APPALACHIAN REFORESTATION INITIATIVE

ARRI Newsletter

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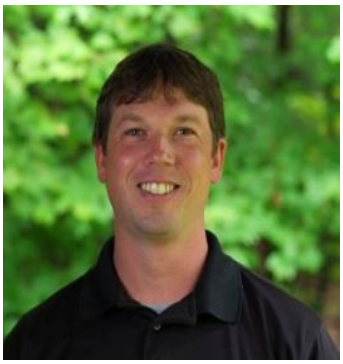
ARRI Science Team Updates: New Leadership and Members

By Chris Miller

We would like to thank Dr. Mike Tyree and Eric Oliver for hosting the ARRI conference at IUP in Indiana, Pennsylvania this year. We had a productive Science Team meeting as we welcomed new members: Dr. Mike Tyree, Dr. Rebecca Swab, Dr. Kenton Sena, Jacob Johnson, and Dr. Cynthia Huebner. These new members have been participating in forestry reclamation research and will make great additions to the ARRI Science Team. Join us in welcoming them!



Dr. Mike Tyree earned his M.S. and Ph.D. from Virginia Tech in Blacksburg, Virginia in 2005 and 2008, respectively, and his B.S. from Pennsylvania State University in 2002. He is currently an Assistant Professor of Plant Ecology in the Department of Biology at IUP in Indiana, Pennsylvania. He is also the curator of the A.G. Shields Herbarium at IUP. Mike's overall research addresses the effects of natural and man-made disturbances on forest ecosystem C cycling. His current projects focus on: 1) the survival and competitiveness of blight-resistant American chestnut backcrosses on the reclaimed surface mine at Flight 93; 2) the impact of hemlock woolly adelgid infestation on ecosystem C cycling in late successional eastern hemlock forests; and, 3) the effects of extreme drought on elite southern pine genotypes. Mike was the co-host for the 2018 ARRI conference at IUP.

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Dr. Cynthia Huebner from the USDA Forest Service, Northern Research Station received her BS in biology from the University of California, Riverside, a MS in environmental science and MA in plant ecology from Indiana University, Bloomington, and a PhD in botany from Miami University of Ohio, Oxford. She has been a Research Botanist for the Northern Research Station in Morgantown, WV since 2000. Her research focuses on the biology and ecology of invasive plant species in forest systems in association with anthropogenic and natural disturbances and across environmental gradients. She has been interested in reclamation and reforestation since her early days, and brings a wealth of experience with a variety of invasive plants (Ailanthus and Japanese stiltgrass), having worked in forest systems in Arizona, Missouri, Ohio, Pennsylvania, and West Virginia.

Dr. Kenton Sena is a Lewis Lecturer at the Lewis Honors College, University of Kentucky. He recently received his doctorate degree in Integrated Plant and Soil Science from the University of Kentucky in May of this year under his advisor and Science Team member Dr. Christopher Barton. He also received his Master of Science in forestry degree under Dr. Barton in 2014. Prior to his studies at UK, he attended Asbury University to receive his Bachelor of Arts in biology at Asbury University. He has been involved with research supporting the FRA since his early graduate years and has published numerous peer reviewed articles and book chapters regarding restoration ecology, environmental biology, forest ecology, soil science, and water quality (many of which were based on surface mines).

Dr. Rebecca Swab is a 2014 graduate of the University of California Riverside where she earned her Ph.D. from the Department of Biology. Her dissertation was entitled: "Increasing understanding of species responses to global changes through modeling plant metapopulation dynamics". She also graduated cum laude with honors with a B.S. and M.S. from the School of Natural Resources and The Ohio State University in Columbus, Ohio. Her M.S. thesis was entitled: "Effectiveness of Lonicera maackii removal on herbaceous understory vegetation from a bottomland hardwood forest in central Ohio". Rebecca is currently the Director of Restoration Ecology at The Wilds in Cumberland, Ohio where she directs ecological restoration research and land management projects, develops publications and outreach to educate conservationists and the public, and manages program budget, staff, interns, and volunteers. A research project at The Wilds that Rebecca has been involved in this year has been a comparison of conventional ripping to the Polster method.

PhD candidate **Jacob Johnson** is attending Pennsylvania State University pursuing a doctorate in Forest Resources and International Agriculture Development (2022). Prior to his studies at Penn State, he received his Master of Science degree at Virginia Tech in 2011 (Thesis title: "Honeylocust and Black Walnut Tree Products within a Temperate Appalachian Silvopature) and Bachelor of Science degree at Virginia Commonwealth University in 2008. As part of his doctoral research, he will be performing a case study to assess the cost of the Forestry Reclamation Approach on mined land. This economic investigation will be the first thorough assessment of the economics behind the FRA and will be used in an upcoming FRA economics advisory.

New ARRI Science Team Co-Leaders Announced

Also announced during this year's Science Team meeting was that Dr. Chris Barton and Dr. Brian Strahm will be stepping down as Science Team co-leaders. We thank both Chris and Brian for their previous leadership and look forward to their continued involvement with the team. In their place, Dr. Jennifer Franklin and Michael French accepted their election as co-leaders. Thanks to both Jennifer and Michael for taking on this role.

Dr. Jennifer Franklin is a forestry professor at the University of Tennessee (UTK) and has been involved with the ARRI science team since its inception. She received her PhD in forest biology from the University of Alberta in 2001. While at UTK, she has published numerous peer reviewed articles and has advised several graduate students studying mine site reclamation. Her research interests include root and soil interactions, plant nutrition, afforestation, and mine site reclamation. She has particular interest in the third step of the FRA, using compatible groundcovers, and has continued to study the relationships between groundcover and trees.

Michael French is the Director of Operations at Green Forests Work and has been involved in mine site reforestation since 2005. He received both his Master of Science and Bachelor of Science from the University of Kentucky in forestry and biology, respectively. Prior to his work at GFW, he was a forester for The American Chestnut Foundation and reforestation coordinator for GFW. He has authored many peer reviewed publications mainly focused on mined land reforestation and the re-establishment of the American chestnut. Michael is also the lead author of Forest Reclamation Advisory #12: Re-establishing

American Chestnut on Mined Lands in the Appalachian Coalfields.

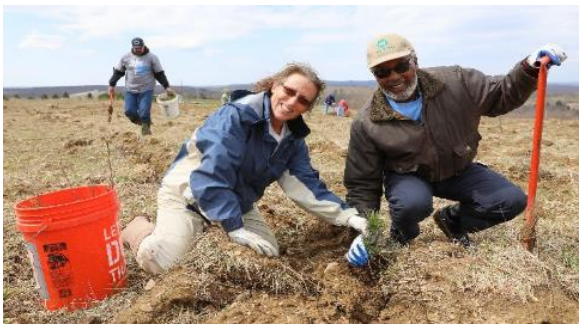
ARRI Completes Phase VII at Flight 93

By Chet Edwards

Over 400 volunteers from across the country gathered on April 27th and 28th to complete Phase VII of the ARRI reforestation project at the Flight 93 Memorial near Shanksville Pennsylvania.

