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## Ohio Hosts Mined Land Reforestation Workshops

By Jeff Emmons and Michael Hiscar

The Office of Surface Mining, Columbus Field Office (OSM-CFO) and the Ohio Department of Natural Resources Divisions Mineral Resources Management (ODNR-DMRM), in conjunction with the Ohio Division of Forestry (DOF) held two one-day reforestation workshops in Cambridge, Ohio and New Philadelphia, Ohio on October 13 and 27, 2006.

The workshops were held to promote the Appalachian Regional Reforestation Initiative (ARRI) using the Forestry Reclamation Approach (FRA) to plant trees on active and abandoned mine sites.

The workshops included discussions on breaking paradigms, ARRI, and the use of FRA, creating suitable

rooting medium, grading practices, ground cover selection, tree selection and successful tree planting. The discussions were lead by Michael Hiscar, OSM-CFO, Patrick Angel, OSM-Kentucky, Dr. James Burger, Virginia Polytechnic Institute, and Chad Sanders, DOF.

*(Workshops continued on page 2)*



Dr. James Burger discussed the creation of a suitable rooting medium in the Cambridge, Ohio work shop.

## ARRI Partners Meet and Pledge Support of Restoring Forests

By Patrick Angel

On November 3, 2006, the Office of Surface Mining (OSM) hosted a ceremony designed for representatives of several Federal and State government agencies, institutions and other participants to pledge support for the Appalachian Regional Reforestation Ini-

tiative (ARRI).

The ceremony occurred immediately after a tour of the University of Kentucky's (UK) reforestation research complex at Starfire Mine (Big Elk Mining) near the town of Hazard, in the mountains of eastern Kentucky.

The ceremony had three objectives: 1) pro-

vide a formal opportunity for participants to pledge support for ARRI with a ceremonial signing of ARRI's Statement of Mutual Intent (SMI); 2) visit the UK's reforestation research complex at the Starfire surface mine operation in Perry County, Kentucky; and 3) promote and encourage *(Agencies continued on page 2)*

## Workshops continued from page 1...

Approximately 70 people attended the two one-day workshops. The attendees included personnel from the DMRM, DOF, and the Division of Wildlife. Other attendees included mining industry personnel, citizen groups, tree-planting companies, consultants, landowners and engineers.

The attendees will now be better able to comply with Ohio Policy/Procedure Directive Inspection and Enforcement 94-1, which requires tree seedlings and their proper planting on mined lands.

At the conclusion of the meeting attendees were asked to sign the Statement of Mutual Intent (SMI) for ARRI. The SMI states the desire to work together to promote and encourage the planting of more trees on mine sites using the FRA technology to increase survival rates, increase overall productivity, and promote natural invasion and succession of plant and animal communities. Over 40 people signed the SMI. The

workshops were the first of many planned for in Appalachia discussing ARRI and the use of FRA.



Attendees listened to a presentation about ARRI and FRA at the New Philadelphia, Ohio workshop.

## Agencies continued from page 1...

partnerships and discussions within and among the US Fish and Wildlife Service (FWS), US Forest Service (FS), US Department of Energy (DOE), OSM, States, landowners, academia and non-government organizations resulting in restoration of native habitats and managing them for fish and

wildlife and re-establishing high-value hardwood forests on active and abandoned surface mines in Appalachia.

Agency and institution participants included: FWS, DOE, FS, OSM, UK, Virginia Polytechnic Institute and State University, Kentucky Department for Natural

Resources, West Virginia Department of Environmental Protection, The American Chestnut Foundation, Rocky Mountain Elk Foundation, Big Elk Mining Coal Company, and Kentucky Coal Association, The Western Pennsylvania Botanic Gardens, and other invited guests.



(From left: Dale Hall, partially hidden- Earl Bandy, John Totten, Lindsay Totten, Tim Dieringer, partially hidden- Steve Rathbun, Jim Holiday, ,partially hidden-George Bain, Marshal Case, Mike Armstrong, John Litynski, Dr. Ann Bartuska, Dr. Rick Sweigard, Lee Andrews, and Dr. Don Graves.) Dr. Graves describes the soil condition and tree growth on the test plot behind him at Starfire surface mine operation in Perry County, Kentucky.



