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FY07 Regeneration Environmental Assessment

**Marienville Ranger District
Allegheny National Forest**

**Warrants 3753, 3777, 3781, 3783, and 3784
Highland Township, Elk County, Pennsylvania**

**Warrants 3230, 3251, and 3254
Jones Township, Elk County, Pennsylvania**

**Warrant Robert Allison
Millstone Township, Elk County, Pennsylvania**

**Warrants 2453, 2812, 2993, 3186, 3187, 3189, 3192, 3801 and
Godfrey
Howe Township, Forest County, Pennsylvania**

**Warrants 3646 and 3801
Jenks Township, Forest County, Pennsylvania**

**Warrants 5110, 5133, and 5134
Kingsley Township, Forest County, Pennsylvania**

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Introduction

The Forest Service has prepared this analysis and document in compliance with the National Environmental Policy Act of 1969 (NEPA), the Appeals Reform Act of 1993 (ARA), and other relevant federal laws and regulations as part of the environmental analysis process for the FY07 Regeneration Project. This environmental assessment (EA) discloses the proposed action, connected actions, affected environment, issues, design features, mitigations, alternatives to the proposed action and analysis of the environmental effects that would result if the proposed action or its alternatives (including no action) were implemented.

Additional documentation regarding environmental effects may be found in the project file (or planning record) located at the Marienville Ranger District office in Marienville, Pennsylvania.

Tiering to the Final Environmental Impact Statement for the Allegheny National Forest Land and Resource Management Plan

The analysis for this project is tiered to the Final Environmental Impact Statement (FEIS) (USDA-FS 2007a) and Record of Decision (ROD) (USDA-FS 2007b) for the ANF Land and Resource Management Plan (LRMP) (USDA-FS 2007c), except for Part 3-Design Criteria, Section 2800 Minerals and Geology, and Oil and Gas Development on pages 90 through 92 of the 2007 ANF LRMP.

Tiering is described in Forest Service Handbook (FSH) (1909.15) as a process of summarizing and incorporating by reference from other environmental documents of broader scope to eliminate repetitive discussions of the same issues and to focus on the actual issues ripe for decision (FSH 1909.15, Chapter 42.1). The environmental impact statement (EIS) for a land and resource management plan is an example of a “broad” EIS prepared for a program or policy statement. The FY07 Regeneration project is a project-level analysis. The scope of the FY07 Regeneration EA will be confined to addressing issues and possible environmental consequences of this project. It will not attempt to address decisions made at higher levels. It will, however, implement direction provided at those higher levels.

The ANF LRMP (or Forest Plan) is a programmatic document that implements the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA), as amended by the National Forest Management Act of 1976 (NFMA). The ANF LRMP implements NFMA by providing “for diversity of plant and animal communities based on the suitability and capability of the (ANF) in order to meet overall multiple-use objectives and within the multiple-use objectives of a land management plan” (16 USC 1604(g)(3)(B)).

The ANF LRMP provides guidance for managing resources and uses on the ANF. All applicable laws, regulations, policies and national and regional direction, as detailed in the Forest Service Manual and Handbook, are part of Forest Plan direction. In the ANF LRMP, goals and objectives present a picture of what the ANF should look like and what services, products and experiences it should provide. Standards and guidelines provide direction for implementing projects and activities. Monitoring evaluates whether the goals and objectives are being met and determines if additional or different management direction is necessary.

The ANF Fiscal Year 2007 Monitoring and Evaluation Report is incorporated by reference. This report contains updates to information on forest health conditions and wildlife information. None of the items monitored in 2007 identified a need to amend the ANF LRMP (USDA-FS 2008a, p.59).

I. Proposal, Needs, and Issues

Background

In 2006 and 2007, district personnel reviewed stands from previous projects that need additional timber harvests and/or reforestation treatments to complete their regeneration sequences. Many of these stands

have interfering understory vegetation and need reforestation treatments, such as herbicide application, site preparation and/or fencing to facilitate the development of adequate advance regeneration. Other stands have received a final harvest but need additional reforestation treatments to ensure they become fully stocked. Stands were prioritized for treatment based on review and recommendations of the reforestation needs for each stand. The stands with the greatest reforestation needs were proposed for treatment in this project and fall into the following categories:

1. Stands that have received a final regeneration harvest but require additional reforestation treatments to ensure that they become fully stocked.
2. Stands that need additional reforestation treatments prior to and after final harvest.
3. Stands that need a shelterwood seed cut and reforestation treatments prior to and after final harvest. Current relative stand density is too high in these stands to allow for the development of adequate advanced regeneration prior to final harvest.
4. Stands that need reforestation treatments or have blowdown salvage as a result of incurring severe damage from the July 2003 storm.
5. Stands in Management Area (MA) 2.2 – Late Structural Linkages that are proposed for uneven-aged treatments to improve vertical diversity within this MA.

An interdisciplinary team of Forest Service resource specialists chose the initial treatment areas from an analysis of existing conditions within the project area (**Purpose for the Action**). Analyzing the land capability, existing conditions and landscape needs, the team identified the need to manage individual stands within the project area to help achieve the desired condition in the ANF LRMP. This includes establishing areas of young forest, improving stand conditions for optimum tree growth, improving forest structure, providing high quality hardwood timber, performing maintenance on forest roads, treating non-native invasive plant (NNIP) species and improving wildlife habitat (**Need for the Action**).

Proposed Action

The FY07 Regeneration project area is located on the Marienville Ranger District of the ANF in northwestern Pennsylvania and consists of 452 acres in 29 stands scattered across the district (see attached maps) and 28 acres in 9 stone pits, which are proposed for expansion and rehabilitation following use. The USDA Forest Service proposes to implement vegetation treatments, reforestation treatments, non-native invasive plant (NNIP) treatments, wildlife habitat enhancements and road maintenance activities to help achieve the desired condition described in the ANF LRMP.

The original proposed action for this project, as shown in the June 2007 scoping package, included timber harvesting, reforestation treatments, prescribed burning, road maintenance and stone pit expansion. Based on additional field verification, changes between the proposed action scoped in June 2007 and the modified proposed action include:

- **Drop Stand 882091.** This stand was dropped from the original proposed action because 11 acres of the stand recently received a shelterwood seed cut under a current timber sale contract. The shelterwood seed cut, herbicide application, shelterwood removal, fertilization and five acres of planting were approved for this stand as part of the East Side project. The remaining ten acres of the stand were dropped due to concerns about operability. As a result, in the proposed action there are 21 fewer acres of proposed shelterwood seed cuts and shelterwood removals, proposed road maintenance decreased by 3.7 miles to 12.7 miles and proposed stone pit expansion decreased by 0.75 acres to 2.625 acres because the FR237 stone pit is no longer needed.
- **Changes in proposed reforestation treatments.** Additional field verification resulted in changes to the proposed reforestation treatments since scoping. Proposed acres of herbicide application and site preparation decreased 10 acres, fertilizer application increased 20 acres, tree shelter

installation decreased 5 acres, planting increased 8 acres, release decreased 21 acres and prescribed burning did not change.

- **Changes in stone pit expansion.** Drop proposed expansion of three existing stone pits (Forest Road [FR] 327.2, FR361 and FR443B) and expand three other existing stone pits (FR353, 399A and 443) instead.
- **Add 11 acres of NNIP species treatments.** This is being proposed to treat NNIP species (glossy buckthorn, multiflora rose, hawkweed, and bull thistle) found in or near the project area with a combination of manual/mechanical and herbicide treatments. The ANF LRMP (USDA-FS 2007c, pp. 13, 18, and 35) contains direction on the treatment of NNIP species. Due to the nature of NNIP species, additional species on the ANF Invasive Plant Species of Concern list (see project file) may be treated if found within the project area according to ANF LRMP direction. See Appendix B for a list of proposed treatment areas and NNIP species.
- **Add approximately 50 acres of wildlife habitat enhancements.** This is being proposed to increase the diversity of soft and hard mast producing trees and shrubs, which the project area currently lacks, and maintain small historic apple orchards within or near the project area. Conifer planting is being proposed to offset the potential loss of conifer cover (eastern hemlock) to insects and diseases (hemlock woolly adelgid). The placement of two nest boxes for eastern bluebirds is being proposed for an opening that currently lacks potential cavity trees or snags.

Vegetation Treatments

Delayed shelterwood (SH) removal is proposed for stands that have had the shelterwood seed cut completed but additional reforestation treatments need to be done to obtain adequate desirable regeneration before the removal cut can take place.

Shelterwood seed cuts and shelterwood removal cuts are proposed to complete regeneration sequences in stands previously harvested but enough trees were not removed to provide adequate sunlight to the forest floor for the establishment of advance regeneration. The shelterwood seed cut would be light, mostly from the intermediate canopy layer to provide adequate sunlight to the forest floor for seedling establishment. Next, reforestation treatments would be done, and the shelterwood removal cut would take place once adequate desirable regeneration is established.

Individual tree selection followed by group selection (second entry) is proposed to increase vertical diversity within stands in MA 2.2.

Reforestation treatments are proposed in stands where regeneration harvests are planned or have occurred to reduce interfering vegetation and to ensure the development of diverse tree seedlings.

Salvage thin is proposed in stands to harvest down and/or damaged trees and increase the diameter growth and health of the residual stand.

Road Maintenance Activities

Road maintenance activities will occur on approximately 12.7 miles of forest roads. These activities would include limestone surfacing, pit run surfacing, culvert replacement, grading and brushing.

Material from nine existing stone pits (FR185G, FR214, FR219, FR221B, FR353, FR385D, FR399A, FR443 and FR683 pits) could be utilized to provide surfacing material needed for road maintenance. The stone pits would be rehabilitated following use. Rehabilitation would include sloping of open pit faces and revegetating of disturbed areas within the pits. No road construction or road management changes are planned with this project.

The proposed activities for Alternative 1 (Modified Proposed Action) are summarized in Table 1. More site-specific information on the proposed action and the list of stands in each category can be found in Appendix B.

Table 1. Proposed Activities in the Alternative 1 (Modified Proposed Action)

Proposed Activities	Total
Vegetation Management/Treatment	
Shelterwood Seed Cut/Shelterwood Removal Harvests	10 units, 262 acres
Delayed Shelterwood Removal Harvests	3 units, 58 acres
Salvage Thin Harvests	3 units, 24 acres
Individual Tree Selection/Group Selection Harvests	2 units, 39 acres
Reforestation Only (No Timber Harvest)	11 units, 69 acres
Reforestation Treatments	
Herbicide	24 units, 413 acres
Site Preparation	15 units, 359 acres
Fertilizer	12 units, 89 acres
Fence	18 units, 361 acres
Tree Shelter	6 units, 26 acres
Planting	24 units, 177 acres
Release	26 units, 428 acres
Prescribed Burn	2 units, 47 acres
Non-Native Invasive Plant (NNIP) Species Treatments	
NNIP Species Treatments	5 areas, 11 acres
Wildlife Habitat Enhancements	
Tree and Shrub Planting	14 units, 34 acres
Tree Protection Fencing/Crib Installation	6 units, 15 acres
Prune/Release Fruit-Producing Shrubs	1 unit, 2 acres
Install Wildlife Structures	1 unit, 2 structures
Transportation Activities	
Road Maintenance	12.7 miles
Number of Stone Pits To Be Expanded	9
Stone Pit Expansion	2.6 acres
Pit Rehabilitation	9 stone pits, 28 acres

Purpose and Need

The purpose of the project is to implement ANF LRMP direction and complete regeneration and reforestation treatments in stands where the regeneration sequence has been initiated but has not been completed yet. The ANF LRMP provides programmatic direction for how the ANF is to be managed for sustainable, multiple benefits. The ANF LRMP also divides the Forest into management areas, each with a specific management objective and associated standards and guidelines. Proposed treatment units lie within MA 1.0 (31 acres), MA 2.2 (76 acres), and MA 3.0 (373 acres). The goals and objectives for MA 1.0 are detailed on pages 102-105, for MA 2.2 on pages 109-112 and for MA 3.0 on pages 113-115 in the ANF LRMP (USDA-FS 2007c). All proposed treatments are consistent with management direction applicable to MAs 1.0, 2.2 and 3.0.

There are several site-specific opportunities for vegetation management within the project area that would change or enhance present conditions to help achieve the desired future condition described in the ANF LRMP. An opportunity to enhance a resource is defined as a “need.”

This proposal is based on the following needs for action:

- 1) A need exists to complete regeneration sequences in stands with previously initiated regeneration treatments, in stands that were severely damaged by the July 2003 storm (stand replacing), and in stands that received a final regeneration harvest and need additional reforestation treatments to ensure regeneration success. This will help foster sustainable forest management, provide for a forested canopy and a diversity of habitats in MAs 1.0, 2.2 and 3.0.
- 2) A need exists to improve the spatial arrangement of age classes in MA 3.0 within the project area. Even-aged harvests would create 320 acres of early successional habitat (0 to 10 year old age class) over the next decade within MA 3.0.
- 3) A need exists to provide a diversity of age and structural classes across the ANF landscape, including early structural, late structural and multi-aged forested conditions, to achieve desired future conditions.
- 4) A need exists to salvage timber in MA 3.0 in response to decline, mortality, windthrow and other factors.
- 5) A need exists to apply group selection cuts in MA 2.2 on an extended rotation (to restore understory to mature forest conditions) to hasten stand development processes, initiate understory development and develop more complex stand structure. Group selection cuts should range from ½ to 3 acres, depending on the forest type, and should simulate gap phase dynamics by creating gaps in the forest canopy to develop multiple age classes, multi-layered canopies, irregular canopy cover, larger trees, down woody material and complex vertical structure.
- 6) A need exists to achieve the desired condition in MA 1.0, which is to provide early structural habitat to sustain species associated with early structural conditions, especially ruffed grouse. The stands managed in this management area are predominantly shade intolerant species such as aspen. Even-aged timber stands in a balanced variety of age (from 0 to 50 years of age) and structural stages (early structural to mid structural stages) are evident.
- 7) A need exists to implement treatment activities that would limit the further introduction and spread of NNIP species (USDA-FS 2007c, p. 13). An invasive species is defined as a species that is non-native (or alien) to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health (Executive Order 13112).

Decision to Be Made

The purpose of this EA will be to provide the responsible official, the Marienville District Ranger, with sufficient information and analysis to make an informed decision about the project in response to the purpose and need for action. The responsible official will also consider public input to the EA to decide the following:

- 1) Are there additional issues and/or alternatives that should be analyzed in detail?
- 2) Which of the alternatives would best help achieve the desired condition outlined in the ANF LRMP and purpose and need for action for the project area?
- 3) Which alternative best addresses the issues raised during scoping?
- 4) Would the proposed action and its alternatives pose any significant environmental impacts to warrant the need for an environmental impact statement?

This project does not require proposing any amendments to the ANF LRMP. A decision on this project is expected by January 2009. All proposed treatments would be implemented within 10 years.

Public Involvement

The project was listed in the ANF Schedule of Proposed Actions (SOPA) beginning in the January 2007 issue. This quarterly publication is mailed to interested parties and is available on the ANF website.

On June 7, 2007 a scoping package was mailed to 131 individuals and organizations, including those who expressed a desire to be notified about current projects, subsurface mineral owners and adjacent landowners. The scoping package included maps of the project area and described the proposed action including its purpose and need. This information was also posted on the ANF website June 12, 2007. On June 11, 2007 a news release announcing the opening of the scoping period was issued to local newspapers, members of the media and other organizations and individuals. Seventeen responses were received and analyzed.

The Forest Service consulted with the Pennsylvania Historical and Museum Commission (State Historic Preservation Office in Pennsylvania) and the Seneca Nation of Indians Tribal Historic Preservation Office in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended in 1980 and 1992, and the regulations (36 CFR Part 800) of the Advisory Council on Historic Preservation. All management activities proposed in this project have been reviewed by both of these agencies for potential impacts to heritage resources.

Issues

Scoping identified several issues, suggested alternatives for analysis, and provided numerous comments that were not classified as issues because they did not raise a dispute with the specific proposed action or its effects. Although scoping identified several issues, none were characterized as significant as defined in the detailed discussion of the analysis of public comments in Appendix A – Scoping Comments Summary by the interdisciplinary team for the purpose of this analysis.

II. Alternatives

Introduction

The proposed action was developed by the interdisciplinary team to respond to the purpose and need for action (Chapter 1). No significant issues were identified through scoping (see Appendix A). Of the six alternatives considered, four were eliminated from detailed study. Two alternatives were analyzed in detail; the Modified Proposed Action (Alternative 1) and No Action (Alternative 2).

Alternatives Considered But Eliminated From Detailed Study

Proposed Action as Scoped in June 2007 – The original proposed action, as shown in the June 2007 scoping package, included proposed timber harvesting on approximately 404 acres, reforestation treatments on 449 acres, prescribed burning on 47 acres, 17.4 miles of road maintenance and expansion of 10 stone pits. The original proposed action was modified based on additional field verification that has occurred since the June 2007 scoping was completed. The changes between the original proposed action and the modified proposed action are described in Chapter 1, Proposed Action. The responsible official weighed the option of keeping this alternative; however, it was decided it would be in the public's interest and more cost effective to drop this alternative from detailed study and move forward with the modified proposed action.

No Herbicide Use – There is concern over the use of herbicides for reforestation activities. Those concerned suggested the Forest Service analyze an alternative without herbicide use. This alternative was considered but eliminated from detailed study because the ANF LRMP (USDA-FS 2007c, pp A-33 to A-36) and associated FEIS reviewed alternatives to herbicides and concluded that herbicides are the most effective, least costly and meet soil, water, health and safety criteria. The use of herbicide to aid in reforestation is a standard practice on the ANF. Manual methods have been found to be ineffective in reducing levels of interference to the point where seedlings can become established. There have been no new technological developments since the ANF LRMP was published. Herbicides are necessitated by the growth of undesirable species that out compete native desired species, which are important for a healthy forest. The ANF has established standards and guidelines in the ANF LRMP (USDA-FS 2007c, pp. 54 to 59) to minimize or eliminate the impacts of herbicide application. Potential herbicide effects on human health are reviewed and analyzed in Appendix G (ANF Human Health Risk Assessment, USDA-FS 2007d) of the ANF LRMP FEIS.

No Timber Harvesting – There is concern that timber harvesting (removing wood) adversely impacts forest health. This alternative was considered but eliminated from detailed study because it fails to meet the purpose and need for this project. These include providing early structural conditions in MA 1.0, developing late structural conditions in MA 2.2, improving the spatial arrangement of age classes in MA 3.0 and salvaging wind thrown and damaged timber in MA 3.0. A no-timber harvesting alternative would not be responsive to the Multiple Use Sustained Yield Act or the National Forest Management Act. Additionally, no timber harvesting on National Forest System land is a national issue; and therefore, it is beyond the scope of this project. The no action alternative is also responsive to this concern.

No Treatments in the Painter Run Watershed – The Forest Service would implement the proposed action, except for proposed treatments for those stands (705026, 705029, 706041, and 706042) in the Painter Run watershed. This alternative was considered but eliminated from detailed study because it is essentially duplication of the modified proposed action. These four stands amount to 13 acres total and are proposed for reforestation treatments only due to changed understory conditions. An alternative that drops these four stands would not be substantially different from the modified proposed action. This alternative also fails to meet the purpose and need (to complete regeneration sequences in stands with

previously initiated regeneration treatments) for these four stands. The effects of not implementing these treatments are addressed in the no action alternative.

Alternatives Analyzed in Detail

Consistency with the ANF LRMP applies only to the specific activities described in the action alternatives. Not all desired conditions in the ANF LRMP can be achieved with a single on-the-ground management activity. Often several management activities are necessary to meet the desired conditions identified in the ANF LRMP.

The following alternatives were considered in detail:

Alternative 1 (Modified Proposed Action)

This is described in section I on pages 2 to 4 and in Appendix B.

Alternative 2 (No Action)

The proposed action would not occur at this time. Proposed timber harvests, NNIP treatments, wildlife habitat enhancements, prescribed burning and road maintenance activities and their effects would not occur nor would their associated benefits be realized under this alternative.

Design Features

The proposed activities in Alternative 1 have been designed to be implemented in accordance with ANF LRMP forest-wide and MA 1.0, 2.2 and 3.0 standards and guidelines (USDA-FS 2007a). Design features are highlighted applications of the ANF LRMP standards and guidelines. In some cases, the standards and guidelines provide options for how they may be applied. A design feature clarifies, where necessary, how these standards and guidelines may apply to specific actions in the project proposal.

Project design features for the Alternative 1 include:

Soils

- In stands with group II soils, cutting and skidding is permitted from June 15 to September 30 and from December 15 to March 1 (USDA-FS 2007c, p. 74). (Stands 620006, 620026, 650103, 652062, 652076, 688012, 716022, 846095, 850068, 853036, 866006, 866031, and 866045)

Regional Forester Sensitive Species

- Resurvey for gooseberry (*Ribes triste* and *Ribes lacustre*) before implementation of any activities to determine species identification and extent of population. If *Ribes trite* plants are present, delineate a 75-foot buffer around the plants in order to maintain shade; if dense ground layer vegetation such as fern and/or grasses is outcompeting gooseberry plants, spot herbicide. If *Ribes lacustre* are present, evaluate the overstory and mid-story shade conditions. Plants may be released if they are showing signs of decline (dead stems, loss of leaves or low fruit production). (USDA-FS 2007c, p. 89) (Stand 620026).

