



United States
Department of
Agriculture

Forest
Service

White Mountain
National Forest
Androscoggin and
Evans Notch
Ranger Districts

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File Code: 1950

Date: March 15, 2007

Dear Interested Citizen:

The Androscoggin Ranger District of the White Mountain National Forest is preparing an Environmental Assessment (EA) for the North Kilkenny Vegetation Management Project and would like your comments regarding the project. We are proposing Alternative 3 (Modified Proposed Action) which includes the following management activities: (1) Timber harvest of approximately 3.4 million board feet on 1,007 acres utilizing both even-aged and uneven-aged management techniques; (2) Expand three permanent wildlife openings by 25 acres; (3) Perform restoration maintenance on 4.5 mile of existing Forest Roads; construct 0.7 miles of new road; classify 1.8 miles of unauthorized roads (formerly called unclassified road) to Forest road, decommission 0.5 mile of unauthorized roads; and re-establish 9 log landings and construct 3 new landings; (4) Improve the septic system at South Pond Recreation Area and; (5) Improve watershed functions at two locations.

Please note that new regulations are in effect which allow only those who submit *timely* comments to be accepted as appellants. If you decide to submit comments, they should enhance the project analysis and provide meaningful and useful information about your concerns.

To be *timely*, your comments must be received within 30 calendar days following the publication of the legal notice in the Manchester Union Leader. If you do not have access to this paper, please call the Androscoggin Ranger Station at 603-466-2713 (TTY 603-466-2856) for the published date. You can obtain copies of the EA at the Androscoggin Ranger Station and on the White Mountain National Forest web site at http://www.fs.fed.us/r9/forests/white_mountain/projects/projects/.

Individuals and organizations wishing to be eligible to appeal must provide the following information: (1) Name, address and telephone number; (2) Title of the proposed action (North Kilkenny Vegetation Management Project); (3) Specific comments on the proposed action, along with supporting reasons the Responsible Official should consider in reaching a decision; and (4) Signature or other verification of identity upon request; identification of the individual or organization who authored the comment(s) is necessary for appeal eligibility.

Comments should be directed to the Androscoggin Ranger District, Katherine W. Stuart via:

- Letter (300 Glen Road, Gorham, NH 03581). Office business hours for those submitting hand delivered letters are Monday through Saturday 8:00am to 4:30pm;
- Phone (603-466-2371 ext. 210);
- FAX (603-466- 2856); or
- E-mail (comments-eastern-white-mountain-androscoggin@fs.fed.us). Electric comments should be submitted in plain text(.txt), rich text format(.rft) or Word (.doc) format.



Please be aware that your name, address and comments will become part of the public record and may be available for public inspection. If this is a concern, please contact us at your earliest convenience.

Thank you for taking the time to participate in this process and providing me with your thoughts. If you have any questions please contact Pat Nasta at 603-466-2713, ext. 222. I look forward to hearing from you.

Sincerely,

/s/ Katherine W. Stuart

KATHERINE W. STUART
District Ranger



United States
Department of
Agriculture

Forest
Service

March 2007

North Kilkenny Vegetation Management Project

Towns of Milan and Stark
Coos County, New Hampshire

Environmental Assessment



Prepared By
**Androscoggin Ranger District,
White Mountain National Forest**



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Contact the White Mountain National Forest

Androscoggin District Office

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CHAPTER ONE – PURPOSE AND NEED FOR ACTION

1.0 Introduction, Document Structure, and Public Input Process

The Forest Service has prepared this Environmental Analysis (EA) 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. This analysis is also tiered the Final Environmental Impact Statement (FEIS) and Record of Decision (ROD) for the 2005 White Mountain National Forest Land and Resource Management Plan (USDA Forest Service, 2005a). This EA discloses the direct, indirect, and cumulative environmental impacts that would result from the Proposed Action or its alternatives.

- Purpose and Need for Action: This section includes information on the history of the project proposal, the Purpose and Need for Action, the agency's proposal for achieving that Purpose and Need. This section also details how the Forest Service informed the public of the proposal and how the public responded.
- Comparison of Alternatives, including the Proposed Action: This section provides a more detailed description of the agency's Proposed Action as well as alternative methods for achieving the stated purpose. These alternatives were developed based on issues raised by the public, the Forest Service and other agencies. This section also summarizes and compares the outputs of the alternatives and proposed activities, and provides a summary table (Section 2.0, Table 2).
- Affected Environment and Environmental Consequences: This section describes the environmental effects of implementing the Proposed Action and its alternatives and is organized by resource area. Within each section, the affected environment is first described, followed by the effects of the No Action Alternative (provides a baseline for evaluation and comparison of the other alternatives that follow) and then the effects of the proposed alternatives and activities.
- Agencies and Persons Contacted: This section provides a list of preparers, agencies and persons consulted during the development of this Environmental Assessment.
- Appendices: The appendices provide more detailed information useful to support the analyses presented in this Environmental Assessment.

Additional documentation regarding environmental effects may be found in the project planning record located at the Androscoggin Ranger District Office in Gorham, New Hampshire.

The White Mountain National Forest sought public input on the Proposed Action for the North Kilkenny Vegetation Management Project in a November 2006 Scoping Report and a public field tour on November 6, 2006. This EA includes Public Comment Package, modifications to the original Proposed Action and an analysis of environmental effects.

1.1 Purpose for the Action

The Purpose for this project is to accomplish resource objectives to meet the overall management direction for the White Mountain National Forest, as established in the 2005 Land and Resource Management Plan (LRMP), referred to as the Forest Plan. Management within the Project Area is intended to meet Forest-wide goals and objectives for riparian and aquatic habitat, transportation, vegetation, recreation, water resources, and wildlife habitat (USDA-Forest Service, 2005a, pp 1-15 to 1-22), including:

Riparian and Aquatic Habitat Goal: Protect, restore, or improve riparian area conditions to benefit riparian dependent resources and values (USDA-Forest Service, 2005a, p 1-15).

Transportation Goal: The Forest Roads Program will provide a safe, efficient, and seamless transportation and parking network that allows for current, continued, and projected management, use, and enjoyment of the Forest with a wide variety of challenge levels (USDA-Forest Service, 2005a, pp 1-16 to 1-17).

Transportation Objectives:

1. Decommission all Forest and unauthorized roads not necessary to meet the management objectives of the Forest Plan as funding is available.
2. Maintain the Forest road network to meet the requirements of the Highway Transportation Safety Act with available funding.

Vegetation Goal: The White Mountain National Forest will manage vegetation using an ecological approach to provide both healthy ecosystems and a sustainable yield of high quality forest products, with special emphasis on sawtimber and veneer (USDA-Forest Service, 2005a, p 1-17).

Vegetation Objective:

1. Manage for commercial products using well-integrated prescriptions that protect biotic and abiotic resources and are compatible with the high level of recreation use on the Forest.

Recreation Goal: Provide quality day use opportunities where the natural forest setting is an important part of the visitor's experience while ensuring the balanced protection of social and natural resources (USDA-Forest Service, 2005a, p 1-13).

Recreation Objective:

1. Provide a healthy and safe place for visitors, and protect the natural environment.

Water Resources Goals: Surface waters on the White Mountain National Forest are considered "outstanding resource waters" and water quality is maintained or improved to protect existing and designated instream uses such as aquatic life. The Forest Service will manage streams at proper functioning condition (PFC) to dissipate energy associated with high water flows, thereby decreasing erosion, reducing flood damage, and improving water quality. Watersheds will continue to provide high quality water for public water supplies, Recreation activities, aquatic biota such as fish, and other purposes (USDA-Forest Service, 2005a, pp 1-17 to 1-18).

Wildlife Habitat Management Goal: The White Mountain National Forest will use sustainable ecosystem management practices to provide a diversity of habitats across the Forest, including various forest types, age classes and non-forested habitats (USDA-Forest Service, 2005a, pp 1-20 to 1-22).

Wildlife Habitat Management Objectives:

1. Manage forest composition for the broad habitat types of northern hardwood, mixed hardwood-softwood, and spruce-fir forest, consistent with Ecological Land Type capability.
2. Maintain less common habitat types, such as aspen-birch where ecologically feasible and desirable to provide for native and desired non-native wildlife and plant species.
3. Maintain high quality mature forest and old forest habitats on a majority of the forest.
4. Provide regeneration age forest and open habitats to sustain biological diversity and support species that prefer those habitats.

The Forest Plan lists the Purposes for MA 2.1 management (USDA-Forest Service, 2005a, p 3-3) that apply to this project:

1. Provide high quality hardwood sawtimber and other timber products on a sustained yield basis.
2. Provide a balanced mix of habitats for all wildlife species.
3. Manage high-use or highly developed recreation areas to acceptable and ecological standards.

1.2 Need for the Action

An Interdisciplinary Team (IDT) of Forest Service resource specialists assessed existing conditions within Compartments 1, 6, 7 and 8 of the South Pond HMU for possible management actions as outlined in the Forest Plan and determined by land capability.

Need for Change

Transportation:

There is a need to assess the transportation network required to meet the long-term management objectives within the Project Area. There is also a need to maintain or construct Forest roads required for long-term management, and decommission both Forest and unauthorized roads (formerly called unclassified roads) that are not needed for long-term management. In both cases, need has been determined with public input through the Roads Analysis process.

Vegetation:

There is a need to harvest high quality sawtimber using even-aged and uneven-aged harvest techniques in individual stands that are at the appropriate rotation age and stand density.

Need has been determined through a review of stand records, field examination of stand conditions, and assessment and application of a silvicultural prescription for each stand.

There is also a need to treat stands to promote and encourage species regeneration that is more consistent with the land capability. Land capability is defined as the inclination of the land to grow hardwoods, spruce/fir or some other forest type given the soil type, climate and geology of the land. Field examination identified opportunities to apply silviculture treatments to better match tree species with land capability.

Water Resources and Riparian and Aquatic Resources:

There is a need to prevent run-off and minimize sedimentation from water flowing down old skid trails, and improve stream habitat through the addition of woody material. This would slow down water velocity and dissipate stream flow energy during high flows. This would also allow for increased sediment storage, and stabilize streambeds and banks. As channels become more stable, habitat conditions would be enhanced for brook trout and other aquatic species.

Wildlife Habitat:

When comparing land capability with existing condition in the MA 2.1 portion of the South Pond HMU, there also is a need to maintain the existing component of aspen-birch, spruce/fir and mixedwoods. With regard to desired future condition for age class diversity, there is a need to increase regeneration age class (0-9 yrs) for northern hardwoods and aspen-birch habitat types. Need has been determined by establishing the capability of individual stands based on Ecological Land Type; establishing existing age, stand composition and condition through a review of stand records and field examination; and identifying opportunities to meet desired age and habitat objectives through treatment of individual stands within the Project Area. The South Pond HMU Table located in the project file displays existing and desired objectives. Section 3.9 of this document provides a more detailed display and discussion of age class and habitat objectives.

Recreation:

The South Pond Recreation Area is within the Project Area and receives high use during the summer season. There is a need to improve the current septic system to protect the natural environment and maintain a safe and healthy place for visitors to enjoy.

1.3 Proposed Action (Modified Scoped Proposal)

The Androscoggin Ranger District proposes to address the Purpose and Need for Action in the northern portion of the South Pond HMU by applying silvicultural practices to diversify age class and wildlife habitat, improve future stand quality, enhance growing condition for softwoods, and provide quality sawtimber.

