

PROJECT STATUS REPORT –BARTON BENCH ECOLOGICAL RESTORATION
GREENBRIER RANGER DISTRICT
MONONGAHELA NATIONAL FOREST

Submitted to the W.V. Dept. of Environmental Protection, Division of Mining and Reclamation

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Project Background:

The Barton Bench area refers to a 90 acre parcel of land mined for coal in the 1970s prior to becoming part of the National Forest system (Figure1). This tract is a portion of the 40,856 acres acquired by the US Forest Service in the late 1980s that has become known as the Mower Tract. The federal standards followed by the coal companies for the cleanup operation left the area in a less than desirable condition. The soils in the project area were degraded and heavily compacted. In addition, the area was planted with predominately non-native grass species, resulting in a dense grass mat as the only vegetation inhibiting native species recolonization. This is a permanent condition referred to as ‘arrested succession’ and was unlikely to correct itself without intervention. There are approximately 2,500 acres of previously mined land on the Mower Tract and 1,800 acres are in a similar vegetative state as the Barton Bench Ecological Restoration Project Area. This high elevation area was a red spruce-northern hardwood ecosystem prior to mining activities. The red spruce ecosystem of the Central Appalachians is characterized by exceptionally high biodiversity and is a regional priority for conservation and restoration. A remarkable 240 rare species have been documented in the surrounding red spruce ecosystem in West Virginia including one federally-listed endangered species (Cheat Mountain salamander), a recently delisted endangered species (West Virginia northern flying squirrel), and rare birds such as the northern goshawk, golden eagle, and saw-whet owl. In addition, at least five highly valued game species (white-tailed deer, black bear, ruffed grouse, snowshoe hare, and woodcock) inhabit these limited spruce forests.

The entire project area falls into Management Prescription 4.1 under the 2006 Forest Plan. This Management Prescription calls for restoration and management of red spruce and spruce-hardwood communities in the Central Appalachians.

Site Goals/End Use Plans:

- a. Short term - provide early successional habitat (high stem density) for wildlife species dependent on this type of habitat;
- b. Long-term – restore watershed conditions and native red spruce-northern hardwood ecosystem within the project area; and
- c. Use the results of this project to move forward with large-scale native species restoration across the previously mined areas of the Mower Tract.

FIGURE 1. VIEW OF BARTON BENCH ECOLOGICAL RESTORATION PROJECT AREA.



Wetland Restoration:

The West Virginia Department of Environmental Protection (WVDEP) partnered with the Monongahela to award \$337,000 to restore over 1,600 feet of stream, as well as 75 small wetlands across the mined area including ephemeral, forested, emergent, shrub-scrub, and wet-meadow types. By restoring these watershed features, water quality will be improved, sedimentation into streams will be reduced, habitat for fish and wildlife will be improved, and surface and subsurface drainage will be returned to more natural flows. With this funding, the Monongahela was able to collaborate with the Center for Wetlands and Stream Restoration to successfully build over 135 wetlands in the summer of 2011.

Wetlands are one of the most rapidly disappearing ecosystems in the world and it has been estimated that 24% of the original wetlands in West Virginia have been lost. Past disturbances in the Barton Bench Ecological Restoration Project Area have altered hydrology and caused large amounts of ground water to be intercepted, resulting in an unnatural volume of surface water. Throughout the Barton Bench Ecological Restoration Project Area, many small vernal wetlands were created to help restore watershed conditions and create habitat for plant and animals (see Figures 2-4). The objectives of wetland restoration were to restore and/or create wetland habitat; to diversify and improve wildlife habitat; and to reduce the risk of pond failure, which would thereby introduce large amounts of sediment to native trout streams. Native vegetation plantings were used around newly constructed wetlands to increase the value of these pools to native wildlife species. More than 5,000 mixed species were planted in and around the newly created vernal pools during the fall of 2011. Species included service berry, elderberry, wild raisin, quaking aspen, big tooth aspen, balsam fir, and speckled alder. Trees were planted with the help

of volunteers, National Civilian Community Corps (NCCC), partners, and Monongahela National Forest staff.

FIGURE 2. EQUIPMENT OPERATOR BEGINS CONSTRUCTION OF A VERNAL WETLAND IN THE BARTON BENCH ECOLOGICAL RESTORATION PROJECT AREA.



The Monongahela National Forest only used a small portion of the funding received from the West Virginia Division of Environmental Protection in 2011. Approximately \$30,399 was used to create wetlands in the project area. The majority of this funding was used for a contract for an excavator and operator to build wetlands. Additional expenses included supplies (flags, flagging, straw, seed, seedlings, plants, etc.) and salary costs to oversee implementation of the wetland contract.