Wildlife

- In all MA 2.2 timber harvest units, ¼-acre within each 5 acres of harvest should be set aside as reserve areas. Layout of these *areas should include areas containing ample amounts of large-diameter coarse woody debris* (representative of the stand) preferably near wet depressions, vernal pools, rock outcrops, snags, den trees, conifers and /or desirable shrubs that are a minor component of the stand (USDA-FS 2007c, pp. 80, 112).
- In addition to the retaining slash (small-diameter coarse woody debris) and reserving at least one 12 inch diameter log per acre in all harvest units, *retain additional trees based on site availability*

as large-diameter coarse woody debris throughout the stands *within MA 2.2*. Retain a variety of down trees since each tree species decays at a different rate and may provide a diversity of micro-environments (USDA-FS 2007c, pp. 80, 112).

- In all MA 2.2 harvest units, retain at least *15 snags per acre* greater than 10 inches DBH. These snags should have some bark remaining and should not pose a safety hazard to sawyers or the public (USDA-FS 2007c, pp. 80, 112).
- In MA 2.2, area fencing and herbicide application will be accomplished within specified treatment areas that allow for wildlife habitat connectivity across the landscape. These activities will be designed and completed to allow for untreated and unrestricted wildlife travel lanes, such as riparian corridors and other corridors of mature forest habitat between stands being regenerated (USDA-FS 2007c, pp. 111-112).
- In Stands 705026, 705029, 706041 and 706042, herbicide will be applied using backpack sprayers only (USDA-FS 2007c, p. 87).

Heritage

- Site-specific heritage site design features are not listed due to the confidential nature of the information. Standards and guidelines for heritage resources are listed on page 62 of the ANF LRMP. Appropriate heritage resource personnel will be contacted prior to formalizing any sale or implementation contract involving ground disturbing activities to include any design features in contracts or agreements to protect heritage sites (USDA-FS 2007c, p. 62).
- In any contract or agreement, the following statement will be included, as appropriate: If any previously unknown or unrecorded sites are found during project implementation, any ground disturbing activity will cease and the appropriate heritage resource personnel notified. A heritage resource specialist will evaluate the situation and determine the proper course of action (USDA-FS 2007c, p. 62).

Scenery/Recreation

- Along the FR223 and Twin Lakes Hiking Trail, leave areas of ¼ acre in size shall be designated by the forest landscape architect (USDA-FS 2007f, pp. 9 and 10) (Stands 688012 and 716022).
- Stand 716022 will be harvested during the dormant (leaf-off) season (USDA-FS 2007f, p. 10).
- Along SR 948, FR223, Allegheny Snowmobile Loop, ASL Connector #11 and Twin Lakes Hiking Trail, slash shall be pulled back 50 feet from the edge of the road or trail, and for an additional 50 feet, slash shall be lopped and scattered to a depth of 3 feet (USDA-FS 2007f, pp. 9 and 10) (Stands 650103, 688012, 716022, 846071, 846095, and 866031).
- Along SR66, SR948, Allegheny Snowmobile Loop and Twin Lakes Hiking Trail, new log landings should be located a minimum of 300 feet from the road or trail. After project completion, landings should be rehabilitated to mimic natural openings (USDA-FS 2007f, p. 11) (Stands 688012, 716022, 846071, 846095, and 866031).
- In all timber sale units, block main skid trails with slash following timber harvest to protect natural resources from illegal ATV activity.
- Snowmobile Hauling Restriction – No hauling during the established snowmobile season on the ANF, noon Saturday through 5 a.m. Monday and legal holidays (USDA-FS 2007c, p. 60) (FR221 and FR327.2).
- Snowplowing of designated snowmobile routes will leave an adequate snow mat (4 inches) for grooming, snowmobile operation and road surface protection (CT 5.33# Snow Plowing).

Commercial and administrative vehicle traffic will run with their headlights on during the established snowmobile season (USDA-FS 2007c, p. 61) (FR221 and FR327.2).

Comparison of Alternatives – Actions and Outputs

Table 2. Comparison of Proposed Activities and Outcomes by Alternative

Management Activity	Alternative 1 Modified Proposed Action	Alternative 2 No Action
Vegetation Management/Treatments		
Shelterwood Seed Cut/Shelterwood Removal Harvests	10 units, 262 acres	zero
Delayed Shelterwood Removal Harvests	3 units, 58 acres	zero
Salvage thin Harvests	3 units, 24 acres	zero
Individual Tree Selection/Group Selection Harvests	2 units, 39 acres	zero
Reforestation Only (No Timber Harvest)	11 units, 69 acres	zero
Volume of Timber Harvested (Millions of Board Feet [MMBF]) (first/second entry)	1.4/3.0	zero
Reforestation Treatments		
Herbicide Application	24 units, 413 acres	zero
Site Preparation	15 units, 359 acres	zero
Fertilization	12 units, 89 acres	zero
Fence	18 units, 361 acres	zero
Tree Shelter	6 units, 26 acres	zero
Planting	24 units, 177 acres	zero
Release	26 units, 428 acres	zero
Prescribed Burn	2 units, 47 acres	zero
Non-native Invasive Plant Species (NNIP) Treatments		
NNIP Manual Treatment/Herbicide Application	5 areas, 11 acres	zero
Wildlife Treatments		
Tree and Shrub Planting	14 units, 34 acres	zero
Tree Protection Fencing/Crib Installation	6 units, 15 acres	zero
Prune/Release Fruit-Producing Trees	1 unit, 2 acres	zero
Install Wildlife Structures	1 unit, 2 structures	zero

Management Activity	Alternative 1 Modified Proposed Action	Alternative 2 No Action
Transportation System Management		
Road Maintenance	12.7 miles	zero
Stone Pit Expansion	9 pit, 2.6 acres	zero
Stone Pit Rehabilitation	9 pits, 28 acres	zero

Alternative 1 (Modified Proposed Action) meets the purpose and need by completing regeneration sequences in stands with previously initiated regeneration treatments or final harvests and in stands that were severely damage in the July 2003 storm event. Three hundred twenty (320) acres of early structural habitat would be created under this alternative providing a diversity of age and structural classes across the ANF landscape. This alternative would also enhance wildlife habitat on approximately 50 acres to provide future forage and cover areas for a variety of wildlife species. Prescribed burning would occur on 47 acres to promote oak regeneration. This alternative would treat 11 acres of NNIP species using manual/mechanical and herbicide treatments, which would reduce the impact of NNIP species on native plant and animal communities. Road maintenance would be performed on 12.7 miles of Forest System roads and approximately 28 acres of stone pits would be rehabilitated following extraction activities. Approximately 4.4 million board feet of timber would be harvested under this alternative in two entries.

Alternative 2 (No Action) would not accomplish the purpose and need of this proposal. Proposed timber harvests, reforestation treatments, wildlife habitat enhancements and NNIP species treatments would not occur. No early structural habitat would be created through even-aged management with this alternative. Road maintenance would occur but level of maintenance would be dependent upon available funding. Progress towards the desired condition of ANF LRMP within the project area would not be achieved.

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III. Environmental Consequences

This section addresses the environmental consequences of the alternatives. The no action alternative (Alternative 2) provides a reference point for describing environmental effects of the action alternative. Where appropriate, the effects of Alternative 2 (no action) are discussed first to provide a baseline for describing the effects of the action alternative. This section focuses on the required factors listed in a finding of no significant impact (FONSI) to determine if an environmental impact statement (EIS) is necessary.

The analysis for this project is tiered to the ANF LRMP FEIS (USDA-FS 2007a) and ANF LRMP ROD (USDA-FS 2007b) for the ANF LRMP (USDA-FS 2007c). The following analyses found in the ANF LRMP FEIS (USDA-FS 2007a) are incorporated in this section of the EA:

- Oil, Gas, and Minerals (OGM); pp. 3-3 to 3-7
- Soils; pp. 3-7 to 3-21
- Hydrology; pp. 3-22 to 3-51
- Air Quality; pp. 3-52 to 3-63 and Review of Information-OGM Activity and Air Quality, ANF (2008)
- Transportation; pp. 3-64 to 3-74
- Vegetation; pp. 3-77 to 3-179
- Wildlife and NNIS; pp. 3-179 to 3-295
- Recreation; pp. 3-296 to 3-328
- Scenery; pp. 3-370 to 3-380
- Heritage; pp. 3-380 to 3-384
- Economics; pp. 3-399 to 3-419
- Human Health and Safety; pp. 3-419 to 3-443

A. Issue-Related Consequences

Although scoping identified several issues, none were characterized as significant by the interdisciplinary team for the purpose of this analysis.

B. Effects Relative to Significance Factors

In 1978, the Council of Environmental Quality promulgated regulations for implementing NEPA. These regulations (40 CFR Parts 1500-1508) include a definition of “significantly” as used in NEPA. The ten elements of this definition are critical to reducing paperwork through a finding of no significant impact (FONSI); when an action will not have a significant effect on the human environment and is therefore exempt from requirements to prepare an EIS.

40CFR Part 1508.27 Significantly:

“Significantly” as used in NEPA requires considerations of both context and intensity:

- (a) *Context.* This means that the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests and the locality. Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend upon the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant.

As discussed in more detail below for other elements of significance, the context of this proposal is limited to the locale of the project area. Even in a local context, this proposal would not pose significant short- or long-term effects. ANF LRMP standards and guidelines, Pennsylvania Best Management Practices (BMPs) and project design features would minimize and avoid adverse impacts to the extent

that such impacts are almost undetectable and unmeasurable, even at the local level. Future projects would be analyzed in context with the activities as proposed and/or implemented under cumulative effects analyses.

- (b) *Intensity*. This refers to the severity of impact. Responsible officials must bear in mind that more than one agency may make decisions about partial aspects of a major action. The following would be considered in evaluating intensity:

1. Impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial.

The action alternative poses beneficial and adverse impacts. Resource protection measures included in the action alternative minimize adverse impacts. Proposed activities are consistent with all the ANF LRMP standards and guidelines (USDA-FS 2007c, pp. 53-100).

The long-term benefit to habitat from lessening the impacts from NNIP species is greater than any potential short-term impacts to non-target plants, whether they are plant species with viability concerns (USDA-FS 2007c) or special forest products (wild edible and medicinal plants). Surveys for plant species with viability concerns have been conducted within proposed treatment areas for NNIP and there are no documented occurrences. If a plant with viability concerns is found during NNIP implementation, appropriate measures (determined by site-specific characteristics) will be implemented to conserve the plant population.

2. The degree to which the proposed action affects public health or safety.

The action alternative (modified proposed action) would avoid adverse impacts to public health and safety through implementation of ANF LRMP standards and guidelines, Pennsylvania BMPs, project design features, timber sale contract requirements, Office of Safety and Health Administration (OSHA) requirements and standard operating safety procedures identified through job hazard analysis.

Short-term adverse effects on public health related to a reduction in air quality from prescribed burning are possible. These potential short-term effects (3 to 5 years) are of limited scope and duration and have been minimized to the extent possible. Emissions from prescribed burning would not exceed federal air quality standards.

Herbicides have been used to control interfering vegetation on ANF since 1987. ANF LRMP standards and guidelines (USDA-FS 2007c, pp. 54-59) used during herbicide application would minimize the risk of human exposure, off-site travel, non-target application, and environmental damage from the activity. The herbicides used are applied at the optimal time for their intended effect and to minimize additional exposure to non-target species. No adverse effects on human health or safety have been reported as a result of herbicide treatment on the ANF. Most of the proposed treatment areas would be treated with a combination of glyphosate and sulfometuron methyl. Potential effects from controlling interfering plants with herbicides have been examined in detail in Appendix G of the ANF LRMP FEIS (USDA-FS 2007d).

Herbicide application for reforestation is proposed on 413 acres in Alternative 1. Alternative 2 proposes no herbicide application. Overall risks from the planned use of glyphosate and sulfometuron methyl are expected to be low (USDA-FS 2007b, p ROD-23). There are no private residences or associated water sources within the project area. Adjacent landowners would be notified in advance of the proposed spray activity. Signs would be posted along the perimeter of treatment areas where these areas are adjacent to open roads or trails, so people would be able to avoid those areas. The herbicides would be applied when minimal risk of accidental exposure is possible. In order to minimize accidental contact, warning signs, maximum wind speed caps (10 mph), directional spraying (near property lines and trails), landowner notification, timing of spray application and buffers would be employed. However, even if someone does contact herbicide residue or the spray mist in a treatment area, the risk to human health would be negligible (USDA-FS, 2007d, pp. G1-76 to G1-102 and G1-131 to G1-142). Cumulative effects to human

health are not likely to occur because none of the herbicides persist in the environment or human body (USDA-FS 2007a, pp. 3-437 to 3-443 and USDA-FS, 2007d, pp. G1-76 to G1-102 and G1-131 to G1-142). Appendix G of the ANF LRMP FEIS (USDA-FS 2007d, pp. G1-76 to G1-80 and G1-131 to G1-134) states that the risks to workers from the proposed use of glyphosate and sulfometuron are negligible. Further information regarding herbicide use for seedling establishment and its safety may be found in the ANF LRMP (USDA-FS 2007c, pp. A-33 to A-38) the ANF LRMP FEIS (USDA-FS 2007a, pp. 3-119 to 3-122 and 3-437 to 3-443) and or Appendix G of the ANF LRMP FEIS (USDA-FS 2007d).

Application rates and specific effects of herbicide application on aquatic and terrestrial ecosystems are discussed in the ANF LRMP FEIS (USDA-FS 2007a, pp. 3-215 to 3-217), in the ANF LRMP (USDA-FS 2007c, pp. A-38 to A-41), and Appendix G of the ANF LRMP FEIS (USDA-FS 2007d). In addition, the potential risk of herbicide use on the ANF to humans, wildlife, terrestrial plants, and aquatic species are discussed in Appendix G of the ANF LRMP FEIS (USDA-FS 2007d).

Water testing conducted in 1987 and 1988 on the ANF showed no detectable levels of herbicide downstream from treatment areas (USDA-FS 1991, p. 4-4). More recent monitoring work of herbicide treatments in 1999 conducted on power line right-of-ways has shown the same results. In 1999, water samples collected downstream from a right-of-way treatment contained no detectable herbicide with buffer strips as narrow as 13 feet for cut stem treatment (with glyphosate) or 58 feet for low volume foliar treatment (USDA-FS 2000).

The effect of herbicide on water quality was evaluated in 2002. A stream on the Bradford Ranger District was monitored adjacent to a 15-acre forested stand from August 7 to 24, 2002, when the herbicide was applied. Laboratory analysis of the water samples did not detect the presence of glyphosate, aminomethylphosphoric acid or sulfometuron methyl. Consequently, water quality and beneficial uses were protected. Based on the effectiveness of the ANF LRMP standards and guidelines, water quality would be maintained at a level that supports the propagation of fish and other aquatic species. No impacts are expected to water quality of domestic or public water supplies within the project areas or near sites proposed for herbicide treatment.

The proposed use of glyphosate and sulfometuron methyl will not adversely affect soil productivity or soil nutrient cycling (USDA-FS 2007d, pp. G1-106, G2-33, G2-42 and G2-44). The soils within the project area (see Soils Resource report, project file) have characteristics that are within the range for the soils considered during the herbicide analysis of the Appendix G of the ANF LRMP FEIS (USDA-FS 2007d, pp. G2-59, G2-60 and G2-70). Therefore, the risk characterization to wildlife, terrestrial and aquatic plants and human health from exposures to ground water and runoff (USDA-FS 2007d, pp. G2-73 to G-82, G1-80 to G1-91 and G1-131 to G1-142) applies to herbicide use proposed in this project.

Anticipated effects to public health and safety from the treatment of NNIP species include the use of herbicides and manual/mechanical control along road corridors. ANF LRMP standards and guidelines for herbicide application would be implemented (USDA-FS 2007c, pp. 54-59) and are based on the human health risk assessment (Appendix G) completed for the ANF LRMP FEIS (USDA-FS 2007d). Appendix A of the ANF LRMP (USDA-FS 2007c, pp. A-43 to A-45) also contains additional information on site selection, herbicide selection, application methods and rates. The job hazard analysis (JHA) for NNIP species control identifies the safety measures for working along road corridors and will be used during implementation. Proposed NNIP species herbicide treatments are anticipated to have negligible effects to public health or safety based on the amount of proposed treatment (11 acres), spot spraying using backpack sprayers, with the implementation of ANF LRMP standards and guidelines and standard safety procedures (JHA).

Within this project, 413 acres of herbicide would be applied under Alternative 1 for reforestation. Even-aged regeneration activities (under Alternative 1) would create early structural habitat that would otherwise be lacking within the project area under Alternative 2. The herbicide application proposed in Alternative 1 would reduce the amount of fern, grass, striped maple, and beech. After herbicide treatment,

a fuller range of plant communities would be expected to occupy the understory (Horsley and others 1994). These would include tree species as well as shrubs, forbs and wildflowers, which are presently absent, providing there are seed sources nearby. Fencing in Alternative 1 would contribute to maintaining plant diversity within specific stands.

3. Unique characteristics of the geographic area such as proximity to historic or cultural resources, parklands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.

Historic or cultural resources would not be affected by this project. These resources will be avoided through project design and no treatment buffers. One stand has been identified as culturally sensitive that contains NNIP species; however, not in known areas of sensitivity. To avoid adverse impacts a design feature is included, which directs consultation with district archaeologists before manual and mechanical treatment to avoid potential damage to heritage sites. If additional NNIP species infestations are found within the project area, the appropriate resource specialist will be consulted with to determine if treatment would impact any of the areas listed.

There are no parklands in or near the project area that would be affected by this project.

Within the project area, there are 157 acres of prime farmland or farmland of statewide importance. Prime farmland and farmland of statewide importance are protected by law. The soils analysis shows that the proposed activities would not permanently affect soils considered prime farmland or farmland of statewide importance (see Soil Resources report, project file). Since the proposed activities would not alter the status of these soils as prime farmland or farmland of statewide importance, a Land Evaluation and Site Assessment determination (LESA) is not required for this project. A LESA determination is only required if the proposed activities would permanently alter these types of soils.

Within the project area, there are no inventoried wetlands according to the National Wetland Inventory (NWI). Effects of proposed treatments will be reduced or eliminated by implementing ANF LRMP standards and guidelines (USDA-FS 2007c, pp. 74-79) to all riparian corridors, including seeps, springs, vernal pools, wetlands, wet soils and intermittent and perennial streams within the project area.

The project area is located approximately 0.5 miles north of the Clarion Wild and Scenic River (stand 705029) and approximately 9.25 miles east of the Allegheny Wild and Scenic River (stand 620002). Due to the distant proximity of the project area to these rivers, no effects are anticipated to either of these rivers or their designation from the proposed treatments in either action alternative. Effects of proposed management on waterways are reduced or eliminated by implementing ANF LRMP standards and guidelines (USDA-FS 2007c, pp. 74-79).

The Pennsylvania Department of Natural Conservation (PA DCNR) recognizes one Important Mammal Area (IMA) in the Hickory Creek and Tionesta Creek area (USDA-FS 2007c, pp. 8 and 11). Ten of the proposed treatment areas and 11 of the CE analysis areas are located within this IMA. This ecoregion has been described by the PA DCNR as “having the highest stream quality for the state and the largest block of core forest state-wide” (USDA-FS 2007c, pp. 8). The project area makes up less than one percent (0.1) of the IMA, which is over 316,773 acres in size, nearly 62 percent of the entire ANF. While the project is part of a larger IMA, the treatment proposals are not expected to adversely affect the habitat and designation of this extensively large IMA. Habitat for important mammals such as the river otter, fisher and northern flying squirrel would be maintained across the IMA. Effects of proposed management on waterways are reduced or eliminated by implementing ANF LRMP standards and guidelines (USDA-FS 2007c, pp. 74-79).

There are two Important Bird Areas (IBAs) on the ANF. One is in the Tionesta Scenic and Research Area and the other is in a portion of the East Hickory Creek watershed (USDA-FS 2007c, pp. 8 and 11). Both of these areas are a substantial distance, approximately 0.5 (stand 716022) and 8 miles (stand 653118) respectively from the project area; therefore, there are no direct or indirect effects anticipated on these

areas and their designation from the activities proposed. The Cooks Forest IBA directly south of the ANF proclamation line is located approximately 5.5 miles (stand 620026) from the project area and is located in an entirely different watershed; therefore, there are no effects anticipated to this IBA. Habitat for birds in the project area would be maintained.

Ecologically important old growth areas on the ANF occur in the Tionesta Scenic and Research Natural Areas and Hearts Content Scenic Area (USDA-FS 2007a, p. 3-186). The project area is located approximately 0.25 miles (stand 716022) from the Tionesta Scenic and Research Natural Areas and approximately 8 miles (stand 653118) from the Hearts Content Scenic Area. The ANF LRMP FEIS recognizes eight high quality remote habitat areas for wildlife (USDA-FS 2007a, pp. 3-194). None of these areas occur in or adjacent to the project area; therefore, there are no effects anticipated to the high quality remote habitat areas or their associated wildlife habitat. There is no federally designated critical habitat for any of the federally listed threatened, endangered or candidate wildlife species within the ANF and therefore none in the project area.

4. The degree to which the effects on the quality of the human environment are likely to be highly controversial.

Legitimate controversy under environmental law must be based on credible scientific evidence. Scoping respondents argue that proposed activities would impact threatened, endangered and sensitive species, the use of pesticides would impact the reduction of honey bees in Pennsylvania and herbicide use would impact wild edibles and medicinal plants. The Forest Service has established standards and guidelines in the ANF LRMP (USDA-FS 2007c, pp. 54-59) to minimize the impacts of herbicide application. Potential herbicide effects (for glyphosate and sulfometuron methyl) on human health are reviewed and analyzed in Appendix G (ANF Human Health Risk Assessment) of the ANF LRMP FEIS. Appendix G1, Section 5 of ANF Human Health Risk Assessment (Tables 49-57) shows that the planned use of glyphosate on the ANF, even at the maximum exposure scenarios, should not affect any member of the public, including sensitive individuals. Section 8 of ANF Human Health Risk Assessment (Tables 93-98) shows that the planned use of sulfometuron methyl on the ANF, even at the maximum exposure scenarios, does not exceed a level of concern for any member of the public, including sensitive individuals.