The Proposed Action is to harvest timber on 1,007 acres, which represents approximately 15% of Compartments 1, 6, 7 and 8 (6,909 acres), 18% of the MA 2.1 lands (5,552 acres) in the Project Area, and approximately 6% of all National Forest lands in the South Pond HMU (15,684 acres). Table 1 lists the stands proposed for harvest, type of harvest, approximate acres, estimated volume, season of operation and objectives. Appendix A has maps showing the location of the stands proposed for harvest, as well as the location of proposed activities for the alternatives.

Table 1. Proposed Stands and Treatments

Std (Stand), **Rx** (Stand Prescription), **Acres**, **Vol** (Volume), **SO** (Season of Operation), **PWO** (Permanent Wildlife Opening) and **Treatment Objective by Stand**. Stand prescription codes are: **111** (Patch Clearcut >2 acres) **113** (Regeneration Cut), **121** (Shelterwood), **132** (Seed Tree Cut), **152** (Group Selection) and **153** (Individual Tree Selection and Group Selection) **210** (Improvement Cut) and **220** (Commercial Thinning). Volume is by MBF (Thousand Board Feet, where one board foot is equivalent to a plank 1 inch thick and 1 foot square). The Season of Operation (SO) is: **Summer (S)**- June 30 through October 15, **Fall (F)**- August 1 through October 15 and **Winter (W)**- December 15 through March 20.

Std	Habitat Type	Acres*	Total Vol (Mbf)*	SO	Rx	Treatment Objective
Compartment 1						
4	Northern Hardwood	41	100	F/W	152	Perpetuate northern hardwoods
18a	Northern Hardwood	19	140	F/W	113	Create regeneration forest habitat for wildlife
18b	Northern Hardwood	22	70	F/W	152	Perpetuate northern hardwoods
23 & 23b	Northern Hardwood	19	45	F/W	153	Perpetuate northern hardwoods
23a	Northern Hardwood	9	50	F/W	111	Expand PWO for wildlife habitat
26	Mixedwood	5	10	W	153	Perpetuate spruce/fir
31	Spruce/fir	9	20	W	152	Perpetuate spruce/fir
32	Mixedwood	13	30	F/W	210	Perpetuate mixedwood
39	Northern Hardwood	3	40	S/F/W	113	Create regeneration forest habitat for wildlife
63	Spruce/Fir	14	60	W	152	Perpetuate spruce/fir
70	Northern Hardwood	5	60	F/W	113	Create regeneration forest habitat for wildlife
76	Northern Hardwood	29	90	F/W	153	Perpetuate northern hardwoods
Compartment 6						
2	Spruce/Fir	14	50	W	152	Perpetuate spruce/fir

Std	Habitat Type	Acres*	Total Vol (Mbf)*	SO	Rx	Treatment Objective
3	Northern Hardwood	14	45	W	220	Perpetuate and enhance existing northern hardwoods
4	Spruce/Fir	18	50	W	152	Perpetuate spruce/fir
5	Mixedwood	37	90	W	153	Perpetuate mixedwoods
6	Northern Hardwood	18	50	W	220	Perpetuate and enhance existing northern hardwoods
8	Spruce/Fir	48	60	W	152	Perpetuate spruce/fir
8a	Spruce/Fir	5	40	W	111	Expand PWO for wildlife habitat
9	Mixedwood	21	170	S/F/W	113	Create regeneration forest habitat for wildlife
10	Mixedwood	39	100	F/W	152	Perpetuate mixedwoods
13	Mixedwood	75	230	F/W	152	Perpetuate mixedwoods
13a	Northern hardwood	10	80	S/F/W	113	Create regeneration forest habitat for wildlife
17	Spruce/Fir	24	100	W	152	Perpetuate spruce/fir
22	Northern Hardwood	84	220	F/W	220	Perpetuate northern hardwoods and
34	Aspen	18	120	F/W	132	Regenerate aspen for wildlife habitat
37	Spruce/Fir	15	50	F/W	121	Perpetuate pine with a component of spruce/fir
39	Mixedwood	12	80	F/W	121	Perpetuate spruce/fir and maintain component of white pine
41	Northern Hardwood	24	50	F/W	220	Perpetuate and enhance existing northern hardwoods
42	White Pine	5	10	F/W	121	Perpetuate white pine
45	Northern Hardwood	8	15	F/W	220	Perpetuate northern hardwoods
48	Northern Hardwood	21	40	F/W	152	Perpetuate northern hardwoods
	Northern	17	40	W	152	Perpetuate northern hardwoods and maintain

Std	Habitat Type	Acres*	Total Vol (Mbf)*	SO	Rx	Treatment Objective
50	Hardwood					aspen component
Compartment 7						
1	Northern Hardwood	11	80	S/F/W	111	Expand PWO for wildlife habitat
4	Spruce/fir	103	270	W	152	Perpetuate spruce/fir
8	Northern Hardwood	15	60	F/W	152	Perpetuate northern hardwoods
24	Northern Hardwood	47 (23)	150	S/F/W	111	Create regeneration forest habitat for wildlife
34	Northern Hardwood	19	80	F/W	152	Perpetuate northern hardwoods
35	Northern Hardwood	47	140	W	152	Perpetuate northern hardwoods
48	Northern Hardwood	16	60	W	152	Perpetuate spruce/fir
Compartment 8						
33	Spruce/Fir	34	150	F/W	152	Perpetuate spruce/fir
TOTAL		1007	3395			

* Numbers are approximate

Connected Actions and other Proposed Activities

Permanent Wildlife Opening Expansion and Maintenance

Three existing permanent wildlife openings would be expanded through timber harvest in adjacent stands. The expanded openings would be maintained every 3 to 5 years by mowing, mechanical equipment (such as chain saws and/or brush saws), and/or prescribed burning.

Transportation

Access to the stands proposed for harvest would be via existing and new roads. Road actions proposed in this alternative were based on a Roads Analysis specific to the project, with public input provided during the initial scoping. The following is proposed road maintenance needs to accomplish the project:

- Restoration maintenance will occur FR 2284, FR 208 (Percy Road) FR 104 (Higgins Brook), FR 460 (Rocky Pond), FR 460B (Rocky Pond Spur B), FR 64 and FR 65B.

Road work would include brushing, reshaping road beds, clearing ditches, curve widening installation of temporary and permanent culverts, and laying of geo-textile fabric;

- Apply spot rock at selected locations along FR 460;
- Surface approximately 900 feet of FR 64A with gravel. Rocking will begin at the junction of FR 64/FR 64A to Forest Service boundary;
- Nine existing landings would be restored and three new ones will be constructed;
- Overlay the wooden snowmobile bridge at Pond Brook with a temporary metal bridge.

Upon completion of the project, the entrances of FR460B, FR 2284 and FR 208 would be blocked (with boulders or metal gates), temporary culverts removed, water bars installed and log deck areas graded and stabilized. The temporary metal bridge at Pond Brook would be removed and the wooden bridge re-installed.

New road construction would occur off FR 64 (the east side of the South Pond Road) and be designated as FR 64B. Approximately 1,500 feet of FR 64B would be constructed to a landing in stand 6/8. This road would cross the Rocky Pond snowmobile trail. It would be a winter haul road and upon completion of the sale would be closed to vehicle access with either a metal gate or rock barriers. Only administrative access would be permitted on this road to maintain the PWO.

New road construction would also occur as an extension of the Rocky Pond Spur B Road (FR 460B). According to the Forest roads database, FR 460B is approximately 0.4 miles in length. Beyond the 0.4 miles, the road becomes a main skid road. We are proposing to improve approximately 0.4 miles of this skid road to meet Forest road standards as a winter road. Because the skid road is not listed in the roads database, upgrading it is considered road construction. This section of skid road is in good condition with a defined roadbed and low grade; it would require minimum work to bring it up to standard. This section would then be added to the roads database as a Forest road.

Roads Analysis

As part of this project, the Forest transportation system was evaluated to determine which Forest unauthorized roads are required for long-term vegetation management within the Project Area. Unauthorized roads are roads that exist on the ground, but are not currently listed in the Forest Roads database. The objective is to decide whether to classify them as *Forest Roads* or *decommissioned* them. Unauthorized roads needed to access timber lands within MA 2.1 will be reclassified as Forest roads in the Forest Roads inventory database. Roads not required would be decommissioned. We are proposing to classify four unauthorized roads (FR 2208, 2283, 2284 and 2370) representing 1.8 miles as Forest Roads; and decommission the last 0.1 miles of Forest Road 104, and all of unauthorized road 2283A (0.4 miles). All the unauthorized roads proposed for Forest road classification have been used for past timber harvest activities and are well placed and in good condition. Since these roads already exist, there would be less impact on the land and be more cost efficient to classify them rather than decommission them and have to construct new roads in the future to access these same areas.

Recreation

As part of this project, the septic system at the South Pond Recreation Area would be improved by:

- replacing the septic lift pump, tank and approximately 2,150 feet of sewer line;
- replacing the leach field at the existing site;
- installing approximately 50 foot of new septic line to connect the host site to the system;
- replacing approximately 100 feet of old clay pipe storm drains below the parking lot.

Site preparation for the new leach field would include removing any brush from the area. Upon completion, the leach field would be covered with new topsoil, seeded with native vegetation to prevent erosion and crowned to promote run-off.

Watershed Restoration

In Compartment 1, a combination of woody material and/or waterbars would be placed in approximately 4,000 feet of old skid roads. This entails placement of approximately 200-500 pieces of wood on entrenched skid roads. These pieces of wood would vary in length according to site conditions and one tree could provide several pieces of wood. Stems would be cut-to-length and placed in skid trails to achieve maximum effectiveness. The source of trees would be those growing within 75 feet of a treated area and would not be anchored. In most areas, removal will be limited to retain summer canopy over the treated area to keep shade and interception attributes intact. Tree species and size used would be based on availability adjacent to treated areas and potentially would include hardwoods, spruce, fir, and pine trees. In Compartment 7, approximately 200-500 pieces of wood per mile would be placed in the unnamed tributary. Trees would be retained adjacent to the channels and canopy cover will be maintained. Hand crews using chain saws and hand tools would perform this work during snow-free periods of the year. In addition to the use of trees to stabilize old skid roads, waterbars may also be constructed to further aid in rerouting water off these roads. All necessary wetlands permits would be obtained prior to implementation.

1.4 Decision to be Made

The purpose for an environmental assessment is to provide the District Ranger, the Responsible Official, with sufficient information and analysis to make an informed decision about the North Kilkenny Project given the Purpose and Need for Action. The District Ranger will consider public input to this 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 move the North Kilkenny Project Area toward the Desired Future Conditions (DFC) outlined in the Forest Plan and the Purpose and Need for Action?
3. Which of the alternatives best addresses relevant issues raised by the public and the Interdisciplinary Team?

4. Would the Proposed Action and its alternatives pose any significant environmental impact to warrant the need for an environmental impact statement?

1.5 Public Involvement

On November 16, 2006, an initial scoping report soliciting comment on the North Kilkenny Vegetation Management Project (and Roads Analysis) was sent to 250 interested people, abutters, local newspapers and various agencies and organizations. This project proposal was initially listed in the January to March 2006 Quarterly Schedule of Proposed Actions (SOPA) for the White Mountain as the South Pond Vegetation Management Project. The name has since been changed to North Kilkenny Vegetation Management Project and is listed as such in the October- December 2006 SOPA. The report letter was also posted on our White Mountain National Forest web page at:

<www.fs.fed.us/r9/forests/white_mountain/projects/projects>.

