

ARRI's First Two Years



December 2005

APPALACHIAN REGIONAL REFORESTATION INITIATIVE

ARRI's Beginnings

The Appalachian Region is made up of seven States: Kentucky, Maryland, Ohio, Pennsylvania, Tennessee, Virginia, and West Virginia. Surface coal mining in these States is taking place on lands that were largely forested with mixed species of hardwood trees prior to mining. However, reclamation of these surface coal mines has, for the most part, resulted in abandoned grasslands that are not conducive to tree survival and growth. These minesites are usually highly compacted and are thick with grasses that compete with trees for water, nutrients, and sunlight and provide a habitat for animals that feed on trees. While these grasslands meet regulatory requirements for reclaiming coal mines, they do not usually provide the economic, recreational, and environmental advantages of restoring the minesites to forest land.

ARRI was created as a way to eventually reestablish the forests that existed prior to mining. ARRI's goals are to communicate and encourage mine reforestation practices that: 1) plant more high-value hardwood trees on reclaimed coal mine lands in Appalachia; 2) increase the survival rates and growth rates of planted trees; and 3) expedite the establishment of forest habitat through natural succession. Research has provided the means to attain these goals by using the Forestry Reclamation Approach (see below). ARRI's mission is to enlist the help of all interested parties in using the Forestry Reclamation Approach to reclaim minesites and eventually restore Appalachia's forests.

ARRI has existed for two years. In that time, we have made significant progress which we will describe in the articles of this newsletter. While there is still much to be done, we believe the basis for success has been established.

The Forestry Reclamation Approach

The basis for achieving ARRI's goals is a series of techniques for reclaiming minesites collectively known as the Forestry Reclamation Approach (FRA). The FRA was developed from research conducted over the past half century by university and government reforestation researchers and experts. Research has shown that the FRA, which will provide for diverse, effective forest lands, has five basic steps: 1) create a suitable rooting medium comprised of topsoil or a suitable alternate material approved by the regulatory authority; 2) place the rooting medium on the site in a manner that minimizes compaction; 3) use ground covers compatible with tree growth;

4) select proper tree species; and, 5) plant trees in a proper manner.

The FRA is based on knowledge gained from both scientific research and experience. The FRA can achieve cost effective regulatory compliance for coal operators while creating productive forests that generate value for their owners and provide watershed protection, wildlife habitat, and other environmental services.

More information about the FRA can be found in a publication authored by the ARRI Academic team titled, "Forest Reclamation Advisory #2."

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Nine year old white oak trees in Kentucky

The ARRI Core Team

To begin ARRI a Core Team was established in December 2003. The Core Team was charged with establishing methods of promoting ARRI and developing ways to provide on-the-ground success. The Core Team is made up of representatives from OSM, the State Regulatory Authorities of the six primacy States in the Appalachian Region, the Tennessee Federal program, and OSM's Appalachian Region Office.

The Core Team Leaders are: Paul

Rothman, KYDNR; Scott Eggerud, WVDEP; Linda Keene, OSM - AVS; and Mike Bower, OSM - AR.

The Core Team has created numerous promotional items including brochures, newsletters, a website, and posters to help spread the word about ARRI.

The Core Team conducts monthly conference calls with call leadership alternating between the State representatives and OSM. These calls update the

Core Team on progress towards implementing FRA in each state as well as special events promoting ARRI and the status of projects that team members are working on.

The Core Team has selected two members to act as liaisons to work with the Academic Team (see below for information on the Academic Team). These liaisons work with the Academic Team to funnel information to and from the Core Team.

The Academic Team

The ARRI Core Team established the Academic Team in March 2005. The Academic Team is comprised of 20 team members representing 10 universities from across the country including Ohio State University, Ohio University, Pennsylvania State University, Purdue University, Southern Illinois University, University of Kentucky, University of Maryland, University of Tennessee, Virginia Tech, and West Virginia University.

Co-Team Leaders of the Academic Team

are: Dr. James Burger, from Virginia Tech and Dr. Donald Graves, from the University of Kentucky

The Academic Team's purpose is to provide the credentials and technical guidance for ARRI and to improve the science behind the FRA.

The Academic Team has begun writing a series of serial bulletins describing ARRI and the Forestry Reclamation Approach. The first two Forest Reclamation Advisories have been completed and are ready

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for printing and distribution. The Academic team will provide 10-12 bulletins which will describe the practical field applications of reforestation research.

