Overview

Green Forests Work (GFW) in partnership with the Monongahela National Forest (USFS), Appalachian Regional Reforestation Initiative (ARRI), West Virginia Division of Natural Resources, NRCS Plant Materials Center, and the Central Appalachian Spruce Restoration Initiative began implementation of an ecological restoration project in the Lambert watershed in the summer of 2013. A holistic suite of restoration activities including soil decompaction, wetland restoration, woody debris loading, and planting of habitat for several rare species endemic to the spruce ecosystem, such as the recently delisted northern flying squirrel, native brook trout, snowshoe hare and numerous species that inhabit wetlands.
Site Preparation

- **Ripping** - Ripping of the heavily compacted soil began in August of 2013. The project involved the use of two D-8 bull dozers with steel ripping blades that plowed the soil to a depth of approximately three feet to mitigate compaction. Another bull dozer (D-7) was utilized to remove non-native conifers and to spread woody material throughout the ripped area. The work was performed by a contractor (Union Concrete) from August 26th – Sept 19th with total equipment time of approximately 300 hours. Approximately 101 acres were treated in the project area, approximately 80 acres of which were ripped (60 acres north of Lambert Run and 20 acres to the south – see map and Appendix I). Of the 80 acres ripped, approximately 65 acres had trees scattered across the ripped area. All ripping activities were overseen by USFS, OSM and GFW partners.

*Map of the study area. Three areas (outlined in white) were ripped to mitigate soil compaction and to prepare the site for planting.*
**Site preparation activities**:

- a) Dozer cross-ripping
- b) Ripping and woody debris spreading
- c) Dozer removing non-native conifers
- d) Manual felling of non-native conifers

**Removal of non-native tree species** - An additional area of approximately 20 acres was created by removing non-native Norway spruce and red pine that were planted during the mining reclamation process. This was accomplished by manually felling trees with chainsaws and mechanically pushing some over with a small bull dozer (D7). Many of the felled trees were scattered across the ripped grasslands to add woody debris and organic matter that will be beneficial for both soil development and wildlife habitat. These areas will be replanted with the restoration forested species. All tree removal activities were overseen or performed by USFS, OSM and GFW partners.
High soil compaction resulted in poor growth of the existing non-native species on the site and limited the trees ability to develop a deep rooting system as evident by the near surface lateral rooting system seen in the mechanically removed trees (a). Red pine removal was performed, in-part, to release native red spruce that were present in the understory (b).

- **Vernal Pool Creation** - A contractor to perform the earth moving work (Ecogrow – Ridgewater, LLC) was on-site for the first week of October. Using an excavator, 106 vernal pools were constructed. All vernal pools were created within the footprint of the site preparation activities. Because the area had been previously mined and recently deep ripped, field conditions (e.g. water source and amount of clay in the soil) was highly variable and unpredictable. Therefore, work did not rely heavily on previously prepared design plans but on the ground conditions. Excellent and knowledgeable operators, the ability to rely heavily on Americorp staff during the government shutdown, along with the ability of GFW to conduct a site visit during the work allowed for a successful project despite the inability of active USFS engagement during the government shutdown.

*Excavator used for constructing vernal pools.*
The wetlands were created to intercept and retain precipitation and groundwater, and trap sediment. They also provide habitat for amphibians and other wildlife species. Even though many of the wetlands were only created in September 2013, most (75 of 106 in Fall 2013) are holding water and several species of frogs and salamanders are already taking advantage of the created habitat. Grouse, turkey and woodcock have also been observed utilizing the wetland habitats.

An individual vernal pool (a) and a mosaic of ponds (b) in April 2014. Tadpoles of scaphiopodidae (American spadefoot toads) were abundant in many of the ponds (c and d). Eastern red-spotted newt (Notophthalmus viridescens) (c, center) and egg masses (d, white/greenish objects) of spotted salamander (Ambystoma maculatum) were also observed in the ponds.

**Vegetation Establishment and Monitoring**

- **Native Species Propagation and Planting** - Through a partnership with the NRCS Appalachian Plant Material Center native plant material and seeds were collected and some were propagated in a greenhouse for use in the study area. These native plants contain local genetic traits making them more adaptive to the site than plants grown from outside genetic sources.