A public field tour on November 6, 2006 was conducted to seek input into the design of this project proposal. The group visited the South Pond Recreation Area, walked segments of the Rocky Pond snowmobile trail, and examined several of the proposed harvest areas and one of the proposed expanded permanent wildlife openings.

Eighteen written or oral responses to the scoping letter were received. These responses have been used to define the analysis and formulate design features.

1.6 Issues

Additional field work, data analysis, discussion by resource specialists, and scoping comments, helped the Interdisciplinary Team (IDT) better define the project proposal to address resource concerns. This led to the formation of Alternative 3: Modified Proposal. Appendix C: Response to Initial Scoping Comments, lists public scoping comments and the Forest Service responses.

Issues Used to Develop Alternative 3:

Issue 1: Road Construction

This issue relates to the benefits versus costs of road construction and was generated by the Interdisciplinary team.

Issue 2: Outstanding Exemplary Community

After the public field tour, several participants were concerned about harvesting within stand 1/30. This stand contains northern white cedar and potential habitat for a Regional Foresters Sensitive Species which may qualify all or a portion of it as an “Outstanding Exemplary Community”.

Issue 3: Expansion of a Permanent Wildlife Opening

The district wildlife biologist and forest hydrologist were concerned that expansion of a permanent wildlife opening (stand 1/4a) near a perennial stream would compromise the 75 foot riparian management zone since the objective of a PWO is to remove all standing trees. There is also concern that a well house adjacent to the proposed PWO may be at risk during prescribed burning.

1.7 Alternatives Considered but Not Analyzed in Detail

Uneven-Aged Harvest Only

One member of the public requested only uneven-aged management. This alternative does not move the South Pond Habitat Management Unit towards its Desired Future Condition because it would not create regeneration age northern hardwood or paper birch-aspen. It also is not responsive to the Purpose and Need for Action and therefore was not considered a viable alternative to the Proposed Action.

CHAPTER TWO - ALTERNATIVES

2.0 Description of Alternatives

Alternative 1: No Action

While this alternative does not meet the Purpose and Need for Action, it does provide a basis for analyzing the effects of conducting no management activities (No Action) in the Project Area, and comparing these effects with alternatives that do propose management activities. This alternative is required by regulations implementing the National Environmental Policy Act (NEPA). There would be no change to the existing condition except from natural occurrences: no harvest of trees, increase in permanent wildlife openings, work or administrative changes to the road system, stream restoration or watershed rehabilitation and septic system improvements at the South Pond Recreation Area. This alternative would not meet Forest Plan expectations for sustained timber products and diverse wildlife habitat in the South Pond HMU for the foreseeable future. Choosing this alternative would not preclude proposing activities in this area at a later date.

Alternative 2: Scoped Proposal

This alternative is the proposed action sent out for public scoping. See Section 2.1 Comparison of Alternatives for treatment acres, prescriptions and proposed activities.

Alternative 3: Modified Proposal

The scoped action and proposed activities were developed to optimize the purpose and need for the project with the most current information at that time. Additional interdisciplinary team (IDT) analysis and public comments resulted in several revisions that address specific economic, vegetation, water resource and wildlife concerns. These revisions are listed below:

- The construction of an additional 0.1 miles of road off FR 460 (Rocky Pond Road) and construction of a landing will be dropped. The southern portion of stand 6/13 and all of 6/17 will be accessed from FR 460 and the northern portion of stand 6/13 will be accessed from FR 64B.
- The expansion of Permanent Wildlife Opening (stand 1/4a) will be deferred due to its close proximity to a perennial stream and a well house that services the South Pond Recreation Area. The prescription is changed from a patch cut to group selection.
- The prescription for stand 1/18b will be changed from clearcut to group selection to maintain water quality and pH levels of a perennial stream that runs within this area. This prescription would encourage intermediate shade tolerant northern hardwoods such as sugar maple and yellow birch in the understory and diversify the current species mix which is mostly beech.

- Stand 1/30 is deferred for this project. The forest botanist will delineate the “Outstanding Exemplary Community” within this area and reserve it from future harvests. Portions of the stand outside the reserve area may be analyzed for treatment in the future.
- The prescription of stand 1/31 is changed from a commercial thinning to group selection. The best method to perpetuate spruce/fir within a stand is to create small groups ranging from 1/20 to 1/10 acre to allow sunlight to reach the forest floor. A commercial thinning would not allow sufficient sunlight to penetrate the canopy and would instead encourage shade tolerant northern hardwoods species.
- The acreage of stand 6/8 is increased from 24 acres to 48 acres. The ID team was concerned that a possible wetland existed in the northern portion of the stand because of areas of standing water and thus deferred treatment. Subsequent field visits by the forest hydrologist determined that this area is not a wetland but has poorly drained soils. Harvesting within the additional 24 acres would occur under frozen ground conditions.
- The stand boundaries for stands 6/13 and 6/17 were adjusted to better define northern hardwood and softwood community types and thus their acreage were adjusted.
- The prescription for stand 6/39 is changed from group selection to shelterwood cut. Due to a high stand stocking density, many of the spruce and fir are suppressed which has stunted crown and diameter growth. A shelterwood cut would remove many of the suppressed trees and retain larger, dominant ones. By opening up the stand, residual spruce and fir will serve as a seed source and encourage more evenly distributed regeneration within the understory.
- Stand 7/4 was expanded from 90 acres to 103 acres to permit the entire stand to be treated, not just a portion.
- The prescription for stand 7/24 will be changed from shelterwood cut to patch cut. Portions of this stand have incurred ice storm damage and the understory is composed mostly of young beech. Patches of damaged and low quality trees will be removed which will open up the stand and allow more intermediate shade tolerant species such as sugar maple and yellow birch to become established in the understory along with beech.

Refer to Section 1.4 for a detailed description for this Alternative.

Design Features Common to Alternatives 2 and 3

Alternatives 2 and 3 have been designed and would be implemented in accordance with the **Forest Plan Forest-wide and MA 2.1 standards and guidelines** (USDA-Forest Service, 2005a).

Design Features clarify where necessary, how these standards and guidelines may apply to specific actions in the project proposal. They also may be features that are not directly

associated with standards and guidelines but will be implemented on the ground to address site-specific safety or resource needs. Design Features for Action Alternatives include:

Soils

- The following soil conservation practices are emphasized for this project (USDA-Forest Service, 2005a, *Forest-wide, Water Resources, Soil & Water Conservation Practices, S-1, p 2-30*):
 - To limit the area subject to soil compaction, log landings will be the minimum size necessary to meet the requirements of the equipment, the quantity and type of forest products, and safety and;
 - Harvested whole trees may be skidded to landings; tops and limbs will be scattered on landings, skid trails and within stands to retain soil nutrients and to reduce compaction and erosion during and after operations as needed

Scenery Management

To minimize visual effects to recreationists and camp owners along North and South Ponds, and maintain scenic quality of Forest roads, and snowmobile trails, the following design features would be employed (USDA-Forest Service, 2005a, *Vegetation Management, G-8, p 2-30*):

- Slash within 25 feet along the Rocky Pond snowmobile trail and Forest boundaries, and 50 feet along Forest Roads (FR) 64, FR 65 and FR 460 would be removed. For the next 25 feet, slash would be lopped and scattered to within 3' of the ground along the snowmobile trail and Forest boundaries.

Recreation

To provide a safe environment for loggers and recreationist using FR 460 concurrently in wintertime, the following design features would be employed (USDA-Forest Service, 2005a, *MA 2.1 General Forest Management, Vegetation Management, G-1, p3-8*):

- Safety and speed limit signs will be posted on the Rocky Pond snowmobile trail during harvest activity and;
- Log hauling on the Rocky Pond snowmobile trail (during snowmobiling season) would not occur on weekends or holidays.

Wildlife

- Where present, reserve most hemlock trees, hemlock inclusions, and some large white pines as wildlife trees. In particular, reserve supercanopy white pine trees within 0.25 miles of South Pond to maintain potential bald eagle and osprey nest trees (USDA-Forest Service, 2005a, *Wildlife, G-3, p 2-33 and Rare and Unique Features, Bald Eagle, G-1, p. 2-13*, USDA Forest Service 2003 and USDA Forest Service 2005d).
- To maintain minor species within stands reserve; (1) scattered cedar trees in stands 1/30 (Alternative 2), 1/31 and 1/32; (2) alder in stand 6/8 and; (3) ironwood in stand 6/13. Exceptions may include hazardous trees and trees located where parts of skid trails or landings that cannot be moved because of land features (USDA-Forest Service, 2005a, *Wildlife, G-3, p 2-33 and USDA Forest Service 2005d*).
- Protect a large seep in the southeastern edge of stand 1/70 for habitat value (USDA-Forest Service, 2005a, *Wildlife, G-11, p 2-34*).

- To maintain hard mast component as a food source for wildlife, beech trees with an abundance of bear claw marks should not be marked for cutting unless the tree is expected to die in the near future. Exceptions may include hazardous trees, trees located where parts of skid trails or landings that cannot be moved because of land features, and trees with >75% crown damage since there is a high probability they will die in the near future. Another exception would be in clearcuts designed to create optimum conditions for the regeneration of paper birch, aspen or softwoods. In these instances, beech trees may be reserved to meet requirements for reserve patches or wildlife trees. In areas with heavy concentration of bear trees, patches of habitat will be reserved to minimize damage to the trees (USDA-Forest Service, 2005a, *Wildlife, G-3, p 2-33* and USDA Forest Service 2005d).
- To maintain and encourage spruce/fir, place small groups near spruce/fir inclusions in stand 7/48 (a hardwood stand) in (USDA-Forest Service, 2005a, *Wildlife, G-3, p 2-33* and USDA Forest Service 2005d and USDA Forest Service 2005d).
- Any prescribed burning of the permanent wildlife openings within the project area will follow guidelines outlined in an authorized prescribed burn plan to ensure that resource objectives are met (USDA-Forest Service, 2005a, *Wildland Fire, G-1, p 2-33*).
- Mowing or stumping of the permanent wildlife openings within the project area will occur during late summer or fall (outside nesting season) when conditions are dry and snow free. (*Specific to Project Area*).
- Reserve wetland in stands 1/63, 6/4 and 6/39 for habitat diversity (USDA-Forest Service, 2005a, *Water Resources, G-2, p 2-32*).
- To protect a raptor's nest in stand 8/33, a no-disturbance buffer of 66 foot would be placed around it. (USDA-Forest Service, 2005a, *Wildlife, S-3, p 2-33* and USDA Forest Service 2005d).
- Forest botanist will delineate northern white cedar seepage swamp in the vicinity of stand 1/30 and 1/31 prior to any harvest activity (USDA-Forest Service, 2005a, *Rare and Unique Features, G-1, p 2-13* and USDA Forest Service 2003).
- Designate a reserve area in the permanent wildlife opening expansion (stand 7/1) to protect a rare plant, ciliated aster (*Symphiotrichum ciliolatum*). District Biologist will provide location of rare plant (USDA-Forest Service, 2005a, *Rare and Unique Features, S-2, p 2-13* and USDA Forest Service 2003).

