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Service

Mower Tract Restoration and Recreation Enhancement Project

July 2016

Environmental Assessment

Greenbrier Ranger District,
Monongahela National Forest
Randolph and Pocahontas Counties, West Virginia

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Photo on the cover is of the Mower Basin, Old Strip Mine, 2015.
Although this picture does not look like an old strip mine, what you are seeing is a densely compacted landscape of non-native grasses and conifers that do not provide quality habitat for wildlife and do not exhibit a naturally functioning hydrology system.
More details about this area's history is included in Chapter 1 - Background.

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Figure 1. Red Spruce planted at Barton Bench after 3 years of growth, 2011.

Chapter 1 – Introduction

Regulatory Framework

The Forest Service prepared this Environmental Assessment (EA) in accordance with National Environmental Policy Act (NEPA) regulations, other relevant Federal laws and regulations, and the 2006 Monongahela National Forest Land & Resource Management Plan updated 2011 (Forest Plan). This EA is intended to provide sufficient evidence and analysis about the estimated environmental effects of proposed alternatives to determine whether or not to prepare an Environmental Impact Statement or Finding of No Significant Impact. The effects analysis reports and other supporting documents are available upon request.

Summary

This project seeks to restore native red spruce-northern hardwood ecosystems on the Mower Tract on Cheat and Shavers Mountain within the Shavers Fork watershed while improving watershed conditions and wildlife habitat. This area has been heavily influenced by previous timber production activities and surface mining prior to federal acquisition. This project proposes a suite of restoration activities on coal mine benches, including soil decompaction, wetland creation, woody (organic) material loading and native species planting to not only emphasize red spruce, but also to improve watershed conditions and create early successional habitat. As these areas develop through succession, they will revert to the red spruce-northern hardwood dominant forest type. Non-commercial spruce restoration to release red spruce in hardwood forests and thin young dense stands of red spruce will also improve the growth and quality of the existing red spruce regeneration. Early successional habitat will also be improved in young hardwood dominant stands where red spruce and hardwood species of wildlife and timber importance would be treated as a crop-tree. Additionally, we propose to improve recreational opportunities through the improvement of a sustainable trail network, improvement of motorized access through road maintenance and the construction of a short connector road between two NFS roads. Stream habitat improvements through large woody material additions and non-system road decommissioning will improve the watershed conditions within the project area.

Location

The project area is located approximately 5 miles northwest of Durbin, in Randolph and Pocahontas Counties, West Virginia (Figure 2). The project area encompasses the majority of the tract bought by the United States Forest Service (USFS) in late 1980's from the Mower Limited Partnership. Approximately 32,980 acres (97%) of the 33,994 acre project area is National Forest System (NFS) land. The remaining 1,014 acres (3%) is in private or state (right of ways along the railroad grade) ownership.

Background

Prior to the late 1880s, old-growth red spruce and red spruce-northern hardwood forests dominated the highest elevations of West Virginia, spanning up to one million acres. The Mower Tract falls within the historic range of this forest ecosystem. Above and below ground ecological processes were heavily influenced by the expanse of red spruce forests.

During the Industrial Logging Era (1880's – 1940's), the vast majority of the project area was clear-cut logged. In addition, much of the areas also experienced unnaturally hot wildfires due to the build-up of slash that remained after logging. In areas where fire occurred, the once-dominated red spruce forest was replaced by hardwood dominant forest because the fires eliminated the naturally occurring red spruce seed source. By the end of the Industrial Logging Era, the ecosystem was reduced to less than 10 percent of its original range. The resulting forest within the project area was transformed from an un-fragmented old-growth red spruce-influenced climax forest to a young, even-aged simple forest, and in many places, void of red spruce presence due to the fires after logging.

From the 1950's through the 1970's, Mower Land and Lumber Company emphasized surface mining for coal with heavier activity during the late 1970'- early 1980's. In the 1980's, Mower reached an agreement with the Forest Service to sell the area known as the Mower Tract to the Forest Service. As part of the purchase agreement, the Mower Lumber Company was permitted to harvest 31 million board feet of timber off of the property. As part of the timbering operations, numerous logging roads, haul roads and skid trails were constructed. It is estimated that approximately 15% of the project area was timbered during this brief period. In addition, at least 1,500 acres (approximately 3% of the project area) was surface mined for coal prior to becoming National Forest System lands. All areas that were surface mined for coal were then reclaimed, following the Surface Mining Control and Reclamation Act of 1977. By law, reclamation consisted of reshaping the mined areas to a more stable condition and planting with nonnative species whose primary purpose was to control erosion. This left areas of heavily compacted soil on slopes that do not reflect the original contour of the mined area, resulting in disturbed hydrological functions. Due to soil conditions and the dominant nature of nonnative plants, these areas are stuck in a condition referred to as 'arrested succession'. In addition to the negative results to the terrestrial environment, the overland flow and lack of forest canopy cover has two major effects on water resources: 1) generation of soil erosion and sedimentation of surface waters, and 2) loss of thermal protection (via surface water flow) and heating of downstream waters. Excess sediment and increased temperatures can affect stream communities through habitat burial and loss of dissolved oxygen.

In 1987, the Forest Service acquired the lands that have become known as the Mower Tract from the Mower Limited Partnership. The majority of the roads constructed for logging and mining operations were closed and reclaimed with the aid of the Soil Conservation Service, which is now known as the Natural Resource Conservation Service (NRCS).

The Forest Service completed a NEPA document (Spruce Opportunity Area Analysis) in 1990. This Decision document identified several actions to be implemented that emphasized resource inventory and protection, along with many recreation improvements. Several inventory, watershed restoration efforts, and road improvement projects were implemented through the 1990s. Very little activity occurred on the Mower Tract from 2000-2008.

The Forest Service reinitiated interest in the Mower Tract beginning in 2008. Initially, efforts focused on working with the NRCS to propagate native species from locally collected plant material to plant on the legacy mine sites, which were dominated by nonnative species. From 2008-2011, approximately 10,000 plants were propagated and planted on reclaimed mine

areas. Planting efforts were largely ineffective because of the compacted soils of the reclaimed mine areas.

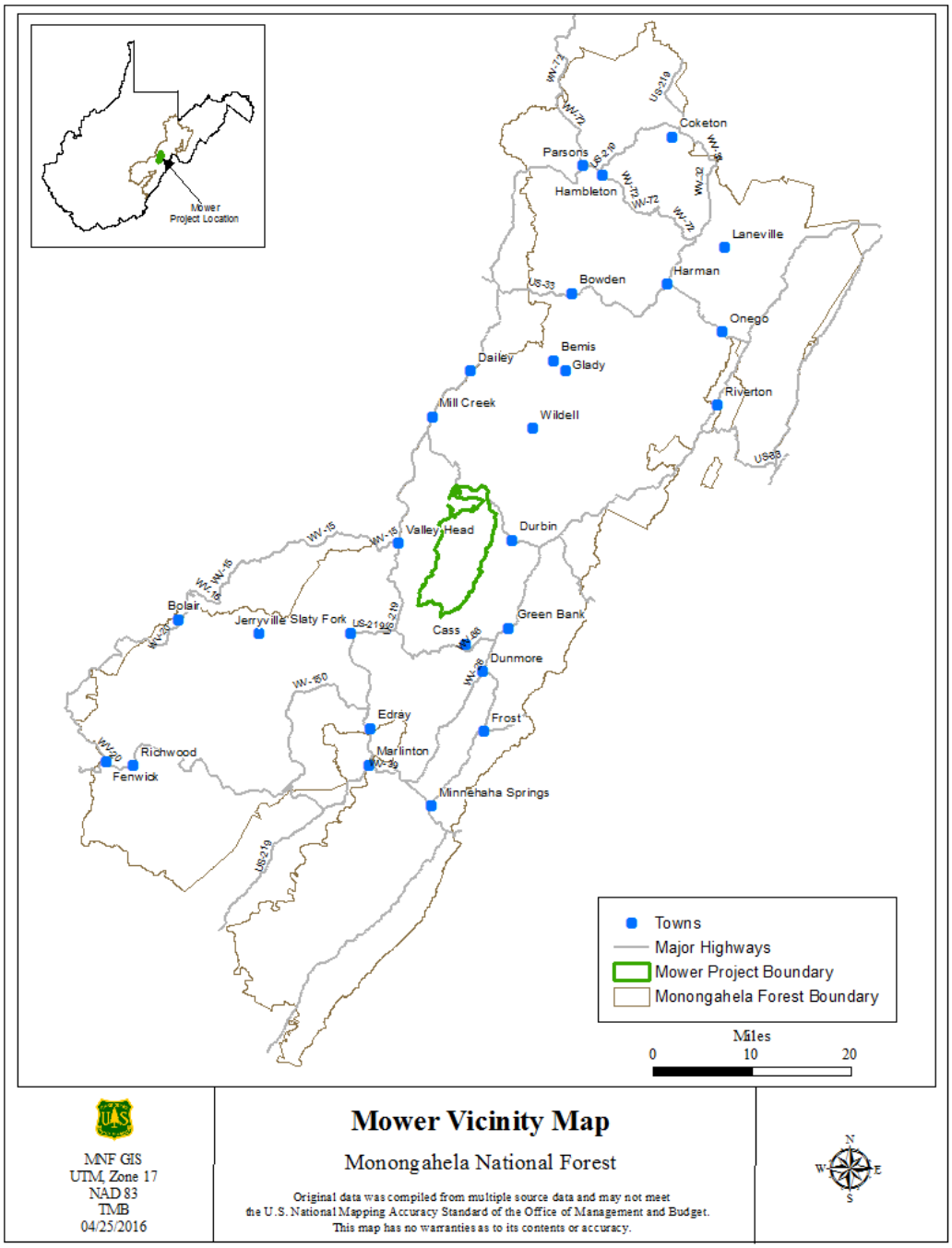

Figure 2. Mower Tract Restoration Project, Vicinity Map.

Recent projects, successes, and lessons learned

In 2010, the Forest Service completed a NEPA document to implement a pilot project on an approximately 90 acre mined area known as Barton Bench. This project was designed to engage partners and use adaptive management to learn from our experiences. As previously mentioned,

large areas (such as Barton Bench) were mined for coal in the 1970s-80's. After 30+ years, very few trees successfully seeded into the reclaimed mined areas. The reclaimed areas remain in a state of "arrested succession". Arrested succession is the delay of natural forest community development, which is a result of compacted soils and competing nonnative vegetation. Along with numerous acres of open areas dominated by nonnative grasses, much of the reclaimed area was converted to plantations of nonnative trees, such as Norway spruce and red pine. The nonnative grasses inhibited the growth of native vegetation, thereby reducing plant diversity. The compacted soils stunted the trees by keeping them from growing healthy roots and tall trunks. Without intervention, these areas will remain in this state for decades, if not centuries.

One of our partners for restoration project is Green Forest Work (GFW). The mission of Green Forests Work is to re-establish healthy and productive forests on formerly mined lands in Appalachia. GFW has planted over 1.6 million trees across Appalachia. Based on this extensive experience of this organization and their successes, the best remedy for these reclaimed areas stuck in "arrested succession" is with restorative intervention.

The overall goal of the Barton Bench project was to revert formerly mined and reclaimed lands into a spruce dominated native forest that would eventually develop into a spruce-influenced ecosystem. Approximately 90 acres of reclaimed mined areas were site prepped (deep ripped) to decompact the soil and provide for optimal conditions for plant growth. Over 22,000 native plants were planted on the areas that were site prepped. To date, plant survival exceeds 90% and plant growth has been exceptional. Additionally, approximately 135 wetlands were created throughout the project area.

After completion of the Barton Bench project, the Forest Service completed NEPA for the Lambert Run area. Instead of only covering the reclaimed mine benches, NEPA included an array of activities within the 2,667-acre Lambert project area. Restoration in Lambert Run began in 2012. To date, approximately 300 acres have been site prepped as part of the Lambert Run Ecological Restoration. Over 100,000 native plants have been planted and several hundred wetlands have been created. Implementation was made possible through a multitude of funding sources and partners.

There were many "lessons learned" throughout the implementation of restoration work to date on the Mower Tract. Several of the most notable "lessons learned" are listed below:

- The Forest Service needs partners, not only for their expertise, but also for resources to implement restoration at a landscape scale. We rely heavily on our partners, especially with implementation.
- Although the ultimate goal is to recreate a forest that will eventually mature into a spruce-influenced ecosystem, by engaging other partners (especially the West Virginia Division of Natural Resources), we can have a short term goal (within 10 years) of creating early successional habitat on areas that were mined and reclaimed.
- Fast growing trees, especially aspen, will quickly transform this open land to one that is covered with dense patches of young trees. Wildlife dependent upon early successional habitat will flourish in these young forests.

- Creation of early successional habitat can be greatly enhanced by creating wetlands as part of the site preparation process on the reclaimed mined areas. In addition, constructed wetlands are critical to the retention of water on site.

Forest Plan Direction

In the Forest Plan, management of lands is guided by Forest-wide and Management Prescription (MP) direction that describes specific desired conditions, goals, objectives, standards, and guidelines. No single project can accomplish all desired conditions, goals, and objectives, but this project would help accomplish some of them in this project area, as described below.

Forest-wide management direction for several disciplines have helped shaped the Mower Tract proposed action, as briefly summarized:

Ecosystems on the Forest:

- Have ecological and watershed integrity, meaning they have a viable combination of all the diverse elements and processes needed to sustain systems and to perform desired functions
- Are dynamic in nature and resilient to natural and man-caused disturbances and changes, including climate change

Ecosystems have the following physical, biological, social, and economic components and conditions:

- Soils are productive and in a condition that promotes vegetative growth, hydrologic function, long-term nutrient cycling, erosional stability, and carbon sequestration.
- Terrestrial communities are within desired conditions for composition, structure, patterns, and processes.
- Habitats support species diversity, with emphasis on maintaining or restoring populations of game and non-game wildlife.
- Grow trees that absorb carbon dioxide and produce oxygen, by storing carbon in above-ground vegetation and below-ground roots and soil nutrients.

For areas impacted by past mineral extraction activities, sites should be returned to condition consistent with management emphasis and protection of forest resources:

- Reduce environmental effects from past mineral-related activity. Restore disturbed land to a productive condition.
- Inventory abandoned mines and prepare restoration plan to address biological and physical resource concerns, chemical stability, and human health and safety.

Soil and Water Resources:

- Soils have adequate physical, biological, and chemical properties to support desired vegetation growth.
- Wetlands and floodplains function as detention/retention storage areas for floodwaters, sources of organic matter, and habitat for aquatic species
- Improve watershed conditions.

Vegetation:

- Forested lands exhibit variable patterns of size classes, densities, structural stages, and species composition due to a combination of successional development, disturbance regimes, and management activities.
- Age class distribution ranges from openings maintained for wildlife habitat to a network of late successional stands.
- Use native species to revegetate, restore, or rehabilitate lands where natural regeneration in not likely to occur in a timely manner.

Wildlife and Fish:

- The amount, distribution, and characteristics of habitat are present at levels necessary to maintain viable populations of native and desired nonnative wildlife and fish species.
- Threatened, Endangered and Sensitive Species:
- Provide habitat capable of contributing to the survival and recovery of species listed under the ESA.

The 33,994 acre project area is entirely within the Management Prescription (MP) 4.1 - Spruce and Spruce Ecosystem Management Emphasis. The desired conditions for this area as prescribed in the Forest Plan are a "mosaic of spruce and spruce hardwood communities. Restoration management focuses on achieving spruce and mixed spruce species composition…developing the multi-age stand structure that likely existed in this community prior to exploitation". Among other things, this prescription emphasizes the following:

- Active and passive restoration of spruce and spruce-hardwood communities
- Recovery or threatened and endangered species and other species of concern associated with spruce and spruce-hardwood communities
- Management of hardwood communities where spruce is a negligible or absent component
- Generally restricted public motorized access and use

This is the third NEPA document concerning ecological restoration and wildlife habitat improvement of the general area (Barton Bench Restoration, 2010 and Lambert Run Restoration, 2012) and the second NEPA document to address spruce restoration (Upper Greenbrier Decision #2, 2012) or wildlife habitat improvement (Greenbrier Range NEPA, 2014) at a programmatic level. Project records are available upon request. This project is based on the results of activities of these projects that are in various stages of implementation and successful restoration. Although this environmental analysis covers a new area, all concepts included in the proposed management have been previously utilized.

Purpose & Need

The current condition of the Mower Tract greatly limits to the variety of ecosystem services that this area can provide. Ecosystem services are commonly defined as the benefits people obtain from ecosystems. Ecosystem services include basic services - provisioning services like

the delivery of food, fresh water, wood and fiber, and medicine - and services that are less tangible and harder to measure but equally critical: regulating services like carbon sequestration, erosion control, and pollination; cultural services like hunting, recreation, ecotourism, and educational and spiritual values; and supporting services like nutrient cycling, soil formation, and primary productivity. There is a need to intervene in the highly disturbed land and influence the current ecological state of the land in order to help conserve and ensure long-term viability of important plant and animal species that depend on spruce-influenced forests, while creating healthy early successional habitat to benefit a range of species.

Past reclamation efforts prior to Forest Service ownership has left approximately 1,100 acres of previously mined and reclaimed areas within the project areas stuck in a state of 'arrested succession'. This left areas of heavily compacted soil on slopes that do not reflect the original contour of the mined area, resulting in disturbed hydrological functions. Planting consisted of nonnative trees, grasses, and forbs. Due to soil conditions and the dominant nature of nonnative plants, these areas are stuck in a condition referred to as 'arrested succession'. This means that while the reclaimed areas are covered with vegetation, they lack the ability to reach full-growth potential and to further develop into later succession, more mature forest types. With no intervention, the thick grass mat will continue to prevent re-colonization of native trees and shrubs, and artificial water drainage characteristics that have formed will continue to adversely affect soil and watershed conditions. Red pine and other nonnative conifers were commonly used in early reclamation in order to return the minelands to forest. Unfortunately, the monoculture within nonnative conifers provide little quality wildlife habitat due to the lack of vegetation diversity and structural complexity of the even-aged stands. These plantations are also of low commercial value due to stunted growth. Reclamation of highly disturb areas and mine lands within the headwaters of mountain streams and rivers, such as those found across the Mower Tract, can help improve watershed conditions downstream for healthier ecosystems and water resources for the public.

The central Appalachian landscape hosts one of the largest red spruce communities south of Maine and the current cover of red spruce dominated forest is merely a fraction of the expanse that existed historically (see Background, pg 7). Based on soils, geology, elevation, and the dominance of red spruce regeneration across various parts of the Mower Tract, conditions are such that management activities to benefit this forest ecosystem will restore a portion of the historical red spruce forest. As a result of our successful partnership with the NRCS to develop Ecological Site Descriptions (ESD) for soils that developed under red spruce forests in the higher elevations on the Monongahela National Forest, we learned soil development processes are different in forested systems with at least 30% red spruce in the overstory as compared to hardwood forests in the Central Appalachians. The ecosystem processes, habitats, and soil development will be restored by actively managing these high elevation areas for the red spruce forests that had previously existed.

The timbering in the 1970s-80s has resulted in vast areas of young, dense spruce. This condition is highly unnatural because the red spruce is overstocked. Without intervention, the dense young spruce stands will not have an opportunity to eventually develop into a healthy spruce-hardwood ecosystem.

Although a number of actions were identified in the 1990 Spruce Opportunity Area Analysis, most actions to improve and/or maintain public access were not implemented. The project area includes both the Cheat Mountain and Shavers Mountain ranges, and one of the highest river valleys in the East. These two rugged mountain ranges have 10 of the 25 highest peaks in West Virginia within the project area. This vast mountainous area with soaring peaks currently lacks designated non-motorized public access points. Additionally, there are currently no maintained trails in the area. Therefore, adequate and sustainable public access into the Mower Tract area is currently lacking. Trails and construction of a short-segment of new road (0.79 miles) would ensure safety and adequate public access into this area, while preserving the character of little motorized access. The emphasis of these actions is not to greatly increase motorized use, but focus on providing sustainable recreational access into the area. The proposed trail system includes the conversion of existing skid roads to low density, sustainable non-motorized trail loops for user access into these beautiful areas.

The red spruce-influenced ecosystem is globally rare, important in the climate change and carbon sequestration discussion, and an aesthetically pleasing environment for forest users. It also fosters conditions that provide drinking water to many downstream users. A management strategy that encourages a red spruce influenced forest and sustainable recreation opportunities would greatly enhance ecosystem services for the American public.

Public Involvement

This proposal first appeared on the District's quarterly Schedule of Proposed Actions (SOPA) in the July 2015 as the Mower Tract Restoration Project EA. However, the Mower Tract restoration project has its roots in Barton Bench and Lambert Run projects previously developed and currently being implemented. This landscape restoration proposal has grown out of the partner and public involvement that we have received the last 5 years. The mine land restoration with associated vernal pools, road decommission, revegetation and a host of other activities has been influenced by working with people outside of the US Forest Service. This project would not be possible without our support from interested partners and public. For instance, the mine site soil preparation (pre-planting ripping) was an outside of US Forest Service idea that we first implemented at Barton Bench. This partner suggested method to prepare the soil increased our revegetation success from 15% to over 90%. Over 15 partners have been involved with the Mower Tract Restoration project. Two schools are involved annually for volunteer planting and science-based outdoor classes.

Additional public outreach for this project has been restoration technique (You Tube) videos made by Northern Institute of Applied Science and US Fish and Wildlife Service National Training Center. These have been sent to restoration professionals and on the web as a model for landscape restoration. This unconventional model of reaching out to interested parties has defined the success of previous Mower Tract area landscape restoration projects (Barton and Lambert Run projects).

The recreation trails portion of the proposed action had extensive public input with four meetings in the summer and fall of 2014. This includes location input on trails and trailheads from West Virginia Mountain Biking association (International Mountain Biking Association),

Back Country Horseman of WV, West Virginia Mountain Trail Runners, Hatchery Run Homeowners Association (Cheat Mountain Club area landowners), and local hikers.

After considering all public comments received throughout the planning process for the first two NEPA documents (Barton Bench, 2010 and Lambert Run Restoration, 2014), no significant or unresolved issues were brought forward. Because this is the third restoration project within the Mower Tract and the amount of previous public and partner involvement, the 30-day public scoping and notice and comment period are being combined prior to issuing a draft Decision Notice for the 45-day objection period. This EA is being distributed to approximately 183 interested parties, in accordance with 36 CFR 218, and a legal notice was published in the paper of record, the *Pocahontas Times* as well as a public announcement in *The Inter-Mountain*. All distributed materials were also available on the Forest website. Consultation with the U.S. Fish and Wildlife Service (USFWS) is being completed in accordance with Endangered Species Act requirements. The decision for this project will be posted on the Forest website and distributed to those people, organization, or agencies who received this EA.

Issues

Preliminary issues are defined as concerns or disagreements about potential undesirable effects that might result from the proposed activities. Until recently (and as described below), the interdisciplinary team did not identify any issues because this is the third NEPA document in the Mower Tract general area with the same actions. As previously described, we have evolved our mineland restoration techniques through working with our various partners and monitoring and implementation of the first four phases of restoration under the Barton Bench and Lambert Run NEPA documents. Furthermore, we have implemented several hundred acres of non-commercial spruce restoration using direct application of herbicide under the Upper Greenbrier Decision #2.

Recently, as a result of our cooperative partnership with the West Virginia Division of Natural Resources and West Virginia Division of Forestry, the Ruffed Grouse Society has donated habitat management equipment to the West Virginia Division of Natural Resources to be used on Kumbrabow State Forest and the Greenbrier Ranger District. This machine is used to shred small trees and brush into a coarse mulch to create early successional habitat. The primary purpose of this action is to improve early successional habitat by creating edge within edge and encouraging the regeneration of high stem density of woody vegetation. Because we think this machine may prove useful in our spruce restoration actions, we have taken some preliminary issues identified by the interdisciplinary team directly related to the use of the habitat management equipment and incorporated these concerns into the proposed action as design features. As described in further detail in Chapter 2, we propose to use the habitat management equipment only when certain conditions exist. As we use this piece of equipment on a small area, we would monitor the results to evaluate impacts and effectiveness before moving onto a larger treatment area.

After considering all public comments received throughout the planning process for the first two NEPA documents, together with input from agency resource specialists, the interdisciplinary team found no unresolved or significant issues [36 CFR 220.7 (b)(2)(i)].

Chapter 2 – Alternatives

This chapter provides a more detailed description of the agency's no-action and action alternatives. These alternatives were developed based on issues and concerns raised by the public and other agencies, as well as lessons learned on previous project monitoring and implementation.

Alternative 1: No Action

Under the Alternative 1, no mineland restoration, spruce restoration, early successional habitat, watershed improvement, or recreation activities would be implemented to accomplish the purpose and need of the project.

Existing conditions would continue. The arrested successional state of the project area would continue and no change in forest development, the short-term availability of quality early successional habitat, and management to enhance and restore historic red spruce forest ecosystem would occur. The reclamation efforts implemented prior to federal ownership on the existing mine lands would continue to provide little diversity, with dominant populations of nonnative vegetation and compacted soil, perpetuating hydrological concerns of poor drainage and soil loss on existing trails and roads. Public access would be limited, as well as the availability of quality recreational opportunities.

Alternative 2: Proposed Action

In order to meet the purpose and need of this project area, the following activities are proposed. All acreages for the various proposed actions have been derived from a GIS exercise and are meant to be approximate. In other words, the programmatic nature of this project would necessitate field review to validate the appropriate action for the existing condition. For example, mineland restoration would only occur in areas that have been previously mined for coal and reclaimed; early successional habitat management (ESH) (including aspen release) would only occur in young hardwoods stands; spruce release in mature hardwood stands would only occur where there is adequate spruce regeneration in the understory and/or midstory but less than 30% spruce in the overstory. Although the acreages are approximate, proposed actions for the various activities would not exceed the acreages given (Table 1).

This project proposal is intended to be restorative in nature, and all activities will be implemented as necessary to avoid all adverse effects to resources through design features and mitigation strategies included in the proposed action. Prior to implementation of road decommissioning, new road construction, trail construction or road-to-trail conversion activities, and trailhead development, post-decisional field surveys would be conducted to ensure that no adverse effects would result in relation to water resources and threatened, endangered, or Regional Forester sensitive (TES) plants and animal species, and cultural resources.

A programmatic approach to post-decisional surveys will be developed on an annual basis, defining where implementation is planned for these activities each field season. Specialists would be given notification well in advance of planned implementation to ensure timely completion of potential effects prior to proceeding with proposed activities. The results of these field surveys will be reviewed by the responsible official and interdisciplinary team and

incorporated into the project file as Supplemental Information Reviews (SIR). If no new resource concerns or effects outside the scope of this environmental analysis are found at the conclusions of those reviews, documentation would be included in the project file and implementation would proceed. If the conclusions of this review indicate that the effects differ from those disclosed in this document, implementation would not occur until a revised environmental analysis is completed and a finding of no significant impact is determined by the responsible official.

Design features and mitigations necessary to avoid or minimize adverse impacts for Alternative 2 are included in Appendix B. In addition, a consolidated list of these, as well as applicable Forest Plan goals, objectives, standards and guidelines, is included in Appendix C.

Table 1. Alternative 2: Summary of Proposed Activities

Restoration and Vegetation Treatments	**Acres (% of Project Area)**
Mineland Restoration	1126.3 (3%)
Non-commercial Red Spruce Restoration in Mature Hardwood Stands	5180.9 (15%)
Non-Commercial Thinning in Young Spruce Stands	4053.5 (12%)
Early Succession Habitat and Crop Tree Release in Young Hardwood Stands	2236.8 (7%)
Public Access Actions	**Miles**
Road Maintenance and Construction NFS FR227B and FR227C New Construction between FR227B and FR227C	 3.3 miles 0.79 miles
Trails Existing road/skid trail conversion New Construction	 61.3 miles 16.5 miles
Trailheads	9 locations
Watershed Restoration and Aquatic Habitat	
Non-system road/skid trail decommissioning	As necessary, pending further field reconnaissance of roads/skid trails resulting from activities prior to federal acquisition
Stream habitat improvement	Initially 15 miles along First Fork, additional areas pending further field reconnaissance of existing conditions and suitability for treatment

Mineland Restoration

Based on reviewing data from past mining and reclamation permits obtained from the West Virginia Division of Environmental Protection, field reviews, and refining the

boundaries of these areas from aerial photography, approximately 1,126.3 acres (3% of the project area) of previously mined and reclaimed areas would be treated (Appendix A, Figure A-1). These are areas showing evidence of 'arrested succession', with highly compacted soils, hydrological concerns, and dominated by nonnative vegetation.

All restoration activities would create an environment favoring the successful establishment of a red spruce-influenced forest with native vegetation and natural succession, as well as natural hydrologic function. Another goal of these actions is to initially create early successional habitat by planting a variety of early successional species, such as aspen, black cherry, mountain ash and other valuable wildlife species. Native herbaceous and forbs would be planted to encourage habitat and visual diversity across the landscape.

- Organic material loading: Within nonnative conifer plantations, trees would be felled, scattered, and/or mulched to provide an accumulation of organic material to promote soil development, while providing habitat for plants and animals. These conditions would increase the potential for native plants and red spruce to begin to re-establish.

- Site prep: Deep ripping with mechanized equipment would occur on slopes less than 40% to loosen soils and increase rainwater infiltration. Cross-ripping would be accomplished by first ripping up and down the slope and then ripping across the slope, following the contour. This would prevent surface water from running down the furrows during storm events.

- Wetland creation: Each wetland would be created within the footprint of other site preparation activities associated with the mineland restoration. Because the area had been previously mined and recently deep ripped to reduce soil compaction, field conditions (e.g. water source and amount of clay in the soil) is expected to be highly variable and unpredictable (based upon previous work on other mine sites at Barton Bench and Lambert Run). Therefore, work would not rely heavily on prepared design plans but would be based upon ground conditions observed. Presence of wet soils (seepage) and clayey or low permeability soils would be opportunistically utilized as encountered. Use of available woody debris and root balls from restoring the nonnative Norway spruce and red pine plantations would also be opportunistically utilized in the design as habitat features. Methods for development of the seasonal wetlands would loosely follow those outlined by Biebighauser (2003). The wetlands would be, on average, 5 to 10 meters in length forming an irregular shape (e.g. amoeba, kidney shape) as landscape factors dictate. After excavation of the depression is completed, exposed soils would be protected with organic material available on-site. As ponding/saturation occurs, transplants of native wetland species would be placed in the wetlands. Seasonal or temporary wetlands would periodically dry up, however, we anticipate that some wetlands would be connected to more permanent seepage sources and would remain permanently inundated. In summary, we propose to not only create a diversity of wildlife habitat, but also to slow and stabilize the flow of water (currently highly erosive in places), by restoring small pit and mound mosaics of wetlands.

- Planting of native species: Native grasses, herbaceous species, wetland shrubs and trees would be planted after site prep and wetland construction is completed, with an emphasis on red spruce and early successional habitat species. Hardwood species would be

beneficial to wildlife and native to the red spruce-northern hardwood ecosystem and would include species such as aspen (quaking and big-tooth), alder, wild raisin, mountain ash, black cherry, basswood, cucumber-tree, hazelnut, Serviceberry, arrowwood, speckled alder, winterberry holly, common milkweed, swamp milkweed, and willow. Fast growing, early successional trees, especially aspen, would quickly transform this open land to one that is covered with dense patches of young trees. As an early successional species, aspen grow quickly but have a relatively short lifespan in comparison to red spruce. As areas initially treated as early successional continue to develop, later successional species, red spruce and northern hardwoods forests would begin to overtake the aspen and dominate the site. Over centuries, these trees would revert the land to a natural state, similar to the historic condition before heavy timbering and mining. This later successional, red spruce dominated forest would create conditions suitable for at-risk wildlife like the Northern goshawk, West Virginia northern flying squirrel, snowshoe hare, or other rare species dependent on spruce-influenced forests.

Non-commercial Red Spruce Restoration in Mature Hardwood Stands

Stands within the project area classified as a northern hardwood forest type with a spruce component between 50 and 100 years old will be non-commercially treated to create conditions to encourage natural red spruce regeneration and the species' dominance in the overstory, while increasing the structural diversity of the existing forest (Appendix A, Figure A-2). These activities would occur on approximately 5,180.9 acres, or 15% of the project area.

Suppressed red spruce within the understory and midstory levels would be released by reducing hardwood vegetation in the midstory via chain saw and/or direct application of herbicide (i.e. hack and squirt or basal bark treatment using glyphosate, imazapyr, or Garlon 4), as well as snag creation through chainsaw girdling or hack and squirt. These activities would allow suppressed red spruce to capitalize on additional nutrient resources and canopy gaps, accelerating their presence and dominance in the overstory. These activities would also increase structural diversity within the stand. Cumulatively, up to approximately 1/3 of these areas (1,727 acres) would be treated, with implementation focused in areas with advanced red spruce regeneration. No activity would occur in areas found to currently have at least 30% of red spruce in the overstory because these areas already meet the desired future condition of a red spruce influenced forest. The habitat management equipment (tracked mulcher) would not be used in these areas.

Non-Commercial Thinning in Young Spruce Stands

Areas within the project area classified as a red spruce forest type between approximately 25 and 50 years old would be non-commercially thinned (Appendix A, Figure A-2). Thinning would reduce competition and encourage growth of the residual red spruce, while creating structural diversity within the stands. Because of the shallow root structure of red spruce and vulnerability to windthrow during storm events, this treatment would alternate throughout the stand, and result in approximately a 20-30% reduction in total basal area of the stand. This activity would occur on 4053.5 acres, or 12% of the project area.

These are very dense red spruce stands that are very difficult to treat without equipment. Therefore, we would explore the use of the habitat management equipment (tracked mulcher) previously described. Because we have concerns about the protection of sensitive soils associated with the red spruce ecosystem, we have incorporated a design feature to ensure that this piece of equipment is used where only when certain conditions exist. Initial treatment using the tracked mulcher would occur on a small area and the machine would stay on existing roads and skid trails to reduce adverse effects to the soil resource. Our monitoring would inform future management to ensure we protect sensitive soils (organic horizons and wet soils). This equipment will only be used when we can ensure operator safety and protection of other resources. Where slope and soils restrict the ability to use the equipment, thinning will be completed using chainsaws and/or brush saws. No herbicide would be applied in the young spruce stands.

Early Succession Habitat and Crop Tree Release in Young Hardwood Stands

These areas would be treated to favor the growth of red spruce and hardwood species desirable to wildlife or timber (e.g. black cherry, sugar maple, healthy American beech, etc.) and enhance early successional habitat. Areas within the project area classified as a northern hardwood forest type between approximately 30 and 50 years old would be treated (Appendix A, Figure A-3). This activity would occur on 2,236.8 acres, or 7% of the project area.

Red spruce and desirable hardwood species would be treated as the crop tree by reducing the competition of adjacent undesirable hardwood vegetation, such as diseased American beech and striped maple. While much of this work would be completed with a chain saw and/or direct application of herbicide (i.e. hack and squirt or basal bark treatment using glyphosate, imazapyr, or Garlon 4), we would explore the use of the habitat management equipment (tracked mulcher) in these stands. Where the tracked mulcher would be used, irregular strips between 10-15 feet in width would be cut through these dense stands to create structural diversity and edge within edge habitat. This treatment would alternate throughout the stand, and result in approximately a 20-30% reduction in total basal area of the stand. Although we believe that we would have more opportunity to work with the tracked mulcher in these stands because of the lack of sensitive soils associated with a spruce influenced ecosystem, the tracked mulcher would stay on existing roads and skids trails. If slope and terrain conditions allow us to use this piece of equipment on a small area, we would monitor the results to evaluate impacts and effectiveness before moving onto a larger treatment area. This equipment will only be used when we can ensure operator safety and protection of other resources.

New Road Construction

New construction and road repair would occur on existing roads NFS Road FS 227B and FS 227C (Appendix A, Figure A-4). This would include improving existing corridor and constructing a 0.78-mile segment of new road to connect these existing road segments. The existing road that is no longer drivable would be decommissioned to improve watershed conditions issues. This would involve removing water drainage structures, restoring the

grade to the natural contour, and decompacting and reseeding the roadbed with native vegetation.

New Trail and Trailhead Construction

The 1990 Spruce Opportunity Area Environmental Assessment called for 54 miles of trail and 12 trailheads. The recreation facilities were not constructed or signed. The majority of the area has routes and trails throughout, but they are not organized, signed, or maintained.

There is interest from various user groups, including mountain biking groups, trail runners, hiking groups, and equestrian trail riders, to develop a network of trail through this unique area. Approximately 78 miles of proposed trails have been identified to provide recreational access within the project area (Appendix A, Figure A-5). The majority (79%) of the proposed trails follow existing roads/skid trails, while the remaining trails (21%) would be new construction to create loops and trails to view points (Table 1).

All trails would be open to multiple uses and designed for the most demanding of these, which is pack and saddle, under a Class 2 standard. Although the goal is to provide hiking, biking, and equestrian access on all trails, site specific conditions, such as terrain, soils, demand and ease of access, would determine which uses can be accommodated. This would ensure the development of a sustainable trail network.

Nine trailhead locations have been identified to provide access to the trail network. Similar to determining trail use, site specific conditions, such as terrain, soils, demand and ease of access, would determine how many vehicles will be accommodated at each location.

Road Decommissioning for Watershed Improvement

Existing non-system roads and skid trails that are having adverse hydrological effects and are no longer needed on the landscape would be decommissioned. At this time, not all of these corridors are completely mapped. These roads would be identified as other activities are implemented. Specific decommissioning activities would be adjusted and less intense for lower elevation roads based the results of progress at higher elevations. Decommissioning activities include:

- Outsloping and removal of berms where necessary, and actions to reduce channelization. This activity would remove road fill material and place it on the cut slope and inside portion of the road to the minimum slope specified (for example, 15%). Where the natural slope above and below the road corridor is less than the degree of outsloping prescribed, the final outslope of the road would be modified to match that of the natural grade. No additional material would be brought in to achieve the outslope prescription.
- Full Recontouring would be similar to outsloping prescriptions except all the road fill material would be removed and placed on the cut slope to achieve a final slope that reflects the natural slope as much as possible. If material on site is not sufficient to obtain the prescribed degree of full recontouring, the greatest degree that can be attained with the material on site would be sufficient.
- Soil Decompaction would occur to a prescribed depth based on site conditions on targeted features. Method of decompaction would be ripping, using the appropriate method for the slope as stated above. Removal of all artificial drainage structures (such as culverts) would occur.