# U VA Wise Hosts Powell River Project Symposium

By Tim Brehm and Chris Stanley

The annual Powell River Project Symposium was held September 6, 2006 at the University of Virginia's College at Wise, in Virginia.

Appalachian Regional Reforestation Initiative (ARRI) core team members Vic Davis and Chris Stanley presented a program titled "A Cooperative Approach to Enhancing Reforestation on Coal Surface Mines". The presentations discussed ARRI's mission and promoted the Forest Reclamation Approach (FRA) on surface mine lands.

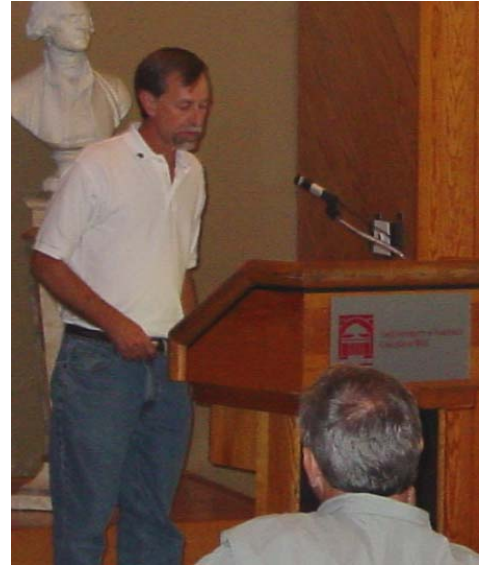
Dr. James Burger a member of the ARRI academic team also presented a program titled "Developing Scientific Knowledge to Aid Mine Reforestation Practice". The presentation discussed the establishment of hardwood trees on surface mine lands emphasizing future economics and sound land management.

Other topics presented at the symposium included "Use of Goats to Control Invasive Vegetation on Mined-Land Pastures", "Black Creek Riparian Restoration Plan", "Mitigation Planning Association", and "Management of Post-2000 Coal Combustion Products in Mined Land Environments."

Sixty participants were in attendance including representatives from coal companies, students, state and federal agencies, and academics.

Carl Zipper, a member of the ARRI academic team, facilitated the symposium and social dinner at the Powell River Project Research and Education Center site later that evening.

The featured speaker at the social dinner was Mark D. Mitchell, Director of Fossil & Hydro Projects for Dominion Resources. Mitchell discussed plans for the future construction of the coal-fire generating facility in Virginia City in Wise County.



Victor Davis delivers a presentation entitled "A Cooperative Approach to Enhancing Reforestation on Coal Surface Mines."



Dr. Mike Kelly, Chair of Powell River Project Board of Directors and Dean of Virginia Tech's College of Natural Resources welcomes the group at the 2006 Leadership Dinner. Dr. Carl Zipper and Mark D. Mitchell look on.

## Kentucky Professional Engineers in Mining Hold 19th Annual Seminar

The Kentucky Professional Engineers in Mining Seminar held their 19<sup>th</sup> annual seminar August 18, 2006 in Lexington, Kentucky.

OSM provided an update on OSM activities that focused on national, regional and Kentucky activities including AML reauthorization, national rulemaking, workshops, Kentucky accomplishments, and

recent oversight studies in Kentucky.

The seminar was sponsored by the University of Kentucky, Kentucky Society of Professional Engineers, Kentucky Coal Association & Coal Operators & Associates, and the Society for Mining, Metallurgy and Exploration.

ARRI members sponsored a booth at the event.

# Group Promotes Mined Land Reforestation

Contributed by: COALFIELD PROGRESS

Tuesday, September 12, 2006

BONNIE SHORTT > Staff Writer

WISE, VA — A three-year-old organization is promoting methods to increase the use of trees in reclaiming mined land here and in several other states.

Members of the Appalachian Regional Reforestation Initiative attended the annual Powell River Project Symposium Wednesday at the University of Virginia's College at Wise, in order to educate the public and coal companies about ARRI's goals.

ARRI works to restore forests on mined land in Kentucky, Maryland, Ohio, Pennsylvania, Tennessee, Virginia and West Virginia.

The nature of reclaimed strip mine soil makes a difference in the

survival rate of trees, said Vic Davis, of the U.S. Office of Surface Mining.

