HAVE 40,000 PUBLIC OWNERS; I HAVE THE PRIVATE OWNERS WHO CONTROL MUCH OF THE SURFACE, OUR LESSEES, THE MINING COMPANIES HAVE A HUGE INVESTMENT ON OUR PROPERTIES. WE ALSO MUST CONSIDER THE LOCAL COMMUNITY, THE COAL INDUSTRY AS A WHOLE AND OUR 40-SOME EMPLOYEES.

WITH OUR PROPERTY AND WHAT CAME FROM ARCH AND THE 10 ACQUISITIONS, WE HAVE OVER 32 BILLION TONS AND 10 MILLION ACRES IN THE PUBLIC COMPANY AND OUR PRIVATE COMPANIES; COMBINED, WE HAVE 60 LESSEES AND 160 LEASES.

SO I GUESS I AM HERE TODAY (OTHER THAN BECAUSE BILL KOVACIC TWISTED MY ARM) BECAUSE WE ARE THE LARGEST COAL LAND COMPANY IN THE U.S.

BUT ALSO I AM HERE, MAYBE, MORE IMPORTANTLY IN THE LONG-RUN, IN MY ROLE AS THE CHAIRMAN OF OUR NATIONAL TRADE ASSOCIATION, THE NATIONAL COUNCIL OF COAL LESSORS, WHICH HAS MEMBERSHIP CONSISTING OF 60 LANDHOLDING COMPANIES, PRIMARILY CAPP, BUT ALSO ILLINOIS BASIN AND TO LESSER EXTENT, OTHER COAL FIELDS.

I HAVE SERVED AS CHAIR FOR TWO YEARS AND PRIOR TO THAT WAS PRESIDENT FOR 8 YEARS.

OUR ROLE IS TO SERVE AS THE LIAISON FOR COAL LANDOWNERS WITH GOVERNMENTAL ENTITIES AND NGO'S. FOR INSTANCE, WE ARE WORKING VERY CLOSELY WITH MSHA NOW ON THE UNDERGROUND MINE MAPPING INITIATIVE.

I WOULD LIKE TO OFFER OUR ASSISTANCE TO SERVE AS THE LIAISON BETWEEN YOUR ORGANIZATIONS AND THE LANDOWNER COMMUNITY ON THE ISSUES DISCUSSED HERE TODAY.

IN TALKING TO MANY OF THE NCCL MEMBERS IN PREPARATION FOR THIS MEETING, I WAS SURPRISED AT HOW MANY SITES FOR SUPER WAL-MART'S ARE AVAILABLE IN CENTRAL APPALACHIA ON PREVIOUSLY MINED LAND, BUT ONLY IF THE RENT IS A PERCENTAGE OF GROSS SALES.

I SAY THIS ONLY PARTIALLY IN JEST. EACH OF US AS LANDOWNERS HAS GREAT HOPE THAT SOME INDUSTRIAL, COMMERCIAL OR RESIDENTIAL USE CAN BE FOUND FOR OUR PROPERTY, "WHEN THE COAL IS GONE".

BUT, WE ALL KNOW THAT THIS IS NOT REALISTIC FOR MOST OF THE PROPERTIES. AFTER ALL, HOW MANY SUPER WAL-MARTS DOES WYOMING COUNTY, WV NEED? CONSIDERING THE REMOTE NATURE OF MOST OF THE COAL FIELDS, CURRENT DEVELOPMENT IS NEITHER REALISTIC NOR ECONOMIC.

THE RECURRING THEME OF THE LANDLORDS I TALKED TO RECOGNIZED THAT LIMITATION BUT WHAT THEY DID NOT WANT TO HAPPEN WAS THAT THEIR PROPERTY WOULD BE RECLAIMED IN A MANNER THAT WOULD PRECLUDE FOREVER A HIGHER AND BETTER USE, OR AT LEAST ONE THAT WOULD YIELD THE OWNERS MORE MONEY.

SO, IF THE QUESTION IS, "IF IT'S NOT GOING TO BE RECLAIMED AS AN INDUSTRIAL PARK, ETC., WHAT DO YOU WANT TO HAPPEN TO THE LAND"? THE ANSWER IS – WE DON'T WANT ANYTHING TO HAPPEN TO IT THAT WOULD PROHIBIT, RESTRICT, IMPEDE OR CURTAIL FUTURE USE OF THE PROPERTY.

ONE OF THE REAL PROBLEMS WE AS LANDOWNERS HAVE WITH THE WHOLE ISSUE OF POST MINING LAND USE (PMLU) IS THAT THE DETERMINATION IS MADE COMPLETELY OUT OF CONTEXT AND SOME OF US WOULD SAY IN A VACUUM OF FACTS.

THINK ABOUT A TYPICAL MINE THAT IS NOW BEING PERMITTED AND PLANNED. THE PERMITTING PROCESS, WHICH FOLLOWS LAND ACQUISITION, MAY TAKE A COUPLE OF YEARS, THEN MINE START-UP TIME AND FINALLY MINING AND CONTEMPORANEOUS RECLAMATION FOR WHAT MAY BE A 10-20 YEAR TIMEFRAME.

HOWEVER, BECAUSE THE POST MINING LAND USE MAY REQUIRE CERTAIN SPECIFIC MINE PLANNING AND RECLAMATION

DECISIONS AT THE TIME OF PERMITTING, WE ARE REQUIRED TO MAKE A DECISION ON PMLU's THAT MAY BE DECADES BEFORE THE LAND WILL ACTUALLY BE AVAILABLE FOR THAT USE. THEN WE ADD FIVE YEARS AFTER MINING FOR BOND RELEASE TO THE WHOLE PROCESS.

JEFF JARRETT THIS MORNING CALLED IT "PLANNING FOR NOW NOT PLANNING FOR THE FUTURE". NO ONE IS SMART ENOUGH TO BE ABLE TO PREDICT WHAT THE BEST USE OF THAT LAND WILL BE FOR ALL THE STAKEHOLDERS 20+ YEARS FROM NOW.

WE HAVE TO TRY TO DO SOMETHING TO BUILD SOME DEGREE OF FLEXIBILITY INTO THE RECLAMATION AND PERMITTING PROCESS SO THAT WE CAN POSTPONE THE ULTIMATE PMLU DECISION AS LONG AS POSSIBLE IN ORDER TO BE SURE WE ARE MAKING A DECISION, BASED ON ALL THE FACTS, THAT IS BEST FOR ALL STAKEHOLDERS.

I WOULD ASK, RHETORICALLY, CAN WILDLIFE HABITAT AS A PMLU BE USED AS A "HOLDING" USE SO THAT <u>IF AND UNTIL</u> A BETTER USE COMES ALONG, IT IS USED AS HABITAT. THAT MAY BE POSSIBLE, BUT I WILL TELL YOU THAT UNDER SOME OF THE CONSERVATION EASEMENTS OUR MEMBERS SHARED WITH ME, THEY WOULD FOREVER FORFEIT THE HIGHER AND BETTER USE OPTION.

WILL LANDOWNERS DO THAT? PROBABLY NOT OUT OF THE GOODNESS OF THEIR HEARTS OR FOR SOME ALTRUISTIC REASON. BUT THEY MIGHT DO IT FOR SOME FORM OF CONSIDERATION.

EACH OF US AS BUSINESS OWNERS OR MANAGERS ARE REQUIRED EACH DAY TO MAKE ECONOMIC DECISIONS LIKE THIS ONE. OUR TYPICAL REASONING PROCESS WOULD GO SOMETHING LIKE THIS: IS IT BETTER FOR ME TO GET "X" DOLLARS TODAY OR A TAX CREDIT OF "X" DOLLARS VALUE TODAY OR A SAVINGS OF "X" DOLLARS TODAY AS OPPOSED TO NOT GETTING ANYTHING UNTIL THE SUPER WAL-MART IS BUILT HERE IN MAN, WV, IN 2058.

THERE IS A BALANCING OF ECONOMIC VALUES ANALYSIS THAT GOES ON AND LEADS TO RATIONAL DECISIONS.

THE QUESTION THEN BECOMES: "CONSIDERING THE RISK THAT IT WON'T EVER HAPPEN, WHAT IS THE CURRENT NET PRESENT VALUE OF THE AMOUNT I CAN SELL THIS LAND FOR IN 2058"? THAT AMOUNT IS GOING TO DIFFER GREATLY, DEPENDING UPON LOCATION AND INFRASTRUCTURE AVAILABILITY, INCLUDING ROADS, SEWER, POWER, WATER, SCHOOLS, ETC. A 500-ACRE MOUNTAINTOP REMOVAL SITE NEXT TO BECKLEY – IF THERE WAS ONE – IS WORTH FAR MORE TODAY THAN THE SAME SITE NEAR OCEANA OR MAN OR GILBERT.

SO TO ME THAT IS THE CHALLENGE YOU FACE IN DEALING WITH LANDOWNERS TO CONVINCE THEM TO ALLOW THE WILDLIFE HABITAT PMLU AND CONSERVATION EASEMENTS BECAUSE MANY COAL OWNERS HAVE LEASE PROVISIONS THAT GIVE THEM VARYING LEVELS OF CONTROL OVER PMLU DECISIONS, AND THEY WILL ALL STILL OWN THE LAND, "WHEN THE COAL IS GONE".

IN MANY WAYS, THOUGH, THE DECISION MAKING PROCESS WILL BE EASIER IF THE SAME ENTITY/PERSON OWNS THE COAL AND THE SURFACE. THAT PERSON WILL HAVE DERIVED A MAJOR ECONOMIC BENEFIT FROM THE MINING OF THE COAL.

HOWEVER, IF DIFFERENT PARTIES OWN THE COAL AND THE SURFACE, YOU HAVE CONFLICTING INTERESTS. I HAVE NEVER YET MET A SURFACE OWNER WHO DID NOT WANT SOME OR ALL OF HIS SURFACE LEFT FLAT AFTER MINING – AND IT IS NOT SO THEY HAVE GREATER VISIBILITY TO HUNT THAT BIG BULL ELK.

IT MAY WELL BE THAT THE SURFACE OWNERS' SOLE ECONOMIC BENEFIT (OR AT LEAST HIS GREATEST BENEFIT) WILL COME AFTER MINING – AND I BELIEVE IT WILL BE HARD TO CONVINCE THAT PERSON TO GO ALONG WITH WILDLIFE HABITAT AS THE PMLU.

PROBABLY THE MOST TYPICAL SITUATION IN CENTRAL APPALACHIA WILL BE WITH MORE THAN ONE MINERAL OWNER AT A MINE SITE AND MULTIPLE – MAYBE SCORES – OF SURFACE

OWNERS. MANY WILL HAVE UNDIVIDED INTEREST OWNERSHIPS AND IN ALL PROBABILITY, SOME LOST OR MISSING HEIR OWNING SOME INTEREST. SOME WILL LIVE NEAR THE MINE, OTHERS LIVE IN DETROIT, CHARLOTTE, ATLANTA, OR SOMEWHERE AND MAY NEVER HAVE SEEN THE PROPERTY. I CAN GUARANTEE THAT THEY HAVE DIFFERING VIEWS OF WHAT THE PMLU SHOULD BE.

LET ME TOUCH ON A FEW OTHER ISSUES RELATING TO WILDLIFE MATTERS AND THEN I WILL EITHER TAKE QUESTIONS OR SIT DOWN.

THERE HAS BEEN SOME DISCUSSION TODAY ABOUT SEDIMENT STRUCTURES AND THEIR VALUE TO WILDLIFE HABITAT. WE AT NRP, AND NEARLY EVERY MEMBER OF NCCL WITH WHOM I'VE TALKED, ARE VERY RELUCTANT TO ALLOW THOSE TO STAY. WE KNOW THEIR VALUE BUT WE ALSO KNOW THEIR RISKS AND LIABILITIES. WE, AND OUR INSURANCE CARRIERS, THINK THAT RISK IS HEIGHTENED DUE TO THE FACT THAT WE HAVE TO AFFIRMATIVELY DO SOMETHING TO HAVE THOSE LEFT ON THE PROPERTY. BY WAY OF SUGGESTION, PERHAPS IF WILDLIFE HABITAT IS THE APPROVED PMLU, THE REGS OR LAW COULD BE CHANGED TO REQUIRE THAT THOSE BE LEFT ON-SITE. THAT MIGHT HELP SHIFT THE RISK.

THE NEXT ISSUE, AND JON GOSSET TALKED ABOUT THIS THIS MORNING, MOST OF US HAVE FORESTERS ON STAFF OR

UNDER CONTRACT BUT WE WERE THE ONLY COMPANY THAT I FOUND THAT HAD A WILDLIFE MANAGEMENT DEGREED PERSON ON STAFF. IF WILDLIFE HABITAT AS A PMLU IS GOING TO BE A FOCUS, THEN A COMMUNITY OF INDIVIDUALS WITH THE PROPER TRAINING IN BOTH WILDLIFE MANAGEMENT AND RECLAMATION NEEDS TO BE TRAINED AND AVAILABLE TO ASSIST LANDOWNERS AND MINERS. THIS EXPERTISE DOES NOT HAVE TO BE FREE BUT IT DOES HAVE TO BE AVAILABLE.

LASTLY, I WAS SURPRISED HOW MANY OF THE NCCL MEMBERS WERE USING PRIVATE HUNTING LEASE PROGRAMS ON THEIR SURFACE PROPERTY. WE HAVE NEARLY EVERY ACRE OF OUR PROPERTY LEASED TO LOCAL HUNTING CLUBS. NO OUTFITTERS, NO ABSENTEE CLUBS – ALL LOCAL GROUPS – THEY MIGHT BE A FAMILY, OR A RURITAN CLUB OR A GROUP OF MINERS OR JUST A BUNCH OF HUNTING BUDDIES. WE CHARGE BETWEEN $1 AND $2 PER ACRE PER YEAR WHICH SEEMED TO BE STANDARD. BUT OUR REAL BENEFIT IS NOT THE MONEY, IT IS THE CARE OF THE LAND. A LOCAL HUNTING CLUB WILL NOT ALLOW TRASH TO BE DUMPED WHERE THEY ARE GOING TO HUNT, THEY WILL BE THE FIRST TO FIGHT A FOREST FIRE, AND THEY WON'T ALLOW TRESPASSERS OR POACHERS. THAT IS THE REAL VALUE THAT ALL OUR MEMBERS SEE. OPEN HUNTING DOES NOT CREATE THE SENSE OF OWNERSHIP THAT A LOCAL CLUB HAS. IF

WILDLIFE AS A PMLU INCREASED THE VALUE OF THE PROPERTY AS A HUNTING LEASE, THAT IS A REAL BENEFIT TO LANDOWNERS.

AGAIN, I WANT TO OFFER THE ASSISTANCE OF THE NATIONAL COUNCIL OF COAL LESSORS TO THIS WHOLE PROCESS THAT WE BEGIN HERE TODAY. MY PHONE NO. IS 304/522-5757 AND EMAIL IS @wpplp., SO CONTACT ME IF WE CAN HELP.

THANKS.