- Water-barring would occur as necessary to prevent surface drainage from producing soil erosion and stream sedimentation problems.
- Woody Material Loading would occur at targeted features (such as outflow areas of existing drainage diversion trenches) by adding a matrix of downed woody material to help reduce the erosive potential of seasonal, shallow overland flows adjacent to bog-like habitat while helping trap sediments and organic material. Where large woody material is included in a proposed activity, it would be obtained from timber stand improvement areas where practical, or another source would be identified.
- Turnaround/circle or gate installation at intersections with decommissioned roads to provide public access, while also protecting the natural resources.

Stream Habitat Improvements

- Stream crossings at the intersection of old roads or other man-made features would be reconstructed to reflect more natural conditions. Artificial structures (such as culverts) would be removed when present. Channel and floodplain morphology would be reconstructed to a more stable configuration.
- Stream channel head-cuts would be stabilized using large rock and woody material as appropriate to deter the head-ward advancement of channel down-cutting and reduce the potential for sediment production downstream.
- Intermittent and ephemeral stream channels would be reconstructed with rock and large woody material to facilitate the restoration of more natural, stable flow pathways across the strip bench and back to their original channel down slope.
- Aquatic habitat in streams would be improved throughout the project area by delivering large woody debris (LWD) to stream channels by felling nearby trees into the channel, or transporting and placing large wood into the channel. Approximately 15 miles have already been identified through coordination with the WVDNR along First Fork, a tributary of Shavers Fork. Trees to use as woody material would be acquired from adjacent habitat and designed to also meet the terrestrial goals identified above (e.g. spruce restoration and timber/wildlife stand improvement). Additional streams may be identified through future surveys of streams in the project area. Any or all streams within the project area are likely moderately to severely deficient in the large woody debris habitat component.

Design Features of the Proposed Action and Applicable Mitigation Measures from Lambert Restoration Project

Applicable design features and mitigation measures included in the Lambert Run project were carried forward in the design features for this project due to the similarity of the restoration activities (Table 2). In addition to these, Appendix B includes design features and mitigation measures specific to Alternative 2 of this project. Applicable Forest Plan Standards and Guidelines are included in Appendix C.

Table 2. Design Features associated with the Alternative 2, brought forward from Lambert Run project.

Resource Area	Design Features/Mitigation Measures
Soil	Do not use herbicides in areas where hydric soils are located or wet soils are located. Aquatic formulas may be used or hand removal methods.
Soil	Do not remove vegetation off site. Leave cut vegetation on site to provide additional habitat and to promote nutrient cycling via decomposition.
Soil	Ripping of soils must be done in a manner that does not facilitate erosive processes, meaning that ripping should be done parallel to the slope, on contour, or diagonally according to safety parameters. Parallel ripping on slopes is prohibited unless intersected perpendicularly.
Soil	If large boulders are part of the soil profile, a single rip pass may be adequate to decompact the soil; however, if deep ripping does not result in bringing large boulders to the surface and the soil textures are less coarse, diagonal ripping must be done in order to achieve desired soil quality improvement and allow for root penetration of any plantings.
Soil & Aquatics	Seeding, mulching, and silt fencing may be needed in order to protect any nearby streams where rhododendron stands may occur.
Aquatics	Proposed TSI treatments that may occur within channel buffers would be guided by project design language that ensures these activities compliment, rather than compromise, riparian conditions for aquatic resources. Design features would constrain the density of stems that could be released within the understory and overstory. Cutting, girdling, or otherwise killing overstory trees within channel buffers must compliment objectives for aquatic resources and maintain the ability to recruit large woody debris. In addition, these actions would not be permitted to materially compromise existing stream shading that is needed to help protect stream temperatures from the heating effects of solar radiation.
Wildlife – West Virginia northern flying squirrel	When decommissioning roads, retain all hardwood trees greater than 6” dbh with a visible cavity (with the exception of striped maple) and all red spruce greater than 10” dbh. If this is not possible, to achieve the watershed objective for a particular road, trees would be cleared only between September 15 and March 31 to reduce potential impacts to WVNFS.
Sensitive Plant Species	To reduce the impact to RFSS plant species, roads and trails that are identified for decommissioning should be surveyed for the presence of RFSS plants. If RFSS plants are located, decommissioning activities should avoid these plants if possible or effort should be made to transplant RFSS plants.
Sensitive Plant Species	Within 75 feet of blunt-lobed grape fern, avoid all soil disturbance, including, but not limited to, ripping, outsloping, and recontouring.

Resource Area	Design Features/Mitigation Measures
Sensitive Plant Species	Prior to beginning of project activities, known locations of TES plants should be marked with brightly colored flagging or other highly visible markers. All persons conducting project activities should be made aware of these locations, should be given basic instructions in identifying the TES species that are present, and should be instructed to avoid impacting TES plants though spray drift, trampling, ripping, etc. to the maximum extent practical.
Sensitive Plant Species	If any other TES plants are found near any activity areas, suspend all activities within 150 feet of the occurrence until protective measures can be developed and implemented.
Vegetation	Treat red spruce as a crop tree in the timber stand improvement units within Management Prescription area 4.1.
Vegetation	Do not treat sapling-sized beech within 20 feet of immune beech.
NNIS	Existing infestations of spotted knapweed, crown vetch, and multiflora rose located in or near activity sites must be controlled to limit potential spread by site preparation activities, road decommissioning, and stream work. Pre-treatment should occur for at least one growing season prior to the beginning of soil and vegetation disturbance.
NNIS	Ideally, all seed mixtures used for soil stabilization, wildlife openings, etc. should be certified weed-free. However it is possible that certified seed will not be available. In this case the seed vendor's test results for noxious weed content should accompany the seed shipment and should demonstrate that the seed is substantially free from noxious weed seeds.
NNIS	Before entering National Forest land, all logging equipment, construction equipment, fire equipment, maintenance equipment, decommissioning equipment, and any vehicles to be used off of currently maintained roads must be free of all soil, seeds, vegetative matter, or other debris that could contain or hold seeds. Equipment and vehicles that are used in a known infestation of high priority NNIS should be cleaned as thoroughly as is practical using dry methods, removing all debris that could contain or hold seeds, prior to continuing along the route.
NNIS	Any necessary wet cleaning of equipment and vehicles used by contractors should be conducted off of National Forest land or at a Forest Service-approved wash station if cleaning on National Forest land is the only practical option. Any necessary wet cleaning of Forest Service equipment and vehicles should be conducted at an administrative site or other designated wash station. Cleaning must not introduce invasive plants to unimpacted sites and must not contaminate soil or water.
NNIS	To the extent possible, inspect off-site sources of gravel and borrow material for NNIS plant material. Do not use material that is known or suspected to contain NNIS plants with the potential to invade forested ecosystems.
NNIS	Do not use hay for mulch. Because a local source for certified weed-free mulch is not yet available, use straw, coconut fiber, wood fiber, synthetic mulch, or other low-risk Forest Service-approved material.

Resource Area	Design Features/Mitigation Measures
Heritage	Should additional or potential heritage sites be located during the course of implementation, the Forest Archaeologist should be notified and activity in that area should cease until the size and nature of the resource can be determined.

Chapter 3 – Affected Environment and Environmental Effects

This chapter briefly provides sufficient evidence and analysis of the context and intensity of the environmental impacts of the alternatives for the District Ranger to determine whether to prepare a Finding of No Significant Impact or an Environmental Impact Statement, in accordance with 40 CFR 1508.9 36 CFR Part 220.7 (b)(3)(i), and 36 CFR Part 220.7 (b)(3)(iii). Alternative 1 (no action alternative) describes the current conditions and expected future conditions if Alternative 2 (proposed action) is not implemented.

The cumulative effects disclosed in this chapter provides sufficient information to determine whether the effects from past, present, and reasonably foreseeable future activities would combine with effects anticipated from the proposed action to result in a significant cumulative effect. The cumulative effects predictions not only consider the proposed action, information on other actions listed in Table 3, but also the existing conditions and effects described under Alternative 1. The project record contains further information used to support the analysis of direct, indirect, and cumulative effects.

Table 3. Summary of Past, Present, and Reasonably Foreseeable Activities.

	Activity	Past, Present, or Future Action	Estimated Acres Affected
1	Multiple strip and deep mining prior to federal ownership, including • Areas around Cromers Top and Hopkins Knob (1930s – 1980s) and • Red Run area prison mine (prior to 1960s)	1930s – 1980s Prior to 1960s	Approximately 2,500
2	Timber harvest prior to federal ownership	Past	Unknown
3	Reclamation activities up through the 1990s, as required by Surface Mining Control and Reclamation Act of 1977, involving erosion control and nonnative plantings	Past	Unknown, at least 1,126 within project area
4	Road building and maintenance, as well as skid trail development prior to federal ownership	Past	Unknown
5	Road building and maintenance subsequent to federal ownership	Past	Variable
6	Wildfires	Past	Unknown
7	Barton Knob Repeater	Ongoing	3
8	Recreation on NFS lands	Ongoing	Dispersed
9	Road maintenance	Ongoing	Variable
10	Native Plantings	Past	16
11	Spruce/Cherry TSI	Future	45
12	Barton Bench Restoration Project	Ongoing	100
13	Lambert Restoration	Ongoing	279
14	Lambert TSI	Future	573
15	Trail/Trailhead maintenance and construction	Ongoing	Variable
16	Limestone application to streams	Ongoing	Variable

	Activity	Past, Present, or Future Action	Estimated Acres Affected
17	Federal, Reserved, and Outstanding Natural Gas and Coal mineral rights, but no recent exploration or development pending at time of analysis	Present	Variable
18	Outfitter and Guide permits	Past	Variable
19	Railroad Use (Durbin and Greenbrier Valley Railroad and Cass Scenic Railroad)	Ongoing	Variable
20	Easements to access private in-holdings	Ongoing	Variable
21	Forest Pests Impacts: Emerald ash borer	Present, Future	32,980
22	Forest Pests Impacts: Hemlock wooly adelgid	Present, Future	32,980
23	Forest Health Impacts: Beech bark disease	Ongoing	32,980

Analysis was completed to determine if the proposed alternatives would result any unavoidable adverse impacts, or irreversible or irretrievable commitment of resources. Unless otherwise noted in a specific resource section, the proposed alternatives would not result in unavoidable adverse impacts, or irreversible or irretrievable commitment of resources. Each resource specialist also reviewed the proposed alternatives for consistency with the Forest Plan, as well as with applicable laws, regulations, handbooks, and executive orders. Unless otherwise noted in a specific resource section, the proposed alternatives are consistent with Forest Plan direction, applicable laws, regulations, handbooks, and executive orders. Many of the mitigation measures found in Table 2 and in Appendix B are specific direction on how to implement Forest Plan and other direction, specific to activities proposed under Alternative 2.

Analysis Calculations - In the modeling and analysis included throughout Chapter 3, the numbers for acres of treatment, road miles, etc. are all best estimates based on the latest available information and technology. The analysis conducted for this EA is intended and designed to indicate relative differences between the alternatives, rather than to predict absolute amounts of activities, outputs, or effects.

Soil Resource

This section describes the direct, indirect, and cumulative effects associated with Alternative 1 and 2 in regards to soil resources, specifically, soil quality and productivity, soil compaction, and erosion in terms of soil movement.

Scope of the Analysis

The spatial boundary used to evaluate direct consequences is the activity areas where actions are proposed within the project area boundary (Figure 2). Indirect effects are limited to the watershed for Mower Tract. The spatial boundary used to address cumulative impacts is the Mower Tract project boundary.

Direct, indirect, and cumulative effects can occur within short term and long term time frames. Short term effects to soils are considered to occur over a short period of a decade or less. Soil formation, and thus soil replacement, takes a long time – more than a century as is evident by the existing condition of soils on the Forest when compared to historic accounts of the ecosystem and literal descriptions of the soil in texts from that time period.

Methodology

Forest Service Manual (FSM) 2550 and Forest Service Handbook (FSH) 2551.3 provide the guidance for this analysis, including the Soil Quality Standards process. The following units of measure are used in this EA to evaluate the soil resource issues:

- Acres of sensitive soil types for steep slopes, erosion potential, and wet soils in the scope of proposed management activities
- Acres of herbicide use
- Acres of disturbance for wetland sites
- Acres of soil disturbance and intensity (Soil Disturbance Class) of wildlife habitat creation
- Acres of soil restored by proposed restoration activities

Assumptions used to estimate the amount of soil disturbance associated with the proposed activities are as follows:

- Width of a skid road – 15 feet (1.82 acres/mile)
- New road construction – 33 feet wide (1 mile of road is = 4 acres)
- Landing – 1/4 acre
- Road decommissioning- 33 feet wide (1 mile of road is = 4 acres) Restoration improves soil quality
- Decommission woods roads – 15 feet wide (1.82 acres/mile)
- Wetlands – ¼ acre
- Trail width – due to the nature of this project trail widths will greatly vary from 3 feet for new disturbance for a standard trail constructed to specifications and for trail conversion up to 15 feet if the trail is a historic road.
- Trail head – ¼ acre or less

- Stream habitat improvement – 181 acres (100 foot wide buffer along 15 miles of stream improvement)

Additional information about the methods used in this analysis are available in the Soils Resource report included in the project file. In addition, the comparison of alternatives table is included in the Soils Resource Report in the project file.

Affected Environment

The purpose of this section is to describe the existing soil resource in the Mower Tract Project Area. Soil survey reports for Randolph and Pocahontas counties are posted online via the Web Soil Survey (http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm). For this project area, the Web Soil Survey provides information for soil types (map units) at a scale of 1:24,000, soil map unit descriptions, typical soil series descriptions, and soil map unit interpretations for various land management activities and soil properties. Soil characterization data for series used in this project area are limited due to the majority of the project area being heavily disturbed.

Known discrepancies in the data as shared by the NRCS Soil Survey Staff throughout time are as follows:

- There are more acres of colluvial soils existing on the landscape than originally mapped. Many of these colluvial soils are mapped as residual soils. This would suggest that the colluvial soils may be deeper and made of material that is not as stable as that on residual sites.
- The counties do not have correlated soil surveys among their boundaries. However, during the period of development of this soil resource report, the NRCS has been updating and correlating soil map units across the Major Resource Land Areas of 127 and adjacent areas. Major updates were made in December 2014 and are incorporated into the analysis herein.
- Because the soil survey for this project area was published prior to mining, the soils shown are from the prior undisturbed land.
- The most recent soil survey data has not yet been updated to include frigid soil series or soils that form beneath red spruce dominated stands and have recently been re-discovered in the central Appalachian red spruce ecosystem.
- Post-mining and reclamation remapping of this area would have resulted in a map unit commonly used for man-made soils. The properties of these soils are highly variable and do not have standard interpretations. Only on-site investigation can determine general interpretations of how these soils function.

The soils that are part of the reclaimed mine site are severely compacted, possess conglomerates of overburden, spoil material, coal refuse, and crushed bedrock. The soils have low infiltration rates and little to no horizon development. The overland flow and lack of forest canopy generate soil erosion and sedimentation of surface waters and create loss of thermal protection and heating downstream waters, all of which can significantly affect stream communities. The soils that are outside of the mining foot print are displayed in a project specific soil survey report created using Web Soil Survey.

Geology

The geologic parent material that underlies the soils in the project boundary is comprised of sedimentary geology that makes up the Appalachia Ridge and Valley and the Allegheny Plateau Provinces. The dominant geology groups are the Pottsville Group which contained the coal seams and tend to be acidic in nature and the Mauch Chunk Group which tends to be more nutrient rich. The valleys are comprised of alluvial material mixed from the Pottsville, Mauch Chunk and geologic material associated with the mining event. Table 4 displays geology within the project boundary.

Table 4. Geologic groups found within the project boundary.

Geologic Group	**Acres**
Mauch Chunk	17,222
Pottsville	16,772
Grand Total	**33,994**

Soil Sensitivity Ratings

Sensitive soils are grouped in the following categories: soils that are prone to mass wasting and/or slippage, slopes >30%-70% (as defined by the soil map unit description), prime farmland, hydric soils, flood plain soils, soils that form on limestone and karst topography, soils that are moderately well-drained or wetter (having a seasonal water table at 18 inches or higher in the profile), and soil susceptibly to carbon loss. Due to the remapping of the project area new soil updates have yet to be applied to this area that would help to identify soils prone to carbon loss. In general it is thought that soils found in the red spruce ecosystem are sensitive to carbon loss (Nauman et al 2015). Soils rated as sensitive may require mitigation measures beyond those in the Forest Plan that are routinely applied during project implementation. While nearly half of the project area is shown to have non-sensitive soils, wet soils (30%) and slopes between 30 and 70 percent (12%) are conditions also found within the area (Table 5).

Table 5. Sensitive soils and associated acreage found within the project area.

Soil Sensitivity Rating	**Acres**	**%**
non-sensitive	15,188	45%
wet	10,137	30%
slope 30 to 70%	3,966	12%
slippage	1,282	4%
slippage-slope 30 to 70%	1,426	4%
wet-hydric	1,155	3%
prime farm land-flood	678	2%
flood-hydric	30	0%
flood-wet	116	0%
flood-wet-hydric	11	0%
limestone	4	0%
limestone-slope 30 to 70%	1	0%
Grand Total	**33,994**	**100%**

Soil Erosion and Sedimentation

For this section, erosion is considered as soil movement and not soil loss. Soil material may or may not move from a site or to a stream channel. Many factors influence soil movement, and when soil moves, it is deposited somewhere. Depositional areas may benefit from the addition of this eroded soil. The effects of soil erosion to streams and water quality via sedimentation are thoroughly discussed in the hydrology and aquatics section of this environmental assessment.

The soil hazard rating for roads and trails shown in Table 6 is calculated using Web Soil Survey and takes into consideration slope, texture, and rock fragment contact. Approximately 67% of the project area is considered to have a severe erosion hazard rating in respect to road and trail suitability. Taking topography into consideration, only about 22% of the project area occurs on slopes that are greater than 30% slopes (Table 7).

Table 6. Soil erosion hazard (Road/Trail) summary by rating value by acres within the project area.

Hazard Rating	**Acres**	**Percentage**
Severe	22,917	67%
Moderate	7,774	23%
Slight	2,774	8%
Null or Not Rated	549	2%
Total	**34,014**	**100%**

Note: Acreage shown here is not reflective of project area acreage due to the dataset used to generate analysis through the Web Soil Survey.

Both erosion and stability on steep slopes will be issues driving management decisions, and extra mitigation and design criteria be required to prevent adverse effects from proposed actions. Wetness, degree of disturbance, and other factors also can influence soil stability. Due to the variability in these characteristics and their influence on soil erosion and mass movement during ground-disturbing projects, these factors also need to be analyzed and mitigated on a case-by-case basis.

Table 7. Slope Ranges across the project area.

Slope Range	**Acres**	**Percentage**
0-10	6,673	20%
10-20	10,923	32%
20-30	8,997	26%
30-40	4,947	15%
40-50	1,828	5%
50+	626	2%
Grand Total	**33,994**	100%

Soil acidification is a natural occurring process on the landscape in forested ecosystems. Since European settlement and the coming of the industrial age, natural soil acidification has been substantially supplemented by human-caused acid deposition. Soil acidification can be seen as a balance between acid inputs and mineral weathering. Therefore, when soil-acidifying

processes (such as acid deposition and forest growth) exceed mineral weathering inputs of base cations, acidification occurs. Acres within the project boundary that are at risk for acid deposition are listed in the table below.

Table 8. Sensitivity to acid deposition within the project area.

Acid Deposition Sensitivity	**Acres**
High	17,223
Low	15,205
NA	1,562
Grand Total	**33,990**

Note: Acreage is not reflective of the acreage of the project area due to the dataset being comprised of two county datasets.

In more recent times, the Monongahela National Forest has been the recipient of some of the highest sulfate and nitrate deposition in the nation, mainly due to its location downwind of many older coal-fired power plants that have had minimal or no pollution control required. Increased acidity in stream water and possible nutrient depletion in soils is the result of a combination of high emissions and limited buffering capacity of certain geologies and soil types found on the Forest. The USDA Natural Resource Conservation Service (NRCS) has sampled soil series in the recent past on the Forest (2002-2015). Data from these soil series (high elevation sites in the Mauch Chunk formation) for certain criteria (base saturation, effective cation exchange capacity, calcium to aluminum ratios, and pH) indicate that the soils in this area are still able to adequately buffer acidic inputs from the atmosphere. The man-made soils have also been sampled in limited quantity within the great Mower Tract landscape. That data was provided in the Barton Bench EA Soil Resource Report and project file.

Prime Farmland

There are 678 acres of prime farmlands designated within the project area boundary. However, because the majority of the lands within this project boundary were previously mined, these soils are most likely not considered prime farmland of state-wide importance and are most likely man-made soils since the post-mining era.

Alternative 1

Direct, Indirect, and Cumulative Effects

Alternative 1 would result in no change to the existing condition and post mine reclaimed landscape in the Mower tract project area. Soils would remain stable in the majority of the area but still heavily compacted with highly altered drainage conditions. Soil quality would remain detrimentally impaired when compared to the surrounding undisturbed lands and what would be expected of similar landscapes with similar geology, climate, landscape, vegetative community, and time. Soils in the post mining bench area are a conglomerate of material comprised of waste rock, gob, slag, refuse, and several inches of newly developed soil material and fines from the weathering rock fragments. Site specific areas of erosion where drainage structures on the post mine site have failed would continue to deliver unknown amounts of sediment to streams.

Unnamed and undesignated road and trail networks would continue to erode and add sediment to the tributaries of Shavers Fork thereby adding sediment to the Shaver's Fork watershed cumulatively and adversely affecting other resources such as water quality and fisheries habitat. Soil formation would be very slow to result in a soils landscape that would support native vegetation. A more shade-tolerant overstory may eventually persist which would slightly alter the soils and how they develop. Ruts and any areas where erosion has developed due to past maintenance operations would continue to exist or reach a point that the soils stabilized with the topography.

If Alternative 1 were selected, soil would continue to remain in a detrimentally disturbed condition resulting in impaired soil quality and effects to the ecosystem; however, the soils would in general be moderately stable on the landscape with the exception of the abandoned skid roads and trails which would continue to be in a detrimental soil disturbance condition and have accelerated erosion leading to increasing levels of sedimentation within the watershed.

Alternative 2

Direct and Indirect Effects

Herbicide application for undesirable vegetation management

The effects of using herbicides in a forested ecosystem vary in the soil resource. Some herbicides are not mobile and bind readily with the soil. Other herbicides are more mobile in soil, and timing of application with soil moisture, precipitation events, and wind all become important factors that must be monitored prior to application until conditions are such that risk of application is low.

If all label application guidelines are followed, the risk of the herbicide leaving the site prior to reaching its half-life and degrading is low unless erosion issues are a concern. The highest risk would be seen on slopes over 30 percent. These are the slopes that are at greatest risk for erosion both natural and management induced.

Chemical and physical factors of the soil play a role in determining mobility. Mobility is affected by soil pH and other soil chemistry factors. Physical characteristics such as rockiness, restricted layers, percent organic matter, and soil texture (percent clay) also affect mobility. Rocky soils pose a risk as increasing mobility of herbicides due to the voids and crevices that rocks can create in the soil profile. The amount of clay a soil has can affect the mobility by decreasing the leaching of the herbicide and binding it once the herbicide reacts with the clay in the mineral soil.

Soils within this project area have been previously mined, therefore they are composed of a mixture of crushed bedrock, rock, gob, slag, refuse, and several inches of newly developed soil material and fines from the weathering rock fragments. Because of the current state of the soils in this project area, herbicide mobility would be of concern due to the unknown soil properties of man-made soils. In areas that were not mined, soils forming from the Mauch Chunk geologic formation would either be more alkaline with loam and clay loam textures and those forming from the Pottsville sandstones tend to have loam to sandy loam textures and extremely acid.

Glyphosate (SERA, 2011a)

Numerous soil bacteria, fungi, invertebrates, and other microorganisms have been studied for effects of glyphosate application.

- Studies have shown that there are no negative effects of glyphosate toxicity on the growth of certain soil bacterium at the recommended environmental concentrations (Amalraj Emmanuel et al., 2015; Gurikar et al., 2016).
- Glyphosate is readily metabolized by soil microorganisms and some species can use glyphosate as a sole source of carbon.
- It is degraded by microbial action in both soil and water.
- Glyphosate degrades in soil, with an estimated half-life of 30 days.
- Glyphosate is highly soluble, but adsorbs rapidly and tightly to soil.
- Glyphosate has low leaching potential because it binds so tightly to soil.
- Modeling results indicate glyphosate runoff is highest in loam soils with peaks after the first rainfall.

Imazapyr (SERA, 2011b)

There are no studies on the effects of imazapyr on soil invertebrates, and incomplete information on the effects on soil microorganisms. Most of the soils within the project area are acidic. The geology is comprised of Pottsville and Mauch Chunk groups. Mauch Chunk soils are known to be more alkaline, thus increasing the risk for imazapyr to take on an ionized form which increases runoff potential. Soils in the Mower Tract project area tend to be silt and sand loams, thus exhibiting less clay content with the exception of those soils forming from the Mauch Chunk geologic formation.

- One study indicates cellulose decomposition, a function of soil microorganisms, can be decreased by soil concentrations higher than concentrations expected from USDA Forest Service applications. There is no basis for asserting adverse effects to soil microorganisms.
- Imazapyr degrades in soil via microbial activity, with a half-life of 25 to 180 days, but rates are highly dependent on microbial action.
- Imazapyr is weakly bound to soil, but adsorption increases with lower pH and increasing clay and organic matter content. Adsorption increases with time as soil dries and is reversible. Modeling results indicate imazapyr runoff is highest in clay and loam soils with peaks after the first rainfall.
- Field studies indicate that imazapyr remains in the top 20 inches of soil and does not indicate any potential for imazapyr to move with surface water. However, above pH 5, the herbicide will take on an ionized form, increasing the risk of herbicide runoff.
- In forest field studies, imazapyr did not run off and there was no evidence of lateral movement.
- Some sensitive plant species could be affected by the off-site drift or by off-site movement in runoff of imazapyr depending on local site-specific conditions.

Triclopyr (SERA, 2003)

The five commercial formulations of triclopyr contain one of two forms of triclopyr, BEE (butoxyethyl ester) or TEA (triethylamine). Triclopyr BEE is much more toxic to aquatic organisms than triclopyr TEA. A breakdown product, TCP (3,5,6-trichloro-2-pyridinol), is more toxic than either form of triclopyr. Site-specific cumulative effects analysis buffer determinations need to consider the form of triclopyr used and the proximity of any aquatic triclopyr applications, as well as toxicity to aquatic organisms.

- Triclopyr has not been studied on soil invertebrates.
- Soil fungi growth was inhibited at concentrations 2 to 5 times higher than concentrations expected from USDA Forest Service application rates.
- Triclopyr has an average half-life in soil of 46 days, while TCP has an average half-life in soil of 70 days. Warmer temperatures decrease the time to degrade triclopyr.
- Soil adsorption is increased as organic material increases and decreased as pH increases. Triclopyr is weakly adsorbed to soil, though adsorption varies with organic matter and clay content. Both light and microbes degrade triclopyr.

Deep Ripping for Mineland Restoration

The direct effect of this would be to improve soil quality by restoring some of the original soil properties back to the landscape that existed prior to mining and to help the soil support a native vegetative community of red spruce and other complimentary woody tree species for the area. Deep ripping would alleviate the hydrologic issues on site as well as provide a more suitable tree planting media.

One of the primary benefits and indirect effects of deep ripping compacted reclaimed mine soils is to facilitate tree planting and subsequent growth. Forest trees typically require a minimum four feet of uncompacted rooting medium to be able to grow successfully and healthy. Therefore, depth-to-blade should reach or exceed this depth.

The recommended method would be to cross-rip the site. This is to optimize the decompaction of the soil. The greatest benefit of this practice is to provide for a loose, friable area at the intersections for trees to be planting allowing for root penetration deep into the profile in all directions. The effects of this type of decompaction would increase porosity, redistributed rock fragments to create voids, improve soil structure, and allow for deep root infiltration, increase infiltration and hydraulic conductivity. Ripping should occur along the contour to decrease erosion hazards on slopes exceeding 20 percent.

Overall the effects result in greatly improving soil quality in these areas.

Wetland Creation

The creation of these wetlands would require soil disturbance, soil compaction, and displacement. Access would need to be designated to bring equipment into each site for excavation. The use of heavy equipment is being proposed for excavation of the wetlands and any soil quality degradation or detrimental soil disturbance would be remediated prior to leaving the site.

Wetland creation should be focused on areas that do not steeply slope (<30%). It is the recommended that sites for wetland creation are selected based on field observations. Areas that would be more acceptable for wetland creation might be indicated by topography (depressions) and standing water. Because this project area has been severely disturbed previously by mining, udorthent soils will be highly variable. It common for these soils to possess pockets of clay accumulation which will aid in the creation of wetlands. These soils are extremely variable in there make-up and require on-site determination.

Proposed trail system

Soil sensitivity limitations vary across the proposed trail system (Table 9). Approximately 38% of the proposed trail system could occur on non-sensitive soils. Approximately 11% will occur on slopes 30-70%. Approximately 34% of proposed trail system could occur on wet and

hydric soils. The trails should be designed such that water can easily pass through culvert and away from the trail surface. Slippage potential occurs on approximately 12%. Maintenance of these trails are necessary to reduce erosion, sedimentation, and mass wasting which will severely impact the soil resource.

Table 9. Soil Sensitivity Limitations for proposed trail system.

Limitation	**Length (Miles)**	**Percentage**
non-sensitive	29.56	38%
wet	23.84	31%
slope 30 to 70%	8.63	11%
slippage	4.74	6%
slippage-slope 30 to 70%	4.64	6%
wet-hydric	3.36	4%
prime farm land-flood	2.73	3%
flood-wet	0.08	<1%
NA	0.05	<1%
Grand Total	**77.64**	**100%**

A further assessment of slope shows a breakdown of the relative feet of trail by slope categories (Table 10). Approximately 4.4 of trails are being proposed on steep slopes (40% or greater). These sections of trail will need to be created and maintained with non-mechanized equipment in order to comply with Forest Plan standard SW07. Construction on steep slopes will require proper erosion control measures such as mulch and seeding where necessary to reduce risk of erosion and sedimentation to nearby waterbodies.

Table 10. Slope ranges that proposed trail system will cross.

Percent Slope	**Length (Miles)**
NA	0.1
0-10	16.0
10-20	29.0
20-30	19.7
30-40	8.5
40-50	2.9
50+	1.5
Grand Total	**77.6**

Common impacts that may occur after trail construction include vegetation loss and compositional changes, soil compaction, erosion, muddiness, exposure of tree roots, trail widening, and the creation of visitor-created side trails.

Soil erosion exposes rocks and plant roots, creating a rutted, and uneven tread surface. Trail widening and the creation of parallel treads and side-trails increase soil disturbance. Increased slope affects the effectiveness of trails and the soil disturbance associated with trails. Water

trapped within low slope alignment trails with lower grades create muddiness and are highly susceptible to widening. This can occur in both valley bottom and ridge-top settings.

Trails that pass through poorly drained soils are susceptible to excessive trail widening as users seek to avoid muddy areas. Wet and muddy soils are more susceptible to erosion, especially when trail grades are steeper. Trails on soils with a high rock or gravel content are less susceptible to soil erosion. Rocks and gravels are less easily eroded by water or wind, and these materials can act as filters, retaining and binding finer soil particles. In general, small rocks and stones should not be removed from trail treads as their presence tends to slow the velocity of water runoff and protect underlying soils.

Muddiness can be limited by avoiding wet soils and flatter terrain, erosion can be limited by avoiding steep trail grades and low trail alignment angles. Parallel treads and tread widening can be limited by locating trails in sloping terrain where steeper side-slopes direct visitors to stay on the provided tread.

Trail construction and maintenance actions, including installation and upkeep of tread drainage features, rock steps, and bridging, are vital to limiting soil erosion and tread muddiness, which in turn, influence user behavior and the extent of impacts such as tread widening and secondary tread development.

Refer to the Recreation Resource Report for trail specifications and references to trail design. The FSM provides guidance for how trails should be constructed and the soil properties that are used to aid in trail design.

Large Woody Material placement, Plantings, and Timber Stand Improvement Activities

There is little to no soil disturbance involved with large woody debris placement, tree plantings and timber stand improvement work as implemented by prescription and design; therefore, effects to the soil resource with regard to disturbance are minimal. The benefits to the soil resource from large woody material placement include increasing organic material, increasing streambank and channel stability which reduce highly erosive forces of large streamflow events that lead to sedimentation. Plantings will help stabilize soil, reduce erosion, and increase diversity as will timber stand improvement.

Throughout the project area streams would be treated depending on their existing condition in the watershed. The stream channels have developed steep cutbanks, head cutting upslope, and unstable channel morphology where soil is eroding downstream. Soil disturbance would occur in the short term to stabilize eroding areas. Disturbance would be rehabilitated with seeding and mulch where needed. Long term benefits would be stabilizing the steam bank to reduce erosion and sedimentation to potential natural background levels. Approximately 181 acres of soil disturbance would occur within the headwaters and the initial 15 miles along First Fork. Additional area may need to be disturbed pending further field reconnaissance of existing conditions and suitability for treatment.

Timber stand improvement involves the mechanical mulching of trees and the single tree removal. Mechanical mulching involves light soil disturbance that results in Class 1 level disturbance as defined by the Soil Disturbance Monitoring Protocols (Dumroese-Page et al., 2009) but leaves behind a layer of thick mulch and would not result in compaction of the soils from the use of any machinery. There is potential to have soil quality improvement with the implementation of activities as landscape restoration tools.

Every effort should be made to use the shredder mulcher on existing skid roads, on dry soils, and on gentle slopes (<15%). Use of the shredder mulcher off road could result in disturbance of

the soil surface horizons, which are critical to soil health. It is expected that the degree of disturbance would be no more than a Class 1 as described by the Detrimental Soil Disturbance Monitoring Protocols (Dumroese-Page et al., 2009). In rare instances where stumps are larger and vegetation may be thicker and surface horizons are also thicker resulting in more organic matter in the soil surface, Class 2 detrimental disturbance may occur. No Class 3 detrimental disturbance would be observed except in the actual hole where the stumps is located in the soil as it is ground down and/or removed.

Road Maintenance and New Construction

The proposed new segment construction (0.78 miles) and existing roads (3.3 miles) in the project area total 4.09 miles (16.4 acres of disturbance). The majority of the soils that will be disturbed occur on slopes that are 30 to 70% (Table 11). Considering slope analysis (Table 12), the majority of this new road segment goes across slopes less than 40%, therefore complying with Forest Plan standard SW07. The analysis showed a small segment of the road on 40-50% slopes, but this is likely due to an error in the GIS analysis data.

Table 11. Sensitive Soils Rating for the proposed connector road.

Sensitive Rating	**Length (feet)**	**Percentage**
non-sensitive	1,204	29%
slope 30 to 70%	2,957	71%
Grand Total	**4,161**	100%

Table 12. Slope ranges that proposed connector road will cross.

Percent Slope	**Length (feet)**	**Percentage**
0-10	57	1%
10-20	397	10%
20-30	1,634	39%
30-40	2,052	49%
40-50	21	1%
Grand Total	**4,161**	**100%**

Maintenance of roads on steep slopes are extremely important in order to reduce soil quality degradation, erosion, and water quality impacts. Roads should be maintained at a frequency of and with practices suitable for the road maintenance level and to meet road maintenance objectives. Consistent long-term maintenance is the only way to ensure that erosion and sediment delivery and hillside failures (e.g., slippage) do not result in chronic or catastrophic soil resource-related problems in the watershed. However, the reality is that roads are not maintained as scheduled due to lack of resources, so existing and newly-constructed roads, especially on steep slopes, would likely contribute to soil quality degradation and water quality impacts.

Road Decommissioning for Watershed Improvements

Road decommissioning would have beneficial effects to the soil resource in the long-term because the soil quality and soil productivity are improved above the existing condition. Roads increase sediment delivery to streams by directing surface runoff into ditch lines connected to

channels, and into stream channels at crossings. Soil compaction retards water infiltration and results in overland flow to ditches or streams. Roads disrupt the natural drainage patterns by intercepting subsurface flow, which also can create overland flow. Much greater road drainage results when subsurface flow is intercepted by road prisms.

Road decommissioning disturbs most of the existing road prism width. These activities provide a moderate risk of sediment generation. Mulching, liming, fertilizing, seeding exposed soils, and installing temporary sediment control features would control the movement of sediment off site (MNF Forest Plan, SW03, SW04 II-10, 2006). Recent post-decommissioning project monitoring has shown little soil moves offsite site after decommissioning is completed.

Cumulative Effects

The majority of obvious resource effects to the soil resource from the Proposed Action are either direct or indirect. By contrast, cumulative effects for soil resources are more difficult to identify conclusively, partly because future effects involve speculation and probability.

Within the Mower Tract project area, there are private lands, on which the land use and management activities are not fully known. However, there clearly are past and present actions and there will be future activities that disturb soil and affect soil quality. Similarly, Forest Service lands have past, present, and future management activities that have affected or presumable will affect the soil resource.

The Forest Service is aware that activities on private land have included timber harvesting, skid road development, grazing, agriculture activities, and other minor residential disturbances, all of which can reduce soil quality. Historically, best management practices may not have been applied commonly on private lands, though more recently (i.e., since the 1980s) some types of activities, notably forestry operations, may have included BMP implementation due to the implementation of the West Virginia Logging Sediment Control Act 2006.

On Forest Service lands within the Mower Tract project area, particularly since the 1970s following passage of the Clean Water Act and as the result of the implementation of Forest Plan standards and guides and BMPs for soil erosion control, land management and practices have improved. Soil quality has been recovering on federal lands but legacy effects remain. Some of the mitigations proposed in the current project will have lasting effects into the future, and therefore, will continue to contribute to soil quality improvements locally. However, the long-term negative effects of some of the road and trail disturbances on hillsides exceeding 40 percent will add to the impacts from private lands. Consequently, implementing the restorative practices proposed in this project area in full would not offset the effects from soil quality degradation on all lands in the project area.