Invasive Species

- To control the spread of invasive species before ground disturbance is initiated, control any weeds already existing in the project area (USDA-Forest Service, 2005a, *Non-native invasive species, S-2, p 2-11*).
- To minimize the potential for invasive to become established, minimize soil disturbance to no more than needed to meet project objectives. Logging practices that reduce soil disturbance include, but are not limited to, oversnow logging and reuse of landings, skid trails, and haul roads (USDA-Forest Service, 2005a, *Non-native invasive species, S-2, p 2-11*).
- To prevent conditions where invasive weeds can become established (such as bare ground conditions), reestablish vegetation using native seed where appropriate and feasible, and certified weed-free or weed-seed free hay or straw where certified materials are reasonably available (USDA-Forest Service, 2005a, *Non-native invasive*

species, S-2 and S-3, p 2-11) .

Watershed Restoration

- Do not cut hemlock or cedar as a tree source for watershed improvement project since they are minor species within the stand (USDA-Forest Service, 2005a, *Wildlife, G-3, p 2-33*).

Water

- To reduce changes in water chemistry, a 100 buffer no cut riparian zone would be placed on Duke Brook (Alternative 2) and North Pond Brook (Alternative 2 and 3) (USDA Forest Service, 2005a, *Water Resources, Soil and Water Conservation Practices, S-2, p2-30*).
- To protect a spring within stand (6/22), a 100 no cut zone will be placed around it (USDA Forest Service, 2005a, *Water Resources, Water Uses, S-3, p2-32*).

2.1 Comparison of Alternatives

Table 2 is a summary table comparing the proposed activities by alternative.

Table 2. Comparison of Alternatives

MEASURE	UNIT	Alt 1	Alt 2	Alt 3
Vegetation Management				
Winter Harvest Only	Acres	0	297	403
Fall/Winter	Acres	0	516	515
Summer/Fall/Winter Harvest	Acres	0	218	89
Clearcut (northern hardwood)	Acres	0	96	58
Permanent Wildlife Opening	Acres	0	21	25
Aspen-Birch Seed Tree Cut	Acres	0	20	18
Patch Cut (northern hardwoods)– gross (net)	Acres	0	0	47 (23)
Shelterwood Prep Cut	Acres	0	92	32
Group Selection Cut	Acres	0	519	576
Individual Tree & Group Selection Cut	Acres	0	97	90
Commercial Thinning	Acres	0	173	148
Improvement Cut	Acres	0	13	13
Total Area	Acres	0	1031	1007
Harvest Volume	MBF	0	3660	3395
Permanent Wildlife Opening Maintenance				
Prescribed Burning or Mowing of (PWOs)	Acres	0	26	30
Transportation System				
Road Restoration Maintenance	Miles	0	5.5	4.5
Road Construction	Miles	0	1.0	0.7
Unauthorized road classified to Forest road	Miles	0	1.8	1.8
Road Decommissioning	Miles	0	0.5	0.5

MEASURE	UNIT	Alt 1	Alt 2	Alt 3
Landings Re-established and constructed	#	0	14	12
Watershed Restoration				
Rehabilitate an unnamed perennial stream flowing into Rocky Pond	Miles	0	0.6	0.6
Stabilize sections of old skid trails near FR 208 (Percy Road)	Miles	0	0.8	0.8
Improvements to the South Pond Recreation Area				
Replacement of the septic lift pump, tank and sewer line	Feet	0	2150	2150
Replacement of the leach field at the existing site	Yes/No	No	Yes	Yes
Installation of a new section of septic line to connect the host site to the system	Feet	0	50	50
Replacement of old clay pipe storm drains below the parking lot	Feet	0	100	100
Socio-Economic Factors				
Estimated Stumpage Receipts	\$	0	\$301,500	\$287,900
Sale Costs	\$	\$42,000	\$144,400	\$139,600

Table 3. Comparison of Alternative by Effects to Resource

Resource	Item of Measure	Measure	Alt 1	Alt 2	Alt 3
Recreation	Dual Use-Rocky Pond Snowmobile Trail	Miles	0	2.9	2.8
Vegetation	Forest Health – Treatment to balsam fir, sugar maple and pine stands with signs of insect damage and disease	Acres	0	323	323
	Species Diversity <u>Group Selection</u> - increase intermediate shade tolerant northern hardwood and softwood species <u>Seed Tree</u> - increase aspen and paper birch	Acres	0	519	576
	Winter harvest – snow cover provides greater protection to understory vegetation	Acres	0	297	403
	Season of Operation – summer/fall harvest allows ground scarification which exposes mineral soil. - Summer/Fall/Winter - Winter only	Acres	0 0	218 297	89 403
Non-Native Invasive Species (NNIS)	Introduction of NNIS – even-aged treatments increase the risk of introducing NNIS into an area	Acres	0	137	124
Soils	Soil Compaction - ground disturbance from road and landing maintenance, new road and landing construction, skid trails, and watershed restoration	Acres	0	81	75
	Soil Productivity - Calcium removal from project area - Even-aged harvest	% Acres	0 0	<2 137	<2 124
Water	Water Quantity – % basal area removed from each of the eight subwatershed of the Upper Ammonoosuc River meets 25% threshold.	Yes/No	Yes	Yes	Yes

Resource	Item of Measure	Measure	Alt 1	Alt 2	Alt 3
	Water Quality – % basal area removed from each of the eight subwatershed of the Upper Ammonoosuc River meets 15% threshold.	Yes/No	Yes	No	Yes
Riparian and Aquatic Habitats	Watershed and Stream Restoration - Skid trail stabilization - Stream rehabilitation	Miles	0 0	0.8 0.6	0.8 0.6
Wildlife	Regeneration Forest Habitat Created - northern hardwoods - aspen/ paper birch -permanent wildlife openings	Acres	0 0 0	96 20 21	81 18 25
	Season of Operation – different species breed at various times of year -Summer/Fall/Winter -Fall/Winter -Winter only	Acres	0 0 0	218 516 297	89 515 403
	Stand Conversion -northern hardwoods converted to spruce/fir to meet HMU objectives	Acres	0	21	21
	Increase spruce/fir understory – benefits species associated with this habitat such as snowshoe hare	Acres	0	373	325
	Cultural Resources – Measures in place to protect cultural resources	Yes/No	0	Yes	Yes
Air Resources	Particle Emissions from Prescribed Fire - Carbon monoxide - Particle Matter < 2.5 microns - Particle Matter < 10 microns	lbs/acre	0 0 0	862 72 84	862 72 84
Scenic Resources	Even-aged harvests – views along Highway 110, hiking trails, South/North Ponds, South Pond Recreational Area and Rocky Pond snowmobile trail	Acres	0	43	43

Resource	Item of Measure	Measure	Alt 1	Alt 2	Alt 3
Socio-economic	Income Generated				
	- Total Receipts		0	301,500	287,900
	- Net Receipts		0	157,100	150,900
	- 25% Fund (received by state)	\$	0	39,279	37,725
	-10% Fund (received by towns)		0	15,710	15,090

CHAPTER THREE - AFFECTED ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

3.0 Introduction and Background

The Project Area consists of the northern portion of the South Pond “Habitat Management Unit” (HMU) and is 6,909 acres in size (44% of the South Pond HMU). Of this area, 5,552 acres are allotted by the Forest Plan to Management Area 2.1 (lands considered suitable for timber harvest). It includes 1,007 acres of National Forest land proposed for vegetative management as well as lands proposed for road improvement, road construction, watershed restoration and recreation activities. The Project Area is located within the towns of Milan and Stark in Coos County, New Hampshire.

There have been four timber sales within this area in the past ten years (completion date is in parentheses); Rocky Pond (1998), War Camp (2001), Fogg Brook (2006) and Higgins Brook (2007). Of the 1,133 acres harvested, even-aged treatments accounted for 156 acres and included overstory removal, seed tree cuts, clearcuts and patch cuts. Aside from timber harvest, the area offers a wide variety of recreation activities, including hiking, scenic and fall foliage viewing, camping, cross-country skiing, snowmobiling, mountain biking, snowshoeing, wildlife watching, hunting, fishing, swimming, and cutting Christmas trees and firewood.

Format

Resource issues raised during the scoping process, public field tour and by the Interdisciplinary Team (see Section 1.7 and Appendix C) are addressed in this chapter. Each resource section analyzed in detail is organized as follows:

- Description of Affected Environment (Existing Condition)
- Analysis of Direct and Indirect Effects on the Resource (By Alternative)
 - Direct Effects are caused by the action and occur at the same place and time
 - Indirect Effects are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable.
- Analysis of Cumulative Effects on the Resource (By Alternative)
 - Cumulative Effects result from the incremental impact of the action when added to other past, present and reasonably foreseeable actions, regardless of which government agency or individual undertakes such other actions.

3.1 Recreation

Affected Environment for Recreation

Recreation facilities within and adjacent to the North Kilkenny Project include snowmobile trails, the South Pond Recreation Area, three trailheads, four hiking trails, two backcountry tent sites and roads used for various recreation activities. In addition to activities associated with these resources, such as picnicking, swimming, boating, hiking, and snowmobiling, the area is popular for hunting, fishing, and wildlife watching.

The closest designated wilderness is the Great Gulf Wilderness, approximately 17.5 miles south, as the crow flies, of the North Kilkenny Project Area. Because of the distance from the project area and the presence of significant mountain ranges in between, there would be no direct, indirect, or cumulative effects to the Great Gulf Wilderness resulting from Alternatives 1, 2, or 3.

South Pond Recreation Area and North and South Ponds

The South Pond Recreation Area is a day-use site operated from mid-June through Labor Day each year by a private concessionaire under special-use permit. The area offers picnic tables and grills, a beach and defined swimming area at South Pond, a non-motorized boat launch, restrooms and a bathhouse, and open play areas. The northern trailhead for the Kilkenny Ridge Trail is within the site; approximately 1,200 feet of this trail is maintained to universally accessible standards and includes several universal access points for fishing.

Several private camps and residences lie on private land adjacent to North and South Ponds; residents access the ponds and surrounding areas for a variety of recreation activities.

Snowmobile Trails

The Rocky Pond Snowmobile Trail is a local connector that was approved and constructed in 2003 after more than 15 years of discussion and planning. It provides a link from the West Milan Snowmobile Trail (Corridor Trail NH 19) and the City of Berlin, NH to the Bell Hill Road Snowmobile Trail (Corridor Trail NH 5) and the City of Groveton, NH. For approximately 2.9 miles this trail uses Forest Road 460, which passes directly through several proposed harvest units and is immediately adjacent to several others.

The Mill Brook Snowmobile Trail is in the vicinity of the Project Area; the trail uses Forest Road 11 (the Mill Brook Road).

Hiking Trails

One hiking trail and a portion of a second trail lie within the North Kilkenny Project Area: the Devil's Hopyard Trail and approximately 1.4 miles of the Kilkenny Ridge Trail. Three proposed harvest units are in proximity to these trails. The Unknown Pond and Mill Brook Trails are in the vicinity of the project area. These trails are within Trail Use Area 6, generally the lowest use backcountry area on the Forest (USDA- Forest Service, 2005b, pp. 3-341, 3-342). Table 4 describes these trails and their use levels.

Table 4: Description and Use Levels of Hiking Trails in and nearby the North Kilkenny Analysis Area

Trail	Use Level-Peak Season*	Description
Kilkenny Ridge	Moderate	20.6 miles (1.4 within project area) – Ridge hike across Kilkenny Range
Devil’s Hopyard	Low	1.3 miles – accesses a small gorge known as the Devil’s Hopyard
Unknown Pond	Moderate	6.3 miles – accesses Unknown Pond and nearby tent sites
Mill Brook	Low	3.8 miles – accesses Roger’s Ledge from the south

* Use level is people per day (ppd) during peak use (e.g. school vacation weeks, holiday weekends). Range of use of levels is: Low = 0-6 ppd; Moderate = 7-25 ppd; High = 26-50 ppd; Very High = 51+ ppd; Data from WMNF Trail Use Levels 2002+ From AMC White Mountain Guide 28th Ed. and Androscoggin Ranger District trails files.

