Engaging the Public in Mine Land Reforestation:

Volunteer Tree Planting Projects and Events in Appalachia

Hannah Angel, Stephen F.Austin State University
Chris Barton, University of Kentucky
Michael French, Green Forests Works/The American Chestnut Foundation
Patrick Angel, Office of Surface Mining, USDI

The Appalachian Regional Reforestation Initiative

Restoring healthy productive forests on mined land

ARRI is a joint effort between… OSM and the Appalachian coal states

ARRI's goals:

- Plant more high-value hardwood trees
- Increase the survival rates and growth rates of planted trees
- Expedite the establishment of forest habitat through natural succession

Working to "restore the American chestnut tree to its native range within the woodlands of the eastern United States"

The ation

- Provide terial
- Minimiz
- Limit gr
- Plant a cies
- Use pro

THE APPALACHIAN REGIONAL REFORESTATION INITIATIVE (ARRI)

FOREST RECLAMATION ADVISORY

Forest Reclamation Advisory No. 4 July 2007

LOOSENING COMPACTED SOILS ON MINED SITES

R. Sweigard, J. Burger, D. Graves, C. Zipper, C. Barton, J. Skousen, P. Angel

Because successful surface-coal mining businesses must move earth materials efficiently, mining operations today use large and heavy equipment. Track dozers and haul trucks used for mining can weigh in excess of 100 tons each, while wheel loaders and loaded haul trucks often exceed 200 tons. It is becoming well known within the mining industry that successful reforestation of reclaimed sites requires loose and uncompacted surface materials, but some areas become compacted due to machinery operation, traffic, and storage that is necessary for the mining business to be successful.

Figure 1. Even when empty, haul trucks can weigh 50 - 100 tons or more; this weight exerts force where tires meet the land surface, causing severe compaction of mine soils. Loaders, dozers, and other heavy mining equipment also cause compaction that hinders tree growth when operated on surface soils.

Trees require deep, loose mine soils to survive and grow into healthy, productive forests. Such forests can support viable forest-products' businesses, protect the watershed, store carbon, and serve as wildlife habitat. This advisory describes procedures that can be used to loosen soils that have become compacted by mining equipment in order to restore land capability for forests.

Avoiding Soil Compaction

The best way to deal with compaction on mine sites is to avoid compacting the soil in the first place. Uncompacted conditions suitable for trees can be created using techniques that cost less than traditional smooth-surface "tracked in" reclamation. Loose dumping of surface materials, combined with the minimum grading necessary to shape the land, creates loose soils and rough surfaces, increases rainwater infiltration, and increases the survival and growth of trees. Throughout Appalachia, coal operators are finding these techniques to be a cost-effective successful method for establishing forests and achieving timely bond release when used with the Forestry Reclamation Approach (Burger and others 2005).

Coal operators can minimize equipment use on the final surface but there will often be areas that become compacted, generally the flatter areas and sites used for equipment storage. Many Appalachian and midwestern mine sites reclaimed under SMCRA have become compacted due to excessive equipment operation (Angel and others 2005). In order for such lands to support a forested postmining land use, soils must be loosened prior to reforestation.

What Can Be Done to Loosen Compacted Soil?

Ripping of the soil with a ripper blade or a deep plow attached to a dozer can alleviate most soil compaction effects on mine sites (Figure 2).

Figure 2. A dozer is ripping to loosen soils and produce soil conditions favorable to successful reforestation in a former roadway.

