

APPALACHIAN REGIONAL REFORESTATION INITIATIVE

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"Professional tree planters planting red spruce and common associates on the Monongahela National Forest. The volunteer component was cancelled due to COVID-19. Photo courtesy of Michael French from Green Forest Works."

ARRI LEGACY PLANTING UPDATE DURING COVID-19 PANDEMIC

ARRI LEGACY COVID-19 PROFESSIONAL PLANTINGS

By Stefanie Miller

Because of the shutdown orders across all the Appalachian states, the volunteer component of the legacy plantings beginning in March were cancelled this year. Despite those restrictions, ARRI's tree planting efforts continued at legacy projects using paid tree planters.

According to Eric Oliver of PA DEP, ARRI was able to plant 62 acres this year with volunteers before these plantings were cancelled. Some plantings for the 2020 season were only postponed until next year so there will be no overall loss in acreage.

Groups involved in the plantings this year include PA Department of Environmental Protection, Office of Surface Mining Reclamation and Enforcement, Pennsylvania Environmental Council, Appalachian Regional Reforestation Initiative, PA Game Commission, Susquehanna River Basin Commission, Department of Conservation and Natural Resources-Forestry, Chesapeake Bay Foundation and Green Forests Work. Many changes happened as a result of the COVID situation but our ARRI crew never gave up on any of these projects. Pennsylvania Environmental Council secured a professional planter to complete many of these projects. All the trees ordered were planted in May. All CDC and PA Department of Health COVID guidelines were followed during the plantings.

Completed 2020 Plantings:

Pre-Shutdown with volunteers

Komatsu-Anglo America in Queensland, Australia: At this event on March 1, 2020, 95 volunteers planted 2,000 trees seedlings and installed cocoons on 25 acres. The same group held a second event on March 2, 2020 where 4 professional planters planted an additional 250 tree seedlings and installed additional cocoons. The cocoons are donut-shaped structures with lids made of biodegradable material. They are filled with water which is slowly released over time. They were installed as a small test to determine how they affect survival rates in arid environments. Coordinated by Chris Barton and Michael French.

University of North Carolina-Chapel Hill at the University of Kentucky, Robison Forest, PVB-WMA: On March 11, 2020, 7 volunteers planted 600 tree seedlings on 1 acre. Coordinated by Chris Barton and Geoff Bell.

Marian University in Indianapolis, IN at KDFWR Wildlife Management Area, Pulaski County, KY: On March 4, 2020, 16 volunteers planted 1,600 tree seedlings on 2.3 acres. Coordinated by Patrick Angel and Doug Potter.

Appalachian State University, Boone, NC, Pennsylvania State University, State College, PA, Xavier University, Cincinnati, OH and Radford University, Radford, VA at KDFWR Wildlife Management Area, Pulaski County, KY: At this event, which occurred on March 12, multiple colleges sent a total of 43 volunteers to plant 2,800 tree seedlings on 4 acres. The number of volunteers were as follows: ASU-10; PSU-10; XU-10; RU-12; EKU-1. Coordinated by Michael French, Patrick Angel, David Cooper and Richard Roth. Special guest, Bob Johnston from Flax for Life, joined them.

Professional Plantings in KY

All Rockcastle River Wildlife Management Area plantings in Pulaski County, KY were completed by professional planters during late April and early May. These plantings were originally

scheduled to happen with volunteers from the following: University of Maryland, College Park, MD; St. Thomas University, Minneapolis, MN; Laudato Si Tree Planting Event-Catholic Commission of Appalachia; Boy Scouts of America-Blue Grass Council, Lexington, KY; University of Kentucky-Lewis Honors College and Appalachian Center, Lexington, KY; Kentucky Writes and Artists for Reforestation, Lexington, KY; Sierra Club, Lexington, KY; and

Philadelphia Insurance. These Kentucky events were previously scheduled on March 18, 25, April 4, 18, 23 & 24, 2020. The projects included 60 acres of reforestation and the creation of a 1.2 acres pollinator habitat composed of native warm season grasses and wildflowers at one Rockcastle site (41,400 trees of which the planters planted 37,600). Professional planters completed plantings at 2 additional legacy sites that were 45 acres (30,600 trees) and 53 acres (40,800 trees).

