

# PROJECT facts

U.S. DEPARTMENT OF ENERGY  
OFFICE OF FOSSIL ENERGY  
NATIONAL ENERGY TECHNOLOGY LABORATORY

Sequestration

03/2006



## RESTORING SUSTAINABLE FORESTS ON APPALACHIAN MINED LANDS FOR WOOD PRODUCTS, RENEWABLE ENERGY, CARBON SEQUESTRATION, AND OTHER ECOSYSTEM SERVICES

### CONTACTS

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### Background

Over 1.8 million hectares of land nationally (including 1.1 million hectares in the east) were under active coal mining permits during 2001; of these lands, over 600,000 hectares (including 200,000 hectares in the east) are currently classified as "disturbed." Converting these abandoned lands to productive forests has the potential of sequestering 100 million metric tons of carbon.

Virginia Polytechnic Institute and State University is working to develop hardwood and conifer forests on eastern U.S. coalfields, not only to sequester carbon but also to support a wood products economy, help control flooding, and provide clean water, wildlife habitat, biodiversity, and recreation. Current mining practices remove and burn the carbon-rich forest. Then, following coal removal, many eastern U.S. mine sites are reclaimed to grass having one-fifth the potential for carbon sequestration compared to reforestation. Primary studies indicate that through optimal reclamation/restoration procedure, there is a potential for mined-land forests to capture 250 to 290 tonnes of carbon per ha over a period of 70 years, at which time the mined lands' biological potential is nearly restored.

### Primary Project Goal

The primary goal of this project is to determine the biological and economic feasibility of restoring high-quality forests on mined land and to measure carbon sequestration and wood production benefits achieved with restored forests.

### Objectives

- To demonstrate and verify large-scale carbon sequestration by reforestation of mined lands using high-value tree species.
- To develop a forest site classification and mapping system for reclaimed mined sites.
- To complete a cost benefit analysis of reforestation on these lands.
- To quantify the social and ecological benefits derived from these projects.



## PARTNERS

Virginia Polytechnic Institute and State University

Mead-Westvaco

Plum Creek Timber

Mountain Forest Products

The Nature Conservancy

U.S. Forest Service

## COST

### Total Project Value

\$629,381

### DOE/Non-DOE Share

\$494,400 / \$134,981

## ADDRESS

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## WEBSITE

[www.netl.doe.gov](http://www.netl.doe.gov)

## Accomplishments

A mine land site quality classification scheme was developed and some field-testing of the methods of implementation was completed.

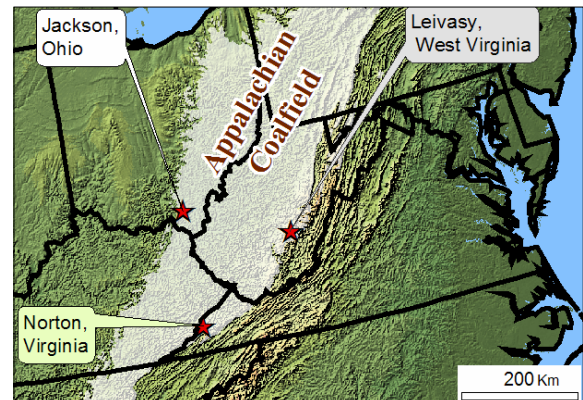
A preliminary economic analysis of the feasibility of reforestation with several different forest types and levels of management, has been completed.

To determine actual sequestration under different forest management scenarios, a field study was installed as a 3 x 3 factorial in a random complete block design with three replications at each of three locations, one each in Ohio, West Virginia, and Virginia. The treatments included three forest types (white pine, hybrid poplar, mixed hardwood) and three silvicultural regimes (competition control, competition control plus tillage, competition control plus tillage plus fertilization). Each individual treatment plot is 0.5 acres. Each block of nine plots is 4.5 acres, and the complete installation at each site is 13.5 acres.

Estimating the acreage of lands in Virginia, West Virginia, Kentucky, Ohio, and Pennsylvania mined under SMCRA and reclaimed to non-forested post-mining land uses that are not currently under active management, and therefore can be considered as available for carbon sequestration.

## Benefits

This study will provide estimates of the carbon sequestration potential for mined lands of varying quality using various reforestation methods. It will provide an inventory of mined lands available for reforestation, an estimate of cost-per-ton of carbon sequestered by reforestation on mined lands, and an estimate of the total eastern-U.S. mined-land carbon-sequestration potential under various policy-incentive scenarios. It will also determine the social and ecological benefits associated with the reforestation of these mined lands.



Location of Field Test Sites in Post-SMCRA Appalachian Coal Fields



White Pine, Hybrid Poplar, and Hardwood Mix Planted at Field Sites