Several vernal wetlands were created throughout the project area. A vernal wetland is a type of seasonal wetland that periodically dries up. These temporary wetlands provide important habitat for many wildlife species including wading birds, furbearers, amphibians, turtles, bats, and even macroinvertebrate species. In addition to improving water quality through filtering, wetlands can also replenish groundwater. Wetlands function as natural sponges by trapping and slowly releasing surface water, rain, snowmelt, groundwater and flood waters. The holding capacity of wetlands helps reduce flooding and can trap sediment. Placing branches and logs in a newly created vernal pond greatly increases the number of wildlife species that will use the habitat. Some salamanders will attach their eggs to tree branches placed in vernal pools (Figures 3 and 4).

FIGURE 3. LOGS ARE ADDED TO A VERNAL POOL TO INCREASE THE VALUE TO WILDLIFE.



FIGURE 4. MANY NEWLY CREATED WETLANDS WERE FILLED WITH WATER WITHIN A WEEK OF CREATION.



Stream Restoration:

Stream restoration work will commence in the summer of 2012 and will result in an additional \$103,000 of in-kind contributions from Canaan Valley Institute (CVI). Staff from CVI donated time in 2011 to further refine the plans for stream restoration. After several site visits to the project area, it became apparent that improperly and poorly maintained roads were a major threat to the watershed and associated streams in the project area. A decision was made to increase the impact of this project by focusing efforts on decommissioning old logging roads. These roads are contributing sediment directly into streams. Funding from the West Virginia Division of Environmental Protection will be used to decommission approximately 8,000 feet of old roads, restore approximately 600 feet of unstable stream, and restore or create an additional 2-3 wetlands within floodplain of the stream (see Exhibit A). The Monongahela National Forest finalized a Challenge Cost Share Agreement with CVI in November 2011. CVI is currently completing design plans and applying for required permits to complete the project. Implementation is planned for the summer of 2012.

Many methods exist to decommission roads. In many cases, it's important to "rip" the road surface to break up compacted soils. This allows water to infiltrate and vegetation to re-establish and thrive on the old road bed. Roads are also often outsloped to restore more natural drainage patterns. After the road is "ripped" and outsloped, the area is revegetated. Revegetation is important in road removal projects because plants provide soil stability, terrestrial and aquatic habitat, and site productivity. Woody debris is often laid along the recontoured slopes. This debris helps hold the soil in place and encourages revegetation.

Reforestation Efforts:

The Monongahela National Forest applied for reforestation funds from the Arbor Day Foundation for this project. A total of \$13,347 was received and used to purchase approximately 16,000 seedlings. In the first planting phase a variety of native species were purchased and planted according to a silvicultural prescription developed by the Monongahela National Forest (Table 1 and attached maps).

TABLE 1. TREE AND SHRUB COMPOSITION PLANTED ON THE BARTON BENCH ECOLOGICAL RESTORATION PROJEC AREA.

Species	Number Planted
Black Cherry	2,650
Service Berry	1,500
Big Tooth Aspen	450
Quaking Aspen	400
Red Spruce	10,000
Yellow Birch	1,000
Sugar Maple	2,100
Red Maple	2,100
American Mountain Ash	1,150
Mixed Native Shrub Species	1,200
TOTAL	22,550

More than 5,000 additional mixed species were planted in the newly created vernal pools during the fall of 2011. Species included service berry, elderberry, wild raisin, quaking aspen, big tooth aspen, balsam fir, and speckled alder. Trees were planted with the help of volunteers, National Civilian Community Corps (NCCC), partners, and Monongahela National Forest staff.

Funds Leveraged for Project:

The Monongahela National Forest successfully leveraged \$100,121 in 2011 in addition to the \$336,878 received from the West Virginia Department of Environmental Protection to complete the Barton Bench Ecological Restoration Project (Table 2). The U.S. Forest Service contributed \$20,700 to complete site preparation, purchase tree mats and caging, and purchase additional tree seedlings. An additional \$19,000 was received by the Forest Service's Eastern Regional Office and was used to propagate additional seedlings through a partnership with the Natural Resources Conservation Service's (NRCS) Native Plant Material Center in Alderson, WV. Deep ripping decompacted soils in the project area to create voids for roots, water, and the air necessary for tree growth (Figure 5). The Monongahela contributed an additional \$8,187 of in-kind staff time to supervise tree planting activities, organize volunteer tree planting events, supervise herbicide application, and develop interpretative signage.

TABLE 2. FUNDS LEVERAGED AS PART OF THE BARTON BENCH ECOLOGICAL RESTORATION PROJECT.