The Monongahela National Forest projects, originally scheduled for early May with volunteers, were completed by professional planters on schedule and included 200 acres with 90,000 seedlings on the Greenbriar Ranger District (Mower Tract) and 65 acres with 38,500 seedings on the Marlinton Ranger District (Sharp's Knob).





Professional tree planters planting red spruce and common associates on the Monongahela National Forest. The volunteer component was cancelled due to COVID-19. Photos courtesy of Michael French from Green Forest Works.

The multiple Kentucky plantings were coordinated by Michael French, Patrick Angel, David Cooper, Chris Barton, Larry Lowe, Kenton Sena, Sarah Hall, Kathryn Engle, Erik Reece, Mary Miller, Amy Coleman and Scott Eggerud.

Professional Plantings in PA

Ehrenfeld Tree planting Project, Cambria County, PA. was previously scheduled as a volunteer event in April 2020, this 4.3 acre planting was completed by professional planters in May with approximately 2,924 trees. Coordinated by Eric Oliver and Michael Stayrook.

Laurel Run Tree Planting Project, Clearfield County, PA was previously scheduled as a volunteer event on 4 acres with approximately 2,720 trees for April/May 2020, this was completed in May by professional planters. Coordinated by Eric Oliver and Mike Stayrook.

Kitko Tree Planting Project, Clearfield County, PA was scheduled as a volunteer planting for early May on 12 acres with approximately 8,160 trees. It was completed by professional planters in May. Coordinated by Eric Oliver.





Professional planters at the Kitko Legacy Project, Clearfield County, PA. Photos courtesy of Eric Oliver.

Porter Project, Schuylkill County, PA, a volunteer planting, was originally scheduled for May 1, 2020. 600 trees were planted on 1 acre

by professional planters. An additional 300 larger trees were received from PPL Electric Utilities Corporation and they were also planted, covering another acre. Coordinated by Bill Reichert and Michael Myers.

State Game Lands 108 Tree Planting Project, Cambria County, PA, a volunteer event, was cancelled for 2020. Areas 1&2 (each are 7 acres; 4,760 trees each) were planted by professional planters in May. Area 3 (13 acres; 8,840 trees) was moved to 2021 season. Coordinated by Laura England, Eric Oliver, Dan Yahner and Bill Johns.

Woodley Tree Planting Project, Sproul State Forest, PA was a volunteer event on 35 acres with approximately 51,500 trees. It was completed by professional planters in May. Coordinated by Eric Oliver and Tom Clark.

Employee planting

Pittsburgh Botanic Garden, Oakdale, Allegheny County, PA was previously planned to be open to volunteers but was instead planted by staff only. This event included approximately 6,000 seedlings; they were not able find any chestnuts this year but will try to include them in next year's plantings.

Postponed events to be rescheduled in 2021:

Flight 93 Memorial, National Park Service, Somerset County, PA. The volunteer events on 23 acres were previously scheduled for April 24 & 25, 2020. This event represents approximately 15,640 trees. Coordinated by Brooke Neel, Adam Shaffer and Scott Eggerud.

OSMRE-A&W Planting Event in Morgan County, TN was previously scheduled for April 3, 2020. This was a new University Tennessee research sit to be planted over the next two years, starting with willow stakes. Coordinated by Chris Miller and the University of TN.

TDEC-Copperhill Planting Event at Copperhill Superfund Site in Polk County, TN is a superfund site in Copperhill that is being reclaimed using modified FRA techniques and planted with American chestnut. Coordinated by Chris Miller and Dave Turner.