The Memorial is situated on a reclaimed surface mine that was last mined in the mid-1990s. Upon completion of the mining, much of the land was reclaimed and seeded with a mixture of grasses, herbaceous plants, and exotic conifers and hardwoods. Phase I of the project began in the spring of 2012 when the National Park Service and the Office of Surface Mining Reclamation and Enforcement teamed with others to reforest sections of the Memorial grounds. With the completion of Phase VII, 117,353 native hardwood trees and shrubs have replaced the non-native grasses, conifers, and hardwood species on 170 acres of the existing surface mined lands within the Park. This entire project has been accomplished by volunteers dedicated to the memory of Flight 93.

The 22 acre tract for the 2018 event was divided into 20 plots that varied in size of 1 to 2 acres. Thanks to the generosity of Rose Bud Mining of Kittanning PA, step 2 of the Forestry Reclamation Approach mitigating soil compaction, was completed just in time for the event. Rose Bud cross ripped the plots with a D9 bull dozer to a depth of 4 feet which really made the planting easy.



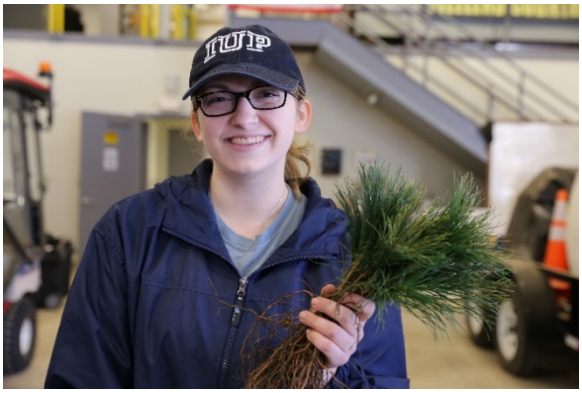
Two volunteers planting a seedling.

A group of Penn State DuBois volunteers placing seedlings in buckets to plant at the site.

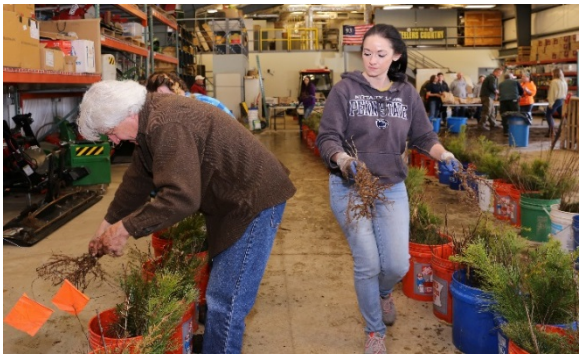
Next, volunteers from Penn State DuBois, Indiana University Pennsylvania (IUP), and Penn State Altoona, which included past OSMRE Director Joe Pizarchik, worked enthusiastically preparing 14,960 seedlings for the 2 day event. Students and forestry professionals prepared 400 planting buckets. The species selected for the 2018 event included:

5684 white pine,	748 pitch pine
449 eastern hemlock	299 red pine
1496 red oak	748 white oak
748 black locust	748 black cherry
449 quaking aspen	449 big-tooth aspen
150 shag bark hickory	500 American hazelnut
250 choke berry	500 silky dogwood
300 elderberry	1197 American chestnut*

*The American chestnut seedlings were donated by the American Chestnut Foundation. These seedlings are a 15/16” back-crossed progeny with Chinese chestnut (15/16ths American and 1/16” Chinese that are blight resistant.

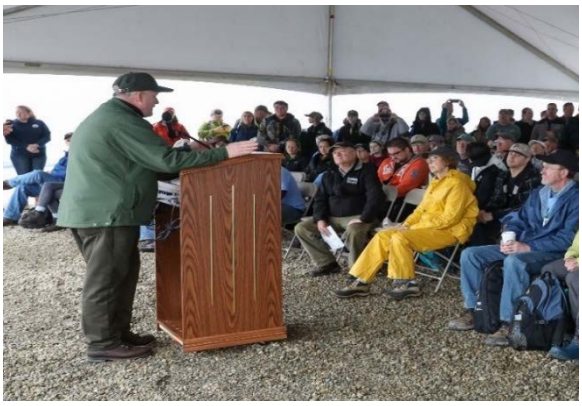


One of Indiana University of Pennsylvania’s many volunteers at the site.



Joe Pizarchik, a past OSMRE director, preparing buckets of seedlings for planting.

Ten teams of 20 volunteers met each morning at the check-in tent. They were greeted and checked-in by the Friends of Flight 93 Volunteers. The Friends of Flight 93 volunteers are the “behind the scenes” coordinators that work diligently with the National Park Service on this event, but also on many events throughout the year. Not only do they donate their time, they also provide tremendous financial support. A fact not well known by the many Park visitors is that the only public funds expended at the Fight 93 Memorial have been for the road system. Everything that has been built, bought, or acquired for the Park has been done through donations with the Friends of Flight 93.



Steve Clark, the Park superintendent, addressing a crowd of volunteers.

The two beautiful days of the event began each morning with opening ceremonies by Park Superintendent, Steve Clark. His emotional and moving account of the brave actions of the 44 individuals that gave their lives that dreadful day, further inspired each volunteer of the sanctity of the Flight 93 Memorial. Steve spoke of the hard work by volunteers, thanked the dedicated financial sponsors and the Forestry Professionals; saying without them, this project would not be possible. He also called our own OSMRE Appalachian Regional Forester, Scott Eggerud, to the podium to present Scott an Award of Recognition for his work and dedication to the ARRI and Flight 93 reforestation project.

During the summer of 2017, the first Reforestation Monitoring project was conducted. The project was conducted by the Indiana University of Pennsylvania, Department of Biology, OSMRE, and the American Chestnut Foundation. The goals were to 1). Determine percent stocking for each of the woody species planted across the six phases, 2). Evaluate growth and health of wood plants, 3). Describe levels of competing vegetation across each

phase; and 4). Assess growth and density of target species within Special Planting Zones. In summarizing the report the monitoring findings were:

Total stocking across all six phases was 74.5%.

Greatest plant growth was observed in the conifers and the greatest growth among deciduous trees were early successional species.