Other cumulative effects include atmospheric deposition and climate change. Both of these environmental influences affect soils. Climate change affects the soils by altering many factors, such as soil moisture, soil temperature, soil ecology, soil chemistry related to carbon. The specific changes are difficult to define precisely due to the interactions that will result within the ecosystem, but some of the expected changes are discussed in lengthy detail in the Monongahela National Forest's recent involvement in the Central Appalachians Climate Change Response Framework (Butler et al., 2015). Over time, the soil would change at least some of its characteristics under a drier warmer climate, if predictions for the area are accurate. The general results would be: soils would lose carbon; soil biota would shift; and more southern vegetative

communities would expand northward. Soil-forming factors would change fundamentally and cause soils and soil ecosystems to respond accordingly. Atmospheric deposition and climate change would not affect soils solely independently, but there is little research to understand how they would interact to influence soil quality or the overall soil environment.

In summary, there would be no indirect, direct, or cumulative negative significant effects to the soil resource from the activities in the Proposed Action. There would be substantial soil quality improvements within the project area that would result from implementation of the restorative activities described in Chapter 2.

Irreversible or Irretrievable Commitment of Resources

This project commits approximately 121 acres of the soil resource to irretrievable status due to new road and trail construction. This project improves soil quality and actually restores the soil resource on 1,126 acres by facilitating a return to more natural soil conditions and development in the mineland restoration treatment area. The additional soil disturbance predicted in early successional and vegetation thinning treatments is not expected to be detrimental and therefore should not persist for more than a year.

Consistency with the Forest Plan, Laws, Regulations, and Handbook

Previous reclamation practices done to the mining area were completed in accordance to laws and regulation with the primary goal of controlling erosion and providing stabilization to the landscape. However, the existing condition does not meet the desired future condition or criteria for the resource. Therefore, soil quality restoration is needed to improve the soil resource to meet the Forest Plan (2006). Otherwise, all alternatives would be implemented consistent with Forest Plan goals, objectives, standards, and guidelines as explained in the above discussions. All alternatives would be implemented consistent with Forest Service laws, regulations, and handbooks regarding management of the soil resource.

Aquatic and Hydrology Resources

This section describes the direct, indirect, and cumulative effects associated with both the no action and proposed action alternatives in regards to hydrology and aquatics resources, including erosion and sedimentation, water quality, water quantity, watershed health, and threatened, endangered, and sensitive aquatic species that may occur or are known to occur within the project area.

Scope of Analysis

The spatial boundary used to evaluate the potential direct effects to hydrologic and aquatic resources associated with this proposal would be confined to the actual areas of treatment activities. Potential indirect effects to hydrologic and aquatic resources may extend beyond the direct treatment areas but would not be expected to occur or be detectable much beyond the extent of the First Fork-Shavers Fork 6th HUC. For the other watersheds which have only a small portion within the project area, it is expected that the indirect effects would not extend beyond the first stream confluence outside the project area. Cumulative effects may occur where potential direct and indirect effects from proposed activities overlap with effects from other past, present, and reasonably foreseeable activity. Therefore, the area of analysis for cumulative effects for hydrologic and aquatic resources is expected to be confined to the First Fork-Shavers Fork and Red Run-Shavers Fork 6th level HUCs.

The temporal boundary for the analysis of effects to hydrologic and aquatic resources considers short-term and long-term effects associated with proposed treatments. Short-term effects were generally considered to be those that are initiated by proposed treatments but lasting a relatively short time period - typically no longer than one or two growing seasons following project implementation. Long-term effects were generally considered to be those which may persist for an extended duration - on the order of several years to more than a decade. Generally, 10 years is used for the temporal boundary, and any exceptions to this 10-year analysis timeframe are noted in this report as appropriate.

Methodology

Existing condition and trend information for hydrologic and aquatic resources were considered in conjunction with proposed project activities to evaluate potential effects associated with the project. Project alternatives were evaluated for potential direct and indirect effects on the issues and concerns that have been identified for the aquatic ecosystem. Each alternative was also evaluated for potential cumulative effects which consider overlapping influences (direct and indirect effects) from all past, present, and reasonably foreseeable actions.

Potential direct, indirect, and cumulative effects are discussed in terms of their likelihood to occur (level of risk) and the extent to which these would be anticipated to beneficially or adversely affect hydrologic and aquatic resources should they materialize. The level of risk for potential effects can generally be categorized as low, moderate, or high risk. Potential resource effects may also be discussed in term of minor impacts or substantial impacts. Minor impacts would tend to be of little or no consequence to existing resource conditions and trends but substantial impacts would likely cause material changes to existing resource conditions or trends. Finally, risks and effects can be described as short-term (lasting weeks to months) or long-term (lasting years to decades).

Affected Environment

The project area lies almost wholly within the Shaver's Fork 5th level Hydrologic Unit Code (HUC) watershed, but also contains small portions of Tygart Valley River and Greenbrier River 5th level HUCs. The approximately 40,000-acre project encompasses approximately the upper third of the Shaver's Fork 5th level Hydrologic Unit Code (HUC) watershed. Approximately 3,200 acres of the 98,867 acre Tygart Valley River HUC and approximately 300 acres of the 158,241 acre Deer Creek-Greenbrier River HUC lie within the project boundary. Six sub-watersheds (6th level HUCs) lie partly within the project area. The project area encompasses approximately 60 stream miles according to National Hydrography Dataset (NHD).

Shavers Fork, the largest perennial stream, flows in a northerly direction to join the Black Fork in forming the Cheat River. According to streams mapped at 1:24000 by the NHD, the following named tributaries to Shavers Fork are also within the project area:

Rocky Run, Oats Run, Beaver Creek, Buck Run, Black Run, Fish Hatchery Run, First Fork, and Second Fork.

Lambert Run, another major tributary is excluded from the project area because it was included in a prior project area of work similar to this project.

Fishery

Recent updates to fish species distribution on the Monongahela National Forest (Welsh and Cincotta 2007) indicate there are 19 fish species that inhabit the First Fork-Shavers Fork sub-watershed. These species represent *Catostomidae* (sucker), Centrachidae (bass), *Cottidae* (sculpin), *Cyprinidae* (minnow), *Percidae* (perch), and *Salmonidae* (trout) fish families. Aquatic habitat in Lambert Run is completely accessible to all fish species that occur in the Shavers Fork. However, only 7 fish species were detected in Lambert Run during electro-fishing surveys in July, 2011. Of these 7 species, six species are native to the Cheat River drainage and one species, brook trout (*Salvelinus fontinalis*), is the Forest's only aquatic Management Indicator Species (MIS). Non-native rainbow trout and stocked brook trout were also among the species found in Lambert Run.

Aquatic species that are federally listed under the Endangered Species Act (ESA) or identified as a Regional Forester's Sensitive Species are not known or expected to occur within the analysis area. Therefore, no specific analysis was performed on listed aquatic species for this project.

Aquatic Habitat Characteristics

The surficial geology of the project area is composed predominantly of the Pottsville Group in the upper elevations and the Mauch Chunk Group in the lower elevations and closer to the streams. The Pottsville Group is associated with poor acid-buffering capacity, and a large portion of the project area is composed of this geology. For this reason, the watershed is naturally a more acidic system and is more sensitive to potential effects from acid deposition. Water chemistry in Shavers Fork is monitored periodically and most recently monitored by the Forest in April and September of 2013 to assess pH, conductivity, and acid neutralizing capacity (ANC), among other water chemistry parameters. The results from the 2013 stream samples, collected near the downstream end of the project area, are:

- pH was 6.41 in April and 7.22 in September
- Conductivity (uS/cm) was 23.2 in April and 35.3 in September

- ANC (ueq/L) was 55.14 in April and 304.58 in September

Though these results indicate stream water in Shavers Fork is well-buffered from potential effects of acid deposition, this is not the natural condition. Limestone sands are routinely trucked in and deposited in and along several stream channels in the First Fork-Shavers Fork watershed (6th level HUC). Without these treatments the effects of acid deposition would be much more apparent and fish populations and most other aquatic inhabitants likely would not be sustainable year-round in this watershed due to the biological ramifications of chronic stream acidification.

Although Lambert Run is not within the project area, it is one of the major tributaries to Shavers Fork and its temperature data can be a useful representative of other tributaries. No stream temperature monitoring has been conducted in Lambert Run using continuous field data recorders. Stream temperature data was collected at various times during a typical hot summer day on July 13, 2011. The data suggest that at least some segments of Lambert Run possess stream temperature regimes that would support coldwater communities year-round.

Other temperature data is taken from the AEUI monitoring in the project area. Rocky Run, Beaver Creek, and Greathouse Run all had maximum 24-hour-mean temperatures of less than 18°C, indicating optimal temperatures for brook trout. Second Fork's maximum 24-hour-mean temperature was just below 20°C, which is considered sub-optimal for brook trout.

Observations of impaired channel conditions in the upper reaches of Lambert Run may also indicate that physical habitat characteristics (*e.g.* habitat composition, pool quality, and stream sedimentation) within this watershed are not suitable for brook trout. Additionally, other data from the AEUI monitoring indicated habitat conditions that are much less than ideal for brook trout. Pool-riffle rations are highly skewed toward riffles (e.g. Greathouse Run indicated 90% riffle and 10% run), sediment samples contained large percentages fines, total cover in pools and glides is rated poor in all four sites, and large wood material is rated as scarce in all four sites. So, although these generally have favorable temperatures, these other parameters indicate conditions that are certainly less than optimal for brook trout.

In addition to the natural streams and riparian areas within the analysis area, there are a large number (probably at least 50) of artificially created ponds. These features were previous constructed on contour in linear fashion positioned down slope from mining operations in order to help trap and store sediment that originated from mined areas during and following mining activity in the 1970's.

Most of these ponds are less than 0.5 acres in size and occupied to some extent by native amphibian and aquatic macro-invertebrate fauna. However, these aquatic habitats are not a naturally occurring feature in this landscape and are not known to be utilized by native fish populations.

Alternative 1

Direct & Indirect Effects

Alternative 1 would not authorize any of the proposed activities to proceed. Because some of the activities being proposed in the Alternative 2 are associated with potential restoration or improvement type benefits, the Alternative 1 would be expected to result in a more prolonged recovery trend for aquatic and riparian resources when compared to the Alternative 2. None of the existing sediment sources would be treated but would continue to contribute to the stream sedimentation burden and impair aquatic resources. Features such as roads, trails, and segments of the strip mining bench would continue to exhibit localize areas of deteriorating conditions that would eventually reach a turning point when conditions stabilize and natural recovery could begin to slowly heal the wounds on the landscape. Until such time, it is expected that aquatic resources in the project area will continue to be adversely impacted by the altered hillslope hydrology, sustained sediment production from accelerated hillslope erosional processes, and unstable channel conditions associated with these features.

Alternative 1 would not introduce some of the new risks to aquatic resources that are associated with some activities being considered in Alternative 2, in particular the addition of approximately 78 miles of trails, but also the use of herbicides as part of the red spruce and crop tree release treatments. Risks to aquatic and hydrologic resources from trails has the potential to be rather substantial, especially without regular and on-going maintenance. Management controls such as maintaining consistency with Forest Plan direction, using established standard protocols, and following specific project design and implementation criteria can minimize unwanted effects to aquatic and riparian resources from herbicide application and the addition of trails to the system.

Cumulative Effects

In addition to the direct and indirect effects described above, past, present, and reasonably foreseeable future activities, such as acid deposition and climate change are factored into the cumulative effects. Potential adverse effects to water chemistry from atmospheric acid deposition and the influence of these effects on the aquatic ecosystem of the project area would likely continue to increase but be partially mitigated by on-going treatments with limestone sand. Effects associated with most other on-going disturbance mechanisms including forecasted environmental changes associated with global warming would likely remain unaffected by either alternative for this project.

Alternative 2

Direct & Indirect Effects

Mineland Restoration

Organic loading involves felling, scattering, and/or mulching the existing non-native trees that were planted as a previous restoration action. Although potentially disruptive to the existing ground cover, the trees are expected to remain on-site in one form or another, either whole or mulched, and they would be expected to continue to act as a protective ground cover. When

combined with the proposed deep ripping and native tree planting, most erosion is expected to be minimal and temporary.

The deep ripping is also expected to cause a temporary ground disturbance, however, the much greater permeability of the treated area and the roughened surface is expected to prevent most lengthy and continuous flow paths and greatly enhance infiltration, thus reducing the degree of runoff from the presently compacted soil condition. Increased water infiltration would reduce the occurrence or intensity of overland flows which would help decrease the potential for soil erosion and sediment transport to streams. Reducing stream sedimentation rates would provide various benefits to the health of the aquatic ecosystem in nearby streams.

Replanting the treated area will have a beneficial effect in protecting the soil from erosion and this positive effect will increase as the vegetation becomes established. However, most areas targeted for native plantings are already covered with vegetation so actions taken to convert these areas to a more desired vegetation type are expected to result in negligible effects to hydrologic, aquatic, and riparian resources.

An increase in wetland habitat is expected to provide beneficial effects to aquatic resources in terms of increased aquatic habitat. As wetlands are expected to be created in areas already treated by the methods described above (deep ripping, organic loading, and planting), much of the water will already be allowed infiltration into the ground and moving very slowly as groundwater flow, the direct and indirect effects to hydrologic resources are expected to be more or less neutral or slightly beneficial. Wetlands, in general, especially when the wetland features are created in physiographic locations where they would naturally be expected to occur in the watershed, function as watershed filters by trapping sediment and preventing or attenuating its migration to streams. Improperly placed wetlands may result in a mix of beneficial effects (attributed to increasing wetland habitat) and potentially minor adverse effects, mostly associated with minor degrees of long-term sediment production.

Non-commercial Red Spruce Restoration in Mature Hardwood Stands

This treatment may result in a canopy reduction sufficient to produce a detectable increase in stream flows on some smaller headwater channels, especially when other treatments (e.g. non-commercial thinning in spruce stands or crop tree release) occur within the same drainage. The amount of streamflow increase is largely dependent upon the type of harvest (e.g. clearcutting, partial cutting or thinning) and the size of the area harvested (Reinhart et. al., 1963, Douglass and Swank, 1972, Arthur et. al., 1998, Swank et. al., 2001). Approximately 20-30% of the watershed basal area needs to be removed before an increase in flows due to harvesting can be detected (Hornbeck et. al., 1997, Hornbeck and Kochenderfer 2000). Although increases in stormflows and peakflows have been measured on small, headwater channels where the entire catchment has been harvested, the effect on downstream channels is quickly diminished due to the limited treatment area relative to the increasing drainage size. Thus, although detectable increases in flows in some streams may occur, any stream flow increases will likely be small and only in smaller headwater streams. Additionally, the effect of any change in evapotranspiration is greatly reduced after the first year as the harvested area regenerates, and generally returns to pre-harvest conditions within 5-10 years (Hornbeck et al. 1997, Swank et al. 2001). Over the longer term, the increase in red spruce in the treated area would be expected to increase the soil and organic layer thickness, which will likely increase the water-holding capacity in these layers.

There is also risk to aquatic and riparian resources associated with the use of herbicides for this activity. Some of this risk is due to the manner in which herbicide chemicals behave in the

environment – properties associated with chemical toxicity, migration, and chemical break-down. The herbicide and soils section provide greater details for these properties and effects associated with herbicide behavior. Otherwise, risks associated with improper handling or use of herbicides could result in damaging effects to riparian vegetation or toxic effects to aquatic life. The risk for these unintended adverse effects to aquatic and riparian resources is expected to be very low but consequence of these effects could be moderate to severe if they were to actually materialize.

Non-commercial Thinning in Young Spruce Stands/Early Successional Habitat and Crop-Tree Release in Hardwood Stands

The potential effects to stream flows of this activity are the same as, and considered with, those laid out in the "Non-commercial Red Spruce Restoration in Mature hardwood Stands" section above and will not be completely repeated here. It is expected that detectable changes in stream flow may occur, but these changes are expected to be small and confined to smaller headwater streams, and thus the overall effects to hydrologic resources are expected to be minor and to occur primarily in the first year or couple of years after treatment.

Thinning with chainsaws will leave the protective ground cover layer intact and in place, thus no appreciable erosion risk is expected as a result of the chainsaw thinning. In general, the use of tracked equipment in the forest has the potential to cause rutting and compaction, and to disturb and remove the ground cover layer, both of which increase the risk of erosion and sedimentation. This is especially true in sensitive areas such as wet areas or riparian areas. These areas should be avoided. Additionally, if the equipment makes multiple passes over the same area, as when multiple entries are used along a particular path in order to access different areas, the likelihood of impacts increases substantially. Since this application of tracked equipment will involve shredding/mulching trees and the shredded material being deposited on the ground in the vicinity of the equipment operation, there will likely be additional material added to the existing layer and providing additional protection.

Overall, if the equipment does not operate in wet areas or riparian buffers, and it does not repeatedly operate over any one piece of ground, the use of the tracked shredder/mulcher is expected to have a low risk of any substantial negative impact to the hydrologic and riparian resources of the project area.

New Road Construction

While both construction of the new system road and the subsequent decommissioning of the unmaintained non-system road would produce a short-term increase in ground disturbance and potential for sediment movement, the decommissioned road segment would be de-compacted and restored to its natural grade and drainage pattern. This would translate in to a long-term reduction in the potential for erosion and sedimentation from this section. The section of new constructed road would, as any road, represent a permanent increase in potential for erosion and sedimentation. Roads that are maintained generate much less sediment than roads that are not regularly maintained, so the amount of increase in sediment generated from the section will depend largely upon how well the road is maintained in the future. Considering the balance of decommissioning an old, highly eroded section of road and replacing it with an equal length of new road that will presumably be maintained, this activity represents an improvement in the hydrologic condition and a corresponding improvement in the effected aquatic and riparian areas downslope of the roads.

New Trail and Trailhead Construction

The current condition of the old roads slated for conversion to trails is not known at this time. Some may be currently producing sediment and others may be stabilized, thus it is difficult to say if the conversion from the current old roads to new trails represents an improvement over current conditions or a new disturbance. The 16 miles of new construction represents a new disturbance with its associated potential erosion and sedimentation risk, and both the conversions and new construction are permanent conversions of land use. As with all trail or road systems, the long-term impacts can vary greatly depending upon, among other factors, the degree of maintenance they receive. When tread erodes below surrounding ground surface water is prevented from exiting the tread and thus the erosion greatly increases and becomes self-perpetuating. Proper maintenance can address this type of problem before it becomes excessive and thus the importance of regular and effective maintenance cannot be overstated.

Common impacts of trails include loss or compositional changes of vegetation, soil compaction, erosion, muddiness, widening of the trail and user created side trails (Hammitt & Cole 1998; Tyser & Worley 1992). Many impacts are limited to the linear disturbance corridor, but some impacts, like surface water flow or sediment transport, can extend further into the natural landscape. Erosion is considered the most severe form of impact because its effects are long lasting, if not permanent (Hammitt & Cole 1998). As there are 20 crossings of perennial streams and undoubtedly many more crossings of intermittent and ephemeral streams, this is an especially important consideration for this project. Much of the proposed trail network is on the highly erosive soil of the Mauch Chunk geologic group, according to the GIS Bedrock Geology layer, especially along Shavers Fork, First Fork and its tributaries, and portions of Second Fork.

Muddiness encourages users to circumvent mud-holes and wet soils, creating trail widening and braided trails (Marion 1994) and increasing area of disturbed and bare earth (Liddle & Greig-Smith 1975) and thus increasing erosion potential. These problems are exacerbated if trails are located near streams or groundwater discharge areas. If soils that are seasonally wet and poorly drained cannot be avoided, trail construction techniques such as boardwalks, turnpikes, causeways, puncheon or geosynthetics may be necessary to sustain traffic and avoid muddiness (Hesselbarth & Vachowski 2000).

Trails that more directly ascend the fall line of a slope, regardless of the steepness, have a low “slope alignment angle”. Trails that more closely follow the contour of the slope (i.e. closer to perpendicular to the terrain slope) have a higher slope alignment angle. Trails with lower slope alignment angles are more susceptible to degradation. Degradation can be reduced with low trail grades and higher slope alignment angles.

Trampling and erosional impacts caused by horses have been found to be much greater than hikers, llamas, mountain bikes and even off-road motorcycles (Cole & Spildie 1998; DeLuca et al 1998, Wilson & Seney 1994). In addition to the compaction of the underlying soil, the action of the shod hoof tends to dig up and loosen the surface layer (McQuaid-Cook 1978). This loose, unconsolidated soil is more prone to erosion than compacted soil and as a result, the potential for erosion increases on horse trails as compared to hiker trails. Loosening of the soil, as occurs with horse traffic, is also a precursor to muddy trail sections (Whittaker and Bratton 1978). Manure on the trail may contain seeds of exotic plants and thus can introduce NNIS to the trail corridor. Additionally, large amounts of manure can pose a threat to water quality. This is especially important where horses tend to linger and rest, such as near a campsite or a stream.

Road Decommissioning for watershed improvement

Improvements to watershed conditions and aquatic ecosystem health can be accomplished by properly storing or permanently removing system roads, woods roads, skid roads, trails and strip mine benches that are not needed or are poorly located, preventing future vehicle access, and substantially reducing soil erosion and stream sedimentation coming from these facilities.

Potential detrimental effects of road and trail decommissioning on aquatic and riparian resources would be expected to be relatively minor and short-term. The greatest area of concern would be that soil erosion and stream sedimentation could increase briefly as a result of the fresh ground disturbance associated with decommissioning work. Locations closer to active springs, seeps, and streams would pose a greater potential to realize these detrimental effects to aquatic and riparian resources. Any increase in soil erosion and stream sedimentation would be expected to dissipate soon after decommissioning work is completed. Under certain circumstances, sediment issues may persist intermittently for months until soil stabilization and revegetation measures have a chance to become more fully effective.

Erosion control measures would be implemented during and immediately following ground disturbance associated with decommissioning work to stabilize and protect the soil surface from substantial erosion. While erosion control measures help to minimize the amount of soil loss and sediment delivery to streams from decommissioning projects, it is likely that some short-term soil erosion and sedimentation would occur during and soon after construction activities. The duration of increased sediment erosion would be expected to be relatively short, on the order of weeks to months (especially where stream channels are rehabilitated), until effective soil stabilization occurs. Once surface drainage is effectively controlled by road decommissioning actions and vegetative cover takes root, rates of erosion and sediment delivery would be substantially reduced from the existing condition and may be nearly eliminated. The exception is where concentrated flows from streams and seeps cross freshly disturbed soils. Erosion from these areas would still be expected to be minor and substantially less than if the roads where not decommissioned. The amount of short-term sediment delivered to stream channels from decommissioning would be expected to be so small compared to existing conditions, potential detrimental effects to aquatic habitats and biota would be not substantial, and would not likely be measurable.

Long-term consequences of the proposed road decommissioning would result in various beneficial effects to hydrologic and aquatic resources. Eliminating stream crossing structures that fragment aquatic habitat and degrade stream channel integrity would be a long-term beneficial effect to the aquatic ecosystem.Net reductions in stream sedimentation would be expected to result in very substantial beneficial effects for the aquatic environment – improved water quality (turbidity), improved spawning gravels, improved habitat conditions and productivity for aquatic species occupying the stream bottom, reduced sediment burden on stream processes, and an overall improved aquatic habitat quality and productivity for populations of native brook trout and other aquatic biota.

Road decommissioning actions would also help restore hydrologic connectivity and hillslope processes to their more natural condition and function in the Shaver's Run watershed. Decommissioning roads helps rehabilitate soils (by decompacting road surfaces) and encourages the regrowth of healthy trees and shrubs to reclaim site productivity and restore more beneficial riparian conditions. In some cases, the mere presence of roads may affect soil moisture retention and cause less water to be stored in hillslope soils. If large enough areas in a watershed are more efficiently dewatered by roads that accelerate the transport of surface and subsurface water down

through the system, less groundwater would be available for a more sustained, longer-term sub-surface release, and this can adversely affect the onset and duration of stream baseflows (normal flows, not stormflows) to some extent. The effects associated with road decommissioning actions would provide long-term benefits to hydrologic and aquatic resources, especially where roads occupy steeper sideslopes and lower hillslope positions (i.e. nearer streams).

Stream Habitat Improvements

Stream Crossings

Removal of crossing structures and other man-made structures requires excavating fill material from the stream channel and the area immediately adjacent. This excavation disturbs the channel bed material and produces bare, unprotected soil on the adjacent channel banks. With the application of the Forest Service's National Core BMPs and appropriate design features the impacts associated with the in-stream activities proposed can be reduced such that the sedimentation impacts will be expected to be small and of short-term duration (a few months or less). Several recommended mitigations are included in the Hydrology and Aquatics Resource Report and in the table in Appendix B. The application of practices such as these can help ensure that very little sediment reaches the stream either during the active construction or in the weeks or months following the work as vegetation and natural ground cover become re-established. This activity represents an improvement over the current ongoing impacts that are occurring as a result of these man-made structures at stream crossings.

Large Woody Material Additions

Aquatic habitat improvements with the addition of large wood material (LWM) to the stream presents another potential for in-stream activity to produce impacts to the stream and adjacent riparian area. Adding relatively smaller trees (approximately 6-inch diameter or less) to a stream with a hand-operated Grip Hoist creates little disturbance to the stream channel and bank or the ground cover in the work area. The impact to the stream and riparian shade is generally negligible as the wood requirements are small, the trees generally not the canopy trees, and they can be selected from areas that least affect the stream and riparian shading.

The construction of large-scale structures of mature trees embedded into the stream bed and banks, by contrast, poses a much greater potential for channel morphology alterations and significant amounts of erosion and sedimentation as heavy equipment is used to excavate and move large amounts of material for the emplacement of large structures composed of intertwined mature trees, usually with their root balls still attached. Furthermore, the removal of trees within the riparian buffer zone can allow more direct sunlight to enter and cause stream and/or riparian area to experience warming that is harmful to the aquatic organisms, in particular, brook trout. The proposal states the trees used for the large wood structures are to be obtained from elsewhere in the project area and not from the riparian area, however, some trees in the riparian area may need to be removed to allow for equipment and large wood access to the work site. This has the potential to open a part of the riparian canopy and allow direct sunlight to warm the riparian and stream environments. To minimize the effects of solar radiation on heating the stream and riparian area, this tree removal for access should be kept to a minimum and those comprising the canopy should be retained to the extent possible.

With the application of appropriate National Core BMPs and design features, the potential for serious or long-term impacts can be kept small and of a short duration. These BMPs and

design features should include plans to protect aquatic species in the area from the work activities, control storm water flow, erosion and sedimentation.

The long-term effects of adding large wood features to streams are expected to be an overall improvement in aquatic habitat as long stretches of monotonous riffles are altered to produce a more complex series of habitats of still water, pools, and runs. Some of the wood structures would be expected to reduce erosion at certain locations, and other structures will likely trap sediment within the system and slow its migration downstream. Wood structures will also improve spawning areas for trout. This set of more complex and diverse environments will be self-sustaining and beneficial to the native aquatic organisms of the area treated.

Re-establishing drainage patterns across restoration areas

Where intermittent and ephemeral stream channels would be reconstructed across strip benches to reconnect the sections of the channel upstream and downstream, there will be a potential that the disturbance will produce additional erosion and sedimentation, but this potential is small and any impacts are likely to be of a short-term duration. This impact is unlikely since the work can be accomplished during periods when the stream is dry. Additionally, because these disconnected stream channels are often still in a state of disequilibrium some are currently producing excessive sediment as they migrate attempting to establish a permanent and stable connection between their upper and lower sections. The reconstruction actions are expected to make this reconnection and establish a lasting and stable channel and thus are expected to produce a long-term decrease in erosion and sedimentation from these migrating channels.

Treating Eroding Headcuts

Treating headcuts with rock and large wood has little potential for adverse impacts and is expected to reduce or arrest further excessive erosion and migration of the headcut. This activity is expected to produce long-term erosion reduction benefits with few if any short-term or long-term adverse impacts.

Cumulative Effects

In consideration of effects from past, present and reasonably foreseeable actions shown in Table 3, cumulative effects associated with Alternative 2 would generally be expected to continue the current gradual trend toward recovery from previous natural and human-induced disturbance to watershed and the aquatic resources.

Various aspects of recovery trends for the aquatic ecosystem would likely be enhanced by watershed improvement actions proposed in this alternative. Where proposed watershed improvement activities represent the predominant influence of change for watershed conditions and processes, cumulative effects would be expected to maintain or produce a net benefit to the condition and trend for aquatic and riparian resources in those catchments.

Potential adverse effects to water chemistry from atmospheric acid deposition and the influence of these effects on the aquatic ecosystem of the project area would likely continue to increase but be partially mitigated by on-going treatments with limestone sand. Effects associated with most other on-going disturbance mechanisms including forecasted environmental changes associated with global warming would likely remain unaffected by either alternative for this project.

Some proposed activities pose some level risk of contributing to cumulative effects of the hydrologic, aquatic and/or riparian resources of the project area. The addition of 78 miles of new trails and 1 mile of new road to the transportation system represent a permanent conversion to a land use that is known to be among the most important contributors to erosion and sedimentation on a forested landscape. This conversion, though, is not from a completely undisturbed landscape.

The mile of new road, while representing a new and permanent disturbance, is replacing an existing road (which will be decommissioned) that has not been maintained and is likely an ongoing sediment source. The majority of the miles of new trail are proposed to be conversions from old roads or skid roads in various stages of degradation or recovery. Allowed sufficient time (possibly many decades) and protected from further disturbance, however, many of these old disturbances would be expected to recover and become stable. Although locating the new trails on existing reduces the degree of new impact, the existence of the new trail removes the possibility of natural recovery of that length of old disturbance. The cumulative, long-term effects associated with this permanent conversion to new road/trail can be kept to an acceptable level with the appropriate and regular maintenance.

The items proposed under the Mineland Restoration, Road Decommissioning, and Stream Habitat Improvement activities, although they may entail short or long term effects as discussed above, are expected address sources of erosion and sedimentation and are thus anticipated to complement and accelerate the ongoing natural recovery to the hydrologic and aquatic resources of the project area. The forest thinning activities proposed will not involve the creation of roads or skid roads, and the tracked mulcher is not expected to damage or significantly disturb the ground cover and thus is not expected to contribute to the cumulative effects to the hydrologic and aquatic resources of the project area.

Given this, cumulative effects associated with Alternative 2 would be expected to maintain or improve aquatic and riparian resources.

Irreversible or Irretrievable Commitment of Resources

No irreversible commitment of hydrologic or aquatic resources is expected to occur as a result of this project.

The 78 miles of new trail and 0.79-mile of new classified road represent an irretrievable commitment of the hydrologic function and sediment-stabilizing function that would normally be performed by the land occupied by the new road or trail. Water on the road or trail that would normally infiltrate into the ground or flow across it as overland flow will now, because of soil compaction ground surface alterations, be diverted further down the trail, road, or associated ditch before being discharged from the road, trail or ditch.

Consistency with the Forest Plan, Laws, Regulations, and Handbook

The alternatives that were analyzed as described in this report are expected to be implemented in a manner that is consistent with the Forest Plan, laws, regulations, executive orders, and handbook direction pertaining to hydrologic, aquatic, and riparian resources management.

Vegetation Resources

This report addresses the impacts that the Mower Tract project will have on the forest vegetation in the area.

Methodology

All the units were evaluated using the standards and guidelines set for prescribing silvicultural treatments in spruce-fir forest in the northeast (Frank and Bjorkbom 1973). Assumptions used to calculate effected acres are as follows:

- Trail width: 72" wide
- Trailhead: 0.5 acres
- New road construction: 3 acres for the 0.79-mile connector road

Although the miles of woods road decommissioning would not be determined until implementation of other activities, an estimated

Scope of Analysis

Of the 33,994-acre project area, approximately 97 percent of the project area is national forest ownership, therefore this analysis pertains to the 32,980 acres of National Forest lands within the project area. The vegetation management activities proposed in this project would occur in the short-term, within five years. The long-term effects of these treatments would be 50-60 years from now, as these young stands mature.

Affected Environment

The Mower Tract project area is dominated by mid- and late-successional sawtimber-sized stands. Approximately 81% of the stands in the project area are greater than 40 years old, while only 2% of the area is early successional habitat (Table 13). The desired age-class distribution for spruce and spruce-hardwood forest in 4.1 areas calls for a large amount of late successional forests (Figure 3). The first timber harvesting in this area took place in the 1920s, at that time the area was mainly a spruce forest and the heavy cutting resulted in the regeneration of hardwood and spruce-hardwood stands. In the 1970s and 1980s prior to government ownership the area was harvested once again. Most of the harvesting done at that time was diameter-limit or partial harvests. Higher-value species such black cherry were removed leaving maple, birch, and spruce to occupy the site. Since government ownership in the late 1980s no harvesting has taken place in the project area, resulting in no early successional habitat being created.

Red spruce is very common throughout the project area. Twenty-three percent of the stands in the project have spruce-fir and red spruce species present in the understories of many of the hardwood stands. Over the last 20-30 years red spruce has been increasing in West Virginia (Hornbeck and Kochenderfer 1998). This increase is mainly due to the suppression of fires that kill spruce regeneration and preferential browsing of competing species by white-tailed deer (Blum 1977; Telfer 1972). As a result approximately 65% of the project area is occupied by spruce and hardwood-spruce forests. Many of the cut over stands in the project area have regenerated in very thick, nearly pure stands of red spruce. Well-established understories of sapling size red spruce occur in many of the hardwood stands in the project area.

Of the approximately 1,126 acres of the project area was strip mined prior to federal government ownership, about 731 acres of these areas have been planted and are now well-established Norway spruce and red pine stands. The remaining area, approximately 395 acres, is in open grassland.

Table 13. Acres of forest types by age class for the NFS land within the project area.

Forest Type	Age Class					Total
	0-19	**20-39**	**40-79**	**80-120**	**>120**	
Red spruce-fir	0	3,010	1,761	1,690	458	6,919
Red pine	0	549	0	0	0	549
Sugar maple-yellow birch-spruce	0	1,651	4,560	6,402	1,982	14,595
Sugar maple-basswood-yellow birch	0	0	1,216	4,931	598	6,837
Mixed Hardwood	0	386	285	1,793	168	2,632
Birch	0	71	192	537	11	811
Open	729	------	------	------	-----	729
Total	**489**	**5,759**	**8,019**	**15,353**	**3,217**	**32,980**

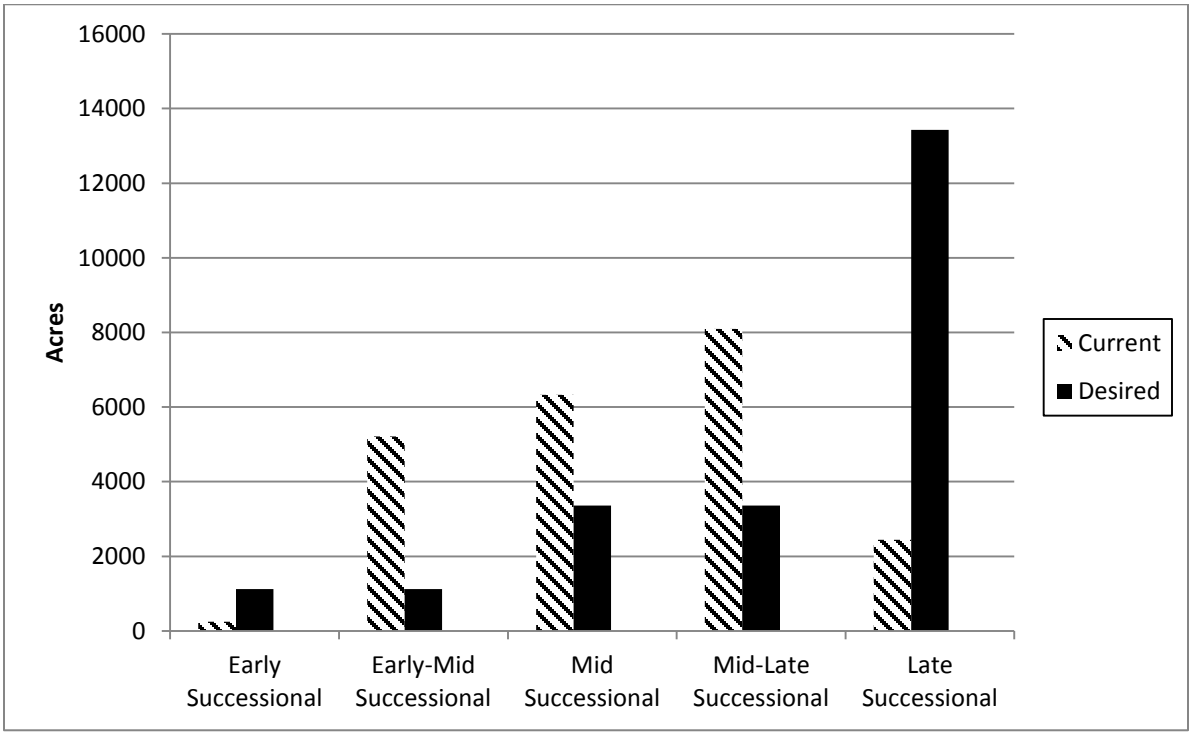

Figure 3. Acres of current and desired age classes for spruce and spruce-hardwood forests in the project area.

Alternative 1

Direct/Indirect Effects

The vegetation in the project would remain the same in Alternative 1. A large percentage (56%) of the stands in the project area are mature forest (>80 years old). The amount of open areas (2%) would remain the same. The young sapling sized spruce and hardwood stands would remain overstocked, reducing their health and vigor.

Cumulative Effects

The existing condition of the area reflects the cumulative impact of many past actions, mainly, logging and strip mining. As the trees in the project area continue to age the proportion of mid-late-successional stands will increase. Under Alternative 1, the forest would retain a high proportion of mature forest. The amount of early successional area will stay approximately the same due to the strip mined areas where the compacted soil and herbaceous weed competition the areas would remain in an open grassy state over the long term.

Alternative 2

Direct/Indirect Effects

The 12,597.5 acres of vegetative treatments in Alternative 2 would have an effect on the future vegetation in the project area. The 4,053.5 acres of precommerical thinning in young red spruce stands would have the effect of increasing the diameter growth and overall vigor of the remaining spruce in the stands. The 2,236.8 acres of crop tree release would increase the amount of black cherry and red spruce in the future stands since they would be two main species released. The timber stand improvement activities would also have the short-term effect of increasing the amount of herbaceous vegetation by increasing the amount of light reaching the forest floor. The treatments would have the effect of reducing the number of stems in the treated stands. The timber stand improvement treatments would not alter the age of the treated stands. After the stands have been treated the remaining tree's crowns will grow and expand occupying the openings where the cut trees once stood, thus have no influence on the age class structure.