CCWF-Sequatchie County Planting Event, Sequatchie County, TN on a site adjacent to

mine land. The landowner is planning to use FRA to reclaim a compacted 3 acres with approximately 2,040 trees. The volunteer event was to involve 114 children and was previously scheduled for April 22, 2020. Coordinated by Chris Miller and Coal Creek Watershed Foundation IRTEC.

Sandy Ridge Tree Planting Project, Centre County, PA was originally planned for May. Coordinated by Eric Oliver.

Gallitzen State Forest Tree Planting Project, Cambria County, PA. This volunteer event has been rescheduled for the 2021 season and will be conducted on 42 acres with approximately 28,560 trees. Coordinated by Laura England, Eric Oliver and Dan Snyder.



Recent Forest Reclamation Advisories Offer Guidance on Managing Invasive Species and Establishing Forest Understory

By Jacob Levine

The ARRI Science team has been busy and productive over the last two years. The team's work includes Forest Reclamation Advisories, which provide thorough and practical summaries of the team's scientific findings on important subtopics. In the last two years, the Science team has produced three new advisories, discussing invasive species at legacy and abandoned mine sites, invasive species at active mine sites, and establishment of shrubs and small trees.

The oldest of these advisories, published in February of 2019, is *FRA Advisory Number 16: Managing Invasive Exotic Plant Species on Legacy Mine Lands*. Mary Beth Adams, Tyler Sanderson, Kenton Sena, Christopher Barton, Carmen Agouridis, Patrick Angel, and Carl Zipper authored the advisory.

Advisory No. 16 describes how invasive species may establish themselves on legacy mine sites and why their presence can harm reforestation outcomes. Unvegetated legacy mine lands minimally impede invasive exotic species, with ample open space to colonize and little native vegetation to compete for resources. Once established, these invasive species in turn crowd out native species, permanently decreasing biodiversity and altering nutrient cycling and other processes.

The advisory presents a four-step plan for controlling competing vegetation and successfully reforesting a mine site: assessing the site and developing a plan, site preparation, planting native trees, and protecting the trees once planted. The paper also describes six techniques for controlling exotic invasive species: chemical herbicides, mechanical methods, manual methods, prescribed burns, biological control, and mulching and solarization. Each has its own advantages and drawbacks, and every site and invasive species will have its own optimal mix of control techniques.

The appendix to Advisory No. 16 zeroes in on several invasive species common to Appalachia, providing essential information and control techniques.

While Advisory No. 16 focuses on controlling invasive species at legacy mine sites, Advisory No. 17 turns to reclamation of active mine sites. The paper, titled *The Forestry Reclamation Approach: An Essential Tool for Controlling Invasive Exotic Plants on Active Mine Sites*, came out in May 2019, with the same authors as Advisory No. 16.

Like the previous volume, Advisory No. 17 explains in detail why mining reclamation sites may be especially vulnerable to invasive exotic plants, and why the establishment of those plants may impede reforestation with native species. The paper then describes six actions that ensure effective management of invasive species at recently active mining sites.

The first action entails implementing all five steps of the Forestry Reclamation Approach as described in FRA Advisory No. 2: creating a suitable rooting medium, loosely grading the topsoil, using tree-compatible groundcover species, planting both early successional trees and commercially valuable crop trees, and using proper tree planting techniques. Advisory No. 17 emphasizes the soil selection and application as especially important to favoring native species over invasive species.

The other actions for managing invasive species include preventing accidental seeding and planting of invasive species during revegetation, becoming familiar with the common invasive species in the locality of the reforestation project, planning for the proper and feasible level of invasive species control, identifying and addressing infestation early, and correctly applying management techniques to ensure that invasive species are eradicated.

The paper ends with the observation that establishment of a native canopy through aggressive intervention makes for the most effective means of long-term invasive species management.

Finally, Advisory No. 18 came out in August of 2019. The paper, titled *Establishing Small Tree and Shrub Species on Mined Lands Using the Forestry Reclamation Approach*, was authored by Jeff Skousen, Alexis Monteleone, Michael Tyree, Rebecca Swab, John Groninger, Mary Beth Adams, David Buckley, Petra Wood, Rick Williams, Scott Eggerud, Patrick Angel and Carl Zipper.