Nick Carter
President & Chief Operating Officer
Natural Resource Partners L.P.
P. O. Box 2827
Huntington, WV 25727-2827
Tel.: 304/522-5757
Fax: 304/522-5401

NC/g
8/12/05

Remarks of
The Honorable
Rebecca W. Watson
Assistant Secretary, Land and Minerals Management
Reclamation for Wildlife Summit
Louisville, Kentucky, June 23, 2005

Introduction

Good morning. I am very happy to be here for this meeting. It is the first-ever national summit on reclaiming mined land for wildlife sponsored by the Office of Surface Mining (or OSM). I hope you have enjoyed this morning's sessions. I know I am looking forward to learning more this afternoon.

I'd like to recognize the folks who put this forum together. About a year and a half ago, Dave Ledford of the Rocky Mountain Elk Foundation and Tom Bennett, former Commissioner of the Kentucky Department of Fish and Wildlife Resources, approached the Interior Department to discuss ways to encourage planting wildlife-friendly vegetation as part of coal mine reclamation.

We listened! As a result of discussions over several months, the idea for this summit was born and today, thanks to the hard work of a lot of people here in this room, it is a reality.

I would like to thank Dave and Tom, and also recognize the Rocky Mountain Elk Foundation. This Montana-headquartered organization is one of the founding members of the American Wildlife Conservation Partners and is helping to bridge wildlife and land-use interests at the Department of the Interior. They have worked overtime in the process. I also would like to thank OSM Director Jeff Jarrett for his leadership in putting this forum together and his staff for making it happen. And finally, let me recognize the coal industry, the state and local governments, and the many other groups and organizations represented here today.

This is an important kick-off to what I hope will be a continuing and productive dialogue on mine reclamation and wildlife habitat. You may not realize it, but by your participation you are helping to put in motion some of Secretary Gale Norton's highest priority initiatives – cooperative conservation, responsible energy development, enhanced recreation opportunities and abandoned mine reclamation.

Department of Interior

The Department of the Interior manages about 1 in every 5 acres of land in the U.S. Interior programs provide the resources for about 30 percent of domestic energy production in the country. This includes coal, oil and natural gas production as well as renewable energy such as wind, solar, geothermal and biomass energy.

I oversee three bureaus that are directly involved in energy production. The Office of Surface Mining, (OSM), The Minerals Management Service, (MMS) which manages off-shore oil and gas development, and when the Energy Bill passes, alternative energy; and The Bureau of Land Management, (BLM) which manages 700 million acres of onshore mineral estate, including more than 261 million surface acres managed for "multiple uses."

National Energy Policy and Interior's Roll

Director Jeff Jarrett spoke earlier this morning about the direction OSM is taking regarding reclamation and post mining land use and how you can – *need* to – be a part of that. Now, I would like to put this discussion into a larger context – and that is the President's Energy Policy and the Department of Interior's role in implementing it.

I was amused by the New York Times Liquified Natural Gas/LNG article last week that said the Century was shaped by coal, the century by oil, but concluded the century would belong to natural gas. *(June 15, 2005: "Demand for Natural Gas Brings Big Import Plans, Objections.").*

That <u>may</u> be true, but we all know that coal will continue to be a large part of our national energy portfolio for some time to come. Even with today's diverse energy portfolio that includes oil, natural gas, nuclear power, and renewable energy sources, <u>coal</u> remains our number one energy source – providing more than 50 percent of our electricity.

Many people ask, why do we continue to depend on coal? The answer is simple - It is abundant, affordable and available in America.

Today, we import 65 percent of the crude oil used in U.S. refineries. Just 20 years ago, we only imported about 25 percent. At the same time, we are facing a natural gas supply crunch in this country. Demand is increasing as gas has replaced coal in many new power plants. As a result, natural gas prices have skyrocketed. And while we still produce most of our natural gas here at home, the Department of Energy predicts that by 2025, demand will grow by 50 percent and domestic production by only 14 percent. That leaves a 36-percent gap in natural gas supply that will increasingly be met by imported LNG.

This is a global issue. In looking at the nation's energy situation, we have to look beyond our borders and think about global markets. And when we do that, it becomes clear there will be increased competition for energy in all parts of the world for some time to come. Energy demand is already rising exponentially in emerging economies such as China and India. Today, the Wall Street Journal reports that China is the second largest consumer of oil after the U.S. and is bidding against Chevron for ownership of Unocal Oil Company.

This global demand is driving up prices and will limit supplies, making domestic energy production that much more important to our national security and to our economy.

But the U.S. remains rich in coal. In fact, the United States owns about a quarter of the world's estimated coal reserves -- about 250 years worth by most estimates. That is why the President's energy policy recognizes the importance of coal. It directs federal agencies to provide regulatory certainty for coal-based electricity generation. And it calls for investments in clean coal technologies to address air pollution and carbon emission challenges.

The President's policy also looks forward. Frequently lost in the discussion is the fact that of the 105 National Energy Policy recommendations, over half are directed at conservation and alternative energy development. The reality is, however, we will continue to rely on coal-produced electricity for a long time while alternative energy sources are developed and brought online.

The National Energy Policy also makes it clear that we must produce energy in an environmentally responsible way. The President has said, "…energy

production and environmental protection are not competing priorities. They are dual aspects of a single purpose -- to live well and wisely upon the earth."

We at the Interior Department have taken these words to heart. We have made it a priority to ensure that energy development and environmental protection go hand in hand. Folks at OSM have been doing this for over 25 years. It is one of the most important purposes of the Surface Mining Control and Reclamation Act of 1977, which identified the need to strike a balance between protection of the environment and the Nation's need for coal as an essential source of energy.

Examples of Energy and Wildlife

Let me give you some examples of how we are working with the wildlife community in the Western United States where natural gas production and wildlife issues are in the national spotlight. (i.e. this month's National Geographic and a 2-part issue of Rocky Mountain Elk Foundation Bugle)

The United States has the sixth largest resource of natural gas in the world. These resources exist mostly off-shore and in five geologic basins near the Rocky Mountains from Montana south to New Mexico. Much of this resource is managed by the BLM. By law, BLM must balance energy development with a multitude of other public land uses, such as recreation, timber, wilderness, ranching, and protection of wildlife habitat.

As BLM intensifies permitting in these energy-rich areas, our wildlife partners have been actively involved with our efforts to protect habitat for sage-grouse, elk and a number of other species. Pinedale, Wyoming, is an area that is particularly rich in energy. It is also very rich in wildlife. These foothills provide important winter habitat for herds of pronghorn, mule deer and elk. The sage-grouse is a year-round resident. In addition, increasing numbers of people are moving into this picturesque area located not too far from the Yellowstone and Teton National Parks.

The Secretary has created a special Advisory Committee to involve the community in managing public land issues resulting from this increased activity. A wildlife working-group is focusing on monitoring big game and sage-grouse in and around natural gas developments. A full-time State game and fish biologist, funded by BLM and the Forest Service, is helping. Industry also has stepped up their efforts to protect wildlife habitat. Just this month,

Shell Oil announced a donation of $1 million to be used for sage-grouse research in Pinedale, Wyoming.

Jim Mosher, Executive Director of North American Grouse Partnership, wrote for the upcoming issue of *Grouse Partnership News*, that the more progressive energy companies, "for reasons of good stewardship and good business…want to operate in ways that are sensitive to and protective of the wildlife resources with which they share the landscape." These energy companies are burying their electric, gas and water lines, using narrow 2-track roads, and smaller well pads and co-locating facilities to make a smaller footprint on the land.

BLM and the wildlife community are working closely with energy companies to encourage them to take these kinds of extraordinary measures to protect wildlife and other natural resource values. My point is, while we take our responsibility to support energy development seriously, we are not the energy department. We manage for a number of public land uses. Our goal is to develop a higher standard for responsible energy development on public lands.

OSM and Reclamation

But private lands provide more habitat for a far greater number of wildlife species than do federal public lands. In fact, 75 percent of endangered species occur on private lands. And most private landowners want to protect wildlife on their lands, whether for " good stewardship" or "good business." The role of the Federal government should be to support these efforts.

The Office of Surface Mining has a long history of working with private landowners. OSM routinely interacts with the public on a variety of coal mining and reclamation issues.

Since its founding nearly 28 years ago, OSM, using fees paid by coal companies, has provided $1 billion in grants to States and Indian Nations to help fund regulation of active coal mines, and an additional $3 billion in grants to clean up health, safety and environmental hazards associated with abandoned coal mines.

OSM recently proposed a new revegetation rule to further encourage plant diversity on reclaimed mine lands and remove impediments to planting trees. *(The comment period on the draft closed May 17)*. It is our hope that, when

finalized, this rule will take us a long way toward restoring mined lands to the kind of healthy, thriving and diverse landscapes that existed before mining took place.

OSM recently sponsored a number of Arbor Day events, joining partners ranging from the U.S. Forest Service, and the American Chestnut Foundation, to State agencies to elementary schools. These partners planted hardwood trees on reclaimed mined land in several states. The tree plantings are an important part of OSM's Appalachian Regional Reforestation Initiative.

Coal companies have done some remarkable reclamation work. As far back as 1954, before the passage of the Surface Mining Control and Reclamation Act of 1977 (SMCRA), what is now Peabody Energy Corporation launched "Operation Green Earth" to plant trees and reintroduce fish and wildlife on mined lands. Today, we have the 2,000-acre Peabody River-King Fish and Wildlife Area in Southern Illinois and the 64,000-acre Peabody Wildlife Area in Western Kentucky.

The Sandow Mine in Texas operated by ALCOA Inc. (formerly the Aluminum Company of America) is one of several mines that have been recognized over the years for maintaining and improving the quality of wildlife habitat during and following active mining.

I would also like to mention a Western initiative that I just recently learned about from Peabody Coal called the Thunder Basin Grasslands Prairie Ecosystem Association. Their objective centers around private landowners taking the lead in a responsible, common sense, science-based approach to long-term management of their lands – 931,000 acres in Wyoming.

More exceptional reclamation activities are highlighted in OSM's annual "Excellence in Surface Coal Mining Reclamation Award Winners" program.

Importance of Cooperation

In this meeting today, we want to start to build on these individual successes– to bring more attention to the growing interest in creating fish and wildlife habitat as a viable post mining land use. For this we need your ideas, thoughts and experiences on how to achieve this. I give you my word that OSM will carefully consider all recommendations that come out of this summit. This is what we call Cooperative Conservation.

The Secretary introduced the 4-C's concept in 2000. Although the ideas are still sound, no one can seem to remember all the 4 Cs. Or some people name 5 or 3. But here they are: Communication, consultation, and cooperation, and all in the service of conservation. Today, we have simplified it. We talk about 2-Cs – Cooperative Conservation.

This meeting is "cooperative conservation" in action. In looking at the registration, I was impressed with the diverse audience here today. In addition to Eastern States we have Western, Midwestern and even international representation. You are gathered here with government, industry, utilities, wildlife groups, citizen groups, coal associations, and environmental engineering consultants.

This is an opportunity for a meaningful exchange of information – an opportunity to share your experiences from past accomplishments and ongoing operations. It is this collective knowledge that will help us shape the future. I would like to emphasize this point: We will listen to you, just as we have listened to the wildlife community's ideas about energy development in the West. And it's not a one-time offer -- it is an ongoing dialogue.

It is this kind of dialogue that the Secretary envisions when she talks about the Department's highest priorities – including responsible energy development, cooperative conservation, and enhanced recreation opportunities. By being here today, you are perhaps reaching outside of your "comfort zone," to help us identify, evaluate, support and apply innovation to the coal mining industry.

I want to thank all of you for your time, your input and for a willingness to think differently and creatively. I look forward to seeing the recommendations that come out of this summit.

Thank you for being here. I would be happy to answer any questions.

END

diana Department of Natural Resources
vision of Reclamation
bandoned Mine Lands Program

Mark Stacy, Environmental Specialist

The Use of Wildlife Enhancement Techniques
by the Indiana Abandoned Mines Lands Program