Funding Source	In-kind, Cash, or Grants	Amount
U.S. Forest Service	In-kind	\$8,187
U.S. Forest Service	Cash	\$20,700
U.S. Forest Service	Cash	\$19,000
Arbor Day Foundation	Grant	\$13,347
Brownfields Assistance Center	Grant	\$17,000
AmeriCorps NCCC	Grant	\$15,500
Citizen Volunteers	In-kind	\$2,587.20
Potomac Highlands CWPMA	In-kind	\$2,300
Canaan Valley Institute	In-kind	\$1,500
TOTAL		\$100,121.20

With the help of the following project partners, the Monongahela National Forest applied for and was awarded an AmeriCorps NCCC planting crew: Appalachian Regional Reforestation Initiative (ARRI), Appalachian Coal Country Team, and West Virginia Office of Surface Mining Reclamation and Enforcement (OSMRE). The eight person planting crew worked for over two months and was valued at \$15,500. In addition, the NCCC crew helped plan a volunteer tree planting event that leveraged \$2,587.20 of in-kind volunteer hours.

FIGURE 5. BARTON BENCH PROJECT AREA AFTER DEEP RIPPING WAS COMPLETED.



Partner Contributions:

Many partnerships were created during the planning and implementation of this project. Major partners included: AmeriCorps, AmeriCorps NCCC, Appalachian Coal Country Team, Appalachian Regional Reforestation Initiative, Enforcement, Natural Resource Conservation Service's Alderson Plant Material Center, Potomac Highlands Cooperative Weed and Pest Management Area, The Center for Wetlands and Stream Restoration, The Nature Conservancy, United States Fish and Wildlife Service, West Virginia Department of Environmental Protection, WesMonTy Resource Conservation and Development Project (RC&D), West Virginia Division of Forestry, West Virginia Division of Natural Resources, West Virginia Highlands Conservancy, and West Virginia Office of Surface Mining Reclamation. Other partners involved included: Appalachian Forest Heritage Area, Brooks Bird Club, Central Appalachian Spruce Restoration Initiation, Highland Adventists School, Izaak Walton League, National Wild Turkey Federation, Ruffed Grouse Society, and Tygarts Valley Conservation District.

Partners played a critical role in funding the project, designing wetlands, establishing silvicultural prescriptions, collecting seed and propagating native plants, applying herbicides, and organizing volunteer planting days. The Northern West Virginia Brownfields Assistance Center awarded two grants totaling \$17,000 to allow the Monongahela National Forest to design a marketing plan, conduct community outreach, and implement marketing designs for the Barton Bench Ecological Restoration Project. These funds resulted in wide spread press coverage of restoration activities, a tri-fold brochure about the site, and a 3-panel interpretive kiosk installed at the entrance to the project area (Figure 6). The Potomac Highlands CWPMA contributed a 3-

person team to treat spotted knotweed throughout the first bench of the project area. This team is expected to return in the summer of 2012.

FIGURE 6. INTERPRETIVE KIOSK BUILT BY LEVERAGED FUNDS FROM THE WEST VIRGINIA BROWNSFIELD ASSISTANCE CENTER.



Public Volunteer Day:

On April 30, 2011 the U.S. Forest Service, CASRI, WesMonTy RC&D, ARRI, OSMRE, and AmeriCorps NCCC planned a volunteer tree planting day on Barton Bench in conjunction with Earth Day (Figures 7 and 8). The NCCC crew produced fliers for the event, recruited local volunteers from schools, and prepared the site for planting by gathering equipment and staging trees. Appalachian Regional Reforestation Initiative and the U.S. Forest Service invited management from the West Virginia Division of Forestry, West Virginia Division of Natural Resources, OSMRE, NRCS, WesMonTy RC&D, The Nature Conservancy, and U.S. Forest Service. The event showcased the project and partners involved. Forest Supervisor, Clyde Thompson and the Director of OSMRE, Joe Pizarchik attended and spoke at the event. Volunteers planted over 4,000 trees during the day and lunch was provided by Appalachian Forest Heritage Area. The event was covered by local media outlets and provided another opportunity to encourage public investment in the site. This volunteer event also raised the profile of the project to the national level with the Director of OSMRE in attendance.