  Approximately 72 pounds of seed were sown throughout the ripped area on 3/31/2014. The seeds were primarily applied as mixtures of various native species that were separated by their suitability for soil wetness conditions on the site. There were three primary seed
mixes per soil moisture regime: dry mix, standing water mix and a marginally wet mixture. The species compositions for the three are outlined in the table below.

Table 1. Common names of native seed sown at the Lambert Run restoration site.

<table>
<thead>
<tr>
<th>Dry Mix</th>
<th>Marginal Wet Mix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternate-leaved dogwood</td>
<td>Poke Milkweed</td>
</tr>
<tr>
<td>American Beech</td>
<td>Red Currant</td>
</tr>
<tr>
<td>American hornbeam</td>
<td>Red elderberry</td>
</tr>
<tr>
<td>Black Cherry</td>
<td>Red spruce</td>
</tr>
<tr>
<td>Black Elderberry</td>
<td>Scarlet Beebalm</td>
</tr>
<tr>
<td>Blackberries</td>
<td>Black Eyed Susan</td>
</tr>
<tr>
<td>Blackeyed Susan</td>
<td>Smooth serviceberry</td>
</tr>
<tr>
<td>Bristly Sarsaparilla</td>
<td>Staghorn Sumac</td>
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<tr>
<td>Butterfly Milkweed</td>
<td>Summer Grape</td>
</tr>
<tr>
<td>Cat Berry</td>
<td>Thimbleweed</td>
</tr>
<tr>
<td>Chokeberry</td>
<td>Trumpet Creeper</td>
</tr>
<tr>
<td>Chokecherry</td>
<td>Turks Cap Lily</td>
</tr>
<tr>
<td>Closed Gentian</td>
<td>Velvetleaf blueberry</td>
</tr>
<tr>
<td>Common Milkweed</td>
<td>Virgin Bower</td>
</tr>
<tr>
<td>Common serviceberry</td>
<td>Wild Burgamot</td>
</tr>
<tr>
<td>Cucumber Magnolia</td>
<td>Winterberry Holly</td>
</tr>
<tr>
<td>Deer berry</td>
<td>Wild Raisin</td>
</tr>
<tr>
<td>Devils Walking Stick</td>
<td>Wild Raisin</td>
</tr>
<tr>
<td>Dolls Eyes</td>
<td>Balsam Fir</td>
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<tr>
<td>Greenbrier sp.</td>
<td>New York Ironweed</td>
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<td>Hawthorn</td>
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<tr>
<td>Hazlenut</td>
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</tr>
<tr>
<td>Indian Hemp</td>
<td>Hardhack Spirea</td>
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<tr>
<td>Joe-Pye Weed</td>
<td>Bog Cranberry</td>
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<tr>
<td>Low-bush blueberry</td>
<td>Blue Monks Hood</td>
</tr>
<tr>
<td>Mapleleaf Viburnum</td>
<td>Cyperus sedge</td>
</tr>
<tr>
<td>Mountain Ash</td>
<td>Cotton Grass</td>
</tr>
<tr>
<td>Mountain Holly</td>
<td>Rattlesnake Mannagrass</td>
</tr>
<tr>
<td>New England Aster</td>
<td>Bog Golden Rod</td>
</tr>
<tr>
<td>Panicled Phlox</td>
<td>Fowl Mannagrass</td>
</tr>
</tbody>
</table>

- **Tree and Shrub Planting** – In October 2013, 19 1/5 acre plots were established (T-post, GPS point and photopoints [1 picture in each cardinal direction from the T-post – see blue dots on map above]) and planted. Approximately 562 aspen (500 in 3 gallon pots, 62 in 2 gallon pots) and 1,000 red spruce trees (conetainers) were planted in the plots.
Approximately 250 of the red spruce trees were planted as part of a Master’s project. USFS, TNC, WV DNR and Americorp assisted in the planting.