Vildlife Habitat

iodiversity

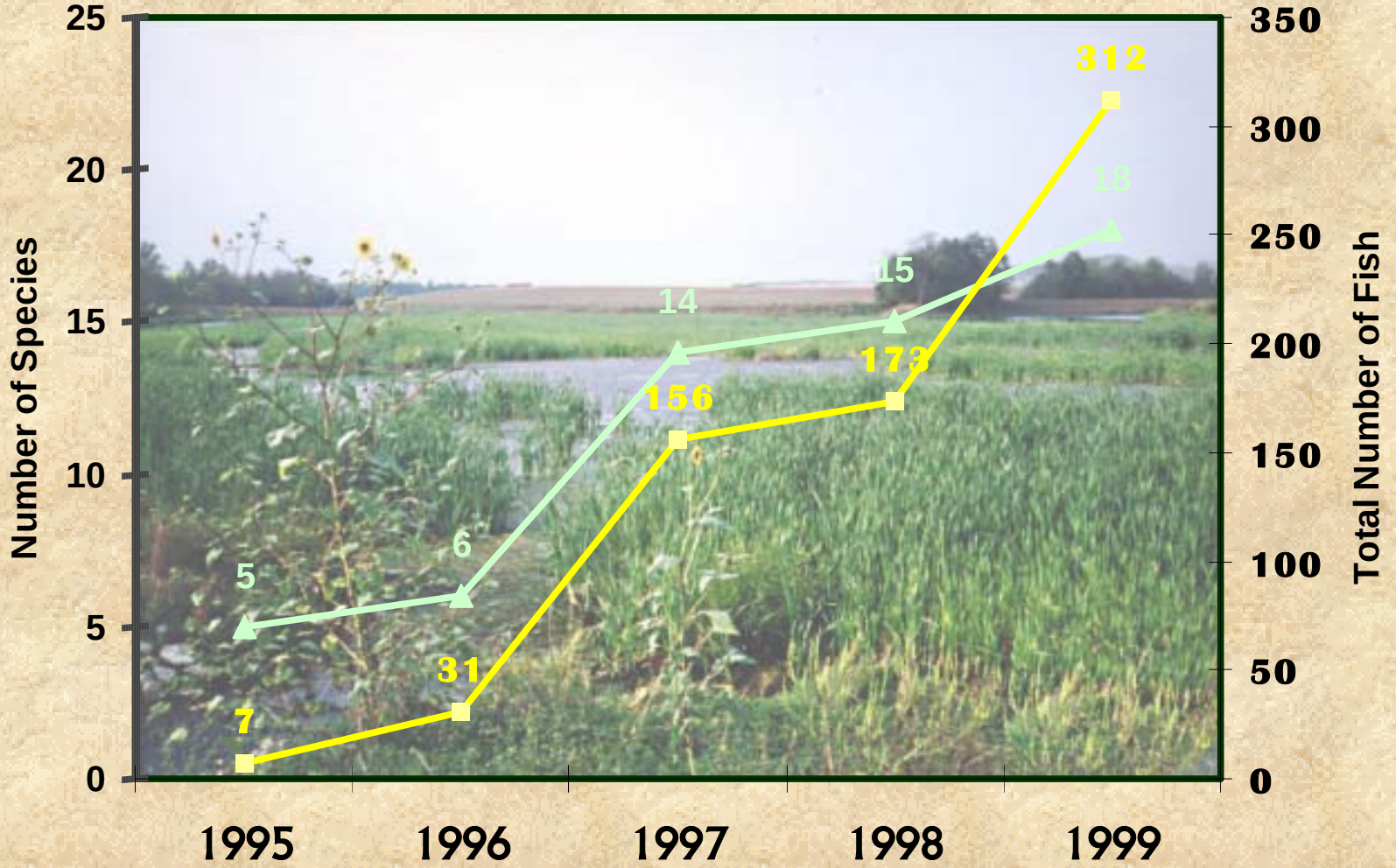
implicity

Barren Fork Creek Biological Survey

US Fish & Wildlife Service

AML Site 262, Tecumseh - Sample Station No. 1

Reclamation Project 7/15/94 to 6/25/96



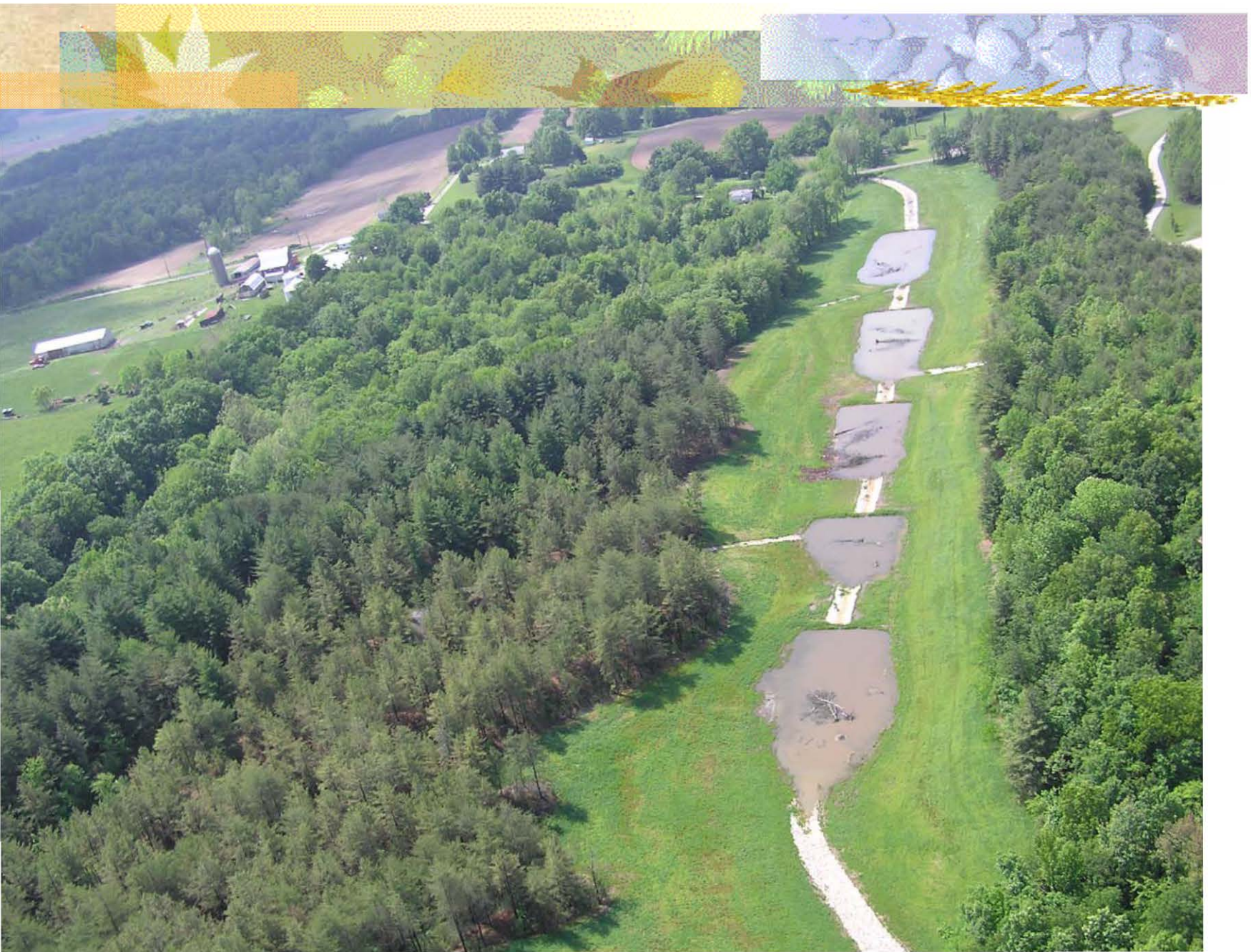
Avoidance

COAL
MINE

Native Warm-Season Grass

Brush/Rock Piles

Water Control Structures



Wetland Development

West Virginia Mining Coordination Program

WILDLIFE
WEST VIRGINIA
DIVISION OF NATURAL RESOURCES

Ecological Succession

The orderly progressive replacement of one community by another until a relatively stable community occupies the area.

Mining began in WV around 1916

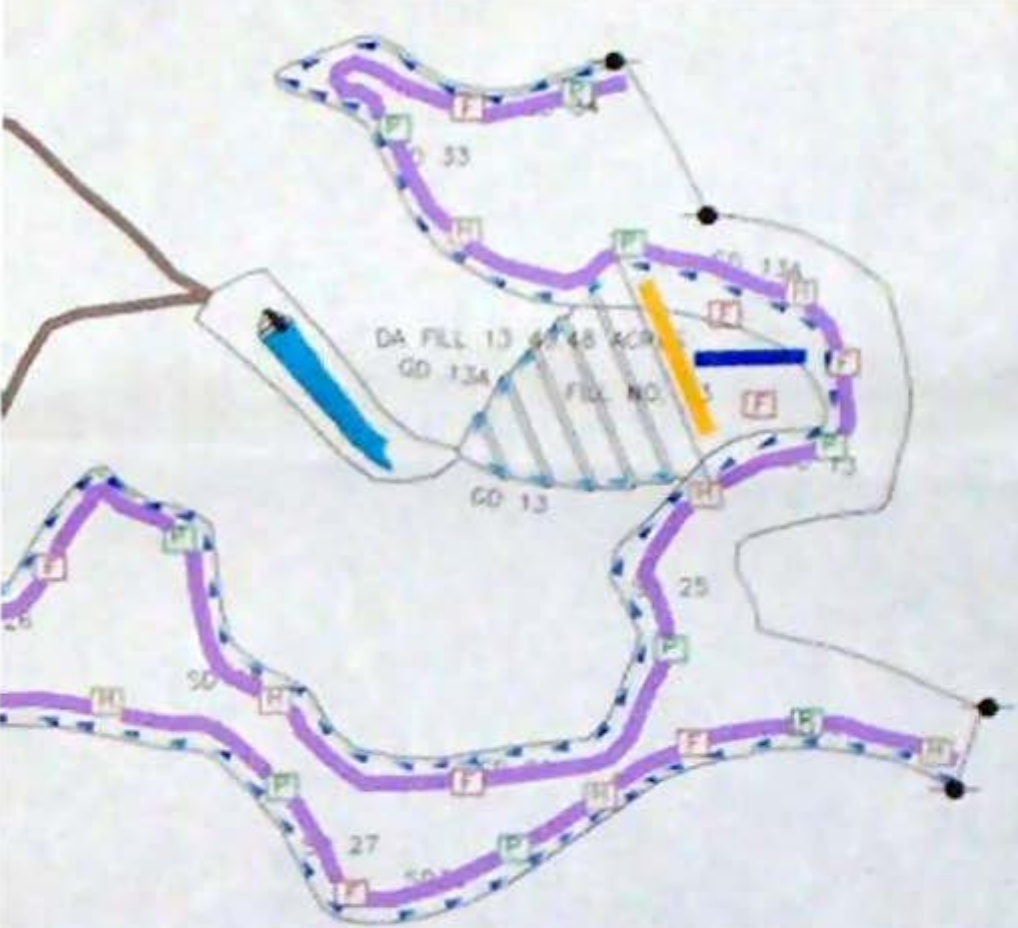
Surface Mine Reclamation Control Act of 1977

1981 - WVDNR Impliments Mining Coordination Program

Table 1. Revegetation Plans and Mine Preplans by Fiscal Year (July 1 To June 30)

Fiscal Year	Mine Preplans	Revegetation Plan Acreage
1981	80	17,244
1982	417	16,240
1983	383	16,548
1984	400	27,000
1985	285	11,000
1986	227	2,100
1987	276	no data
1988	250	no data
1989	261	no data
1990	390	12,559
1991	375	13,600
1992	237	3,450
1993	308	3,000
1994	263	5,311
1995	241	5,894
1996	175	3,656
1997	196	8,150
1998	162	9,646
1999	151	2,657
2000	153	6,900
2001	145	2,652
2002	139	2,543
2003	119	2,223
2004	140	7,477
Total	5773	179,850

Note: no data = years DNR was not permitted to complete revegetation plans but continued to review permit applications.



PLANTING LEGEND

4 ACRES	F	1/4 ACRE FRUIT TREE BLOCK (WILD PLUM, CHERRY, ETC.)
3.00 ACRES	H	1/4 ACRE HARDWOOD BLOCK (OAK MIX.)
4.25 ACRES	P	WHITE OR VIRGINIA PINE 10 X 10 SPACING OR 5 ROWS
1.43 ACRES		4 ROWS AUTUMN OLIVE
.94 ACRES		2 ROWS BLACK ALDAR 2 ROWS DOGWOOD

to the best of my knowledge and belief all the information required by the mining laws of this state.

By: _____

No. 7352

Taken, subscribed, and sworn to me this 19th day of November, 2001

_____ Notary Public

My commission expires 5/12/__

*The term "Certify" as used herein is defined as follows: The certification of conditions is a declaration of professional judgment and does not constitute a warranty or guarantee either expressed or implied. Nor does it relieve any other party of their obligation or responsibility to adhere to applicable rules, standards, regulations, or any other applicable rules, ordinances or contract documents. Base mapping furnished by the applicant. Determination of accuracy and completeness is based on the representation of site conditions either existing or proposed.

Enviro Consulting Services, LLC shall not be liable for any loss or damage arising out of or due to failure of the operator/permittee to comply with all applicable safety regulations, rules, laws, or operation/permitting, the operator/permittee shall operate and maintain equipment in safe condition and communications while inspecting.

No.	Date	Revision	By	Job No.
1	02/28/01	NEW DRAWING	RP	PCC-002-01
2	8/5/01	CORRECTIONS	RP	PCC-002-01
3				
4				
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6				
7				
8				
9				

Job No.: PCC-002-

Drawn By: RP

File Name: COPLEY2_

Scale: 1" = 5

Quad: TRA

District: HART

County: LIN

PEN COAL CORPORATION

Route 1 McComas Road, P.O. Box 193
Dunlow, WV 25511

COPLEY TRACE NO. 2 SURFACE MIN
PERMIT No. S 5026-98 NPDES No. WV1
AMENDMENT NO. 1

PLANTING MAP

'99 8 13

Contour

MTR

West Virginia Mining Coordination Program

June 2005

Randy Kelley

Wildlife Biologist

West Virginia Division of Natural Resources

Introduction

Ecological succession "is the orderly progressive replacement of one community by another until a relatively stable community occupies the area." (Smith 1974). Smith's definition is based on systematic progression of the vegetative community from primary to climax following the removal of the existing community by natural or man induced means. This re-growth and replacement occurs in stages. I don't think Dr. Smith had mining in mind when he developed his definition. Surface coal mining may offer the "ultimate" in early stage succession. Following mining, the reclamation of both the soil and vegetative communities is required by state and federal law. It is this reclamation that offers managers the opportunity for early successional stage habitat management.

With the passage and implementation of the Surface Mine Reclamation Control Act of 1977 the West Virginia Division of Natural Resources (WVDNR) became aware of opportunities to provide technical assistance to the mining industry regarding Fish and Wildlife issues on mined lands. The agency worked closely with the industry in order to facilitate our involvement in the reclamation process with regards to wildlife habitat reclamation needs. Our goal was to foster better reclamation that would increase wildlife populations, reduce impacts to our fishery resources and meet regulatory soil stabilization criteria.

Mining Coordination

In 1981 the WVDNR implemented a Pittman Robertson/Dingle Johnson project entitled Mining Coordination. The federal aid project had two objectives: 1) To coordinate with state and federal mining authorities reviewing mining permit applications so that recommendations regarding permit approvals and conditions are made and 2) To

provide technical assistance regarding the use of effective reclamation techniques that will benefit fish and wildlife on mined lands. The program was staffed with five biologists located regionally within West Virginia's coalfields. This service is provided at no cost to the company.

It is difficult to estimate the amount of surface disturbance and reclamation that has been completed since SCMRA"s inception because of the fluidity of the mining reclamation process that is driven by coal market conditions. However, the WVDNR does have program records that indicate that we have prepared Fish and Wildlife Reclamation Plans (wildlife plans) for nearly 180,000 acres from the inception of our program in 1981 to present (Table 1). This unfortunately does not mean that this many acres have been planted for wildlife. It was common practice through the 1980's and 90's to get wildlife plans in the permitting process but to modify the post-mining land use to pasture or rangeland once reclamation was ongoing to avoid having to plant trees and shrubs.

In addition we have provided reviews and comments on 5,773 mine preplans (land inquiries). These preplans are submitted to us for review as an indication of an initial intent to mine in an area. Our program biologists provide comments back to the mining company regarding fish and wildlife issues of concern to help reduce impacts to these resources and recommend enhancements to benefit these resources.

Fish and Wildlife Revegetation Plans

The primary objective of the Fish and Wildlife Reclamation Plans is to speed the development of early successional stage habitats that would benefit wildlife on what had previously been left as open undeveloped grasslands by the mining companies. In order

to obtain a plan from the WVDNR companies are required to submit maps detailing the proposed mine complex. The Wildlife Biologist and the landowner select targeted wildlife species so that plant species selection and spacing can be determined. After completion the plans are then included in the mining permit application and will become part of the permit if it issued.

Table 1. Revegetation Plans and Mine Preplans by Fiscal Year (July 1 To June 30)

Fiscal Year	Mine Preplans	Revegetation Plan Acreage
1981	80	17,244
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Total	5773	179,850

Note: no data = years DNR was not permitted to complete revegetation plans but continued to review permit applications.

In the early years of this program most surface mines were contour mines which left native plants above and below the mined area. Initial changes had to be made in the grass mixtures that were being used in order to get a more favorable wildlife ground cover. However ground cover requirements led to extremely heavy seeding rates and thus very dense ground cover. The tree and shrub plantings in the plans were designed using block and row plantings to break up the large open areas and provide travel corridors between the top and bottom slopes. Plant species used were selected based on their food and cover values for the target species. Fast growing and productive soft mast shrubs and trees were the plants of choice in most cases. These species are the typical invader species in early succession so planting these in the beginning gives the site a jumpstart on development of a plant community.

Soil complexes at these mine sites are often drastically different than the original soil and required compaction left them very hard. Experimentation with a variety of plant species was required to find those that would grow on hard altered mine soils, could compete with the heavy ground cover, and could withstand altered soil moisture regimes. Since these plans were part of the mine permit their implementation and success were critical to the mining companies. If the suggested species failed to survive then the company would have to replant leaving the company less likely to use wildlife plans on future permits. Native hardwoods were not often planted as their success rates were low but older site reviews indicate that they have been able to recolonize the contours through natural regeneration.

As MTR mining began to replace contour mining as the preferred surface mining technique Wildlife Revegetation Plans were adapted to fit the larger disturbance areas.