The Statement of Mutual Intent

The Core Team developed a Statement of Mutual Intent to give individuals and groups an idea of what we needed in the way of support to fulfill our goals. Signatories to the Statement pledge to promote the provisions of ARRI and apply the site preparation and planting techniques of the FRA necessary to reestablish forests.

The Core Team held an initial signing ceremony on December 15, 2004 at Stonewall Jackson Lake State Park, West Virginia during which 36 people



SMI signatories gather at the Stonewall Resort in WV

signed the Statement.

A year later we have 102 signatories to the Statement of Mutual Intent representing 71 diverse groups including the Governor of Kentucky, the American Chestnut Foundation, the Rocky Mountain Elk Foundation, the National Mining Association, major coal producing companies, researchers from universities across the country, environmentalists, and representatives from state, local, and federal government.

Arbor Day Events

In the spring of 2005, ARRI held five tree planting events throughout the region to celebrate Arbor Day.

Scott County, Tennessee - March 30, 2005

Scott County High School students joined Federal and Tennessee officials in planting over 400 hardwood trees on a re-



claimed coal mine in celebration of Arbor Day. Additionally, representatives of the Tennessee Division of Forestry, Tennessee Environment and Conservation Department, Abandoned Mine Land Reclamation signed the Statement of Mutual Intent. OSM Appalachian Region Director Brent Wahlquist also participated.

Frostburg, Maryland - April 6, 2005



Jeffrey Jarrett, Director of OSM along with other OSM senior executives, took part in an Arbor Day tree planting event at a

reclaimed surface coal mine near Frostburg, Maryland. The site was a contour site that has been re-mined with portions of the site already planted. Participants in the project planted approximately 1000 trees.

Virginia - April 8, 2005

The Virginia Department of Mines, Minerals and Energy and OSM along with Virginia coal industry representatives, and elementary school students from Keokee and St. Charles Elementary Schools planted trees on an abandoned mine land

site. DMME Deputy Director Benny Wampler opened the event



and OSM Director Jeff Jarrett spoke about the importance of using proper reforestation techniques on coal mined lands.

Kentucky - April 13, 2005

Elementary school students joined Federal and Kentucky officials, University of Kentucky faculty, and representatives from The American Chestnut Foundation to plant trees on a reclaimed coal mine. Students from the school also participated in a poster and an essay contest and State, school, foundation and company officials signed the ARRI Statement of Mutual Intent.



Muskingum County, Ohio - April 22, 2005

The Ohio ARRI Team in conjunction with the Ohio Division of



Resources Management conducted a tree-planting ceremony at a previously mined coal mine site. Various hardwood species including American Chestnuts were planted.

ARRI Awards Program

Core Team members from each State will award plaques that recognize those who reclaim active and abandoned mine lands using FRA within their State. To select winners, the ARRI Core Team formed an awards team to create application standards and a matrix for scoring nominations. The awards team completed a document describing the awards program and sent it to the core team in March 2005. The ARRI core team members from each State in the AR will solicit nominations and choose the winners from their State. Awards are expected to be given out by the States at the end of this year (normally in conjunction with ongoing State awards programs).

In 2005, one Title IV and one Title V award will be given in each of the Appalachian States.



OSM Cooperative Agreements

In 2005, OSM funded 2 Cooperative Agreements related to ARRI: Kentucky - OSM provided \$46,296 to University of Kentucky for "Development of a Field Procedure to Evaluate the Reforestation Potential of Reclaimed Surface-Mined Land"

Virginia - OSM provided \$40,000 to Virginia Tech for a project to "Demonstrate the Potential for Large-Scale Carbon Sequestration by Reforestation of Mined Lands Using Managed Forests"

ARRI Training Modules

Members of the ARRI core team created three PowerPoint training modules to explain the benefits and techniques of using FRA technology to reclaim mine sites. One module is geared towards industry and landowners, one toward permit reviewers and consultants, and one towards State and Federal inspectors.

In addition, the Core Team is working with NTP to add explanations regarding FRA technologies to existing NTP courses and one ARRI Core Team member has volunteered to teach the reforestation section of the Soils and Revegetation Course.

Forestry Reclamation Approach Demonstration Projects

The University of Kentucky, Virginia Tech and West Virginia University have established four research projects that show the benefits of using the Forestry Reclamation Approach for planting trees on reclaimed coal mined lands.