The spruce release in mature hardwood stands would be done in approximately 5,180.9 acres. This treatment would have a long-term effect on forest type. Releasing sapling sized red spruce would over time increase the amount of spruce in the young hardwood stands, turning sugar maple-yellow birch-spruce stands into predominantly spruce stands over the long-term.

Early successional habitat would be created within the crop tree release stands. These areas would be created using mechanical equipment to mulch vegetation mainly within old skid roads within the stands. This treatment would have the effect of reducing the basal area in the stands and creating small linear openings throughout the stands. It would have no effect on age class distribution or forest type.

The mineland restoration work would occur on 1,126.3 acres of the project area. The treatments would result in the removal of approximately 731 acres of red pine and Norway spruce planted after the areas were striped mined in the 1980's. The treatment would increase the amount of early successional habitat in the project, while reducing the amount of open grassland area. Planting in the mineland areas would increase the amount of red spruce in the project area.

The other activities in Alternative 1 would have minor effects on the vegetation within the project area. The recreation activities (trail construction, trail maintenance, and trail head construction) would impact approximately 61 acres. These activities would involve clearing vegetation along trail routes and parking areas and no effect on age class or forest types in the project area. Proposed road decommissioning would impact any trees growing the road prism, but this will have no impact on forest type. Woody debris placement in the streams in the project area will require trees in adjacent stands to cut and placed in the streams.

Cumulative Effects

The proposed action would have a long-term effect on vegetation in the project area. Timber stand improvement work would be done on 6,290.3 acres. Timber stand improvement would have the long term effect of increasing the amount of black cherry and spruce in the hardwood stands. The timber stand improvement treatments would also have the long term effect of retaining hardwoods in the young spruce dominated stands and increasing the growth of spruce in these stands. The 5,180.9 acres of spruce release in mature stands would have the long-term effect of increasing the amount of red spruce the overstory. Over time as the overstory hardwood die out the released spruce that has grown into the mid-story will move into the overstory. The mineland restoration work will have the effect of increasing the acreage of red spruce stands in the project area. It will also eliminate most of the red pine and Norway spruce in the project area.

The other projects would have minor long-term impacts on the project area. Approximately 61 acres would be taken out forest production by the recreational activities. The new road construction would also take about three acres out of forest production.

Irreversible or Irretrievable Commitment of Resources

The irretrievable effects of the proposed action would be the loss of open areas that would be ripped and planted.

Consistency with the Forest Plan, Laws, Regulations, and Handbook

Alternative 1 is consistent with the Forest Plan standards and guidelines. The proposed action is consistent with the goals and objectives of management prescription 4.1 areas. Approximately 11,471.2 acres would be non-commercially thinned and release work, to increase the amount and growth of spruce, which is consistent with the Forest Plan to restore spruce in areas where spruce exists (Forest Plan III-14). The mineland restoration is consistent with the Forest Plan goal to restore Norway spruce and red pine plantations to native red spruce and mixed hardwood species. Forest Plan guideline 4124 states that red spruce may be planted, typically on a small scale, when determined to be a practical strategy for restoration or enhancement. The mineland restoration activities of the project calls for larger scale planting (greater than 10,000 stems per acre), which has been determined a practical strategy for restoration in these areas. All the alternatives are consistent with the following laws and regulations:

National Forest Management Act of 1976
Multiple Use Sustained Yield Act of 1960
FSH 2409.17 chapters 8, 9, and 50

Threatened, Endangered, and Sensitive Plant Species

This section addresses the effects of the alternatives of Mower Tract project to threatened, endangered, and Regional Forester's Sensitive Species plants. Threatened, endangered, and sensitive plants are collectively referred to as TES plants. Regional Forester's Sensitive Species plants are hereafter referred to as RFSS plants. For the purposes of this analysis, the scope and metholodogy is the same for all TES species, while the direct/indirect and cumulative effects for each alternative are separately discussed for both Threatened/Endangered plants and RFSS plants.

Scope of Analysis

For direct, indirect and cumulative effects, the spatial boundary of the analysis is the project area boundary (Figure 1). The project area boundary includes all parcels of land that would be affected by project activities. For cumulative effects, the spatial boundary of the analysis is the Proclamation and Purchase Unit boundary for the Monongahela National Forest. This is the boundary to which the National Forest Management Act's species diversity and viability requirements apply.

The temporal boundary for direct and indirect effects, as well as cumulative effects, on TES species is 50 years from the beginning of project implementation. While effects to each individual species may not persist that long, successional changes set in motion by project activities will continue for at least that long, potentially affecting some species that occur in forested habitats.

Methodology

Surveys for TES plants have been conducted sporadically throughout the project area by the Forest Service or West Virginia Division of Natural Resources/Natural Heritage in the past. The limited botany survey work that has been conducted has been done during the growing season by experienced botanists, and has consisted of meandering walks through representative habitats in all parts of targeted activity areas, with a goal of traversing an average of 100 linear feet per acre of activity area. Locations of TES plants were noted and documented using global positioning system technology. As a precaution in case additional species are listed prior to project implementation, botanists listed all plant species that were encountered. Future surveys will be conducted in the same manner by qualified personnel.

Botany surveys for TES plants will be conducted in all proposed activity areas that will involve soil disturbance, with the exception of the mineland restoration areas. Field surveys in areas proposed for mineland restoration would occur as necessary prior to implementation. While past surveys have found occasional RFSS in previously mined areas, the likelihood of a federally-listed or Regional Forester sensitive species occurring in those areas is low.

Informal surveys for woody RFSS will also be conducted by trained work crews during implementation of spruce release, young spruce thinning, and hardwood crop tree release. Species that will be identified and avoided include long-stalk holly, Bartram's shadbush, and Canada yew. Crews will be trained by experts to identify potential habitat for these species and botanical characteristics in the field.

For TES plants not found during surveys, an additional process was used to determine their likelihood to occur within the project area. This analysis was based on historic records, the presence of potential habitat in the project area, and current scientific and agency literature. Species were omitted if the project area did not contain landscape characteristics, plant

community composition/structure, or historic occurrence records that would suggest suitable habitat. For the remaining plant species known or likely to occur in the project area, the potential effects of each action were then assessed according to the plants' life history characteristics and habitat needs. Results of this analysis for each TES species can be found the in the 'Likelihood of Occurrence' Table found in the Ecology/Botany report located in the project file.

It should be noted that this report uses the term "occurrence" to refer to locations of TES plants. This term simply means a discrete site where the plant occurs. "Occurrence" is not necessarily equivalent to the term "element occurrence," which is the unit used by NatureServe and state Natural Heritage Programs to track biological populations that are more or less separated from other populations of the same species (NatureServe 2002).

Threatened & Endangered Plant Species

Affected Environment

Four federally-listed threatened and endangered plant species are known to occur on the Monongahela National Forest: running buffalo clover (*Trifolium stoloniferum*), shale barren rockcress (*Arabis serotina*), Virginia spiraea (*Spiraea virginiana*), and small whorled pogonia (*Isotria medeoloides*). Based on field surveys and existing records, none of these species is known to occur in the Mower Project Area, and only two have potential habitat in the project area.

Virginia Spirea

Virginia spirea is a clonal shrub found on damp, rocky banks of large, high-gradient streams (USFWS 1992a). This species is limited to the channels and banks of large streams such as the West Fork of the Greenbrier River, the East Fork of the Greenbrier River, and the Little River of the West Fork. Virginia spiraea is known to occur along the Greenbrier River approximately 51 air miles southwest of the project area. There are no large, high gradient streams in the project area; therefore, there is no potential habitat for Virginia spiraea.

Running Buffalo Clover

The Monongahela National Forest contains largest and highest quality populations of RBC anywhere in its range (USFWS 2007). Potential habitat for running buffalo clover typically exists in lightly disturbed forests and woodlands on soils derived from geologic features such as on the Mauch Chunk and Greenbrier limestone formations on the MNF (NatureServe 2006a, USFWS 2007). The Mower Restoration project area is dominated by the Pottsville Formation, an acidic, nutrient-poor substrate more conducive to red spruce. The Pottsville Formation overlies the Mauch Chunk which could potentially be exposed on eroded sideslopes. While running buffalo clover has never been documented in areas that were formerly a spruce-influenced ecosystem like those found in the project area, potential occurrence in the project area cannot be ruled out entirely. Historic and known occurrences on the MNF are located in oak and oak-pine habitat, which are not similar to habitats found in the project area. Based on predominant geology, the potential for occurrence of running buffalo clover in the proposed activity areas area appears to be very low.

Small Whorled Pogonia

Habitat preferences for small whorled pogonia are poorly known, but appear to include a variety of forested habitats. Occurrences have been documented in mixed deciduous and pine-hardwood habitats of a variety of ages. It seems to be associated with partial canopy openings (USFWS 1992b), acidic soils having a pan layer, and slopes of 11 to 17 percent near small streams (USFWS 2008, 2008a). Likelihood of occurrence for small whorled pogonia is considered to be very low in the project area because it is not known to occur nearby and no surveys have documented it. Also, there is no habitat in the project area similar to the oak or oak-pine site conditions of any of the known or historical occurrences in the MNF. However, potential occurrence cannot be completely ruled out based on poorly understood habitat preferences and the difficulty of locating this species using conventional survey techniques.

Shale Barren Rockcress

Shale barren rockcress occurs in specialized habitats known as shale barrens in eastern West Virginia and western Virginia (USFWS 1991). Shale barrens are limited to the drier areas of the Monongahela National Forest. The nearest known shale barrens on the Forest are located approximately 35 miles south of the project area. Therefore, shale barren rockcress is not likely to occur in or near the project area due to lack of shale barren habitat.

Alternative 1

Direct & Indirect Effects

Alternative 1 would not implement any new activities. Furthermore, there is very little potential habitat for T&E plants in the action area. For these reasons, there would be no effects on threatened and endangered plants.

Cumulative Effects

There are no anticipated direct or indirect effects to threatened and endangered plant species from implementation of the No Action beyond those that occur due to natural processes and ongoing management activities such as road maintenance, dispersed recreation activities, etc. Even these activities would be unlikely to affect threatened and endangered plants because no threatened or endangered plants are known to occur in the project area. For these reasons, there will be no cumulative effects to any threatened or endangered plant species.

Alternative 2

Direct & Indirect Effects

There are no known occurrences of any threatened and endangered plant species in the action area. Furthermore, there is very little potential habitat for these species in the action area, and all areas of ground disturbance except for mineland restoration areas will be surveyed prior to implementation. Under the Proposed Action, the potential for direct and indirect effects on threatened and endangered plants is so low as to be discountable. Consequently, the proposed action will have no effect on threatened and endangered plant species.

Cumulative Effects

There are no anticipated direct or indirect effects to threatened and endangered plant species from implementation of the Proposed Action beyond those that occur due to natural processes

and ongoing management activities such as road maintenance, dispersed recreation activities, etc. Even these activities would be unlikely to affect threatened and endangered plants because no threatened or endangered plants are known to occur in the project area. For these reasons, there will be no cumulative effects to any threatened or endangered plant species.

Effects Determinations

Table 14. Effects Determination to Threatened and Endangered plant species within the project area.

Species	**Determination**
Running buffalo clover (*Trifolium stoloniferum*)	No Effect
Shale barren rockcress (*Arabis serotina*),	No Effect
Small whorled pogonia (*Isotria medeoloides*)	No Effect
Virginia spiraea (*Spiraea virginiana)*	No Effect

Irreversible or Irretrievable Commitment of Resources

None of the alternatives are expected to have direct, indirect, or cumulative effects on threatened and endangered plants. Therefore, none of the alternatives would make any irreversible or irretrievable commitments of resources with respect to threatened and endangered plants.

Consistency with the Forest Plan, Laws, Regulations, and Handbook

All alternatives would be unlikely to affect threatened and endangered plants adversely. Therefore, all alternatives would be consistent with Forest Plan direction to avoid and minimize adverse impacts to threatened and endangered plants. All alternatives would be unlikely to affect threatened and endangered plants adversely. Therefore, all alternatives would be consistent with Endangered Species Act protections and consultation requirements, as well as all regulations, directives, and policies that implement that act with respect to threatened and endangered plants.

Regional Forester's Sensitive Species Plants

Affected Environment

Sixty-one plant species are listed as Regional Forester's Sensitive Species on the Monongahela National Forest. Based on field surveys and existing records, ten sensitive plant species are known to occur in the Mower project area. Potential habitat exists for an additional 20 species, for a total of 30 sensitive species that could occur within the project area. Plants which do not have potential habitat in the project area are not analyzed further.

Over 200 occurrences of RFSS plants are documented thus far in the project area. The vast majority of these occurrences are Arctic bentgrass (Agrostis mertensii) and long-stalk holly (Ilex collina). Others include Bartram's shadbush (Amenlanchier bartramiana), Blue-ridge St. John's wort (Hypericum mitchellianum), blunt lobed grape fern (Botrychium oneidense), thread rush (Juncus filiformis), heartleaf twayblade (Listera cordata var. cordata), large-flowered Barbara's buttons (Marshallia grandiflora), Shriver's frilly orchid (Platanthera shriveri), and Canada yew (Taxus Canadensis). Most of these are documented in one or more proposed activity areas.

To facilitate analysis, sensitive plant species have been grouped according to their primary habitat: wetland/riparian habitat, mesic forest, and rocky habitat. The following tables list RFSS species that occur or could occur in Mower project activity areas.

Table 15. Rock habitat RFSS plants that could or are known to occur within the project area.

Scientific Name	**Common Name**	**Habitat Comments**	**Known Occurrence**	**Potential Habitat**
Pycnanthemum beadlei	Beadle's mountainmint	Open canopy over rocks		x
Scutellaria saxatilis	Rock skullcap	Variety of rocky situations, but most common in moist, partially shaded talus.		x
Trichomanes boschianum	Bristle fern	Wet, shaded sandstone overhangs		x
Tortula ammonsiana	Ammons' Tortula Moss	Wet, sandstone walls, outcrops, or cliff overhangs adjacent to waterfalls		x

Table 16. Mesic forest RFSS plants that could or are known to occur within the project area.

Scientific Name	**Common Name**	**Habitat Comments**	**Known Occurrence**	**Potential Habitat**
Botrychium lanceolatum var. angustisegmentum	Lanceleaf Grapefern	Moist, shady woods		x
Botrychium oneidense	Blunt-lobed grapefern	Moist to wet wooded areas	x	
Carex roanensis	Roan Mountain sedge	Mid to high elevation mesic forests		x
Corallorhiza bentleyi	Bentley's coral root	Few known occurrences; acidic to circumneutral deciduous woods, often near roadsides. Habitat poorly understood.		x
Cypripedium reginae	Showy lady's slipper	slightly acidic to slightly alkaline soils in woodland glades, ravines, and damp calcareous slopes		x

Scientific Name	Common Name	Habitat Comments	Known Occurrence	Potential Habitat
Gymnocarpium appalachianum	Appalachian Oak Fern	maple-birch-hemlock woods on mountain slopes and summits, on moist sandstone, talus slopes, or bouldery colluvium		x
Platanthera shriveri	Shriver's frilly orchid	Deciduous forests; wooded roadsides	x	
Taxus canadensis	Canada yew	Typically in spruce-northern hardwoods; also wetlands and riparian areas.	x	
Viola appalachiensis	Appalachian blue violet	Often in riparian areas, but can occur in other mesic situations		x

Table 17. Wetland and Riparian Habitat RFSS plants that could or are known to occur within the project area.

Scientific Name	Common Name	Habitat Comments	Known Occurrence	Potential Habitat
Agrostis mertensii	Arctic bentgrass	Open riparian habitats	x	
Amelanchier bartramiana	Bartram Shadbush	Moist to wet sites	x	
Euphorbia purpurea	Darlington's Spurge	Open or closed canopy in wetland to upland sites		x
Hasteola suaveolens	Sweet-scented Indian plantain	Riverbanks and disturbed wetlands		x
Hypericum mitchellianum	Blue Ridge St. John's wort	Riverbanks and disturbed wetlands	x	
Ilex collina	Long-stalked holly	Open or closed canopy	x	
Juncus filiformis	Thread rush	Bogs and disturbed wetlands	x	
Listera cordata	Heartleaf Twayblade	Forested Swamps	x	
Marshallia grandiflora	Large-flowered Barbara's buttons	Banks of large streams	x	
Menyanthes trifoliata	Bog Buckbean	Bogs and marshy places		x
Pedicularis lanceolate	Swamp lousewort	Open, wet meadows		x

Scientific Name	Common Name	Habitat Comments	Known Occurrence	Potential Habitat
Poa paludigena	Bog Bluegrass	Open to partially shaded wetlands		x
Polemonium vanbruntiae	Bog Jacob's-ladder	wooded swamps, bogs, mossy glades, seeps, and riparian areas		x
Ranunculus pensylvanicus	Pennsylvania Buttercup	Grows in a variety of areas that tend to have open to filtered light and that are wet to periodically flooded		x
Ribes lacustre	Bristly Black Currant	Wetlands in partial shade to full sun		x
Stellaria borealis ssp. borealis	Boreal Starwort	Wetlands		x
Woodwardia areolate	Netted chain fern	Moist, sandy, acidic drainages and seeps		x

Alternative 1

Direct & Indirect Effects

Alternative 1 would not implement any new activities. Therefore, it would not have any direct or indirect effects on sensitive plants beyond those that occur due to natural processes and ongoing management activities such as road maintenance, dispersed recreation activities, etc. Even these activities would be unlikely to affect threatened and endangered plants because no threatened or endangered plants are known to occur in the project area.

Cumulative Effects

Because Alternative 1 would have no direct or indirect effects on sensitive plants, it would not contribute to the cumulative effects of other past, present, and reasonably foreseeable future actions.

Alternative 2

Direct & Indirect Effects to individual known occurrences

Mineland Restoration

Although areas proposed for mineland restoration have not been surveyed extensively for sensitive plants, intensive surveys in similar activity areas nearby (Barton Bench and Lambert Run projects) have found only a few RFSS plants. The previously mined and reclaimed areas provide little habitat for most RFSS plants because they are dominated by nonnative grasses and conifer plantations. Suitable habitat does exist for several disturbance-tolerant acidic wetland species.

Pilot surveys would be carried out to the extent possible, and the intensity of future survey activity would be determined by results. All known or discovered RFSS occurrences will be avoided to the extent possible. The existing condition has inhibited the re-establishment of natural successional processes and vegetative communities.

These activities would loosen and improve soils, increase rainwater infiltration, increase native species density and diversity while reducing competition from non-natives, and generally improve the ability of the landscape to support a more natural northern hardwood-spruce ecosystem. For these reasons, mineland restoration activities are not likely to have a long-term negative effect on RFSS plants, and are anticipated to improve habitat suitability over time.

Additional information about the specific location of sensitive species found in the project area can be found in the Ecology/Botany/NNIS report located in the project file.

Non-commercial red spruce restoration in mature hardwood stands

Past surveys are limited, so some sensitive species may exist in areas proposed for this treatment. Several herbaceous and woody RFSS are documented to occur in these stands. However, because this activity creates no soil disturbance and only limited manipulation of vegetation community structure, no effects to herbaceous RFSS are anticipated. Woody species have the potential to be negatively affected by this activity if they are not avoided. Spruce release crews will be taught to identify these species and will avoid impacting individuals to the extent possible.

Gaps created by this activity would occupy less than 15 to 20 percent of the total canopy, so the light regime in these stands would not be changed appreciably. Most plant species respond favorably to small increases in light, but such increases are not large enough to cause a substantial increase in competing vegetation. Herbicide applications conducted as part of this activity would consist of precisely targeted cut surface and basal spray applications to non-RFSS species. The long-term increase in the spruce component of these stands would change the character of the habitat somewhat. However, spruce likely would still make up less than half of the overstory, such that the stands would still be considered mixed spruce-northern hardwood stands. For sensitive plant species that are known to occur or might occur undetected in these northern hardwood stands that currently have spruce in the understory, such a change likely would not have an appreciable negative effect on habitat suitability, and may improve habitat.

Additional information about the specific location of sensitive species found in the project area can be found in the Ecology/Botany/NNIS report located in the project file.

Non-commercial thinning in young spruce stands

Because of past management and the young age of these stands, these stands are disturbed and densely shaded by sapling cover, and are therefore not likely to support most sensitive plants. Pilot surveys would be carried out in these and other activity areas to the extent possible, and the intensity of future survey activity would be determined by results. Should any sensitive plants exist undetected in other areas, the activities would be unlikely to affect them negatively at the population level because no ground disturbance would occur over the majority of the area. Additionally, if the tracked mulcher is used, it would still affect such a small portion of areas proposed for this activity that negative effects to undetected sensitive species are likely to be discountable.

Additional information about the specific locations of sensitive species found in the project area can be found in the Ecology/Botany/NNIS report located in the project file.

Early successional habitat and crop tree release in young hardwood stands

These stands have a history of disturbance and are highly shaded because of their young age, but they do provide habitat for some disturbance tolerant RFSS.

Because this activity creates no soil disturbance and only limited manipulation of vegetation community structure, no effects to herbaceous RFSS are anticipated. Woody species have the potential to be negatively affected by this activity if they are not avoided. Work crews will be taught to identify long-stalk holly, Bartram's shadbush, and Canada yew, and will avoid impacting individuals to the extent possible. All herbicide applications would use precisely targeted cut surface and basal spray applications. Partial opening of the dense sapling canopy could ease competition for any sensitive plants that might be present. The canopy would not be opened up enough to trigger a full-scale response from herbaceous and shrubby vegetation that might outcompete sensitive plants.

This activity would also create scattered small openings (up to 0.1 acre in size to mimic natural disturbances). Such small openings would be unlikely to negatively affect any sensitive plant species that might be present. Most plant species respond favorably to small increases in light, but such increases are not large enough to cause a substantial increase in competing vegetation. The long-term increase in the spruce component of these stands would change the character of the habitat somewhat. However, spruce likely would still make up less than half of the overstory, such that the stands would still be considered mixed spruce-northern hardwood stands. For sensitive plant species that might occur in these northern hardwood stands that currently have spruce in the understory, a change likely would not have an appreciable negative effect on habitat suitability.

Additional information about the specific location of sensitive species found in the project area can be found in the Ecology/Botany/NNIS report located in the project file.

Non-system road and skid trail decommissioning

Decommissioning would occur on non-system roads and skid trails that are having adverse hydrological effects. Many of the non-system roads and skid trails that could be selected for decommissioning have not been traveled or maintained in years, so they have been recolonized by native plants and have the potential to support sensitive plants. At the time of this writing, no areas have yet been identified for decommissioning. As non-system roads and skid trails are identified for decommissioning, botany surveys would occur prior to any disturbance. Any occurrences of sensitive species would be avoided so as to avoid negative impacts. Additional information about the specific location of sensitive species found in the project area can be found in the Ecology/Botany/NNIS report located in the project file.

Trailhead construction

The majority of the areas proposed for trailheads have not been surveyed for sensitive species. Prior to construction of any trailhead, botany surveys would be conducted. If sensitive plant species are found, the individual trailhead would be redesigned or dropped so as to avoid negative impacts to sensitive plants. Currently there are no known RFSS occurrences at planned trailheads.

Existing road to trail conversion

There are approximately 61 miles of trail reconstruction proposed on non-system roads. Many of these routes have not been traveled or maintained in years, so they have been

recolonized by native plants and have the potential to support sensitive plants. As areas are scheduled for trail work, botany surveys would occur prior to any disturbance. There are several occurrences identified within 30 feet of either side of these routes. Additional information can be found within the Ecology/Botany/NNIS report in the project file.

New trail construction

There are approximately 16.5 miles of new trail construction proposed. Due to the programmatic nature of this activity, specific trail construction will be designed so as to avoid any sensitive plant occurrences. As areas are scheduled for trail work, botany surveys would occur prior to any disturbance. Any occurrences of sensitive species would be avoided so as to avoid negative impacts. At the time of this writing there are no known occurrences within 30 feet of either side of any planned new trails.

New Road Construction

Currently there are no known occurrences of RFSS plants along FR227 Connector Route. Prior to any work, botany surveys would be conducted and any sensitive plant occurrences would be avoided.

Direct & Indirect Effects to habitat types

Rocky habitat

Due to the representative nature of the botanical surveys, undiscovered occurrences of this species could occur, but it is highly unlikely given the relative rarity of rocky habitat in the project area. The potential for effects appears to be low. Some proposed road decommissioning could occur in areas where rocky habitat occurs. In areas where decommissioning includes outsloping or full recontouring, any undiscovered sensitive plants likely would be eliminated. Design criteria would require surveys prior to ground-disturbing activities along roads and trails, and avoidance of all occurrences to the maximum extent practical.

Mesic forest habitat

Within the project area, there are known occurrences of blunt-lobed grape fern, Shriver's frilly orchid, and Canada yew. Additional undiscovered occurrences probably exist. No other mesic forest sensitive species are known to occur in the analysis area, so the potential for affecting other species in this group is low. Therefore as with wetland species, all proposed activities that involve major ground and vegetation disturbance have the potential to negatively impact undiscovered occurrences of these species. Design criteria would require surveys prior to ground-disturbing activities along roads and trails and avoidance of all occurrences to the maximum extent practical, and avoidance of Canada yew during herbicide treatments. Where impacts to herbaceous RFSS species cannot be avoided, efforts could be made to transplant them to a nearby suitable location, and transplants monitored for survival.

Over the long term, non-system road and skid trail decommissioning would lead to less compacted soils, less erosion, and greater habitat connectivity, improving habitat quality and quantity for native plants including mesic forest species. Increased sunlight from spruce and crop tree release could benefit mesic RFSS species growing in close proximity to treated areas.

Wetland and riparian habitat

Because of the low likelihood of wetland RFSS being present on old minelands, intensive surveys will likely not be done on all areas of mineland restoration. A few occurrences of RFSS are known, however, and therefore the soil disturbance of mineland restoration activities is anticipated to negatively affect some undiscovered RFSS individuals at the time of implementation. However, many of the species that have a possibility of being present are adapted to moderate disturbance. The ripping method will also preserve the soil profile. Therefore even if mature RFSS individuals are damaged or destroyed, the seedbank will remain mostly intact and be able to respond. These species could re-colonize ripped areas if they are not completely extirpated from the site. Actual benefits to these species would be unlikely to occur if none are present nearby to colonize the habitat.

In areas of non-commercial spruce restoration, spruce thinning, and hardwood crop tree release areas, herbicide application could negatively impact individual long-stalk hollies and Bartram's shadbush if these species are not identified and avoided. This possibility will be significantly reduced by design criteria that will require crew training and avoidance of impacts to these species during treatment activities. Increased sunlight from spruce release could then benefit long-stalk hollies growing in close proximity to released spruce.

Undiscovered occurrences of wetland RFSS could be negatively impacted by soil disturbance and other actions associated with road and trail construction, reconstruction, and decommissioning. The likelihood of populations remaining undiscovered is low, however, as all areas of road and trail soil disturbance will be surveyed prior to implementation. While some survey work has been done, it is not considered representative, and additional surveys are planned. RFSS occurrences will be avoided where possible. Where impacts to herbaceous RFSS species cannot be avoided, efforts could be made to transplant them to a nearby suitable location, and transplants monitored for survival. Decommissioning would restore natural contours to many stream and riparian area crossings. Over the long term, non-system road and skid trail decommissioning would lead to less compacted soils and greater riparian habitat connectivity, improving habitat quality and quantity for native plants.

Cumulative Effects

Cumulative effects include the effects of the past and present activities discussed above, the effects of the alternative presented, and all the reasonably foreseeable future actions. Alternative 2 would have no direct or indirect effects on known occurrences of sensitive plants, but has the potential to affect undiscovered occurrences. Because botanical surveys will be conducted prior to any ground or vegetation disturbance, and potential habitat will be avoided if surveys are not conducted, the potential for affecting undiscovered occurrences is considered low enough that a meaningful analysis of the contribution to the cumulative effects of other past, present, and reasonably foreseeable future actions is not practical.

No ongoing or reasonably foreseeable future Forest Service actions are likely to impact known occurrences of RFSS plants if design criteria, avoidance measures, and mitigation protocols are followed. Therefore, the direct and indirect effects of the Mower Restoration Project, added to the effects of other past, present, and reasonably foreseeable future actions is not expected to impact population viability within the analysis area. Also, project acitivites would pose a negligible risk of damaging or extirpating unknown occurrences of other sensitive plant species with potential habitat in the project area. Therefore, for all sensitive plant species listed in Tables 15-17, Alternative 2 may impact individuals, but is not likely to lead to loss of

viability or a trend toward federal listing. Sensitive plant species that are not listed in Tables 15-17 are not expected to occur in the project area. Therefore, there will be no impacts to these species.

The cumulative effects of Alternative 2 in combination with the existing condition of the species and habitats, past events and actions, and reasonably foreseeable future actions would be restored, native habitats that would provide quality habitat for a large number of species, but that could not provide optimum habitat everywhere for every species. Future private or agency actions are not expected to create impacts that would interact cumulatively in an additive or synergistic manner with the proposed project.

Irreversible or Irretrievable Commitment of Resources

Alternative 1 (No Action) would not affect sensitive plants, so it would not make any irreversible or irretrievable commitments of resources with respect to sensitive plant species.

Alternative 2 (proposed action) could result in the irretrievable loss of an undetermined number of Arctic bentgrass (*Agrostis mertensii),* long-stalk holly (*Ilex collina)*, Bartram's shadbush (*Amenlanchier bartramiana),* Blue-ridge St. John's wort *(Hypericum mitchellianum),* blunt lobed grape fern *(Botrychium oneidense),* thread rush *(Juncus filiformis),* heartleaf twayblade *(Listera cordata var. cordata),* large-flowered Barbara's buttons *(Marshallia grandiflora),* Shriver's frilly orchid *(Platanthera shriveri),* and Canada yew *(Taxus Canadensis),* and other species which appear to have suitable habitat but are currently not known to exist in the project area. The losses would not be considered irreversible, because the seed bank will be left mostly intact, enabling species to recolonize disturbed sites over the long term as vegetative succession proceeds.

Consistency with the Forest Plan, Laws, Regulations, and Handbook

Alternative 1 (No Action) would not affect sensitive plants, and therefore would be consistent with Forest Plan direction that requires protection of sensitive plants.

Alternative 2 could affect undiscovered occurrences of sensitive plants as described above. Damage to all known occurrences would be avoided to the extent possible, so Alternative 2 would be consistent with Forest Plan direction to avoid and minimize negative impacts on sensitive plants to the extent practical (see Forest Plan standard VE13). Additional information about the specific location of sensitive species found in the project area can be found in the Ecology/Botany/NNIS report located in the project file. Design features for specific activities at known locations or locations discovered during pre-implementation surveys are included in Appendix B.

Alternative 1 would take no actions and have no effects on sensitive plants, so it would be consistent with all laws, regulations, handbooks, and executive orders relating to the protection and management of sensitive species.

Under Alternative 2, effects to sensitive species would be avoided and minimized as much as possible, and would not result in loss of viability or a trend toward federal listing. Because of this maintenance of viability, Alternative 2 would be consistent with requirements in the National Forest Management Act and its implementing regulations related to maintenance of biological diversity and population viability.

Non-native Invasive Plant Species

This section addresses the effects of the alternatives of Mower Tract project to nonnative invasive plant species (NNIS).

Scope of Analysis

The spatial boundary for direct and indirect effects for this analysis pertains to the 32,980 acres of National Forest lands within the project area. For cumulative effects, the spatial boundary of the analysis is the Proclamation and Purchase Unit boundary for the Monongahela National Forest.

The immediate, direct effects of these treatments on vegetative community structure and patterns of succession would begin soon after implementation, and will persist for decades as the vegetation matures. The temporal boundary for analyzing direct and indirect effects to NNIS is 30 years from the beginning of project implementation. This temporal boundary is also used for the cumulative effects analysis because the contribution to cumulative effects ends when the direct and indirect effects no longer exist.

Methodology

Surveys for NNIS plants have been conducted sporadically throughout the project area by the Forest Service or West Virginia Division of Natural Resources/Natural Heritage in the past, and will continue throughout the project area as needed. Botany surveys will be conducted in all proposed activity areas that will involve soil disturbance, significant daylighting, or road decommissioning or construction. Surveys will also be conducted as necessary to track known populations and document new infestations.

The limited botany survey work that has been conducted has been done during the growing season by experienced botanists, and has consisted of meandering walks through representative habitats in all parts of targeted activity areas, with a goal of traversing an average of 100 linear feet per acre of activity area. Locations of NNIS plants were noted and documented using global positioning system technology. Future surveys will be conducted in the same manner by qualified personnel. For plant species known or likely to occur in the project area, the potential effects of each action were assessed according to the plants' life history characteristics and habitat needs.

Affected Environment

Five non-native invasive species are known to occur in the Mower project area. In the north, there is spotted knapweed, bull thistle, garlic mustard, and tall fescue. There are also several known patches of reed canary grass in the south central part of the project area. Spotted knapweed is currently being treated.

Alternative 1

Direct & Indirect Effects

Alternative 1 (No Action) would not implement any new activities. Therefore, it would not cause any new or expanded invasive plant infestations beyond those that occur due to natural processes and ongoing management activities such as road maintenance, dispersed and developed recreation activities, etc. Alternative 1 also would not reduce any existing infestations beyond reductions that may occur due to ongoing invasive plant treatment programs.

Cumulative Effects

The existing condition of the area reflects the cumulative impact of many past actions, including, but not limited to those shown in Table 3. Because Alternative 1 would have no direct or indirect effects on invasive plant infestations, it would not contribute to the cumulative effects of other past, present, and reasonably foreseeable future actions.

Alternative 2

Direct & Indirect Effects

Any activity that increases daylight at ground level or disturbs soil has the potential to facilitate the spread of existing NNIS or the introduce NNIS from contaminated equipment. The potential for both direct and indirect spread of NNIS is greatest in activity areas near existing infestations which could provide ready seed sources. However, invasions could occur in other areas due to long-distance dispersal of seeds via contaminated equipment, seed or plant material, and natural means such as birds and wind.

Soil disturbance will occur in activity areas of mineland restoration, vernal pool creation, road maintenance and construction, and trail construction and maintenance including trailheads. Significantly increased daylighting will occur in areas of mineland restoration, non-commercial thinning, and ESH habitat and crop tree release. Spruce release will create a moderate increase to forest-floor ambient light levels.

Design features and mitigation measures will reduce the risk of anthropogenic introduction or spread in all activity areas. Pre- and post-activity surveys, and coordination with ongoing invasive plant control treatment programs, will help control infestations.

Cumulative Effects

The major potential negative effect of the Mower project relative to nonnative invasive plants is the potential for introduction and spread of invasive plants in areas disturbed by project activities. This effect would add to the effects of past activities that may have caused the introduction and spread of invasive plants. The impacts from these past activities are still influencing the forest and vegetative landscape, resulting in several infestations of non-native invasive plants. Any effects of the Mower project also would be additive to the effects of recently completed, ongoing, and reasonably foreseeable future activities (Table 3) within the cumulative effects boundary.

The actual cumulative amount of infested land is impossible to predict under either alternative, but design criteria and mitigation measures that would be applied to Alternative 2 would reduce the potential for a large cumulative increase in infested land. Recent and foreseeable activities will affect a very small percentage of the project area, and there is little overlap with acres affected by the proposed action. The cumulative effects of this project are therefore negligible when added incrementally to past, present, and reasonably foreseeable actions.

Irreversible or Irretrievable Commitment of Resources

Alternative 1 would implement no action and have no effects. Therefore, Alternative 1 would cause no irreversible or irretrievable commitment of resources with respect to invasive plants.

Under Alternative 2, an undetermined portion of the restored mineland, restored red spruce habitat, new ESH habitat, areas of crop tree release, and roads and trails (existing and decommissioned) could be irretrievably infested by non-native invasive plants. Project design criteria include measures to monitor and coordinate with other projects to control these infestations, so the infestations would not be considered irreversible

Consistency with the Forest Plan, Laws, Regulations, and Policy

The alternatives would meet the requirements of laws, regulations, and Forest Service policy for vegetation resources. However, the Alternative 2 (proposed action) would be more consistent with direction in the Forest Plan, and meet the intent and spirit of management prescription 4.1 better than Alternative 1.

Tiering to the Forestwide EA, and in coordination with project implementation, new and existing NNIS sites will be analyzed and treated as needed. Alternative 2 also includes design criteria to reduce the risk of spreading invasive plants via equipment or planting material. These measures ensure consistency with Forest Plan direction for non-native invasive species (see Forest Plan direction VE19 through VE23 on pages II-19 and II-20).

The primary federal direction that relates to management of non-native invasive species by federal agencies is Executive Order 13112 (February 3, 1999). The provisions of this order that are relevant to the Mower project stipulate that federal agencies use their programs and authorities to prevent the spread of invasive species, control invasive species in a cost-effective and environmentally sound manner, and refrain from funding, authorizing, or carrying out activities that are likely to promote the spread of invasive species.

Alternative 1 would not implement any activities or have any direct or indirect effects with respect to invasive species, so it would be consistent with Forest Plan direction for minimizing the spread of invasive species. Therefore, Alternative 1 would be consistent with EO 13112.

Alternative 2 tiers to the Forest-wide NNIS EA, and contains provisions for surveys of invasive plants that have the potential to cause disruption of forested ecosystems. These control and monitoring provisions make Alternative 2 consistent with EO 13112.

Threatened, Endangered Terrestrial Wildlife Species

This biological assessment (BA) includes the effects analysis for federally-listed terrestrial wildlife species in regards to the alternatives considered for this project.

Scope of Analysis

For direct and indirect effects, the spatial boundary includes the 33,994 acre Mower Restoration Project Area. For cumulative effects, the spatial boundary is the same.

Restoration activities are anticipated to commence in 2016. Implementation frequency and duration would be contingent upon funding. Noise and visual disturbances associated with restoration activities are not expected to persist after the activities are completed, which is anticipated to be in the next 10 years. Potential short-term effects refer to potential impacts post project implementation for up to approximately 30 years. Long-term effects refer to potential impacts beyond 30 years after project implementation.