Block and rows are still used but larger blocks and longer rows are required. Unfortunately the same obstacles to plant growth that exist on the contours are also present on MTR sites. In fact soil compaction is much greater and the absence of a seed source from above for natural regeneration greatly retards the regrowth of native hardwoods which are vital to wildlife. Also of greater concern on the MTR sites was the pH of the new topsoils that are being used. Regulations called for them to be near a 7.0 pH but hardwoods prefer a more acidic soils.

Lawsuits over the legality of the large valley fills that are needed for MTR mining have brought the reclamation of MTR sites into the public eye. The use of Wildlife as post-mining land use decreased during this time due mostly to what we see as a lack of understanding of the process and the obstacles that had been placed on their development. This resulted in a drop in the participation in our program although so far in 2005 we have seen some improvement. Although things continue to be disputed the scrutiny caused by the lawsuits has led to changes in reclamation practices that will benefit the planting of more native species particularly hardwoods. These changes have been aimed at forestry related post-mining land uses but we have been able to incorporate them into our plans. Although they are still a work in process the changes are the hope of the future. In addition we must overcome the negative connotation that has been placed on the wildlife plans and make these plans attractive to landowners and operators.

‘Coal Program – Cooperative Highlights’

West Virginia Department Environmental Protection

Louisville, Kentucky; June 2005

“Mine Reclamation for Wildlife Summit…”

- **Stephanie R. Timmermeyer**

  Cabinet Secretary

  www.wvdep.org

Division of Mining and Reclamation

Randy Huffman, Director

In Cooperation With:

- WV Coal Industry
- WVDNR Wildlife Resources & State Parks
- US Army Corps of Engineers
- US Environmental Protection Agency
- US Fish & Wildlife Service
- US Office of Surface Mining

Coal Project Sources

- Stream Mitigation Fund
- Abandoned Mined Lands (pre-SMCRA)
- Special Reclamation (post-SMCRA)
- Routine Reclamation (SMCRA)
- Others-Entrepreneurial or Civic

West Virginia

Project Locations

'The Mountain State'

Blackwater Falls

- Famous Landmark!

Blackwater River (Falls)

- Affected by Acid Rain/Mine Drainage
- Until 1994 Lime-Drum Neutralization
- A ‘Plop-Plop, Fiz-Fiz’ Restoration Success
- Trout Fishery/Local Economy Improves

Lime Drum Treatment/Results!

Chief Logan State Park

In the Heart of the Coalfields Chief Logan State Park Gets:

- **A 685-Acre Addition** - roughly half to the park, remainder to Wildlife Management Area (WMA)
- **A 7-Acre Fishing/Recreation Dam**

Chief Logan S. P. Amenities

Red Creek-Dolly Sods Wilderness

For the Red Creek Project

- Bringing Back the Brook Trout …
- Project Currently in Process
- 920-Acres of WMA
- Access & Limestone Sand Treatment to restore 14 miles of stream fishery!

Rockhouse Lake WMA

- A 14-Acre Fishing Lake
- With 4-Acre Wetland
- 100 Acres of land

Wallback WMA

- **<u>A 15-Acre Fishing Lake</u>**
- Shooting Range too
- Under Construction at Present

And That's Not All Folks!

- **Pedlar WMA** - Lakes and Acreage
- **Middle Fork River** – Limestone Sands
- **Philippi City Park** – Acreage/River Access
- **Pleasant Creek WMA** – Acreage
- **Lick Creek** - Lake
- **Anawalt WMA** – Lake and Acreage
- **Kanawha Flat Rocks** – unique area to The Nature Conservancy and others…

And Lots of Other Projects

- Little Boyd Coal Co.
- Small Natural Stream Channel Design and Restoration
- With Re-mining

Aquaculture Too

Children's and Handicapped Access

- Small Ponds

Early Successional Habitats/Species

- Bobwhite Quail, Elk and others…

Participating Operators

- Anker Coal Group
- Buffalo Coal Co.
- Fola Coal Co.
- Peabody Energy
- Pittston Co.
- Whiteflame

Arch Coal, Inc.
Consolidation Coal
Massey Energy Co.
Argus Energy (Pen)
Premium Energy
……and others

That's All Folks ...Thank You!

Reclaiming Coal Mined Land for Fish & Wildlife…

Hosted by the U.S. Office of Surface Mining

June 23, 2005

Breakout Session: Revegetation/Habitat Restoration

Subject

CONSOL Energy Conservation Partner Program

Burning Star #5 Mine, Illinois

Dennis Fredericks, CONSOL Energy

Goal of this conference:

Explore ways to increase the amount of fish and wildlife habitat created on reclaimed mine lands.

Burning Star #5 Surface Mine

West-Central Illinois

8,500 Permitted Acres

Final Bond Release in 2004

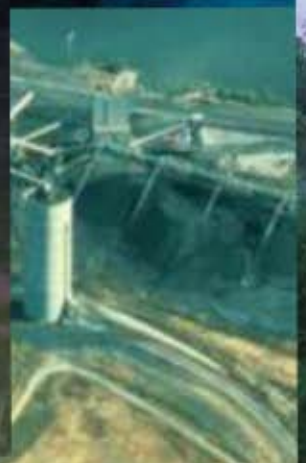
OSM & Other Awards

O&K
RH 200

Wildlife Habitat ???

Does disturbed land have any value??

Which species need habitat ?



Texas

Illinois

ENERGY
for Wildlife
NATIONAL WILD TURKEY FEDERATION

Montana

Opportunity + Partners =

Wildlife

The Kentucky Reforestation Initiative

The Kentucky Department of Natural Resources

Paul Rothman

Reforestation Works, Trees Please!!

Current regulation supports the use of RAM #124 methodology

NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
Department for Surface Mining Reclamation and Enforcement

405 KAR 16:190. Backfilling and grading.

RELATES TO: KRS 350.020, 350.093, 350.100, 350.405, 350.410, 350.450, 350.465; 30 CFR Parts 730-733, 735, 816.102-.106, 917; 30 USC 1253, 1255, 1265

STATUTORY AUTHORITY: KRS Chapter 13A, 350.028, 350.100, 350.465; 30 CFR Parts 730-733, 735, 816.102-.106, 917; 30 USC 1253, 1255, 1265

NECESSITY AND FUNCTION: KRS Chapter 350 in pertinent part requires the cabinet to promulgate rules and regulations establishing performance standards for protection of people and property, land, water and other natural resources, and aesthetic values, during surface mining activities and for restoration and reclamation of surface areas affected by mining activities. This regulation sets forth requirements for backfilling and grading, including requirements for highwall elimination, return to approximate original contour, timing of backfilling and grading, use of terraces, thick and thin overburden conditions, covering coal and acid and toxic materials, and regrading or stabilizing rills and gullies.

Section 1. Timing of backfilling and grading. Backfilling and grading shall be conducted in accordance with the requirements for contemporaneous reclamation as set forth in 405 KAR 16:020.

Section 2. General backfilling and grading requirements.

(1) Except as provided in subsection (9) of this section, all disturbed areas shall be returned to their approximate original contour. All spoil shall be transported, placed in a controlled manner, backfilled, compacted (where advisable to ensure stability or to prevent leaching of toxic materials), and graded to:

(a) Eliminate all highwalls (except as otherwise provided in Section 7 of this regulation), spoil piles, and depressions (excluding depressions and impoundments approved pursuant to subsection (5) or (6) of this section);

(b) Ensure a long-term static factor of safety of at least 1.3 for all portions of the reclaimed land;

(c) Achieve a postmining slope which does not exceed the angle of repose and which does prevent slides;

(d) Minimize erosion and adverse effects on surface and ground water both on and off the site; and

(e) Support the approved postmining land use.

(2) Spoil, except excess spoil disposed of in accordance with 405 KAR 16:130, shall be returned to the excavated areas.

(3) Disposal of coal processing waste and underground development waste in the mined-out area shall be in accordance with 405 KAR 16:140, except that a long-term static safety factor of 1.3 shall be achieved.

(4) On approval by the cabinet in order to conserve soil moisture, ensure stability, and control erosion on final graded slopes, cut-and-fill terraces may be allowed, if the terraces are compatible with the approved postmining land use and are appropriate substitutes for construction of lower grades on the reclaimed lands. The terraces shall meet the following requirements:

(a) The width of the individual terrace bench shall not exceed twenty (20) feet, unless specifically approved by the cabinet as necessary for stability, erosion control, or roads included in the approved postmining land use plan.

(b) The vertical distance between terraces shall be as specified by the cabinet, to prevent excessive erosion and to provide long-term stability.

(c) The slope of the terrace outslope shall not exceed 1v:2h (fifty (50) percent). Outslopes which exceed 1v:2h (fifty (50) percent) may be approved, if they have a minimum static safety factor of more than 1.3, provide adequate control over erosion, and closely resemble the surface configuration of the land prior to mining. In no case may highwalls be left as part of terraces.

(d) Culverts and underground rock drains shall be used on the terrace only if approved by the cabinet.

(5) Small depressions may be constructed on backfilled areas, if the depressions:

(a) Are needed to minimize erosion, conserve soil moisture, create or enhance wildlife habitat, or promote vegetation;

(b) Are not disapproved by the cabinet;

(c) Are not substitutes for compliance with approximate original contour requirements;

(d) Do not adversely affect the stability of the backfilled area; and

(e) Are not located on steep-slope outslopes.

(6) Impoundments on backfilled areas may be approved, if the impoundments:

(a) Meet the applicable requirements of 405 KAR 16:060, Section 10 and 405 KAR 16:100;

(b) Are demonstrated, to the satisfaction of the cabinet in the permit application, to have no adverse effect on the stability of the backfilled area;

(c) Are consistent with and suitable for the approved postmining land use;

(d) Are specifically approved by the cabinet in the permit application; and

(e) Are not located on steep-slope outslopes.

(7) All surface mining activities on slopes above twenty (20) degrees, or on lesser slopes that the cabinet defines as steep slopes, shall comply with the requirements of 405 KAR 20:060.

(8) All final grading; preparation of overburden before replacement of topsoil, topsoil substitutes, and topsoil supplements; and placement of topsoil, topsoil substitutes, and topsoil supplements shall be done along the contour to minimize subsequent erosion and instability. If grading, preparation, or placement along the contour is hazardous to equipment operators, then grading, preparation, or placement in a direction other than generally parallel to the contour may be used. In all cases, grading, preparation, and placement shall be conducted in a manner which minimizes erosion and provides a surface for placement of topsoil, topsoil substitutes, and topsoil supplements which will minimize slippage.

(9) The postmining slope may vary from the approximate original contour if approval is obtained from the cabinet for:

(a) The provisions for thin overburden in Section 4 of this regulation;

(b) The provisions for thick overburden in Section 5 of this regulation;

(c) Mountaintop removal operations in accordance with 405 KAR 8:050, Section 4;

(d) A variance from approximate original contour requirements in accordance with 405 KAR 8:050, Section 6; or

(e) Incomplete elimination of highwalls in previously mined areas in accordance with Section 7 of this regulation.

Effective Date: November 26, 1991

Current regulation supports the use of RAM #124 methodology

coal, times the bulking factor to be determined for each permit area. The provisions of this section apply only if surface mining activities cannot be carried out to comply with Section 2 of this regulation to achieve the approximate original contour.

(2) In surface mining activities where the volume of spoil over the permit area is demonstrated to be more than sufficient to achieve the approximate original contour, surface mining activities shall be conducted to meet, at a minimum, the following standards:

(a) Transport, backfill, and grade all spoil and wastes, not required to achieve the approximate original contour of the permit area, to the lowest practicable grade, to achieve a static factor of safety of 1.3 and cover all acid-forming and other toxic-forming materials;

(b) Transport, backfill and grade excess spoil and wastes only within the permit area and dispose of those materials in accordance with 405 KAR 16:130.

(c) Transport, backfill, and grade excess spoil and wastes to maintain the hydrologic balance, in accordance with 405 KAR 16:060, 405 KAR 16:070, 405 KAR 16:080, 405 KAR 16:090, 405 KAR 16:100 and 405 KAR 16:110 and to provide long-term stability by preventing slides, erosion and water pollution.

(d) Transport, backfill, grade, and revegetate wastes and excess spoil to achieve an ecologically sound land use approved by the cabinet as compatible with the prevailing land uses in unmined areas surrounding the permit area.

(e) Eliminate all highwalls and depressions by backfilling with spoil and suitable waste materials; and

(f) Meet the revegetation requirements of 405 KAR 16:200 for all disturbed areas.

Section 6. Regrading or stabilizing rills and gullies. Except as provided in subsections (1) and (2) of this section, if rills or gullies deeper than nine (9) inches form in areas that have been regraded and topsoiled, the rills and gullies shall be filled, graded, or otherwise stabilized and the area reseeded and replanted according to 405 KAR 16:200.

(1) Rills or gullies less than nine (9) inches deep shall be stabilized and the area reseeded and replanted, if the rills or gullies are disruptive to the approved postmining land use or to the establishment of vegetation, may result in additional erosion and sedimentation, or may cause or contribute to the violation of a water quality standard.

(2) Rills and gullies deeper than nine (9) inches need not be filled, regraded, and revegetated if all of the following criteria are met:

(a) They are incised to solid bedrock or are otherwise stable and not likely to further erode;

(b) They are not disruptive to the approved postmining land use or to the establishment of the vegetative cover; and

(c) They neither cause nor contribute to the violation of water quality standards.

Section 7. Remining previously mined areas.

(1) General requirements. Remining operations on previously mined areas, including steep slope areas, that contain a pre-existing highwall shall comply with Sections 1 through 6 of this regulation except as provided in this section.

(2) Variances to backfilling and grading requirements for remining operations. The requirements within Section 2(1)(a) of this regulation to completely eliminate highwalls shall apply to remining operations, except for situations in which the volume of all reasonably available spoil is demonstrated, to the satisfaction of the cabinet in the permit application, to be insufficient to completely backfill and eliminate the pre-existing or modified highwall. The highwall shall be eliminated to the maximum extent technically practicable in accordance with the following criteria:

(a) All reasonably available spoil shall be used to backfill the area.

(b) The backfill shall be graded to a slope which is compatible with the approved postmining land use and which provides adequate drainage and long-term stability (1.3 long-term static factor of safety). The exposed coal seam shall be covered in accordance with Section 3 of this regulation.

(c) Spoil generated or handled by the remining operation shall not be placed on the fill section of any existing or new bench.

(d) Any highwall remnant shall be stable and not pose a hazard to the public health and safety or to the environment. The permittee shall demonstrate, to the satisfaction of the cabinet in the permit application, that the postmining highwall remnant will be stable. If the highwall remnant is determined by the cabinet to be unstable or potentially unstable, the permittee shall perform any corrective measures required by the cabinet to stabilize the highwall remnant.

(e) Spoil placed on the outslope during previous mining operations shall not be disturbed if the disturbance will cause instability of the remaining spoil or otherwise increase the hazard to the public health or safety or to the environment.

LP

Kentucky
Department for Surface Mining
Reclamation and Enforcement

Reclamation Advisory Memorandum

From: Carl Campbell, Commissioner C.C.