The risk analysis for terrestrial wildlife and invertebrates (the bee) are shown in Tables 17 (p. G2-74) and 19 (p. G2-78) of Appendix G in the ANF LRMP FEIS. Based on application rates of 1 to 4 pounds per acre for glyphosate, all hazard quotient (HQ) values are less than the level of concern (HQ = 1). At an HQ of one or less, there is no plausible basis for asserting that adverse effects are likely to occur at application rates that might be used in ANF programs (p. G2-73). Appendix G (p. G2-79) states there is no basis for anticipating the occurrence of adverse effects to bees exposed to sulfometuron methyl at application rates that might be used in ANF programs.

Public involvement efforts (see Chapter 1, Public Involvement and Appendix A) have not revealed any controversies regarding the potential environmental effects of the alternatives. The controversy that scoping respondents discuss is about the action (herbicide use) itself and not controversy about the anticipated effects of the action based on Appendix G. Proposed activities fall within routine practices on the ANF as described in the ANF LRMP.

5. The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.

The action alternative was designed to achieve the objectives identified in the ANF LRMP (see Chapter 1, Purpose and Need). ANF LRMP standards and guidelines and project design features would reduce the risk of adverse effects. All treatments proposed for this project constitute well established methods for vegetation management and are consistent with vegetation management practices outlined in Appendix A (USDA-FS 2007e) of the ANF LRMP. Proposed road maintenance, stone pit expansion and reclamation, NNIP species treatments and wildlife enhancement treatments also follow well established practices.

Although the use of herbicides for NNIP species control specifically have not been implemented to date on the ANF, there are no anticipated effects on the human environment that are highly uncertain or involve unique or unknown risks. This is based on previous experience with the use of herbicides for reforestation purposes (using same herbicides and methods). Proposed treatments have been analyzed and implemented in the past on the ANF and little uncertainty or risk is anticipated by use of the methods and techniques proposed.

6. The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.

Due to the routine nature of the action alternative, no precedent would be set for future actions or represent a decision in principal about future management considerations. All proposed management activities complement and address the desired conditions for the project area and the stated goals and objectives in the ANF LRMP. Any future decisions would need to consider all relevant scientific and site-specific information available at that time.

7. Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.

The action alternative is not related to any other actions with cumulatively significant impacts and is not a component part of any larger action. Any future federal actions would be analyzed on their own merits.

Direct effects are impacts that occur at the same time and place as the proposed activities. Indirect effects are impacts that occur at a different place or later time than the proposed activities. Direct and indirect effects can adversely affect or benefit resources. Cumulative effects are impacts that result from the incremental effects of the proposed action when added to past, present and reasonably foreseeable future actions, regardless of land ownership. An individual action when considered alone may not have a significant effect, but when its effects are considered in sum with the effects of other past, present and reasonably foreseeable future actions, the effects may be significant. The descriptions and analyses are based on the best available information about the resources in the affected environment.

Because the proposed treatment areas are scattered across eight separate 7.5 minute topographic quadrangles, spanning 25.8 (linear) miles and located in 13 different watersheds, the cumulative effects (CE) analysis area for most resources includes entire stands and private and state game lands with a ½-mile radius from the center of each proposed treatment area. Stands included in the CE analysis areas were selected strictly by whether the majority of their (physical) area fell within the ½-mile radius. As a result, actual CE areas surrounding each treatment area vary in size, shape and area. The CE analysis area for most resources includes 10,935 acres, including 1,021 acres of private and state game lands (9 percent) and 9,914 acres of NFS land (91 percent). These CE analysis areas are shown on Maps 1-15. These CE analysis areas were chosen because the land within their boundaries shares vegetation types, wildlife habitats, drainage patterns, climate, geology, disturbance regimes, access, and past historic uses as well as future impacts.

The time period for the CE analyses for most resources will be 10 years prior to the project (1999 to 2008) and 20 years into the future (2009 to 2028). This time period provides an overall view of the incremental impacts to each resource that is affected by the action and is germane to the decision. The effects of ground disturbing activities generally recover within 5 years. A timeframe of 10 years into the past was used as it would incorporate completed and ongoing activities from past projects. A timeframe of 20 years into the future was used to allow for all proposed and reasonably foreseeable related future activities to be completed and resulting vegetation changes to occur.

Past management activities within the project area within the last 10 years include timber harvests and reforestation treatments and are summarized in Table 7. Routine maintenance, such as grading and brushing, occurs as needed when funding is available.

Currently, there are approximately 95 existing private oil and gas wells within the CE analysis area. Four new wells have been drilled within the CE analysis area within the past 5 years. The Forest Service recently received a proposal for 30 new wells within the CE analysis area. However, the rate of OGM development can vary based on economics, technology and supply and demand. Based on the information presented in OGM analysis (see project file), the interdisciplinary team decided to use the ANF LRMP FEIS assumptions in order to project future rates of development within the CE analysis area. Using the average future private OGM development projection (USDA-FS 2007a, pp. 2-60) of 512 wells per year (0.001 wells/acre), it can be estimated that approximately 11 wells per year could be developed within the CE analysis area over the next 20 years. This would result in approximately 219 new wells over the CE analysis time period. This level of OGM development would affect 2.6 percent of the CE analysis area and result in the creation of 285 acres of non-forested habitat. Cumulative effects from private OGM development on each resource are discussed in their respective sections.

Predicting the level of future activities is difficult; however, federal activities would continue to be subject to the NEPA process. ANF LRMP standard and guidelines will continue to provide direction in decision making to protect the land and recreation investments from impacts in the future.

Direct, indirect and cumulative effects as well as design features (if any) will be discussed in terms of the physical environment (soils, water, transportation and air quality), the biological environment (vegetation, wildlife and NNIP species) and the social environment (heritage, scenery, recreation, and economics). Design features are highlighted applications of the ANF LRMP standards and guidelines. In some cases, the standards and guidelines provide options for how they may be applied. A design feature clarifies, where necessary, how these standards and guidelines may apply to specific actions in the project proposal.

7.1 Physical Environment

7.1.1 Soils

Specific information regarding soils, including soil types found in the project area, can be found in the Soil Resource Specialist report (in the project file). The following soil quality statement is applicable to all stands:

The Soil Management Handbook (FSH 2509.18) suggests a maximum threshold of 15 percent reduction in “measurable or observable soil properties or conditions, or any measurable or observable reduction in soil wetland or hydrologic function” shall not be exceeded as a result of land management treatments. This measurement of “detrimental soil conditions” would be applied to activity areas (individual treatment units within a project). The ANF has instituted a monitoring program to evaluate soil properties at the conclusion of management activities to determine if the 15 percent maximum is exceeded. Those “soil conditions” that are most relevant to this project are compaction, erosion and displacement. System roads, trails and administrative facilities such as campgrounds, are not included in measurements for loss of soil productivity.

Short-term effects to soils relate to a recovery period of 1 to 3 three years. These effects are apparent until the affected area develops a vegetative cover and responds to site treatments to minimize soil movement and compaction. Long-term effects to soils result from soil displacement and could last for more than 100 years. These effects result from the removal of the upper portion of the soil profile. This part of the soil profile contains a large amount of the soil’s organic matter and available plant nutrients and therefore, its productivity or quality. The replacement of this part of the soil takes a long time and depends on local climate and ecological conditions.

Design features for Alternative 1 includes:

- In stands with group II soils, cutting and skidding is permitted from June 15 to September 30 and from December 15 to March 1 (**USDA-FS 2007c, p. 74**). (**Stands 620006, 620026, 650103, 652062, 652076, 688012, 716022, 846095, 850068, 853036, 866006, 866031, and 866045**)

Direct and Indirect Effects

Alternative 2 (No Action)

Alternative 2 proposes no soil disturbing activities. Areas of bare soil within the project area, primarily roads and trails, have the potential for soil erosion and sedimentation. Soils would continue to erode in these areas until some physical point of stabilization is achieved. Natural weathering and erosion would continue to occur at background levels. Soils in the watershed would continue to acidify due to acid deposition.

Alternative 1 (Modified Proposed Action)

ANF LRMP standards and guidelines, Pennsylvania BMPs and other resource protection measures would limit the effects from soil disturbing activities to possible short-term increases in soil erosion and sedimentation but no long-term adverse effects.

Road Maintenance

Road maintenance would occur on 12.7 miles of existing roads that would be used for hauling timber. Short-term effects would include an increase of soil movement during road maintenance activities. Stone pit expansion would result in the soil resource being taken out of production until the pit is rehabilitated after use or reclaimed when it is depleted.

Vegetation Treatments

The majority of soil disturbance would occur during timber harvesting. Skid trails, using rubber tire skidders, are created in order to remove the timber. Log landings are also created in order to temporarily deck the timber until it can be loaded onto trucks and hauled off-site. Areas of compaction on log landings may result from blading of the surface and heavy equipment use while stock piling logs. Kochenderfer and Edwards (1997) reported that the amount of soil exposed as a result of skid trails and trucking roads decreases rapidly after logging. This is because grasses and shrubs become re-established in the disturbed areas. The study measured skid trails and truck roads in 1987 and again 5 years later in 1992. The percent of the disturbed area in the skid trails decreased from 6.2 percent of the logged area in 1987 to 5.1 percent in 1992 measurements. The percent of disturbed area in truck roads decreased from 4.5 to 3.1 percent in the same time period. It is thought that practically all of the skid trails, even in heavily cut areas, would eventually convert back to forest. However, Kochenderfer and Edwards (1997) recommended that water-control structures are necessary on closed roads, whether they are skid trails or abandoned system roads, because bare soil (up to 4 percent of the area) can remain on these roads even after six growing seasons.

In conventional harvesting operations, the impacts of unbladed primary skid trails and log landings are considered to be short-term impacts to soil productivity because there would be no removal of the surface soil horizons. These horizons may be mixed due to rubber tire movement on top of the soil surface, but the majority of the soil remains on site and relatively in place. Table 3 shows the sensitive soils within the proposed treatment areas.

Understory Vegetation Treatments

All of the activities (with the exception of herbicide and fertilizer applications, which are discussed in the following section) are low intensity activities, done primarily by field crews using either hand tools or mechanized equipment like chain saws, brush cutters and augers, and for this reason the chance of soil compaction would most likely be minimal. Direct and indirect effects from soil erosion and sediment production from these activities would be minimal as well, because surface debris and understory plants

found in both untreated and harvested stands would provide a barrier or soil cover, effectively protecting the soil surface from rain splash erosion. Tree shelter installation would cause minimal soil compaction due to the localized nature of this task.

Prescribed burning is proposed in two stands for a total of 47 acres. These stands could be burned up to three times each to promote regeneration with oak. Leaf litter would not generate temperatures in a light intensity burn that would adversely affect soil biota. The amount of ground cover removed during the burn is dependent upon several factors at the time of the burn including type and quantity of fuel, atmospheric factors (temperature and wind) and fuel moisture content. Prescribed burning would most likely be done in a way that some type of cover would remain on the surface acting as a barrier against rain splash caused erosion. Prescribed fires in these forest types result in increased calcium levels in the soil surface, decreased soil nitrates and minimal effects to carbon storage. Conservation measures to correct any substantial soil removal or disturbance during fire line construction could include mulching, seeding with annual grass and installing waterbars to dissipate water flow.

NNIP species treatments would rely primarily on the use of hand tools and possibly spot herbicide spraying to accomplish this objective. Hand tool use and its effects are discussed above, while the use of herbicide is discussed in the following section.

When compared to Alternative 2, Alternative 1 proposes to create a greater acreage of new, young stands, which can have a more rapid rate of carbon sequestration. Also, under Alternative 1, which would harvest the greater volume of timber, more carbon would remain stored as wood products for a longer period of time. Down woody debris would continue to accrue under both alternatives.

Understory Vegetation Treatments (Herbicide and Fertilizer Application)

Herbicide, fertilization and fencing treatments using heavy equipment have the potential for greater soil compaction, but even these treatments, when applied with the ANF LRMP standards and guidelines would likely cause minimal impacts to the soil resources. Herbicide is applied by a sprayer in swaths 50 to 60 feet wide, and granular fertilizer is applied similarly in swaths which are up to 100 feet wide. Minimizing the number of passes a machine would make for each type of application would cause a concurrent reduction in the potential for soil compaction. Fence building and maintenance activities have a potential for compaction and erosion in roughly a 10-foot wide zone along the perimeter of the fence, which is used as a travel way to access the fence with mechanized equipment. The potential for compaction could be expected to increase in proportion to the number of trips. Nevertheless, compaction is projected to be relatively low, due to the small size of the vehicle used (an all-terrain vehicle) and the relatively low number of trips. The potential for erosion from bare ground would diminish rapidly as grass, forbs and woody debris accumulates in the perimeter track and provides a protective cover for the soil. On steeper slopes, water bars would be installed to prevent water from running downhill and causing gully formation in the track.

Both glyphosate and sulfometuron methyl herbicide application are proposed in Alternative 1. Glyphosate herbicide adsorbs readily to soils and becomes relatively immobile immediately after application, so there is limited potential for residual effects to soil nutrients. The behavior of glyphosate residues in soil has been tested in a wide range of environmental conditions, which bracket those found on the ANF. Based on these studies, the soil half-life of glyphosate on the ANF is estimated to be less than 60 days with half-life in the litter of the forest floor to be less than 30 days. The half-life of glyphosate is shorter than average in silt loam soils and longer than average in sandy soils (USDA-FS 2007d, pp. G1-42 to G-43). Glyphosate does not accumulate in the soil, and soil microfloras degrade it to aminomethyl phosphonic acid, which is somewhat more stable than glyphosate. The principal end products of glyphosate decomposition are carbon dioxide, water, nitrogen and phosphate.

Sulfometuron methyl herbicide is more mobile in some soils than glyphosate, but it has a relatively short half-life in acidic soils, such as those found on the ANF. Sulfometuron methyl is much less mobile at pH 6 and below (acidic conditions) and in soils having high organic matter contents; therefore, little soil

mobility is expected in the types of soils found on the ANF (USDA-FS 2007d, p. G1-106). It is listed as "inhibitory" under certain laboratory conditions for some soil fungi and bacteria. Schreffler and Sharpe (2003) indicate that sulfometuron methyl applied after timber harvest acidifies soil, but the results were not statistically significant. No other studies have indicated that sulfometuron methyl has the side effect of soil acidification. Given conditions that exist on the ANF, the proposed use of sulfometuron methyl will not adversely affect soil nutrient cycling or soil productivity (USDA-FS 2007d, G1-106, G2-42). Microbial degradation of sulfometuron methyl occurs, but slowly. Non-microbial hydrolysis (a type of chemical decomposition) appears to be an important mechanism in sulfometuron methyl dissipation. Sulfometuron can break down in a few days to several weeks depending on soil and air temperatures, but based on average soil conditions found on the ANF, the half life is expected to be less than three weeks (USDA-FS 2007d, p. G1-106). Principal products of the breakdown of sulfometuron methyl include saccharin, carbon dioxide and methyl 2-(aminosulfonyl) benzoate. Both herbicides are formulated to target plant growth, and available studies do not indicate that either glyphosate or sulfometuron methyl affects nutrient cycling in forest soils (e.g. nitrogen mineralization) (USDA-FS 2007d, p. G1-44).

Alternative 1 proposes to fertilize 12 units totaling 89 acres. Recently, concerns over leaching losses of base cations associated with the use of nitrate-nitrogen fertilizers has led to a limitation on the use of this form of nitrogen. Since the concern over base cation loss is greatest on the plateau and shoulder landform positions, the need for nitrogen application in units occupying these positions has been evaluated more carefully prior to prescribing fertilization (USDA-FS 2007a, p. 3-123). Of the 12 units, five are on moderately sloping terrain, while the remaining seven units are on more gently sloping terrain closer to the plateau top.

Wildlife Enhancements

Proposed wildlife habitat improvements would have minimal direct or indirect effects on the soil resources other than ensuring that planting sites remain vegetated with a mixture of trees and shrubs resulting in a low potential for soil erosion and sedimentation from the affected units. These plantings are usually made with hand tools or power driven augers. Scalping (removing ground cover from a one-foot square patch to expose bare soil) is usually done prior to planting as a means to control competing vegetation and to get the newly planted seedlings off to a good start. In some cases, either individual tree shelters or fence cribs, which enclose a group planting, may be used to deter deer from browsing the seedlings. Additionally, two bluebird nesting boxes will be installed within the project area. The nest boxes would likely be attached to metal or wooden posts. Due to the minimal amount of soil disturbance from planting, fencing and placement of structures, no loss of soil productivity is anticipated as a direct or indirect effect of these activities.

Included in this project is a proposal to maintain and manage wildlife openings (inactive and depleted stone pits), which would require agricultural practices, such as disking to prepare for seeding and to control competing vegetation, seeding and applying lime and fertilizer. Disking would remove most of the existing ground cover prior to seed bed preparation and seeding increasing the potential for soil erosion to occur. On relatively bare sites like this, the degree of erosion would be a function of percent surface cover, slope length and percent, soil texture and rainfall. Consequently, erosion losses have the potential to be higher than those associated with proposed treatments. However, erosion losses would be lessened by the establishment of new ground cover and by the presence of straw mulch during the establishment phase. Also, the amount of soil erosion could be greatly influenced by the amount and timing of rainfall occurring during the establishment phase.

In general, direct and indirect effects of the wildlife treatments are expected to be relatively minor (see Wildlife Resource report [in the project file] for additional details and a fuller description of the proposed treatments).

Detrimental Soil Conditions

Table 3 displays the acreages of sensitive soils within the proposed treatment areas for Alternative 1. These acreages were approximated based on interpretations and descriptive information for the soil map units (USDA-NRCS 1985) found within the proposed treatment areas. Potential detrimental effects to these soils resulting from project activities would be minimized through implementation of ANF LRMP standards and guidelines and project design features, such as seasonal restrictions and avoidance of sensitive areas. The project area includes about 480 acres of NFS land; vegetation management activities are proposed on 452 acres with another 28 acres proposed for stone pit expansion and rehabilitation.

Table 3. Soil Disturbance Category and Sensitive Soils Found within the Project Area and Cumulative Effects Analysis Areas.

Sensitivity	Alternative 1 (Acres ¹)	Alternative 2 (Acres ¹)	Cumulative Effects Area (Acres ²)
10 to15 percent Disturbance	46 to 69 ³	Not Applicable	1,001 to 1,501 ³
Erosion Hazard severe (moderate)	4 (9)	Not Applicable	193 (1,901)
Severe Rutting Hazard(comparable to Erosion Hazard) – severe (moderate)	4 (9)	Not Applicable	193 (1,901)
Equipment Limitation severe (moderate)	0 (10)	Not Applicable	1,174 (4,491)
Slope – 25 to 60 percent	3	Not Applicable	159
Slope – greater than 60 percent	10	Not Applicable	914
Mass Wasting Hazard	None Noted	Not Applicable	Past Occurrences in Limited Areas
Prime Farmland	91	Not Applicable	2,628
Farmland of Statewide Importance	66	Not Applicable	1,535
¹ Acres falling into sensitivity categories for Alternatives 1 and 2, where the project area (not including stone pits) is 452 acres. ² Acres falling into sensitivity categories for the cumulative effects area, where the cumulative effects area is 10,935, including 9,914 acres managed as part of the ANF. These figures are for comparison purposes only, since activities occurring as part of Alternative 1 are not expected to affect the cumulative effects area for these types of soil sensitivity and vice versa. ³ Shows a range of 10 to 15 percent of the acreage for either Alternative 1 or the cumulative effects area. For Alternative 1, the higher end of the range is the maximum acreage that could be detrimentally affected by this project, without exceeding FS, R9 guidelines (USDA-FS 2005).			

Under Alternative 1, it is anticipated that that between 10 and 15 percent (or between 46 and 69 acres) of the soils within the proposed treatment areas would experience detrimental effects from the proposed activities, which is at or below the threshold established for soil disturbance on the ANF (Soil Management Handbook - FSH 2509.18). Any detrimental effects that occur within the proposed treatment areas would most likely be localized and not carry over to the cumulative effects (CE) analysis area.

Cumulative Effects

Because the 29 stands proposed for treatment are dispersed over a large area, it was decided to designate 16 small cumulative effects (CE) analysis areas, each of which comprises a ½-mile wide area around each stand or grouping of stands. Together, these 16 CE analysis areas comprise an area of 9,914 acres of NFS land and 1,021 acres of private and state game land, totaling 10,935 acres. For this analysis, the project area is considered to be the sum of the 29 stands, whose total area amounts to 452 acres, and 28 acres in 9 stone pits. Cumulative effects on soils are such that they are typically a result of multiple disturbances on the same site. Road work may occur on an ongoing basis immediately outside the project area. This work would mostly be road maintenance performed by one or more of the following entities: Forest Service, Pennsylvania Department of Transportation, township jurisdictions in Elk, Forest and Warren Counties, or OGM operators. Roads could be decommissioned in this area as well. These activities are unlikely to affect soils within the project area.