Two remote tent sites are in the vicinity of the project area: Unknown Pond and Roger’s Ledge. Unknown Pond has a moldering toilet, five native-soil tent pads, and a designated common area with fire ring. Roger’s Ledge has a moldering toilet and open, undesignated tenting areas.

Other Recreation Components

The trails, roads, and general backcountry areas are used by visitors and residents for a variety of recreation activities in addition to those described above. Nordic skiing and snowshoeing, dog sledding, mountain biking, and motorized boating occur to some extent in the area.

The Forest Service describes recreation settings on National Forest lands according to the Recreation Opportunity Spectrum (ROS). The lands within the project area predominantly fall into Management Area (MA) 2.1, General Forest Management. The ROS goal for MA 2.1 is to offer a full mix of ROS objectives. The MA 2.1 lands in the project area are identified as Roaded Natural and Semi-Primitive Motorized. Roaded Natural settings are characterized by predominantly natural appearing environments with moderate evidences of the sights and sounds of human activity. Resource modification and utilization practices are evident, but harmonize with the natural environment. There is opportunity for both low and high degrees of contact with other visitors, and for both motorized and non-motorized recreation. Semi-Primitive Motorized settings are characterized by predominantly natural or natural-appearing environment of moderate to large size. Concentration of users is generally low, but there is often evidence of other users. Motorized use may also be evident.

The Analysis Area for direct and indirect effects on recreation is the northern portion of the South Pond HMU and encompasses Compartments 1, 6, 7 and 8. The time frame is the actual duration of the North Kilkenny Project, expected to be 2 to 4 years depending on sale operations. This area and duration were selected because the direct and indirect effects on

recreation activities are primarily related to harvest operations and will essentially cease when the harvesting operation is complete.

The Analysis Area for cumulative effects on recreation is defined as the South Pond and Mill Brook HMU's. The time frame is 10 years into the past, the present including ongoing activities, and the foreseeable future (10 years; 1998-2018). This time frame was chosen because it is a reasonable length of time for measuring past effects and for projecting upcoming projects. Past projects which had an effect on recreation include the War Camp, McCordick Brook, Fogg Brook and Little Mac timber sales, the Rocky Pond Snowmobile Trail construction project, the South Pond parking area repaving project and the Unknown Pond tent site project.

Direct and Indirect Effects on Recreation

Alternative 1: No Action

Alternative 1 would not alter current recreation opportunities. Silvicultural prescriptions designed to improve wildlife habitat for game species would not occur; as a result hunting opportunities would not noticeably change. The septic improvements at South Pond could take place following a separate analysis. Since No Action would result in no change to existing recreation activities the cumulative effects of this alternative would also result in no change to recreation activities and opportunities.

Action Alternatives 2 and 3:

These alternatives are very similar in terms of direct and indirect effects on recreational activities.

Snowmobile Trails

Recreation use of the Rocky Pond Snowmobile Trail would be directly affected by road maintenance and harvest activities. Wood removed from a portion of 6/13 and stands 6/13a, 6/17, 7/1, 7/4, 7/8, 7/34, 7/35, 7/48, and 8/33 would be hauled on approximately 2.9 miles of FR 460 where it is concurrent with the snowmobile trail. The miles of dual use is modified under Alternative 3 to 2.8 miles due to the elimination of 0.1 miles of road construction that would have occurred as an extension of FR 460. Desirable silvicultural prescriptions and/or existing ground conditions for most of these stands dictate a need for frozen-ground operating conditions.

These alternatives include a proposal to construct 0.4 miles of winter road into stand 6/10. This road would cross the Rocky Pond Snowmobile Trail requiring a reduction in posted speed limit on either side of the crossing. Snowmobiles would have to cross this section of plowed road for the duration of winter harvest activities. Construction of this road would eliminate 3,000 feet of dual use on the Rocky Pond Snowmobile Trail and reduce contact between snowmobile riders and log trucks.

Finally, a short section, approximately 100 to 150 feet, of the Rocky Pond Snowmobile Trail entering stands 6/4 and 6/5 just west of where the trail crosses South Pond Road would be

improved to access a landing. This section of trail would receive logging truck activity and be subject to dual use provision as described in Design Features (Section 2.0).

Under both action alternatives, the quality of the recreation experience for snowmobile riders on the Rocky Pond Trail will be affected for the duration of harvest activities, especially related to the extent of plowed surface conditions and length of trail posted under 10 mph speed limits.

Stand 7/24 is part of the South Pond HMU and consequently within the North Kilkenny analysis area. However, actual harvest of this stand is planned for inclusion in a future timber sale. Wood from this stand would be hauled down FR 11a and FR 11, the Mill Brook Road/Mill Brook Snowmobile Trail, and would affect snowmobile use of that trail at that future time. Since the proposed harvest of this stand is outside the 2-4 year timeframe for this direct and indirect effects analysis, the effects of this harvest will be considered in the cumulative effects section.

Other Recreational Opportunities

Visitors to South Pond Recreation Area would encounter evidence of timber harvest activity. However, because units proposed for timber harvest are largely scheduled for fall or winter seasons, visitors to the recreation area during the peak-use season would not experience the visual and audible effects of ongoing harvest activity.

Hikers on the first half mile of the Kilkenny Ridge trail may hear and observe ongoing timber operations in stands near to the trail (stands 1/4, 1/39 and 1/70). However, as discussed above the vast majority of operations would occur during frozen ground conditions when hiking use in the area is at its lowest level.

Improvements to the septic system would likely occur away from the peak use season. Any visitors to the site during construction would be affected by the sights and sounds of this activity.

The stream and watershed restoration would not have any direct or indirect effects on recreation since they are not near any recreation areas and are not visible from hiking or snowmobile trails.

There would be no direct and indirect effects from other connected actions.

Cumulative Effects on Recreation

Alternative 1: No Action

Ongoing and future projects in the analysis area which could have a cumulative effect on recreation include the ongoing Higgins Brook timber sale and the future Mill Brook timber sale. The Higgins Brook project began in 2004 and is expected to end in 2007 or early 2008. The Mill Brook project is undergoing analysis. The project could commence in 2008 and last until approximately 2013.

Action Alternatives 2 and 3:

Snowmobile Trails

This project combined with the ongoing Higgins Brook vegetation management project and the future Mill Brook Project could increase cumulative effects on snowmobile use of the area. Riders traveling on the Rocky Pond Snowmobile Trail currently encounter dual use on approximately 0.5 miles of FR 460 from the junction with FR 2285.1 to FR 104. Riders accessing this trail from the end of the Spruceville Road encounter approximately another 0.4 miles of dual use. The Mill Brook Snowmobile Trail, a local route which is lightly used, rarely groomed for riding, and often plowed to accommodate timber harvest on private inholdings, would be subject to dual use for the duration of the winter harvest of that future operation. Cumulatively, up to approximately 8.5 miles of snowmobile trail could be under a dual use condition over the next 5-8 years. However, timing of the sales, active sale administration and coordination with timber purchasers, as well as the desire for timber operators to work in a cost-effective manner make it highly unlikely that the full 8.5 miles of snowmobile trail would be simultaneously impacted by harvest operations. It should also be noted that while the Rocky Pond Snowmobile Trail is connected to the overall system, the Mill Brook Snowmobile Trail is a stand-alone, dead-end trail.

Other Recreational Opportunities

Neither action alternative would change the long-term recreation opportunities described in the Forest Plan (2005) within this analysis area. Recreation and vegetation management activities have co-existed in this area previously, as evidenced by the use of roads constructed for timber removal as snowmobile trails. Short-term effects from noise associated with North Kilkenny and Mill Brook Projects would be primarily experienced by non-motorized visitors in the fall and winter months and would be localized within 1-2 miles of actual harvest operations. Visitors during these periods would encounter logging truck traffic on certain roads. These effects would end once these projects are completed.

Cumulative effects to the South Pond Recreation Area, biking, fishing, hunting, hiking and other recreation opportunities as well as the setting and experience characteristics of the Semi-Primitive Motorized ROS class are not anticipated because past, ongoing and foreseeable future projects do not and would not have measurable direct or indirect effects on these recreation activities.

Past projects within the analysis area either had minimal effect on recreation due to the distance from recreation facilities and trails or in the case of the Rocky Pond Trail construction, South Pond repaving, and Unknown Pond projects directly enhanced recreation opportunities in the area. Wildlife habitat benefits associated with the timber sale projects have cumulatively increased opportunities for hunting and wildlife viewing. Other than these enhancements, the effects on recreation from timber harvesting largely ceased when the harvest operations ended.

3.2 Inventoried Roadless Areas

Introduction

The North Kilkenny Project does not propose any actions within any inventoried roadless area (IRA).

No issues related to inventoried roadless areas were identified by the public or the IDT. However, the proposed actions were still analyzed as to the possible effects on an IRA adjacent to the project area.

The subject of “roadless” has generated much confusion and controversy over the years. In addition to describing the effects of the North Kilkenny project on inventoried roadless areas, this section of the EA provides a background and brief history of roadless areas, and describes the analysis method used to evaluate project-level effects on these lands.

Please note: Policy direction found in the Forest Service Handbook (FSH) was amended effective January 31, 2007 to replace the word “roadless” with the phrase “potential wilderness”. This section of the North Kilkenny Project Environmental Assessment will refer to these areas as “roadless” or “inventoried roadless areas” because the Forest Plan and supporting documents for this Forest were completed prior to this amendment; however it is important to note that the terms may be used interchangeably.

Background

Inventoried roadless areas (IRA’s) are lands within a National Forest that may have potential for wilderness study or designation. Conducting an inventory of roadless areas is the first step in identifying National Forest lands which meet the criteria for being evaluated for wilderness suitability. An IRA is not a land management allocation.

When developing or revising Forest Plans or when directed by Congress, the Forest Service is required to examine National Forests to determine which lands meet baseline criteria of size and condition to be included in an inventory of roadless areas. We then evaluate those lands for their wilderness characteristics. This inventory and evaluation process can have two results: either lands are recommended to Congress for designation as wilderness consistent with the Wilderness Act of 1964, or lands are placed into other management area allocations to meet purposes such as recreation or timber harvest.

The Forest Service is guided by the Forest Service Handbook (FSH) in this two-part process of first identifying then evaluating lands for wilderness potential. The FSH 1909.12 Chapter 70 sets objective criteria to determine whether National Forest lands are in a condition that meets a baseline standard to be included in a roadless area inventory. There are criteria which apply nationwide and additional criteria which apply only to National Forests in the eastern U.S. due to the history of human use and modification, and the natural ability of these lands to recuperate.

Once that inventory is compiled, the lands are assessed according to FSH direction as to their capability and availability as wilderness. Capability is an evaluation of whether the area has characteristics consistent with the Definition of Wilderness section of the Wilderness Act. Availability is an evaluation that weighs the trade-offs – e.g. social, economic, recreational, biological – that would result from wilderness designation as opposed to management for other uses. The evaluation may also consider public demand for a particular wilderness versus demand for other uses in that area.

This process, and the decision whether to recommend lands for wilderness designation or manage for multiple uses other than wilderness is typically documented in an EIS related to a Forest Plan revision or other large-scale programmatic analysis.