Date: March 10, 1997

Subject: Reforestation Initiative

RAM # 124

Introduction

In the spring of 1996, after conducting both field visits and public meetings, the Kentucky Environmental Quality Commission issued a resolution to Governor Paul E. Patton and the Natural Resources and Environmental Protection Cabinet (NREPC) concerning the establishment of trees and shrubs on mine sites. The specific concern was that certain regrading and reclamation techniques currently being used or promoted seemed to inhibit the proper growth and development of deep rooted woody species.

In response the NREPC, through the Department for Surface Mining Reclamation and Enforcement (DSMRE), established a very diverse working group of professionals from industry, environmental groups, the U.S. Office of Surface Mining, the University of Kentucky Extension Service, the Department of Fish and Wildlife Resources, the Department for Natural Resources and its Division of Forestry, DSMRE, and others. The purpose of the group was to review current reclamation policy and practices that impact tree survival and growth on mined lands, and develop reclamation advisory guidance that, when utilized, would promote woody species use and development on mined lands.

The working group approached this task in a most professional manner and with a cooperative, progressive spirit. On behalf of DSMRE, I want to express my sincere appreciation to the members of the working group for their hard work and for the excellent result. The individual members are identified at the end of this document.

The following information represents the suggestions conveyed by the working group, and is henceforth accepted by the DSMRE as appropriate reclamation practice for those mined areas reclaimed to a postmining land use which requires the establishment of deep rooted woody species.

The Natural Resources and Environmental Protection Cabinet does not discriminate on the basis of race, color, national origin, sex, age, religion, or disability and provides, on request, reasonable accommodations including auxiliary aids and services necessary to afford an individual with a disability an equal opportunity to participate in all services, programs, and activities. This publication, and other materials offered to the public by the cabinet, can be provided in an alternative format to any individual with a disability. To request this publication in an alternative format, contact: Office of the Commissioner, Department for Surface Mining Reclamation and Enforcement, 2 Hudson Hollow, Frankfort, Ky. 40601-4321. (502) 564-6940

Reclamation Advisory Memorandum #124

Identified three prevalent problems associated with current reclamation practices. They are:

- **Excessive compaction of the rooting medium by repeated tracking with large heavy equipment**
- **Selection of inappropriate materials for the rooting medium**
- **Excessive competition from the herbaceous ground cover species established to control erosion**

RAM #124 Recommends the Following Practices

- Select the best available on-site growth medium. The soiling material should have low to moderate levels of soluble salts, a pH of 5.0 to 7.0, low pyritic sulfur content, and a texture conducive to proper drainage. However, some sites simply don't have this type of soiling material available. In those cases it is very important that the tree and groundcover species selected will tolerate the site conditions.
- Minimizing compaction during the application and final grading of the soiling material is extremely important. Compaction can be minimized by dumping and leveling of the final surface layer in separate operations. When the soiling material is placed, it should be dumped in piles that tightly abut one another. Once all the soiling medium has been placed, a low pressure bulldozer should then be used to gently level the area in one or two passes.
- Slow growing tree compatible ground covers should be selected (TRM # 21 should be consulted for recommendations).
- Fertilizer requirements should be based on a current soil test, and the soil testing laboratory should be informed that the area will be planted in trees.
- Selection of tree and shrub species should be appropriate to the approved post mining land use.
- Tree planting activities should always be performed by experienced and reputable tree planters.

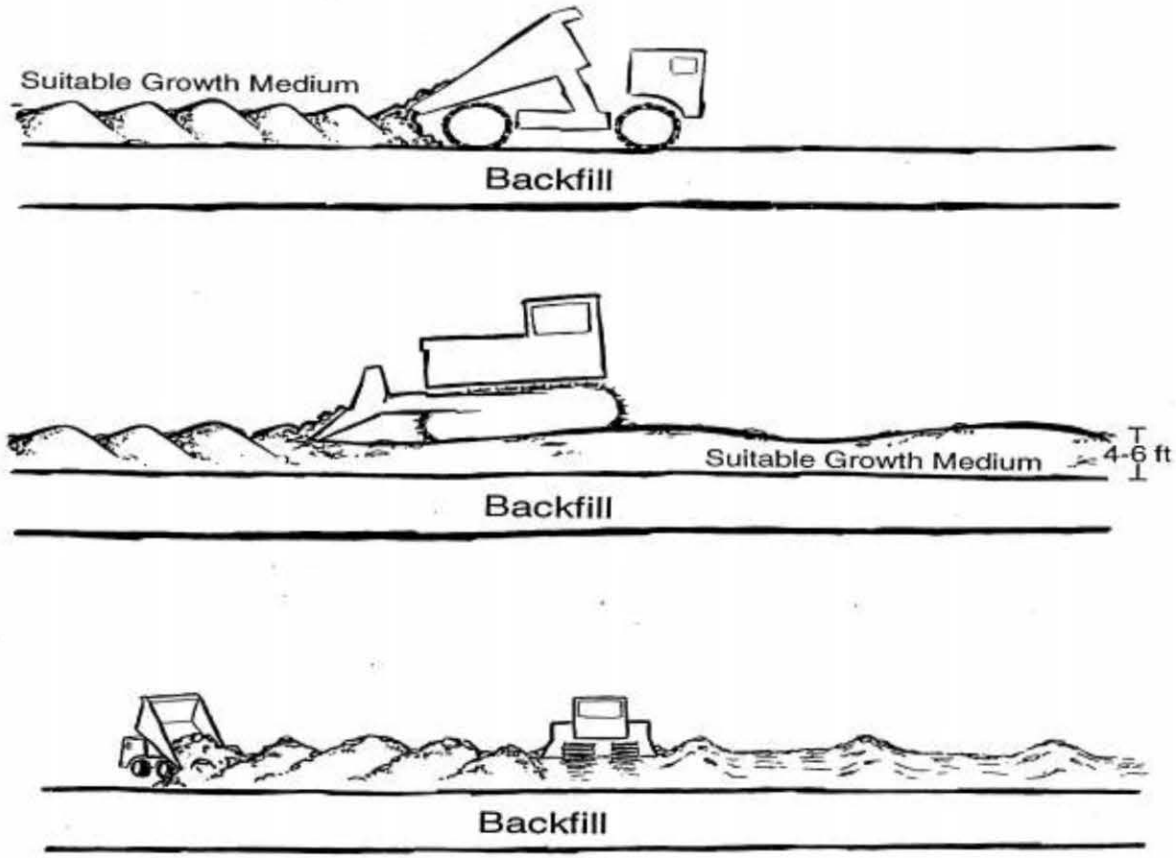


Diagram 1. Area Mining or Mountaintop Removal methods

illustrations not to scale

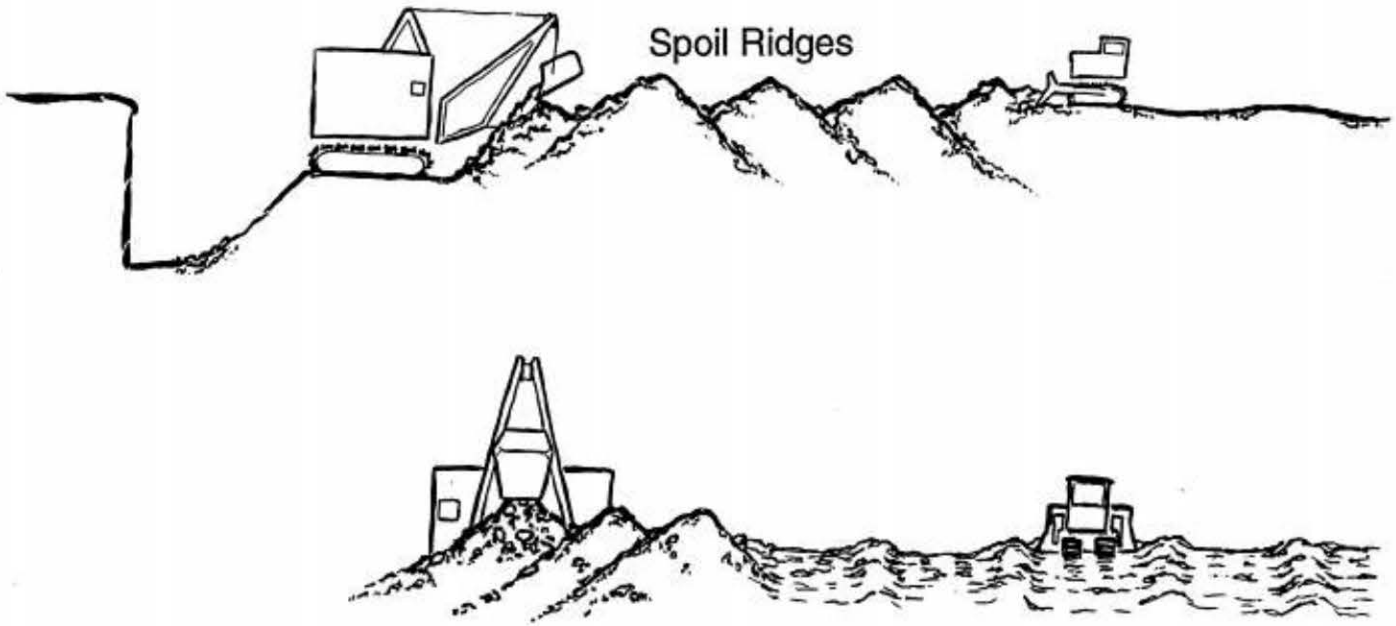


Diagram 2. Area Mining or Mountaintop Removal by Dragline method

illustrations not to scale

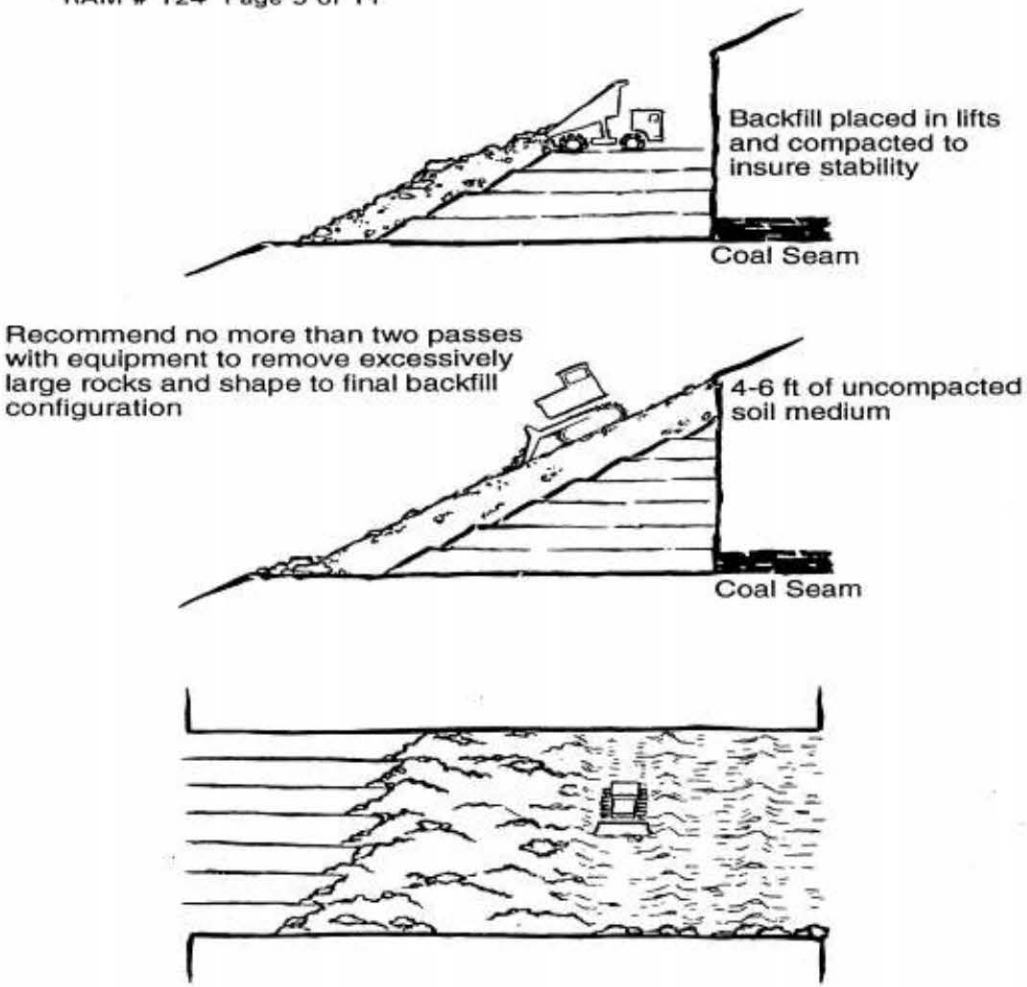


Diagram 3. Contour Mining or Other Sloped Areas

illustrations not to scale

Table 1. The effects of reclamation technique on white pine productivity and stand value at 30 years.

Case	White Pine Site Type	Site Index* (Base Age 50)	Bd. Ft. Vol. at Age 30 (MBF**/ac)	Harvestable Wood Products	Harvest Price ($/MBF)	Total Value ($/acre)
I	Projected average quality of a post-SMCRA reclaimed mine soil (Torbert et al., 1994)	60	6.1	pulp	20	122
II	Average quality of an undisturbed Appalachian forest site (Doolittle 1958)	80	35.1	small sawtimber	50	1755
III	Actual quality of a white pine stand on a good minesoil in Virginia (Kelting et al., 1997)	110	46.4	large sawtimber	75	3480

Site Index = Expected tree height after 50 years.

*MBF = thousand board feet (Vimmerstedt, 1962).