Studies done on tested land showed that after eight years, trees planted on reclaimed sites survive at the following rates:

- 71 percent survive in non-compacted soil;
- 56 percent survive in rough grade soil;
- 22 percent survive in compacted soil; and
- 43 percent survive in dozer ripped soil.

The study was conducted in Kentucky, said Chris Stanley, of the Virginia Division of Mined Land Reclamation.

Virginia strip mines are generally reclaimed with rough grade soil, Stanley explained. Reclamation with non-compacted soil has

not yet been approved for Virginia, he said. Stanley noted that tests have also demonstrated that the size of a tree is influenced by the compaction of the soil.

Reforestation research at Virginia Tech's Powell River Project since 1980 shows that restored forests can be equally or more productive than the native forests removed by mining, according to a publication by Tech forestry department official James Burger and Carl Zipper, with Tech's Crop and Soil Environmental Department. Burger noted that reforestation is important because of the products and services the trees can offer.

Stanley noted that ARRI started in 2003. But in 1995 DMLR created Memo 396, which had four goals, three of which matched ARRI's current goals. Memo 396 did not address proper tree planting techniques.

## OSM and U.S. Fish and Wildlife Meet to Explore Partnerships

By Linda Keene

The Office of Surface Mining (OSM) in cooperation with the Kentucky Department for Natural Resources and the University of Kentucky, and the U.S. Fish and Wildlife Service (FWS) sponsored a workshop in Hazard, Kentucky on June 20-22, 2006 entitled, "The Appalachian Regional Reforestation Initiative and Terrestrial Carbon Sequestration Workshop."

The workshop, had the following three main objectives: 1) to promote and encourage partnership discussions for future implementation of terrestrial carbon sequestration projects along the Appalachian mountain range; 2) visit Appalachian Regional Reforestation Initiative partnership projects for terrestrial carbon sequestration on surface mine lands in the coal fields of eastern Kentucky; and, 3) develop mutually agreeable terrestrial carbon sequestration project concepts for Industry, State, OSM, and FWS that will restore native habitats and manage them for fish and wildlife.

Joe Blackburn, OSM, said, "The chance to exchange ideas and demonstrate how our agencies operate is a good thing. Things get done by communication and relationships. What it does is help you reach common ground. From a practical sense this workshop showed Fish and Wildlife employees what mining is about."

Participants included representatives from the coal industry, academia, and the state and Federal surface mining regulatory authorities and wildlife agencies from the seven Appalachian coal states.



# Ohio Implements Forestry Reclamation Approach on Reclaimed Site

Photos by Michael Hiscar

The following pictures show examples of the Forestry Reclamation Approach on a reclaimed mine site in Ohio before the trees have been planted.



Jockey Hollow Wildlife Area, Ohio. In front of the tree line, Cravat Coal Company has used Alternative Respoiling Material, or ARM, to prepare the area for tree planting this spring. Behind the tree line is an area that was previously reclaimed to traditional pastureland.



This picture shows a close-up of old tree roots in the re-spoiling material with an active pit in the background. Because this site was previously mined there is little or no topsoil left for cover, therefore ARM was used as top soil substitute.



This site at Jockey Hollow is approximately 25 to 35 acres. This spring, each acre will be planted with 600-800 trees per acre consisting of a wildlife forest mixture. There will be an estimated 21,000 trees on this reclaimed mine site.



The replaced material in this photo has a good seed base of ginseng, may apples, wild flowers and other mature trees already growing in the area. The old tree roots will offer organic material for the newly planted trees.

# Water Management Administration, Mining Program, Bureau of Mines, perform Reforestation Demonstration Project

By Mike Garner

The Maryland Department of the Environment, Mining Program, Bureau of Mines has completed a reforestation demonstration plot on a reclaimed surface mine. The demonstration plot was completed in the spring of 2006 in conjunction with the reclamation of the TD Mining Bond Forfeiture Reclamation Project, located just southwest of Frostburg, Garrett County, Maryland.

Most surface mined lands in the Appalachian coal fields were forested prior to mining. Surface coal mining completely removes the vegetation and soil from the surface in order to extract the underlying coal reserves.