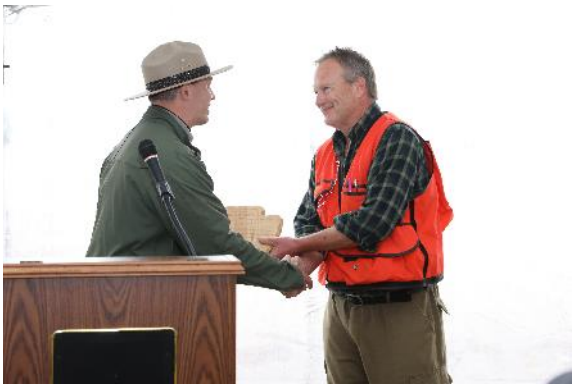
Overall, 88% of all plants showed no sign of deer browse.

The largest threat comes from growth suppression due to extensive competing vegetation from grass and herbaceous dicots (plants with non-wood stems)

The final report was prepared by Michael Tyree, Jeff Larkin, Scott Eggerud, Patrick Angel and Michael French. The report concluded that abundance across the site is adequate to maintain a fully stocked forest in the future. To review the entire report, go to the ARRI website.

The reforestation goal of the Flight 93 Reforestation Project is 200 acres and 150,000 trees. The project is winding down and possibly only has three phases remaining. Tree plantings are usually held in late April. If you would like to join the tree planting volunteers, go to the Friends of Flight 93 website and sign up!

Two volunteers planting trees at Flight 93.



Steve Clark, Park Administrator, presenting Scott Eggerud, OSMRE Forester, with an award recognizing his hard work with ARRI at the Flight 93 Project.

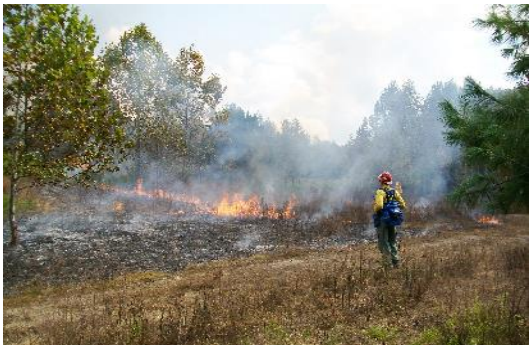
Dozer Fire Training in Kentucky

By Cliff Drouet

In December 2016, Jim Taitt (OSMRE/Appalachia Region Branch Chief) and Cliff Drouet (OSMRE Forester) met to discuss new and innovative partnerships for reforestation efforts on reclaimed mine sites. The main discussion point was how to involve the US Army Corps of Engineers as an active partner with Appalachian Region Reforestation Initiative (ARRI). The US Army Engineers from an Engineer Battalion in PA had conducted outstanding realistic training for their Engineer soldiers on Flight 93 National Memorial (located near Shanksville, PA) by ripping the old mine site using their bulldozers prior to NPS Volunteers hand planting seedlings on the mine site. The long term plan for this site is to reforest this National Memorial with native tree species over a 10 year period.

The partnership between the US Army Engineers and the NPS was a one- time event that Jim Taitt wanted to continue and build into a robust partnership including Active, Reserve

and National Guard Engineer units throughout the Appalachia Region. This partnership would provide equipment, operators and maintenance support and the opportunity to conduct realistic field training by performing mechanical site preparation (ripping) on reclaimed mine land owned by the National Park Service and other agencies. Cliff understood the concept involving the US Army Corps of Engineers and the various Army Engineer units since he is a retired Army Engineer Officer with 36 years of military service and four combat tours with the Army Engineers.



One of the students, attending the training, watching the prescribed fire which was part of the lesson plan.

All of the students and instructors that attended the training during the burn day wearing Nomex (fire resistant) pants and shirts as required by PPE.

OSMRE started to craft a partnership plan. In the end a plan to train multiple state and federal agencies on dozer operations, dozer safety, dozer maintenance, mechanical site preparation, the importance of dozer support regarding wildland fire fighting thereby increasing in-state wildland firefighting resources was developed. This training idea was developed to be an accredited 40 hour course which includes constructing roads, fire lanes, structure protection, creek crossings, wildland fire fighting techniques and the proper use of the dozer blade and ripper attachment.

OSMRE staff had to plan and coordinate a complicated logistic matrix involving: recruiting multiple agency partners, students from each participating agency, prepare a training curriculum, provide class materials/equipment, meals, lodging, transportation, multiple dozers to train on, refueling requirements, adequate training in a large training area w/multiple training sites and other logistic requirements. They met with several agency partners (University of Kentucky – Department of Forestry, Kentucky Department of Natural Resources, Kentucky Army National Guard, US Forest Service, Kentucky Abandoned Mine Lands) over several months to discuss this proposed dozer training course. After the State and Federal agency partners were briefed on the concept and provided the draft training plan; all partners strongly agreed this training was needed for their agencies and pledged their full support.

The decision was made to hold the course at University of Kentucky-Robinson Forest. There were 15 students from multiple state and federal agencies with six instructors and nine dozers were provided for training by US Forest Service and Kentucky Division of Forestry. The students trained on five realistic training areas and were able to operate different types of dozers. They had plenty of hands-on stick time and trained on dozer operation, maintenance and safety. One training day focused solely on wildland fire fighting and safety and the students learned how to deploy a fire shelter,

structure protection using a dozer, how to build fire lanes and the proper way to plan a prescribed burn.

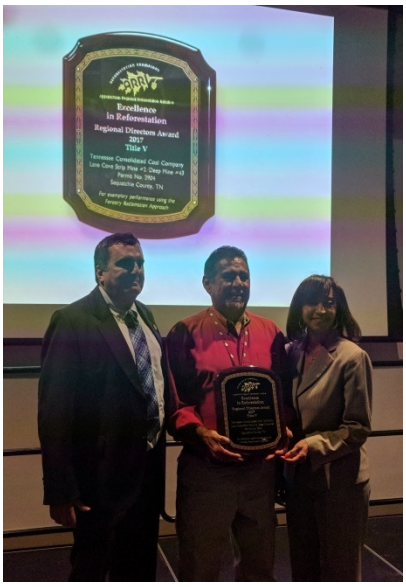
This pilot program was a huge success and received praise from all participating partners. Additional training tasks are being added to the curriculum as requested by the students and partner agencies and this revised training program will be a robust 40 hour course that will train dozer operators to support wildland fire fighting efforts and mine land restoration.