Kentucky - Starfire

Started in 1996, research at Starfire has focused on tree performance, spoil characterization, hydrology and water



Nine year old trees planted on plot reclaimed using FRA.

quality. Starfire presents a dramatic difference in tree growth and survival on plots reclaimed in different manners. Trees planted on conventionally reclaimed (compacted) plots either died or if they survived, their

growth was severely stunted. The nine year old trees planted using FRA techniques not only survived but thrived.

Kentucky - Bent Mountain

The University of Kentucky is evaluating tree performance, water characterization studies and the suitability of different types of loose-graded spoils for forest development on a sur-



Tree seedlings planted using FRA at Bent Mountain

face mine on Bent Mountain in Pike County, Kentucky. Six research plots have been established for the purpose of evaluating the influence of three different loose-graded spoil types on tree performance. The three spoil types are: (1) predominately brown weathered sandstone; (2) predominately gray unweathered sandstone; and (3) equally mixed brown weathered and gray un-weathered sandstones. *(continued on page 5)*

Forestry Reclamation Approach Demonstration Projects (continued)

Four species of tree seedlings were planted into the loosely graded spoil and tree height, tree diameter, and above and below ground biomass was measured in June of 2005, and will continue to be measured each summer into the future. This research will analyze the hydrologic characteristics of the different spoil types and whether or not trees respond differently in them.

Tennessee - White Oak Reforestation Project

The White Oak Reforestation Project is located in Campbell County, Tennessee, on an active Gatliff Coal Company remining permit. The Knoxville Field Office worked with Gatliff Coal Company to develop the White Oak Reforestation Project, with a focus on implementing current reforestation technology.



A red oak tree on the WORP

The permanent reforestation demonstration plots include 130 acres of reclaimed mine land. Each plot is established using different growth mediums, different grading and compaction treatments, and various native and noncompetitive ground covers. The tree species include commercially valuable hardwoods such as Northern Red Oak, White Oak, and Yellow Poplar, as well as other native trees and wildlife shrub species. To date over 65,000 trees have been planted on the project area. The long range plans are to establish a permanent demonstration area to show the application of the Forestry Reclamation Approach technology.

Virginia - Powell River

At Powell River, Virginia Tech has focused on developing practical, cost effective solutions to natural resource prob-



Tree growth at Powell River

lems in central Appalachian coal mining areas including effective methods of tree planting. The Powell River Project is located in Wise County, Virginia. It is a cooperative project between the Virginia coal industry and Virginia Tech, who have been doing research addressing reforestation since 1980. Mine soil compaction caused by excessive grading has been shown at Powell River to seriously decrease reforestation success and long term forest health and productivity, while having no detectable erosion-limiting effects.

West Virginia - Catenary Coal

This active mining site consists of over 9,000 permitted acres. The permit is an approved Experimental Practice that compares mine soils, parent materials, compaction rates and ground



Tree seedlings planted at Catenary Coal

covers for reforestation purposes. The research is being done in conjunction with West Virginia University and the West Virginia DEP. Commercial forestry plots included such species as white ash, red and white oak, yellow poplar, sugar maple and black cherry. The project includes annual monitoring of the percentage of ground cover, observation of volunteer growth, and invader species. Tree survival rates, heights, soil analysis, and climatic conditions will be monitored throughout the study period.

Meetings and Tours

ARRI Core Team members have conducted numerous meetings and given tours of FRA sites to publicize ARRI and to inform various groups about the benefits of reclaiming mine lands using

the FRA.

Kentucky: On July 7, 2005, 30 high school and middle school science teachers from all over Kentucky were given a tour of the reforestation research on the

Starfire mine lead by ARRI Core Team members.

During the week of July 11, 2005, 30 state and federal inspectors from Kentucky and West (continued on page 6)

Meetings and Tours (continued)

Virginia visited Starfire and Bent Mountain.

Tennessee OSM inspectors also visited Kentucky for a reforestation field trip during the week of July 18, 2005.

Numerous tours of various sizes ranging from just a few people up to large groups have taken place on surface mine research sites in Kentucky during the summer of 2005. In all, over 200 people have participated in field trips and tours of the research complexes at Starfire and Bent Mountain during the summer.

An ARRI presentation was also made to the full body of the American Chestnut Foundation during their annual meeting in Lexington, Kentucky on October 31, 2005. Representatives of ARRI also spoke to the annual meetings of the Professional Engineers in Mining in Lexington, Kentucky on August 18, 2005.