Brief History

The White Mountain National Forest completed such an analysis – the Forest Plan revision – in 2005. The inventory of roadless areas and the evaluation of each for wilderness capability and availability are documented in Appendix C of the FEIS for the Plan (2005c).

For this process, the Forest began with an inventory of lands previously identified as roadless through earlier evaluations: In the early 1970's the Forest Service conducted an examination of all National Forests as part of the Roadless Area Review and Evaluation (RARE I); this was revised in 1979 (RARE II), and the results documented in the FEIS for that national process. In the late 1990's the agency was directed to analyze new management direction for inventoried roadless areas (those identified in RARE II and subsequent inventories, such as the 1986 Forest Plan) as part of the Roadless Area Conservation Rule (RACR). This rule was finalized in 2001, and set specific management direction to limit road building and timber harvest except in special circumstances on lands included in the inventory.

The WMNF used the 2001 inventory as a starting point for the wilderness evaluation process. Through planning team analysis and with Regional direction, it became evident that additional lands – areas outside the 2001 IRA boundaries – would meet the inventory criteria in the FSH. A new inventory was conducted and presented to the public in the Draft EIS for the Forest Plan. Through public involvement, further analysis, and extensive field verification, additional adjustments were made to the inventory for the Final EIS. This new 2005 inventory resulted in 27 IRA's totaling 403,000 acres. Each IRA was then evaluated for its capability and availability as wilderness.

Ultimately, the 2005 Forest Plan recommended to Congress that 34,500 acres be designated as wilderness in the Wild River valley and around the existing Sandwich Range Wilderness. Congress followed these recommendations with passage of the New England Wilderness Act in December, 2006, creating the 24,000 acre Wild River Wilderness and adding 10,800 acres to the Sandwich Range Wilderness.

The remaining lands in the roadless area inventory were assigned to other management areas, consistent with Forest Service Handbook direction. Most of the land within IRA's was allocated to MA's that emphasize semi-primitive conditions and recreation use; other lands were assigned to MA's that emphasize timber harvest and wildlife habitat creation, all with the goal of providing a balanced mix of uses across the Forest.

The management of Inventoried Roadless Areas has undergone a great deal of legal scrutiny over the years. The RACR and its associated management direction for IRA's was enjoined in a Federal District Court in 2003 before being replaced by the State Petition Rule, a regulation promulgated in 2005. This rule was also challenged, and a recent 2006 court ruling struck down the State Petition Rule and re-established the Roadless Area Conservation Rule of 2001. Consequently, the Forest Service is following Forest Service Manual Interim Directive 1920-2006-1 which mandates consistency with management direction in the RACR for all lands included in the 2001 roadless area inventory.

Analysis Method

This section describes the approach taken to analyze the effects of the North Kilkenny Project on inventoried roadless areas.

The analysis first considered whether the proposed actions would result in a change in the boundary of an IRA; in other words, whether lands currently within an IRA would remain in the IRA following project implementation. The roadless area inventory criteria from the FSH were used to conduct this analysis.

Table 5 shows the inventory criteria and the method used to measure project-level effects on each criterion.

Table 5: Inventory Criteria and Measurement Methods

Criteria Description		Method for Measuring Project-level Effects on the Criteria
1	The land is regaining a natural, untrammelled appearance.	Measured by acres of harvest and miles of new road construction.
2	Improvements in the area are being affected by the forces of nature rather than humans and are disappearing or muted.	Measured by miles of new road construction.
3	The area has existing or attainable National Forest System ownership patterns, both surface and subsurface, that could ensure perpetuation of identified wilderness values.	Measured by total acres of NFS ownership.
4	The location of the area is conducive to the perpetuation of wilderness values. Consider the relationship to the area to sources of noise, air, and water pollution, as well as unsightly conditions that would have an effect on the wilderness experience.	Measured by total acres of harvest and total miles of new road construction.
5	The area contains no more than ½ mile of improved road for each 1,000 acres, and the road is under Forest Service jurisdiction.	Measured by total miles of existing improved road and total miles of proposed new road construction.
6	No more than 15 percent of the area is in non-native, planted vegetation.	Measured by total acres of non-native planted vegetation
7	Twenty percent or less of the area has been harvested within the past ten years.	Measured by total acres of harvest and acres of regeneration harvest.

Criteria Description		Method for Measuring Project-level Effects on the Criteria
8	The area contains only a few dwellings on private lands and the location of these dwellings and their access needs insulate their effects on natural conditions of Federal lands.	Measured by total number of private dwellings

After taking a hard look at the above criteria and considering whether our proposed actions would affect an area’s inclusion in the roadless inventory, we evaluated the project’s effect on any wilderness characteristics of the IRA. To conduct this analysis we looked at how the project would affect the wilderness capability criteria from the FSH and the FEIS for the revised Forest Plan:

Table 6: Wilderness Evaluation Criteria (Capability) and Method for Measuring Project-Level Effects

Criteria		Method of Measure
1	Natural Integrity Natural Appearance	A measure of whether the long-term ecological processes of the area are intact and operating. Addressed by describing the effects a project may have on natural processes in the area. A measure of the degree of environmental modification that will occur because of a project. Addressed by describing the extent of modification that will occur in the area (e.g. length of roads built, facilities constructed) and how apparent the impact will be to the visitors of the area in both the short-term and the long-term.
2	Opportunities for Experiences Often Unique to Wilderness: <ul style="list-style-type: none"> • Solitude • Challenge • Primitive Recreation 	Measured by the opportunity to be isolated from the sights, sounds, and evidence of humans, and experience a high degree of challenge and risk while using primitive outdoor skills. Addressed by describing how project activities might affect the size of the area, the number and type of primitive recreation opportunities available, the opportunity to experience natural quiet, and the addition or absence of facilities.
3	Special Features	Addressed by describing the effect proposed activities would have on other values of ecological, geologic, scenic or historical or cultural significance.
4	Description/Boundary Conditions/Manageability as Wilderness	A measure of the ability to manage an area as wilderness, the resulting configuration of the potential wilderness, and the interaction of the other elements above. Addressed by discussing how proposed activities may affect the boundary location, size, shape, and access to the area.

It should be noted that all inventory criteria and evaluation criteria may not be directly applicable for every project proposal.

Affected Environment

The closest IRA to the North Kilkenny Project Area is the Kilkenny Inventoried Roadless Area (37,096 acres). The southernmost stand proposed for harvest in the project area, Stand 8/33, is approximately 0.6 miles from the IRA boundary. Stands 7/24, 7/48 and 7/35 are more than a mile from the boundary. South Pond Recreation Area is just less than two miles away from the IRA at its closest point.

Direct, Indirect, and Cumulative Effects

The analysis area for direct, indirect, and cumulative effects to inventoried roadless areas is the 2005 Kilkenny IRA. The timeframe for the direct and indirect effects is the duration of the project – approximately 2-4 years. The timeframe for cumulative effects is the past decade, the present, and 10 years into the foreseeable future (1998-2018). This timeframe was chosen because the past 10 years was the basis for roadless area analysis in the Forest Plan, and 10 years into the future represents a reasonable length of time for anticipating upcoming projects.

Alternative 1: No Action

Selection of Alternative 1 (No Action) would result in no direct, indirect, or cumulative effects to the Kilkenny IRA.

Alternatives 2 and 3

The direct, indirect, and cumulative effects of Alternatives 2 and 3 on the Kilkenny IRA are very similar and will be described together.

Effects on Roadless Area Inventory Criteria (Table 5)

Because no activities are proposed within the Kilkenny IRA, there would be no measurable direct, indirect, or cumulative effects on the characteristics of the area that result in inclusion of the Kilkenny area in the roadless area inventory. During and following implementation of Alternative 2 or 3, the area mapped in 2005 as the Kilkenny IRA would still meet the criteria for inclusion in the roadless inventory.

Effects on Wilderness Capability Evaluation Criteria (Table 6)

Due to the distance of the activities proposed in the North Kilkenny Project from the Kilkenny IRA there would be no significant direct, indirect, or cumulative effects on those characteristics of the area as described in the wilderness capability criteria.

Project activities related to timber harvest would result in indirect, short-term, and localized noise that could be audible in a small area near the boundary of the IRA closest to the southernmost stands proposed for harvest. This could affect the opportunity to experience solitude in this portion of the IRA (capability criterion #2). The noise of harvest operation

would occur primarily during fall and winter when human use of the area is lowest, and would occur in areas within the IRA that are not accessible via trail. Consequently, it is unlikely that any visitor to the IRA would experience these effects to the opportunity for solitude. These effects would cease with completion of harvest operations in these stands.

Analysis of wilderness capability criteria 1, 3, and 4 revealed that either the criterion did not apply or that no measurable effects on these criteria would occur.

3.3 Vegetation

Timber Resources

Affected Environment for Timber Resources

Many of the stands located within the Analysis Area have been identified for vegetative treatment because they are overstocked mature stands of northern hardwood, softwood or mixedwood. Many of the trees have low timber quality and are approaching an age where mortality is imminent, or have some damaged component within the stand. According to the *Silvicultural Guide for Northern Hardwood Types in the Northeast* (Leak et al. 1987) and *Silvicultural Guide for Paper Birch in the Northeast (revised)* (Safford 1983) commercially treating these stands would improve the quality and vigor of remaining trees. Existing stand conditions are described in Table 7.

Table 7. Existing Conditions for Stands Identified for Vegetative Treatment

Stand	Habitat Type	Species Mix	Acres	Comment
Compartment 1				
4	Northern Hardwood	Sugar and Red Maple, Yellow Birch	41	Uneven-aged harvest in 1995
18a & 18b	Northern Hardwood	Beech, Sugar Maple, Yellow Birch with scattered spruce/fir	41	Low quality hardwoods with ice storm damage
23a & 23b	Northern Hardwood	Sugar Maple and Yellow Birch	28	Over-stocked mature hardwood stand
26	Mixedwood	White Pine, Red Maple, White Cedar, Spruce/Fir	5	Harvesting southern hardwood portion of stand to increase sugar maple in understory
31	Spruce/fir	White Cedar, Spruce/Fir, Red Maple, Paper Birch	9	Uneven-aged harvest in 1982
32	Mixedwood	White Pine, Spruce/Fir, Red Maple, Beech	13	Uneven-aged harvest in 1982
39	Northern Hardwood	Sugar Maple and Yellow Birch	3	Portions of stand incurred ice damage from 1998 Ice Storm
63	Spruce/Fir	Spruce/Fir, Red Maple,	14	Dense spruce/fir with areas of