Tennessee Consolidated Coal receives the ARRI Excellence in Reforestation - Regional and Tennessee State Awards

By Chris Miller

The Knoxville Field Office annually recognizes exemplary performance and execution of the FRA for the previous calendar year. This recognition is the ARRI – Excellence in Reforestation – State Award. State award nominees are also nominated for the ARRI – Excellence in Reforestation – Regional Director's award. This year, Tennessee Consolidated Coal Company's (TCC) Deep Mine #43, permit #2904 won both the state and regional awards in recognition of their work to promote the reforestation of surface-mined land in Tennessee. Representatives from TCC accepted the Regional Award at the ARRI Conference in Pennsylvania on Wednesday, August 8, 2018. OSMRE Pittsburgh Division Chief Ben Owens and OSMRE Acting Director Glenda Owens presented the award. On Monday, October 8th, TCC received Tennessee's ARRI - Excellence in Reforestation State Award at the Tennessee Mining Conference in Gatlinburg, Tennessee.

The area nominated for the awards is a 140 acre surface mining and 10 acre underground mining operation permitted and operated by TCC. The majority of the surface mining operation was mined and reclaimed in the 1990s. The remaining deep mine, Mine #43, continued mining until 1998 when it was placed in cessation status. The mine remained idled in hopes that the coal market would improve enough to become active again. However, in 2017 this permit began its reclamation process. After witnessing the success of the FRA on other sites in the state, the company pursued a revision to implement the FRA on the remaining 10 acre underground mine area.

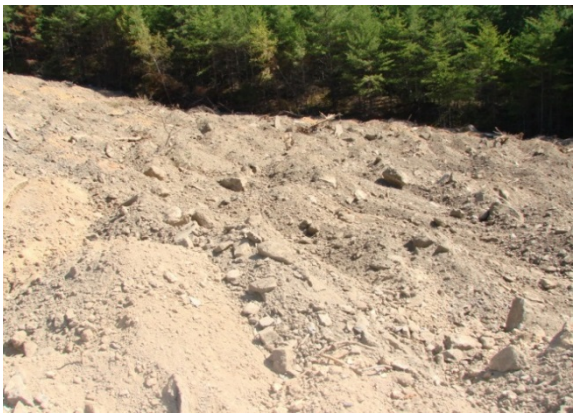


Bernard Higgins (middle), representative from TCC, accepts the ARRI – Excellence in Reforestation Regional Director's Award from OSMRE Pittsburgh Division Chief Ben Owens (left) and OSMRE Acting Director Glenda Owens (right).

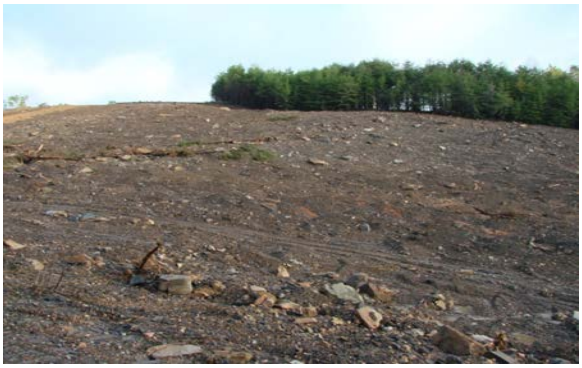
Using excess material from the strip mine along with stored material from creation of the face-

up, the company was able to achieve the approximate original contour on the deep mine area with no lack of material or over-stacking of the highwall. The tree growth medium consisted of four to six feet of a mixture of topsoil, brown weathered sandstone, small amounts of shale, and woody material. Minimal grading of the tree growth medium was achieved using a novel technique that eliminated all dozer tracks in the backfill. The operator began by spreading the growth medium over the backfill using the FRA-recommended technique for sloped sites. The material was dumped, and only one pass down the slope achieved their final grade. However, the operator noticed windrows and tracks from the one pass grading on the slope. In order to eliminate minor rill erosion that may occur from the single pass of the tracks, they turned their D-6 dozer around and pushed the material back up the slope, forming a mound at the top of the backfill. Once the dozer had reached the top, they backed down and proceeded to push another mound of dirt which butted up against the previous pass. They did this on the entire 10 acre site. This novel "push-up" method eliminated all dozer tracks from the final slope, leaving the top of the slope completely uncompacted. Shortly after reclamation, rains from Hurricane Irma battered the site. Although they received 4.2 inches of rain from the storm, there was no observed erosion of the backfill, and all discharges from the receiving ponds remained clear.

The permit revegetation plan included a ground cover mix that will provide initial soil stabilization, and is compatible with growing trees. The (spring) ground cover included: 5 lbs. of orchardgrass, 5 lbs. of timothy, 10 lbs. of perennial rye, 5 lbs. of ladino clover, and 8 lbs. of indiangrass. The mixture was seeded at reduced rates according to the FRA with a minimum mandatory ground cover of 60%. Trees were planted at a rate of 680 stems per acre and included northern red oak, sawtooth oak, black locust, white oak, chestnut oak, shagbark hickory, sugar maple, and American chestnut. The tree species mix on this area also included American chestnut donated by the Coal Creek Watershed Foundation and shortleaf pine donated by ARRI Science Team member Dr. Jennifer Franklin.



The final grade after using the "push-up" technique at TCC's Mine #43.



A photo taken the morning after 4.2 inches of rain from Hurricane Irma fell on the site with no observable erosion.

The permittee was in constant contact with the inspector and ARRI Core Team members to ensure the reclamation practices they employed were in accordance with the FRA. In addition to their operational commitment to the FRA, TCC also hosted the 2018 TN Arbor Day event, where 80 local middle school students and 20 volunteers planted nearly 1,000 seedlings on 1.5 acres on the site.

Williams Forestry planting the tree seedlings in the un-compacted backfill of Mine #43 with sparse vegetation to allow for tree growth.

As an illustration of the effectiveness of their success, the American chestnut planted at the TN Arbor Day event in April have already grown eight inches. The Core Team members in Tennessee are confident that this site will be a model to other operators in the area and will continue to monitor tree growth in future site visits.

Dr. Patrick Angel, 40 Years of Service

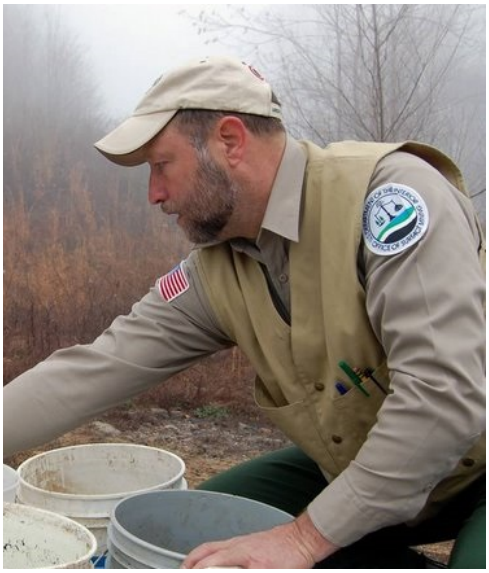
Dr. Patrick Angel at work.