The temporal scale used to evaluate the CE analysis on soil resources will be 10 years prior and 20 years into the future. Thus, a 30-year time frame will be analyzed. Detrimental effects from soil compaction related to a single event are not expected to persist beyond 5 years. Likewise, in rare and limited instances where cover is removed from the soil surface (other than roads, landings and other high use areas), re-establishment of plant cover can be expected to occur in less than 5 years. Given the preceding, some effects may be analyzed using a longer time scale, such as 20 years into the future, to show the long-term effects on soils and soil nutrient changes with acid deposition.

Acid Deposition

Acid deposition occurs within CE analysis area independent of Forest Service management, and it is anticipated that it would continue at an increasing rate as more fossil fuel is burned to meet energy needs around the world. It is difficult to predict the potential impacts of more efficient power plants and shifts to other forms of energy production such as nuclear, wind and solar, which do not have atmospheric emissions. Soil acidification is a naturally occurring phenomenon, and by inference, it can be expected to continue at an increasing rate throughout the CE analysis area as acid deposition increases.

Although the Clean Air Act has been responsible for overall reductions of sulfur concentrations in the air, acid deposition from atmospheric sources could continue to increase the amount of nitrogen and sulfur in the soil, with a resulting increase in soil acidity. These increases in soil acidity would lead to continued leaching of calcium and magnesium through the soil profile. This leaching, when combined with the lack of limestone and dolomite in the dominant geology of the ANF, would result in continuing losses of calcium and magnesium from the soil profile.

Harvest methods affect the nutrient cycling of the forest floor differently (Elliott and Knoepp 2005). Methods, such as whole-tree harvesting, that remove excess organic material have more detrimental effects on nutrient availability than stem-only methods, which leave organic material (branches, leaves, tree crowns) at the harvest site (Elliott and Knoepp 2005). Short harvest rotations also have shown decreases in soil base cations due to the lower accumulation of organic matter and higher soil disturbance (Grigal 2000). Likewise, soil disturbing activities, including skidding and log yarding, decrease soil productivity by removing soil organic matter and increasing compaction (Berger and others 2004). Because the majority of the base cations in the watershed come from litter fall, soil disturbance should be limited as much as is reasonably possible. Methods for harvesting should also leave woody debris and slash material on site to augment nutrient and organic matter input (Mann and others 1988). The point of this discussion is that a particular type of harvest system could exacerbate the loss of base cations due to acid deposition. Implementation of ANF LRMP standards and guidelines, project design features, and Pennsylvania BMPs would ensure that soil disturbance is minimized and coarse woody debris is left on site. Whole tree harvesting is not being proposed in any of the alternatives.

Alternative 2 (No Action)

Under this alternative, no new management activities would occur. Overall, soil would continue to erode at the very low level or background rates common to a forest landscape at equilibrium with the rates of soil formation and erosion. This would be different on bare areas or sloping terrain, all of which could have accelerated rates of erosion due to a lack of cover, steeper and longer slopes and poor water infiltration rates where surfaces are compacted. The preceding is especially true on areas such as roads, which need periodic maintenance to maintain proper drainage and erosion control features. Since road maintenance may not occur within the CE analysis area as part of this project, erosion and sources of sediment originating from Forest Service roads may not be corrected under this alternative.

Without future vegetation management, trees would mature and down woody debris would accumulate over time and decay slowly releasing more carbon into the atmosphere and the soil. Assuming that the stands regenerated adequately, somewhat of a mixed age distribution of age classes would result where the larger, older trees would contain relatively large amounts of sequestered carbon, but their rate of carbon sequestration would be less than the rate for younger trees. Conversely, younger trees would contain relatively low amounts of sequestered carbon, but the rate at which they sequestered atmospheric carbon would be higher than the rate for older trees. Regeneration would most likely develop at a slower rate in this alternative; therefore, the rate of carbon sequestration would be slower than in Alternative 1. The amount of carbon sequestered would be related to the volume of biomass on a per acre basis. Some areas may fail to regenerate due to interfering vegetation.

Alternative 1 (Modified Proposed Action)

Any disturbances that remove the upper portions of the soil profile restart the soil formation process. There are no activities proposed in this project that do this to the soil; however, proposed activities include conventional logging, landing and skid trail development that disturb the soil surface and possibly the subsoil to some degree. Soil development would then be setback, and it could take many decades for that soil to recover to its native state. In the case of roads, it would take a change in management and road obliteration to see soil recovery occur.

Regeneration would most likely develop at a faster rate in this alternative; therefore, the rate of carbon sequestration would be greater than in Alternative 2. The amount of carbon sequestered would be related to the volume of biomass on a per acre basis.

National Forest System Land

Scattered stands from the East Side, Spring Creek, Painter Run, Windthrow Categorical Exclusion, and ANF Windthrow projects lie within the CE analysis effects area. Past management activities within the project area within the last 10 years include timber harvests and reforestation treatments and are summarized in Table 7. Routine maintenance, such as grading and brushing, occurs as needed when funding is available.

Many additional activities have the potential to cumulatively affect soil resources. They vary in scale and scope from recreational activities, such as hiking and dispersed camping to road construction and maintenance. Over time, soil compaction may occur, low levels of erosion may develop, and small amounts of sediment may be produced, but none are measurable at the project level. On the ANF, stands can be eliminated or restricted spatially and temporally to avoid wet soils altogether or to restrict the management to dryer seasons and periods of the year. Additionally, wet soils are often designated as reserve areas during project layout, which restricts most ground disturbing activities from occurring in them.

There are 95 existing wells within the CE analysis area, and the Forest Service has recently received a proposal for 30 additional new wells within the CE analysis area. It is reasonable to expect OGM development would continue within the CE analysis area resulting in additional areas with long-term compaction due to road and well pad construction. Road construction and use on NFS and other lands,

including OGM activity, have the potential for soil erosion and sedimentation. ANF LRMP standards and guidelines and Pennsylvania BMPs would help to minimize the erosion created by road construction and maintenance and the volume and type of traffic these roads support.

Private and Other Lands

Within the last 10 years, there has been approximately 8 acres of overstory removal harvests on the 1,021 acres of private and state game lands within the CE analysis area. Additional timber harvest can be expected on these lands in the foreseeable future. Residential development (recreational camps) has been ongoing at a relatively slow pace, depending on the location of the tract. Future demand for camps could place pressure on undeveloped, private tracts for this purpose; however, it is anticipated that there will be little change in future residential development within the CE analysis area. Future OGM development and possible camp construction have the potential to reduce soil productivity through compaction and erosion. The primary concern for the ANF are activities occurring on private land that have the potential to contribute to erosion or sedimentation problems on the ANF.

Timber harvest and road construction, maintenance and use on private and state game lands have the potential for soil erosion and sedimentation. Pennsylvania BMPs would help to minimize the erosion created by timber harvesting and road activities.

Implementation of all activities would be consistent with state and federal laws and Forest Service regulations and handbooks regarding management of soils. Although activities on private land and from OGM developments within the CE analysis area may contribute to adverse effects on soils, ANF LRMP standards and guidelines, Pennsylvania BMPs and other resource protection measures would help to ensure that effects from implementation of Alternative 1 would have no adverse direct or indirect effects to soils. Timber harvesting can remove large amounts of nutrients from a stand; however, because of the relatively dispersed nature of the stands to be harvested, the timber harvests are not expected to be significant, particularly for nitrogen (Adams 1999). Therefore, there would be no cumulative effects to soils from implementation of Alternative 1.

7.1.2 Water Resources

Specific information by watershed is shown in the Water Resources report (see project file). The project area is distributed across the Marienville Ranger District of the ANF within 13 watersheds (see Table 4). The proposed treatment areas include 452 acres in 29 stands and 28 acres in 9 stone pits.

Table 4. Number and Size of Proposed Treatments in Hydrologic Unit Code (HUC) 6 Watersheds.

HUC 6 Watershed Name	Number of Proposed Treatments	Acres of Proposed Treatment in Watersheds
Big Mill Creek	3	97
Bluejay Creek	4	22
Clarion River (middle lower)	4	12
Coon Creek	1	16
Salmon Creek	2	44
South Branch Tionesta Creek	4	50
Spring Creek (lower)	3	31
Spring Creek (upper)	9	83
Tionesta Creek (lower)	1	31
Tionesta Creek (middle)	1	4
Tionesta Creek (upper)	2	27
West Branch Clarion River (lower)	1	18
West Branch Millstone Creek	1	4

Direct and Indirect Effects

Environmental consequences will be summarized based on the effects from proposed Forest Service activities. The cumulative watershed effects section will evaluate effects from private and Forest Service activities. Finally, consistency of alternatives with Pennsylvania BMPs and ANF LRMP standards and guidelines is presented at the end of this section.

Summary of Effects

- ANF LRMP standards and guidelines provide direction that will minimize direct and indirect effects to streams and wetlands. Overall, activities will be limited or avoided around streams and wetlands. Riparian corridors and wetland management zones are designed to provide adequate filtering of sediment, herbicide and fertilizer, protect water temperature and allow for the recruitment of large woody debris (LWD) into stream channels and wetlands (USDA-FS 2007c).
- This project includes timber harvesting on 383 acres including shelterwood seed cuts, shelterwood removal cuts, salvage thinning, single tree and group selection cuts, and associated reforestation treatments including herbicide application, site preparation, fertilizer application, installing tree shelters, tree planting, release and prescribed burning. Reforestation only (no timber harvests) is proposed on 69 acres.
- Twenty-two of the 29 stands are located more than 300 feet from streams. Four stands are 200 to 300 feet from streams and three stands are 100 to 200 feet from streams. Under Alternative 1, herbicide applications are proposed on 413 acres. Those stands that overlap streams or riparian areas would be protected through herbicide buffers identified in the ANF LRMP standards and guidelines (USDA-FS 2007c, pp. 57-58).
- Three stands are proposed for herbicide treatment within the Big Mill Creek municipal watershed (Ridway Reservoir). No effects should occur to this drinking water source with the adherence to ANF LRMP standard and guidelines (USDA-FS 2007c, pp. 57-58). In addition, the Ridway Reservoir where the water is pulled from is located over 6 miles downstream from the proposed treatments.

- The treatments proposed in this project need additional timber harvests and/or reforestation treatments to complete their regeneration sequences, which will cause only temporary disturbance to the forest floor.
- Road maintenance and road hauling should not cause negative effects to water quality and stream flows. Where improvements are made to the road for hauling timber, there could be beneficial effects to water quality and quantity through the reduction in runoff and sedimentation (Sheetz and Bloser 2008). It is anticipated that watershed will experience very little change from the no action alternative.

Water Quality

Sedimentation from roads is the principle concern for water quality and aquatic habitat identified in the ANF LRMP FEIS (USDA-FS 2007a), and this will be the primary focus for the water quality section. This project does not propose any road construction or reconstruction. Road use during timber hauling can impact water quality; however, this is addressed in road use plans and through road maintenance.

The ANF LRMP FEIS (USDA-FS 2007a) provides documentation that demonstrates minimal effects to water temperature, nutrient concentrations and sediment concentrations from the types of vegetation management and reforestation activities proposed in this project. This is based on standards and guidelines found in the ANF LRMP that will be applied to all Forest Service activities. These standards and guidelines meet or exceed Pennsylvania BMPs (PA-DEP 2005). The Herbicide Risk Assessment, Appendix G of the ANF LRMP FEIS (USDA-FS 2007d), has reviewed effects to groundwater and surface water regarding aquatic life and human health water quality criterion. This assessment has found that the ANF LRMP standards and guidelines would ensure that any herbicide treatments would protect water quality (USDA-FS 2007c).

Of the 29 stands proposed for treatment, four stands are more than 200 to 300 feet from streams and three stands are 100 to 200 feet from streams. Where streams and wetlands, including vernal pools, occur within stands, ANF LRMP standards and guidelines will be applied to identify riparian corridors along streams and wetland management zones around wetlands. Riparian corridors will be defined as stated in the ANF LRMP, which will keep the majority of activities more than 50 feet from intermittent streams and 100 feet from perennial streams. Wetland management zones will limit harvesting activities within 100 feet of wetlands and 200 feet of vernal ponds (USDA-FS 2007c, pp. 77-78). Riparian corridors and wetland management zones are designed to provide adequate filtering of sediment, fertilizer and herbicide, protect water temperature and allow for the recruitment of LWD into stream channels.

Water Quantity

Similar to the water quality section, runoff from roads is the principle concern for water quantity and changes to aquatic habitat as identified in the ANF LRMP FEIS (USDA-FS 2007a). Proposed road maintenance, approximately 12.7 miles, would also correct sections of road that are contributing increased runoff to streams.

The ANF LRMP FEIS (USDA-FS 2007a) provides documentation that demonstrates minimal effects to water quantity when vegetation management activities are distributed over several watersheds. ANF LRMP standards and guidelines will provide the greatest controls to water quantity by maintaining an intact forest floor and minimizing soil disturbance (Stuart and Edwards 2006).

Cumulative Effects

Cumulative effects (CE) for water resources will not be analyzed specifically for each watershed where the proposed treatments fall. The nature of this project does not necessitate an in depth analysis of the effects of each watershed. The following reasoning was used to come to this determination:

1. The project area is spread out across the ANF and the proposed treatments are within 13 watersheds (see Table 4). Only two watersheds have more than 50 acres of treatments proposed. These watersheds are Big Mill Creek (97 acres) and Spring Creek (113 acres)
2. The treatments proposed in this project need additional timber harvests and/or reforestation treatments to complete their regeneration sequences, which will cause only temporary disturbance to the forest floor.
3. Based on previous watershed evaluations, it is highly unlikely the proposed regeneration treatments would cause effects to water quality or quantity with the implementation of ANF LRMP standards and guidelines, which meet or exceed Pennsylvania BMPs. The ANF LRMP FEIS (USDA-FS 2007a) provides documentation that demonstrates minimal effects to water quantity when vegetation management activities treat less than 25 percent of watersheds. Considering the rotational patterns of timber harvesting, it is unlikely that any watershed will have more than 15 percent of any watershed in the 0-10 year age class. The two following projects provide examples that Forest Service activities, in combination with private activities, only have a small portion of watersheds in the 0-10 year age class.
 - a. The Spring Creek FEIS cumulative watershed evaluation looked at treatments proposed throughout the Spring Creek watershed (USDA-FS 2004). This evaluation included Spring Creek FEIS treatments, past, present and future actions within the watershed and state game and private lands. All of these activities together would create non-forest and forest areas in the 0 to 10 year age class on only 7.4 percent of the watershed. No noticeable changes to water quality or quantity were predicted. This cumulative watershed evaluation included the 12 treatments proposed in the FY 07 Regeneration project, totaling 113 acres.
 - b. The Brush Hollow EA (USDA-FS 2008b) cumulative watershed evaluation analyzed the headwaters of the Big Mill Creek watershed, which is located in close proximity to three proposed stands totaling 97 acres. This watershed evaluation included treatments from Brush Hollow EA, the East Side FEIS, Herbicide Diversity EA and KEF Windthrow EA. Increases in stream flows are not expected because all activities proposed in this watershed amount to only 7.2 percent of the watershed. Adding in the treatments from this project would add only another 1.1 percent of treatment areas in this watershed.

The physical, chemical and biological characteristics of water are representative of its ability to support protected uses. Proposed activities are evaluated for how they affect streams ability to support protected uses.

Due to the nature of this project, where the 29 stands proposed for treatment are dispersed over a large area, it was decided to designate 16 small cumulative effects areas, each of which comprises a ½-mile wide area around a stand or a grouping of stands. Together, these 16 small cumulative effects areas comprise a cumulative effects area of 9,914 acres (91 percent) of NFS land and 1,021 acres (9 percent) of private and state game lands, totaling 10,935 acres, which collectively will be analyzed as part of this project. For this analysis, the project area is considered to be the sum of the 29 stands, whose total area amounts to 452 acres, and 28 acres in 9 stone pits. The temporal scale used to evaluate the cumulative effects on the water resources will go 10 years back to 1999 and project 20 years into the future to 2028. Thus, a 30-year time frame will be analyzed. This timeframe for CE analysis is intended to include any previous effects of management and natural activities cumulatively with current, proposed and reasonably foreseeable future activities.

Road maintenance and road hauling should not cause negative effects to water quality and streamflow regime. Where improvements are made to the road for hauling timber, there could be beneficial effects to water quality and quantity through the reduction in runoff and sedimentation. There are 1.95 miles of new

Forest Service road construction approved for construction within the CE analysis area. This was approved in the East Side document and this road was evaluated in Spring Creek FEIS and was not found to impact water quality or quantity.

There are currently 95 OGM wells within the CE analysis area. Within the last 5 years, four new wells have been drilled within the CE analysis area. A recent well package has been submitted, which proposes to drill 30 new wells within the CE analysis area near the West Branch of Bluejay Creek. However, the rate of OGM development can vary based on economics, technology and supply and demand. Based on the information presented in OGM analysis (see project file), the interdisciplinary team decided to use the ANF LRMP FEIS assumptions in order to project future rates of development within the CE analysis area. From 2009 to 2028, 219 new OGM wells could be drilled, disturbing 285 acres (2.6 percent) of the CE analysis area. OGM operators are required to develop and implement soil erosion and sedimentation plans for their OGM developments, which are approved by the Pennsylvania Department of Environmental Protection (PA DEP). These plans outline the BMPs used to minimize soil erosion and sedimentation. As soil and water problems are identified, the Forest Service will work with OGM operators and PA DEP to prevent and control soil erosion from roads and protect water quality.

Within the last 10 years, there has been approximately 8 acres of overstory removal harvests within the CE analysis area. Final harvests on private and state game lands are estimated to be 10 percent of the forested land per decade, and intermediate thinnings are estimated to be 11 percent forested land per decade. The harvest method on these lands is expected to be a shelterwood seed cut and removal sequence with half of these acres being treated with herbicides. No other reforestation treatments were used for private and state game lands in this analysis. Adherence to Pennsylvania BMPs for road construction and timber harvesting would minimize effects to water resources.

Consistency with Commonwealth and Forest Plan Standards

The Commonwealth of Pennsylvania's anti-degradation policy requires that at a minimum existing water uses and level of water quality necessary to protect the existing uses shall be maintained and protected.

Alternative 1 is not expected to cause impacts to aquatic life from the proposed activities. Therefore, Alternative 1 would meet the intent of the anti-degradation policy and Pennsylvania and ANF LRMP water quality standards and guidelines.

7.1.3 Transportation

Direct and Indirect Effects

No road management changes are being proposed under either alternative. No road construction or reconstruction is being proposed in either alternative. The existing road system was inventoried in 2007 and road needs were considered during the development of the proposed activities. Proposed road maintenance and stone pit expansion are disclosed in Appendix B. The effects of road maintenance and pit expansion on other resources have been considered in those resource effects analyses.

There are approximately 12.7 miles of road maintenance proposed in Alternative 1. Road maintenance could also occur in Alternative 2 (No Action) dependent on funding and use. Maintenance is defined as the ongoing upkeep necessary to retain or restore a road to its approved road management objective. Maintenance includes a variety of activities, such as roadside brushing, surfacing, culvert replacement, installation of sediment basins and surface and ditch armoring.

Alternative 2 (No Action)

The proposed stone pit expansion would not be approved for use in Alternative 2. If future projects require stone, it would be hauled from an approved pit outside of the project area or an additional environmental analysis would be completed.

Alternative 1 (Modified Proposed Action)

Table B-6, Appendix B shows the nine stone pits proposed for expansion in Alternative 1 and their current sizes. The total area proposed for expansion is approximately 2.6 acres. A pit management plan has been developed for each pit including rehabilitation to ensure the efficient use of stone. All of the pits proposed for expansion are located in MA 3.0. Effects of stone pit expansion are expected to be minimal and include the loss of vegetation and ground disturbance on approximately 2.6 acres. The stone pits would be rehabilitated upon completion of extraction activities.

Cumulative Effects

There has been no new road construction associated with Forest Service management in the CE analysis area in the past 10 years and none is proposed with this project. Within the CE analysis area, approximately 1.95 miles of road construction – new corridor (FR740 and FR740B) was approved with the East Side project. Expansion of the FR286 stone pit was also approved for the construction of FR740 and FR740B. Following construction, FR740 and FR740B would be gated and closed except for hunting access, if needed. No other planned road construction associated with Forest Service activities is anticipated in the foreseeable future. No changes in road management are planned with this project or anticipated with Forest Service activities in the foreseeable future. Routine road maintenance would occur as needed dependent on funding and use.

The need for additional stone pit expansion beyond that analyzed with this project or other approved projects would require additional environmental analysis. There is concern about the quantity, quality and access to stone in the future. Consequently, alternate (off-forest) sources for stone and gravel may be needed or investigated in the future. Limestone surfacing would be procured from private sources outside of the ANF.

7.1.4 Air Quality

Due to the regional nature of air quality issues, most of the pollution affecting the ANF is from external sources. Current air pollution impacts occurring on the ANF result from numerous sources including automobiles, off-road construction equipment, wildfires, factories, oil refineries and power plants, all of which contribute to the regional pollution load. The ANF is situated near the industrial heart of the United States and near a high concentration of coal-fired electric generating facilities; the leading source of sulfur dioxide (SO₂) and nitrogen oxide (NO_x) emissions. A large percentage of the United States population lives within a day's drive of the ANF.

The Clean Air Act (CAA) sets the standards for air quality in the United States. National Ambient Air Quality Standards (NAAQS) set air quality standards for six criteria pollutants with which the entire country must comply. Primary NAAQS standards are set based on human health criteria. It is up to state air quality regulatory agencies to come up with State Implementation Plans to ensure that these standards are met in their respective states. If the standards are not met for any criteria pollutant, the area is designated as non-attainment for the pollutant. The Clean Air Act Amendments (CAAA) of 1977 established the Prevention of Significant Deterioration (PSD) program. These amendments designated specific Wildernesses and National Parks as Class I areas. Under Title I, Part C of the CAAA, Federally mandated Class I areas are provided with an additional measure of protection. The ANF has no Class I areas within or near its administrative boundaries.