Subsurface ripping was first used for reclamation on prime farmlands disturbed by mining in the Midwest. In years following SMCRA's passage, rubber-tired equipment was often used to replace the subsoil and topsoil on prime farmland sites. Such practices compacted soils and created lands that could not produce the required crop yields.

http://arri.osmre.gov

Spreading the FRA through…

- Arbor Day Events
- SMI Signing Ceremonies
- Reforestation Awards
- Videos
- TV and Radio
- Newspaper
- ARRI Newsletter
- ARRI Website
- ARRI Advisories
- FRA Training
- ARRI Conferences
- Partnerships

American chestnut

Cerulean Warbler

Since 2005…
about 95 million trees have been planted
on about 140,000 acres


Photo by Chris Barton

Photo by Tiffany Heim

A New Direction

(Backward Looking)

≈1 million acres of reclaimed grass/shrub lands in Appalachia

- CCC modeled program to stimulate economy and improve the environment
- Plant millions of trees on thousands of acres of degraded mine land
- Create much needed "green" jobs in Appalachia

Photo by Chris Barton

Green Forests Work

(Investing in America)

….to mitigate climate change,

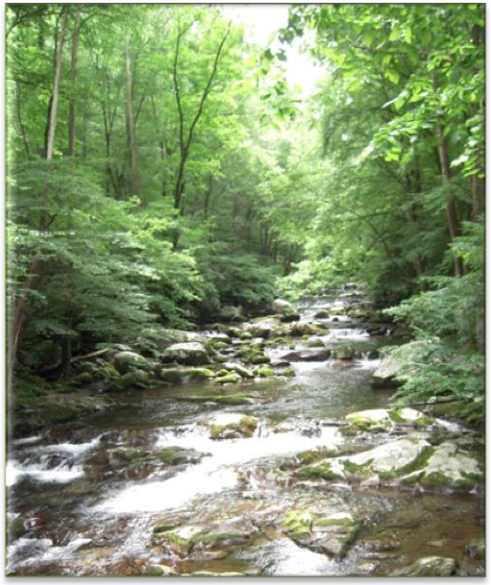
….to improve water quality,

….to restore habitat,

….to create economic opportunities,

….to empower Appalachian citizens

….to turn negative energy into positive energy



Haiku

folks argue in road
while old man steps around them
on way to plant trees


Photo by Michael French


Mountaineers
Appalachian School of Law
Appalachian's Leadership College
Alice Lloyd College
ASU
God has made of one blood all peoples of the earth
Berea College
Centre College
CMU
Central Michigan University
the City College of New York
D
Frostburg State University
1789
Georgetown University
Duquesne Dukes
EKU
VE RI TAS
IUP
Kent State University
Excellence in Action
Michigan State
Missouri State University
Morehead State University
Nazareth College
Northeastern Huskies
NKU
Oberlin College
Learning and Labor
O
1855
Penn State Altoona
U.K.
University of Kentucky
PennState DuBois
1855
The Pennsylvania State University
1855
RU
Radford University
Saddleback College
St John Fisher College
Sewanee
The University of the South
Samford
ATM
UAB
ub
Alabama Crimson Tide
UConn
Michigan
University of the Cumberlands
Cumberland College
Williamsburg, KY
Vita Abundantior
UT
UVA-Wise Cavaliers
Virginia Tech
VT
WKU
Wheelock College
Xavier University

7 yrs of GFW's work on legacy mines…

217 projects in 8 states

1.59 million trees

2,600 acres

11,701 volunteers

Photos by Nathan Hall and Rebecca Dyer

Feature Projects

- Virginia: American Chestnut Orchard
- Pennsylvania: Flight 93 Memorial
- West Virginia: Boy Scout Jamboree Project
- Ohio: Hellbender Bluff Carbon Offset Project
- Maryland: ADF Air Quality Mitigation
- Kentucky: Fishtrap Lake Stream Mitigation
- West Virginia: Red Spruce Restoration
- Tennessee: Golden-Winged Warbler Recovery
- Kentucky: Burning Man Wood Offset

Photo by Hannah Angel

Photo by Hannah Angel

Harrison County, OH

Photo by Nathan Hall

University of Kentucky
College of Agriculture, Food, and Environment

Photo by Hannah Angel

Radford University - VA
Drew University - NJ
Appalachian State University - NC

Photo by Hannah Angel

Flight 93 Memorial Tree Plantings

Photo by Michael French


www.greenforestswork.org
www.arri.osmre.gov
www.acf.org
Photo by Hannah Angel