Methodology

To determine which T&E species could be potentially affected by the proposed activity, a "Likelihood of Occurrence" (LOO) table (see Biological Assessment, Appendix A in the project file) specific to the project area was completed. In this table, all Forest T&E species are listed along with their current federal/state ranking, habitat description requirements and known locations. A comparison between species habitat requirements and existing project area habitat was made. Species information was collected from District/Forest T&E records and files, records from the WV Natural Heritage Program, research literature, field surveys, and personal communication with specialists to determine each species' likelihood of occurrence in this project area. Conclusions drawn from the LOO table dictate the level of analysis needed for each T&E species. T&E species determined not to occur or unlikely to occur in the project area due to lack of habitat are not carried through further analysis.

Two other listed species, gray wolf (*Canis lupus* – endangered) and eastern cougar (*Puma concolor couguar* – endangered), formerly existed in the area, but are believed to have been extirpated in the late 1800s or early 1900s (WVDNR 1988). One listed species, the gray bat (*Myotis grisescens*), is known from one record from a winter hibernaculum survey in 1991. This record is considered accidental, and the species is not considered to occur in West Virginia (Stihler pers. comm. 2000). These three species will not be discussed further in this analysis.

The key to determining effects is evaluating how Alternative 2 affects species and habitat, and, in particular, how Alternative 2 affect factors that limit a species's ability to thrive (limiting factor). Direct and indirect effects to federally-listed species and habitat lead to a "determination of effect" for each species. These determinations can be: 1) "no effect"; 2) "may affect, beneficial affect"; 3) "may affect, not likely to adversely affect"; or 4) "may affect, likely to adversely affect".

The determination of effects and supporting effects analysis are provided below for the Virginia big-eared bat, Indiana bat, and northern long-eared bat and Cheat Mountain salamander. Additional information for species specific methodologies, including survey efforts and suitability modeling, is included in the BA found in the project file.

Affected Environment

For the federally-listed threatened and endangered species known or likely to occur within the project area, a summary of potential habitat within the project area is included below. Additional information specific to each species and survey efforts that have occurred in the project area can be found in the BA included in the project file.

Virginia big-eared bat (Corynorhinus townsendii virginianus)

No Virginia big-eared bats (VBEB) have been captured during mist net surveys in the project area. No VBEB caves are located within the project area. One cave (Stewart Run Cave) is within 6 miles of the project area. This cave is considered an insignificant hibernaculum for the VBEB. There are approximately 28,720 acres of primary habitat for VBEB in the project area as a result of Stewart Run Cave. There are no known maternity or bachelor colonies within six miles of the project area. There are no mine adits or abandoned buildings on federal property within the project area that could be used as day or night roosts.

Indiana bat (Myotis sodalis)

No Indiana bats have been captured in the project area. According to WVDNR data, there are no mapped caves in the project area. Three Indiana bat hibernacula are located within 5 miles of the project area: Cass Cave, Stewart Run Cave and Simmons-Mingo Cave. Given the distance from the project area to the known hibernacula, project actions would not affect these cave environments. Approximately 24,600 acres of the Mower project area does fall within the 5-mile primary foraging habitat for these caves. However, due to the cool moist climate of the project area, Indiana bat usage presence is thought to be discountable in the project area, as evidenced by lack of any Indiana bat captures from mist net surveys in the project area.

Indiana bat maternity activity is not expected in the project area because of the cool moist climate associated with spruce (and former spruce) forests. The negative data for Indiana bats, despite numerous mist net surveys over the last fifteen years verifies this notion.

Northern long-eared bat (Myotis septentrionalis)

NLEB typically uses mature, intact interior forest for roosting, though younger, managed forests are also used; roost selection is likely adaptable and variable depending on forest characteristics in an area (Broders et al. 2006, Carter and Feldhamer 2005, Ford et al. 2006, Henderson et al. 2008, Lacki and Schwierjohann 2001, Loeb and O'Keefe 2006, Perry and Thill 2007). The entire project area is considered suitable habitat for the NLEB.

Based on mist net surveys, 31 NLEB at four of the five mist net locations within the project area. It is unknown if there is still a viable population of NLEB in the project area since the onset of WNS. There seemed to be much more maternity activity in the project area prior to the arrival of WNS in West Virginia. Since WNS, maternity activity has only been detected once (2009). There was no documented maternity activity in 2011 and 2013. However, for the purposes of this analysis, it is assumed that the entire project area could support NLEB. No maternity roosts have ever been identified in the project area.

Cheat Mountain salamander (Plethodon nettingi)

Based on the survey data and mapping efforts, there are approximately 2,737 acres of Cheat mountain salamander (CMS) habitat in the project area (see BA, Figure 12, in project file). This

number is an overestimate because of the discontinuous nature of potential CMS habitat, as described above. The CMS habitat consists of approximately eleven areas scattered throughout the project area on the upper slopes and highest ridges. Of this area, approximately 1,461 acres are considered 'occupied' habitat. Areas considered occupied habitat are comparable and connected to where CMS have been discovered. All known locations of CMS are within the occupied polygons. Approximately 520 acres are considered 'presumed occupied'. Although previous searches have failed to find CMS, the habitat is excellent and in the spirit of Section 7(a)(1) it seems appropriate to presume occupancy for the CMS in these areas. The remaining 756 acres are considered 'potential' CMS habitat. For these areas, while there may have been some failed searches for CMS, there is not enough data to dismiss the potential for CMS occurrences. However, based on review of the habitat notes, the habitat is less than ideal.

The rest of the project area is not considered CMS habitat because of past anthropogenic disturbances, climatic (too warm and dry) or edaphic factors (geologic formations, lack of rock and an abundance of clay in the soil, too wet, surface or subsurface flow, etc.), topographic location, or a combination of these factors. Additionally, the presence of the Allegheny Mountain dusky salamander and/or redback salamander greatly reduces the likelihood of CMS presence. There are approximately 50 occurrences of negative field survey data (CMS searches did not discover CMS) scattered throughout the project area that verifies this notion.

Alternative 1

Federally-listed Species

Direct & Indirect Effects

Alternative 1 would not implement any new activities. For these reasons, there would be no effects on federally-listed bat species.

Cumulative Effects

There are no anticipated direct or indirect effects to federally-listed species from implementation of the No Action beyond those that occur due to natural processes and ongoing management activities such as road maintenance, dispersed recreation activities, etc. For these reasons, there will be no cumulative effects to federally-listed species.

Alternative 2

Virginia big-eared bat (Corynorhinus townsendii virginianus)

Direct & Indirect Effects

Implementation of the proposed action is not expected to directly or indirectly have an effect on the VBEB, or its habitat. There are no known caves in the project area used by the VBEB, be it winter hibernacula, maternity colonies, or bachelor colonies. Although approximately 28,720 acres in the analysis area occur within a 6-mile foraging area from an insignificant hibernaculum for VBEB, the VBEB is not expected in the project area because of the cool moist climate as a result of the high elevation of the project area. Therefore, it is unlikely that VBEBs would travel to forage within the project area, as evidenced by the lack of capture of VBEB from mist net surveys. Project implementation would have a beneficial effect on foraging habitat for the

VBEB through the restoration activities proposed. However, any effects to this species under Alternative 2 are considered discountable because of the low probability of VBEB frequenting the project area.

Cumulative Effects

Any cumulative effects to this species under Alternative 2 are considered discountable because of the low probability of VBEB frequenting the project area.

Indiana bat (Myotis sodalis)

Direct & Indirect Effects

Implementation of the proposed action is not expected to directly or indirectly have an effect on the Indiana bat, or its habitat. There are no known caves in the project area used by the Indiana bat and no Indiana bats have been captured in the project area. Although approximately 24,600 acres in the analysis area occur within a 5 mile foraging area from three different Indiana bat hibernacula, the Indiana bat is not expected in the project area because of the cool moist climate as a result of the high elevation of the project area. Therefore, it is unlikely that Indiana bats would travel to forage within the project area, as evidenced by the lack of capture of Indiana bats from mist net surveys. Project implementation would have a beneficial effect on foraging habitat for the Indiana bat through the restoration activities proposed. However, any effects to this species under Alternative 2 are considered discountable because of the low probability of Indiana bats frequenting the project area.

Cumulative Effects

Any cumulative effects to this species under Alternative 2 are considered discountable because of the low probability of Indiana bat frequenting the project area.

Northern long-eared bat (Myotis septentrionalis)

Direct & Indirect Effects

For a summary of anticipated effects to the NLEB and its habitat, please see the relevant sections within the "Potential Effects of Management Activities" of the Conferencing Report (pages 6 and 8-9); the "Effects of the Action" section of the CO (pages 14-16); the Regional BA (pages 50-82); and the Regional BO (pages 38-77). The anticipated effects to habitat and/or individuals for each of the proposed activities are provided in the BA found in the project file.

Potential adverse effects to the NLEB and its habitat are thought to be negligible and discountable and project implementation would have a beneficial effect on foraging and roosting habitat for the NLEB through the restoration activities proposed. There are no known caves in the project area used by the NLEB. Although NLEB have been detected in the project area, the nature and the location of the proposed activities are not thought to adversely affect this species. NLEB maternity activity has been confirmed in the project area at one of the mist net locations. The only proposed activity within 5 miles of the documented NLEB maternity activity is 30 acres of mineland restoration. As described in the summary of design features associated with the proposed activities in Appendix B, bat acoustic surveys would occur prior to any mineland restoration that would include the knocking down of nonnative conifer trees.

Outside of this activity, the biggest risk to potentially impacting NLEB would result from all activities that would involve the felling of trees greater than 5" dbh. These activities include:

trailhead construction, new trail construction, road decommissioning, and new road construction. Therefore, prior to implementation of these activities, the Forest Service will conduct bat acoustic surveys or clear large trees outside of the non-volant period for the NLEB. If NLEB are detected, the Forest Service will reinitiate consultation with the FWS prior to implementing these activities.

Due to the dispersed nature of disturbance and the design features incorporated into the project, along with the abundance of other higher quality roost trees and snags scattered throughout the project area, the probability of a NLEB being present in the trees that will be affected by these projects is considered negligible and discountable.

All applicable S&G from the 2006 Forest Plan, as listed in Appendix A of the 2006 BO and pages 184-190 of the programmatic BA (USDA 2015) meant to avoid incidental take in both summer and winter habitat have been incorporated into the proposed action.

There is no permanent conversion of suitable NLEB habitat to unsuitable habitat, and the proposed action is likely to improve summer roosting and foraging habitat over the long-term: snag creation, reduced understory clutter, maintenance of canopy-covered foraging/travel corridors and likely improvement in abundance and diversity of insects.

Cumulative Effects

Any cumulative effects to this species under Alternative 2 are considered discountable because of the design features incorporated into the project to avoid negatively impacting the species.

Cheat Mountain salamander (Plethodon nettingi)

For a summary of potential effects to the CMS and its habitat, please see pages 65-66 of the MNF Forest Plan Revision BA (2006b). A summary table is included in the BA that describes the anticipated effects of the proposed activities to the CMS and its habitat.

Although there is a small portion of new trail proposed in CMS habitat, post-decisional surveys will ensure that this trail segment has no effect on the CMS. The trail will be rerouted or not constructed if CMS or CMS habitat is encountered. Approximately 2.5 miles of road to trail conversion is located in CMS habitat. Because the trail would be built on an existing linear disturbance, negative effects to the CMS are not expected. Of the 2.5 miles proposed in CMS habitat, approximately 1 mile is located in the Fish Hatchery Run area. Field reviews in 2015 showed that there would be no effect to CMS habitat as a result of road to trail conversion in this area. Approximately 0.8 miles of road to trail conversion in CMS habitat is located above Watertank Hollow, just south of the Fish Hatchery area. Although there are good areas of CMS habitat, it appears that the trail could be located so as to avoid effects to CMS. To ensure that the integrity of CMS habitat is maintained in adjacent habitat, post-decisional review would include involvement by the wildlife biologist. For the rest of the areas, although field reviews have not been conducted, they would be conducted prior to implementation. If a trail cannot be located to avoid CMS habitat, that portion of the trail would not be constructed.

Three vegetative manipulation activities include management in CMS habitat. These activities are non-commercial spruce restoration in mature hardwood stands (373 acres); non-commercial thinning in young spruce stands (915 acres); and crop tree release in young hardwood stands (224).

For the spruce release in mature hardwood stands, negative effects to CMS and its habitat are thought to be discountable. The recommended design features is that there is no use of herbicides

in areas within mapped CMS habitat. The nature of this activity is such that very little canopy gap is created in the overstory. The majority of impact would be on hardwood midstory vegetation that is over top of red spruce trees. For the small trees that would be cut, they would be left on the forest floor. Although there would be a slight risk to the CMS and its habitat for areas in CMS habitat, the long term effect would be beneficial because it would encourage a forest with more red spruce, which would encourage the cool moist microclimate that the CMS depends upon.

For the thinning in young spruce stands and crop tree release in young hardwood stands in CMS habitat, the forest is currently overstocked with 1000s of stems per acre. Although this activity would impact the overstory vegetation, all trees cut as part of the thinning operation would be left on the forest floor, providing organic material to provide shade to retain the cool, moist microclimate. The tracked mulcher would not be used in CMS habitat and no herbicide will be used in areas within mapped CMS habitat. Potential effects to the CMS and its habitat are thought to be discountable because of past disturbances and the nature of the activity proposed.

The following activities would have no effect on the CMS or its habitat due to the nature and/or location of the activity: mineland restoration, trailhead construction, road decommissioning, new road construction, and stream habitat improvements. For activities proposed in CMS habitat, design features have been incorporated into this proposed action and are described in Appendix B. A map showing these locations is included in the BA found in the project file.

Effects Determination

The following determinations of effects to T&E species have been made as a result of this effects analysis.

Species	Alternative 1	Alternative 2
Virginia big-eared bat (*Corynorhinus townsendii virginianus*)	No effect	May affect, Not Likely to Adversely Affect
Indiana bat (*Myotis sodalis*)	No effect	May affect, Not Likely to Adversely Affect
Northern long-eared bat (*Myotis septentrionalis*)	No effect	May affect, Not Likely to Adversely Affect
Cheat Mountain salamander (*Plethodon nettingi*)	No effect	May affect, Not Likely to Adversely Affect

Irreversible or Irretrievable Commitment of Resources

Project activities would not result in an irreversible or irretrievable commitment of resources for any federally-listed species. Furthermore, the loss of habitat for federally-listed species is not measurable.

Consistency with the Forest Plan, Laws, Regulations, and Policy

Because Alternative 1 does not implement actions that improve or enhance the habitat of federally-listed wildlife species or help move these species towards de-listing, this alternative does not help achieve the desired future conditions for the project area and is therefore inconsistent with the Forest Plan. Although Alternative 1 does not enhance or improve potential

suitable habitat for federally-listed wildlife species, it is not inconsistent with law, regulations, policy, or agency direction.

Alternative 2 is consistent with Forest Plan and moves towards achieving the goals and objective for the project area. In regards to the proposed actions of Alternative 2, consultation is ongoing with the USFWS. Alternative 2 would be consistent with Endangered Species Act protections and consultation requirements, as well as all regulations, directives, and policies that implement that act with respect to threatened and endangered plants.

All alternatives would be consistent with the following:

- Multiple Use and Sustained Yield Act of 1960
- National Environmental Policy Act of 1969
- Endangered Species Act of 1973 (ESA)
- Sikes Act of 1974
- Forest and Rangeland Renewable Resources Planning Act of 1974
- Federal Land Policy and Management Act of 1976.

Other Wildlife Species of Concern

This section summarizes the analysis of analysis of terrestrial wildlife, and includes those listed as Regional Forester's Sensitive Species (RFSS), Management Indicator Species (MIS), and Birds of Conservation Concern (BCC).

Regional Forester's Sensitive Species (RFSS)

Scope of Analysis

For direct and indirect effects, the spatial boundary includes the 33,994 acre Mower Restoration Project Area. For cumulative effects, the spatial boundary is the same.

Restoration activities are anticipated to commence in 2016. Implementation frequency and duration would be contingent upon funding. Noise and visual disturbances associated with restoration activities are not expected to persist after the activities are completed, which is anticipated to be in the next 10 years. Potential short-term effects refer to potential impacts post project implementation for up to approximately 30 years. Long-term effects refer to potential impacts beyond 30 years after project implementation.

Methodology

Field surveys, GIS layers pertaining to wildlife, layers specific to RFSS, as well as layers pertaining to unique habitat features such as wetlands and riparian areas were reviewed. Additionally, GIS layers were updated based on a February, 2016 information request to the West Virginia Division of Natural Resource's Natural Heritage Database. Sixty-five terrestrial animals are listed as RFSS on the MNF. This number does not include aquatic species.

A Likelihood of Occurrence (LOO) table was created and updated based upon the December, 2011 RFSS update to aid in the analysis to determine which RFSS are likely to occur in the Mower project area (see Biological Assessment, Appendix A in the project file). Through this analysis, it was determined that 8 RFSS are known to occur in the project area and there is potential habitat for an additional 6 terrestrial RFSS in the project area (Table 18). Species determined not to occur or unlikely to occur in the project area due to lack of habitat, based on the LOO (51 species) were not brought forward for further analysis because no impacts are anticipated due to the lack of potential habitat in the project area.

Although transient bald eagles could frequent the project area, there are no documented instances of nesting. Therefore, no further analysis will be completed for bald eagle. Implementation of Alternatives 1 or 2 would have no direct, indirect, or cumulative impacts on the bald eagle. The analysis for the West Virginia northern flying squirrel can be found in the Management Indicator Species report.

The key to determining effects is evaluating how Alternative 2 affects species and habitat, and, in particular, how Alternative 2 affect factors that limit a species' ability to thrive (limiting factor). Direct and indirect effects to RFSS species and habitat lead to a "determination of effect" for each species. These determinations can be: 1) "no impact"; 2) "beneficial impacts"; 3) "may impact individuals but not likely to cause a trend to federal listing or a loss of viability"; or 4) "likely to result in a trend to federal listing or a loss of viability".

RFSS species have been grouped into the following habitat types for effects analysis: riparian; wetland; rocky; mature forest; and savannahs/grasslands habitat.

Table 18. Regional Forester Sensitive species known to occur or with potential habitat within the project area.

Common Name	Scientific Name
Known to Occur in Project Area:	
West Virginia northern flying squirrel	*Glaucomys sabrinus fuscus*
southern rock vole	*Microtus chrotorrhinus carolinensis*
eastern small-footed bat	*Myotis leibii*
little brown myotis	*Myotis lucifugus*
tri-colored bat	*Perimyotis subflavus*
long-tailed shrew	*Sorex dispar*
southern water shrew	*Sorex palustris punctulatus*
Northern goshawk	*Accipiter gentilis*
Potential habitat could occur in the Project Area:	
Allegheny woodrat	*Neotoma magister*
southern bog lemming	*Synaptomys cooperi*
olive-sided flycatcher	*Contopus cooperi*
early hairstreak	*Erora laeta*
rapids clubtail	*Gomphus quadricolor*
vesper sparrow	*Pooecetes gramineus*

Affected Environment

Riparian habitat species

Riparian acres have been calculated based on 100-foot buffers on ephemeral and perennial streams. There are approximately 1,338 acres of riparian habitat within the analysis area. This is a coarse number based on 56 miles of streams. The aquatic/riparian zones in the analysis area provide potential habitat for the RFSS terrestrial animals (Table 19).

Table 19. Limiting Factors for RFSS riparian habitat species.

Species	Potential Habitat	Known Occurrence	Limiting Factor
Southern water shrew		X	Disturbance to habitat
Little brown myotis		X	White Nose Syndrome
Rapids clubtail	X		Habitat alteration and contamination

Southern water shew

Although southern water shrews are difficult to capture, occupancy has been documented at four different locations throughout the project area. Riparian areas throughout the project area are considered potentially occupied by the southern water shrew.

Little brown myotis

Approximately 32 little brown myotis have been captured via mist netting at five different locations throughout the project area. Every capture was a non-reproductive individual; therefore, evidence of reproduction in the project area has not been documented.

Rapids clubtail

This is a type of dragonfly that depends upon prefers clear streams with strong current over clean gravel, cobbles or bedrock, on comparatively unproductive soils ("trout stream"). It is believed that adults seek out running water or small rapids to lay their eggs. Although this species has not been documented in the project area, two other species of the same genus have been found along the Shavers Fork River. Streams within the project area are considered potential habitat for this species.

Wetland habitat species

Wetland areas were determined from the National Wetlands Inventory (NWI). Wetlands mapped by the NWI that were within stream buffers were not included here because they are part of the riparian habitat, as described above. Based on the NWI, there are approximately 58 acres of isolated wetland habitat in the project area.

Table 20. Limiting factors for RFSS wetland species.

Species	**Potential Habitat**	**Known Occurrence**	**Limiting Factor**
Southern bog lemming	X		Disturbance to wetlands
Tri-colored bat		X	White Nose Syndrome

Southern bog lemming

These animals are found in mixed forests, wetlands and grasslands in eastern North America, especially, in or near bogs, wet meadows and fields near ponds and creeks. Although the southern bog lemming has not been documented in the project area, wetlands throughout the project area are considered potential habitat for this species.

Tri-colored bat (eastern pipistrelle)

Based on winter bat counts conducted by the WVDNR, White Nose Syndrome has resulted in a 95% population decline over the last several years in West Virginia. Ten individuals (7 in 2001; 2 in 2006; and 1 in 2011) have been captured at one mist net location in the project area. Every capture was a non-reproductive individual; therefore, evidence of reproduction in the project area has not been documented. Mist net surveys at this same location in 2015 did not capture any tri-colored bats.

Rocky habitat species

Rocky habitat consists of areas with surface rock, small outcrops, and ledges. Although the amount of rocky habitat within the project area is not known, it is expected to be sporadic throughout the project area.

Table 21. Limiting factors for RFSS rocky habitat species.

Species	Potential Habitat	Known Occurrence	Limiting Factor
Southern rock vole		X	Disturbance to habitat
Eastern small-footed bat		X	Disturbance to habitat
Long-tailed shrew		X	Disturbance to habitat
Allegheny woodrat	X		Disturbance to habitat

Southern rock vole

The southern rock vole has been found in three different areas within the project area.

Eastern small-footed bat

Unlike other bat species, White Nose Syndrome has not had a devastating impact on this species. Based on winter bat counts conducted by the WVDNR, there has been a 10.5% increase in the winter population of this species in West Virginia since the onset of White Nose Syndrome. Four individuals of this species have been captured at one mist net location in the project area, including reproductively active females.

Long-tailed shrew

The long-tailed shrew is found on rocky slopes in mountainous areas. It has been documented at five locations in the project area.

Allegheny woodrat

This species is found in extensive rocky areas in deciduous or mixed forests, outcrops, cliffs, rocky talus slopes, caves, riverbanks with sandstone rocks and boulders. Although it has never been documented in the project area, the potential for occurrence cannot be ruled out because it is widespread across the Monongahela in rocky areas.

Spruce-influenced Mature Forest habitat species

The Mower Tract project area is dominated by 50-100 year old forests. Approximately 17% of the stands in the project area are greater than 100 years old, while approximately 13% of the area is less than 30 years old. Historically, the entire project area was a red spruce influenced old-growth ecosystem as a result of mature forests with at least 30% overstory red spruce. Today, the project area is a combination of nonnative grasses and plantations; immature hardwood dominated forests with varying levels of natural spruce regeneration in the understory and midstory; young hardwood dominated forest with varying amounts of red spruce; and young dense spruce thickets. Well-established understories of sapling-sized red spruce occur in the hardwood stands throughout the project area.

Table 22. Limiting factors for RFSS of spruce-influenced mature forest habitats.

Species	Potential Habitat	Known Occurrence	Limiting Factor/Other comments
West Virginia northern flying squirrel		X	The WVNFS is analyzed in detail in the Management Indicator Species (MIS) report.
Northern goshawk		X	Disturbance to nesting
Olive-sided flycatcher	X		Habitat alteration
Early hairstreak	X		Disturbance to habitat or failure of beechnut crop

Northern goshawk

There is a historic nest site in the upper reaches of First Fork. Additionally, it is not uncommon to have reports of goshawk sightings throughout the project area.

Olive-sided flycatcher

This bird is a distinctive large flycatcher of the boreal and western coniferous forests that breeds in montane and northern coniferous forests, at forest edges and openings, such as meadows and ponds. Potential habitat for this species exists where there are openings in mature spruce influenced forests with standing snags.

Early hairstreak

The early hairstreak is found in a narrow band from northern Wisconsin across southeastern Canada to Maine and from there scattered through the Appalachian range from New England to northern Georgia. It is considered one of the rarest of butterflies throughout its range and in several states and provinces this species is critically imperiled. The habitat is mature deciduous and mixed woods containing its hostplants, American beech and beaked hazelnut.

Savannah and Grassland habitat species

Savannahs and grasslands within the project area include areas previously mined and reclaimed that are dominated by nonnative grasses.

Table 4. Limiting factors for RFSS savannah grassland habitat species

Species	Potential Habitat	Known Occurrence	Limiting Factor
Vesper sparrow	X		Disturbance to habitat

Vesper sparrow

The Vesper Sparrow responds quickly to changes in habitat. It is often the first species to occupy reclaimed mine sites and abandon old farm fields as they return to forest. The mineland

restoration areas, particularly those that are dominated by grasses could provide potential habitat for this species.

Alternative 1

Direct & Indirect Effects

Riparian Habitat and Species

Under this alternative, there would be no potential for negative effects from management actions. Also, there would be no potential for beneficial effects related to riparian habitat, other than time to continue to slowly heal from past anthropogenic impacts. However, with no action, forest structure would continue to be primarily even-aged, with a continued gradual decline in tree growth.

Wetland Habitat and Species

Under this alternative, there would be no potential for negative effects from management actions. Also, there would be no potential for beneficial effects related to wetland/vernal pool creation.

Rocky Habitat and Species

Under this alternative, there would be no potential for negative effects from management actions.

Spruce Influenced Mature Forest Habitat and Species

As there are no project activities proposed in Alternative 1, there would be no direct effect to mature forest species, and viable populations would be maintained. Natural disturbances such as ice and wind storms, and disease or insect outbreaks could occur, but the extent of their effects cannot be predicted. Most trees are now in the 60 to 100 year old age class; with Alternative 1, these forested stands would continue to age and mature. Vertical stand structure would increase in diversity within stands, and diversity between stands would slowly decrease as all stands trend toward uneven-aged conditions.

Savannah and Grasslands Habitat and Species

Under this alternative, there would be no potential for negative effects from management actions.

Cumulative Effects

Because Alternative 1 would have no direct or indirect effects on sensitive animals, it would not contribute to the cumulative effects of other past, present, and reasonably foreseeable future actions.

Alternative 2

Direct & Indirect Effects

Only activities that would occur in each habitat or have the potential to affect that particular habitat or species are included in this analysis. Tables summarizing each activities potential effects to the various habitat types can be found in the Wildlife RFSS report in the project file.

Riparian Habitat and Species

Overall the effects of Alternative 2 on RFSS associated with riparian habitat and populations would be negligible. Activities associated with the proposed trail system (Trailhead construction and new trail construction) would have a negligible negative impact on riparian habitat and species. Community viability would be maintained and no adverse effects on sensitive species would be expected. Alternative 2 may impact individuals but is not likely to cause a trend toward federal listing or a loss of viability for the sensitive species inhabiting riparian habitat.

Wetland Habitat and Species

As long as the recommended design feature to avoid mapped wetlands is incorporated into the project (Appendix B), there would be no potential for negative effects from management actions. If the design features are not incorporated, there would a slight risk in negatively impacting approximately 4.3 acres of wetland habitat. Overall the effects of Alternative 2 on RFSS associated with wetland habitat and populations would be negligible. Community viability would be maintained and no adverse effects on sensitive species would be expected. There would be an improvement of wetland habitat as the result of wetland/vernal pool creation as part of the mineland restoration activities. Alternative 2 may impact individuals but is not likely to cause a trend toward federal listing or a loss of viability for the sensitive species inhabiting wetland habitat.

Rocky Habitat and Species

Although trail construction, road construction, and use of the tracked mulcher could be detrimental to this habitat type, this habitat would be avoided for these types of activity. Additionally, there are no known occurrences of any species dependent upon rocky habitat near these proposed activities. Mineland restoration is the only proposed activity that has the potential to affect rocky habitat or the species dependent upon this habitat type. There is a southern rock vole occurrence within one mineland restoration unit. Although this activity poses a short-term risks to individuals, this activity is expected to have a long-term beneficial effect to this habitat type.

Overall the effects of Alternative 2 on RFSS associated with rocky habitat and populations would be negligible. Community viability would be maintained despite the potential short term risk to southern rock vole as a result of mineland restoration. Alternative 2 may impact individuals but is not likely to cause a trend toward federal listing or a loss of viability for the sensitive species inhabiting rocky habitat.

Spruce Influenced Mature Forest Habitat and Species

With the exception of the northern goshawk historic nest areas, there are no known occurrences of any species dependent upon mature habitat near any proposed activities. A

seasonal restriction to avoid activities in areas of historic nesting activity that could disturb nesting Northern goshawk has been recommended as a design feature to this project (Appendix B). All vegetative activities are designed to improve mature habitat over the long-term. The recreation actions could have negative impacts, but any impacts or risk to species is expected to be minor.

Overall the effects of Alternative 2 on RFSS associated with mature habitat and populations would be negligible. Alternative 2 may impact individuals but is not likely to cause a trend toward federal listing or a loss of viability for the sensitive species inhabiting mature habitat.

Savannah and Grasslands Habitat and Species

The only activity that has the potential to affect this habitat type is the mineland restoration. Based on aerial photography interpretation, the amount of area that is dominated by grasslands is limited. Therefore, any potential effects to this habitat, or species dependent upon this habitat is considered discountable. Overall the effects of Alternative 2 on RFSS associated with savannah and grassland habitat and populations would be negligible. Alternative 2 may impact individuals but is not likely to cause a trend toward federal listing or a loss of viability for the sensitive species inhabiting mature habitat.

Cumulative Effects

Cumulative effects to RFSS include the effects of the past activities, the effects of the alternative presented, and all the reasonably foreseeable future actions. Over the short-term, while disturbance associated with proposed activities could reduce RFSS habitat quality, the project would have an immeasurable negative impact on habitat within the cumulative effects area. Over the long-term, a net cumulative increase in herbaceous and shrubby habitat in the cumulative effects area would occur due to implementation of this project and the ecological restoration activities and TSI already underway and/or expected in the foreseeable future. Areas targeted for restoration would be put on a trajectory to one day be mature spruce-hardwood forest, thus increasing the quantity and quality of this type of habitat over the long-term. Furthermore, wetland restoration work as a result of this project and other projects in the cumulative effects area would increase wetland habitat over the long-term, providing beneficial effects for the southern water shrew, southern rock vole and southern bog lemming.

Effects Determination

The follow table summarizes the effects determination for the alternatives considered in this analysis of effects to RFSS and the habitat they are dependent upon.

Table 23. Summary of Effects Determination for RFSS habitat types.

Habitat Type	Effects Determination	
	Alternative 1	**Alternative 2**
Riparian	No impact	May impact individuals but not likely to cause a trend to federal listing or a loss of viability
Wetland	No impact	May impact individuals but not likely to cause a trend to federal listing or a loss of viability
Rocky	No impact	May impact individuals but not likely to cause a trend to federal listing or a loss of viability
Spruce-influenced mature forest	No impact	May impact individuals but not likely to cause a trend to federal listing or a loss of viability
Savannahs/grasslands	No impact	May impact individuals but not likely to cause a trend to federal listing or a loss of viability

Irreversible or Irretrievable Commitment of Resources

Project activities would not result in an irreversible or irretrievable commitment of wildlife populations and the loss of habitat is not measurable.

Consistency with the Forest Plan, Laws, Regulations, and Policy

All alternatives would be consistent with direction in the Forest Plan, and would meet the requirements of laws, regulations, and Forest Service policy.

Management Indicator Species

Implementing regulations for the National Forest Management Act (NFMA), under which the 2006 Monongahela National Forest Land & Resource Management Plan (Forest Plan) was prepared, require National Forests to select MIS to monitor the effects of Forest management activities on fish and wildlife populations and habitat (36 CFR 219.19). The Forest Plan identifies three terrestrial animal species as MIS:

- Cerulean warbler (*Dendroica caerulea*)
- Wild turkey (*Meleagris gallopavo*)
- West Virginia northern flying squirrel (*Glaucomys sabrinus fuscus*)

Scope of Analysis

For direct and indirect effects, the spatial boundary includes the 33,994-acre Mower Restoration Project Area. For cumulative effects, the spatial boundary is the same.

Restoration activities are anticipated to commence in 2016. Implementation frequency and duration would be contingent upon funding. Noise and visual disturbances associated with restoration activities are not expected to persist after the activities are completed, which is anticipated to be in the next 10 years. Potential short-term effects refer to potential impacts post project implementation for up to approximately 30 years. Long-term effects refer to potential impacts beyond 30 years after project implementation.

Methodology

The three terrestrial MIS discussed herein have certain unique habitat requirements, and each can be viewed as representing a particular combination of habitat elements. Cerulean warblers typically occur in mature-to-old mixed mesophytic and oak forests with tall, large-diameter trees and a mostly closed canopy, but with some canopy gaps and complex vertical structure. Cerulean warblers also are associated with large tracts with forest interior conditions (Hamel 2004 and references therein). Wild turkeys in the eastern U.S. are highly dependent on acorns, but they also require herbaceous openings for brood rearing and shrubby cover for nesting (Wunz 1990). Thus, turkeys represent forests with an oak component that have interspersed openings and regenerating stands. Because the cerulean warbler and wild turkey are MIS to measure the potential impact on oak dominated forests and the project area does not contain oak dominated forest, neither species will be discussed further.

The Monongahela National Forest contains a majority of the range-wide habitat for the West Virginia northern flying squirrel (WVNFS). The WVNFS shows preference to older forests with greater than 30% overstory red spruce. The Forest Plan contains quantitative objectives for providing habitat for restoring spruce-hardwood forest, which is critical to the WVNFS. The entire analysis area is assigned to Management Prescription (MP) 4.1, which emphasizes recovery of the WVNFS through active and passive restoration and enhancement of spruce and spruce-hardwood communities. This analysis will consider the alternatives and their effects in regard to achieve this desired condition.

Affected Environment

Historically, the entire project area was a red spruce influenced ecosystem as a result of mature forests with at least 30% overstory red spruce. Today, the project area is a combination of nonnative grasses and plantations; immature hardwood dominated forests with varying levels

of natural spruce regeneration in the understory and midstory; young hardwood dominated forest with varying amounts of red spruce; and young dense spruce thickets. Well-established understories of sapling-sized red spruce occur in the hardwood stands throughout the project area.

With the exception of open areas on the mine benches, the entire project area is considered suitable WVNFS habitat. However, with the exception of the older spruce-hardwood forest (approximately 925 acres) scattered throughout the project area, the rest of the project area is considered lower quality habitat because of past anthropogenic disturbances severely reducing the amount and quality of old spruce-hardwood forest. WVNFS have been documented (either by live trap surveys or nest box monitoring) at 10 locations scattered throughout the project area.

Alternative 1

Direct & Indirect Effects

Because Alternative 1 would not involve any changes from the existing condition, previously mined portions of the Project Area would continue to be stuck in 'arrested succession'. As such, these areas would continue to be unsuitable habitat for the WVNFS. Areas proposed for spruce release would continue to lack enough of a spruce component to provide good WVNFS habitat into the future. The effects determination for the Alternative 1 on the WVNFS is no effect.

Cumulative Effects

Because Alternative 1 would have no direct or indirect effects on management indicator species, it would not contribute to the cumulative effects of other past, present, and reasonably foreseeable future actions.

Alternative 2

Direct & Indirect Effects

Mineland Restoration

Although mineland restoration (e.g. site preparation, planting of native species, and vernal wetland creation) would occur on previously mined areas that are currently open grasslands or nonnative conifer plantations (not suitable WVNFS habitat), nonnative conifer trees would be impacted in some areas by heavy machinery. Because of the poor quality of habitat (either open areas or young, nonnative conifer plantations) and lack of WVNFS use, these types of activities would have no short-term effect on the WVNFS or suitable habitat. Long-term effects would be the expansion of WVNFS habitat because restoration activities are designed to begin spruce-hardwood forest regeneration on the currently open grasslands on nonnative conifer plantations that are stuck in 'arrested succession'.

Non-commercial thinning in young spruce stands/Early succession habitat and crop tree release in young hardwood stands

Timber stand improvement (TSI) activities in young spruce and hardwood stands would occur on approximately 6,290 acres. The primary goal of these activities is to enhance early successional habitat and release existing red spruce seedlings and saplings and eventually

increase the red spruce overstory component. All trees mechanically felled would be less than 6" dbh and not contain a visible cavity, with the exception that there would be no size restriction on striped maple. This species is the main competitor to red spruce and other desirable trees. These activities are thought to have discountable short-term effects due to the nature and location of the activity. Over the long term, this activity is expected to have a beneficial effect on the WVNFS and its habitat.

Non-commercial red spruce restoration in mature hardwood stands

Red spruce release in mature hardwoods would occur on approximately 5,181 acres. Herbicides, chainsaws, and hand tools would be used to kill scattered mature hardwoods. Impacts to the WVNFS and its habitat from the direct application of herbicide to stems or stumps are thought to be negligible because of the localized application, combined with the chemical hazard rating of the various herbicides. Furthermore, no long-term effects from the herbicides are expected because the herbicides used degrade rapidly in the environment and do not bioaccumulate. The Herbicide Report located in the project file and summarized in this document provide additional information in regards to their proposed use and associated effects.

Similar to the previously discussed activity, all trees mechanically felled would be less than 6" dbh and not contain a visible cavity, with the exception that there would be no size restriction on striped maple. Although the TSI portion of this activity will not employ a size limitation or seasonal clearing restriction on striped maple, potential negative effects to the WVNFS are thought to be discountable.

New Road Construction

The 0.79 miles of new road construction would result in a small loss of functional WVNFS habitat. A seasonal clearing design feature has been incorporated into the proposed action to not cut trees greater than 6" dbh from March 31 – September 15 to reduce the likelihood of impacting young, immobile WVNFS. With this design feature, effects to individual WVNFS is thought to be discountable.