The bulk of the native woody species planting occurred in the spring of 2014. A professional planting crew (Williams Forestry and Associates) worked at the site from April 10-13, 2014 and planted 25,575 seedlings. Of this, 2,715 were potted plants prepared by the NRCS Appalachian Plant Material Center and included:

- Wild raisin (1,526 in 1 gallon pots)
- Elderberry (400 in 1 gallon pots)
- Aspen (212 in 3 gallon pots)
- Serviceberry (500 in containers and 1 gallon pots)

The potted plants were located primarily in the near vicinity of the vernal pools. The remaining 22,860 seedling planted by the professional tree planters included:

- Red Spruce (12,760 plugs)
- Bigtooth Aspen (2,500 plugs)
- Black Cherry (7,500 bare-root; 100 3-gal potted)

Two volunteer planting events occurred on May 9-10, 2014. GFW and partners used the event for education and outreach. On May 9th a local middle school (Green Bank) volunteered and learned the importance of red spruce to the ecosystem, why wetlands matter, and the role restoration plays in protecting ecosystems from climate change. On May 10th a group from Oakbrook Stewards of Creation (Reston, VA) and others participated. Between the two days there were 117 volunteers and several dozen partners that planted approximately 1,500 red spruce and 1,500 serviceberry. USFS and GFW returned the following week and planted the remaining (approximately) 1,425 red spruce and serviceberry seedlings. In all, 30,000 seedlings were planted. Testimonial from some of the volunteers are included below.
Preparing for the May 9th, 2014 tree planting event (a). Students from Green Bank Middle School plant trees (a and b) and learn about wetland ecology (d).

Testimonials:

This is my third time doing volunteer tree planting in Appalachia, but it’s the first to narrowly focus on integration of the native habitat. Prior to our group planting, partners for the Mower Tract felled some of the non-native Norway Spruce creating a more realistic environment for rebuilding a forest. Rather than planting in a huge desolate area that had been stripped down to nothing, they had us plant native Red Spruce and Serviceberry in and around these downed trees. They also created pools, like mini ‘wetlands’, for salamanders, frogs and other wildlife. We found animal tracks and droppings in the areas we planted! This was encouraging and exciting for me to see. It’s not only about the trees for me. I was happy to be a part of the renewal of an entire habitat.

--Tracy Janiak
We always like a challenge and planting trees in and around felled non-native ones presented just that this year, but the holistic approach to integrating new native Red Spruce was fascinating. The idea of successive plantings to feed and encourage wild life habitat made us feel good knowing that this region will profit greatly from such careful planning. We look forward to returning again to see the progress on this site!

--Karin and Zenon Slawinski

My day planting trees on Cheat Mountain with Green Forests Work was an amazing experience. My grandparents got engaged on this mountain in the early 1950s, so this area has a very special place in my family's history. Although the work was very physically demanding, it was extremely rewarding to know that even my small effort of planting one hundred or so trees that day will help return the land to a red spruce forest. The natural beauty of this area is spectacular yet the remaining scars of mining activity remind us that we have an obligation to help the land recover. I hope these reforestation efforts will continue on Cheat Mountain and other former surface mines in West Virginia. I look forward to volunteering again at future tree plantings.

--Karie Barbour

- **Monitoring** – There are 34 1/5 acre monitoring plots established on Lambert North. Each plot is delineated/landmarked with a T-post at plot center and GPS coordinates. Each site is characterized using methods outlined in the CASRI Rapid Assessment Monitoring Plan and includes an assessment of understory, overstory and midstory vegetation (both planted, existing and naturally colonized). Additional information on the status of planted seedlings, as well as bare ground coverage and downed wood debris is also included on the data sheet. An example sheet is located in the Appendix II.

Four additional monitoring arrays in both Lambert North and South will be established in the summer of 2014. Monitoring for those plots will conform to procedure outlined in the University of Kentucky Research Foundation Quality Assurance Project Plan for the Mower Tract Ecological Restoration (April 25, 2013). An excerpt on the monitoring as outlined in the QAPP is presented in Appendix III.

**Outreach, Documentation and Other Benefits**

- The Creative Imagery Team (USFWS-NCTC) created 3 video clips to describe the restoration work
  - Spruce Reforesting Short: [http://bcove.me/tdb781dn](http://bcove.me/tdb781dn)
  - Spruce Reforesting Long: [http://bcove.me/dq4bncc9](http://bcove.me/dq4bncc9)
  - Spruce and Climate Change: [http://bcove.me/51gb50ll](http://bcove.me/51gb50ll)
- Shredded wood from storm cleanup projects by the West Virginia Division of Highways was incorporated into a portion of the site preparation area at no extra cost.
• A Master’s project is underway on the project site to investigate the value of mycorrhizal fungi inoculation (commercial and native inoculum) of planted tree seedlings.