Study conducted by James A. Burger, Professor of Forest Soil Science, Virginia Polytechnic Institute and State University

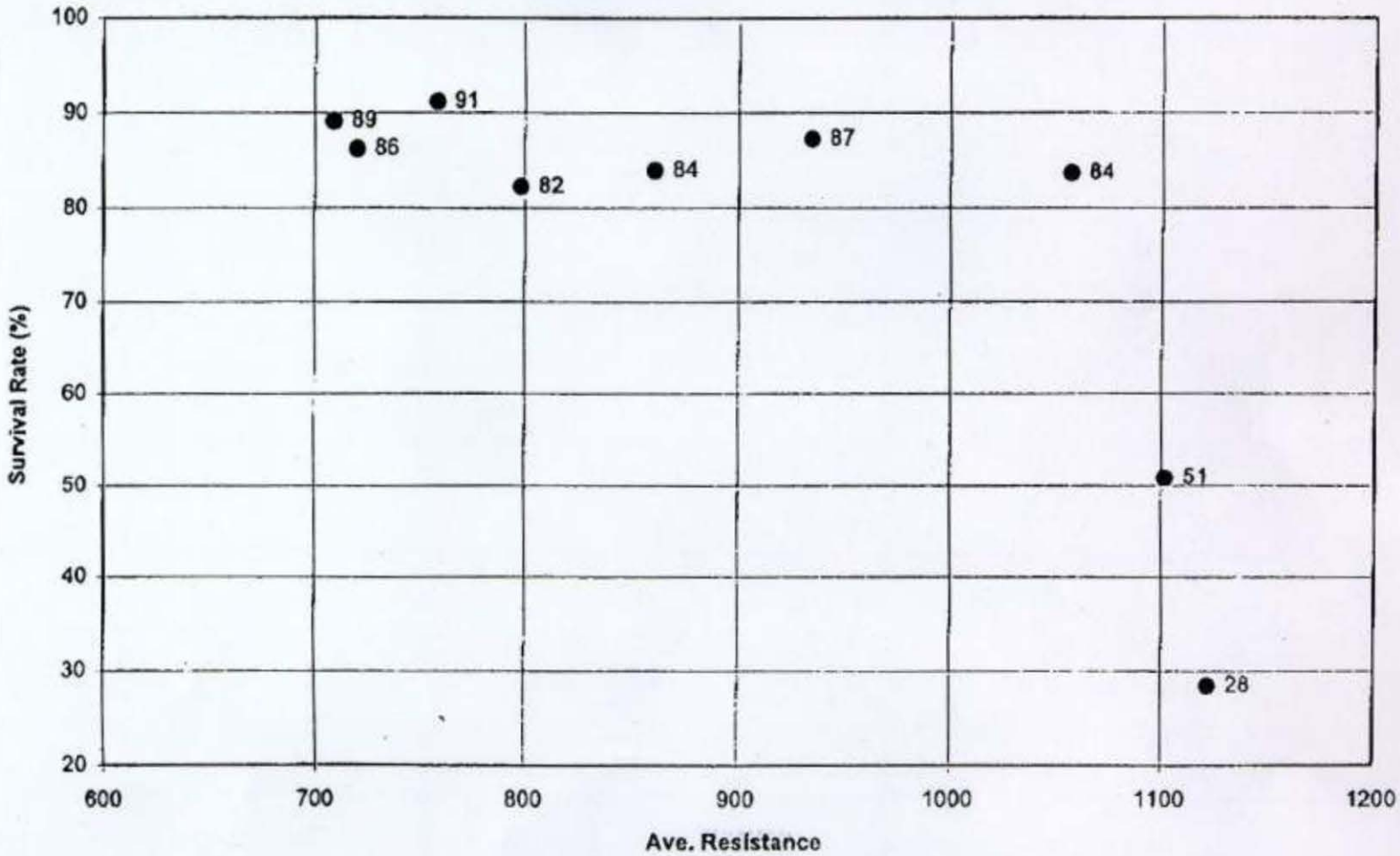
Starfire High Value Tree Reclamation Project
Preliminary survival data for 1997

	strike off		uncompacted		compacted	
	cell# 1		**cell# 2**		**cell# 9**	
	black walnut	95%	black walnut	95%	black walnut	95%
	paulownia	38%	paulownia	55%	paulownia	25%
no mulch	red oak	91%	red oak	93%	red oak	100%
	white ash	94%	white ash	89%	white ash	95%
	white oak	91%	white oak	90%	white oak	91%
	white pine	87%	white pine	92%	white pine	82%
	yellow-poplar	92%	yellow-poplar	90%	yellow-poplar	98%
	cell# 6		**cell# 3**		****cell# 8**	
	black walnut	97%	black walnut	98%	black walnut	29%
	paulownia	72%	paulownia	50%	paulownia	25%
hard wood	red oak	99%	red oak	100%	red oak	96%
bark mulch	white ash	97%	white ash	92%	white ash	97%
	white oak	96%	white oak	94%	white oak	53%
	white pine	83%	white pine	95%	white pine	15%
	yellow-poplar	94%	yellow-poplar	95%	yellow-poplar	41%
	cell# 5		**cell# 4**		****cell# 7**	
	black walnut	96%	black walnut	97%	black walnut	0%
	paulownia	45%	paulownia	17%	paulownia	15%
barn straw	red oak	94%	red oak	97%	red oak	52%
mulch	white ash	99%	white ash	99%	white ash	82%
	white oak	93%	white oak	87%	white oak	21%
	white pine	87%	white pine	85%	white pine	14%
	yellow-poplar	97%	yellow-poplar	94%	yellow-poplar	15%

**Cells 7 and 8 were planted in April 1996. Cells 1-6, and cell 9 were planted in March 1997.

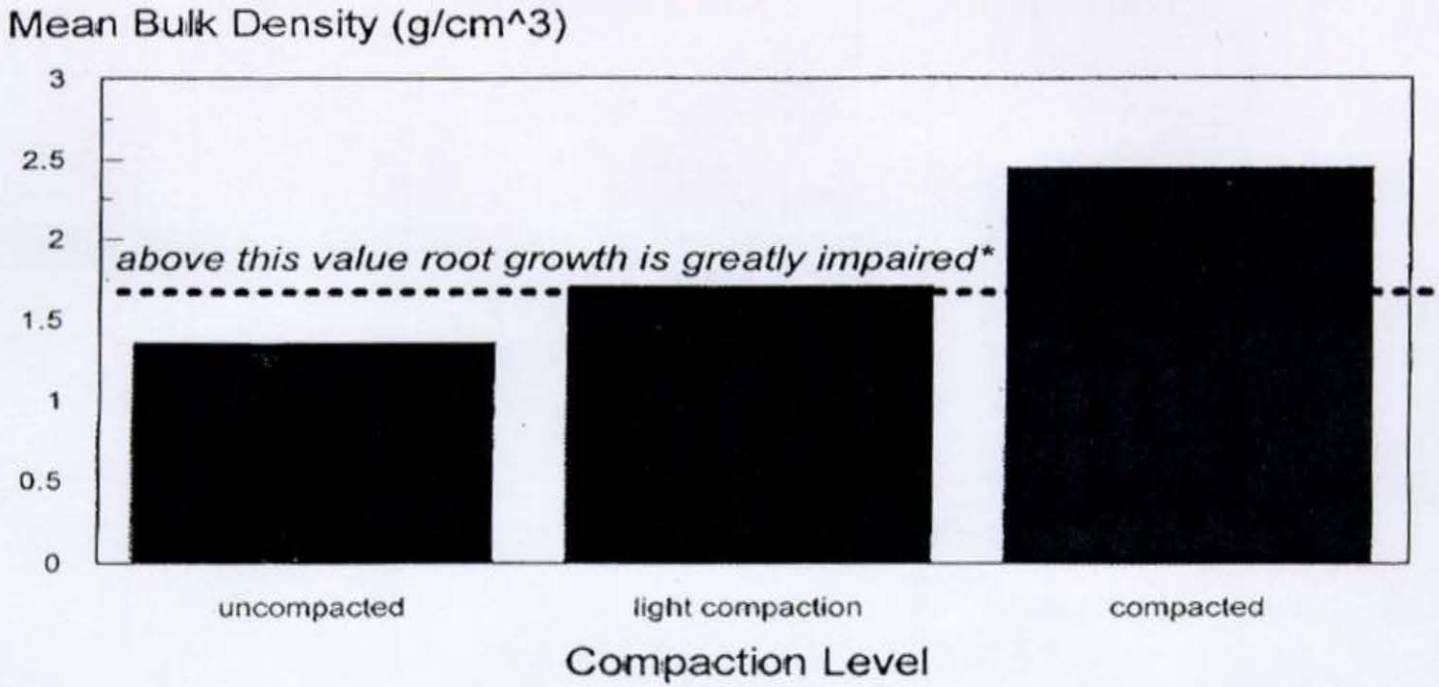
Figure 6

Survival Rate vs. Resistance to Penetration



Robinson Forest Initiative High Value Tree Reclamation Project

Bulk Density



(means with different superscripts are significantly different at $P < 0.05$)
*(The Nature and Properties of Soils (Brady, N. 1990))

Figure 1

STARFIRE HIGH VALUE TREE RECLAMATION PROJECT

2000 - 2004 AVERAGE SURVIVAL AND GROWTH Cells 1-15

	SPECIES	%SURVIVAL								HEIGHT (CM)							
		1997	1998	1999	2000	2001	2002	2003	2004	1997	1998	1999	2000	2001	2002	2003	2004
UNCOMPACT	White Pine	92	81	82	81	82	79	78	82	36	42	66	112	153	225	323	431
	White Ash	95	88	86	69	87	83	80	80	40	51	71	100	131	180	242	308
	Black Walnut	97	68	76	65	75	68	69	68	77	75	66	83	90	113	150	184
	Yellow-poplar	93	86	77	64	83	82	79	80	24	32	48	81	107	125	220	276
	Royal Paulownia	37	29	40	33	30	30	29	26	9	66	104	276	275	296	350	497
	White Oak	88	69	87	70	83	80	84	81	28	32	39	60	88	121	168	217
	Northern Red Oak	99	86	85	73	84	80	83	82	28	31	41	67	100	157	228	278
	TOTAL AVERAGE	**86**	**72**	**76**	**65**	**75**	**72**	**72**	**71**	**35**	**47**	**62**	**111**	**135**	**174**	**240**	**313**
ROUGH GRADE	White Pine	87	52	51	50	50	49	56	50	34	36	46	70	97	130	220	307
	White Ash	98	86	85	86	78	82	81	81	41	54	71	90	106	141	183	236
	Black Walnut	100	61	61	52	59	57	57	55	82	72	63	77	75	88	98	116
	Yellow-poplar	94	63	61	51	59	57	54	52	24	29	40	61	74	89	152	203
	Royal Paulownia	52	32	44	35	30	31	24	21	11	63	92	156	198	224	261	354
	White Oak	94	55	78	66	68	71	70	69	29	31	33	49	72	92	144	197
	Northern Red Oak	96	71	70	57	62	63	65	64	29	28	31	58	85	121	188	242
	TOTAL AVERAGE	**89**	**60**	**64**	**57**	**58**	**59**	**58**	**56**	**36**	**45**	**54**	**80**	**101**	**126**	**178**	**236**
COMPACT	White Pine	37	18	12	8	5	3	3	4	34	33	32	23	23	19	23	57
	White Ash	91	87	85	62	82	78	82	82	40	43	45	52	66	83	98	118
	Black Walnut	41	26	34	13	15	21	19	18	79	51	31	30	30	27	32	40
	Yellow-poplar	59	50	30	9	15	15	9	11	27	25	21	44	40	48	90	98
	Royal Paulownia	21	7	12	8	8	7	4	3	23	76	82	86	126	79	134	173
	White Oak	49	25	49	25	27	27	24	21	27	24	16	25	33	40	48	62
	Northern Red Oak	82	66	51	19	23	24	19	17	27	20	17	38	33	63	82	106
	TOTAL AVERAGE	**54**	**40**	**39**	**21**	**25**	**25**	**23**	**22**	**37**	**39**	**35**	**42**	**50**	**51**	**72**	**93**
DOZER RIPPED	White Pine	---	---	---	46	44	40	35	36	---	---	---	35	48	67	109	169
	White Ash	---	---	---	76	88	94	89	79	---	---	---	53	65	74	111	124
	Black Walnut	---	---	---	58	62	55	51	54	---	---	---	53	50	52	63	74
	Yellow-poplar	---	---	---	31	32	34	29	30	---	---	---	40	50	49	89	113
	Royal Paulownia	---	---	---	34	33	42	35	38	---	---	---	59	119	131	181	231
	White Oak	---	---	---	49	43	49	33	33	---	---	---	33	38	42	63	79
	Northern Red Oak	---	---	---	54	50	53	33	34	---	---	---	35	37	39	61	73
	TOTAL AVERAGE				**50**	**50**	**52**	**44**	**43**				**44**	**58**	**65**	**97**	**123**

Research by Don Graves, University of Kentucky

STARFIRE HIGH VALUE TREE RECLAMATION PROJECT

2000 - 2004 DIAMETER MEASURMENTS

CELLS 1 - 15

	Species	Diameter @ Ground					Diameter @ 4.5'				
		2000	2001	2002	2003	2004	2000	2001	2002	2003	2004
UNCOMPACT	White Pine	2.67	3.66	5.21	6.93	8.76	0.94	1.24	1.96	3.40	5.31
	White Ash	1.65	1.65	2.62	3.71	4.37	1.07	1.07	1.22	1.60	2.24
	Black Walnut	1.12	1.12	1.78	2.41	3.10	0.33	0.33	0.99	0.69	1.30
	Yellow-poplar	1.55	1.55	2.24	4.01	4.88	0.79	0.79	1.30	1.57	2.34
	Royal Paulownia	4.98	6.86	7.67	10.34	12.17	3.05	3.96	4.60	6.40	8.69
	White Oak	1.22	2.06	2.08	3.12	4.17	0.53	0.76	0.94	1.04	1.63
	Northern Red Oak	1.45	2.03	2.62	3.61	4.83	0.74	0.97	1.12	1.40	2.13
	TOTAL AVERAGE	**2.09**	**2.70**	**3.46**	**4.88**	**6.04**	**1.06**	**1.30**	**1.73**	**2.30**	**3.37**
ROUGH GRADE	White Pine	1.75	2.29	3.05	4.70	7.04	0.17	0.39	0.44	1.73	3.35
	White Ash	1.96	2.16	2.41	3.07	4.01	0.23	0.35	0.44	1.02	1.63
	Black Walnut	1.24	1.37	1.27	1.73	2.24	0.03	0.06	0.27	0.18	0.43
	Yellow-poplar	1.35	2.13	1.93	3.12	4.06	0.21	0.29	0.33	0.79	1.55
	Royal Paulownia	4.39	6.20	5.33	6.96	8.74	0.83	1.20	1.17	3.45	5.28
	White Oak	1.24	1.70	1.78	2.97	3.96	0.10	0.19	0.28	0.71	1.40
	Northern Red Oak	1.32	1.96	2.18	3.28	4.32	0.12	0.28	0.32	0.99	1.85
	TOTAL AVERAGE	**1.89**	**2.54**	**2.57**	**3.69**	**4.91**	**0.24**	**0.39**	**0.46**	**1.27**	**2.21**
COMPACT	White Pine	0.51	0.51	0.38	0.46	1.09	0.00	0.00	0.05	0.03	0.25
	White Ash	1.09	1.60	1.37	2.03	2.51	0.15	0.38	0.58	0.20	0.48
	Black Walnut	0.41	0.64	0.46	0.64	0.86	0.00	0.03	0.00	0.00	0.00
	Yellow-poplar	0.79	0.99	0.91	1.80	2.36	0.00	0.05	0.05	0.36	0.53
	Royal Paulownia	2.36	4.19	2.49	3.61	5.23	1.22	1.98	1.50	1.73	2.69
	White Oak	0.91	0.69	0.61	0.91	1.17	0.15	0.08	0.10	0.00	0.05
	Northern Red Oak	0.69	1.04	0.89	1.24	2.39	0.05	0.15	0.41	0.08	0.41
	TOTAL AVERAGE	**0.97**	**1.38**	**1.02**	**1.53**	**2.23**	**0.22**	**0.38**	**0.38**	**0.34**	**0.63**
DOZER RIPPED	White Pine	0.74	1.09	1.47	2.24	4.04	0.00	0.00	0.10	0.33	1.02
	White Ash	0.86	1.17	1.52	1.65	2.24	0.13	0.20	0.23	0.23	0.41
	Black Walnut	0.76	0.91	0.86	1.22	1.68	0.00	0.00	0.00	0.03	0.10
	Yellow-poplar	0.76	1.02	0.94	1.65	2.57	0.00	0.00	0.08	0.10	0.30
	Royal Paulownia	1.35	4.34	3.73	4.42	5.54	0.58	1.75	2.39	2.41	3.40
	White Oak	0.66	0.81	0.76	1.19	1.68	0.00	0.00	0.10	0.03	0.18
	Northern Red Oak	0.53	0.69	0.61	1.12	1.35	0.00	0.00	0.05	0.03	0.08
	TOTAL AVERAGE	**0.81**	**1.43**	**1.42**	**1.93**	**2.73**	**0.10**	**0.28**	**0.42**	**0.45**	**0.78**