Ohio: On May 18, 2005, the Ohio Core Team members and AEP conducted a tour of AEP reforestation property. Among those attending were ARRI team members from Ohio, West Virginia, and Kentucky; OSM employees from Columbus; Nicole Cavender from The Wilds; and members of the ARRI Academia Team - Dr. David Hix of Ohio State University, Dr. Jeff Skousen of West Virginia University, and Dr. Clark Ashby of Southern Illinois University Carbondale.

Pennsylvania: On March 16, 2005, an ARRI presentation was given to members of the Pennsylvania Mining Professionals.

On June 7, 2005, Pennsylvania Core Team members gave a PowerPoint presentation on the ARRI program and goals of the initiative to 17 Pennsylvania Department of Environmental Protection personnel.

On August 8, 2005, ARRI Core Team

members presented the ARRI program to the Pennsylvania Department of Environmental Protection's Knox District Office Inspection and Permitting Staff.

On September 12, 2005, ARRI representatives gave a PowerPoint presentation to inspection, permitting and management staff of the Department of Environmental Protection's Greensburg Office.

Presentations will be made in December

In July 2005 ARRI attended a tour with staff of the University of Tennessee of a mine site that was reforested in 1960, which currently supports a diverse, mid to late successional hardwood forest.

In October 2005, ARRI met with staff from the Tennessee Division of Forestry to discuss the principals of FRA, and conducted a tour of the WORP.



ARRI Core Team members conducted numerous tours

at the Department of Environmental Protection's offices at Ebsenburg and Moshannon.

Tennessee: In June 2004 ARRI representatives conducted a tour of the White Oak Reforestation Project (WORP) with staff from Kentucky Department of Environmental Protection, University of Kentucky, and OSM LFO.

In July 2004 ARRI met with the Director of the Tennessee Abandoned Mine Lands Section to discuss the principles of FRA, and conducted a tour of the WORP.

ARRI met with professors and students from the University of Tennessee Forestry Department in August 2004 to conduct a tour of the WORP.

November 2004 - ARRI met with the manager of the Tennessee State Nursery in November 2004 to discuss ARRI and FRA, and ways the State nursery can assist by providing quality hardwood seedlings.

Virginia: Representatives of the Office of Surface Mining, the Kentucky Department for Natural Resources, and the University of Kentucky made a presentation to The American Chestnut Foundation Board of Directors meeting at Bristol, Virginia on April 16, 2005.

On October 25, 2005, an ARRI representative from OSM's Knoxville Office presented a paper at the annual meeting of the National Association of Abandoned Mine Land Professionals in Bristol.

ARRI was discussed during a VA DMLR forum in Big Stone Gap on September 9, 2005, to promote wildlife enhancement on mine sites with a reforestation post-mining land use. Meeting participants included representatives from the Wild Turkey Federation, the Rough Grouse Society, the Division of Mined Land Reclamation, VA Tech, the mining industry, and industry consultants.

West Virginia: On May 31, 2005, West Virginia members of the Core Team gave a presentation to the US Dept. of Energy's National Energy Technology Laboratory.

On November 18, 2005, an ARRI presentation was given in Charleston during a Covering Coal conference to 30 journalists representing small and medium sized newspapers in the Appalachian Region. Representatives of several environmental groups were also present.

ARRI CORE TEAM LEADERS

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REFORESTATION CHAMPIONS



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Next Year

The ARRI Core Team believes we have gotten off to a good start promoting ARRI and the FRA. Our next undertaking will be to measure the progress of implementing ARRI on the ground. Some of the States have already implemented some small areas of tree planting that are incorporating FRA practices. Also, coal operators are submitting permits that include tree planting using the FRA.

To track these efforts we are developing a reporting format that the States of the

Appalachian Region will use to help identify the progress we have made in implementing ARRI and the FRA within each state.

This report will be used to indicate the effectiveness of our efforts in promoting ARRI and to identify the areas we need to focus on.

We will be continuing to overcome the barriers that prevent successful reforestation. In particular, we believe our training efforts will help break down the

most pervasive barrier; the culture that has been established over the years of what reclamation should look like. While the science of FRA is well established, it results in a significantly different looking reclaimed minesite than people are used to seeing. We need to convince operators, consultants, landowners and regulatory personnel that conventional reclamation will not reestablish the diverse, thriving forests that existed prior to mining.



ARRI at work...