• The use of a radio controlled quadcopter with 14 megapixel wireless HD FPV camera from the University of Kentucky provided invaluable video documentation of work accomplished (see Appendix I).

• Portions of the project area were near dispersed recreation areas. The ripping was not only used for site preparation activities but also to improve the viewshed.

• Some of the vernal pools were strategically located to hinder illegal ATV access; Others were placed to use surface runoff from roads as the water sources for the constructed vernal pools; were others were located were the groundwater appeared to be close to the surface to reduce the potential for erosion.

• Volunteer tree planting events for 117 volunteers, which included an entire middle school (Green Bank Middle School, 90 students).

• Project was featured in the Spring 2014 issue of Reclamation Matters with photo of Lambert Run appearing on the cover.

• Briefing paper for Climate Change Adaptation Project covering the work on the Lambert Restoration Project produced (Appendix IV).

• Tours:
  o Climate Change Advisor to the Forest Service Chief
  o Mineral staff, including the National Program Director from the Forest Service’s Washington Office
  o Regional Forester (Region 9) of the Forest Service
  o Unit Leader of USGS Virginia Cooperative Fish and Wildlife Research Unit
  o National Program Director for Wildlife, Fish and Rare Plants from the Forest Service’s Washington Office
  o Forest Service, Northern Research Station Unit Leader
  o Department of Fish and Wildlife Conservation

### Upcoming Work

Additional funds have been secured for land ripping, non-native tree removal and organic loading on an additional 70 acres in the Lambert Run watershed (Lambert South). American Forests and the WV Division of Natural Resources will partner with GFW on the additional acreage by providing seedlings and professional tree planters. In addition to the increased acreage, we will be developing educational materials (interpretive on-site sign and brochures) to enhance outreach opportunities.

Work on the new scope has begun and will be completed by September 30, 2014.
Appendix I – Aerial Photos of Study Area

Radio Controlled DJI Phantom Vision Quadcopter used for aerial imagery.

Aerial imagery of the Lambert north section of the study area.
Aerial imagery of one portion (east) of the Lambert south section of the study area.

Aerial imagery of one portion (west) of the Lambert south section of the study area.
Aerial imagery showing both the north and south sections of the Lambert study area.
Appendix II – Example Data Sheet for Field Monitoring

CASRI Rapid Assessment Monitoring Plan

Project location ______Lambert North Restoration____________   Date: _11__/04__/2013____
Plot Number: (.05-acre plot - circle with 26'4" radius, or 46’ 8” square) ___LAM1____________________
GPS Coordinates: ______38*36'54.4"______ _______ N ______079*56'04.0"__________________ W
Aspect:  W  S  E  W none      S  Slope (10% increments, ie. 0-10%, 10-20%): __0-10%___
Number of live spruce seedlings_________0__________
Randomly select one red spruce seedling:
• Height of randomly selected spruce____N/A__________ Terminal growth on leader_______N/A___________
#___0___ Dead spruce seedlings located   Live spruce seedlings condition: [ ]
Notes:_____________________________________________________________________________________________
__________________________________________________________________________________________________

Understory Vegetation Cover (Absolute Cover): Definition: Ferns, forbs, shrubs, and saplings less than 10’ tall.
_50__ %  Bare soil               __20__ % Rock
_1__ %  Mosses, lichens (nonvascular)  __10__%Grasses, sedges, rushes, or other graminoids
_0__ %  Ferns  ___1__ %Forbs
_0__ %  Shrubs/saplings  ___1__ % Leaf litter
_17__ %  Coarse Woody Debris  ___0__% Standing Water
_0__ %  Mulch
100 %  Total
Notes(If possible, please record any non-native, invasive species identified in plot):
___________________________________________________________________________________________________

Overstory Canopy Cover (Relative Amounts): Definition: trees over 30’ tall and occupying the main uppermost canopy
_0__ %  Coniferous (Non-spruce)
_0__ %  Hardwoods
_0__ %  Spruce
_0__ %  Total
Notes:No overstory