Diameter Measurements at Ground Level and 4.5 Ft. (DBH) are all approximate
Diameter Measurements are in Centimeters

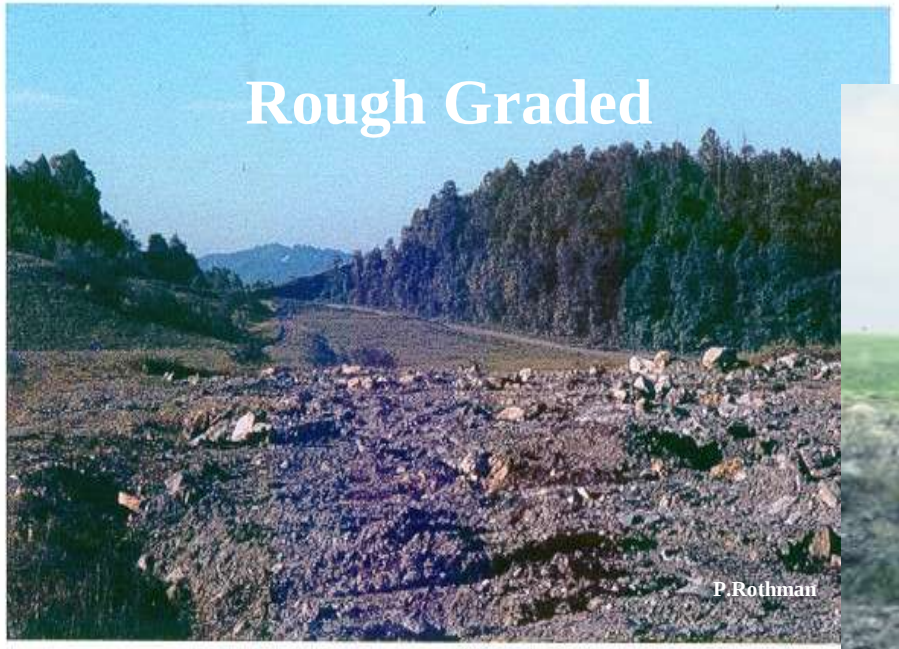
Research by Don Graves, University of Kentucky

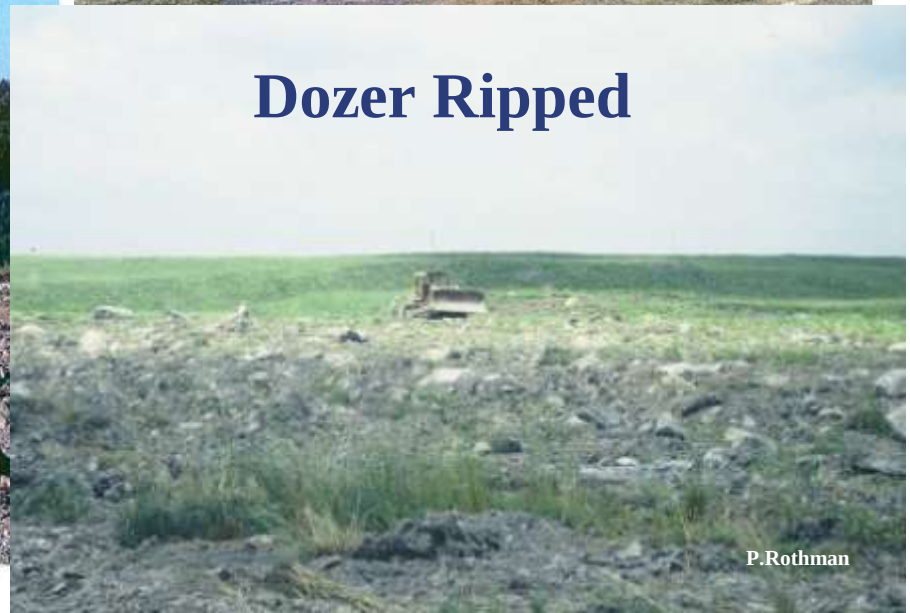
APPALACHIAN REGIONAL REFORESTATION INITIATIVE

ARRI

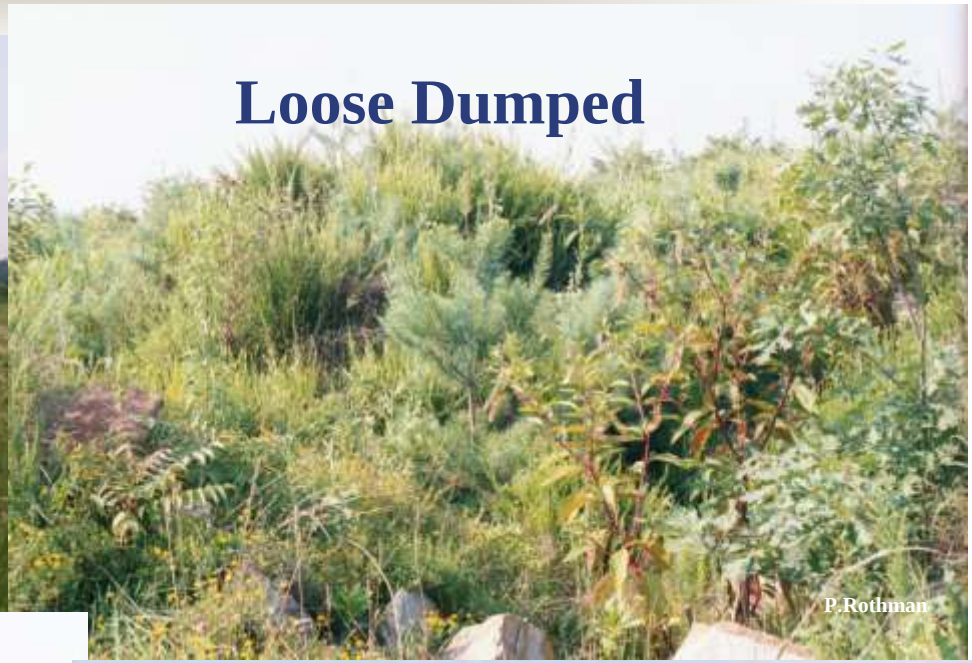
Compacted
P.Rothman

Loose Dumped
P.Rothman


Rough Graded
P.Rothman


Dozer Ripped
P.Rothman

Compacted
P.Rothman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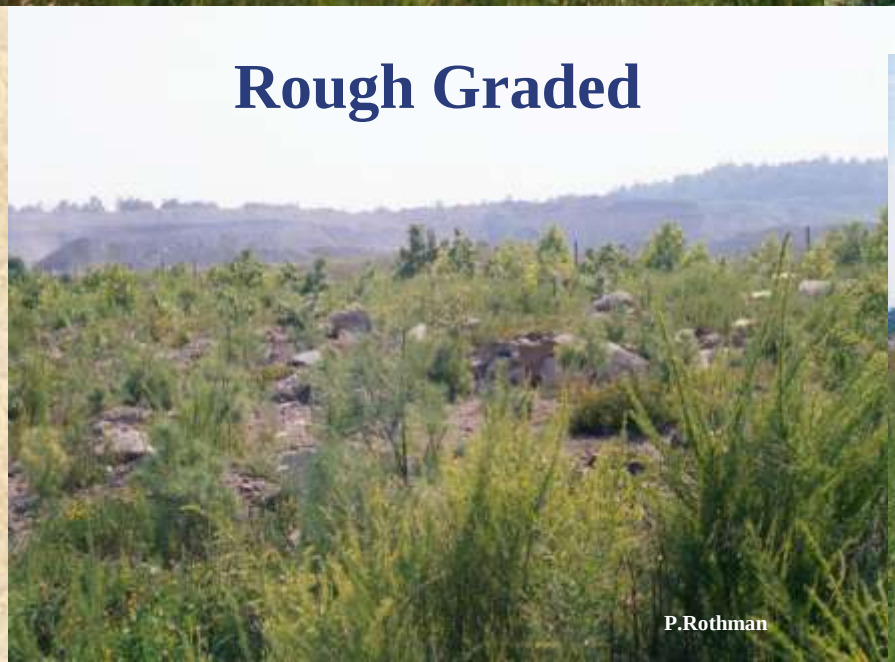
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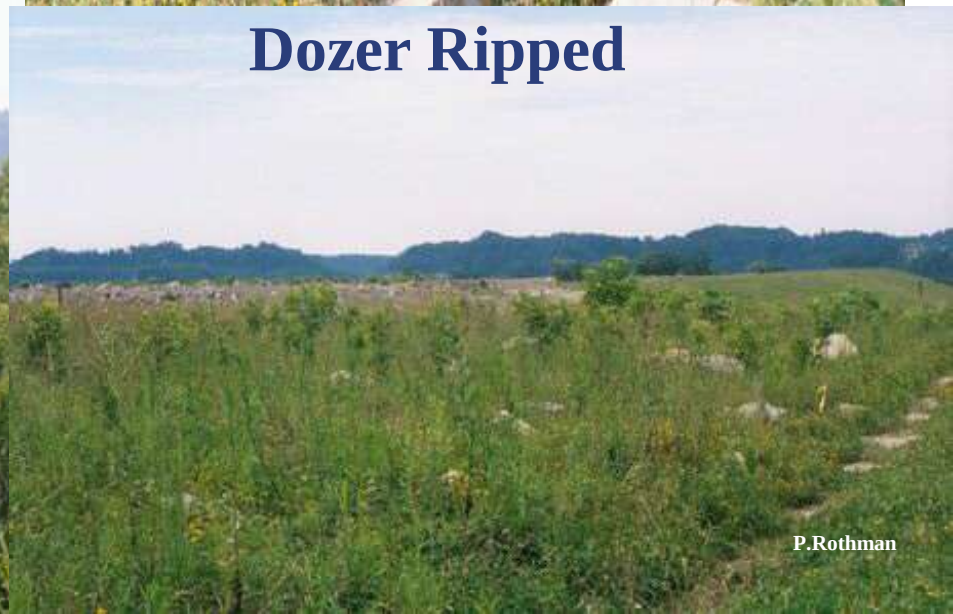
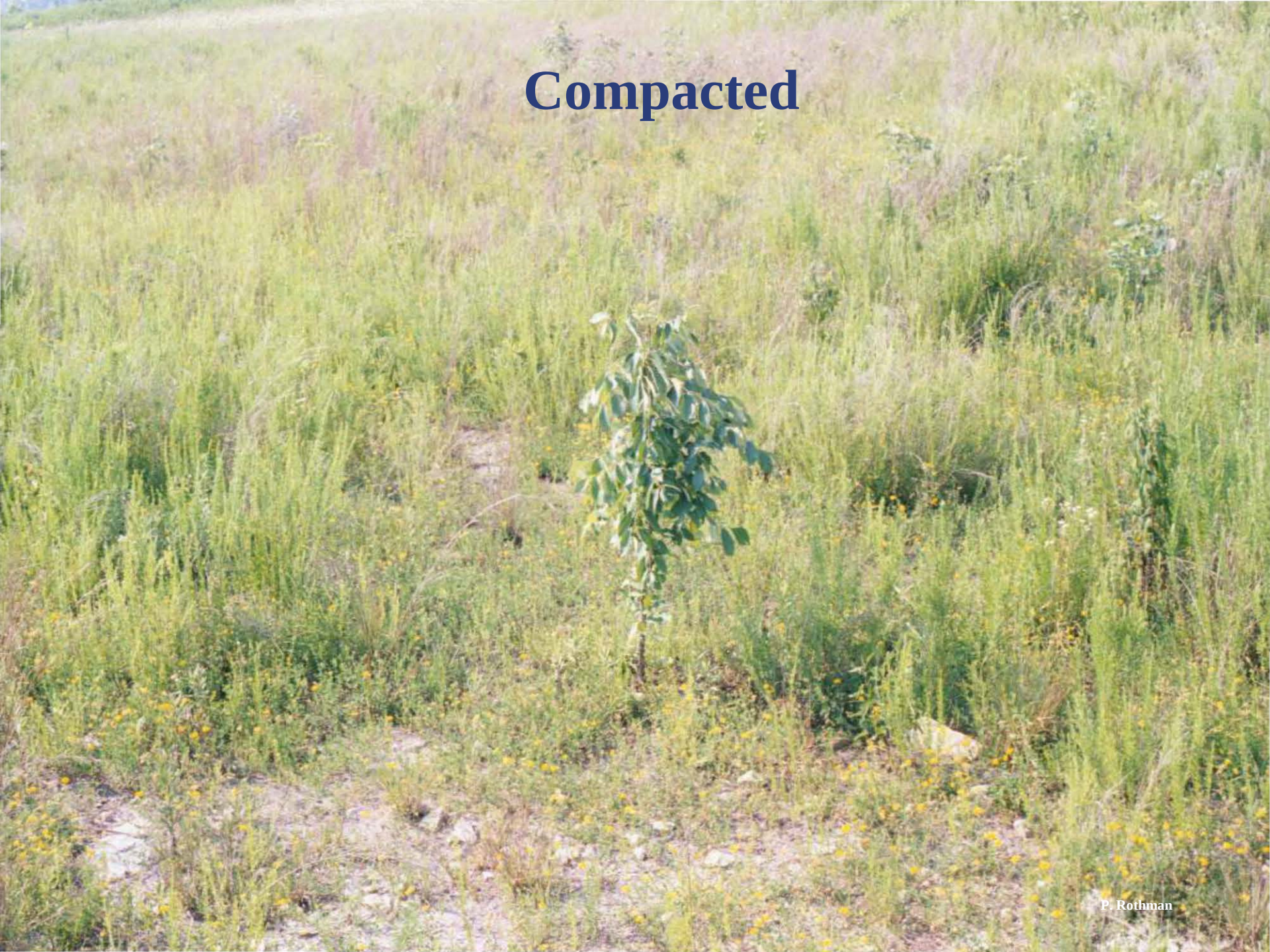