In 1977, the newly enacted federal surface mining laws dictated national standards for coal mining and coal mine reclamation. To meet these standards, coal mine operators began using heavy grading, soil compaction, and thick herbaceous ground cover to provide both quick and long-term soil stabilization. This type of reclamation is well suited for areas where the post-mining land-use is pasture or grazing, but in areas where the post-mining land-use is designated as forestry or undeveloped land, this traditional and long accepted practice severely inhibits tree growth. The heavily compacted soil slows tree growth by impeding root penetration and decreasing water infiltration into the soil. The thick mat of cool season grasses out-competes small seedlings for moisture and sunlight, delays natural succession by decades and severely limits the survival rate of

planted tree seedlings.

Three demonstration plots were developed on the TD Mine Project Site using the FRA techniques. Soil encountered during backfilling that was suitable for tree growth was left in place until the demonstration plots were rough backfilled and ready for topsoil placement. The soil was then pushed from the stockpile area using D-9 bulldozers and deposited on the surface of the demonstration plots. The bulldozers pushed a blade full of soil to the back of the demonstration plots, with each consecutive blade full butted against the previous. In this manner, the topsoil was never compacted by bulldozer traffic and left very rough. The abutting soil piles were then back-bladed with a single pass of the bulldozer resulting in a uniform, un-compacted topsoil layer of 4 to 6 feet thick. A composite soil sample was taken and reported a pH of 6.4. No nutrient analysis was completed and no soil amendments were applied.

The plots are on the east slope

Plot #1 (2 acres)

of Big Savage Mountain, elevation 2650, and slope toward the southeast at a 6% grade.

On Plot #1, trees were planted by hand using the Bureau of Mine's in-house tree planting crew. The trees were planted during the first week in April, 2005. Plot #2 was planted by hand on April 6, 2006 by High School students, Government personnel, Watershed Groups and other volunteers during the Bureau of Mines 2006 Arbor Day event.

The remainder of the mine site, Plot #3 was backfilled, graded and stabilized using the traditional reclamation methods of compaction and thick herbaceous ground covers. Trees were planted on this area during the last week in April, 2006 by a tree planting contractor using a mechanized tree planter. A mixture of Green Ash, Pin Oak, Black Cherry, Northern Red Oak, Chestnut Oak, and White Oak were planted at a rate of 500 trees to the acre. This area was also treated with 5 tons/acre of

Plots #2 (5.2 acres)

<p><u>Trees</u></p> <p>750 Black Cherry</p> <p>250 Chestnut Oak</p> <p>400 Green Ash</p> <p><u>Herbaceous</u></p> <p>Orchard Grass 10lbs/ac</p> <p>Perennial Rye Grass 10 lbs/ac</p> <p>Weeping Lovegrass 10 lbs/ac</p> <p>Timothy 10 lbs/ac</p>	<p><u>Trees</u></p> <p>500 red maple</p> <p>1000 northern red oak</p> <p>1250 black locust</p> <p>100 american plum</p> <p><u>Herbaceous (60 lbs/acre)</u></p> <p>Orchard Grass 10 lbs/ac</p> <p>Perennial Rye Grass 10 lbs/ac</p> <p>Weeping Lovegrass 10 lbs/ac</p> <p>Timothy 10 lbs/ac</p> <p>Birdsfoot Trefoil 10 lbs/ac</p> <p>Redtop 10 lbs/ac</p> <p>Red Clover 2 lbs/ac</p>
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(Water Management continued on page 7)



# Water Management continued from page 6...

agricultural grade lime and 400 lbs/acre of 10-20-20 fertilizer. These rates are an industry standard and are generally accepted as appropriate application rates for new re-vegetation on mine sites.

The goal of the demonstration project is not to provide scientific data but rather provide a site that will visually demonstrate the benefits of the FRA to Maryland's Coal Mining Industry and landowners that have property leased to mining companies. It will be used to promote forestry as a viable post-mining land-use and to encourage coal mine operators and landowners to forego the visually pleasing, smooth, compacted grades, and sterile grass fields for the environmental and economic benefits of a well-managed hardwood forest.

The initial results appear to show greater tree growth and survival rates on the FRA sites, although a late summer drought in 2005 has affected the results on Plot #1. It will require at least one or two more growing season before the benefits can be visually observed.