In April of this year, Dr. Patrick Angel had been employed by OSMRE for 40 years. He was hired in 1978 under the Carter Administration after training the first group of OSMRE inspectors prior to their dispatch into the coal fields to implement SMCRA.

Before OSMRE, Patrick worked for 8 years with the state of Kentucky regulating the coal industry and then training reclamation practitioners with the University of Kentucky.

With OSMRE, his badge number was Number 2 and he has the distinction of having issued the first federal Cessation Order under SMCRA. He recounts stories of how in the early years of SMCRA, wildcat mine operators regularly threatened, intimidated and shot at federal inspectors in Kentucky, Tennessee and Virginia.

From 1978 until 2006, Patrick supervised the inspection and enforcement operations for OSMRE in the mountains of eastern Kentucky.



Dr. Patrick Angel at work.

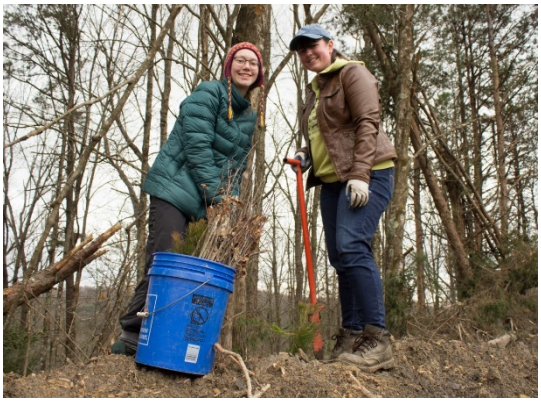
Patrick has a BS and MS in Forestry but when he was inspired by the forest reclamation researchers at the University of Kentucky, Virginia Tech and elsewhere, he returned to UK to study the Forestry Reclamation Approach. In 2008, he earned a Ph.D. at UK in Soil Science with a focus on the reforestation of surface mines.

Dr. Angel is currently serving as Senior Forester and Soil Scientist for OSMRE. He is one of the founding fathers of the Appalachian Regional Reforestation Initiative (ARRI) where he is promoting reforestation partnerships on surface mines across the US coal fields.

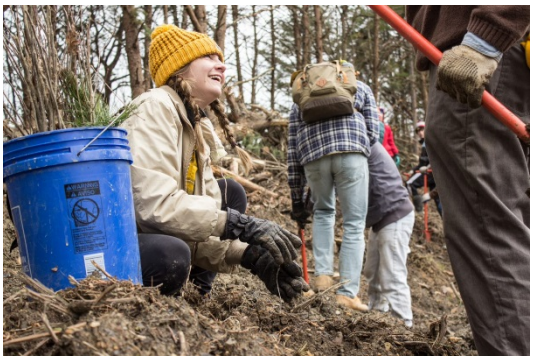
ARRI and GFW Celebrate a Successful Tree Planting Season on Legacy Mines

By Dr. Patrick Angel

ARRI and Green Forests Work (GFW) had a very successful tree planting season on legacy mines in 2018. Over 1,950 ARRI/GFW volunteers and professional tree planters planted a record breaking 401,728 seedlings on over 660 acres. A typical example of a GFW volunteer tree planting project on a legacy mine site this year was on the Rockcastle Wildlife Management Area (RWMA) managed by the Kentucky Department of Fish and Wildlife Resources in Pulaski County, Kentucky where alternate spring break college students, boy scouts, members of conservation and art groups, state agencies and the general public contributed to the planting of about 25 acres of mined land. Made possible by grants and donations from the Arbor Day Foundation, Angel's Envy, Arborgen and other partners, the RWMA project provided forest restoration on an old, de-graded surface mine site near Ano, Kentucky. Students from the following schools planted trees on the project: Appalachian State University, Drew University, University of Kentucky, Xavier University, Radford University, University of North Carolina-Chapel Hill, University of Delaware and Marian University. The students were joined by members of the Cumberland Chapter of the Sierra Club, the Kentucky Writers and Artists for Reforestation and Boy Scout Troops from across Kentucky.



Volunteers enjoying a day planting trees which was made possible by grants and donations.

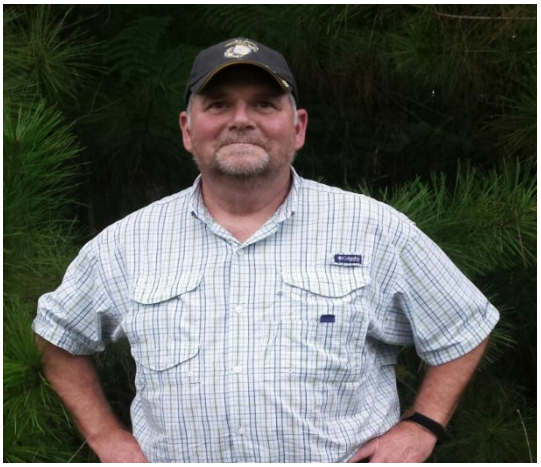


More volunteers enjoying the day planting trees.

Arbor Day Event at Pinchot State Forest in Pennsylvania

The following article was compiled from a video produced by PEC (Pennsylvania Environmental Council) featuring forester, Ben Hardy, from DCNR and forester, Cliff Drouet, from OSMRE.

Pinchot State Forest, in northeastern Pennsylvania's anthracite coal region, recently hosted a volunteer site preparation and planting event with the Pennsylvania Environmental Council (PEC) and local volunteers. The site used to be an active surface and sub-surface mining area and was acquired as a state forest in the last ten years. In conjunction with EPA, Pennsylvania has undertaken a large mine reclamation project in which they regraded the land and tried to return the site to its original contours



Cliff Drouet, one of OSMRE's forester's.

With the help of PEC and local volunteers, Pennsylvania is ready to plant trees to reforest the area. Participants planted white pine, Virginia pine, black locust, quaking aspen and hybrid American chestnuts donated by the American Chestnut Foundation. The Virginia pine grows particularly well on mine spoil areas, as does black locust. Locust species are part of the legume (bean) family, which puts nitrogen back in the soil and helps build the soil capacity. On April 10, Tennessee's ARRI core team members and the Coal Creek Watershed Foundation (CCWF) celebrated their 10th Annual Arbor Day together as event coordinators. We thank the CCWF for their continued support of ARRI and our mission to restoring forests on coal mined land. Over time as the trees grow they will return more nutrients to the soil and develop the site into a better area.

There are dozens of benefits to planting trees. Trees improve air quality by absorbing carbon dioxide and releasing oxygen, and help prevent the loss of soil through rain water runoff.