Dozer Ripped
P.Rothman

Compacted
P.Rothman

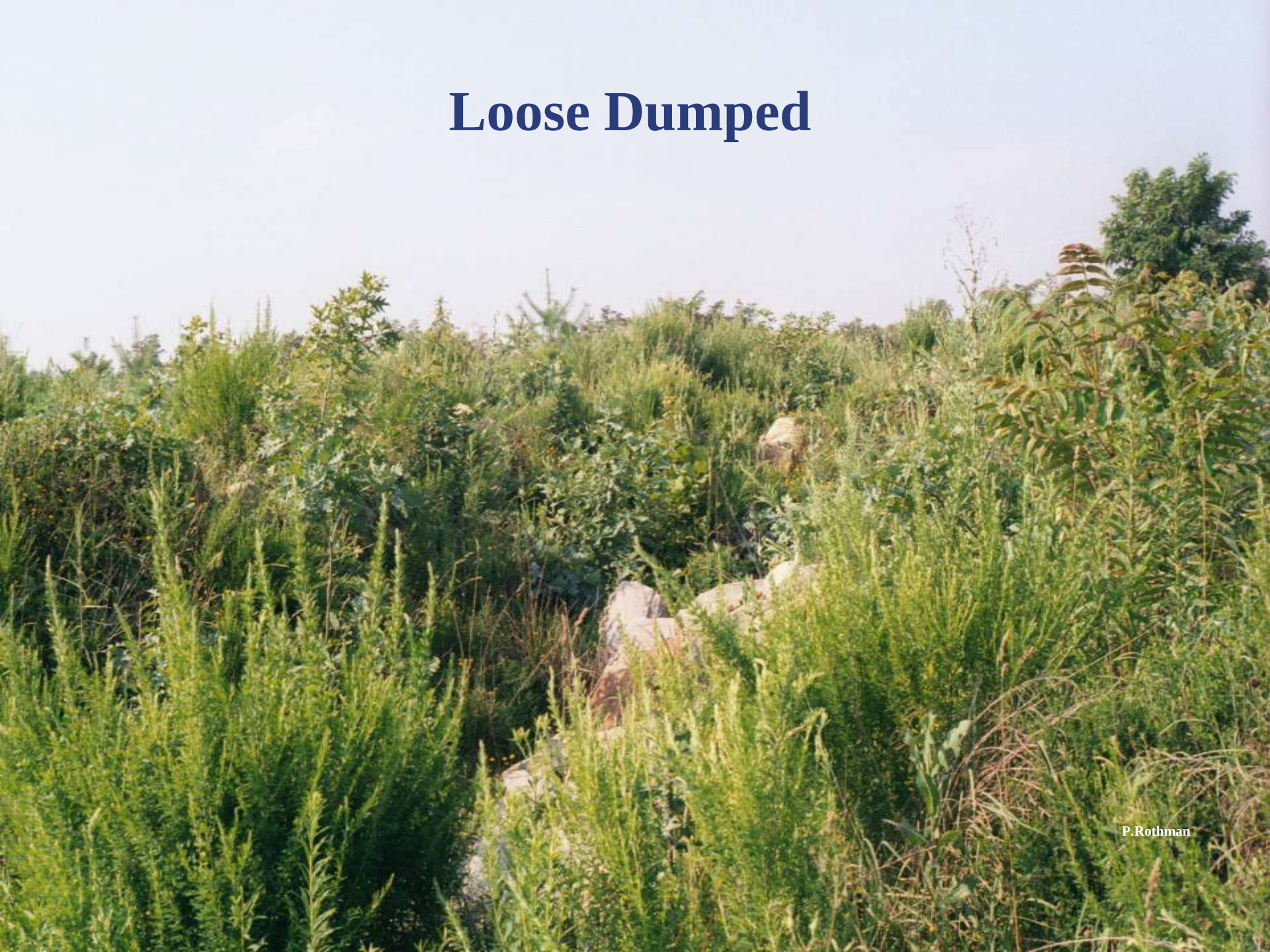
Compacted



Rough Graded

Rough Graded

Loose Dumped



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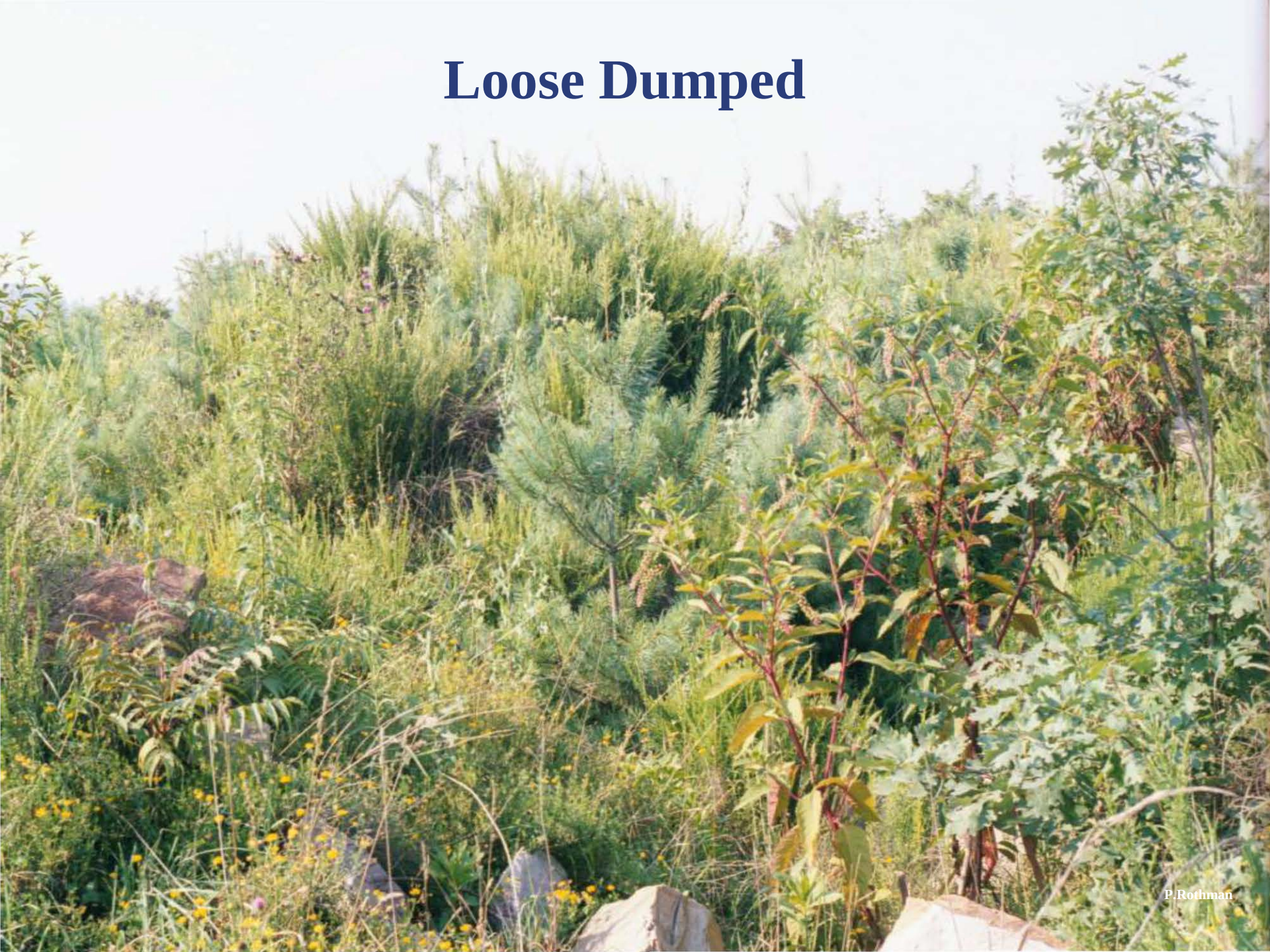

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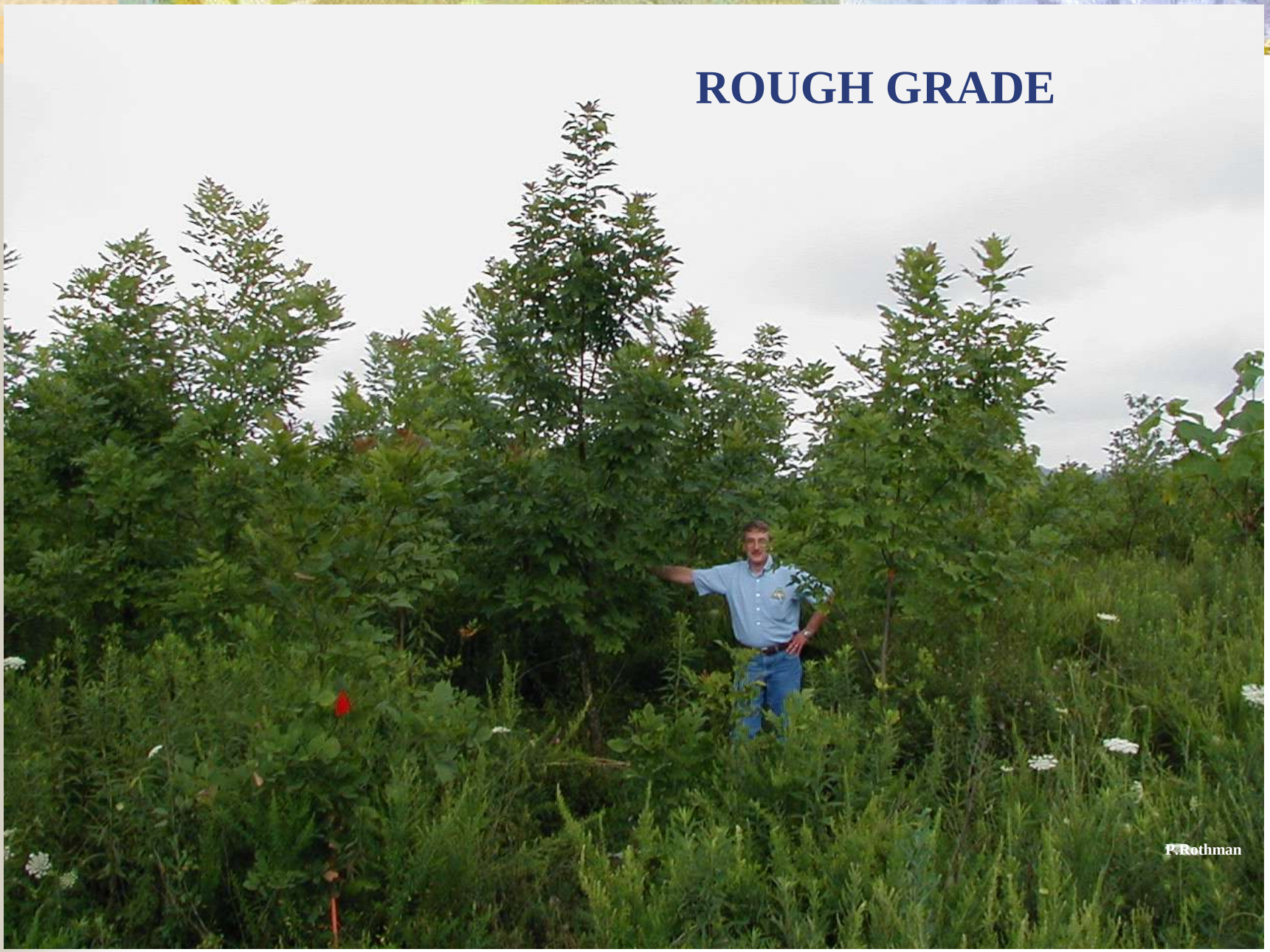

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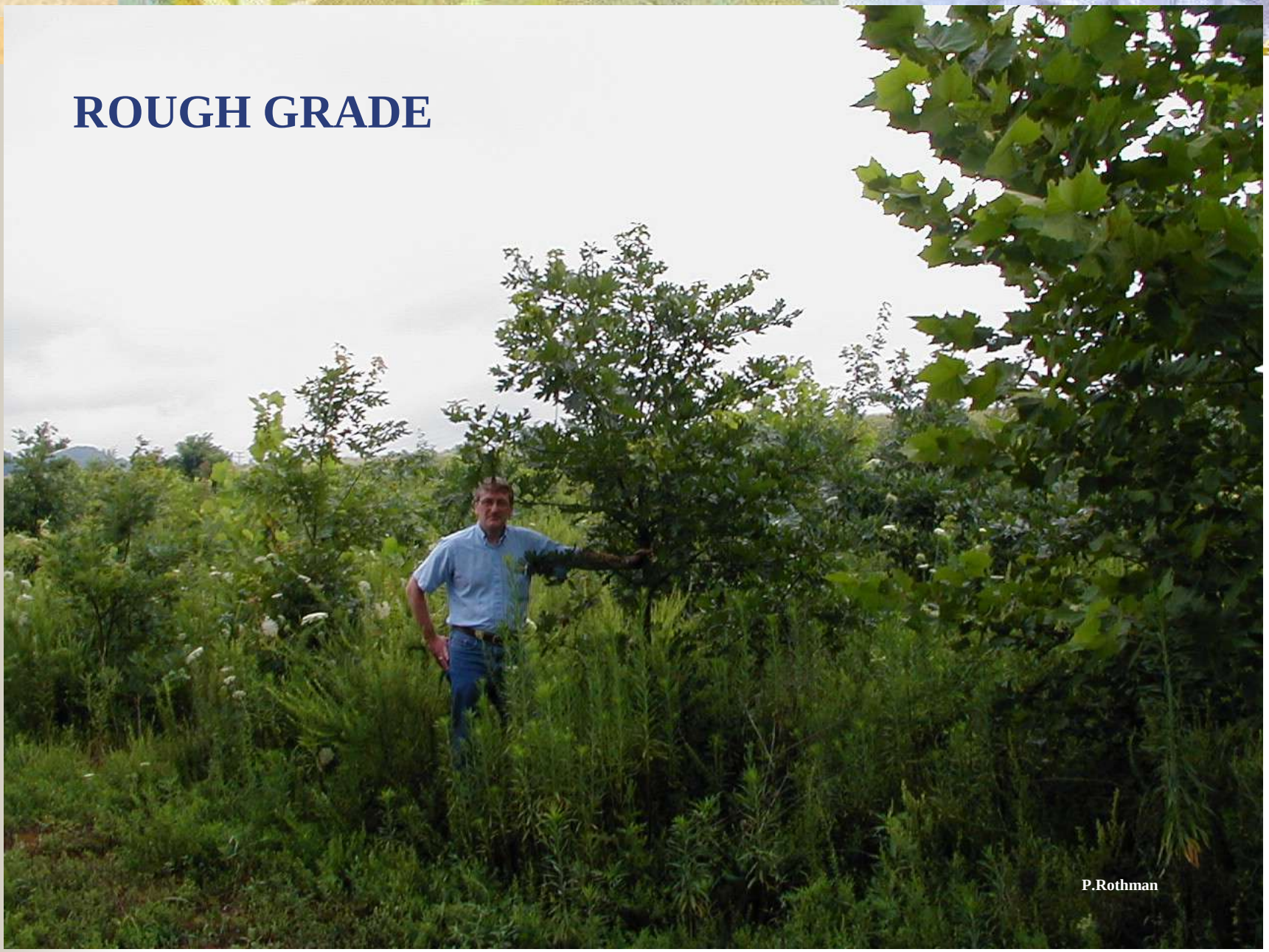

LOOSE DUMPED

P.Rothman

P.Rothman

P.Rothman

P.Rothman

P.Rothman

P.Rothman

Remining

Remining Incentives

Current remining incentives

- Reduced base bond amounts
- Highwall elimination
- Reduced revegetation standards
- Individual NPDES permits(Rahall)
- AML reclamation agreements

Incentives that were not extended in 2004

- Reduced bond liability periods (2 years)
- Unforeseen/unanticipated events

London Regional Office

Jamieson Construction Company

Permit Number : 863 - 0282

Western Kentucky

Peabody Coal Company's

Ken Mine

Permit Number: 898 - 9074

Charolais Coal No. 1, LCC
Permit No. 889

Eastern Kentucky Operations

Stone Mining

Permit Number: 897 - 0085

QUESTIONS?

www.surfacemining.ky.gov/regguidance/rams/