Midstory Canopy Cover (Relative Amounts): Definition: Trees or shrubs that are 10 to 30’ tall
_0__ %  Coniferous (Non-spruce)
_0__ %  Hardwoods
_0__ %  Spruce
Notes: No midstory

Additional Comments:

Photos:
North: DSCN0725
South:DSCN0727
Appendix III – Monitoring Plan from QAPP

Performance (survival and growth) of the planted seedlings in the ripped area will be measured on an annual basis for five years after planting. Permanent plots will be developed at four locations within the ripped area following procedures of the USDA Forest Service’s, Forest Inventory Analysis. A generalized plot layout will be developed as described on pages 10-13 of The Forest Inventory and Analysis Database: Database Description and Users Manual Version 5.1.4 for Phase 2 (http://www.fia.fs.fed.us/library/database-documentation/current/ver5.1.4/FIADB_user%20manual_5-1-4_p2_11_2012.pdf). Adapted for assessing reforestation success, each standard plot will consist of four 24.0-foot (7.3 m) radius subplots (approximately 0.0415 or 1/24 acre), on which trees are measured. As such, within each subplot approximately 28 trees will be measured (112 per plot and 448 per site). All trees within the plot will be tagged with a metal tree tag so that repeated measures for survivorship and growth (height and diameter) can be performed annually. Within each of these subplots a nested a 1-m2 microplot will be established for herbaceous cover, natural colonization and invasive species monitoring.

In a subsample (n=5) of created wetlands, vegetative (woody plants <1 m and all herbs) covers of each species will be examined in two 4-m2 permanent ground-layer plots per pond. Species covers
in these plots will be estimated annually each August. Species richness (total number of species) and total vegetative cover (sum of all species mean covers) will be calculated for each wetland annually. In addition, all identified plant species will be assigned into three classes according to their wetland indicator category (Reed 1988). OBL and FACW categories were classed as true “wetland” species, FAC+ and FAC categories as “facultative” species (those equally likely to occur in wetland or upland habitats), and FAC-, FACU, and UPL categories as “upland” species. The number of species and the percent cover (sum of species mean covers) of each indicator class will also be calculated for each wetland. (Reed, P. B., Jr. 1988. National list of plant species that occur in wetlands: national summary. U.S. Fish and Wildlife Service, Washington, DC, USA. Biological Report 88(24).


Appendix IV – Climate Change Adaptation Information Sheet
Climate Change Adaptation Project

Lambert Restoration Project

Working forests are an integral part of the Central Appalachians landscape, providing forest products, jobs, and environmental benefits to local communities. Climate change introduces new challenges to the integrity and productivity of these forests over the long term. The Lambert Restoration Project on the Monongahela National Forest provides a real-world example of how climate change adaptation can be incorporated into forest management. Through this project, the Monongahela National Forest has carefully considered restoration goals to show how management actions can enhance long-term resiliency of forests to climate change.

CLIMATE CHANGE IN THE ALLEGHENY MOUNTAINS

The Central Appalachians region is already experiencing the effects of climate change, and many of these impacts are expected to increase in the future. A variety of factors that strongly influence the area’s forests are anticipated to change, including seasonal temperatures, timing and type of precipitation, frequency and severity of natural disturbances, and the range of pests and diseases.

Potential climate change impacts in the Allegheny Mountains are expected to intensify through the end of the century, including:

- An increase in annual temperature by roughly 2 to 8 °F.
- An increase in winter and spring precipitation, and a decrease in summer and fall precipitation, with more severe drying (4 inches or more) in high elevation areas.
- Changes in the timing of precipitation are expected to increase erosion potential in the winter and spring, especially on steep slopes and where hydrology has been altered.
- Models agree that some tree species may decline, including red spruce, sugar maple, aspen, and other native species.
- Certain insect pests and pathogens will increase in occurrence or become more damaging.

Lambert Restoration Project

SIZE: 2,667 acres

FOREST TYPES: Several high-elevation types including dense red spruce, spruce-northern hardwoods, aspen, mixed hardwoods, and legacy mine benches with no forest cover or with nonnative conifer plantations.

The Lambert Run Strip abandoned coal mine lands were mined in the 1970s and bought by the Forest Service in the 1980s in the 40,745-acre Mower Tract acquisition. Rehabilitation efforts in the 1970s consisted of reshaping the mined areas to a more stable condition and planting nonnative species for erosion control. The contemporary result is large areas of heavily compacted soil with low water infiltration, where the predominant cover is aggressive grasses and Norway spruce.