The Pinchot site once contained a large number of mine and spoil pits. The mining company tried to reshape the land to the original contour to allow the water to flow naturally. The pit was filled with large rocks, with smaller rocks layered on top and the area covered with a layer of topsoil. To prepare the site for planting, the operator uses a bulldozer with a ripper attached on the back. The ripper, which is similar to a steel plow, rips the soil and prepares it for planting, similar to plowing a field.

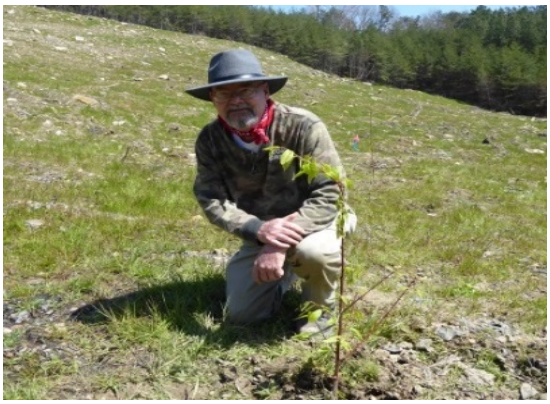
Trees were planted in eight-foot intervals, for a total of 680 trees per acre. The trees should be established in a few years and in five to ten years there will be a noticeable change in the area. An old Chinese proverb states: "One generation plants the trees and another enjoys the shade"; you cannot think of a forest in in human terms.

Tennessee Celebrates Their Tenth Annual Arbor Day Event

By Chris Miller

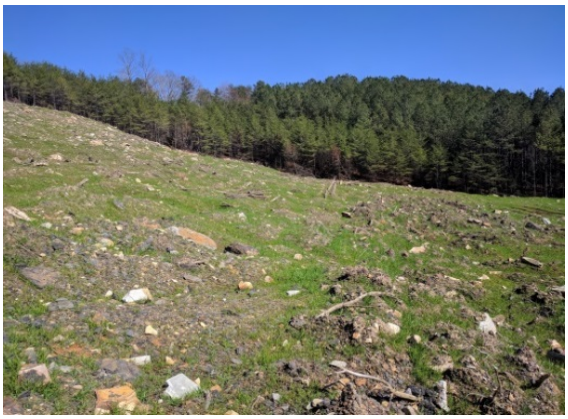
On April 10, Tennessee's ARRI core team members and the Coal Creek Watershed Foundation (CCWF) celebrated their 10th Annual Arbor Day together as event coordinators. We thank the CCWF for their continued support of

ARRI and our mission to restoring forests on coal mined land.

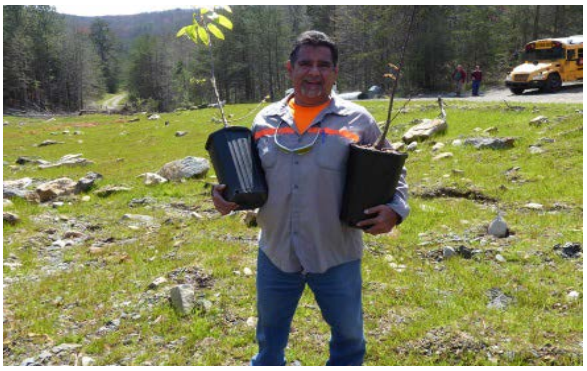


Barry Thacker of CCWF, next to his home-grown blight-resistant American chestnut (photo provided by Carol Moore, CCWF).

Around 80 students from Whitwell Middle School and 20 adult volunteers showed up to plant nearly 1,000 seedlings on the reclaimed site. On top of a mixture of native hardwood seedlings, the students planted around 50 blight-resistant chestnuts provided by the American Chestnut Foundation. These trees were grown from seed by Barry Thacker of the CCWF. The University of Tennessee's forestry professor and Science Team member Jennifer Franklin provided 200 shortleaf pine for the event.

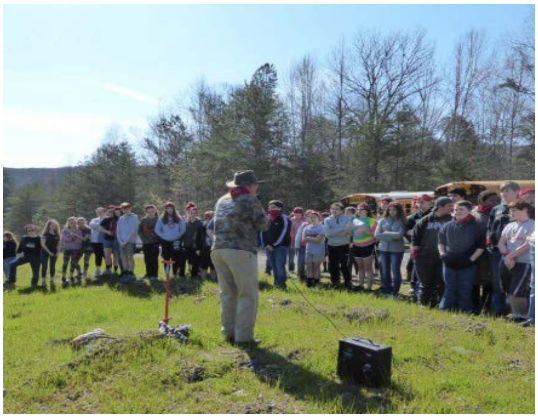


The planting site prior to being reforested. (photo provided by Carol Moore, CCWF).

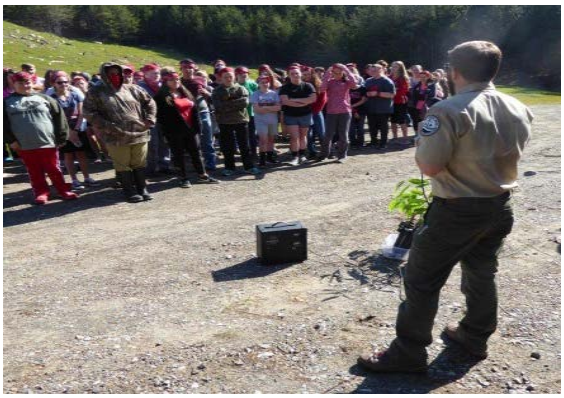


Bernard (Chico) Higgins of TCC standing on his reclaimed site ready to be reforested (photo provided by Carol Moore, CCWF).

To kick off the event, Barry Thacker spoke to the students about the importance of the American chestnut in the native forest. Students learned about how important the tree was for their ancestors who lived in the area, and how they would be able to tell their children about how they played a part in bringing the tree back to the native ecosystem. Next, ARRI Core Team members showed the students proper tree planting techniques and pointed out to the students that in order to successfully plant trees, they must be treated like crops in a garden. The five steps of the FRA were compared to gardening techniques, something all the students could identify with.



Barry Thacker explaining to the students the importance of the American chestnut. (photo provided by Carol Moore, CCWF).



ARRI Core Team member Chris Miller explaining proper tree planting techniques (photos provided by Carol Moore, CCWF).

After two hard hours of planting, all the seedlings were planted. Thankfully the rain held off and the only muddy students were the ones who had ditched the dibble bars and instead opted to dig with their hands. Luckily their teammates knew to gently tug the seedlings when they were done to ensure they had been planted correctly.

Students lining up on the planting site, preparing to plant the trees.

An American chestnut planted by students from Whitwell Middle School, TN.