Stand	Habitat Type	Species Mix	Acres	Comment
		Paper Birch		well established softwood regeneration
70	Northern Hardwood	Sugar Maple and Yellow Birch	5	Portions of stand incurred ice damage from 1998 Ice Storm
76	Northern Hardwood	Sugar Maple, Beech	29	Uneven-aged harvest in 1980
Compartment 6				
2	Spruce/Fir	Spruce/Fir, red Maple, Hemlock, Paper Birch	14	Low quality hardwoods with softwoods
3	Northern Hardwood	Sugar Maple, White Ash	14	Dense northern hardwood stand
4	Spruce/Fir	Spruce/Fir, Red Maple, Paper Birch	18	Dense spruce/fir with areas of well established softwood regeneration
5	Mixedwood	Spruce/Fir, Red and Sugar Maple, Yellow Birch	37	Low quality hardwoods with dense pockets of softwoods
6	Northern Hardwood	Red Maple, Sugar Maple, Yellow Birch, White Ash	18	Harvest low quality hardwoods
8	Spruce/Fir	Spruce/Fir, Paper Birch, Red Maple	48	Harvest low quality trees
8a	Spruce/Fir	Spruce/Fir, Paper Birch, Red Maple	5	Part of stand 8
9	Mixedwood	Red Maple, Beech, Yellow Birch, Sugar Maple, Paper Birch,	21	Low quality hardwoods and ice storm damage
10	Mixedwood	Spruce/Fir, Red Maple, Paper Birch	39	Mature fir and paper birch
13	Mixedwood	Sugar Maple, Yellow Birch, Ash, Beech, Hemlock	87	17% of the stand was patch cut in 1983 and 1997
17	Spruce/Fir	Spruce/fir, Yellow Birch, Red Maple	24	Patchy growth of mature timber, areas of dense softwood understory
22	Northern Hardwood	Sugar Maple, Beech, Hemlock	84	Harvest low quality hardwoods and promote aspen-birch
34	Aspen	Aspen	18	Mature aspen stand
37	Spruce/Fir	Spruce/Fir, White Pine, Red Maple, Aspen, Paper Birch	15	Over stocked softwood stand
39	Mixedwood	Spruce/Fir, Red Maple, Paper Birch,	12	Low quality softwoods, windthrow damage

Stand	Habitat Type	Species Mix	Acres	Comment
		White Pine		
41	Northern Hardwood	Sugar Maple, Yellow Birch	24	Patchy growth of mature timber sugar maple borer damage
42	White Pine	White Pine, Fir, Hemlock	5	Over stocked softwood stand insect damage
45	Northern Hardwood	Sugar Maple	8	Over stocked hardwood stand sugar maple borer damage
48	Northern Hardwood	Sugar Maple, Paper Birch, Beech	21	Low quality hardwoods with ice storm damage
50	Northern Hardwood	Red Maple, Aspen, Paper Birch, Spruce/Fir	17	Low quality and over-mature hardwoods (aspen-paper birch)
Compartment 7				
1	Northern Hardwoods	Sugar Maple, Red Maple, Yellow Birch	11	Expansion of PWO
4	Spruce/fir	Spruce/fir	90	Uneven-aged harvest in 2001, treatment was not uniformly applied to balsam fir across stand.
8	Northern Hardwood	Sugar Maple, Red Maple, Yellow Birch	15	Low quality hardwoods with limited regeneration
24	Northern Hardwood	Yellow Birch, Beech	47	Patchy growth of mature trees, ice storm damage from 1998 Ice Storm
34	Northern Hardwood	Sugar Maple, Yellow Birch, Beech, Spruce, Hemlock	19	Dense stand with low quality trees
35	Northern Hardwood	Sugar Maple, Yellow Birch, Beech, Red Maple	47	1998 ice storm damage
48	Northern Hardwood	Spruce/Fir, Paper Birch	16	Overstocked softwoods with pockets of paper birch
Compartment 8				
33	Spruce/Fir	Spruce/Fir, White Pine	34	Over stocked softwood stand

The Analysis Area has been actively managed for wood products for over 100 years due to its capability to regenerate and produce high quality trees. Logging has played an important role in the White Mountains since the 19th century and present vegetative conditions are largely the result of historical logging practices and more recent forest management. There is no documentation or evidence that the Analysis Area was or is considered prime farmland due to the rocky nature of the soils; although some of the more level areas near the Upper Ammonoosuc River were once managed for grazing of livestock.

South Pond HMU

Since 1998, four timber sales have occurred within the South Pond HMU, harvesting a total of 1,133 acres on MA 2.1 lands (11,781 acres). This included 977 acres of uneven-aged management using single tree and group selection harvest and 156 acres of even-aged management using overstory removal, clear cut and patch cut harvest.

Roadside assessments and comparing 1995, 2003 and 2005 aerial photos shows that the main activity taking place on private lands surrounding the South Pond HMU is timber harvesting with little residential and industrial development. Within the past ten years, approximately 300 acres of private land has been harvested. Adjacent to the South Pond HMU, privately owned land has been harvested on two parcels; one is a 166 acre parcel surrounded by National Forest lands which was harvested in the late 1990's using even-aged treatments. The second is a 134 acre even-aged harvest located to the east of the Forest Service boundary. The 2005 Final Environmental Impact Statement (FEIS) (USDA- Forest Service, 2005b, pp 3-80 to 3-86) identified trends of decreasing forestlands and increasing populations over the next 20 years in all of the State, except for Coos County.

In the foreseeable future, there is a possibility that the Forest Service will engage in further assessment of the South Pond HMU to determine if there is potential for additional vegetation management activities within this area over the next ten years. Such activities would take place on MA 2.1 lands, and would be consistent with the same habitat objectives that defined the Need for Change for this project.

Other projects that have occurred in the South Pond HMU in the last ten years include; a 2004 Decision Memo for a Forest-wide Wildlife Opening and Scenic Vista Maintenance, and Hazardous Fuels Reduction Project of which nine acres comprising four PWOs are located in the South Pond HMU; establishment of the Rocky Pond snowmobile trail which included closing the Pearly Lang snowmobile trail, and reconstruction of bridges and roads along South Pond and York Pond Roads.

Mill Brook HMU

The Mill Brook HMU is located to the west of the South Pond HMU. The Forest Service is proposing a 1,066 acre vegetation management project in Compartments 2, 3 and 4 in the northern portion of this HMU for 2008. The proposal is to regenerate 47 acres of northern hardwoods, expand two PWOs for a total of 9 acres, and treat the remaining 1,101 acres using uneven-aged prescriptions. Other projects include ongoing maintenance of permanent wildlife openings using prescribed fire and mowing, rehabilitation of existing campsites and construction of tent platforms at Unknown Pond, and a watershed project to obliterate a 500' section of road adjacent to Mill Brook and restore small sections of Mill Brook within and upstream of this area.

The total acreage of Compartments 2, 3 and 4 is approximately 8,500 acres of which 3,610 acres are assigned to MA 2.1. Within the past ten years, there have been three timber sales within these compartments; West Branch (2000), Little Mac (2004) and McCordick Brook

(2004). A total of 356 acres was harvested; 233 acres using uneven-aged management such as commercial thinning, group selection and individual tree selection and 123 acres using even-aged management such as patch cut, clearcut and seed tree cut.

Within the northern portion of the Mill Brook HMU there are two private lots surrounded by National Forest lands that have been or may be harvested within the next ten years, totaling 333 acres.

The Analysis Area for direct and indirect effects on timber resources is MA 2.1 lands within Compartments 1, 6, 7 and 8 of the South Pond HMU. This area is situated with Route 110 to the north, an unnamed ridgeline from Green's Ledge to Square Mountain to the south, the Kilkenny Ridge to the west, and the National Forest boundary to the east. These are National Forest lands that permit vegetation management using various silvicultural techniques. The Analysis Area encompasses 6,909 National Forest acres of which approximately 98% of these lands comprise a closed-canopy forest of mature and old age classes with even-aged and uneven-aged stands. The amount of closed and open canopy helps to describe the structural diversity within the Analysis Area. **The temporal scope for direct and indirect effects on timber resources** is up to two years after the proposed activities occur on the ground. This time period was chosen because it represents the length of time for regeneration to become established in the understory.

The Analysis Area for cumulative effects on timber resources encompasses National Forest lands within the South Pond HMU, the northern portion of the Mill Brook HMU (Compartments 2, 3 and 4) and adjacent private land within the National Forest proclamation boundary (see Map). This includes 24,184 acres (15,684 acres in South Pond HMU and 8,500 acres in the northern portion of Mill Brook HMU) of National Forest lands in Management Areas 2.1 and 6.2, and approximately 3,080 acres of private land within the towns of Milan and Stark. This area was chosen because; 1) the habitat objectives for the South Pond HMU provides a measurable assessment of how the Proposed Action and its alternatives contribute to the habitat objectives of the White Mountain National Forest, as defined in the 2005 Forest Plan; 2) it takes into account a proposed vegetation management project in an adjacent HMU and; 3) it considers activities on private lands that are adjacent to the Project Area.

The temporal scope for cumulative effects on timber resources is ten years past and ten years into the future (1998-2018) from when the proposed harvest will occur. Ten years is particularly crucial as a time frame because it represents the length of time after an even-aged harvest has occurred and the stand is considered in the regeneration phase of growth where the canopy is not fully closed and sunlight can penetrate the majority of the ground. A look at the existing condition of the South Pond HMU shows a deficiency in the regeneration age class (0-9 years) in the northern hardwood and aspen-paper birch habitat types. With an open canopy, early-successional, shade intolerant species such as aspen and paper birch and intermediate shade tolerant species such as sugar maple and yellow birch can become established both at the stand level, and as a component in stands of other habitat types.

Direct and Indirect Effects on Timber Resources

The goal of MA 2.1 lands is to provide high quality sawtimber and other timber products on a sustained yield basis. This is accomplished by maintaining a healthy, vigorous forest through forest management. Forest management is also used to influence the species composition of forest stands to improve diversity and enhance the quality of timber products being grown. The use of various silvicultural treatments, such as group selection, clearcutting and individual tree selection can influence the desired species mix.

Alternative 1: No Action

Species Diversity

Under the No Action Alternative, all stands in the Project Area would continue to grow and mature. Some trees would die from natural forces related to size, competition, or age stress. Other similar or more shade-tolerant individuals would replace these trees. Over a long period of time, the stand would begin to resemble a climax vegetation type. There would be a species shift from stands that may contain paper birch, red maple, white pine, ash, and aspen, to stands dominated by beech, sugar maple, yellow birch, and spruce/fir. Natural disturbances could modify this outcome by temporarily providing an opportunity for the less, shade-tolerant species.

Forest Health and Productivity

Older trees would die out and the remaining, healthy trees would grow larger. As the balsam fir within stands grows older, it will become more susceptible to natural mortality, ice damage, wind throw, and forest pests. Susceptibility to natural forces over time results in natural disturbances. These may occur in small pockets or over larger areas.

The Forest Plan goal of providing high quality sawtimber and other timber products on a sustained yield basis would not be met.

Action Alternative 2: Scoped Proposal

Species Diversity

Stands with prescriptions for individual tree and group selection harvest (see Table 1) would create small groups of 1/20th acre in size to release or regenerate softwoods and up to 2 acres in size to release or regenerate intermediate shade tolerant hardwood species. Group selection harvests would remove approximately 17-35% of each stand, as prescribed. Individual tree selection would remove trees that are damaged, diseased or poor quality and would focus growth on selected, healthy trees. These treatments would maintain an uneven-aged stand leading to greater diversity of age classes and species. Where advanced regeneration is present, such as spruce and fir in the mixed hardwood/softwood stands, it will be strongly represented in the resulting stocking. Overall, the health and vigor of stands would be improved, resulting in increased growth rates on selected quality sawtimber trees. Group selection would continue to be practiced in these stands in future management entries.

Clearcuts would generally be located in areas of low quality and/or mature trees to allow the next generation of trees the opportunity to grow at their full potential. Species content in

clearcut treatments would shift more towards shade intolerants/intermediate shade tolerant, and early successional species such as aspen, paper birch, and white ash. The disturbance may encourage regeneration of yellow birch and sugar maple. Monitoring of past clearcut harvest units on similar sites has shown rapid establishment of hardwood and softwood regeneration with the same species mix found in pre-cut mature forests.