When looking at the impacts of air quality, it is important to keep in mind that a handful of pollutants contribute to a variety of air quality related effects. These pollutants are a concern because of their impacts to human health and natural resources. Air pollutants are generally classified as either primary or secondary pollutants. Those emitted directly into the atmosphere as products of combustion are classified as primary pollutants, while those formed when primary pollutants undergo atmospheric chemical reactions are classified as secondary pollutants. Descriptions of criteria pollutants can be found in the

ANF LRMP FEIS on pages 3-52 through 3-55 and in the Review of Information – OGM Activity and Air Quality, ANF (2008).

Under the CAA, states must identify air quality control regions for the purpose of demonstrating attainment (or non-attainment) of the NAAQS. In the vicinity of the project area, these air quality control regions are identified as individual counties. Since air pollution is regional in nature and has the potential to disperse beyond project boundaries, emissions will be evaluated in the context of the four-county (Elk, Forest, McKean and Warren) pollution loads. For this reason, the scope of the air quality analysis will extend to the four-county boundary, which includes the air quality control regions where the project area and the ANF are located. Emissions were evaluated on an annual load basis assuming that activities would be evenly distributed over five years. The residence times in the atmosphere for most air pollutants are short lived and high concentrations of pollutants emitted during an activity dissipate and move out of the area. In other words, pollutants emitted during one day of activities would not necessarily remain in the atmosphere and accumulate with those emitted during a subsequent day.

Direct and Indirect Effects

The primary ANF management activities that contribute to air quality emissions are timber harvest, all terrain vehicle (ATV) use and prescribed fire. Fine particulate matter (PM), nitrogen oxides (NO_xs), volatile organic carbons (VOC) and carbon monoxide (CO) emissions from these activities contribute to the total pollution load and are the criteria pollutants addressed in this analysis. Ozone as a secondary pollutant is dependent on multiple factors for its formation and can not be estimated directly. However, NO_xs are the limiting factor in ozone production and can serve as an indicator for ozone. The goal here is to address the estimated emissions of critical pollutants from ANF management activities to assess whether or not they would significantly impact attainment of the NAAQS or significantly contribute to harmful conditions for humans in nearby communities. Therefore, potential emissions of these pollutants as they compare to the four-county emissions will serve as indicators for air quality effects in the first step screening analysis. *All counties near the project area are currently in attainment status for all criteria pollutants.*

The regional emissions data were obtained from the most recent and accurate emissions database available for this area. Currently, this is the 2002 VISTAS base case emissions database. The estimated emissions were derived from the emissions estimates used in the ANF LRMP FEIS. Three ANF management activities were analyzed using the same methods employed for the ANF LRMP FEIS (USDA-FS 2007a, pp. 3-52 to 3-63): timber harvest, prescribed fire and ATV trail use. It can be assumed that if predicted emissions from the proposed ANF management activities contribute a small enough percentage to the total pollution load, they would not impact attainment of the NAAQS. A percentage threshold of 5 percent has been chosen for the emissions comparison. If emissions from ANF management activities do not exceed 5 percent of the total pollution load in the region, they will be considered below our level of concern. The threshold of 5 percent was chosen to be very conservative in protecting air quality. Air regulations often include a 5 percent change as a threshold for more rigorous or refined air quality analyses. Although we are more concerned with emissions from ANF management activities on the NAAQS, this threshold seemed appropriate for this analysis because PSD increments represent a percentage of the total NAAQS.

Alternative 2 (No Action)

There would be no newly proposed Forest Service management activities in the project area under this alternative and thus no additional emission of pollutants.

Alternative 1 (Modified Proposed Action)

Timber harvest and prescribed emissions for the project were analyzed and compared to the four-county area. There are no ATV trails within or near the project area; therefore, ATV emissions were not included in the project level analysis but are included in the cumulative effects analysis. Table 5 shows the direct

and indirect air quality effects for the project. As shown in Table 5, potential emissions from the proposed timber harvesting and prescribed burning operations with any alternative in this project are negligible and do not increase four-county emissions by 5 percent and therefore are below the level of concern.

Implementation of all activities would be consistent with state and federal laws and Forest Service regulations and handbooks regarding management of prescribed fire. ANF LRMP standards and guidelines, Pennsylvania BMPs and prescribed burn plans would limit effects to air quality from prescribed burning. The ANF uses the best available smoke management techniques and technology to alleviate nuisance or human health impacts of smoke in local communities and sensitive areas.

Table 5. Direct and Indirect Air Quality Effects from Timber Harvests and Prescribed Burning Proposed in the FY07 Regeneration Project to the Four-County Area

Alternative	Pollutant	Timber Harvest Emissions (Tons per Year)	Prescribed Burning Emissions (Tons per Year)	ANF Management Emissions (Tons per Year) ¹	Four-County Emissions (Tons per Year)	Percent ANF Management Increase of Four-County Emissions ¹
1	VOC	0.0058	0.000	0.0058	12,047	0.00
	PM	0.0003	38.5870	38.5870	5,322	0.73
	NOx	0.0055	0.2585	0.2640	11,188	0.00
	CO	0.0294	233.4960	233.4960	66,765	0.35
2	VOC	0.0000	0.0000	0.0000	12,047	0.00
	PM	0.0000	0.0000	0.0000	5,322	0.00
	NOx	0.0000	0.0000	0.0000	11,188	0.00
	CO	0.0000	0.0000	0.0000	66,765	0.00

Notes: ¹ ANF Management Emissions includes emissions from proposed timber harvest and prescribed burning. There are no ATV trails within or near the project area.

Cumulative Effects

In the vicinity of the project area, these air quality control regions are identified as individual counties. For this reason, the scope of the air quality CE analysis will extend to the four-county boundary, which includes the air quality control regions where the project area and the ANF are located. Due to the transient nature of air quality, past actions do not affect current conditions; therefore, the timeframe for the cumulative effects air quality analysis is 2009 to 2028. This analysis is based on the Review of Information – OGM Activity and Air Quality analysis dated July 31, 2008 for the ANF LRMP FEIS. The cumulative air quality analysis evaluated emissions occurring on the ANF from prescribed burning, timber harvest, ATV vehicles and OGM development activities within the four-county area.

As shown in Table 6, air emissions will be increasing over the next 20 years, primarily due to OGM development. These increases in emissions may degrade air quality in the four-county area. ANF management activities would yield a very minor change from the 2002 four-county area emission levels (all less than 5 percent). The 5 percent threshold is a conservative reference point to display the level of potential change. It is not the threshold for significant adverse effects. Because expected emissions do not increase four-county emissions by 5 percent, no cumulative effects to air quality are expected from implementation of this project.

Table 6. Cumulative Air Resource Effects

Alternative	Pollutant	OGM Emissions (Tons per year)	ANF Management Emissions ¹ (Tons per Year)	Cumulative Emissions (Tons per year)	Four-County Emissions (Tons per Year)	Percent ANF Management and OGM Increase of Four-County Emissions (2 nd Decade)	Percent ANF Management Increase of Four-County Emissions (2 nd Decade) ¹
1	VOC	11,564	297	11,861	12,047	98.46	2.47
	PM	258	153	411	5,322	7.72	2.88
	NO _x	1882	187	2,069	11,188	18.49	1.67
	CO	30,328	2,878	33,206	66,765	49.74	4.31
2	VOC	11,564	297	11,861	12,047	98.46	2.47
	PM	258	153	411	5,322	7.72	2.88
	NO _x	1882	187	2,069	11,188	18.49	1.67
	CO	30,328	2,878	33,206	66,765	49.74	4.31

Notes: ¹ ANF Management Emissions includes emissions from timber harvest, prescribed burning, and ATV use (from Table 1 in Review of Information – OGM Activity and Air Quality, Allegheny National Forest [USDA-FS 2008c]).

7.2 Biological Environment

7.2.1 Vegetation

Specific information regarding vegetation management can be found in the vegetation report (located in the project file).

Direct and Indirect Effects

Alternative 2 (No Action)

The proposed activities would not occur at this time and only routine custodial or maintenance activities would occur in the project area. None of the proposed NNIP species treatments or wildlife habitat enhancements would be performed under this alternative. Since no harvest or reforestation treatments would occur under Alternative 2, any changes in vegetation would be the result of natural stand development or disturbance processes. No new early successional habitat would be created except for that caused by natural processes or potential future management in another project. It is estimated that interfering vegetation (fern, grass, American beech and striped maple) would be present over most of the project area within 20 years, preventing many seeds from germinating and becoming established. Shade tolerant trees and shrubs, such as American beech, black birch, striped maple, grasses and ferns, would probably continue to dominate the understory over time. Horizontal diversity, or patchiness across the landscape, would decline unless natural disturbances and/or future management create new age classes. Beech, birch and striped maple would grow into the midstory and contribute towards vertical diversity (canopy depth).

Alternative 1 (Modified Proposed Action)

This alternative would utilize timber harvesting as a management tool on 383 acres within the project area. Under this alternative, even-aged management would create 320 acres of early-structural habitat over the next decade. Shelterwood seed cuts and shelterwood removal cuts are proposed for 262 acres and delayed overstory removals on 58 acres, to support favorable conditions for the growth of new tree seedlings, by allowing more sunlight to reach the forest floor. Uneven-aged management using single

tree/group selection is proposed for 39 acres. A majority of the stands in this alternative are not adequately stocked with desirable regeneration and additional reforestation treatments are necessary to achieve this goal. The amount of reforestation activities proposed are as follows: 359 acres of site preparation, 413 acres of herbicide application, 177 acres of planting, 89 acres of fertilization, 361 acres of fence installation, 26 acres of tree shelter installation, 428 acres of release, and 47 acres of prescribed burning (see Table 1 and Table B-1 in Appendix B) Reforestation treatments would control competing vegetation long enough to allow tree seedlings to become established, improving the diversity of the understory species in treated stands. Where fencing is proposed in treated stands, the understory species diversity will improve. There would not be any change in forest types under this alternative.

This alternative contributes toward the need to provide wood products to the local economy. The proposed action would result in an estimated 1.4 million board feet (MMBF) during the first entry and an additional 3.0 MMBF during the second entry.

Cumulative Effects

Cumulative effects (CE) are impacts that result from the incremental effects of the proposed action when added to past, present and reasonably foreseeable future actions. A timeframe of 10 years (1999-2008) into the past was used as it would incorporate completed and ongoing activities from past projects. A timeframe of 20 years (2009-2028) into the future was used to allow for all proposed and reasonably foreseeable related future activities to be completed and resulting vegetation changes to occur. The CE analysis area for this project encompasses 16 small cumulative effects areas, each of which comprises a ½ mile wide area around each stand or grouping of stands. The cumulative effects on vegetation are discussed in terms of the cumulative effects of treatment amounts, age class (early successional and late successional stages) and understory and midstory vegetation.

The following assumptions are used for private and state game lands in the CE analysis. There are 1,021 acres of private and state game lands within the CE analysis area. Based on estimates from aerial photographic interpretation, these properties are mostly a mix of hardwood forest (943 acres) and conifers (70 acres). Within the last 10 years, there has been approximately 8 acres of overstory removal harvests within the CE analysis area. Final harvests on private and state game lands are estimated to be 10 percent per decade, and intermediate thinnings are estimated to be 11 percent per decade. The harvest method on these lands is expected to be a shelterwood seed cut and removal sequence with half of these acres being treated with herbicides. No other reforestation treatments were used for private and state game lands in this analysis.

The following assumptions were used for Forest Service land in the CE analysis. This project will be the only proposed project on Forest Service land in the first decade (2009-2018). Final even-aged harvest on Forest Service would treat 6 percent of MA 3.0 and 10 percent of MA 1.0 in the second decade (2019-2028). Forest Service would plant, fence, and fertilize 20 percent of the final harvest acres in the second decade. Forest Service would treat 100 percent of the final harvest acres for all other reforestation treatments. Intermediate thinning on the Forest Service is estimated to be 2 percent for the second decade. In order to get a high percentage of oak regeneration it may be necessary to burn the proposed oak stands in the first decade up to three times. It was estimated that a 20 acre stand may be burned up to three times in the second decade.

Cumulative Effects from Harvest Treatments

Previously approved vegetation management activities within the CE analysis area, which have not been completed yet, would occur in both alternatives. To meet ANF LRMP direction for MAs 1.0 and 3.0 in the second decade (2019 to 2028), additional final harvests (shelterwood and overstory removal cuts) and their associated reforestation treatments are expected to occur on approximately 6 percent of the CE analysis area.

Table 7 summarizes treatments that have occurred or are anticipated to occur within the CE analysis area. Forest accomplishment records have been reviewed to determine the level of activity that has occurred on NFS land within the CE analysis area in the past decade. It should be noted that multiple treatments might have occurred on any given acre. For example, a stand may have received a shelterwood seed cut, followed by an herbicide application, site preparation for natural regeneration and then the shelterwood removal cut (final harvest) once adequate seedlings are established. Therefore, the information presented in Table 7 represents the total acres of treatment, not the actual physical number of acres that may have received one or more treatments.

The projected total even-aged final harvest activity comes from this project proposals and potential future final harvests from NFS and other lands within the CE analysis area. The project range of even-aged final harvests is between 11 (Alternative 2) and 14 percent (Alternative 1) for the 30 year CE analysis period. Therefore, 86 to 89 percent of the analysis area is not expected to be regenerated using even-aged management during the CE analysis time period.

Table 7. Cumulative Vegetation Totals by Treatment for Cumulative Effects Analysis Area (10,935 acres)

Treatment	Past Treatments 1999-2008 (Acres/Percent of CE area)	Cumulative Totals (past, present, future ¹) Acres/Percent of CE area	
		Alternative 1	Alternative 2 (No Action)
Shelterwood Seed/Removal Cut	272 (2.5%)	1310 (12%)	1048 (10%)
Overstory Removal	113 (1%)	171 (2%)	113 (1%)
Intermediate Thinning	0 (0%)	310 (3%)	310 (3%)
Salvage Only	287 (3%)	287 (3%)	287 (3%)
Sanitation Cut	2 (0%)	26 (0%)	2 (2%)
Two Aged Cut	22 (0%)	22 (0%)	22 (0%)
Individual Tree/Group Selection	72 (1%)	111 (1%)	72 (0%)
Herbicide	284 (3%)	1371 (13%)	958 (9%)
Fencing	31 (0%)	506 (5%)	145 (1%)
Site Preparation	316 (3%)	1247 (11%)	888 (8%)
Fertilization	131 (1%)	334 (3%)	245 (2%)
Planting	91 (1%)	382 (3%)	205 (2%)
Release	375 (3%)	1375 (18%)	947 (9%)
Burning	0 (0%)	201 ² (2%)	60 ² (1%)

¹ To get future harvest acres take 12 percent of MA 3.0 acres (8,627) and 20 percent of MA 1.0 acres (545). Future private final harvests in the next 20 years were estimated at 10 percent per decade (204 acres for 20-year period).

² Anticipated future prescribed burning is estimated to be one 20-acre stand burned up to three times.

Cumulative Effects for Early Age Classes and Late Successional Forest

Table 8 displays the present age class distribution found within the CE analysis area and forecasts the distribution that would occur in 20 years (by 2028) under the different alternatives. There are minor differences in age class distribution anticipated between the alternatives. Age class changes in Alternative 1 are the result of the reforestation treatments proposed in this and future projects on NFS and other lands. Changes in Alternative 2 are a result of the treatments proposed in future projects on NFS and other lands. However, future projects would not harvest more than 6 percent of the CE analysis area in a 10-year period.

Table 8. Age Class Distribution for CE Analysis Area

Age Class	Present Condition (2008)	Alternative 1 (2028)	Alternative 2 (2028)
Openings	3%	3%	3%
0-10 years	3%	6%	6%
11-20 years	6%	4%	1%
21-50 years	5%	12%	12%
51-110 years	78%	35%	38%
111+ years	4%	40%	40%

In Alternative 1, early age class forest would increase from 9 to 10 percent within the CE analysis area. This compares with an estimated 10 to 12 percent ANF LRMP direction for MA 3 in the 0-20 year age class. The cumulative effects of Alternative 1, in combination with other actions, are predicted to increase the early-structural habitat towards the ANF LRMP direction for MA 3.0. In Alternative 2, early age class forest will decrease from 9 to 7 percent within the CE analysis area.

In both alternatives, late-structural forest will increase from 4 to 40 percent. This assumes that future final harvests all come from the 111+ age class in both alternatives within the CE analysis area by 2028. In the long term, areas managed for late-structural forest would continue to be influenced by the legacy of deer browsing impacts, introduced and native forest insects and natural disturbances over time. Mature (>50 years and < 110 years old) forest habitat would be 35 percent in Alternative 1 and 38 percent in Alternative 2. Regardless of the alternative, there is a similar distribution in age classes in the mature and late-structural forest.

Currently, there are approximately 95 existing private oil and gas wells within the CE analysis area. The Forest Service recently received a proposal for 30 new wells within the CE analysis area. It is foreseeable that additional OGM development would occur within the CE analysis area in the future. However; the rate of OGM development can change at any time and is based on economics, technology and supply and demand. Using the average future private OGM development projection (USDA-FS 2007b, pp. 2-60) of 512 wells per year (.001 wells/acre), it can be estimated that approximately 11 wells per year could be developed within the CE analysis area. This would result in approximately 219 new wells over the CE analysis time period. This level of OGM development would affect 2.6 percent of the CE analysis area and result in the creation of 285 acres of non-forested habitat. Although non-forest habitat is created, wells and lease roads are regarded as non-forest inclusions within forested stands for the early age class and late-structural forest for this analysis.

Cumulative Effects to Understory and Midstory Vegetation

The principle effects of past and proposed vegetative management activity are most easily seen in changes related to species diversity and structure. Diversity is defined as the distribution and abundance

of different plant and animal communities and species within an area. Structure is defined in terms of horizontal as well as vertical vegetative components, such as herbaceous, understory, midstory and overstory layers (vertical) as well as how these layers are distributed across the landscape (horizontal). The following summary of anticipated cumulative effects takes into account what has happened and what can reasonably be expected to take place in the CE analysis area.

Concerns with interfering forest understories and lack of diverse seedling regeneration exist throughout the project area. All of the regeneration prescriptions include the application of herbicide. The primary objective of its use is to create conditions favorable for seedling development and growth. This will increase seedlings height so final harvests can occur and stands will have successfully regenerated. Without the use of herbicides and other reforestation treatments, beech, birch, striped maple, grasses and ferns would continue to dominate the understory within the CE analysis area. These areas will likely be dominated by beech, striped maple and birch, with pockets of other tree species developing where they are protected from deer browsing. Current encroachment of fern, grass, striped maple and beech brush in the understory would inhibit growth of seedlings and continue to spread where canopy gaps occur. If deer densities return to a high level, there could be a decrease in plant species in the long term (> 50 years).

Thirteen (13) percent of the CE analysis area could have herbicides applied over the 30-year period under Alternative 1 and 9 percent under Alternative 2. Even-aged regeneration activities (under Alternative 1) would create early-structural habitat that would otherwise be lacking within the CE analysis area under Alternative 2. The herbicide application proposed in Alternative 1 would reduce the amount of fern, grass, striped maple and beech. After herbicide treatment, a fuller range of plant communities would be expected to occupy the understory (Horsley and others 1994). These would include tree species as well as shrubs, forbs and wildflowers that are presently absent, providing seed sources are nearby. Fencing could be constructed on 9 percent of the CE analysis area over the 30-year period under Alternative 1 and 6 percent under Alternative 2.

Future OGM activity could potentially increase the amount of fern, grass, striped maple and beech brush in the understory in the CE analysis area along new OGM access roads and around well sites . Similar cumulative effects in the CE area are expected as discussed in USDA- FS 2007b, pages 3-172 and 3-173.

7.2.2 Non-Native Invasive Plant Species

Surveys were conducted along road corridors and in proposed treatments areas for non-native invasive plant (NNIP) species within the project area (see data sheets, project file). NNIP species infestations within the proposed treatment area and along road corridors are present as small, scattered occurrences, because of the enclosed nature of most forest stands and road corridors in or near the project area. Most NNIP species of concern on the ANF are shade intolerant.

Management activities that cause ground disturbance and/or remove forest canopy have the potential to facilitate the introduction and spread of NNIP species on the ANF. It is important to recognize that the ability of NNIP species to be introduced and spread into an area depends on the level of disturbance, habitat disturbed, presence of a seed source and dispersal vectors, which varies by NNIP species (Parendes and Jones 2000).

Direct and Indirect Effects

Alternative 2 (No Action)

As no new federal activities are proposed under Alternative 2, there would be no direct effects related to NNIP species. However, the potential for infestation and spread of NNIS species plants by humans would remain, and roads would remain the primary pathway along which NNIP species are established and spread. Proposed NNIP species treatments would not occur and associated benefits would not be realized. The benefits of reforestation activities, which make conditions less conducive for the establishment and spread of shade intolerant NNIP species, would also not be realized.