Current management goals seek to improve watershed conditions, provide wildlife habitat, and restore native red spruce-northern hardwood ecosystems.

About...
The Central Appalachians Climate Change Response Framework provides an integrated set of tools, partnerships, and actions to support climate-smart conservation and management actions across Ohio, West Virginia, and Maryland.

For more information visit [www.forestadaptation.org](http://www.forestadaptation.org) or contact Patricia Butler (prbutler@mtu.edu)
INCORPORATING CLIMATE CHANGE INTO FOREST MANAGEMENT

Staff from the Monongahela National Forest used *Forest Adaptation Resources: Climate Change Tools and Approaches for Land Managers* to identify actions to enhance the long-term resiliency of high-elevation spruce ecosystems.

Red spruce is currently expanding on the landscape, recovering from past logging, acidification, and wildfire to regain an important ecological niche. Current restoration efforts are focused on restoring site ecological functions related to soil and water, and restoring native tree, shrub, and herb species. Although climate impact models project severe declines for red spruce by the end of the century, these high elevation areas provide the last remaining habitat that is cool and wet enough to support red spruce. Restoration of these sites now may increase the ability of red spruce forest to cope with future changes in climate by correcting arrested succession, reconnecting forested landscapes, and providing a greater suite of red spruce sites with the potential to serve as refugia. Below are examples of adaptation approaches and tactics identified for the site.

<table>
<thead>
<tr>
<th>Sites</th>
<th>Management Objectives</th>
<th>Adaptation Approach</th>
<th>Adaptation Tactic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixed hardwood forest</td>
<td>• Improve composition by increasing red spruce component to 30%</td>
<td>• Restore diversity of native species</td>
<td>• Release existing red spruce by removing midstory hardwoods</td>
</tr>
<tr>
<td></td>
<td>• Enhance growth rate and stand structure</td>
<td>• Promote diverse age classes</td>
<td>• Protect black cherry and disease-resistant beech</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Reduce impacts to soils and nutrient cycling</td>
<td>• Leave thinned wood on site for woody material</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Retain biological legacies</td>
<td></td>
</tr>
<tr>
<td>Mine bench</td>
<td>• Establish native species</td>
<td>• Maintain and restore diversity of native species</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Increase coarse woody material</td>
<td>• Reduce landscape fragmentation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Restore hydrologic function</td>
<td>• Prevent the introduction and establishment of invasive plant species and remove</td>
<td>• Uproot nonnative Norway spruce and remove nonnative herbaceous species (spotted</td>
</tr>
<tr>
<td></td>
<td></td>
<td>existing invasives</td>
<td>knapweed)</td>
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<tr>
<td></td>
<td></td>
<td>• Reduce impacts to soils and nutrient cycling</td>
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<td></td>
<td></td>
<td>• Maintain or restore hydrology</td>
<td>• Increase input of coarse woody material (leave uprooted Norway spruce, mulch trees</td>
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<td></td>
<td>on site, and import clean mulch from other sites</td>
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<td></td>
<td></td>
<td></td>
<td>• Loosen soils mechanically to break up compaction</td>
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<td></td>
<td></td>
<td>• Decommission roads that are impeding hydrologic function or repurpose for</td>
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<td></td>
<td></td>
<td>recreation</td>
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<td></td>
<td>• Assess road stream crossings and upgrade culverts to handle higher peak stream</td>
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<td></td>
<td>flow and allow aquatic organism passage</td>
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<tr>
<td>Mine bench</td>
<td>• Establish native species</td>
<td>• Maintain or restore hydrology</td>
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<td></td>
<td>• Increase coarse woody material</td>
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<td></td>
<td>• Restore hydrologic function</td>
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<tr>
<td>NEXT STEPS</td>
<td>Climate change considerations are integrated into forest management under the Lambert Restoration Project. Some areas have already been deep ripped and planted, while others are in progress. Wetland creation and road decommissioning is also ongoing. Native species will continue to be planted according to availability, with an emphasis on greater native species diversity.</td>
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</tr>
</tbody>
</table>

REFERENCES