ARRI 2018 Conference at (IUP) Indiana University of Pennsylvania

By Jacob Levine

The 12th annual ARRI Mined Land Reforestation Conference took place at Indiana University of Pennsylvania August 8th and 9th, with more than 100 people attending. The gathering of scientists, industry professionals, non-profit staff and government regulators once again provided a valuable opportunity to gain knowledge and understanding of the Forestry Reclamation Approach, and make important connections across organizations.

This year centered on the theme of *Developing Partnerships for Mine Land Reforestation*. Presenters throughout the first day of the conference demonstrated how they leveraged the skills and resources of partners to enhance their own work. OSMRE Acting Director, Glenda Owens, provided opening remarks, as did Pennsylvania's Deputy Secretary of the Office of Active and Abandoned Mine Operations, John Stefanko.

Eric Cavazza, Director of Pennsylvania's Bureau of Abandoned Mine Reclamation (BAMR), delivered the keynote address. Pennsylvania's work on abandoned mine reclamation, which uses the Forestry Reclamation Approach for nearly all projects, offered an effective case study in the value of forging and maintaining partnerships.

The morning's presentations included a study on tree survival by Jeffrey Skousen of West Virginia University, an industry perspective from Jamie Stilley of Amerikohl Mining, a case study

from East Texas by Cassie Phillips of Stephen F. Austin University, and nonprofit viewpoint from Laura Bray of Pennsylvania Environmental Council.

The afternoon featured presentations from Dean Baker of Pennsylvania's BAMR on reforestation in the state's bituminous district, Amir Hass of West Virginia State University on water chemistry in reclaimed mine soil, Jacob Johnson of Penn State University with a case study on the economics of the FRA, Jennifer Franklin of University of Tennessee on browse damage effects on tree establishment, and Jeff Painter of the Pennsylvania Game Commission on developing partnerships.

Brooke Neel of Friends of Flight 93 and Adam Shaffer of the Flight 93 National Memorial shared their experiences in developing the site of the Flight 93 crash in southwestern Pennsylvania into a fitting memorial and historic site where abandoned mine reclamation with reforestation is taking place. Capping the first day of the conference, Davitt Woodwell of Pennsylvania Environmental Council led a group discussion about developing and sustaining partnerships.

Awards Presented at the ARRI Conference

During the conference luncheon, OSMRE's Ben Owens presented the 2017 Excellence in Reforestation awards. The Title IV award for reforestation on abandoned mine lands went to the Pennsylvania Bureau of Abandoned Mines and Morgan's Excavating, LLC, for their work on the Coaldale site in Rush Township, Centre County, PA.

The reclamation work at the Coaldale site eliminated two dangerous highwalls that were more than 50 feet tall, with more than 7,000 combined linear feet. The site was adjacent to a county road and highly accessible, leading to intensive public use, including garbage dumping, fire rings and ATV use. The FRA approach was utilized, including rough grading and backfill, storm water infiltration to prevent erosion, and hummocky mounds alongside deep-tilled depressions.

More than 38,000 seedlings were planted over 61 acres, including eastern white pine, northern red oak, chestnut oak, and Norway spruce. In addition to the general FRA work at this site, the American Chestnut Foundation donated and planted more than 525 American chestnut trees. The chestnuts were planted in a one acre fenced in plot and will be monitored by the American Chestnut Foundation in perpetuity.

The Title V ARRI award went to Tennessee Consolidated Coal for its work at the Lane Cove Strip Mine in Sequatchie County, Tennessee. This 140-acre site saw most of its mining and reclamation in the 1990s. After witnessing the success of FRA at other Tennessee sites, Tennessee Consolidated Coal pursued a revision to implement FRA on the remaining 10 acres of the site. This project is notable for executing a novel technique to achieve minimal compaction and desirable micro-topography on a sloped site. The operator started with one-pass grading of the growth medium. Material was then pushed up the slope to eliminate minor rill erosion from the initial pass. Linear mounds of topsoil were placed perpendicular to the slope to prevent erosion.

The Lane Cove project was a great example of leveraging partnerships. Tennessee Consolidated Coal was in frequent contact with the inspector and ARRI staff to ensure proper FRA techniques. The company hosted an Arbor Day event with a local middle school and community volunteers. The chestnuts at the site were donated by Coal Creek Watershed Foundation, and the shortleaf pines were

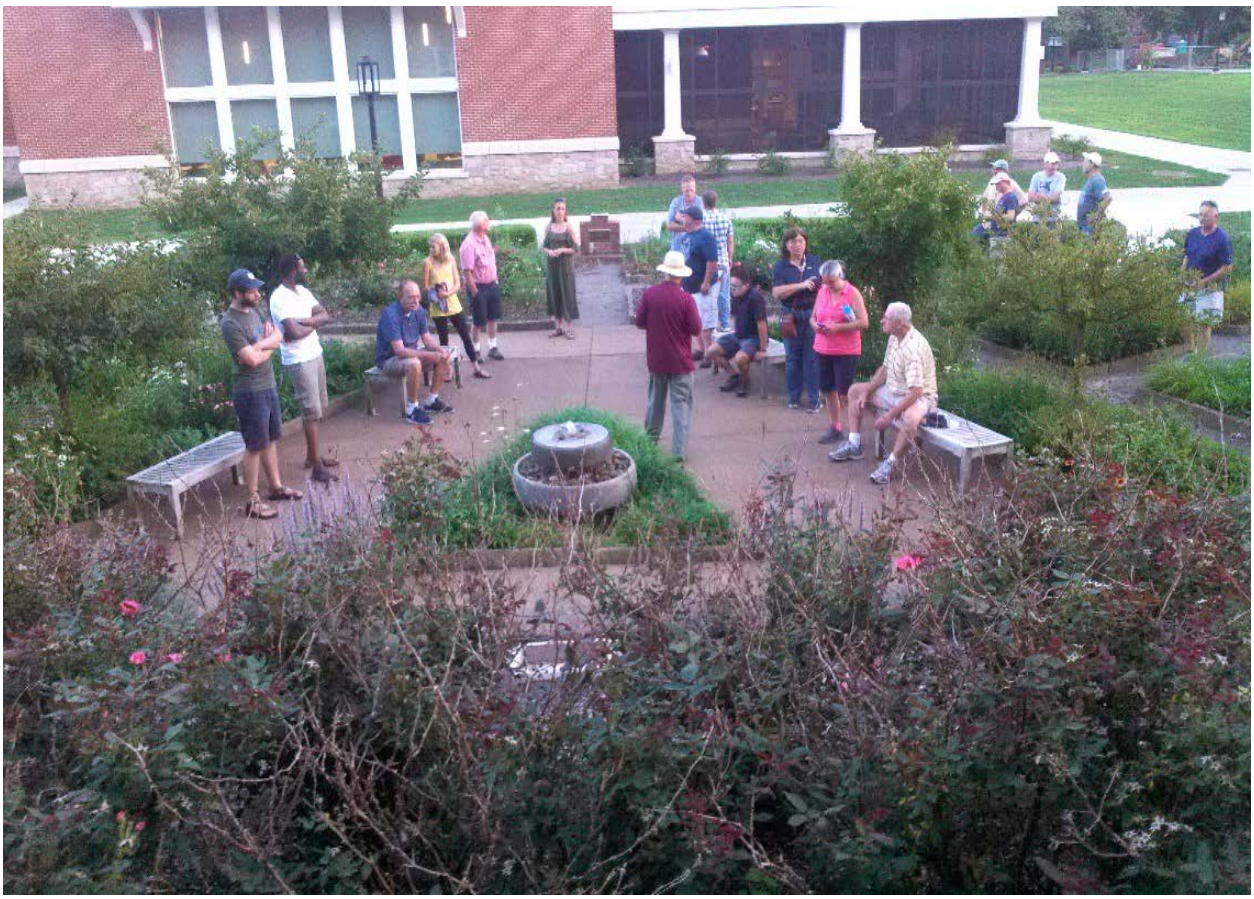
donated by ARRI Science Team member Dr. Jennifer Franklin.