Alternative 1 (Modified Proposed Action)

Under Alternative 1, 262 acres of shelterwood seed cut/removal, 58 acres of overstory removal, 24 acres of salvage thin, 39 acres of individual tree/group selection and 2.6 acres of stone pit expansion are proposed. Vegetation management activities create conditions conducive to the spread of NNIP species through ground disturbance and removal of forest canopy. These effects are expected to be short-term because within 5 years of ground disturbance the area would be re-vegetated, and within 10-15 years of timber harvest, the forest canopy would close or re-established no longer providing desirable growing conditions for shade intolerant NNIP species. Of the documented NNIP species within the project area, glossy buckthorn is the most shade tolerant species and can grow in shade and sun conditions while multiflora rose can tolerate partial shade conditions. Orange hawkweed and bull thistle prefer open areas.

Since NNIP species populations have been found within proposed treatment areas and along nearby roadways, it is possible that logging and other equipment could facilitate the spread of existing NNIP species by carrying seeds or reproductive fragments into non-infested areas. In order to reduce the potential of indirect introduction and spread, an equipment cleaning provision is included in timber sale and other contracts.

Pit expansion also creates conditions conducive to the spread of NNIP species by removing vegetation and topsoil to access rock material and is considered a long-term effect. After the rock material is removed, these areas would be seeded with desired vegetation that once established would help in reducing the establishment and spread of NNIP species. In order to reduce the potential of NNIP species being transported to and from pits, surveys for NNIP species will be conducted in areas proposed for pit expansion, and treatment for NNIP species would occur before pit material is excavated.

While these proposed management activities may create conditions conducive to the establishment and spread of NNIP species, direct and/or indirect effects are not anticipated to be significant under any alternative because:

- Based on the amount of proposed timber harvest (383 acres), the scattered location of the sites, and the time frame over which the activities would occur (several years), the proposed activities are not anticipated to produce significant effects to or from NNIP species.
- The long-term effects of habitat conversion from road construction and pit expansion on NNIP species are expected to increase in areas of disturbance conducive to the introduction and spread of NNIP species. Re-vegetation of these areas with desired species as well as treatment of NNIP species would lessen potential effects from NNIP species.
- Implementation of ANF LRMP standards and guidelines (USDA-FS 2007c, pp. 53-54) and standard operating procedures would minimize or reduce potential dispersal from existing NNIP species infestations. For example, construction, timber sale and other contracts, where appropriate, include equipment cleaning provisions.

Cumulative Effects

The NNIP species CE analysis area encompasses 10,935 acres with 9,914 acres of NFS land and 1,021 acres of private and state game lands. Stands or groupings of stands proposed for treatment are scattered across the Marienville Ranger District and CE analysis area boundaries were established around each stand or grouping (see attached maps). The time-frame for the NNIP species CE analysis is 20 years (2009 to 2028). Within 20 years, it is anticipated that proposed activities would be completed and forest canopy conditions would be closed. Cumulative effects related to NNIP species are evaluated by assessing the current condition, proposed and reasonably foreseeable future activities on NFS and other lands within the CE analysis area.

In order to understand the contribution of past actions to the cumulative effects of the proposed action and alternatives, this analysis relies on current environmental conditions as a proxy for the impacts of past

actions. This is because existing conditions reflect the aggregate impact of all prior human actions and natural events that have affected the environment and might contribute to cumulative effects. It is unclear as to how and when these NNIP species were introduced. It is recognized that species, such as multiflora rose and glossy buckthorn's major mode of long-distance dispersal are birds and they may have been introduced that way. However, multiflora rose was also historically planted for wildlife food and cover by various agencies throughout Pennsylvania and potentially within the CE analysis area. By looking at current conditions, we are sure to capture all the residual effects of past human actions and natural events, regardless of which particular action or event contributed those effects. For these reasons, the analysis of past actions in this section is based on current environmental conditions.

Based on the analysis presented under direct and indirect effects, activities most likely to result in cumulative effects from Forest Service management activities include vegetation management with short-term effects and road construction and OGM development with long-term effects. Activities on private and other lands that can facilitate NNIP species establishment and spread include short-term effects from timber harvest and long-term effects from agriculture, residential development (primarily recreational camps), road construction and OGM development.

Short-term effects - Vegetation Management

Cumulatively in 2028, the 0-20 age class resulting from final harvests on federal and private activities is estimated to be 1,310 acres (12 percent of the CE analysis area) under Alternative 1 and 1,048 acres (10 percent of the CE analysis area) under Alternative 2. The increase in 0-20 age class by 2028 is not anticipated to be significant based on the temporary nature of these openings and the amount and scattered nature of the vegetation management activities.

Long-term effects - Conversion of Forest to Non-Forest

The ANF LRMP FEIS (USDA- FS 2007a) discusses the effects of road construction on pages 3-292 to 3-293. Approximately 1.95 miles of previously approved Forest Service road construction may occur and create conditions conducive to the spread of NNIP species. This road construction would result in converting approximately 8 acres from forest to non-forest conditions. Roadways are the primary corridors for NNIP species spread, and haul roads have been shown to be the primary conduit for the dispersal of introduced species into the interior of managed stands in upper Michigan, this study is considered applicable to the ANF as well (Buckley and others 2003). Areas of disturbance along the road-bed would be seeded with desired vegetation, which would help in reducing the potential for NNIP species to become established and/or spread. NNIP species treatments may occur following ANF LRMP standards and guidelines.

It is estimated that 567 acres within the CE analysis area are considered non-forest habitat which includes openings, roads and railroad corridors, pipelines, utility corridors, oil and gas wells and other openings. Of this, approximately 103 acres exist as openings associated with OGM development. Proposed Forest Service management activities would result in approximately 8 acres, in Alternative 2, and 11 acres, in Alternative 1, of future non-forest habitat. Similarly, it is anticipated that there will be little change in future residential development within the CE analysis area. The largest amount of future non-forested habitat would be a result of anticipated oil and gas development with approximately 285 acres being developed within the next 20 years. Three percent of the CE analysis area is currently non-forest and by 2028 approximately 6 percent of the CE analysis area would be non-forest under both alternatives.

Based on the discussions presented under direct, indirect and cumulative effects and the implementation of ANF LRMP standards and guidelines, design features, and Pennsylvania BMPs, there are no significant effects anticipated under any alternative to NNIP species.

7.2.3 Wildlife

General effects to wildlife and their habitat are discussed in the ANF LRMP FEIS (USDA-FS 2007a, pp. 3-179 to 3-295). Site-specific effects to wildlife and their habitat are discussed in detail in the wildlife

report, biological assessment (BA) and biological evaluation (BE) for this project (see project file). The effects analysis presented in these documents evaluates effects of proposed action on Management Indicator Species (MIS), threatened, endangered and sensitive species, and other species with viability concerns. Collectively, these documents assess the effects to wildlife and their habitat that would be expected to occur under each of the alternatives analyzed.

Wildlife management in MAs 1.0 and 3.0 emphasizes early structural species, including deer in all forest types and squirrel in oak types. Specialized habitats and inclusions within these management areas receive treatments to specifically benefit game species, non-game species and species with viability concerns. ANF LRMP standards and guidelines would protect spring seeps and other water areas critical to wintering wildlife. In MA 3.0, wildlife habitat management would emphasize a variety of timber age classes. Management will recognize deer and turkey wintering areas to provide a sustained supply of winter thermal cover and food. ANF LRMP standards and guidelines would provide for the retention of dead and down logs to maintain habitat for indigenous species.

The project emphasizes the need to provide for a diversity of wildlife habitats in MA 1.0, improve the spatial arrangement of age classes in MA 3.0 and provide for forested canopy and late-structural habitat in MA 2.2. Restoring and establishing a diverse tree seedling component, other than coppice beech, birch and striped maple, would help to sustain forest structure and forest continuity. The project would retain a variety of coarse woody material so that several stages of decaying logs would be retained for a long period of time. In combination, the retention of coarse woody material and the re-establishment of desirable forested conditions with tree seedlings would provide suitable habitat for indigenous species with viability concerns.

Wildlife travel patterns and corridors will remain near riparian areas and areas possessing forest cover conditions for many species in the project area. Some species will use and adapt to non-forest areas created by OGM activities.

Design features for Alternative 1 include:

- In all MA 2.2 timber harvest units, $\frac{1}{4}$ acre within each 5 acres of harvest should be set aside as reserve areas. Layout of these *areas should include areas containing ample amounts of large-diameter coarse woody debris* (representative of the stand) preferably near wet depressions, vernal pools, rock outcrops, snags, den trees, conifers and /or desirable shrubs that are a minor component of the stand (USDA-FS 2007c, pp. 80, 112).
- In addition to the retaining slash (small-diameter coarse woody debris) and reserving at least one 12 inch diameter log per acre in all harvest units, *retain additional trees based on site availability* as large-diameter coarse woody debris throughout the stands *within MA 2.2*. Retain a variety of down trees since each tree species decays at a different rate and may provide a diversity of micro-environments (USDA-FS 2007c, pp. 80, 112).
- In all MA 2.2 harvest units, retain at least *15 snags per acre* greater than 10 inches DBH. These snags should have some bark remaining and should not pose a safety hazard to sawyers or the public (USDA-FS 2007c, pp. 80, 112).
- In MA 2.2, area fencing and herbicide application will be accomplished within specified treatment areas that allow for wildlife habitat connectivity across the landscape. These activities will be designed and completed to allow for untreated and unrestricted wildlife travel lanes, such as riparian corridors and other corridors of mature forest habitat between stands being regenerated (USDA-FS 2007c, pp. 111-112).
- In **Stands 705026, 705029, 706041 and 706042**, herbicide will be applied using backpack sprayers only (USDA-FS 2007c, p. 87).

Cumulative Effects

The cumulative effects (CE) on threatened and endangered species and Regional Forester sensitive species (RFSS) are described in the BA and BE respectively. The time period for the CE analyses will be 10 years prior to the project (1999 to 2008) and 20 years into the future (2009 to 2028). This time period provides an overall view of the incremental impacts to each resource that is affected by the action and is germane to the decision. The effects of ground disturbing activities generally recover within 5 years. A timeframe of 10 years into the past was used as it would incorporate completed and ongoing activities from past projects. A timeframe of 20 years into the future was used to allow for all proposed and reasonably foreseeable related future activities to be completed and resulting vegetation changes to occur.

Because the proposed treatment areas are scattered across eight separate 7.5 minute topographic quadrangles, spanning 25.8 (linear) miles and located in 13 different watersheds, the cumulative effects (CE) analysis area for most resources includes entire stands and private land with a ½ mile radius from the center of each proposed treatment area. Stands included in the CE analysis areas were selected strictly by whether the majority of their (physical) area fell within the ½ mile radius. As a result, actual CE areas surrounding each treatment area vary in size, shape and area. The CE analysis area for most resources includes 10,935 acres, including 1,021 acres of private land (9 percent) and 9,914 acres of NFS land (91 percent). These CE analysis areas are shown on Alternative 1, Maps 1 through 15. These CE analysis areas were chosen because the land within their boundaries shares vegetation types, wildlife habitats, drainage patterns, climate, geology, disturbance regimes, access and past historic uses as well as future impacts. Sub-surface OGM rights are privately owned. Regardless of the MA, the diversity and quality of wildlife habitats do not substantially change across the CE analysis areas.

For threatened and endangered species and for all but one RFSS (timber rattlesnake), based on habitat availability in the project, species requirements and documentation records, the CE analysis areas presently have no occupied habitat. Because these species are absent, individuals will not be directly impacted by the proposed activities. The CE analysis area is considered occupied habitat for one RFSS, the timber rattlesnake.

The mature deciduous and mixed deciduous/conifer forest habitat or opening habitat found in the project area provides suitable habitat for two threatened and endangered species (Indiana bat and small whorled pogonia) and seven RFSS (northern goshawk, timber rattlesnake, Hooker's orchid, mountain wood fern, American ginseng, checkered rattlesnake plantain and white trout-lily). Although suitable habitat would be altered by timber harvests and reforestation activities, only 3 acres forested habitat would be converted to non-forest habitat due to stone pit expansion and an additional 285 acres is expected to be impacted by future OGM development. Even with this conversion of habitat and the effects of the proposed activities, an estimated 62 percent of the CE analysis area would maintain mature upland forest conditions. ANF LRMP standards and guidelines and project design features would help protect important habitat features within these upland environments.

ANF LRMP standards and guidelines apply to those species that are associated with more hydric conditions. Preferential treatment is given to riparian corridors and wetlands wherever they occur. There are 24 RFSS and one endangered species (northeastern bulrush) that have suitable but unoccupied habitat in the streams, wetlands and along the riparian corridors within the CE analysis area. These species are strongly linked to environments associated with small-size streams or tied to hydric conditions whether forested or non-forested habitat. With the implementation of ANF LRMP standards and guidelines protecting the habitat of these species, no adverse cumulative impacts are anticipated.

Another two endangered species (clubshell mussel and northern riffleshell mussel) and 28 RFSS, associated with medium to large-size stream, river and reservoir ecosystems, are not documented in the project area and have no suitable habitat in the project or CE analysis area. No cumulative effects on these species are anticipated.

Game Species

Substantial monitoring efforts regarding harvest trends, health and condition of harvested animals, hunter distribution and pressure, local population estimates and habitat conditions have been made on a consistent basis over the last two decades across the ANF. Investments have been made in wildlife habitat enhancements, such as the regeneration of decadent aspen stands, maintenance of fruit trees, planting of mast-producing trees, shrubs and evergreen cover, construction and maintenance of herbaceous openings and placement of structures (habitat components) that directly benefit game species.

The mature deciduous hardwoods and seedling and sapling forest conditions in the project area provide suitable habitat for the black bear, white-tailed deer, wild turkey, ruffed grouse and woodcock. Except for the woodcock, each of these species has been documented in the project area. Sections of streams capable of supporting brook trout are not found specifically in the project, but springs and seeps originating in several stands eventually feed waterways that provide suitable habitat.

Eighty-five (85) percent of the project area is mature hardwood forest providing a variety of hard-mast for these species as well as nesting, roosting and foraging habitat. The proposed regeneration of mature stands would benefit these species by providing escape and winter cover for the black bear, a substantial amount of desirable browse for deer, nesting and brood-rearing conditions for wild turkey and breeding and foraging habitat for ruffed grouse and woodcock. Although final harvests would produce a noticeable shift from mature mast-producing forest to early-structural habitat on a project-scale, this change is not considered significant as an estimated 62 percent of the CE analysis area would continue to support mid- to late-structural habitat throughout the 20 year analysis period. Proposed reforestation activities are expected to establish stands with a more diverse and desirable mix of trees and shrubs, which over the long-term, would support a diverse assemblage of game and non-game species. Regarding brook trout, no adverse indirect effects of the project are anticipated. All water sources in the project and the aquatic life they support are maintained and protected from adverse effects of management activities by the implementation of ANF LRMP standards and guidelines (USDA-FS 2007a, pp. 74-79).

The effects of the proposed actions favor wildlife that spends part or all of its life cycle in early structural habitat. Proposed actions and future final harvests have the greatest potential to affect mature forest habitat. At present, an imbalance in size and age classes in forest conditions exist in MAs 1.0 and 3.0 within the project and CE analysis area. Considering the desired future condition of these management areas, efforts that strive to achieve a better balance of forest conditions are likely to improve forest health and resilience as well as enhance habitat for a variety of game species.

7.3 Social Environment

7.3.1 Heritage

Heritage resources within the project area include prehistoric sites and historic sites related to logging, oil and gas development and homesteads. Section 106 of the National Historic Preservation Act (NHPA), as amended, requires state and federal agencies to avoid degradation or destruction of sites eligible for the National Register. Eligibility has not been determined for any of the sites within the project area. Until evaluated, recorded sites must be managed as though they have been determined eligible. At this time, heritage resources identified in the project area will be avoided.

Design features for Alternative 1 include:

- Site-specific heritage site design features are not listed due to the confidential nature of the information. Standards and guidelines for heritage resources are listed on page 62 of the ANF LRMP. Appropriate heritage resources personnel will be contacted prior to formalizing any sale or implementation contract involving ground disturbing activities so any design features in contracts or agreements protect heritage sites.

- In any contract or agreement, the following statement will be included, as appropriate: If any previously unknown or unrecorded sites are found during project implementation, any ground disturbing activity will cease and the appropriate heritage resource personnel notified. A heritage resource specialist will evaluate the situation and determine the proper course of action.

Direct and Indirect Effects

Alternative 2 (No Action)

No proposed activities would occur; therefore, there would be no effects to heritage resources since there would be no change to these resources from proposed activities.

Alternative 1 (Modified Proposed Action)

Alternative 1 would not affect heritage resources since heritage resources would be avoided through project design and the use of no treatment buffers (avoidance). ANF LRMP standards and guidelines, resource protection measures and design features have been successfully applied on the ANF for many years to protect heritage resources. Upon completion of timber harvests, skid trails are routinely blocked with slash or otherwise made impassible to vehicular traffic, effectively reducing potential access to heritage sites.

Cumulative Effects

Heritage resources and sites within the CE analysis area would be avoided under all alternatives. Future projects as well as oil and gas developments would be reviewed for heritage resources to ensure that heritage resource sites are protected. Future activities would be designed to avoid or mitigate effects to heritage resources. Therefore, there are no anticipated cumulative effects to heritage resources from the proposed or foreseeable future activities in any alternative.

7.3.2 Scenery

The scenery analysis is based upon the Scenery Management System (SMS), as described in USDA-FS Agriculture Handbook 701, Landscape Aesthetics: A Handbook for Scenery Management (USDA-FS 1995). SMS is a tool to manage viewsheds developed to maintain diversity and prevent unacceptable alteration to scenic resources. Two primary indicators are used to measure impacts to scenic resources:

1. The existing landscape character type (forest canopy, if any, and understory vegetation) of the project area will remain intact, and
2. Treatments in the project area and alternatives meet the ANF LRMP Scenic Integrity Levels (SILs), (USDA-FS, 2007c, pp. 62-64).

The landscape character in the CE analysis area can be described as a dense forest of hardwood species (black cherry, red maple, sugar maple, beech, yellow birch, white ash and yellow poplar) with pockets of conifers (hemlock, white spruce, white pine and red pine). This vegetation is found on a forested plateau bisected by small streams that flow into larger rivers. OGM wells and utility right-of-ways are found in the area.

The desired condition for scenery is represented by three SILs found within the project and CE analysis areas. These include high, moderate and low SILs. Table 9 describes SILs within the project and CE analysis areas required to meet or exceed scenery standards on the ANF. SILs were developed from scenic inventory data and include Concern Levels (CL), Scenic Attractiveness, Scenic Classes and Management Areas. For example, CL 1 represents locations where forest visitors have a high interest in scenery, such as along high traffic travel routes (roads and trails), concentrated use areas (campgrounds, visitor centers, and vistas) or water bodies (lakes, rivers, and streams). Concern levels are used in determining the appropriate design features or mitigation measures needed to meet SILs for the proposed activities.

Table 9. Scenic Integrity Levels in and near the Project Area

Scenic Integrity Level	Description/Desired Condition	Concern Level Corridors ¹
High Scenic Integrity (H)	Appears Unaltered – The valued landscape character appears intact. Deviations may be present, but are not evident because they repeat the form, line, color, texture, and pattern common to the landscape character so completely and at the appropriate scale (USDA-FS, 2006cm, p. III-11).	CL1 – SR66, SR948, MRN ATV/Bike Trail, Allegheny Snowmobile Loop North Country National Scenic Trail, Fourmile Run, CNST, SR 666, Tionesta Creek
Moderate Scenic Integrity (M)	Appears Slightly Altered – The valued landscape character appears slightly altered. Noticeable deviations must remain visually subordinate to the landscape being viewed (USDA-FS, 2006cm, p. III-11).	CL2 – SR3004, FR143, FR185, FR223, ASL, ASL Connectors #9, and #11, Twin Lakes Trail, Big Mill Creek
Low Scenic Integrity (L)	Appears Altered – Deviations from the valued landscape character may begin to dominate the landscape being viewed, but they should borrow valued attributes such as size, shape, edge effect, and pattern of natural openings, vegetative type changes, or architectural styles that may occur elsewhere (USDA-FS, 2006cm, p. III-12).	CL3 – all system and non-system roads and streams not specified as CL1 and CL2
¹ Concern Levels (CL) or levels of interest in scenery: CL1 = High; CL2 = Average or Moderate; CL3 = Low		

Design features for Alternative 1 include:

- Along the Twin Lakes Hiking Trail and FR 223, leave areas of ¼ acre in size shall be designated by the forest landscape architect (USDA-FS 2007f, pp. 9 and 10) (Stands 688012 and 716022).
- **Stand 716022** will be harvested during the dormant (leaf-off) season (USDA-FS 2007f, p. 10).
- Along SR 948, FR223, Allegheny Snowmobile Loop, ASL Connector #11 and Twin Lakes Hiking Trail, slash shall be pulled back 50 feet from the edge of the road or trail, and for an additional 50 feet, slash shall be lopped and scattered to a depth of 3 feet (USDA-FS 2007f, pp. 9 and 10) (Stands 650103, 688012, 716022, 846071, 846095 and 866031).
- Along SR66, SR948, Allegheny Snowmobile Loop and Twin Lakes Hiking Trail, new log landings should be located a minimum of 300 feet from the road or trail. After project completion, landings should be rehabilitated to mimic natural openings (USDA-FS 2007f, p. 11) (Stands 688012, 716022, 846071, 846095 and 866031).

Direct and Indirect Effects

Alternative 2 (No Action)

If Alternative 2 were implemented, none of the proposed treatments would take place and there would be no change in the current scenery condition. The existing landscape character would remain intact since any changes in vegetation would be the result of the natural development or disturbance process. These

natural processes may be seen as pockets of dead and dying trees, large openings in the canopy, and some stands with high densities that may lack age class diversity.