New Trail Construction and Road-to-Trail Conversion

Approximately 0.6 miles of new trail construction would occur in old (greater than 100 years old) red spruce dominated forests. The rest of the new trail construction would occur in younger forests, most of which are hardwood dominant due to past disturbances. For all new trail construction, there is a design feature to either not cut trees greater than 6" dbh from March 31 – September 15 to reduce the likelihood of impacting, immobile WVNFS or conduct WVNFS acoustic surveys prior to the cutting of trees during the summer. If WVNFS are detected, trees would not be cut during the summer. With these design features, effects to individual WVNFS is thought to be discountable.

Road Decommissioning

While an estimated acreage could be associated with the road decommissioning activities, this would be an inaccurate portrayal of this activity because of the highly variable level of work needed to "decommission". For example, some roads may not need any work to be considered decommissioned and may just be removed from the database as a non-system road, resulting in no change in habitat. Conversely, a full recontour could involve acres of tree clearing for every

mile decommissioned, leading to a measurable impact on the WVNFS and its habitat. Therefore, rather than conduct a misleading effects analysis, several design features have been incorporated into the proposed activity to not only meet the watershed objective, but also to reduce the level and risk of negative impacts to the WVNFS and its habitat.

A design feature for road decommissioning is to retain all hardwood trees greater than 6" dbh with a visible cavity (with the exception of striped maple, as described above) and all red spruce greater than 10" dbh, so as to avoid disturbing leaf nests. If this is not possible, to achieve the watershed objective for a particular road, trees would be cleared at the time of year least likely for encountering young, immobile WVNFS (September 15-March 31). Through implementation of these design features, adverse effects as a result of road decommissioning are thought to be discountable and negligible.

Stream Habitat Improvements

While an estimated acreage could be associated with the large woody material loading in streams, this would be an inaccurate portrayal of this activity because of the highly variable level of work needed to augment streams with wood. Additionally, the amount and location of this activity is not currently known. For this activity, no red spruce would be cut. Because they would be greater than 6" dbh, these trees would be seasonally cleared, as described above. As such, adverse effects as a result of large woody material loading are thought to be discountable and negligible.

Summary of direct/indirect effects

If any WVNFS are denning in or around management areas, noise from heavy equipment could disturb them and cause them to flee from their cavities or nests. However, given the small area of habitat to be affected at a given time and the low quality of the habitat to be affected, the number of squirrels disturbed is thought to be discountable and negligible.

It is anticipated that the majority of activities would have little to no direct negative effect on WVNFS habitat, by virtue of being limited to previously disturbed areas. Although trees used for large woody debris loading would be cut from the adjacent forest, the amount of trees would be very limited and spread over a large area. Therefore, negative effects to WVNFS habitat are expected to be discountable and negligible and all activities would have a long-term beneficial effect on the WVNFS and its habitat. The effects determination for Alternative 2 is may impact individuals, but would not cause a loss in viability or trend towards listing for the WVNFS.

Cumulative Effects

Cumulative effects to the WVNFS include the effects of the past activities discussed above, the effects of the alternative presented and all the reasonably foreseeable future actions. Over the short-term, while disturbance associated with proposed activities could reduce WVNFS habitat quality, the project would have an immeasurable negative impact on habitat within the cumulative effects area. Over the long-term, a net cumulative increase in herbaceous and shrubby habitat in the cumulative effects area would be expected due to implementation of this alternative and the ecological restoration activities already underway and/or expected in the foreseeable future. Furthermore, areas targeted for restoration would be put on course to develop into a mature spruce-hardwood forest, thus increasing the quantity and quality of future WVNFS habitat over the long-term.

Irreversible or Irretrievable Commitment of Resources

Alternative 1 would not result in an irreversible or irretrievable commitment of resources due to no management actions being taken. Alternative 2 would not result in an irreversible or irretrievable commitment of WVNFS populations and the loss of habitat is not measurable.

Consistency with the Forest Plan, Laws, Regulations, and Policy

The Alternative 1 (No Action) would not be consistent with management guidelines for MP 4.1 identified in the Forest Plan (2006). Alternative 2 (Proposed Action) would be consistent with direction in the Forest Plan, and would meet the requirements of laws, regulations, and Forest Service policy. Additionally, the Forest Plan (TE 64) allows for NFS habitat disturbance to improve WVNFS habitat.

Birds of Conservation Concern

This section of has been prepared in response to the President's Executive Order 13186 "Responsibilities of Federal Agencies to Protect Migratory Birds" of January 10, 2001. Pursuant to this Executive Order, the U.S. Fish and Wildlife Service developed a list of birds of conservation concern (BCC) for the Appalachian Mountain Bird Conservation Region. This section addresses the impacts of both alternatives on BCC.

Scope of Analysis

The spatial boundary to analyze direct, indirect, and cumulative consequences for this project is the project area. Proposed activities are anticipated to commence in 2016. Implementation frequency and duration would be contingent upon funding. Noise and visual disturbances associated with proposed activities are not expected to persist after the activities are completed, which is anticipated to be in the next 10 years. Potential short-term effects refer to potential impacts post project implementation for up to approximately 30 years. Long-term effects refer to potential impacts beyond 30 years after project implementation.

Methodology

The MNF and the State of West Virginia occur within the Appalachian Mountain Bird Conservation Region. Twenty-seven species of birds are listed as BCC for the Appalachian Mountain Bird Conservation Region. Birds of conservation concern were grouped according to primary habitat usage based on information from the *West Virginia Breeding Bird Atlas* (Buckelew and Hall 1994). Additionally, information was solicited from local ornithologists with the WVDNR. Information on habitat preferences was used to assess the likely effects of management activities on the species in each habitat group.

Affected Environment

Twenty of the 27 species of BCC in the Appalachian Bird Conservation Region are applicable to the MNF. To simplify a discussion of the effects of the alternatives, these species have been grouped by the type of habitat they use. A summary of the potential or known habitat or occurrence is shown in below.

Species Using Forested Habitat

- Kentucky Warbler (*Oporornis formusus*) – dense understory of mature, humid deciduous forest, wooded ravines, oak-pine or northern hardwood forest. This species is not expected in the project area.
- Louisiana Waterthrush (*Seiurus motacilla*) – along streams flowing though heavily wooded valleys, deciduous forest, some hemlock, northern hardwoods. Although potential habitat could exist, this species has never been documented in the project area.
- Swainson's Warbler (*Seiurus motacilla*) – dense under story under an older forest, rhododendron or mountain laurel thickets in woods, mostly found in the south and west part of the state. There are no records of this species from the northern half of West Virginia.
- Worm-eating Warbler (*Helmitheros vermivorus*) – mature deciduous woodland that lacks dense ground cover, mature beech-maple or oak-pine forest. Although potential habitat could exist, this species has never been documented in the project area.

- Cerulean Warbler (*Dendroica cerulea*) – mature forest, mixed mesophytic and oak forest below 600 meters in elevation, common in the west part of the state, sparse in the mountains. This species is not expected in the project area.
- Wood Thrush (*Hylocichla mustelina*) – mature or near mature deciduous forest, prefers dense shade on forest floor. This species could occur in the project area.
- Acadian Flycatcher (*Empidonax virescens*) – mature mixed deciduous forest dissected by small streams and ravines; lower elevations; not in spruce, oak, or pine forest; nests over water; more common in the west side of the state. This species is not expected in the project area.
- Yellow–bellied Sapsucker (*Sphyrapicus varius*; breeding populations only) – upland black cherry forest, cut over mature hardwoods, spruce-hardwoods. This species could occur in the project area.
- Whip-poor-will (*Caprimulgus vociferus*) – mixed deciduous woods, upland oak-hickory forest; not in spruce, hardwood-pine or hardwood-hemlock, few in northern hardwoods, rare in dense forest. This species is not expected in the project area.
- Saw-whet owl (*Aegolius acadicus*; breeding populations only) – spruce and mixed spruce-hardwoods, swampy areas in coniferous forest, high elevations. Potential habitat exists in the project area and this species has been documented in the project area.
- Black-billed Cuckoo (*Coccyzus erythropthalmus*) – northern hardwoods, cove hardwoods, oak-hickory forest. Although potential habitat could exist, this species has never been documented in the project area.
- Prothonotary Warbler (*Protonotaria citrea*) – swamps (wooded wetlands) and large streams, not in the highlands. This species is not expected in the project area.
- Red-headed Woodpecker (*Melanerpes erythrocephalus*) – open oak groves with little understory, groves of oaks and grazing lands, Ohio River valley and low elevations in the Allegheny Mountains. This species is not expected in the project area.

Species Using Non-forested Habitat (grassland or other permanent openings)

- Sedge Wren (*Cistothorus platensis*) – wet grass and sedge meadows, nests near surface of water, needs wetlands, grassy marshes. This species could be found in the project area.

Species Using Young Forest/Brushy Habitat

- Olive-sided Flycatcher (*Nuttallornis borealis*) – in openings in northern spruce forests, such as bogs, old beaver ponds, burned over slash from lumber operations with scattered snags and trees for perches. This species could occur in the project area and is discussed in RFSS analysis.
- Bachman's Sparrow (*Aimophila aestivalis*) – brushy overgrown fields, abandoned pastures growing up in shrubs, often in erosion gullies in steep hill sides, much un-used habitat remains. This species is not expected in the project area.
- Bewick's Wren (*Thryomanes bewickii*) – dry open country in valleys east of the mountains, in small clearings in spruce at high elevations, brushy thickets, favors old farm buildings, old farmsteads, very local or extirpated. This species is unlikely to occur in the project area as it is nearing extirpation in the region.
- Prairie Warbler (*Dendroica discolor*) – young pine forests and brushy scrub, young second growth hardwoods, overgrown pastures, Christmas tree plantations. This species

could in the project area, although it is unlikely due to the higher elevation and cooler climate.

- Golden-winged Warbler (*Vermivora chrysoptera*) – low, brushy second growth forest and open woodland, especially power line right of ways, higher elevations, not in spruce. This species is not expected in the project area.

Species Using Both Forest and Non-forest Habitat

- Peregrine Falcon (*Falco mexicanus*) – nests in cliffs, bridges over water, or high rise buildings in urban areas. Feeds over fields, forest, or urban areas by catching birds during flight. No suitable nesting habitat exists in the project area, nor is any likely to occur during the temporal scope of the analysis. This habitat group is not analyzed further

Alternative 1

Direct & Indirect Effects

Alternative 1 would not involve any changes from the existing condition. As such, the majority of the project area would continue to provide minimal habitat for BCC. Therefore, Alternative 1 is considered to have no effect on BCC.

Cumulative Effects

Because Alternative 1 would have no direct or indirect effects on BCC, it would not contribute to the cumulative effects of other past, present, and reasonably foreseeable future actions.

Alternative 2

Direct & Indirect Effects

Alternative 1 would not involve any changes from the existing condition. As such, the majority of the project area would continue to provide minimal habitat for BCC. Therefore, Alternative 1 is considered to have no effect on BCC.

The proposed activities are thought to have a negligible effect on the aforementioned BCC birds because of the lack of potential habitat in the project area. Furthermore, the proposed activities would not have a noticeable impact on potential habitat. For the BCC, the project may impact individuals but will not lead to listing nor will it cause a loss in viability as any impacts to the BCC are thought to be discountable.

Cumulative Effects

Cumulative effects to BCC include the effects of the past activities discussed in the EA, the effects of the alternative presented and all the reasonably foreseeable future actions. Over the short-term, while disturbance associated with proposed activities could reduce BCC habitat quality, the project would have an immeasurable negative impact on habitat within the cumulative effects area. Over the long-term, a net cumulative increase in herbaceous and shrubby habitat in the cumulative effects area would occur due to implementation of this project and the ecological restoration activities and TSI already underway and/or expected in the foreseeable future. Areas targeted for restoration would be put on a trajectory to one day be

mature spruce-hardwood forest, thus increasing the quantity and quality of this type of habitat over the long-term. Furthermore, wetland restoration work as a result of this project and other projects in the cumulative effects area would increase wetland habitat over the long-term, providing beneficial effects for BCC dependent upon this type of habitat.

Irreversible or Irretrievable Commitment of Resources

Alternative 1 would not result in an irreversible or irretrievable commitment of resources due to no management actions being taken. Alternative 2 would not result in an irreversible or irretrievable commitment of WVNFS populations and the loss of habitat is not measurable.

Consistency with the Forest Plan, Laws, Regulations, and Policy

All alternatives would be consistent with Forest Plan direction for BCC (pp. II-30 and II-31) 3.4.

Herbicide Use and Public/Worker Risk

Herbicide use is preferred over other vegetative management methods such as mechanical treatments. Mechanical treatments are not preferred because of their lack of effectiveness. The main reason for this is many of the less desirable species such as beech and striped maple vigorously sprout after being cut. Herbicides are a type of pesticide used to control plants. Herbicides affect biochemical pathways that are specific to plants, making herbicides the least toxic form of pesticides. Additional information regarding the proposed chemical for Alternative 2 (proposed action) can be found in Herbicide Report located in the project file.

Scope of the Analysis

Herbicide treatments would occur over a ten year period. Approximately 7,417.7 acres (22 percent of the project area) may receive some type of herbicide treatment through direct applications, such as cut surface or basal spray (Table 24). This is the maximum extent of treatment and the actual would likely be less than the entire acreage shown in Table 24. This analysis pertains to the 32,980 acres of National Forest lands within the project area.

Table 24. Acres of potential herbicide treatment within the project area.

Treatment	**Acres**
Crop tree release in young hardwood stands	2236.8
Spruce release in mature hardwood stands	5180.9
Total	**7417.7**

Methodology

A risk assessment was done for the herbicides proposed in this project. A risk assessment is required under the National Environmental Policy Act (40 CFR Part 1502.22). Syracuse Environmental Research Associates (SERA) recently created new models for the Forest Service to better predict the effects of purposed pesticide use. Older versions of risk assessments used margin of safety to determine the potential effects of pesticides to humans and the environment. In the newest version the hazard quotient is used to determine the relative hazard of using a proposed herbicide. Hazard quotients between zero and one indicate a low relative hazard of using an herbicide. Hazard quotients above one indicate an increased risk of effects from exposure. When a hazard quotient is above one, additional measures would be taken to minimize any effects.

Alternative 1

Direct and Indirect Effects

Under Alternative 1 no herbicides would be applied in the project area. No direct or indirect consequences to human health would occur in this alternative.

Cumulative Effects

Since no herbicides would be applied, there would be no cumulative impact from Alternative 1.

Alternative 2

Direct and Indirect Effects

In old regeneration harvest between 19-46 years old, a cut surface treatment of 50% solution of triclopyr will be used to control competing trees.

Table 25. Herbicide concentrations for TSI activities associated with early successional habitat and crop tree release in hardwood stands in the project area.

Application Type	**Concentration**	**Volume per acre**	**Lbs. per acre of active ingredient**
Cut surface	50% solution triclopyr (Garlon 3A or an equivalent)	1.0	1.5 lbs./ac

In sawtimber sized stands were there is a well-established understory of red spruce (at least 200/ac) herbicides would be used to control undesirable competing mid-story hardwoods like beech and striped maple to release the suppressed spruce to and let it grow into the mid-story. A cut surface treatment using imazapyr and/or a basal treatment using triclopyr would be used to control competing vegetation to release understory red spruce.

Table 26. Herbicide concentrations and volumes for TSI activities associated with noncommercial red spruce restoration in hardwood stands in the project area.

Application Type	**Concentration**	**Volume per acre**	**Lbs. per acre of active ingredient**
Cut surface	6% solution imazapyr (Arsenal or an equivalent)	1.0	1.5 lbs./ac
Basal Spray	10% solution of tricloypy and oil (Garlon 4 or equivalent)	5.0	2.0 lbs/ac

Public Risk

The term public includes hikers, campers, hunters, fuelwood gatherers, and other forest users. It basically it includes all people who use or work in the project area except those who work with the herbicide treatments. Results of the public health portion of the risk assessments done for the herbicides used in this project are shown in Table 27.

Table 27. Summary of hazard quotients for the general public who may use the project area.

Herbicide	**Category**	**Average Hazard Quotient**

Tricloypr	Vegetation contact Contaminated Fruit Fish Consumption	2 6 .00008
Imazapyr	Vegetation contact Contaminated Fruit Fish Consumption	.0003 .009 .000004

Represented in the table is worst case scenarios for any of the given herbicides used. The high hazard quotients for dermal exposure of triclopyr are because triclopyr is mixed with oil making it easier to penetrate the skin. The dermal exposure in the table is a result of the public coming into contact with treated vegetation, which is highly unlikely since triclopyr is applied directly to the lower portion of treated stems.

Worker Risk

The term 'workers' includes all personnel involved in the herbicide application in this project. Results of the risk assessment for the project show the typical exposure rates for a worker are not a concern, expect for the use of gloves contaminated with triclopyr for more than one hour. This means gloves contaminated on the inside with triclopyr, chemical resistant gloves are used and if contaminated on the inside, the gloves are disposed of, and new ones used. This is to reduce the risk of exposure to works. There is a slight chance that a sensitive worker could experience problems, the maximum rate of exposure was used to account for sensitive workers. Only the triclopyr had hazard quotients above one for worker exposure

Table 28. Summary of hazard quotients for workers within the project area.

Herbicide	**Category**	**Average Hazard Quotient**
Triclopyr	Accidental Exposure ----Spill on Worker ----Contaminated Gloves General Exposure	 0.7 .1 2
Imazapyr	Accidental Exposure ----Spill on Worker ----Contaminated Gloves General Exposure	 .008 .038 .0096

Cumulative Effects

Since the herbicides used do not bioaccumulate and degrade rapidly in the environment no cumulative impacts would result from Alternative 2.

Irreversible or Irretrievable Commitment of Resources

There are no irreversible or irretrievable commitments of resources to the public or workers from applying the herbicides proposed in this project.

Consistency with the Forest Plan, Laws, Regulations, and Handbook

All the alternatives are consistent with the following laws and regulations:

Federal Insecticide, fungicide, Rodenticide, Act of 1947

West Virginia Pesticide Control Act of 1990

FSH 2109.14-Pesticide Use Management

Heritage Resource

This report discloses issues and concerns to historic property associated with the Mower Tract Restoration Project and the potential direct, indirect and cumulative effects of the proposed actions being considered. For the purposes of this analysis, effect means the alteration to the characteristics of a historic property qualifying it for inclusion in, or eligibility for, the National Register of Historic Places (NRHP) per the definition in 36 CFR 800.16(i). Historic property means any prehistoric or historic district, site, building, structure, object or historical/cultural landscape included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term also applies to any cultural resource or property not yet evaluated to determine whether it is eligible for the NRHP. This term includes artifacts, features, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or native Hawaiian organization and that meet the National Register criteria per the definition in 36 CFR 800.16(l).

Scope of Analysis

The spatial boundary, or area of potential effects (APE), used to evaluate direct effects included the respective boundaries of the proposed action and alternatives. The spatial boundary used to evaluate the indirect effects included the entire Mower Tract, as well as the adjacent Cass Scenic Railroad and the Spruce Mill and Town site to analyze the potential for visual effects to adjacent historic properties.

The temporal boundary used to evaluate direct, indirect and cumulative effects was ten years because the proposed actions will be completed between 2016 and 2020 and the visual effects are likely to continue for up to five years post-treatment.

Methodology

The proposed action and alternatives were reviewed in accordance with the programmatic agreement among the U.S.D.A. Forest Service, Monongahela National Forest, The West Virginia Division of Culture and History, and the Advisory Council on Historic Preservation regarding the process for compliance with Section 106 of the National Historic Preservation Act, as amended.

The Forest Service conducted a cultural resource survey of the Lambert Run project area during 2011. While not within the current APE, Lambert Run is within the Mower Tract and adjacent to the current proposal. The Lambert Run EA provides an excellent overview of the cultural description and settlement patterns of the area (Calabrese 2011). The Forest Service determined the area held no potential for containing intact historic properties. The proposed reclamation activities within the Mower Tract will occur at locations with disturbance comparable to that of Lambert Run.

A cultural resource survey of the current APE was conducted between September 2014 and October 2015. The survey was performed under the direct supervision of the MNF Heritage Program Manager along with volunteers affiliated with Appalachian Forest Heritage Area (AFHA), the Absentee Shawnee Tribe certified heritage paraprofessional crew, and professional archaeologists that volunteered out of interest in working with the aforementioned partners.

The investigation targeted locations where the proposed trails intersect areas of probability at which the slope was less than 20 percent and the visibility was less than 75 percent. The vast majority of the proposed trail will maintain grade along the slopes of this steep terrain. Shovel

test probes were used primarily at locations where the trail will encounter geographic features such as benches, saddles, and terraces. No new historic properties were identified as a result of the survey. The test areas revealed variance in the severity of subsurface disturbance, but all test areas yielded obvious signs of disturbance observed across the landscape as a result of past resource extraction.

In addition to the survey efforts, the Heritage Program Manager and District Ranger arranged two site visits to Cheat Summit Fort and the historic trace of the Staunton-Parkersburg Turnpike to discuss the mine reclamation proposal and necessary protection measures for the site.

Affected Environment

There are five previously identified historic properties within the current area of potential effect (APE). The historic Staunton-Parkersburg Turnpike, the Cass Scenic Railroad, the Spruce Mill & Town, Cheat Summit Fort, and the Hopkins Mine and Incline railroad are all within the area of analysis. Additional information regarding the documentation and eligibility determination for these sites can be found in the Heritage resource report located in the project file.

These historic properties represent a tangible connection to the history and heritage of West Virginia. The integrity of an historic property is a critical component of that connection. All of these historic properties are currently in excellent condition. However, the current environment that surrounds these historic properties has been highly disturbed prior to federal acquisition, leaving much of the area in an altered state of arrested succession. The highly disturbed landscape in the general vicinity detracts from the overall setting and environment.

The historic properties are located around the outer edges of the project area. There is currently a lack of public access to, and recreation activities within, the project area. The Mower Tract is a detachment from the experience of the public that visit these historic properties. The result is a somewhat fragmented approach to interpretation and public history.

The altered state of the surrounding environment does not make the aforementioned historic properties any less significant. The sites are important reflections of West Virginia heritage, but the Forest Service should embrace the opportunity to enhance the overall experience for the public when revisiting the connections to our past.

Alternative 1

Direct/Indirect Effects

Alternative 1 will have no direct or indirect adverse effects to historic properties. Current management plans within the project area are addressed programmatically and reviewed by the MNF Heritage Program Manager on a case-by case-basis.

Cumulative Effects

There will be no direct or indirect effects to Alternative 1. As such, there will be no cumulative effects.

Alternative 2

Direct/Indirect Effects

The proposed action alternative will have no adverse effect on historic properties. Standard protection measures will be carried out for each undertaking in accordance with the programmatic agreement among the U.S.D.A. Forest Service, Monongahela National Forest, The West Virginia Division of Culture and History, and the Advisory Council on Historic Preservation regarding the process for compliance with Section 106 of the National Historic Preservation Act, as amended.

The intervention at the highly disturbed land will contribute to the overall setting and environment of historic properties and enhance the personal connection between the land and heritage, particularly if the intervention encourages the restoration of the unique and historical red spruce forest of the central Appalachian landscape.

Mineland Restoration

The areas proposed for mineland restoration are highly disturbed and have no potential to host intact historic properties. Standard protection measures and an appropriate buffer will be implemented to avoid adverse effect to Cheat Summit Fort and the historic trace of the Staunton-Parkersburg Turnpike. Mineland activities will not be conducted within the viewshed of the Cass Scenic Railroad or the Spruce Mill and Town site.

Non-Commercial Red Spruce Restoration in Mature Hardwood Stands

The release of hardwood vegetation via chain saw and/or direct application of herbicide is exempt from Section 106 review. These activities have little-to-no potential to affect historic properties.

Non-Commercial Thinning in Young Spruce Stands

Non-commercial thinning does not involve ground disturbance. The use of a tracked mulcher will be limited to existing roads and skid trails initially. These activities have little-to-no potential to affect historic properties. If conditions allow the use of the mulcher off of these corridors, the use shall be monitored by the Heritage Program Manager.

Early Succession Habitat and Crop Tree Release in Young Hardwood Stands

The use of a chain saw and herbicide do not involve ground disturbance. Any use of a tracked mulcher will be limited to existing roads and skid trails. These activities have little-to-no potential to affect historic properties. If conditions allow the use of the mulcher off of these corridors, the use shall be monitored by the Heritage Program Manager.

New Road Construction

New road construction and road repair would occur on existing roads and highly disturbed land. This activity will have little-to-no potential to affect historic properties.

New Trail and Trailhead Construction

No historic properties have been identified within the proposed trail locations. All new trail construction activities shall be coordinated with the MNF Heritage Program Manager prior to implementation in order to eliminate or reduce effects to historic properties. Increased public

access to the project area will encourage public awareness of the historic properties. At the present time, recreation and tourism are the biggest economic interests in the area. Trails and road construction will provide additional recreation opportunities and support heritage tourism. This is relevant because the economic interests of the area suggest that management decisions highlighting the importance of historic properties will encourage greater respect and concern for their preservation. Public access to the Mower Tract would lay the groundwork for future interpretation and collaboration with partners in heritage and serve as a conduit for a sense of shared stewardship in public history. The infrastructure for public access into the project area will foster these opportunities and put the Forest Service in a strategic position to move beyond basic site protection and avoidance, and pursue the responsibility in stewardship and collaboration as directed in FSH 2309.12, Heritage Program Management Handbook.

Road Decommissioning for Watershed Improvement

Road Decommissioning activities will have little-to-no potential to affect historic properties.

Stream Habitat Improvements

All stream habitat improvements shall be implemented programmatically in direct consultation with the MNF Heritage Program Manager on a case-by-case basis in order to eliminate or reduce effects to historic properties.

Cumulative Effects

The potential for cumulative effects is not significant. All present and future undertakings must be reviewed for effects to historic properties. There will be no direct or indirect effects if the proposed action is implemented. As such, there will be no cumulative effects.

Irreversible or Irretrievable Commitment of Resources

The proposed action and alternative would not result in irreversible or irretrievable commitment of heritage resources because standard protection measures will be implemented.

Consistency with the Forest Plan, Laws, Regulations, and Handbook

The standard protection measures necessary for Alternative 2 spelled out by the MNF programmatic agreement are consistent with the Forest Plan.

There are no conflicts with laws, regulations, handbooks, and executive orders. The alternatives and standard protection measures are consistent with all laws, regulations, handbooks, and executive orders related to the management of heritage resources.

- National Historic Preservation Act of 1966 (16 USC 470)
- Archaeological Resources Protection Act of 1979 (16 USC 470)
- Forest Service Manual 2360
- Forest Service Handbook 2309.12
- 36 CFR Parts 296, 219.24 and 261.2
- American Indian Religious Freedom Act of 1978
- Archaeological and Historical Conservation Act of 1974 (16 USC 469)
- Historic Sites Act of 1935 (16 USC 461-467)
- Executive Order 11593

Recreation, Roadless Areas, Scenic Quality, Wild and Scenic Rivers and Wilderness Resources

This section describes the effects of the Mower Tract Restoration Project No Action and Proposed Action on Recreation, Scenery, Roadless Areas, Wild and Scenic Rivers, and Wilderness.

Scope of the Analysis

The scope of this analysis was limited to recreation resources (dispersed camping, driving for pleasure, fishing, hiking, hunting, viewing scenery, etc.) within the Mower Tract Restoration Project Area (Mower Tract) and areas adjacent to or in proximity of the project area from which lands within the project area may be viewed. The scope of analysis was selected, in part, because the recreation resources within the Mower Tract are not limited or unique to this area; they are similar to those found in many other areas of the Monongahela National Forest (MNF) Secondly, the direct, indirect, and cumulative effects of proposed activities are not expected to extend beyond the Mower Tract. The temporal boundary for this analysis is 10 years.

Methodology

For this analysis, current laws and policies, the current Forest Plan (USDA, 2006) was reviewed. Site visits and other considerations, such as past history of recreational use in this area and professional judgement, were also used to generate the effects of the No Action and Proposed Action alternatives.

Affected Environment

The major recreational uses of the Mower Tract are dispersed recreational activities, such as dispersed (roadside) camping, driving for pleasure, fishing, hiking, hunting, viewing scenery (including from a tourist rail road that parallels the Shaver's Fork River), and wildlife watching. The following table describes the current recreation resources within the project area.

Table 29. Existing recreation resources within the project area.

Recreation Resource	**Existing Condition of the Mower Tract Restoration Project Area**
Developed Campgrounds	No developed campgrounds are present or planned in the project area.
Dispersed Camping	There are dispersed (roadside) campsites along roads and near waterbodies in the Mower Tract.
Class Q Roads	There are no Class Q roads located in the project area.
FS System Trails	There are no existing FS system trails in the project area.
User-made (non-system) Trails	There are few user-made pedestrian trails noted in the project area. However, motor vehicle and ATV use is evident on old routes and/or user created routes within the project area.

Recreation Resource	Existing Condition of the Mower Tract Restoration Project Area
Wild and Scenic Rivers (WSR)	In the early 1980's, the Shavers Fork River was listed on the Nationwide Rivers Inventory for possible inclusion in the Wild and Scenic Rivers system. In 1995, the MNF completed a River Study and determined that the Shavers Fork through the Mower Tract is eligible for inclusion in the WSR system with a potential classification as "recreational." However, the river was never officially designated or released from study river status by Congress. This means that the MNF must continue to manage the river (and a ¼ mile corridor on each side of the river) to retain its free-flowing condition, highest classification potential, and outstandingly remarkable values.
Wilderness	There are no designated Wildernesses within or adjacent to the project area.
Inventoried Roadless Areas (previously known as Roadless Area Conservation Rule Areas (RACR) or "Clinton Roadless Areas")	There are no Inventoried Roadless Areas (IRA) within or adjacent to the project area. The closest IRA is the Little Mountain IRA, approximately one-half mile east of the Mower Tract.
Recreation Opportunity Spectrum (ROS)	The Monongahela Forest Plan segmented the project area into four ROS categories: Rural (R): A small area around Cheat Bridge has been classified as Rural. Roaded Natural (RN): A small area on the central, western edge of the project area been classified Roaded Natural. Semi-primitive Motorized (SPM): The northern half of the project area and the area around Forest Roads (FRs) 235, 267, and 267B have been classified Semi-primitive Motorized. Semi-primitive Non-motorized (SPNM): The eastern edge and southwestern area of the Mower Tract have been classified as Semi-primitive Non-motorized.
Scenic Integrity	According to the Monongahela Forest Plan, two levels of Scenic Integrity exist in the project area: High: along the Shaver's Fork River and a small area on the extreme southwestern edge of the project area Moderate: the rest of the project area

Recreation Resource	Existing Condition of the Mower Tract Restoration Project Area
Inherent Scenic Attractiveness	According to the Monongahela Forest Plan, the majority of the project area has a "typical or common" Inherent Scenic Attractiveness. The exceptions to this are the Shaver's Fork river corridor and a small area on the extreme southwestern edge of the project area (the same areas with a High Existing Scenic Integrity) that are considered "distinctive." From an ecological point of view, it makes sense that the areas of arrested succession need to be released from their current state. However, from a recreation/viewing scenery point of view, the areas of arrested succession provide a unique opportunity for an open expanse of grassland, sweeping vistas, and sunny areas to camp and play.
Scenic Class	According to the Monongahela Forest Plan, all Scenic Classes are represented in the project area. Classes 1-2 (scenery with high public value): the bulk of the project area Classes 3-5 (scenery with moderate public value): various-sized areas scattered about the eastern and northwestern segments of the project area Classes 6-7 (scenery with low public value): three small areas on the western edge of the project area

Alternative 1

Direct and Indirect Effects

There would be no direct or indirect effects of implementing Alternative 1 on the following resource areas within the Mower Tract Restoration Project Area because the activities listed in the Proposed Action would not occur and visitor use the of Mower Tract would continue as in the past.

- Dispersed Camping
- User-made, non-system trails
- Wild and Scenic Rivers
- Recreation Opportunity Spectrum
- Scenery
- Developed campgrounds
- Class Q roads
- Wilderness
- Roadless Area Conservation Rule Areas

Cumulative Effects

Because there were no direct or indirect effects under Alternative 1, there will be no cumulative effects to the recreation resource or scenery within the project area.

Alternative 2

Direct and Indirect Effects

The following are direct and indirect effects of implementing the Proposed Action by recreation resource. These resource areas are not present in the Mower Tract Restoration Project Area and are not included in this analysis:

- Developed campgrounds
- Class Q roads
- Wilderness
- Roadless Area Conservation Rule Areas

Dispersed Camping

Dispersed (roadside) camping would not be allowed at the nine designated trailheads per Forest Supervisor Order #21-90.

Forest Service System Trails

Approximately 78 miles of proposed trails have been identified in the Project Area. The majority of these proposed trails (79%) follow existing road/skid trails. The rest (21%) would be new trail construction. All of these trails would be non-motorized, multi-use (pedestrian, bicycle, and pack and saddle - equestrian), Trail Class 2 trails.

A January 2015 Decision Memo approved the construction of approximately 48 miles of trails, seven primary trailheads, and seven secondary trailheads in the Mower Tract. Phase I of this work was submitted to the West Virginia Division of Highways for possible funding under a Recreation Trail Program grant. The MNF recently heard that this project has been approved. We are hopeful that we will receive the Notice to Proceed and can begin construction of these trails during the summer of 2017.

Care must be taken that:

1. Mineland restoration and other activities in this Environmental Assessment do not tear up the newly constructed trails.
2. The total amount of trails (the combination of the Decision Memo trails plus the trails described in this Environmental Assessment) does not exceed the Forest Plan Standard 4116: “New trail construction shall not cause trail density in the prescription unit to exceed 2 miles per square mile. This standard does not apply to relocation of existing trails.”

Access to the trail system, including roads and trailheads, should be developed to accommodate the most demanding of the designated use. In this case, equestrian is the most demanding of the proposed uses. Generally, if as the project is implemented, it is found that roads, parking lots, and/or trails cannot be created to sustainable pedestrian, bicycle, and/or equestrian standards, then the trail and trailheads would be relocated or the types of allowed uses would be adjusted to reflect what the proposed trail can support. Information about the design standards and needs of the different types of proposed uses can be found in the recreation resource report located in the project file. If trails are to be used for the implementation of other project activities, Forest Plan standards and guidelines, as well as recommended design features are included in Appendix B and C.

User-made (non-system) Trails

Some user-made trails would be designated as FS system trails. As system trails, they would receive periodic maintenance and should be in better condition for recreation users.

Wild and Scenic Rivers

The Shavers Fork River in the Mower Tract was included on the NRI because it has a:

> "Diversity of recreation opportunities related to fishing, hunting and nature study in a relatively remote scenic setting with extensive areas of red spruce and associated ecosystems. Opportunities for interpretation of early logging and mining history." (National Park Service)

In 1995, the Monongahela National Forest released the "Wild and Scenic River Study Report and (Draft) Environmental Impact Statement on Twelve Rivers in the Monongahela National Forest." The Shavers Fork River from Snowshoe Dam to US Route 33 east of Bowden (this includes the river through the Mower Tract) was determined to be eligible for inclusion in the Wild and Scenic River system with a potential classification of recreational.

A final EIS and a decision by Congress on whether or not to designate any of the Monongahela NF rivers has not occurred to date. Until that decision is made and according to the Monongahela Forest Plan:

> "Rivers and their corridors that are determined eligible are managed to retain their free-flowing condition, their highest classification potential, and the outstandingly remarkable values identified until they are either designated as WSRs by Congress or returned to their original or assigned management prescription."

Additional management guidance can be found in the FS Handbook 1909.12 Chapter 80 (Wild and Scenic Rivers.) The Classification Criteria for WSRs allows a Recreational River to have:

- Some development
- Substantial evidence of human activity
- Lands may have been developed for the full range of agricultural and forestry uses
- May show evidence of past and ongoing timber harvest
- Readily accessible by road or railroad
- The existence of parallel roads or railroad on one or both banks as well as bridge crossings and other river access points is acceptable

All types of activities in the Proposed Action (including the potential of trail bridges on the upper reaches of the river) would occur within the river corridor (1/4 mile on each side) of the Shavers Fork River. Due to the sensitivity of the visual impacts that could occur along this river, several design features are recommended and have been included in Appendix B. Additional supporting information can be found in the Recreation Resource report in the project file.

ROS

Each Recreation Opportunity Spectrum class is defined in terms of its combination of activity, setting, and experience opportunities. The Forest Plan has segmented the Mower Tract into four ROS classes:

Rural

- A "Rural" ROS area is characterized by substantially modified natural environment. Sights and sounds of humans are readily evident.
- Mineland restoration activities would take place in the Rural ROS area of the Mower Tract. This would be consistent with a ROS setting of Rural.

Roaded Natural

- A "Roaded Natural" ROS area is characterized by predominately natural-appearing environments with moderate evidences of the sights and sounds of man. Such evidences usually harmonize with the natural environment. Resource modification and utilization practices are evident, but harmonize with the natural environment.
- Mineland restoration, Spruce Release, and Trail Construction would take place in the Roaded Natural ROS areas of the Mower Tract. These activities, especially if carried out with sensitivity to the visual impact of them, would be consistent with a ROS setting of Roaded Natural.

Semi-primitive Motorized

- A "Semi-primitive Motorized" ROS area is characterized by a predominately natural or natural-appearing environment of moderate-to-large size. Moderate probability of experiencing isolation from the sights and sounds of humans. Public motor vehicle use is allowed.
- All types of proposed activities would take place in Semi-primitive Motorized areas of the Mower Tract. While we are moving towards the more primitive end of ROS, natural resource management (especially activities designed to restore an area) continue to fit a "natural-appearing" environment. Because public use of motor vehicles is allowed in a SPM area, people can expect to hear motors and other noise. These activities, especially if carried out with sensitivity to the visual impact of them, would be consistent with a ROS setting of Semi-primitive Motorized.

Semi-primitive Non-motorized

- A "Semi-primitive Non-motorized" ROS area is characterized by a predominantly natural or natural-appearing environment of moderate-to-large size. High, but not extremely high, probability of experiencing isolation from the sights and sounds of humans. Public motor vehicle use is not allowed.
- All types of proposed activities would take place in Semi-primitive Non-motorized areas of the Mower Tract. As in SPM, natural resource management (especially activities designed to restore an area) continue to fit a "natural-appearing" environment, especially over time. One difference between SPM and SPNM is the opportunity to experience isolation from the sights and sounds of humans. Any management activity that uses motor vehicles or motorized equipment will decrease

the opportunity to experience isolation from the sights and sounds of humans. But, this impact would be of short duration; i.e. only when the management activity is occurring. These activities, especially if carried out with sensitivity to the visual impact of them, would be consistent with a ROS setting of Semi-primitive Non-motorized.