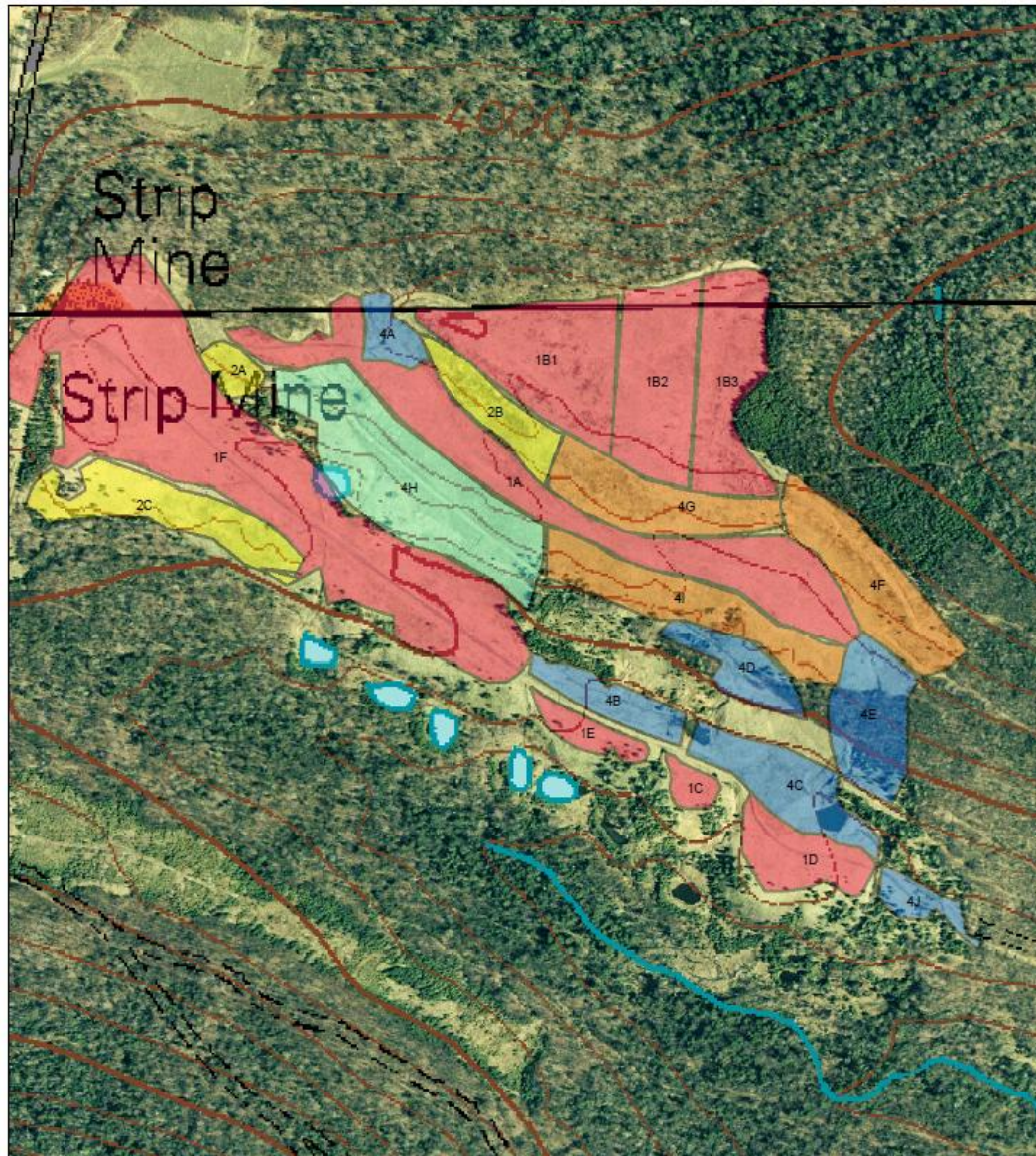
FIGURE 7. YOUNG VOLUNTEERS LEARN ABOUT THE IMPORTANCE OF REFORESTATION OF RECLAIMED MINE SITES BEFORE PLANTING TREES ON ARBOR DAY AT BARTON BENCH.



FIGURE 8. AMERICORPS NCCC CREW PLANTS HARDWOODS PURCHASED WITH ARBOR DAY FOUNDATION REFORESTATION FUNDS.



MAP 1. SITE PREPARATION ACTIVITIES FOR THE BARTON BENCH ECOLOGICAL RESTORATION PROJECT AREA.



Legend

Treatments

<all other values>

Site_Prep

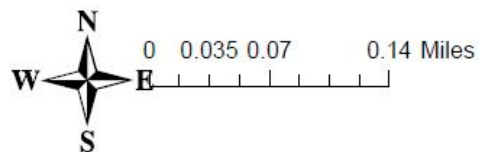
Burn

Contour-rip

Cross-rip

Nothing

Wetland-Rest



MAP 2. SPECIES COMPOSITION OF PLANTINGS ON THE BARTON BENCH ECOLOGICAL RESTORATION AREA.