Implementing Alternative 2 would have no effect in the project area's capacity to meet or exceed the mapped SILs. The existing condition would remain, and the visual quality of the landscape would not change.

Alternative 1 (Modified Proposed Action)

The most obvious changes to the landscape are from harvesting activities that remove large numbers of trees and/or understory vegetation (change in landscape character type) and add woody debris (slash) to the forest floor. The dead or dying brown leaves of slash often contrast with surrounding green vegetation and create a highly visible impact. The visual effect is short term, since vegetation growth rapidly returns (within 1-5 years) with the same or like vegetation, although younger, that was growing prior to harvest treatment. Reforestation treatments (herbicide application, site preparation, fencing, prescribed burning, release, planting and fertilizing) improve the ability of a stand to reach maturity and have a positive long-term effect (5+ years) on visual quality.

The effects from proposed timber harvests would meet or exceed the SILs as stated in the ANF LRMP standards and guidelines (USDA-FS 2007c, pp. 62-64). When needed, the Scenery Management Implementation Guide (USDA-FS 2007f, pp. 7-11) and project design features would be used to meet or exceed SILs as seen from CL1 and CL2 travelways.

Cumulative Effects

The scenery CE analysis area encompasses 10,935 acres with 9,914 acres of NFS land and 1,021 acres of private and state game lands. Stands or groupings of stands proposed for treatment are scattered across the Marienville Ranger District and CE analysis area boundaries were established around each stand or grouping (see attached maps).

The time period considered for the CE analysis starts 10 years prior to the project proposal and extends 20 years into the future. It covers the effects of past activities and the effects of the approved projects yet to be completed as well as proposed activities and those in the reasonably foreseeable future. It provides for overall view of the incremental impact of vegetation management and OGM development activities in combination with past, current and future project proposals. It is difficult to predict exactly where or what activities would occur in the future, but it is important to remember that future federal activities would be subject to the NEPA process to ensure that scenic quality is protected. The desired condition outlined in the ANF LRMP would guide choices and protect the land from cumulative effects as projects are proposed in the future. The standard practice on the ANF is to meet or exceed SILs by design, modification and design features. Monitoring of the scenic resource is conducted every 5 years to ensure practices meet ANF LRMP standards and guidelines. Past monitoring has demonstrated a 99 percent success rate in meeting or exceeding scenery standards (USDA-FS 1998, p.60). This is expected to continue into the future.

The number of new OGM wells and accompanying roads would probably continue to increase in the cumulative effects analysis area. The rate of OGM development can vary based on economics, technology and supply and demand. The effects of expanding OGM development on scenery would be most evident along CL1 and CL2 travelways. Areas with the greatest impacts may require rehabilitation, if OGM activities fail to meet the specified SILs.

In summary, the cumulative effects resulting from past, proposed and reasonably foreseeable future management activities would maintain the existing landscape character type and would meet or exceed the established SILs of the CE analysis area. No detrimental effects to scenery resources are anticipated under either alternative.

7.3.3 Recreation

The recreation analysis is based upon the Recreation Opportunity Spectrum (ROS) and utilizes two primary indicators for measuring impacts: (1) whether the alternatives are consistent with ROS settings and (2) changes to recreation activities and use patterns in the project area. Since the project area includes widely scattered units across the Marienville District, the project area refers to the identified units and their immediate environment which may reasonably be expected to be affected by the proposed action.

Design features for Alternative 1 include:

- In all timber sale units, block main skid trails with slash following timber harvest to protect natural resources from illegal ATV activity.
- Along the Twin Lakes Hiking Trail and FR 223, reserve areas of ¼ acre in size shall be designated by the forest landscape architect (**USDA-FS 2007f, pp. 9 and 10**) (**Stands 688012 and 716022**).
- **Stand 716022** will be harvested during the dormant (leaf-off) season (**USDA-FS 2007f, p. 10**).
- Along SR 948, FR223, Allegheny Snowmobile Loop, ASL Connector #11 and Twin Lakes Hiking Trail, slash shall be pulled back 50 feet from the edge of the road or trail, and for an additional 50 feet, slash shall be lopped and scattered to a depth of 3 feet (**USDA-FS 2007f, pp. 9 and 10**) (**Stands 650103, 688012, 716022, 846071, 846095 and 866031**).
- Along SR66, SR948, Allegheny Snowmobile Loop, and Twin Lakes Hiking Trail, new log landings should be located a minimum of 300 feet from the road or trail. After project completion, landings should be rehabilitated to mimic natural openings (**USDA-FS 2007f, p. 11**) (**Stands 688012, 716022, 846071, 846095 and 866031**).
- Snowmobile Hauling Restriction – No hauling during the established snowmobile season on the ANF, noon Saturday through 5 a.m. Monday and legal holidays (**USDA-FS 2007c, p. 60**) (**FR221 and FR327.2**).
- Snowplowing of designated snowmobile routes will be done as to leave an adequate snow mat (4 inches) for grooming, snowmobile operation, and road surface protection (CT 5.33# Snow Plowing). Commercial and administrative vehicle traffic will run with their headlights on during the established snowmobile season (**USDA-FS 2007c, p. 61**) (**FR221 and FR327.2**).

Direct and Indirect Effects

Alternative 2 (No Action)

If Alternative 2 were implemented, there would be no change from the current condition of the recreation resources since proposed activities would not take place. Under Alternative 2 (No Action), all ROS indicator settings would remain the same as the existing condition. Therefore, ROS objectives would be met in MA 1.0, 2.2 and 3.0. Wildlife habitat would remain the same and would not be improved for the benefit of game species and hunters. If this alternative were implemented, maintenance would continue on major roads and trails dependent on funding.

Implementing Alternative 2 would result in no effect on recreation activities and use patterns within the project area with the exception of hunting. Allowing the existing condition to remain, as proposed under this alternative, would leave many of the stands with dense interfering understory vegetation and in less than ideal conditions for hunting. Those areas with damaged trees, debris or downed trees may hinder hunting activities. A change in recreation activities would not be anticipated under this alternative.

Alternative 1 (Modified Proposed Action)

Under Alternative 1, proposed activities would be implemented and their recreation effects are described in this section. Harvest activities are expected to occur over a 3 to 5 year period. For comparative

purposes, implementing either of the two alternatives will meet the current ROS classification of Roaded Natural for the project area. Existing and proposed conditions are categorized as to how they contribute to the ROS classification of Roaded Natural. The ROS indicators are access, remoteness, site management, visitor management, social encounters and visitor impacts. These indicators exceed (conditions exceeding the norm), meet (normal conditions expected to be found in the setting), inconsistent (conditions incompatible with the standard, but which may be necessary to meet other management objectives), or are unacceptable (conditions not acceptable under any circumstances) with the ROS Roaded Natural classification.

- **Access:** The proposed road activities in Alternative 1 would have little direct effect on access. It is possible that some roads would have limited access or temporary closures during harvest, herbicide or prescribed burning activities in order to protect public safety, but these are expected to be of short duration and little direct effect. Block main skid trails with slash following timber harvest to protect natural resources from illegal ATV activity.
- **Remoteness:** Under Alternative 1, the indicator of remoteness may temporarily shift to inconsistent in the Roaded Natural setting as a result of the noise from harvest activities, especially near the Twin Lakes Trail (Stand 716022). The increased noise and traffic from harvest activities throughout the entire project area would not be out of the norm for Roaded Natural areas, as frequent “sights and sounds of man” are the norm. Restrict logging activities to the dormant season (leaf-off) to avoid noise effects to the public during traditional high-use periods (see project design features recreation).
- **Site Management:** Development level would not change because the timber harvests and other activities proposed in this alternative would have no effects to existing developed recreation facilities on the ANF since there are none in or near the project area.
- **Visitor Management:** There are no changes to visitor management techniques proposed in Alternative 1. The effects of the actions in Alternative 1 would therefore have no effect on the ROS class of Roaded Natural since the standard for a Roaded Natural setting is noticeable regrowth and controls that harmonize with the natural environment.
- **Social Encounters:** Social encounters may temporarily increase or decrease due to harvest and reforestation treatments, because some public displacement would occur. The effect of harvest and reforestation activities might send some forest users into other areas of the forest and/or project area. However, the number of displaced recreationists would be limited as most areas in the project area receive low to moderate use. Thus, no change to the values of the ROS setting indicators is expected for the Roaded Natural ROS class within the project area.
- **Visitor Impacts:** The value would not change as evidence of other users in the project area as a result of proposed activities is not likely to increase or decrease.

In general, the harvest and reforestation activities proposed in Alternative 1 would have a limited effect on recreation activities and use patterns in the project area. Direct effects to forest visitors in areas of concentrated use from timber harvest or reforestation activities may include a temporary interruption of the recreation experience (camping, hiking, driving for pleasure, hunting, fishing and snowmobiling). Some recreation activities may see a temporary decrease in use as a result of proposed activities, but others may actually have an increase (i.e. bird watching or hunting for species that are dependent on early successional habitat). Field observation shows that recreationists who are affected by vegetation harvesting activities will simply move to another location and resume their recreation experience, often within a few miles. Reforestation activities, such as herbicide application and/or prescribed burning, may displace forest visitors to adjacent areas of the forest for their recreation activity until green leafy vegetation returns (1 to 6 months after treatment) depending on a person’s personal preference.

- **Developed Recreation:** No developed recreation sites would be affected by activities proposed in the action alternative.
- **Hiking Trails:** Stand 716022 is located on both sides of a portion of the Twin Lakes Trail. ANF LRMP standards and guidelines (USDA-FS 2007a, pp. 60-64) specify that log skidding and road construction shall not cross trail corridors except at designated crossing sites or unless the trail is already located on the road. The portion of the Twin Lakes Trail that exists in stand 716022 is located on FR 443A. This unit is proposed to receive a shelterwood seed cut, which will open up the stand to allow advanced regeneration to grow while the remaining overstory provides some shade to retain adequate light and moisture conditions for new seedlings. Once the new stand is established, a removal cut would be scheduled so the shade from the overstory does not begin to interfere with the growth of the young stand. Herbicide, site preparation, and/or release may also be necessary to assist the young stand in establishment and growth. If a new stand does not re-establish in the appropriate time frame, planting may occur with tree shelters installed to protect the young trees from browsing by wildlife and to provide a favorable microclimate. Design features for these activities would include harvesting in seasons of low trail use; blocking of skid trails and re-signing of the trail so that hikers remain on the trail; planning the retention of wildlife den trees to provide points of visual interest; lopping and scattering slash within 200 feet of the trail to provide a visual transition zone into the stand, girdling or stump application of herbicide to remove inhibiting vegetation instead of broadcast spraying; and using tree shelters made of colors that blend more naturally with the local environment (see project design features recreation). With the specified design features, the implementation of Alternative 1 proposed activities could have positive effects to hikers using the Twin Lakes trail by providing changing scenes for visual interest and the opportunity to view wildlife and songbird species that prefer early structural habitat.
- **Motorized Trails:** FR327-1 is part of the ASL and FR221 serves as ASL Connector #11. Treatment units 846071 and 846095 are located along the Allegheny Snowmobile Loop (ASL) and unit 650103 is located on Connector #11. A direct effect to the users of the ASL and Connector #11 would be the potential safety hazard of meeting large vehicles and equipment on the driving surfaces of project area roads (also designated snowmobile trail). The ANF LRMP (USDA-FS 2007c, pp. 60-64) specifies standards and guidelines for the implementation of harvest and reforestation treatments near motorized CL2 trails. Design features would be the same as those proposed in the scenery section. Harvest and hauling activities would be done outside of weekend and holiday time periods when the trails receive the most use. With the problem of illegal ATV activity, skid trails would need to be blocked after finishing the project to protect physical and biological resources. With the specified design features, the implementation of Alternative 1 proposed activities would have no direct or indirect effects to snowmobile riders using the ASL and ASL connectors.
- **Dispersed Camping:** Dispersed camping occurs primarily along forest roads within or near the project area. Direct effects would include the temporary interruption of the camping experience by loggers using dispersed parking and camping spaces as log landings or by campers seeing and hearing large trucks hauling timber near their campsites. A positive direct effect would be the availability of more campsites for dispersed camping use once vegetation harvest and hauling activities are completed and new log landings become available.
- **Hunting and Fishing:** Hunters would be impacted by both harvest and reforestation activities proposed in this alternative. Hunters would be displaced in the short-term by timber harvest activities, but in the long term, treatments would add some variety to habitats found along the roads, attracting more species. In treatment areas where a final harvest is proposed, hunting would improve for species dependent upon early successional habitat. However, the resulting

slash may make it more difficult for persons with limited mobility to move through these stands and to hunt or retrieve their game. Road access and those roads open for the fall hunting season, such as FR 219, would be improved through planned maintenance in the project area. Once the activities were completed, fencing would also have an impact on hunters, as it would impede mobility through the forest. As a result, some hunters would be displaced to adjacent areas until the fences were taken down (approximately 10 years). However, there are a small number of hunters who like to hunt within fences and may enjoy the new hunting opportunities within the additional fenced areas.

Fishing opportunities would not be impacted by activities proposed in Alternative 1. The proposed treatment areas are not close enough to any streams to change water quality or aquatic habitat.

- **High Recreation Use Corridors:** There are no high recreation use corridors (CL1) in the project area. Effects to the Twin Lakes Trail, ASL and ASL Connector #11 are discussed above.
- **Special Events or Unique Features:** There are no unique features or special events that have been identified in this project area.

Cumulative Effects

The CE analysis area for recreation resources is the same as the CE analysis area for scenery and other resources for the same reasons and the same time period. Resource management has occurred throughout the CE analysis area that should be considered cumulatively when assessing changes in recreation management. The time period considered for the CE boundary is 10 years prior to this project and 20 years into the future to consider effects from past activities, proposed activities, and reasonable foreseeable future activities including already approved projects that have not been completed yet.

Within the past 10 years, the only recreation projects undertaken within the CE analysis area include maintenance (brushing and mowing) of the ASL and ASL Connector #11, tread work and trail maintenance on Twin Lakes Trail and the start of a dispersed campsite inventory for the Marienville Ranger District. Within the next 5 years, Recreation Facilities Analysis (RFA) (USDA-FS 2008d) identified portions of Beaver Meadows and Twin Lakes Recreation Areas for closure or decommissioning due to aging infrastructure (water and sewage systems, roads and restroom buildings) unless partners are found to help replace or rehabilitate the infrastructure and help operate and maintain the facilities.

The demand and interest in recreation activities on NFS land changes over a period of time and space. It is important to consider how recreation may or may not change within the CE analysis boundary and within the aforementioned time frame. The following projections are made concerning recreation activities in the northern assessment regions of the U.S. from 1995 to 2050 based upon the primary recreation activities taking place: hiking will increase 31 percent, snowmobiling will increase 22 percent, off-road driving will increase nine percent, dispersed camping will decrease 16 percent, hunting will decrease 1 percent, fishing will increase 27 percent, and sight-seeing will increase 50 percent (Bowker, Cordell, and English 1999). As these projections show, the demand for most primary recreation activities would increase in the near future as would the U.S. population. However, the amount of public land available for recreation is not projected to increase proportionally. In fact, because of budget constraints, some areas of public land are actually being closed to public use. The result is that more and more users are concentrated onto fewer and fewer acres of public land. People desiring developed facilities of the ANF may find the remaining areas more and more crowded in the future. However, some of those visitors may decide that dispersed camping along roadsides and gravel pits satisfy their needs. Since these areas are already hardened, the possible increased use is not expected to result in detrimental environmental effects. Still others may opt to go elsewhere to a facility that provides the experience they desire and not return to the ANF. Therefore, cumulative effects to recreational activities and/or use patterns are not expected to increase for Alternative 1.

Vegetation Management Activities

The age of stands within the CE analysis area was compiled to illustrate how well forest visitors would be able to use the area should either alternative be implemented. Claims are often made that timber harvest has reduced recreation opportunities on the ANF. However, the effects of timber management on recreation do not accumulate over time. Even though new harvest treatment areas (<20 years of age) are more difficult for forest visitors to use because fencing impedes access, slash is abundant and sapling or briar growth is very thick, forest visitors are able to utilize most stands in young forest (21 to 50 years of age) or mature forest (51+ years of age).

Table 8 shows the age classes of timber for each alternative within the cumulative effects boundary. The existing condition in 2008 is compared with the likely future condition of each Alternative in 2028. This comparison illustrates how much timber management is apparent to forest visitors, as well as their ability to use that area.

Table 8 shows that approximately 3 percent of the CE analysis area has received a final harvest in the past 10 years and may be difficult for forest visitors to use. Seventy-eight (78) percent of the CE analysis area appears to be mature forest and is accessible by forest visitors. Under Alternative 2, the existing condition would remain and the recently harvested stands would grow into the young forest stage while the majority of the CE analysis area would remain in the mature forest stage. Under Alternative 1, approximately 40 percent of the CE analysis area would grow into the ANF LRMP identified late-structural forest. Under Alternative 1, approximately 10 percent of the CE analysis area would be in the regeneration stage over the next two decades and approximately 75 percent would remain in the mature forest stage with 40 percent being late-structural forest. Both alternatives would retain the majority of the CE analysis area in a condition easy for recreationists to use while Alternative 1 would provide slightly more early structural habitat and increased hunting opportunities. The final harvests proposed under Alternative 1 would affect the appearance of these stands and could affect the amount of non-hunting recreational use these areas receive. However, as mentioned in the recreation areas and use patterns section, many of these stands are not heavily used for recreation outside of hunting season. In the CE analysis area, forest visitors may be displaced from these areas for 10 to 50 years depending on personal preference. The activities in the action alternative are consistent with past management and compatible with the current recreation use in the area.

Oil and Gas Management Activities

An additional cumulative effect to recreation is OGM development. The development of OGM can change at any time and is based on economics, technology and supply and demand. The effects of expanding OGM development on recreation would include a loss of solitude (due to machinery noise and vehicle traffic), easier access (due to additional road miles), a more modified environment (due to additional roads and wells) and a reduction in visual quality. These effects do accumulate over time and may result in concentrating recreation use on areas of public land that have not been developed for oil and gas extraction. Field observations show that areas of intensive OGM development do not receive the same amount of recreational use as do undeveloped areas in the same management area. Under either alternative, OGM development, if it occurs, would have an effect on recreation in the CE analysis area because OGM development changes the character and the use patterns in the area where development occurs. Because it allows more access into the area, visitors with a high tolerance for the modification of the area may find using the area easier, while visitors, who desire a more natural condition or remote experience, may move elsewhere to recreate. The amount of use may or may not change, but the nature of the use would change depending on the user's individual preference.

7.3.4 Economics

Direct and Indirect Effects

Alternative 2 (No Action)

With the implementation of Alternative 2, none of the proposed activities would be carried out. Therefore, there would be no monetary implementation costs other than the normal custodial and stewardship costs associated with managing a national forest. There also would be no monetary return to the federal treasury. The costs in Table 10 relate to inventory and planning costs for this project.

Alternative 1 (Modified Proposed Action)

Under Alternative 1, proposed timber harvests would provide an economic benefit. In the short-term, income and jobs would be produced through harvest and subsequent reforestation projects. Timber management activities would improve the diversity of tree species, foster the establishment of species that are shade intolerant to moderately shade intolerant, ensure a continuing supply of mast producing species and provide for a sustained yield of high-quality hardwoods. While there would be costs to the government associated with the implementation of these alternatives, the costs would be offset by the returns to the national treasury (timber returns and increased tax base from new jobs) and to the local economy (new jobs and associated spending). Table 10 shows a general summary of the net cash flow comparison of priced activities proposed in each alternative for relative comparison. It should not be considered actual yields or losses, nor does it attempt to analyze all resource values. We recognize that many of the values generated by the various alternatives (both positive and negative) involve goods and services that are not priced in the marketplace and are thus not represented in this comparison. These goods and services involve such things as habitat for native species, birding, fishing, hunting, hiking, snowmobiling, scenic beauty and high quality water. The effects each alternative has on these types of non-priced goods and services are found elsewhere within this chapter under other resource headings.

In considering the effects on recreation activities in the project area, it is recognized that the proposed management activities could negatively affect some forest users in their use of the land proposed for treatment. Based on the short-term impacts to recreational resources and the potentially beneficial impacts that would result from the proposed activities (enhanced wildlife habitat supporting hunting, viewing wildlife species, berry picking, etc.), the balance of these effects would indicate no significant effect on recreation income or related jobs.

As shown in Table 10, a direct effect of Alternative 1 would be the varying amounts of total costs, which indicate the level of jobs related to the layout, marking, administration and reforestation treatments prescribed in the alternative.

Table 10. Economic Analysis of Costs/Returns to U.S. Government

	Alternative 1	Alternative 2
Total Costs¹	\$2,200,940	\$220,000
Total Returns²	\$2,943,600	\$0
Net Cash Flow³	\$742,660	(-) \$220,000

¹ Total costs represent the costs to the US Government from implementing activities such as road maintenance, herbicide application, fence installation, site preparation, wildlife habitat improvements and timber sale planning and administration.

² Total returns represent the revenues generated from the harvest of timber on NFS land.

³ Net cash flow is calculated by: (Total Return – Total Cost)

Cumulative Effects

The spatial cumulative effects boundary for the economic resource is the four-county area (Warren, Forest, Elk, and McKean). This boundary is used because the project occurs in two of these counties and it is likely that much of the products produced and the jobs filled are within the four counties. The time frame for this cumulative effects analysis is 30 years (1999 to 2028). This time frame is used, because it encompasses the period in which a majority of the commercial treatments would occur, federal funds would be expended, and related monies would be distributed to the county.