Scenic Integrity Objectives

Moderate Existing Scenic Integrity:

- Nearly all of the proposed activities occur in the Moderate Existing Scenic Integrity class. Landscapes in the Moderate Existing Scenic Integrity class appear slightly altered.

High Existing Scenic Integrity:

- The Shaver's Fork WSR corridor and a small area on the extreme southwestern edge of the project area are in the High Existing Scenic Integrity class. While limited in amount, all types of proposed activities would take place in the river corridor. Landscapes in the High Existing Scenic Integrity class "appear" intact. Deviations may be present but must repeat the form, line, color, texture, and pattern common to the landscape character so completely and at such scale that they are not evident.

Scenic Class:

- Nearly all of the Mower Tract is in the High Scenic Class which means that the scenery in the Mower Tract has a high scenic value to the public.

Before management activities are implemented on-the-ground, the site specific effects to the scenery resource must be considered. Several Design Features to consider to enhance or maintain the scenic integrity or scenic class of the project area are included in Appendix B.

Cumulative Effects

This cumulative effect of the Mower Tract Restoration Project Alternative 2 combined with the past, present, and reasonably-foreseeable actions, will not affect the existing use of the project area by recreationists. The landscape is already altered by human use.

Irreversible or Irretrievable Commitment of Resources

There are no irreversible or irretrievable commitments of resources in the Alternative 1 or Alternative 2 because no permanent changes to the environment are proposed.

Consistency with the Forest Plan, Laws, Regulations, and Handbook

After reviewed the following sections of the Monongahela National Forest Land and Resource Management Plan (September 2006, revised 2011) and considering this effects analysis, both alternatives are consistent with the Forest Plan.

- Forest-wide Management Direction for Recreation Resources
- Forest-wide Management Direction for Scenery Management

- Forest-wide Management Direction for Wild and Scenic Rivers
- Management Prescription 4.1
- Appendix C – Roadless Area Inventory and Wilderness Evaluation

The following sections of the Forest Service Manual (FSM), Forest Service Handbooks (FSH), and reference guides were used in this analysis:

- FSM 1920 – Land Management Planning
- FSM 2300 – Zero Code
- FSM 2310 – Planning
- FSM 2353 – National Forest System Trails
- FSM 2354 – River Recreation Management
- FSM 2380 – Landscape Management
- FSH 1909.12 – Land Management Planning Handbook Chapter 70 – Wilderness
- FSH 1909.12 – Land Management Planning Handbook Chapter 80 – Wild and Scenic Rivers
- Landscape Aesthetics: A Handbook for Scenery Management
- ROS Users Guide

In addition, the "Wild and Scenic River Study Report and Environmental Impact Statement on Twelve Rivers in the Monongahela National Forest (Draft, 1995)" was also used during this analysis.

Both alternatives were found consistent with this direction.

Transportation Resource

This section addresses the transportation impacts in the Mower Tract project.

Scope of the Analysis

The spatial boundary for the analysis is the project area boundary. The project area boundary includes all parcels of land that would be affected by project activities; therefore, it is an appropriate boundary for the analysis of direct and indirect effects on the transportation system. The temporal boundary is 10 years, associated

Methodology

A spatial analysis was conducted to determine effects to the road system in the project area. Routes were identified with the analysis and summarized in tables shown by alternative. Road densities were calculated and compared to Forest Plan Standards and Guides. Road density and road mileages have been calculated using system road data under the jurisdiction of the Monongahela National Forest.

Affected Environment

The transportation system provides access for management activities occurring on the Forest. The road system is needed by a variety of resources such as recreation, special uses, timber harvest, range management, minerals development, and fire protection. There are current 57.0 miles of National Forest System (NFS) roads within the Mower Tract Restoration project boundary (Table 30). The current road density across the project area is 1.07 miles per square mile (Table 31).

Table 30. Current Transportation System within the project area.

Route Number	Name	Jurisdiction	Maintenance Level	Mileage
227	Mower Tract	Forest Service	3	6.8
227B	South Lambert	Forest Service	2	1.4
227C, D, E	Mower Basin; Tower Road	Forest Service	1	3.3
235	Shavers	Forest Service	3	18.1
235B, C	Shavers Access	Forest Service	1	1.0
247, A	Fish Hatchery	Forest Service	2	3.8
233	River Road	Forest Service	3	10.0
233A, B	Black Run	Forest Service	1	3.0
245	Cheat Fort Summit	Forest Service	3	0.4
267	Bald Knob	Forest Service	2	9.2
Total				57.0

Table 31. Current NFS Road Density for the project area.

Management Prescription	Road Density (mi/sq. mi)
Management Prescription 4.1 - Spruce and Spruce-Hardwood Ecosystem Management	1.07

Alternative 1

Direct and Indirect Effects

The current transportation system will be maintained to the objective maintenance levels shown in Table 30. Road activities associated with ongoing road maintenance programs by the Monongahela National Forest will be implemented in the project area. No additional improvements or decommissioning will be performed. The current road density is shown in Table 31. Public motorized access would remain the same under Alternative 1.

Cumulative Effects

No cumulative effects. The existing condition would continue as described.

Alternative 2

Direct and Indirect Effects

Public motorized access through the project area under Alternative 2 would remain the same as the existing condition, with the exception of the 0.79 mile connector road between NFS Road 227B and NFS Road 227C. This would improve access to the proposed trail system, and serve as a sustainable route through this section of the project area than the existing non-system road that it will replace. Alternative 2 proposes the decommissioning of this and other non-system woods roads currently closed to public motorized as the condition of these woods roads are better understood as other proposed activities are implemented.

Table 32. Road density within the project area under Alternative 2.

Management Prescription	Road Density (mi/sq. mi)	Forest Plan Allowable Road Density (mi/sq. mi)
Management Prescription 4.1 - Spruce and Spruce-Hardwood Ecosystem Management	1.09	2.5

Cumulative Effects

Alternative 2 will include the construction of .79 miles of NFS road. Non-system roads currently closed to public motorized use would be decommissioned as the condition of this woods road system is better understood as other proposed activities are implemented. Overall, there would be a less resource damage associated with non-system roads after they are appropriately decommissioned. General road maintenance would also occur as funding and the needs arise.

Irreversible or Irretrievable Commitment of Resources

There would be no irreversible or irretrievable commitment of resources associated with Alternative 1. Alternative 2 would bring add approximately .79 miles of road onto the existing system with maintenance requirements from ongoing road maintenance programs by the Monongahela National Forest.

Consistency with the Forest Plan, Laws, Regulations, and Handbook

Both alternatives are consistent with the Forest Plan as all applicable Forest Plan Standards and Guides will be followed. No conflicts with the following Laws, Regulations, Handbooks, and Executive Orders:

Miscellaneous Report FS-643 titled Roads Analysis: Informing Decisions about Managing the National Forest Transportation System (USDA-FS 1999)
Forest Service Manual 7700 – Travel Management
Forest Service Handbook 7709.55 – Transportation Planning Handbook
Forest Service Handbook 7709.57 – Road Construction Handbook
Forest Service Handbook 7709.58 – Transportation System Maintenance Handbook
Forest Service Handbook 7709.59 – Transportation System Operations Handbook

Economic Impacts Resource

Scope of the Analysis

Randolph and Pocahontas counties are the area that would be most directly impacted by the effects of the project. Surrounding counties could also be impacted since labor for this project may come from people living in Pendleton, Webster, Tucker, and Highland (VA) counties.

Short-term economic projections were made for a ten year period and long-term projections were made to the end of the next timber rotation (90 years) for the Mower Tract project.

Methodology

The economic analysis was done by obtaining cost and prices from various sources. Cost figures for the Monongahela National Forest developed from previous projects were used for this project when available. Planting, deep ripping, timber stand improvement, and herbicide cost information were determined from previous contracts on the Monongahela National Forest (Table 33). The economic software QuickSilver (version 7.0) was used for analysis of the cost and benefits. Non-system woods road decommissioning was estimated based on the number of these roads decommissioned in the nearby Lambert Strip Restoration project. As stated in Chapter 2 under Alternative 2, this activity will be developed as project implementations occurs and these routes and associated conditions are better understood. Additional information is included in the Economic Impact Report located in the project file.

Table 33. Estimated costs associated with Alternative 2 of the project.

Item	**Cost**
Road/Maintenance	$22,500/mile
Road/Construction/Reconstruction	$100,000/mile
Road/Decommission	$26,000/mile
Road/Decommission	$10,000/acre
CTR	$100/acre
Young spruce release	$150/acre
Spruce release	$100/acre
Trail Construction	$26400/acre
Trail Head Construction	$5,000
Train Maintenance	$10,000/miles
Woody Debris Placement	$10,000/mile
Deep ripping	$1000/acre
Planting	$500/acre
Waterhole construction	$500/waterhole

Alternative 1

Direct and Indirect Effects

There are no incremental revenues or benefits associated with Alternative 1. People from local communities would not be employed for road improvement, planting, mineland restoration, timber stand improvement, spruce release treatments, aquatic improvement, and wildlife improvement projects (Table 34).

Cumulative Effects

Alternative 1 would not have a long term adverse effect on the local economy.

Table 34. Comparison of costs and revenues by each alternative.

	Alternative 1	Alternative 2
Road Costs		
Maintenance	0	74,250
Construction & Reconstruction	0	79,000
Total	0	153,250
Mineland work Cost		
Deep ripping	0	1,137,000
Planting	0	568,500
Total	0	1,705,500
Recreation	0	
Trail Construction	0	435,600
Trail Head Construction	0	45,000
Trail Maintenance	0	647,328
Total	0	1,127,928
Non-Commercial Treatments		
Young Hwd	0	223,700
Young Spruce	0	608,100
Spruce Release in Mature Hwd	0	518,000
Total	0	1,349,800
Watershed Projects		
Road Decommissioning-Heavy	0	3,068,000
Road Decommissioning-Light	0	1,180,000
Woody Debris Placement	0	817,500
Total	0	5,065,500
Wildlife Projects		
Waterholes	0	563,000
Total		563,000
Total Cost	0	9,964,978
Total Revenue	0	0

Alternative 2

Direct and Indirect Effects

The proposed action not would generate any revenues (Table 34). The proposed action would cost 9.96 million dollars over a 10-12 year period, with watershed work being the largest cost accounting for 51% of total costs (Figure 4). Approximately 731 acres of red pine and Norway spruce stands would be knocked over for the woody material loading for mineland restoration activities. Although the standing timber has an estimated value of $40,205, it was deemed non-merchantable at the current time due to poor access and markets.

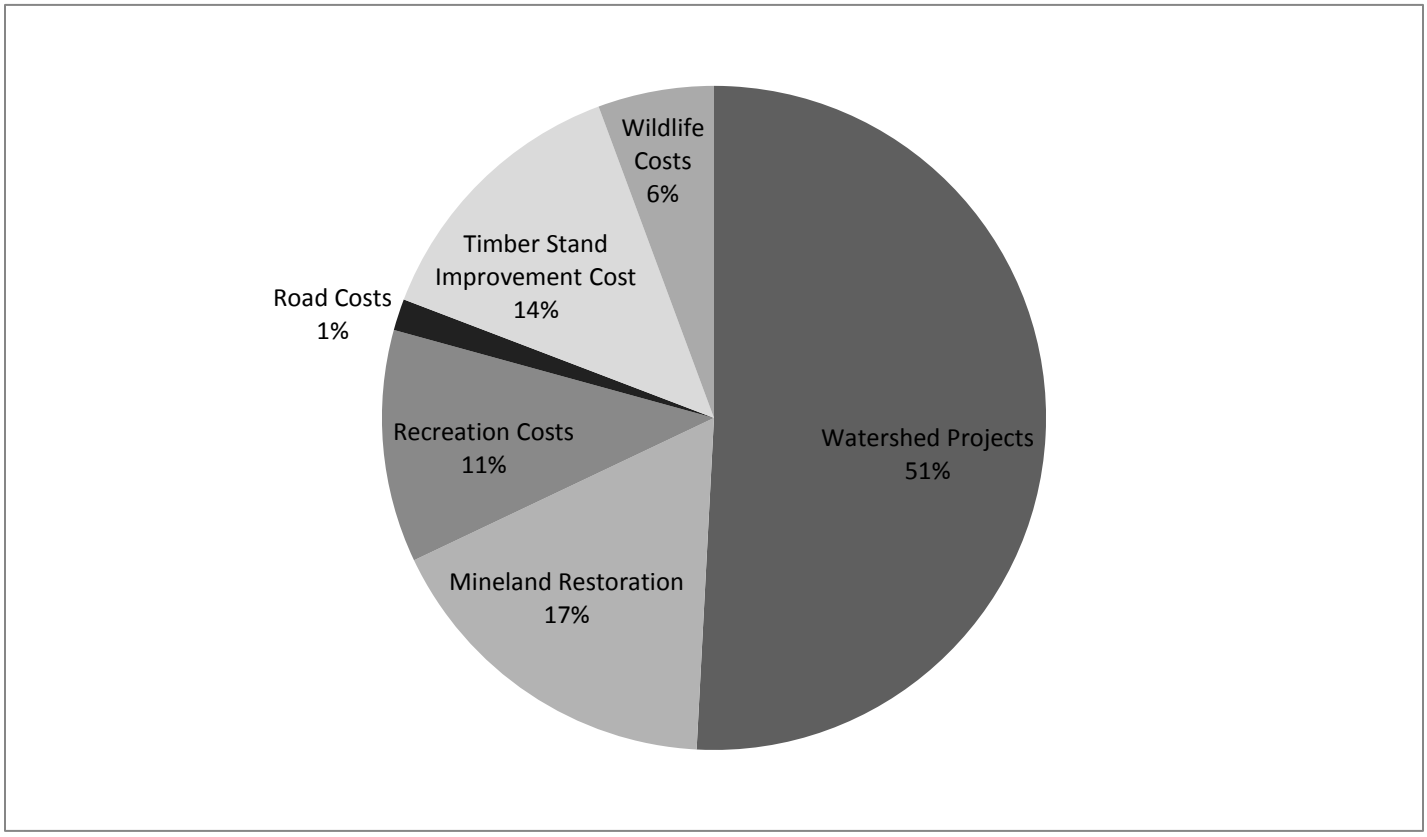

Figure 4. Costs associated with the proposed action by activity types.

Cumulative Effects

There would be only negligible cumulative economic impacts as a result of the Alternative 2 (proposed action). Money spent on the various projects would not create any long-term employment in the effected counties.

Irreversible or Irretrievable Commitment of Resources

Since acres in forestland would increase when the proposed action is fully implemented no irreversible or irretrievable commitment of economic resources would occur form this project.

Consistency with the Forest Plan, Laws, Regulations, and Handbook

There are no Forest Plan standards and guidelines concerning economics. However, Alternative 2 would be consistent with the Forest Integrated Desired Conditions on page II-7: "Forest ecosystems provide a variety of sustainable products and services for current and future

generations. Timber, range, wildlife, water, recreation, minerals, and special use programs offer opportunities for economic development, and contribute to local community needs, while maintaining ecological integrity." Alternative 1 would not offer any specific opportunities for economic development. Alternative 2 is consistent with the Forest Plan goal to contribute to the local and regional economies (Forest Plan II-40)

All the alternatives are consistent with the following laws and regulations:

National Forest Management Act of 1976

Multiple Use Sustained Yield Act of 1960

Forest Service Handbook 1909.17 Chapters 10, 20, and 30

Chapter 4 – Project Preparation and References

This chapter provides a list of people who prepared the EA. This chapter also includes lists of references used by specialists in the preparation of their Specialist Reports and the EA. Additional documentation, including detailed support data and analyses for the project area resources, is located in the project planning file at the Cheat-Potomac Ranger District office in Petersburg, West Virginia.

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The Monongahela National Forest has worked cooperatively with the following agencies and organizations in developing this project proposal:

West Virginia Division of Natural Resources (WVDNR)
U.S. Fish and Wildlife Service (USFWS)
West Virginia Mountain Biking association
Back Country Horseman of WV
West Virginia Mountain Trail Runners
Hatchery Run Homeowners Association (Cheat Mountain Club area landowners)
Local hikers

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Appendix A: Alternative 2 Activity Maps

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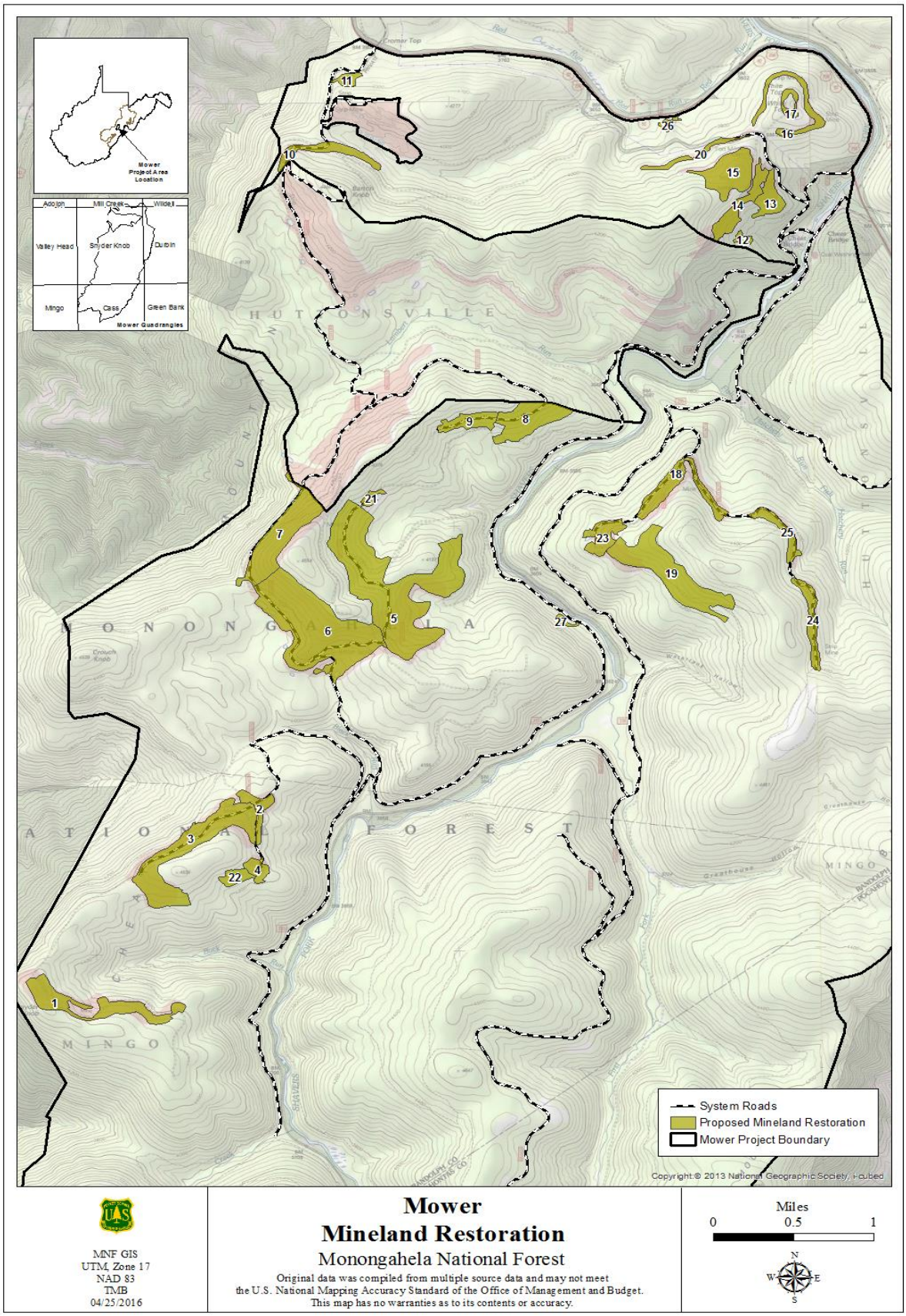

Figure A - 1. Alternative 2: Mineland Restoration Activities.

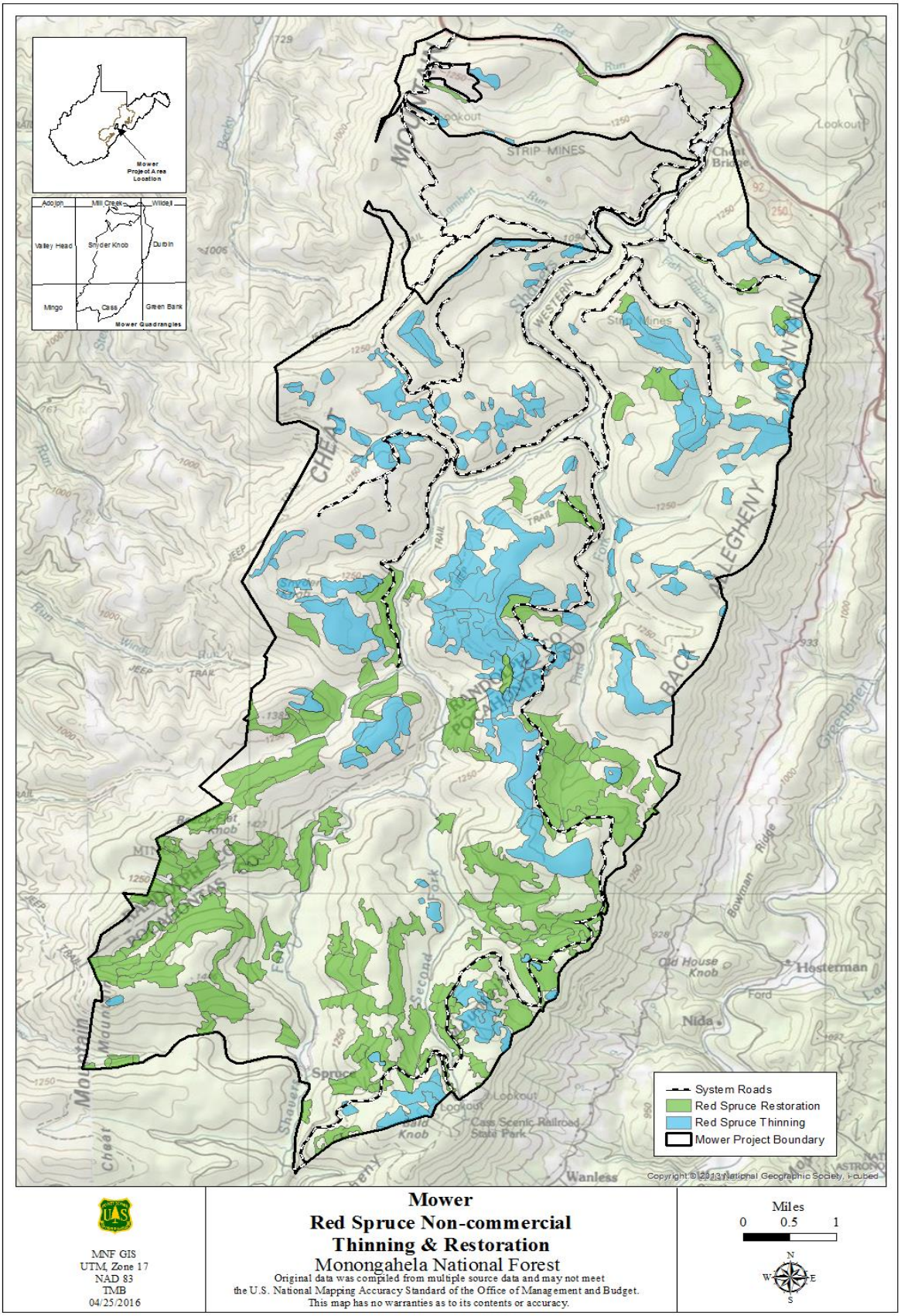

Figure A - 2. Alternative 2: Non-commercial Red Spruce Restoration and Thinning Activities.

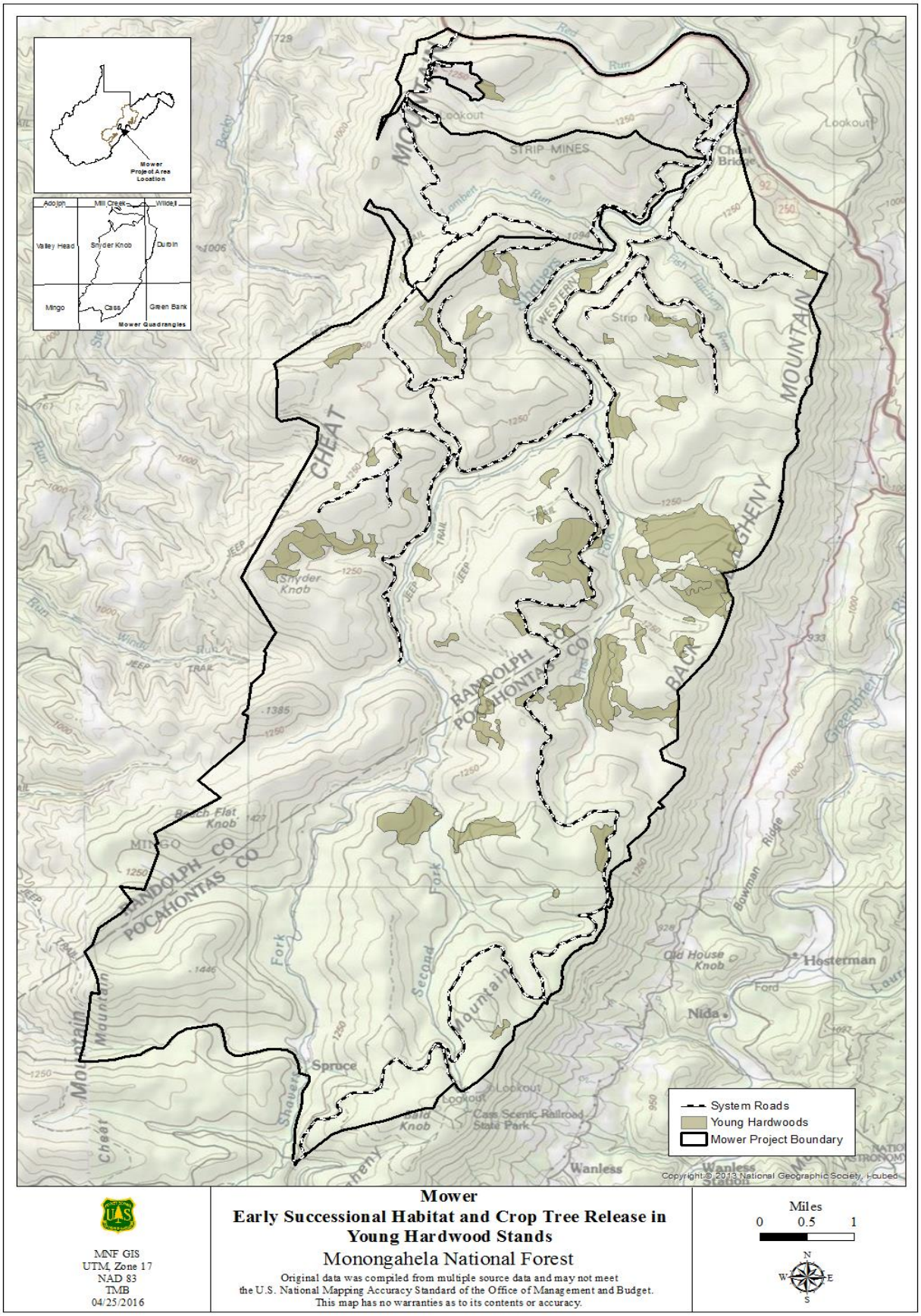

Figure A - 3. Alternative 2: Early Successional Habitat and Crop Tree Release Activities.

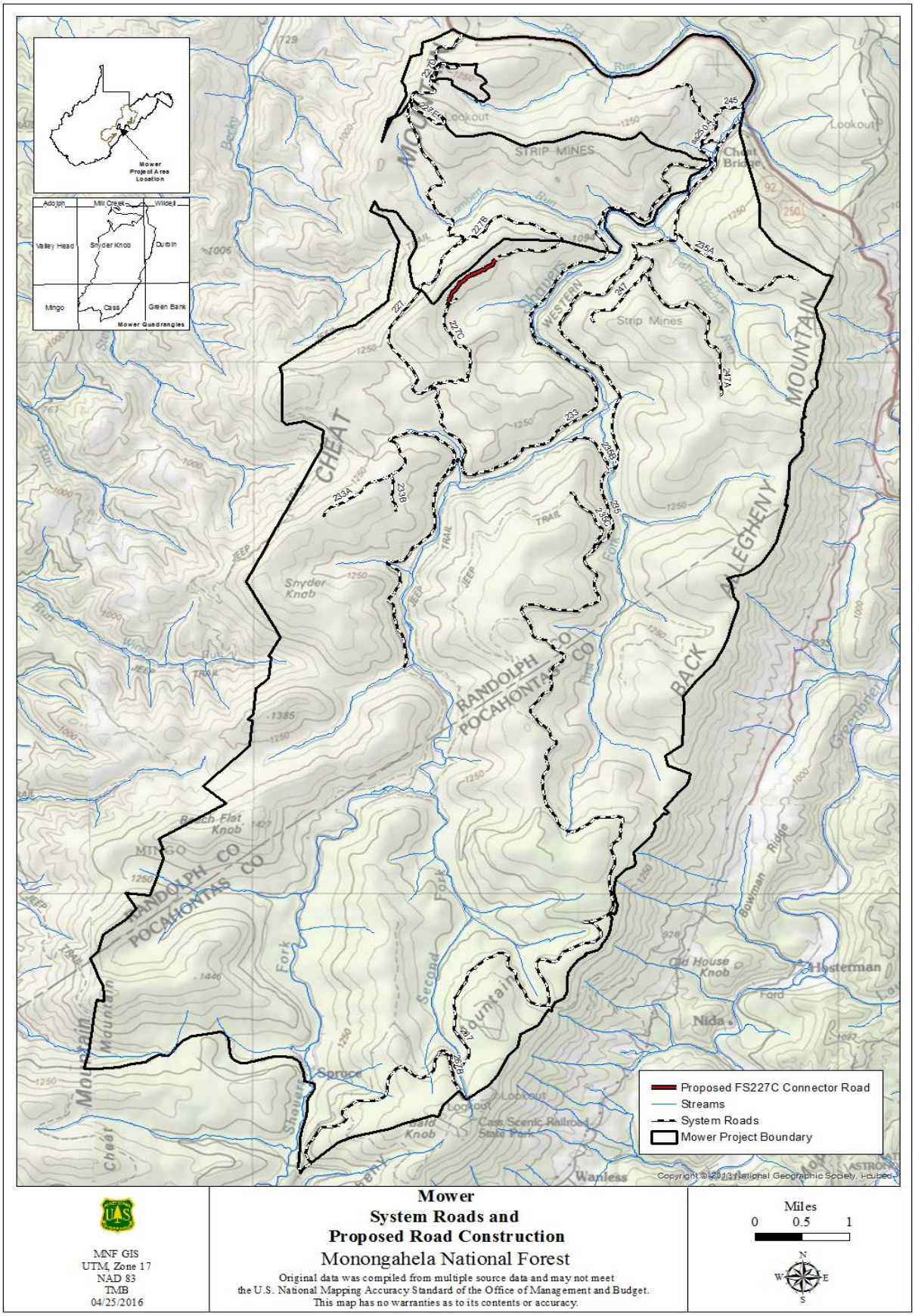

Figure A - 4. Road System and Alternative 2: New Road Connector.

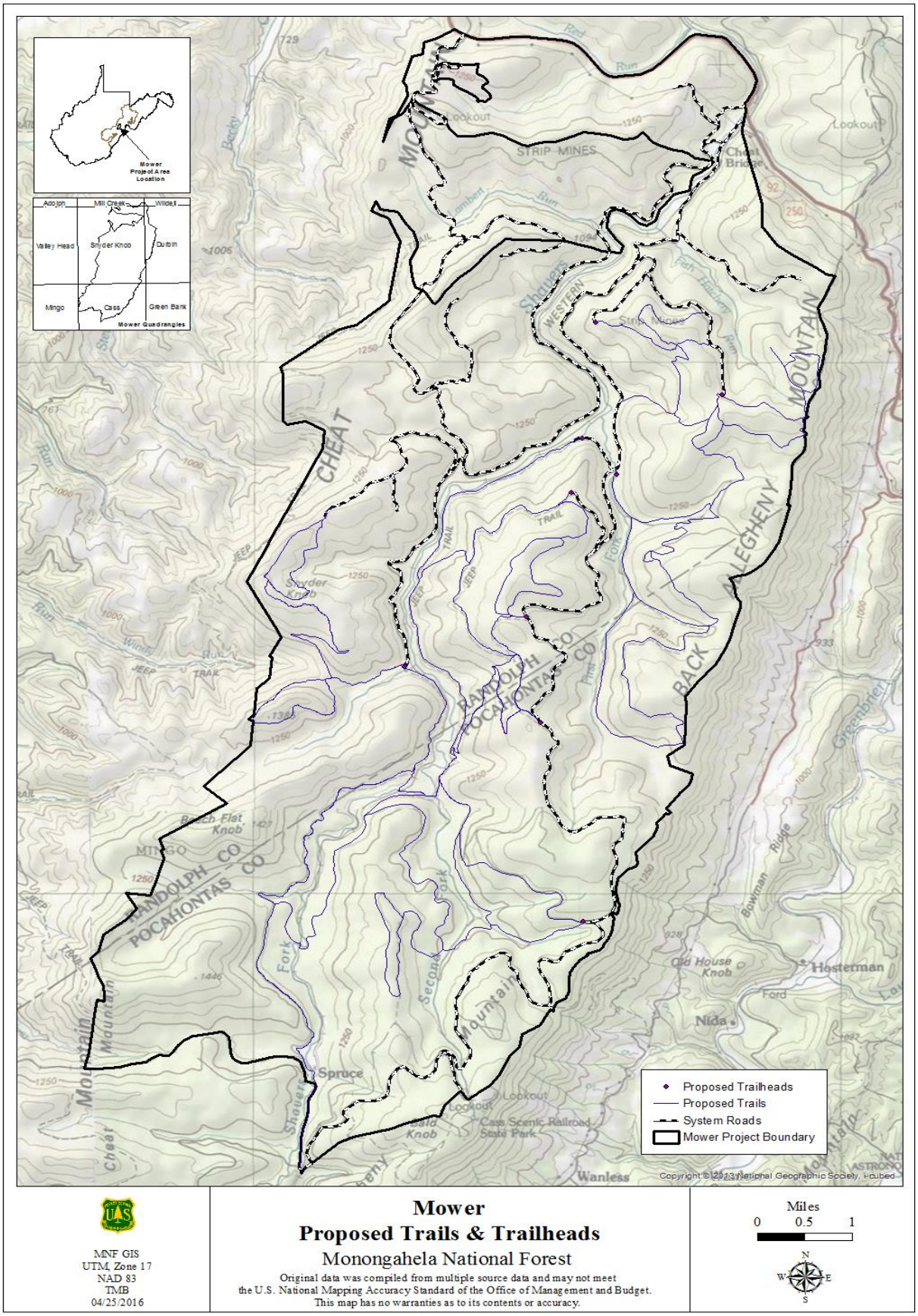

Figure A - 5. Alternative 2: Trail System Proposal.

