



APPALACHIAN REGIONAL REFORESTATION INITIATIVE (ARRI) **FOREST RECLAMATION ADVISORY**

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THE APPALACHIAN REGIONAL REFORESTATION INITIATIVE

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The Appalachian Regional Reforestation Initiative (ARRI) is a cooperative effort by the States of the Appalachian Region with the Office of Surface Mining to encourage restoration of high quality forests on reclaimed coal mines in the eastern USA. ARRI's goals are to communicate and encourage mine reforestation practices that 1) plant more high-value hardwood trees on reclaimed coal mined 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. These goals can be achieved when mines are reclaimed using the Forestry Reclamation Approach (FRA).

The FRA is a method for reclaiming coal-mined land under the Surface Mining Control and Reclamation Act (SMCRA) to forest, and is based on knowledge gained from both scientific research and experience (Burger and others, 2005). The FRA is considered by state mining agencies and US Office of Surface Mining to be an appropriate and desirable method for reclaiming coal-mined land to support forested land uses (see References).

When mining and reclamation operations are conducted using the FRA, results can include both cost-effective regulatory compliance by the coal operator and productive post-mining forests. Productive forests generate value for their owners and provide watershed protection, wildlife habitat, and other environmental services (Photo 1).

Why is the ARRI needed?

SMCRA improved the surface-mine landforms by increasing stability, improving water quality, and enhancing human safety in the Appalachian region, compared to the results of pre-SMCRA mining. However, SMCRA's implementation has not been accompanied by widespread replacement of forests disturbed by mining. Many mined lands were restored as grasslands but are not currently

used for hay or pasture by their owners. Native forests will eventually be restored on such areas by natural succession, but this process is slow and centuries may be required.

Following SMCRA's implementation, regulators focused on stability of landforms created by mining at the expense of restoring forest land capability. This approach was caused by a desire to solve the problems such as severe erosion, sedimentation, landslides, and mass instability caused by pre-SMCRA surface mining. As a result, excessive soil compaction was common on surface mines, and aggressive ground covers were generally planted. Furthermore, both regulators and mine operators were challenged by the technical complexities of implementing SMCRA in the years following its passage. As a result, reforestation took a back seat. Lastly, some early efforts by mine operators to reforest under SMCRA proved problematic, in part because these efforts were conducted without the benefit of scientific knowledge that is available today; as a result, mine operators and regulators came to believe that post-mining land uses such as hay and pasture land were easier and cheaper to achieve than forests. These factors and others contributed to a significant loss of forests due to mining across Appalachia. The current reforestation initiative is an effort to increase knowledge and change attitudes about planting trees on surface mines.

Forests have been the traditional land use and support an established industry throughout the eastern coalfields; in recent years, resurgence in the hardwood timber and wood-using industries has occurred throughout the region. Furniture, flooring, and paneling are made from many fine hardwood species, while softer woods are used for plywood, oriented-strandboard, and wood pulp. "Soft hardwoods" such as tulip poplar, red maple, sycamore, green ash and bigtooth aspen, all of which have good potential as reclamation species, are being sought by industrial wood-users along with the traditionally-valuable species



Photo 1. Thinning and pruning a 17-year old white pine stand established by an active coal mining operation in Virginia using procedures similar to the Forestry Reclamation Approach. Scientific studies demonstrated that this site's productivity is comparable to that of the area's native forests (Rodrigue and Burger, 2004), and that the stand's response to management has created additional economic value for the timber owner (Burger and others, 2003).

such as the oaks. Furthermore, forests provide many benefits such as wildlife habitat, watershed control, carbon sequestration, and recreation. Owners of mined lands, who were once content to have their land reclaimed to grassland and shrubland, are becoming more interested in reforestation with commercially-valuable hardwoods.

A goal of mined land reclamation under SMCRA is to create land with equal or better post-mining land use potential than the land was prior to mining. Scientific research has demonstrated that reforestation using the FRA is capable of achieving this goal. Many grassland areas created after SMCRA, have soil properties less favorable to forests than on the lands that preceded mining. The role of ARRI is to coordinate and improve dissemination of information, while promoting further research across all the Appalachian States.

What is a Forest Reclamation Advisory?

Reforestation researchers and experts from universities throughout the region have joined forces with Federal and State regulators to form the ARRI. One goal of the ARRI's Academic Team is to generate a series of guidance documents called Forest Reclamation Advisories which will describe state-of-the-science procedures for coal-mine operators and other mine reforestation practitioners, agency personnel, and mined land

owners. This introductory publication is the first in the series intended to cover a variety of topics related to reforestation of mined lands. Future publications may address emerging issues as well as current knowledge. Revisions will be published as new information becomes available.

For access to future Forest Reclamation Advisories as they are published, or for a complete list of ARRI Team members, see the ARRI web site at <http://arri.osmre.gov/>

Faculty and researchers from the following universities and organizations contributed to this Forest Reclamation Advisory: Ohio State University, Pennsylvania State University, Purdue University, Southern Illinois University, University of Kentucky, University of Maryland, University of Tennessee, Virginia Polytechnic Institute and State University, West Virginia University, and United States Forest Service (retiree).

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