ARRI Conference Field Trip

Site visits on the second day took attendees to five FRA reclamation projects. The first stop was an active mining reclamation project by Amerikohl Mining at its Barrett II operation. Attendees then stopped at two adjacent abandoned mine lands projects- the Coaldale project that received the Excellence in Reforestation award, and the Wolf Run site, notable for its use of emerging FRA methods for establishing vegetation that supports pollinators.

A Western Pennsylvania Conservancy site in Force, PA, was the fourth site visited. The site was developed under a grant to the American Chestnut Foundation to test a newer blight-resistant chestnut hybrid. Finally, the group visited Moshannon State Forest, where Pennsylvania is in the early stages of replanting a legacy site that was reclaimed in the early 2000s using conventional techniques.

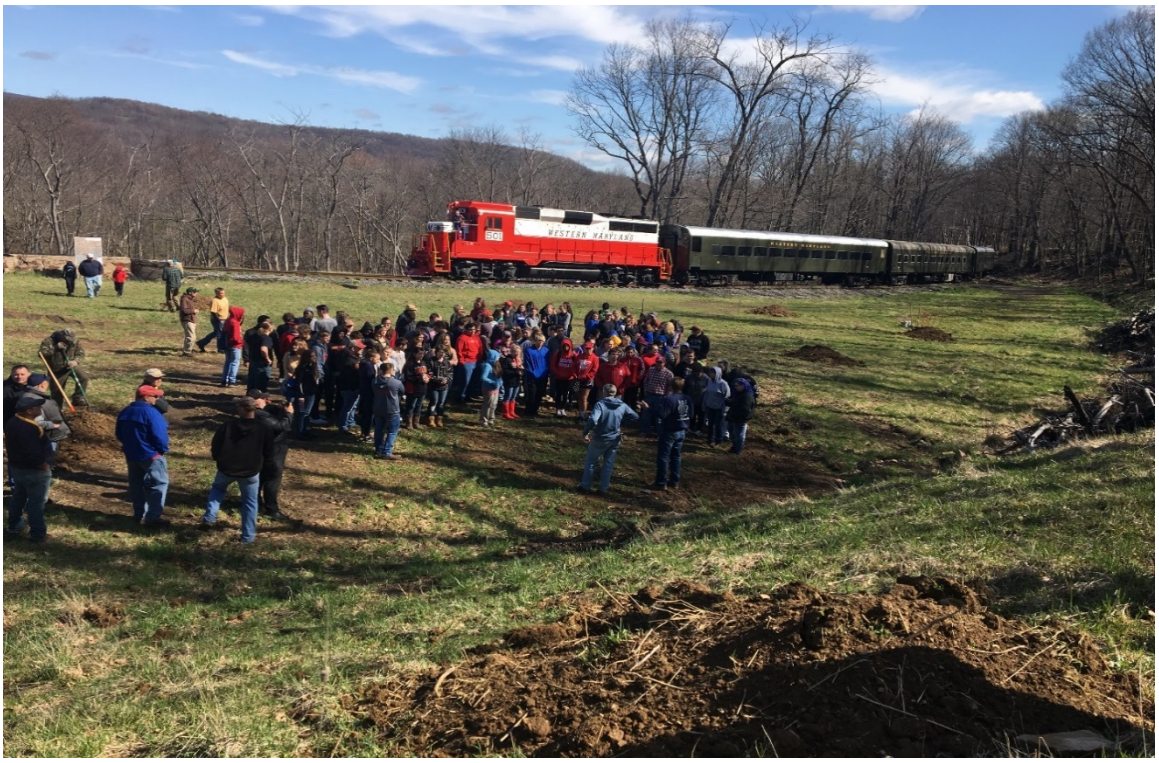
The five sites presented the full spectrum of FRA work and were a fitting conclusion to a successful conference.



Chair of the Allegheny Arboretum Board - Dr. Jerry Pickering, a retired IUP Biology professor, leading the group of ARRI conference participants on a walking tour of the Allegheny Arboretum at Indiana University of Pennsylvania. (Photo provided by Tom Cunningham)

Maryland Celebrated Arbor Day at Garner's Meadow

By Scott Eggerud



Students arrived on the planting site via the restored Western Maryland Scenic Railroad.

The Maryland ARRI contingent held a very successful, and memorable, Arbor Day event on April 26, 2018. Approximately 120 students from Mountain Ridge High School, Allegany High School, Fort Hill High School and the Allegany Career Center planted a recently reclaimed AML site located along the Western Maryland Scenic Railroad and the Great Allegheny Passage Rail to Trail. This three acre site was a large slip that threatened the scenic railroad and the bicycle trail. The site is now stable, and thanks to the students, has native hardwoods including red oak, black cherry, black walnut, red maple and American chestnut planted in the background; wildlife shrubs including red chokeberry, flowering dogwood, gray dogwood and elderberry planted in the foreground; and wildflowers sowed on the fields between the shrubs and the trail system. Switch 9, as the site was once known, will be a very beautiful, and special place along these tails. Mark, Tom, Christian, Stephany, Mike and all others involved did an excellent job! A sign was placed above the plantings renaming this site Garner's Meadow. If you ever travel these trails look for the sign. The students, by the way, arrived to the site on the beautifully restored Western Maryland Scenic Railroad.

The Appalachian Regional Reforestation Initiative was started in 2004 with the goal of encouraging the planting of high-value 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 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 see our website at: https://arri.osmre.gov/

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