Ap

Appendix B: Recommended Design Features and Mitigation Measures

Soils and Water Resources		
Reference No.	**Description**	**Where applicable**
Mower01	Do not use herbicides in areas where hydric soils are located or wet soils are located. Aquatic formulas may be used or hand removal methods.	Where herbicide use is proposed in Non-commercial red spruce restoration in mature hardwood stands and early successional habitat and crop-tree release in young hardwood stands
Mower02	Do not remove vegetation off site. Leave cut vegetation on site to provide additional habitat and to promote nutrient cycling via decomposition.	Project-wide
Mower03	Ripping of soils must be done in a manner that does not facilitate erosive processes. Meaning that ripping should be done parallel to the slope, on contour or diagonally according to safety parameters.	Mineland Restoration areas
Mower04	If large boulders are part of the soil profile, a single rip pass may be adequate to decompact the soil; however, if deep ripping does not result in bring large boulders to the surface and the soil textures are less coarse, diagonal ripping must done in order to achieve desired soil quality improvement and allow for root penetration of any plantings.	Mineland Restoration areas
Mower05	Seeding of disturbed soils where erosion is a concern such as next to moving water, culverts, and other areas where there is a link to a stream channel or ditch line. An annual grass seed would be appropriate or heavy mulching with a weed free source.	Project-wide
Mower06	All BMPs should be utilized for the construction of trails and roads.	Project-wide
Mower07	Use the shredder mulcher on dry soils and on gentle slopes (<15%). Cease use during wetter times of the year and aim to work during dry periods. Return the resulting mulch to the soil surface and apply it heavier where ruts, rills, or gullies are inadvertently created. Seeding and mulching can help to mitigate any excessive soil disturbance. The only instance which would require the use of a 6-way blade is if an adverse hydrologic condition (i.e. a seep was intercepted) was created.	Mulcher use
Mower08	Construction on steep slopes will require proper erosion control measures such as mulch and seeding where necessary to reduce risk of erosion and sedimentation to nearby waterbodies.	Trail system as proposed

Mower09	On wet and hydric soils, trails should be designed such that water can easily pass through culvert and away from the trail surface.	Trail segments as identified in Sensitive soils analysis
Mower10	Regular maintenance and monitoring should occur on trail segments susceptible to slippage to reduce erosion, sedimentation, and mass wasting	Trail segments as identified in Sensitive soils analysis
Mower11	Avoid wet soils and flatter terrain in determining trail placement. Avoid creating potential erosion by avoiding steep trail grades and low trail alignment angles. Parallel treads and tread widening can be limited by locating trails in sloping terrain where steeper side-slopes encourage use within the established corridor. Harden tread surface as necessary and possible where there is little rocky content.	Trail system as proposed
Mower12	Wetland creation should be focused on areas that do not steeply slope (<30%). Because of the variability of the soils in severely disturbed mining areas, wetland creation sites should be based on conditions such as depressions or areas of standing water. Soils should contain a sufficient amount of clay in order to effectively retain surface water.	Wetland Creation Sites
Mower13	To minimize movement of herbicide where erosion is a concern (slopes >30%), in soils have high levels of rock with large voids, or where soil pH has shown to increase risk of movement to desirable vegetation, hand and spot (wick) application would need to occur in these areas and then revegetated post herbicide application with adequate time for the herbicide to have degraded or planted with a mix that would not be susceptible to the herbicide residues left behind once the plants die and decompose.	Herbicide application
Mower14	If trail tread soils that are seasonally wet and poorly drained cannot be avoided, integrate structures such as boardwalks, turnpikes, causeways, puncheon or geosynthetics, to sustain traffic and avoid muddiness.	Trail system as proposed
Mower15	Consider alignments that follow contours and have low grades to ensure stability and decreased erosion.	Trail system as proposed

Mower16	Ensure that Forest Service National Core BMPs and appropriate designs are utilized when removing, reconstructing or stabilizing stream crossings. This includes, but is not limited to: working only during those periods when the stream flows are at their normal annual lowest and when aquatic organisms are least likely to be impacted, installing sediment control structures (sediment fence, straw bales, etc.), when necessary, diverting flows around the active work area, and contouring the channel banks to a natural morphology, seeding and applying a protective ground cover to the areas of bare and disturbed ground, and ensuring the channel substrate material is appropriately sized. Consultation with watershed personnel should occur prior to implementation.	Stream crossings as part of stream habitat improvements and road decommissioning

Terrestrial Wildlife Resources

Reference No.	Description	Where applicable
Mower17	Bat acoustic surveys would occur prior to implementation. If NLEB are detected, reinitiate consultation with USFWS.	Mineland Restoration where nonnative conifers are knocked down.
Mower18	To protect NLEB, activities that require the cutting of all trees greater than 5” dbh for the activities listed, one of the following design features will be incorporated: 1) bat acoustic surveys prior to implementation of the listed activities. If NLEB are encountered, FS will reinitiate consultation with FWS; or 2) No clearing of trees greater than 5” dbh from May 15 – July 15 (the non-volant period for NLEB in West Virginia).	Trailhead construction, new trail construction, road decommissioning, new road construction, and stream habitat improvements
Mower19	No use of herbicides in areas within mapped CMS habitat.	Spruce release in mature hardwoods (Portion of 33 units in mapped CMS habitat (373 acres))
Mower20	No use of tracked mulcher in mapped CMS habitat.	Non-commercial Thinning in Young Spruce Stands (Portion of 45 units in mapped CMS habitat (915 acres))

Mower21	No use of herbicide or tracked mulcher in mapped CMS habitat.	Early Successional Habitat and Crop Tree Release in Young Hardwood Stands (Portion of 11 units in mapped CMS habitat (224 acres))
Mower22	Post-decisional review prior to implementation to ensure trail does not affect adjacent habitat. If effects cannot be avoided, the trail segment in CMS habitat would be dropped.	Road to trail conversion (Portion of 9 trail segments (2.5 miles))
Mower23	Review of exact trail location by WL biologist to avoid CMS habitat.	New trails construction (One new trail construction (Ward Knob) is in close proximity to CMS habitat)
Mower24	Do not use tracked mulcher in riparian area habitat.	Non-commercial Thinning in Young Spruce Stands (Units 25, 32, 61, 78, 86, 100, 135, 154, and 155); Early Successional Habitat and Crop Tree Release in Young Hardwood Stands (Units 7, 15, 22, 24, 26, 46, 56, and 59)
Mower25	Drop portion of units in mapped wetland habitat.	Non-commercial Red Spruce Restoration in Mature Hardwood Stands (Units 2, 36, 43, 47, 72, 76, 99, and 101)
Mower26	For areas with documentation of historic goshawk nesting, to avoid potential disturbance during the goshawk nesting season, coordinate with the WVDNR to either conduct dawn acoustic surveys for goshawk or do not implement actions from March 1 – July 1.	Non-commercial Red Spruce Restoration in Mature Hardwood Stands (Units 40, 43, 44, 47, 49, 52, 66, 74, and 86); Non-commercial Thinning in Young Spruce Stands (Unit 139); Trail construction (Odey Run Trail)

Mower27	For all new trail construction, coordinate with the WVDNR to conduct the appropriate level of goshawk surveys in areas of new trail construction. If no goshawk activity/nests are observed, no other design features would be necessary. If goshawk activity is documented, further coordination with the WVDNR would be necessary and require design features measures to avoid disturbing nesting goshawk and may include the following: seasonal restrictions (no trail construction from March 1 – July 1); rerouting trail segments to avoid nesting areas; etc.	New Trail Construction
Mower28	For public safety and to reduce disturbance to nesting goshawk, seasonal closures of activities and/or trails with documented goshawk nesting activity would be necessary in the future. If necessary, areas around nesting goshawk may be closed to public or administrative activities from March 1 – July1. Appropriate design features would be determined through coordination with the WVDNR.	All project activities
Mower29	Avoid rocky habitat (small outcrops, and ledges) to minimize impact to RFSS dependent upon this type of habitat.	Trail Construction, Road construction, use of tracked mulcher.
Mower30	To protect young, young immobile WVNFS in suitable habitat, the following design features will be implemented: 1) Conduct WVNFS surveys (hair snare or acoustic surveys) to disprove the presence of WVNFS, which would clear areas from any restrictions; or 2) In areas presumed to be occupied by WVNFS (e.g. areas of suitable WVNFS habitat not surveyed or surveyed and determined to be occupied), avoid cutting trees greater than 6” dbh to the maximum extent practicable during April 1 – September 14, with the following exceptions: There is no size restriction limit for striped maple or fire cherry. Due to the nature of these two tree species (brittle trees that do not provide cavities), the likelihood of natal WVNFS nests (e.g. female WVNFS with immobile young) is considered discountable.	All activities that involve tree felling, except for mineland restoration.

Vegetation Resources

Reference No.	Description	Where applicable
Mower32	Prior to implementation, survey all areas of planned ground disturbance for road and trail construction, reconstruction, maintenance, or decommissioning, and trailhead construction. RFSS plants should be marked with brightly colored flagging or other visible markers.	All RFSS plants in areas of planned soil disturbance associated with road or trail construction, reconstruction, maintenance, decommissioning, or trailhead construction.
Mower33	Avoid soil disturbance within 30 feet of RFSS plants wherever possible, including but not limited to outsloping and recontouring.	All RFSS plants in areas of planned soil disturbance associated with road or trail construction, reconstruction, maintenance, decommissioning, or trailhead construction.
Mower34	When ground disturbance cannot be avoided to RFSS plants and relocation appears practical, efforts should be made to transplant as many specimens as practical to nearby suitable habitat.	All RFSS plants in areas of planned soil disturbance associated with road or trail construction, reconstruction, maintenance, decommissioning, or trailhead construction.
Mower35	Use only precisely targeted spot applications of herbicide within 150 feet of RFSS plants. Cut surface and basal bark application of herbicide for the control of saplings, underbrush, or NNIS is allowed near RFSS plants; however, any such application must not expose any RFSS to herbicide.	All RFSS plants in areas of spruce release, and crop tree release.
Mower36	Soil-mobile herbicides may not be used within 150 feet of RFSS plants.	All RFSS plants in areas of spruce release, spruce thinning, and crop tree release.
Mower37	Identify and avoid impacts to known locations long-stalk holly (Ilex collina), Bartram's shadbush (Amelanchier bartramiana) and Canada yew (Taxus canadensis).	All RFSS plants in areas of spruce release, spruce thinning, and crop tree release.

Mower38	Before entering National Forest land, all logging equipment, construction equipment, fire equipment, maintenance equipment, decommissioning equipment, and any vehicles to be used off of currently maintained roads must be free of all soil, seeds, vegetative matter, or other debris that could contain or hold seeds. Equipment and vehicles that are used on infested sites must be cleaned to the above standard before being moved to other locations on National Forest land.	Project-wide
Mower39	When equipment used for constructing, reconstructing, maintaining, or decommissioning roads is operated in a known infestation of high priority NNIS, it should be cleaned as thoroughly as is practical using dry methods prior to continuing along the route.	Project-wide
Mower40	Any necessary wet cleaning of equipment and vehicles used by contractors should be conducted off of National Forest land or at a Forest Service-approved wash station if cleaning on National Forest land is the only practical option. Any necessary wet cleaning of Forest Service equipment and vehicles should be conducted at an administrative site or other designated wash station. Cleaning must not introduce invasive plants to unimpacted sites and must not contaminate soil or water.	Project-wide
Mower41	Do not use hay for mulch. Because a local source for certified weed-free mulch is not yet available, use straw, coconut fiber, wood fiber, synthetic mulch, or other low-risk Forest Service-approved material.	Project-wide
Mower42	Retaining American beech immune to beech bark disease. Do not treat sapling sized beech within 20 feet of immune beech	Timber Stand Improvement Activities associated with non-commercial red spruce restoration in mature hardwood stands, non-commercial thinning in young spruce stands, and early successional habitat and crop tree release in young hardwood stands

Mower43	Enhancing red spruce component in 4.1 areas by treating red spruce as a crop tree	Timber Stand Improvement Activities associated with non-commercial red spruce restoration in mature hardwood stands, non-commercial thinning in young spruce stands, and early successional habitat and crop tree release in young hardwood stands

Recreation and Scenic Resources

Reference No.	Description	Where applicable
Mower44	The combination of the Existing Scenic Integrity and Scenic Class tells us that this is a special, scenic area. While it would be consistent with either of these classes to see a landscape slightly altered or "appearing" intact by the other actions described in the Proposed Action, whenever possible, the form, line, color, texture, pattern and scale common to the unaltered landscape should be repeated to help blend the human activities into the landscape. For example, do not use straight lines as the edges of the Early Successional Habitat cutting units. Blend the cutting units into the landscape by following topography, streams, and other natural patterns. This blending is a requirement for the High Scenic Integrity areas.	Project-wide
Mower45	Before management activities are implemented on-the-ground, the site specific effects to the scenery resource must be considered.	Project-wide
Mower46	Consider placing Early Successional Habitat near roads to open up viewpoints.	Project-wide
Mower47	Any bridges should be constructed so that they do not restrict the free-flowing character of the Shavers Fork.	Any crossings along Shavers Fork or within the viewshed from this stream.

Mower48	New trails and road-to-trail conversions must be located and constructed to be sustainable over the long term. Road-to-trail conversion could involve: 1) Checking a route and finding it sustainable. No on-the-ground work would be necessary, or 2) Checking a route and finding it not sustainable due to poor drainage, unreasonable grades, etc. On-the-ground work to make that trail sustainable could involve working within the existing route corridor or decommissioning the existing route and constructing a new trail in a new corridor.	Trail system as proposed
Mower49	Because these are multi-use trails, we would use a mix of the pack and saddle, bicycle, and pedestrian design standards to create the most sustainable trail for any of the three user groups. Design Specification details are included in the Recreation Resource report found in the project file.	Trail system as proposed

Heritage Resources

Reference No.	**Description**	**Where applicable**
Mower50	Avoid proposed activities at locations of 3 historic properties within the project area.	Cheat Fort Summit (46 Rd 28), Hopkins Mine & Incline RR (46 Rd 475), and Historic Trace of Staunton-Parkersburg Turnpike

Appendix C: Applicable Forest Plan Standards and Guidelines

Management Prescription 4.1- Spruce and Spruce-Hardwood Ecosystem Management		
Standard	4109	Maintain culls and snags to provide for wildlife habitat. Manage culls to provide dens and future snags. If non-commercial and in excess of wildlife needs, culls may be girdled or injected with herbicide to produce snags. When thinning or implementing other vegetation management, retain at least 5 culls per acre, if available. Retain culls and all snags except as noted below. a) Snags and culls may be removed when they are public safety hazards along roads, trails, or established campsites, or safety hazards in harvest units. b) Snags and culls may be removed for scenery management purposes in locations of very high or high scenic integrity such as in a vista or in the immediate foreground of a road open for public motor vehicle
Guideline	4110	Red spruce should be restored, maintained, or enhanced in stands where potential natural vegetation includes a spruce component and there is some spruce present in the overstory or understory within or immediately adjacent to the stand. Spruce restoration should not normally be conducted in stands without an understory red spruce component or natural red spruce seed source. In stands greater than 80 years old, with greater than 30% spruce in the overstory, community composition and structure should be maintained primarily through natural processes.
Standard	4115	Trail management shall be compatible with the desired ROS setting of the area.
Standard	4116	New trail construction shall not cause trail density in the prescription unit to exceed 2 miles per square mile. This standard does not apply to relocation of existing trails.
Standard	4117	The prescription area may be entered every year for ecological restoration or timber management practices, based on the consideration of multiple resources.
Standard	4118	No more than 40 percent of forested NFS lands within each 4.1 prescription area unit shall be harvested over a 10-year period. Thus, at least 60 percent of the unit shall provide security areas for wildlife during the 10-year period.
Standard	4119	Unforeseen activities such as timber salvage or pipeline installation, shall be counted toward the 40% disturbance standard above.

Guideline	4120	In areas where spruce and spruce-hardwood restoration, enhancement, or maintenance is practiced, multi-aged, uneven-aged, and stand improvement cuts are the preferred silvicultural treatments. a) Group selection, modified shelterwood and two-age harvest methods are preferred when the objective is spruce or spruce-hardwood ecosystem restoration, enhancement, or maintenance.. Group selection cuts should be limited to two acres or less. Complete overstory removal should be avoided. b) Thinning in spruce and spruce-hardwood stands should leave at least 75% of the existing basal area. c) Restoration or enhancement treatments may be implemented at any stand age.
Guideline	4122	Spruce stands may be thinned at regular intervals, depending on their need.
Guideline	4123	Use artificial regeneration where needed to attain required stocking guides.
Guideline	4124	Red spruce may be planted, typically on a small scale, as part of research and administrative studies, or when determined to be a practical strategy for restoration or enhancement.
Guideline	4125	Use 1/3 acre leave clumps around scattered residual overstory spruce trees and snags in even-age regeneration units to reduce windthrow potential. Leave clumps at the rate of one clump for each 5 to 8 acres regenerated. Channel buffers may be counted toward this requirement where their configuration allows them to serve both purposes.
Guideline	4126	TSI and site preparation work should favor spruce trees, shrubs beneficial to wildlife, vegetation for screening, and other objectives of a site-specific silvicultural prescription.
Guideline	4127	Cut all non-merchantable stems > 1” dbh during site preparation for natural regeneration activities except for leave clump trees, marked cull trees and snags, spruce and hemlock trees or other desirable advance regeneration, and shrubs beneficial to wildlife.
Guideline	4131	Maintain natural areas of standing water as wildlife watering sources. Artificial areas of standing water may be created in conjunction with other resource activities as the opportunity arises.
Guideline	4132	Roads intended for intermittent use should be revegetated between uses and typically managed as wildlife habitat.

Guideline	4135	Road densities and impacts should be minimized to reduce disturbance in the area. a) Construction of new classified roads should not cause road density within the prescription area unit to exceed 1.0 mile per square mile for collector roads, or 2.5 miles per square mile for any combination of collector and local roads. b) New collector roads should generally be gated and maintained for recurring administrative use. c) New local roads should generally be closed between projects by physical barricades. Use should be intermittent. Public motorized use should generally not occur from April 15 to August 1 to reduce disturbance to wildlife.
General Forest Direction		
Soil and Water Resources		
Standard	SW03	Disturbed soils dedicated to growing vegetation shall be rehabilitated by fertilizing, liming, seeding, mulching, or constructing structural measures as soon as possible, but generally within 2 weeks after project completion, or prior to periods of inactivity, or as specified in contracts. Rip compacted sites when needed for vegetative re-establishment and recovery of soil productivity and hydrologic function. The intent is to minimize the time that soil is exposed on disturbed sites or retained in an impaired condition.
Standard	SW04	Erosion prevention and control measures shall be used in program and project plans for activities that may reduce soil productivity or cause erosion.
Standard	SW05	Maintain at least 85 percent of a vegetation management activity area in a non-detrimentally disturbed condition. Existing system roads and trails, and other administrative facilities within the activity area, are not considered detrimentally disturbed conditions when assessing compliance with this standard.
Standard	SW06	Severe rutting resulting from management activities shall be confined to less than 5 percent of an activity area.

Standard	SW07	Use of wheeled and/or tracked motorized equipment may be limited on soil types that include the following soil/site area conditions: a) Steep Slopes (40 to 50 percent) – Operation on these slopes shall be analyzed on a case-by-case basis to determine the best method of operation while maintaining soil stability and productivity. b) Very Steep Slopes (more than 50 percent) – Use is prohibited without recommendations from interdisciplinary team review and line officer approval. c) Susceptible to Landslides – Use on slopes greater than 15 percent with soils susceptible to downslope movement when loaded, excavated, or wet is allowed only with mitigation measures during periods of freeze-thaw and for one to multiple days following significant rainfall events. If the risk of landslides during these periods cannot be mitigated, then use is prohibited. d) Soils Commonly Wet At Or Near The Surface During A Considerable Part Of The Year, Or Soils Highly Susceptible To Compaction. Equipment use shall normally be prohibited or mitigated when soils are saturated or when freeze-thaw cycles occur.
Guideline	SW11	Soil stabilization procedures should take place as soon as practical after earth-disturbing activities are completed or prior to extended periods of inactivity. Special revegetation measures may be required.
Guideline	SW14	Mulch should be applied on severely eroded areas, or areas with high potential for erosion, such as new road cut and fill slopes.
Guideline	SW15	Topsoil should be retained to improve the soil medium for plant growth on areas to be disturbed by construction. Topsoil should be salvaged from an area during construction and stockpiled for use during subsequent reclamation, or obtained from an alternate site. On some areas, soil material may have to be added to obtain vigorous plant growth. Soil to be used for this purpose should have chemical tests made to determine its desirability for use.
Guideline	SW16	Where the removal of vegetative material, topsoil, or other materials may result in erosion, the size of the area may be limited from which these materials are removed at any one time.
Guideline	SW17	During watershed or project-level analysis, incorporate soil protection or improvement into project planning through an awareness of: a) Soil, geology, and landform conditions; b) The inherent capability of the soils involved; and c) The degree and duration of soil disturbance.

Guideline	SW19	Management activities that may result in accelerated erosion and loss of organic matter should have one or more of the following practices applied to mitigate potential effects: a) Limiting mineral soil exposure, b) Appropriately dispersing excess water, c) Ensuring sufficient effective groundcover, d) Stabilizing disturbed soils through revegetation, mulching, or other appropriate means, e) Preventing or minimizing excessive compaction, displacement, puddling, erosion, or burning of soils, and f) Preventing or minimizing the initiation or acceleration of mass soil movement (e.g., slumps, debris flows, or landslides).
Standard	SW23	Logging and construction equipment shall not be washed in stream courses, nor shall material from washed equipment be allowed to drain into surface waters.
Guideline	SW26	Management activities should maintain stream flow regimes to provide for channel stability and stream functions that support healthy riparian habitat, aquatic habitat, and downstream uses.
Standard	SW34	No programmed timber harvest shall occur within the channel buffers identified in the table in SW37. Tree removal from the buffers may only take place if needed to meet aquatic or riparian resource management needs, or to; a) Provide habitat improvements for aquatic or riparian species, or threatened, endangered, sensitive, and locally rare species; b) Provide for public or worker safety; c) Construct or renovate an approved facility; d) Construct temporary road, skid road, or utility corridor crossings; e) Conduct aquatic or riparian-related research, or f) Allow for cable yarding.
Standard	SW36	When stream crossing structures are removed, stream channels shall be restored to their near-natural morphology (width, depth, and gradient associations for streambeds, streambanks, floodplains, and terraces). Disturbed soil shall be stabilized.

Standard	SW37	During project-level planning and implementation, determine channel buffers for streams that would potentially be affected by proposed activities. The following table represents default buffer widths to be applied to both sides of the channel. Stream Classification (Buffer Width) Perennial (100 feet) Large Intermittent (>50-acre drainage area) (100 feet) Small Intermittent (<50-acre drainage area) (50 feet) Ephemeral (25 feet) Buffer widths may be adjusted based on interdisciplinary review and site-specific field investigation. The buffers shall, at a minimum, encompass the riparian area defined on the basis of soils, vegetation and
Standard	SW46	New structures (culverts, bridges, etc.) shall be designed to accommodate storm flows expected to occur while the structures are in place. Use scientifically accepted methods for calculating expected storm flows.
Guideline	SW48	Existing trails in channel buffers may be reconstructed or relocated to reduce impacts to riparian and aquatic resources.
Guideline	SW49	Closure orders may be used to control environmental impacts caused by dispersed recreation.
Guideline	SW51	Ground disturbance should be avoided within seeps, vernal pools, bogs, fens, and other wetlands during project implementation. These areas should be managed to protect wet soils and rare plants and provide wildlife watering sources using the following protection: a) No new system roads or skid roads should be located within these areas except at essential crossings. Such crossings should be designed to minimize disturbance to the extent practical. b) Logs should not be skidded through these areas. Keep slash and logs out of them. c) Where available, a canopy of 60-100 percent crown closure should be maintained within and adjacent to these areas, unless a more open canopy is needed for TEP species or RFSS management. d) Mast trees or shrubs may be planted in seeps if mast plants are currently lacking.
Guideline	SW55	New trails should not be located within channel buffers except at crossings, to control access to water bodies, or when location outside the buffer would pose greater risk to aquatic or riparian resources.
Guideline	SW60	Crossings should be designed so stream flow does not pond above the structure during normal flows to reduce sediment deposition and safely pass high flows.

Vegetation Resources		
Guideline	VE06	Native plant species should be used to revegetate, restore, or rehabilitate lands where natural regeneration is not likely to occur in a timely manner. Non-native, non-invasive plant species may be used: a) When needed in emergencies to protect resources (soil stability, water quality, etc) b) As an interim non-persistent measure to help re-establish native plants c) When native plant species are not available d) In permanently altered plant communities. When project objectives justify the use of non-native plant materials, documentation explaining why non-natives are preferred should be part of the project planning process.
Standard	VE13	For management actions that have been identified by the Forest as likely to cause a negative effect on RFSS populations, negative effects shall be avoided or minimized to the maximum extent practical while still accomplishing the purpose of the project or action. Unavoidable negative effects shall be mitigated to the extent practical and consistent with the project purpose.
Guideline	VE14	Rare communities should be identified during project analysis. Management actions should avoid rare communities unless management is necessary to maintain, enhance, or restore a particular community. Conservation and management measures for rare communities should be determined on a case-by-case basis.
Guideline	VE16	Use Forest Service-approved portions of Conservation Strategies and Agreements, as appropriate, in the management of sensitive species habitat to help keep management actions from contributing to a trend toward listing for these species.
Standard	VE21	On-Forest source sites for gravel and borrow materials shall be inspected for NNIS before materials are processed, used, or transported from the source site to the project area. Gravel or borrow material source sites with NNIS present shall not be used, unless effective treatment or other mitigation measures are implemented to prevent the spread of NNIS.
Standard	VE22	Projects that may contribute to the spread or establishment of noxious weeds shall be designed to include measures to reduce the potential for spread and establishment of noxious weed infestations.
Guideline	VE23	All seed used on National Forest System lands should free of seeds from noxious weeds.

Guideline	VE24	NNIS management should determine the presence, location, and amount of infestations. Management strategies should also identify: a) Methods and frequency for treating infestations, b) Treatment procedures and restrictions, c) Reporting requirements, and d) Follow-up or monitoring requirements.
Guideline	VE27	Where pest problems occur, the selection of corrective measures should take into account management objectives, effectiveness, safety, environmental protection, and cost.
Goal	VE28	Provide for safe and effective pesticide use on the Forest when needed as part of an Integrated Pest Management strategy.
Standard	VE35	All reasonable efforts shall be made to notify adjacent landowners and persons within the treatment area prior to application of restricted use pesticides.
Guideline	VE36	During environmental analysis for pesticide use, other reasonable alternatives should be evaluated to achieve the purpose and need of the project.
Guideline	VE38	Use application techniques that provide proper pesticide placement on the target area or species. Low pressure spray equipment is preferred.
Recreation, Scenic Resources, and Wild and Scenic Rivers		
Guideline	RC16	Location of recreational developments should be determined with priority given to correcting health and safety problems, protecting the environment, complementing prescribed recreation opportunities, and meeting public demand.
Standard	RC23	Horse or mechanized use may be prohibited on trails not designed or maintained for such use.
Guideline	RC24	Facilities that may be provided in dispersed areas, consistent with the ROS, are: a) Sealed vault toilets. b) Trails and parking areas to reduce adverse impacts. c) Potable water. d) Access may be graveled, all-weather road. e) Trash collection facilities. f) Tables and fireplaces g) Bridges h) Shelters i) Stock facilities.

Standard	RC28	Damage to or loss of system trails from timber harvest, road construction, mining, special uses, or prescribed fire activities shall be repaired or mitigated by the program initiating or proposing the activity.
Standard	RC29	If a trail is temporarily used as a road, relocate the trail for the duration of the project.
Guideline	RC32	Maintenance and/or relocation of existing trails should take priority over new trail construction. Trail maintenance priorities are as follows: a) Reduction of hazards to trail users. b) Prevention and mitigation of resource damage. c) Trail marking and signing. d) Treadway clearing work needed for user enjoyment.
Guideline	RC33	Visual variety and scenic attractions should be integrated in determining new trail development or existing trail relocation.
Guideline	RC35	Established agreements with individuals or organizations to construct or maintain trails on the Forest should continue. New agreements should be considered on a case-by-case basis, and should be consistent with Forest Plan direction.
Guideline	SM03	Slope contouring should be used on road construction projects in areas of high visual sensitivity.
Guideline	SM04	Reduce color contrasts of exposed soil within the time limit specified by the adopted scenic integrity objective. Use mulch, topsoil, seeding, and fertilizing as appropriate.
Guideline	SM05	Road and trail structures—such as bridges, binwalls, and headwalls—should be designed to meet the Scenery Integrity Objective (SIO).
Guideline	SM08	The SMS should be used to consider landscape character, scenic integrity levels, constituent information, and landscape visibility when inventorying or analyzing effects to the scenery and landscape aesthetics proposed by other management activities. The following matrix should be used to provide a compatibility comparison of the SIO and ROS classifications.
Guideline	WS04	The following Scenic Integrity Objectives should be assigned to the classifications of eligible Wild and Scenic River corridors: a) Very High to a Wild classification, b) High to a Scenic classification, c) Moderate or High to a Recreational classification.

Heritage Resources		
Standard	HR04	Unevaluated heritage resources must be treated as eligible historic properties until evaluated.
Standard	HR05	Projects shall be designed to avoid, minimize, or mitigate adverse effects to NRHP-eligible or unevaluated heritage resources. In-place protection of all identified eligible or unevaluated heritage resources is the minimum requirement. Heritage resources evaluated and determined not eligible for inclusion in the NRHP are afforded no such protection.
Standard	HR08	Develop mitigation measures for each unevaluated, NRHP-eligible, or NRHP-listed heritage resource where direct and/or indirect management-related effects are probable.
Standard	HR09	Forest Service line officers shall stop ground-disturbing activities that impact or may impact known or newly-discovered heritage resources until the Forest Heritage Resources Program manager or qualified staff has made an on-site assessment of the resource and has completed appropriate cultural resources compliance. Heritage resources that have been evaluated and were determined not eligible for inclusion in the NRHP are afforded no such protection.
Timber Resources		
Standard	TR22	An area shall be considered reforested when it meets the stocking and species requirements specified in the detailed silvicultural prescription for the site-specific area.
Guideline	TR23	Sites should only be converted from one forest type to another (e.g. mixed hardwoods to red spruce or oak-hickory) as part of ecosystem restoration efforts.
Guideline	TR24	Consider the needs of other appropriate resources when prescribing TSI activities.
Guideline	TR25	Silvicultural operations should be identified during project planning in the detailed silvicultural prescriptions and scheduled in priority based on expected benefits and the objectives of the Management Prescription area.
Roads and Facilities		
Standard	RF04	Roads shall be constructed to the standard appropriate to their intended use, considering safety and other resource concerns.
Standard	RF06	New road construction shall avoid wetlands where feasible. If a wetland cannot be avoided, road construction may be allowed as long as the subsurface drainage patterns can be preserved and maintained. Any road that would cross a wetland shall cross in a way that minimizes disturbance to the wetland.

Guideline	RF08	In support of road management decisions, use an interdisciplinary science-based roads analysis process such as Roads Analysis: Informing Decisions About Managing the National Forest Transportation System (USDA FS, 1999 Report FS-643).
Guideline	RF09	Evaluate existing routes during transportation planning to determine whether they should be retained, reconstructed, replaced, or decommissioned. Evaluate transportation needs based on existing uses and condition, the access needs of cooperators, permittees, and private landowners, environmental and economic impacts, and compatibility with management prescriptions. Coordinate evaluation with information in the Roads Analysis Report for the Monongahela National Forest (January 2003) or updated versions.
Guideline	RF10	During watershed or project-level analysis, opportunities for road decommissioning should be identified and prioritized based on: a) Hazard assessments in the Roads Analysis Report for the Monongahela National Forest (January 2003) or updated versions b) Identified needs in drainages with 303(d) impaired water bodies c) The access needs of cooperators, permittees, and private landowners d) Prescription units that exceed road density standards for the management prescription e) Other site-specific concerns identified in the watershed or project analyses.
Guideline	RF11	The process to determine road maintenance levels should evaluate the purpose of the road, the type of vehicles expected, the duration and frequency of use, and necessary environmental protection measures.
Guideline	RF12	Roads that are no longer needed for access or management should be decommissioned. Evaluate long-term access needs and potential trail conversion or linear wildlife opening opportunities prior to making a decision to decommission a road.
Guideline	RF13	Road decommissioning should include the following: a) Road should be physically blocked to prevent vehicle use, unless designated for use by trail vehicles. b) Drainage structures should be removed and natural drainage re-established, unless needed for use by trail vehicles. c) The road profile should not normally be returned to contour during decommissioning, but recontouring may occur to meet special environmental or visual needs. d) Exposed soils should be revegetated and natural plant succession should be allowed to occur, unless needed for trail purposes. e) Decommissioning should normally be accomplished in conjunction with other project work but may occur independently if funding is available.

Guideline	RF25	Information should be made available to the public to communicate specific management decisions about public motor vehicle use on Forest system roads and trails.
Fish and Wildlife		
Standard	WF13	For management actions that have been identified by the Forest Service as likely to cause a negative effect on RFSS or Birds of Conservation Concern populations, negative effects shall be avoided or minimized to the maximum extent practical while still accomplishing the purpose of the project or action. Unavoidable negative effects shall be mitigated to the extent practical and consistent with the project purpose.
Standard	WF14	For protection of cold water fisheries, apply the following to the channel buffers of perennial trout streams (stocked and native) during the period of October 1 to June 1: a) Potential sediment-producing ground disturbance exceeding two consecutive days shall only be initiated after consultation with a Forest fisheries biologist. b) Sediment-producing ground disturbance during this period shall use additional erosion control measures and seeding or mulching, applied concurrently with the activity.
Standard	WF15	When activities are proposed near a known active raptor nest, a wildlife biologist shall be consulted for measures to avoid or mitigate disturbance.
Guideline	WF16	When consistent with management prescription emphasis and direction, openings may be created and maintained in coordination with other resource projects to provide for vegetation diversity. Mechanical or chemical means, prescribed fire, or grazing may be used to help maintain openings. Native or desirable non-native, non-invasive trees and shrubs with high value for wildlife may be planted, released or pruned.
Guideline	WF17	Temporary, seasonal, or permanent closures may be implemented for areas and transportation routes to address concerns over human-caused disturbances during critical life stages such as nesting, denning, or spawning. Coordinate closures with WVDNR.
Guideline	WF18	Use Forest Service-approved portions of Conservation Strategies and Agreements, as appropriate, in the management of RFSS habitat to help keep management actions from contributing to a trend toward listing for these species.
Guideline	WF19	Management actions should be designed and implemented so they do not fragment habitat for native and desired non-native fish species.
Guideline	WF21	Passage for fish and other aquatic organisms should be provided at all new or reconstructed stream crossings of existing or potential fish-bearing streams. Exceptions may be allowed to prevent the upstream migration of undesired species.
Guideline	WF22	Habitat improvement structures should be designed to complement riparian areas and management prescription emphasis. Improvement structures should be constructed of native materials where available.

Guideline	WF24	Habitat maintenance, enhancement, and restoration opportunities for migratory birds that are identified during watershed or project-level analysis should be implemented to the extent they are consistent with management prescription emphasis and project purposes, and to the extent practical and allowed by budget constraints.

Appendix D: Response to Comments

Scoping and 30-day Comment (05/26/2016)			
Letter/ Response No.	**Comment No.**	**Comment**	**Response**
1	1	Public money used for trail development is a concern. Public should have terminal access to all of it, from start to finish.. each trailhead. It should be developed so not one person or group has a monopoly on it. No private money--creates a situation where publish can be denied access to National Forest.	Thank you for your interest in the Mower Tract Restoration Project. The development of this trail system was focused on providing a variety of trails throughout this unique area. The entire trail system would be accessible to the general public, as with any recreational opportunities across NFS lands. As with any organized, commercial use of public lands by private businesses and organizations, an Outfitter and Guide or other appropriate special use permit would be required for any group interested in using the trail system for such purposes.
1	2	I would like to see when dealing with Cheat Mountain salamander in spruce areas, that those areas are evaluated by excepted professionals. The salamander survey done will be of such that it can and is applicable to all spruce areas.	In regards to Cheat Mountain Salamander (CMS), surveys that have and would take place as the project progresses would consistently follow protocols in place for this species. The proposed actions and design features (EA, Appendix B pg 131-132) would avoid occupied habitat and areas shown as potentially suitable habitat. As part of ESA Section 7 consultation, we have worked closely with the FWS and Dr. Thomas K. Pauley (Prof. of Herpetology at Marshall University) to refine the published habitat suitability model for CMS by taking past CMS survey results, along with environmental factors such as soil types and other conditions that limit the suitability of habitat for this species. Actions such as trail development, mulcher use, and herbicide use would not take place in known or mapped CMS habitat. We are expecting to receive a response from the USFWS in regards to out Biological Assessment that has been submitted for this project.

2	1	I see weak measurement of impacts to the flying squirrel and other red spruce-northern hardwood ecosystem dependent flora and fauna. FOB is requesting language be added to include monitoring techniques such as hair snares, and other measures of squirrel impacts/populations.	In addition to taking measures to avoid impacting the WVNFS (seasonal clearing restrictions and/or WVNFS clearance surveys), we will be supportive of monitoring techniques for measuring impacts to WVNFS populations throughout project implementation. This language has also been included in the EA, Appendix B under Design Feature Mower 30, as well as in the Decision Notice.
3	1	The WVDNR strongly supports the proposed Mower Tract Restoration Project which we feel will provide for long term red spruce ecosystem restoration, as well as improve wildlife habitat conditions for a diversity of wildlife species. Furthermore, it increases recreational opportunities for a variety of user groups.	Thank you for your support of this project.
3	2	The WVDNR is somewhat concerned that the proposed mineland restoration efforts will negatively impact the Vesper Sparrow, which is known to breed on legacy mine sites within the area.	Based on aerial photography interpretation and the existing condition of the mineland restoration areas, the amount of area that is domintated by grasslands is limited. Literature suggests that VS needs open areas of 30 acres or more for ideal habitat. While these grassy areas could provide potential habitat for VS, the restoration of a more native vegetative cover and subsequently the historic red spruce forest known to have occurred here is directly tied to the desired future condition of this MP. Key areas within these restoration areas will be reserved for scenic vistas, but would be substantially smaller than that habitat requirements of this species. Activities associated with mineland restoration is not likely to cause a trend toward federal listing or a loss of viability for this or other sensitive species dependent on grassland habitats.

3	3	The proposed trail network will appeal to several user groups and will provide exceptional hunter access to a very remote area of the National Forest. … Providing marked trailheads and trail access will go a long way toward encouraging hunters and other recreationists to utilize the area to a larger degree.	Thank you for your support of this project and the proposed improvements to the public's recreation access into the area.
3	4	The WVDNR does have concerns that the development of new trails and roads, and the accompanying increase of human activity, could negatively impact the Northern Goshawk, which is highly sensitive to human disturbance and breeds within the project area.	To address this concern, we met with the WVDNR on 5 July 2016. Based on that meeting we have agreed to collaboratively work with the WVDNR to not only avoid impacts to the Northern Goshawk but to take advantage of this opportunity to collaboratively collect more data on the Northern Goshawk to learn more about this species. In summary and to minimize potential Northern Goshawk disturbance during the nesting period (March 1 - July 1) in areas with historic documented nesting, we will work with the WVNDR to either conduct dawn acoustical surveys or avoid activities during the nesting period for Northern Goshawk (see below). (EA, Appendix B, pg 133, Mower28). Furthermore, we will work with the WVDNR to conduct surveys for goshawk in areas proposed for new trail construction (Mower 29). There is also a Forest Plan guideline (EA, Appendix C pg 152, WF17) which allows for the temporary, seasonal, or permanent closure in area or transportation routes to address this concern (Mower 30). Due to the variability of activity of this species from year to year, it will be critical to monitor any new or recent presence of Northern Goshawk within the project area and issue closures as necessary to not only limit disturbance, but also to provide for the safety of forest visitors using the area. We would also include interpretive information at trailheads to education the public about the species, which would allow us to monitor any

			new activity that may occur. Any future design features incorporated into implementation of this project will be coordinated with the WVDNR.
3	5	The WVDNR has concerns with the potential introduction of NNIS via horses along the developed trail network.	Several design features and mitigations to minimize the risk of spreading NNIS are included in the EA Appendix B specific to project activity implementation. Additional details about these strategies are included in Appendix B under Reference No. Mower 43-46 (EA, pg. 135) and VE21-24 (EA, pg. 146). Forest Service staff will monitor the trail system as part of routine trail management activities. If new NNIS populations are discovered, they can be inventoried, prescribed appropriate treatment, and incorporated into the Forest-wide NNIS Management EA.
4	1	Generally supports the restoration work planned for the Mower Tract. (Phone response, TNC)	Thank you for your support of this project.
5	1	Generally supports the restoration work planned for the Mower Tract. (Phone response, Cheat Mountain Club)	Thank you for your support of this project.
6	1	Generally supports the restoration work planned for the Mower Tract. (Phone response, private citizen)	Thank you for your support of this project.