D-9 bulldozers pushed soil from the stockpile area and deposited it on the surface of the demonstration plots. The bulldozers then pushed a blade full of soil to the back of the demonstration plots, butting each against the previous. In this manner, the topsoil was never compacted by bulldozer traffic.



This photo shows the loose soil on the surface of the mine. Tree seedlings have been planted.



Three areas of Savage Mountain demonstrate the Forestry Reclamation Approach .

Photos by Paul Yacovone

These photos show the Forestry Reclamation Approach being implemented at an Amerikohl mine site in Pennsylvania.



# ARRI News Briefs for Autumn 2006

By Patrick Angel

Great interest was generated from an ARRI presentation made on September 13 in Branson, Missouri to an all-hands meeting of the Mid-Continent Region. The Forestry Reclamation Approach and the progress made by ARRI over the past 3 years were discussed.

#

An ARRI representative made a presentation about the Forestry Reclamation Approach to agricultural students at the University of Kentucky, College of Agriculture on October 19, 2006. They discussed the Appalachian Regional Reforestation Initiative and job opportunities in the field of reclamation technology with State and Federal agencies and industry.

#

An ARRI representative made a joint presentation with a representative of the Western Pennsylvania Botanic Garden (WPBG) to the Urban and Commercial Forestry Conference in State College, Pennsylvania on October 20, 2006. The presentation focused on the active partnership between ARRI and the WPBG. It showcased the effort to create a botanic garden out of an abandoned mine located near Pittsburgh, Pennsylvania using the Forestry Reclamation Approach.

#

A two day meeting was held on October 24 and 25, 2006 in Lexington, Kentucky for the purpose of exploring opportunities to develop Regional or National NTTP Reforestation Training courses and workshops. OSM representatives from headquarters, the Appalachian Region, and the Mid-Continent Region met with state representatives from Kentucky, West Virginia, and Indiana.

#

ARRI representatives from OSM, the University of Kentucky, and West Virginia University conducted presentations and participated in a panel for the annual Conference of Government Mining Attorneys in Lexington, Kentucky on October 27, 2006.

Topics that the ARRI representatives discussed were the Appalachian Regional Reforestation Initiative, the Forestry Reclamation Approach, developments in

recent reforestation research, and recent OSM rule changes and proposed changes related to reforestation issues.

#

On October 28, 2006, an ARRI representative made two presentations at the Annual Conference of the Society of American Foresters (SAF) in Pittsburgh, Pennsylvania.

The first presentation explained the Appalachian Regional Reforestation Initiative and the Forestry Reclamation Approach, and the second presentation focused on the results of 10 years of reforestation research by the University of Kentucky at the Starfire Mining Complex in Perry County, Kentucky.

Other ARRI Academic Team members from VPI, WVU, OSU, PSU, UK, and UT also presented their surface mine reforestation research findings which will eventually serve as the technical foundation for ARRI's Forestry Reclamation Advisories.

The SAF has created this special session in their annual conference in an effort to focus specifically on surface mine reforestation and to accommodate ARRI and the reforestation research being generated by ARRI's Academic Team.

#

On November 02, 2006, members of ARRI's Academic Team from the University of Kentucky conducted a tour of the Bent Mountain Research Complex in Pike County, Kentucky for OSM's Acting Director, the Lexington Field Office Director, and staff members. The tour focused on research designed to determine the hydrological characteristics and physicochemical properties of loose-graded brown and gray sandstone spoils and mixed sandstone/shale spoils and their influence on surface mine reforestation.

#

Photo by Paul Yacovone

This bear was wondering around the mine site in Pennsylvania.





# Appalachian Regional Reforestation Initiative



**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. The initiative is a coalition of the States of the Appalachian , 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: <http://arri.osmre.gov/>**

## **GOALS OF ARRI**

- **Plant more high-value hardwood trees on reclaimed coal mined lands in Appalachia.**
- **Increase the survival rates and growth rates of planted trees.**
- **Expedite the establishment of forest habitat through natural succession**

## **ARRI Core Team Leaders:**

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Scott Eggerud, West Virginia DEP  
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Mike Bower, OSM Appalachian Region

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