This advisory analyzes in greater detail step four of the FRA- planting early successional species that will promote the effective establishment of a native forest canopy. Early successional species establish the structural diversity of the ecosystem, deter harmful invasive species, and provide food and cover to wildlife, some of which will deposit seeds from adjacent native forests. Because foresters have traditionally focused on commercially valuable crop species, less is known about the important understory shrubs and small trees.

The paper analyzes the results of eight reforestation trials and determined that many desirable understory species show higher than 40 percent survival, especially when planted in appropriate conditions. To ensure effective understory establishments, foresters should select suitable soil material, develop a planting plan with appropriate woody species, use good planting stock and proper planting techniques, and protect and maintain the plantings.

The Science Team anticipates that the next Advisory will discuss hydrology and its impact on reforestation efforts.

Our ARRI State Nursery Partners Experiencing Challenging Times due to COVID-19

By Cliff Drouet, Forester



What a year it's been during 2020, the COVID pandemic has affected all corners of the planetplacing intense pressure on individuals, businesses, communities, states and nations-not to mention our forests and environment. COVID caused several cancellations and changes within the state forest managed nurseries; particularly those in KY and WV.

The KY Division of Forestry owns and manages two state nurseries (one in east KY and one in west KY). Both nurseries experienced a couple short-term temporary closures last year due to the threat of exposure to COVID. To ensure public and state employee safety, seedling orders that were to have been shipped out for the 2020 spring season were rescinded. The KY Division of Forestry appreciates the opportunity for business generated by timber companies/natural resource agencies/contractors and individuals alike on potential future seedling sales in the upcoming year. The WV Division of Forestry has one state nursery and they plan to ship seedling orders that were made during Fall 2020 but they're not accepting any new orders at this time. The WV nursery is currently closed due to state health directives regarding COVID.

I had the opportunity to meet with the WV State Forester; Mr. Barry Cook; during the 2019 SAF National Convention and Barry discussed several topics during that meeting. He voiced strong support of the ARRI program-not just within the borders of WV but throughout the entire Appalachian region and his vision for improving the WV State Nursery with new buildings, updated mechanical equipment and hiring additional nursery personnel. Sadly, Barry died in a tragic accident in early May 2020 and his long-range forestry plans died as well. Now the WV State Nursery is suffering from low funding and possible permanent closure.

Meanwhile in KY, where the COVID numbers have steadily increased since late Summer of 2020; the outlook is to continue to operate both state nurseries. There was a change of leadership in the KY Division of Forestry during the Fall of 2020 when KY State Forester, James Wright retired, and Brandon Howard was appointed as the new KY State Forester. Both of these State Foresters are huge supporters of the ARRI program and their state nurseries. It has been a challenge to manage two nurseries during the 2020 pandemic year. The KY Division of Forestry plans to continue to operate both nurseries as in the past while maintaining their mission: "to protect, conserve and enhance the forest resources of the Commonwealth through a public informed of the environmental, social and economic importance of these resources."

Both WV and KY are struggling to make up tax revenues throughout their states and maintain all state agency activities/services without closing offices and state nurseries which are critical for the future of forestry in both states and to border states as well.

I've stayed in contact with our ARRI partner nurseries in KY and WV and with several private nurseries and they're facing the same dire challenges that the state nurseries are.

Our ARRI state nursery partners have shown great resilience and innovation during this COVID timeframe and they're having to make tough decisions now for the near term and long-range operations of their nurseries. I truly want all our nursery partners (state and private) to survive and grow with deliberate optimism despite this COVID challenge and I urge all readers to support them as well.