Past, present and future activities occurring within this cumulative effects area include timber harvest, reforestation, road building, recreation, OGM development and wildlife activities. The ANF LRMP FEIS contains a history of the economic and demographic conditions within the four-county area (USDA-FS 2007a, pp. 3-399 to 3-410). Primary Forest Service related contributions from projects are related to forestry and logging, recreation and manufacturing. Oil and gas development and support services also make large contributions to local economies. Additional details can be found in the cumulative effects discussion for the ANF LRMP FEIS (USDA-FS 2007a, pp. 3-412 to 3-413).

Alternative 2 (No Action)

There are no direct or indirect effects to the local economy from Alternative 2; therefore, there are no cumulative effects.

Alternative 1 (Modified Proposed Action)

Management activities proposed in Alternative 1 would be expected to impact the local economy, including local jobs for contractors, who purchase timber, and primary and secondary wood processors, who hire local people who harvest, haul and process timber and who spend money at local businesses. Local employment also supports the needs of people coming into the area to hunt, fish and enjoy other recreation activities. These impacts were assessed in the ANF LRMP FEIS for each of the alternatives (Alternatives A through D) that were analyzed in detail (USDA-FS 2007e, Appendix B, pp. B-78 to B-98). On a proportional basis (according to land area), the cumulative effect on the local economy of proposed Alternative 1 management activities would most closely approach the effects shown from ANF LRMP FEIS Alternative Cm (the selected alternative).

The historical activities, private land harvesting activities and future management activities would continue to contribute to the local economy as jobs are supplied within the industry and material is

transported and processed in local mills. Revenues to the local economy would come in the form of salaries to workers, returns from the national treasury and sale of wood products.

7.3.5 Environmental Justice

Environmental justice involves fair treatment and meaningful involvement of all people, regardless of race, color, national origin or income, with respect to the development, implementation and enforcement of environmental policies and projects. The geographic scope considered under the environmental justice review is Elk and Forest Counties, the location of the project area. Criteria for low income and minority populations are based on census statistics for the State of Pennsylvania by county. The temporal scope of the analysis is based on the 2000 census information. For detailed analysis, see the Environmental Justice report in the project file.

Direct, Indirect, and Cumulative Effects

Statistics for low income and minority populations for Elk and Forest Counties do not exceed requirements for additional environmental justice review (see Environmental Justice worksheet, project file). The effects of Alternative 1 could be positive to both minority and low-income populations. Timber harvesting has the potential to create or support industry and jobs in the region. Alternative 2 would not provide the benefits mentioned above, as this alternative does not include any timber harvest proposals. As documented in the recreation section of this chapter, there would be no loss of recreation or tourism opportunities in the project area as a result of the proposed activities under any alternative. No cumulative impacts to low income households or minorities would occur from implementation of either alternative.

8. The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.

There are three scientific (research) study areas located within the ½-mile CE analysis areas. One study area is located approximately 200 feet from stand 866031; another study area is located approximately 400 feet from stand 562052; and a third study area, the Tionesta Research Natural Area, is located approximately 1,400 feet from stand 716022. To avoid impacts to research study areas, the design feature that is usually implemented specifies keeping all proposed activities at least one-tree height (75 feet) away from the research study areas. Therefore, no effects are expected to any existing research study areas due to their distance from the proposed treatment areas.

The project area was surveyed for heritage resources in 2007. Heritage resources have been delineated and buffered for protection. Avoidance of, or monitoring of logging and other activities in and around heritage resources by archaeologists would ensure that heritage resources are not affected. If any new heritage resources are discovered during implementation of this project, operations will cease in the area of the new discovery until adequate site boundaries can be identified on the ground for avoidance. Eligibility for listing in the National Register of Historic Places has not been determined for any of the heritage sites documented within the project area.

Areas proposed for NNIP species treatments occur within stands and along road corridors and are not anticipated to adversely affect districts, sites, highways, structures or objects listed in or eligible for listing in the National Register of Historic Places. Treatments are not expected to cause loss or destruction of significant scientific, cultural or historical resources.

9. The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act (ESA) of 1973.

In compliance with the requirements of ESA, the Forest Service prepared a biological assessment of this project's potential effects on the Indiana bat, small-whorled pogonia, northern riffleshell mussel, clubshell

mussel and northern bulrush and is incorporated by reference. In summary two of the five species (Indiana bat and small-whorled pogonia) have suitable habitat within the project area, but have not been documented in the project area. The remaining three species (northern riffleshell mussel, clubshell mussel and northern bulrush) have no suitable habitat in the project area. There is no federally designated critical habitat for any of the federally listed threatened, endangered or candidate wildlife species (16 U.S.C 1532 (5)(A)) within the ANF and therefore within the project area (see project BA, p. 9, in project file). A **may affect, not likely to adversely affect** determination was reached for the Indiana bat and small-whorled pogonia. A **no effect** determination was reached for the northeastern bulrush, northern riffleshell mussel and clubshell mussel.

Potential effects associated with NNIP species treatments to endangered or threatened species or their habitat have been analyzed and reported in the Biological Evaluation (USDA-FS 2007g) for the ANF LRMP FEIS and the FY07 Regeneration BA and Biological Evaluation (BE) (project file). These effects are anticipated to be non-significant with implementation of ANF LRMP standards and guidelines (USDA-FS 2007a).

10. Whether the action threatens a violation of federal, state, or local law or requirements imposed for the protection of the environment.

Neither the action alternative (Alternative 1) nor the no-action alternative would threaten a violation of federal, state, or local law or requirements imposed for the protection of the environment. The proposed activities considered in this analysis are consistent with the ANF LRMP and the National Forest Management Act.

Regional Forester Sensitive Species (RFSS)

A biological evaluation (BE) for the 61 RFSS listed for the ANF was prepared for the project (see project file). Based on habitat availability, species requirements, and documentation records, the 480 acre project area has suitable habitat for seven Regional Forester Sensitive Species (RFSS), but none of these species has been documented in the project area. Findings from the BE indicate that the mature Allegheny hardwoods, mixed upland hardwoods and oak forest types found in the project area provides potential habitat for the northern goshawk, timber rattlesnake and five rare plants including Hooker's orchid, mountain wood fern, American ginseng, checkered rattlesnake plantain and white trout lily, whose habitat is mesic forestland. In summary, a **may affect individuals, but not likely to cause a trend toward federal listing or loss of viability** determination was reached for seven RFSS. An evaluation of cumulative effects shows that the current proposed and projected federal and other activities associated with private ownerships would not cause a trend toward federal listing of these species. ANF LRMP standards and guidelines and project design features are expected to conserve important habitat features for these upland species (for example, the retention of conifer inclusions for the northern goshawk). The implementation of ANF LRMP standards and guidelines and project design features that protect potential den habitat, reserve coarse woody debris and seasonally restrict some activities are likely to reduce the risks to and improve the viability of the timber rattlesnake. A **no impact** determination is reached for the other 52 RFSS species (see project BE, project file).

Design features for Alternative 1 include:

Resurvey for gooseberry (*Ribes triste* and *Ribes lacustre*) before implementation of any activities to determine species identification and extent of population. If *Ribes trite* plants are present, delineate a 75 foot buffer around the plants in order to maintain shade; if dense ground layer vegetation such as fern and/or grasses is outcompeting gooseberry plants, spot herbicide. If *Ribes lacustre* are present, evaluate the overstory and mid-story shade conditions. Plants may be released if they are showing signs of decline (dead stems, loss of leaves or low fruit production). (USDA-FS 2007a, p. 89) (Stand 620026).

Management Indicator Species and Species with Viability Concerns

Management indicator species (MIS) are used in concert with other indicators to gauge the effects of management on wildlife habitat. ANF MIS include aquatic invertebrates and four wildlife species. Forest-wide MIS habitat status and trends, preferred habitat, threats and management emphasis are discussed in the ANF LRMP FEIS (USDA-FS 2007b, pp. 3-196 to 3-204). These species are closely associated with ecological communities of management interest. An analysis of the MIS for the project is located in the wildlife specialist report (see project file).

The five MIS on the ANF are the timber rattlesnake, northern goshawk, cerulean warbler, mourning warbler and aquatic invertebrates. As previously discussed, the timber rattlesnake and northern goshawk are also RFSS. The timber rattlesnake is a species of remote deciduous forests. Den sites are critical to supporting viable populations. The northern goshawk is a species of mid- to late-structural mixed deciduous and conifer forest, often containing a diverse landscape and structural conditions. Each of these species and its habitat are protected through the implementation of ANF LRMP standards and guidelines (USDA-FS 2007a, pp. 84 and 87). The impacts of the proposed activities and determinations for the timber rattlesnake and northern goshawk have been discussed in the RFSS portion of this section and a detailed discussion of the direct, indirect and cumulative effects of the alternatives are discussed in the BE (see project file).

Cerulean Warbler

The cerulean warbler is a species of mid- to late-structural oak forest with some canopy gaps. This species has not been documented but could be found on the 10 percent of the project area, which supports mid to late structural northern red oak, white oak, mixed oak and other hardwood forest types. The proposed action would have a short-term effect on potential habitat of the cerulean warbler since 47 acres of mid to late structural habitat is proposed for a shelterwood seed cut/shelterwood removal (final harvest) sequence. No permanent loss in oak habitat is expected. However, the actions would create early structural oak habitat that would not be available to this species for the next 30 to 50 years. Also long-term, the cerulean warbler may experience limited benefit from 13 acres of oak planting associated with wildlife habitat improvements under Alternative 1 and additional oak planting under reforestation efforts in the project area. Alternative 2 (no action) would have no effect on this species. Mid and late structural habitat in other hardwood types will be maintained on at least 62 percent of the CE analysis area under Alternative 1 by the year 2028. Because of its minority status forest-wide, inclusions of oak are generally considered unique habitat and are reserved. Oak sites are also avoided and retained when encountered during private OGM development on NFS land on the ANF.

Aquatic Invertebrates

Aquatic invertebrate diversity and relative abundance are used as indicators of stream quality important for a diversity of fish, dragonflies, mussels and other aquatic species. The 480 acre project lacks lower slope and bottomland habitat, as much of the project area is located on dry upland plateau, which is nearly flat, gently sloped or rolling terrain. All proposed treatment areas are located in watersheds classified as high quality cold water fisheries, except for Ellsworth Run and Painter Run, which are classified as cold water fisheries by the Pennsylvania Department of Environmental Protection.

The abundance and diversity of aquatic invertebrates is directly tied to the water quality and environmental conditions found in and along a waterway. The ANF LRMP focused on five activities that can adversely affect water quality. They include vegetation management, road construction and management, motorized ATV and off highway motorized (OHM) trails and OGM development. All of these activities, if not planned, constructed or maintained correctly, can become hydrologically connected to a waterway resulting in the transport of sediments directly into the stream. When these activities become too numerous or close to the stream, protective measures may not be able to prevent adverse effects to aquatic invertebrates from occurring.

On average, the proposed treatment areas are located over 750 feet away from intermittent or perennial streams. At least six treatment areas support springs or seeps. Seven of the 29 treatment areas are within 300 feet of classified streams, which increases the risk of erosion and sedimentation. Streams and riparian habitat in the project area would be maintained and protected from adverse effects of proposed management activities by the implementation of ANF LRMP standards and guidelines (USDA-FS 2007a, pp. 74-79) under either alternative. No new roads or motorized trails are being proposed with this project. Over the long-term, road maintenance is expected to have a beneficial effect on water quality especially at point-sources of sedimentation such as road and stream crossings. Tree and shrub plantings along or near springs and seeps within proposed treatment areas would help to maintain or improve water quality. These plantings would also help stabilize and retain soil and provide shade over these water sources. Alternative 2 would have no effect on this habitat component.

Ninety-one (91) percent of the 10,935-acre CE analysis area is NFS land. Regardless of size, streams and riparian habitat across this area are protected from adverse effects of future management activities by the implementation of ANF LRMP standards and guidelines (USDA-FS 2007a, pp. 74-79). Private OGM development on NFS land is regulated by Commonwealth regulations and Pennsylvania BMPs. Forest Service resource administrators and specialists work with OGM operators to protect aquatic and riparian habitat.

Mourning Warbler

The mourning warbler is an indicator of early structural (seedling and sapling) habitat, which it uses for foraging, reproduction and cover. Young forest habitat is important to many game species, such as ruffed grouse and a number of species with viability concerns. Currently, 15 percent of the 480 acre project area provides early structural forest habitat (0–50 years of age) that could support species such as the mourning warbler. Field surveys by district personnel and efforts associated with the Pennsylvania Breeding Bird Atlas Project have failed to document this species in the project area.

Within the project area, Alternative 1 increases early structural forest habitat to 85 percent while Alternative 2 (no action) results in no change in habitat. With implementation of either alternative, no permanent loss in forest habitat would occur. Wildlife and plants that utilize early-structural forest habitat would experience an increase in suitable habitat within the project area. Presently, 3 percent of the CE analysis area supports forest habitat ranging from 0 to 50 years of age. By 2028, under Alternative 1 and including future vegetation management activities, 30 percent of the CE analysis area is expected to provide early structural forest conditions while Alternative 2 would provide this habitat on 27 percent of the CE analysis area. Although Alternative 2 proposes no timber harvests, increases in seedling and sapling habitat are anticipated due to future final harvests anticipated on NFS and private lands across the CE analysis area.

Additional Species with Viability Concerns

The National Forest Management Act requires national forests to preserve and enhance the diversity of plant and animal communities to meet multiple use objectives based on the suitability and capability of the land. Migratory birds were considered in the ANF LRMP FEIS (USDA-FS 2007a, pp. 3-208) and included as part of the species viability evaluation. Migratory birds that occur on the ANF that were determined to have viability concerns were analyzed as part of the species viability process. The rationale and process for determining the status and listing of species and the forest-wide effects of management are located in the ANF LRMP FEIS on pages 3-205 to 3-208 (USDA-FS 2007a) and Appendix E of the ANF LRMP FEIS (USDA-FS 2007e).

During ANF LRMP FEIS analysis, a total of 78 species were identified with potential viability concerns for the ANF. Eleven of these species are protected but are not included on the threatened and endangered or RFSS lists for the ANF. Because their viability on the ANF was questioned, ANF LRMP standards and guidelines (USDA-FS 2007a, pp. 84-89) were developed and would be implemented in the project area to protect these species and their habitat. With the exception of the Henslow's sparrow and eastern box

turtle, the nine remaining species with viability concerns have suitable habitat within the project area. The list of seven birds, two reptiles and two amphibians and their status in the project area can be found in Table 2 of the wildlife report (see project file). This list includes the coal skink where the primary habitat is mature oak. Approximately 10 percent of the project area supports mature oak forest and other hardwood stands containing small inclusions of surface rocks and rubble.

Seven Avian Species

With the exception of the red-shouldered hawk, six of the seven avian species have not been documented in the project area. They use both mature hardwoods and hardwoods mixed with conifer forest types. Great blue heron, red-shouldered hawk and Swainson's thrush often prefer suitable habitat near riparian areas. With a larger waterway nearby, the heron may find suitable nesting and roosting habitat on the hardwood slopes above Salmon Creek near Fourmile Run southwest of Stand 635035. ANF LRMP standards and guidelines provide protection for riparian areas and a variety of waterways. At the end of the analysis period (20 years), it is estimated that 15 percent of the project area and 62 percent of the 10,935-acre CE analysis area would remain as mature or over-mature hardwoods. Suitable habitat would remain readily available for these species. Pure conifer habitat is not found in the project area; however, conifer inclusions exist within proposed treatment areas and 13 acres of conifer planting is being proposed in Alternative 1 to enhance conifer cover within the project area. Conifer component can be found on approximately 10 percent of the CE area and is expected to be retained through the CE analysis time period. All conifer trees greater than 18 inches in DBH would not be cut under ANF LRMP standards and guidelines.

Presently, 3 percent of the CE analysis area supports hardwood forest habitat ranging from 0 to 50 years of age. By the year 2028, 30 percent of the CE analysis area is expected to provide early-structural forest habitat. Although no permanent loss in forest habitat is anticipated, harvesting activities would produce a shift from mature forest to seedling and sapling habitat. This shift is not considered significant as an estimated 62 percent of the 10,935-acre CE analysis area would continue to support mid- to late-structural forest that would provide habitat for these species. In addition, over the next two decades, mature forest habitat would slowly increase as pole (size) stands continue to mature.

The hemlock wooly adelgid remains a threat to the hemlock component. Consequently, it may have a long-term adverse effect on those species, which utilize mixed hardwood and conifer habitat. For the short-term, suitable conifer habitat is expected to remain available to these species. OGM developments are expected to affect 3 percent of the CE analysis area and may have some adverse effect on the habitat of these species. Private mineral developers are encouraged to follow ANF LRMP standards and guidelines, which protect many of the habitat requirements of these species. There are no known raptor, heron or raven nests currently in the project area. If a nest of these species is discovered during implementation of this project, ANF LRMP standards and guidelines would be implemented to protect any sites.

Henslow's Sparrow

Since there are no grasslands within the project area, there would be no direct or indirect effect to the Henslow's sparrow or its habitat under Alternative 1. Opening habitat would increase slightly under Alternative 1 as a result of 2.6 acres of stone pit expansion. Twenty-eight (28) acres of pit rehabilitation and reclamation are likely to enhance habitat for this species. There has been no documented occurrence of this species within the project or CE analysis area.

Approximately 4 percent of the NFS land and 18 percent of private property in the CE analysis area supports opening habitat. Upland and lowland shrub types, savannah and orchard habitat and other openings, such as large utility corridors, highway right-of-ways and stone pits comprise much of the opening habitat found on NFS land. Residences, camps, forest openings and agricultural fields occur on private land. Other than the activities proposed under Alternative 1, no additional wildlife enhancements

to openings are planned at this time in the CE analysis area. Alternative 2 would have no effect on this habitat component.

Golden-winged Warbler

Habitat for the golden-winged warbler (seedling and sapling habitat) is expected to increase in the project area due to proposed vegetation management activities under Alternative 1. By 2028, this habitat would occupy approximately 30 percent of the CE analysis area under Alternative 1 and 27 percent under Alternative 2. Shrub components within mature forest and along riparian areas would be retained regardless of the proposed treatments and under both alternatives. Although an estimated 15 percent of the 480 acre project area provides potential breeding habitat, there have been no documented occurrences of this species in the project area.

Coal Skink

The coal skink occupies dry oak and other dry mature hardwood sites containing small inclusions of surface rock and rubble. The project area provides suitable habitat on 47 acres of mature oak forest. In addition, areas of surface rubble, typically ¼ acre or less in size, are found in at least six of the proposed treatment areas. Other rocky surfaces may be found on the edges of roads and pipelines. The effects of the proposed activities on the coal skink are the same as those described for five avian MIS that utilize mature hardwood habitat. The coal skink has not been documented in the project area but unique features, such as rock outcrops, are protected from disturbance through implementation of ANF LRMP standards and guidelines.

Jefferson Salamander, Four-toed Salamander and Eastern Box Turtle

The Jefferson salamander and four-toed salamander are found in mature hardwoods and hardwoods mixed with conifers in or near vernal pools and ponds. The eastern box turtle uses forested riparian habitat. Each of these species occurs in or near a variety of aquatic environments that are protected by ANF LRMP standards and guidelines (USDA-FS 2007a, pp. 74-79). Additional conservation measures protecting these individuals and the integrity of their habitat are found on page 87 of the ANF LRMP (USDA-FS 2007a). No impacts to the Jefferson salamander, four-toed salamander and eastern box turtle or their habitat are anticipated because these species have not been documented in the CE analysis area. Proposed treatments avoid wetland inclusions and riparian habitat, and ANF LRMP standards and guidelines would protect these species.

National Forest Management Act

The National Forest Management Act requires projects to be consistent with minimum specific management requirements as provided in the implementing regulations at 36 Code of Federal Regulation (CFR) 219.27. Resource Protection 219.27(a) is discussed in Chapters 2 and 3 of the EA. Vegetative Manipulation 219.27(b) and Silvicultural Practices 219.27(c) are as follows: The actions proposed in the action alternative meet the management requirements outlined in 219.27 (b, c and d). Proposed NNIP treatments do not threaten a violation of federal, state or local law or requirements imposed for the protection of the environment and are consistent with the ANF LRMP and the NFMA.

Clean Water Act

The action alternative would be consistent with the provisions of the Federal Clean Water Act. Implementation of all activities would be consistent with state and federal laws and Forest Service regulations and handbooks regarding vegetation management and transportation activities. Implementation of ANF LRMP standards and guidelines, resource protections, design features and Pennsylvania BMPs for all proposed activities ensures that effects from implementation of the action alternative would have no adverse direct or indirect effects to water quality.

Clean Air Act

The action alternative would be consistent with the conformity provisions of the Federal Clean Air Act. Implementation of all activities would be consistent with state and federal laws and Forest Service regulations and handbooks regarding management of prescribed fire. ANF LRMP standards and

guidelines, resource protections, Pennsylvania BMPs and following a burning plan during project implementation ensure that effects from implementation of the action alternative would have no adverse direct or indirect effects to air quality. When burns are conducted, the ANF uses the best available smoke management techniques and technology to alleviate nuisance or human health impacts of smoke in local communities and smoke sensitive areas.

Transportation Management Planning

This project complies with the direction in Forest Service Manual 7700, Chapter 7710 – Transportation Atlas, Records and Analysis, Effective December 14, 2001. The ANF has completed a Forest-wide Roads Analysis Process (RAP). The action alternative is consistent with the recommendations developed during the Forest-wide RAP. The Forest Supervisor has determined that there is adequate road information to inform the decision.

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Maps

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