Red Spruce Restoration on Legacy Mine Lands Continues on the Monongahela National Forest

By Scott Eggerud, Forester

Red spruce restoration on legacy mine lands continues on the Monongahela National Forest in two of the four Ranger Districts. Red spruce restoration on old mine lands on the "Mon" began in 2011 and has occurred every year, except for 2012, and will continue through the 2021 planting season and beyond. Mine land restoration work began on Barton Bench, on the Mower Tract, in the Greenbrier Ranger District in 2011 and has expanded to include work on Sharp's Knob in the Marlinton Ranger District.

These high elevation sites, over 4,000 feet above sea level, were dominated by pure stands of old growth, red spruce and mixed stands of red spruce and maple, beech and birch before the industrial logging in the late 1800's and early 1900's. Most of the spruce was clear-cut for paper production. Huge fires followed the harvests burning the slash and even the soil. This resulted in excessive soil erosion, downstream flooding and a drastic change in cover types. Maple, beech and birch quickly covered the land where red spruce once dominated. Even the red spruce seed pool was destroyed making the return to red spruce even more difficult without human intervention.

The 40,000-acre Mower Tract was owned by Mower Land and Lumber Company and sold to the USFS in the early 1980's. Prior to the sale, much of the timber on this tract was harvested and about 4,000 acres mined for coal. Surface and underground mining methods were employed. Trees were planted back on much of the mined lands however species planted were mostly nonnative conifers including Norway spruce, red pine, white pine and Scotch pine, in descending order. Some open areas were also created. These pine savannahs were beautiful, but far from natural. To date 446,924 native trees, shrubs and other plants were planted on 964 acres of legacy mine lands on the Mower Tract alone. Approximately 1,358 wetlands, most of which were vernal pools, were also created to retain water, moderate flows, and create critical habitat for many types of plants and animals. Most of these trees and shrubs were planted by professionals but over 500 volunteers also helped over the years. NEPA work has been completed for additional plantings far into the future.



5-year-old red spruce on Barton Bench, Mower Tract, Monongahela National Forest.



Stream reconstruction on Lambert North, Mower Tract, Monongahela National Forest.

Red spruce restoration began on Sharps Knob in the Marlinton Ranger District in 2018. After three years of planting, 67,756 trees, shrubs and other plants were planted across 122 acres. Eight wetlands were also created. Again, professional planters planted the bulk of these trees, but 57 volunteers were also engaged in 2018. Approximately 260 additional acres of mined lands in the Sharp's Knob area may be suitable for restoration.



Snowshoe Resort employee's plant red spruce on Sharps Knob, Monongahela National Forest.

Green Forests Work headed up the restoration effort. Other partners include: the USFS -Monongahela National Forest, Appalachian Headwaters, the Argosy Foundation, Snowshoe Resort, the Appalachian Stewardship Foundation, the National Forest Foundation, the Appalachian Regional Reforestation Initiative, the Office of Surface Mining Reclamation and Enforcement, The Nature Conservancy, Appalachian Forest Heritage Area, NRCS - Appalachian Plant Materials Center, Central Appalachian Spruce Restoration Initiative, the Arbor Day Foundation, West Virginia Highlands Conservancy, the University of Kentucky and many others.

The Appalachian Regional Reforestation Initiative was

started in 2004 with the goal of encouraging the planting of highvalue hardwood trees on reclaimed coal mine sites using the Forestry Reclamation approach.

ARRI is a coalition of the States of the Appalachian Region, the Office of Surface Mining and their many partners in industry, environmental organizations, academia, local, State and Federal government agencies and local citizens who have come together to support this valuable initiative.

For more information on ARRI visit our website at: https:/arri.osmre.gov/

ARRI Core Team Leaders: Scott Eggerud, OSMRE Appalachian Region

Lawrence Tankersley, Virginia DMME

Science Team Leaders

Dr. Jennifer Franklin, University of Tennessee

Michael French, Green Forests Works

Science Team Liaisons:

Chris Miller, OSMRE Knoxville Field Office

Scott Eggerud, OSMRE Appalachian Region

Newsletter Team:

Newsletter Coordinator and Layout Design: Patty Hoffman

News Editor: Jacob Levine