The portion of stands 1/39 and 1/70 proposed for clearcutting incurred severe crown damage from the 1998 storm. Because many of the trees are damaged and growth rates have slowed due to stand maturity, now is an opportune time to start over by clearcutting. This would improve timber productivity at the site, and capture economic value before mortality incurs.

Stands 1/18a and 1/18b (Alternative 2) are also being proposed for clearcutting for the same reason as stands 1/39 and 1/70. Aside from crown damage to many of the sugar maple, most of the beech trees are infected with beech bark disease which has resulted in reduced wood quality and stand productivity.

Stand 6/9 is proposed for clearcutting to salvage mature paper birch that is dying due to damage from the 1998 storm event. Also, though this is a mature northern hardwood stand, many of the trees are still pole-size which concludes that height and diameter growth rates have declined. Economically now is the time to harvest this stand so it can be restocked with vigorous, fast growing trees that can effectively utilize the site. Also clearcutting would maintain a component of paper birch within this stand since it is a shade intolerant species.

Over the past 20 years, stand 6/13 has had small patchcuts dispersed throughout it. This has led to a diverse stand of varying age classes and species mix. These patchcuts are growing healthy, young sugar maple, ash and yellow birch. A 10 acre clearcut would continue to maintain a diversity of age classes and provide regeneration habitat now that the most recent patchcuts are moving into the young age class.

A direct effect of clearcutting in northern hardwood stands is the promotion of stump sprouts in species such as aspen and red maple. According to a study on four sites in New England, *Whole-tree Clearcutting in New England: Manager's Guide to Impacts on Soils, Streams, and Regeneration* (Pierce et al. 1993), stump sprouting and germination of new seedlings began in the first growing season after harvest. Within five years after cutting, young, dense stands were established on all four sites. Stocking surveys conducted on the Forest three years after treatment has shown successful regeneration in even-aged and uneven-aged harvested stands and that trees are a sustainable resource.

The seed tree cut prescription for stand 6/34 would remove the majority of low quality northern hardwoods and overmature aspen and birch. The aspen and paper birch are beginning to losing sawlog quality and now is an opportune to harvest these species before they lose financial value as well. Scattered aspen and paper birch trees would be retained to serve as seed trees. The newly generated stand would be a mix of aspen, paper birch and intermediate shade tolerant northern hardwood species such as sugar maple and yellow birch. This prescription would continue to provide aspen-paper birch habitat and be consistent with the land capability for the site.

Stand 7/24 is a northern hardwood stand with mature yellow birch in the overstory and mostly young beech in the understory. Many of the overstory trees incurred crown damage from the 1998 Ice Storm. By removing a portion of the overstory in patches (2 to 5 acres), intermediate shade tolerant species such as sugar maple and yellow birch can become established and create a more diversified species mix in the understory.

Shelterwood harvests for stands 1/30, 6/37, 6/39 and 6/42 would create growing conditions for species that are somewhat intolerant of shade. For all stands, low quality and mature softwood and northern hardwood trees would be harvested while white pine and other softwoods of better form and quality would be retained. By removing approximately 50-60% of the stand, additional sunlight would accelerate growth on young pine, spruce and fir saplings and seedling allowing them to move into the midstory.

The commercial improvement cuts in stand 1/32 would remove some of the mature, lower quality hardwood trees to encourage a more mixedwood composition of paper birch, spruce/fir, pine and cedar.

With commercial thinning, a portion of the stands would be harvested and removed to stimulate regeneration and to harvest defective or declining trees. Approximately 1/3 of the stocking would be removed to create space and light for seeds to germinate and for young trees to grow. Generally, the poorer quality or codominate trees would be harvested, leaving a stand of well-spaced trees with a understory of tree regeneration and other woody plants. Over time, residual tree growth and in-growth returns the stand to full stocking. The residual stand restricts sunlight so that the treatment would favor more shade tolerant plants and trees.

Expansion of the four permanent wildlife openings would convert 21 acres of tree production ground to ground retained in a shrubby, herbaceous condition. These areas would be maintained by mowing, prescribed burned or mechanical treatment every 3 to 5 years to discourage growth of woody vegetation and favor herbaceous plant species such as goldenrod and raspberries.

Forest Health and Productivity

There is evidence of insects and fungus infestation within stands that contain balsam fir, sugar maple, aspen, pine and beech. These agents suppress growth, reduce stand vigor and health, impact tree quality and economic value and eventually lead to tree mortality.

Balsam fir at all ages is subject to insect and disease attack (Frank and Bjorkbom 1973) Balsam fir in stands 1/63, 6/4, 6/5, 6/8, 6/10, 6/39, 6/41, 6/42 and 7/4 are overmature and are susceptible to pathogens and rot, and many are showing signs of infection. This includes bore holes in tree trunks, butt rot and defoliation of crowns. All of this weaken trees and supresses tree growth. Because balsam fir is shallow rooted, as trees weaken they become more susceptible to wind damage and wind throw which is evedent in the proposed stands. This is especially true in old, unmanged stands on wet, shallow soils (Johnston, 1986). It is recommended that damaged trees be removed through timber harvest to improve stand health and capture economic value. Release of damaged trees not only increases growth on residual healthy fir, but also can reduce incidence of rot. To reduce wounding to fir (which is how

pathogens enter trees) harvest operations would occur in the winter, when the base and roots are snow covered.

The majority of the beech within all of the proposed stands suffers from beech bark disease (*nectria ditissima*). Aside from using expensive insecticides, there is no other way to treat the disease. To improve the health of these stands, diseased trees will be removed and disease resistant beech trees would be retained for the propagation of genetically resistant offspring. This would increase the level of resistance in the Forest and lead to a healthier beech population in the future.

Many of the over-mature aspen in stand 6/34 show signs of a fungus commonly called konkrot which appears in the upper bole of the tree at the base of limbs. Since the rot appears in the upper portion of the tree, there may still be sawlog quality logs within the lower portion. To obtain the full value of the stand, now is an opportune time to harvest the stand before decay and discoloration becomes excessive. Also, it is an opportune time before the disease has an opportunity to spread to healthy aspen and decrease quality and value. The seed tree harvest for stand 6/34, would create a new stand that is vigorous, fast growing with minimal disease.

Young and mature sugar maple in stands 6/41 and 6/45 exhibit sugar maple borer damage in the lower 20 feet. This is where most of the timber value of the tree is located and sawlog quality is compromised due to galleries, discoloration, decay and twisted grain. To control the borer infestation, sugar maple trees that are infected would be harvested to prevent reinfestation to residual sugar maple. By harvesting sugar maple in the early phase of the disease, most of the sawlog quality and value is retained. Individual tree selection would open up these stands to promote sugar maple regeneration which would replace damaged trees over time.

Scattered pines within stands 6/37 and 6/42 are infected with white pine blister rust which has produced cankered (dead and sunken) areas on tree trunks and branches. Other pines show signs of white pine weevil characterized by crooked and multiple stems. These deformities result in a loss of merchantable volume and lumber grade. The best silvicultural practice to reduce damage from the white pine weevil is to maintain approximately 40-50% crown closure of the overstory trees (Katovich and Mielke 1993). By removing infected trees and retaining healthy trees, the overall health and vigor of the stand would improve.

Summer harvesting (June –October) would be permitted in clearcuts, patchcuts and seed tree cut stands where bark damage would not be an issue since no or few residual trees would remain. These areas would provide habitat for herbaceous species that require disturbance. Many plants have adapted to survive in clearcuts or can quickly re-colonize these areas a short time afterwards (Whitman and Hagan 2000). There would be some species of plants that can not tolerate direct sunlight and would die, however these would be replaced by species that are sun tolerant.

Harvesting in the fall may damage portions of the understory due to repeated passes of logging equipment. To minimize disturbance, pre-existing skid trails would be used as much as possible and new trails would be laid out prior to operation to reduce the area affected.

Winter harvesting over a snow pack can minimize damage to understory vegetation from repeated passes of logging equipment. Regardless of season of operation, existing skid trail locations would be used where feasible, and new trails would be laid out prior to operations, limiting the area affected by harvest operations and minimizing impacts to the harvest area. All skid trails would be located, developed and utilized in accordance with Forest Plan standards and guidelines and New Hampshire Best Management Practices (BMPs).

Indirect effects may include an increased risk of windthrow in the partially cut stands, and to trees adjacent to clearcuts, patch clearcuts and group selection areas. Trees exposed to the wind on wet sites are susceptible to windthrow until crowns expand to fill the canopy and the roots become windfirm. Some residual tree damage would occur from harvesting operations, but skid trails are planned adjacent to trees marked for removal in order to provide adequate working space for logging equipment. Mortality of stressed trees due to insect, disease and/or damage may be increased.

By removing low quality trees, future harvesting in these stands should lead to a higher percentage of quality sawlogs.

Connected Actions and other Proposed Activities

Road maintenance would most likely result in the occasional removal or trimming of vegetation in some areas to accommodate equipment. Curve widening on FR 460 near the Pond Brook snowmobile bridge would require removal of some trees to improve sight distance and public safety.

Two of the roads proposed for construction are upgrades to existing travel ways; the Rocky Pond snowmobile trail and a skid road that extends from FR 460B. These travel ways have a defined road prisms, ditches and are vegetated with grass (no woody vegetation). Construction would have little effect on existing vegetation and would consist of trimming tree limbs and removal of some young trees along the road edge to accommodate logging equipment.

The third road proposed for construction (FR 64B) will require felling trees and lying in a new roadbed. Approximately 0.7 acres will be removed from the productive land base to accommodate this new road.

The watershed restoration projects near the Percy Road (FR 208) and Rocky Pond would remove scattered, mature trees within 75 feet of the treatment areas (skid roads and stream channel). This would be similar to an individual tree harvest and the area would be maintained as mature forest. The additional sunlight would encourage regeneration and promote a multi-age riparian zone along these areas. Thus as mature trees, die out, younger trees will be present to take their place and provide future channel stability. The residual canopy cover would meet Forest Plan Standards and Guideline for Riparian and Aquatic Habitats (USDA-Forest Service 2005a. p2-24).

The establishment of the Rocky Pond snowmobile trail in 2001 utilized existing Forest roads, logging roads and skid trails. Road brushing and removal of some trees was required to bring the trail up to prescribed specifications.

Upgrade to roads and bridges along South Pond and York Pond roads required minimal removal of brush and small trees along cutbanks and road edges to install structures. These areas are now revegetating to naturally occurring species.

For the recreation project at the South Pond Recreation Area, some trees and vegetation may be removed surrounding the existing leach field to bring it up to standards. No trees would be removed to install the new septic line since it would be at the same location as the existing line which follows the South Pond road and the leach field access road. Also, trees and woody vegetation would not be effected by the installation of the new drain pipes below the parking lot and new lines connecting the septic system to the host site since these improvements would occur on open, grassy ground.

Action Alternative 3: Modified Proposal

The direct and indirect effects would be very similar to Alternative 2 with several modifications.

Species Diversity

Because of numerous stands prescription changes (See Section 2.0) and acre adjustments due to rockiness of soil and limited accessibility, the proposed regeneration-age acres for northern hardwoods decreased from 96 acres to 81 acres. The majority of these prescriptions were changed to group selection or patch cut with the goal of encouraging shade intolerant and intermediate shade tolerant northern hardwood stands and softwoods within 0.5 to 5 acre patches.

The number of permanent wildlife openings (PWOs) proposed for expansion is reduced from four to three due to the deferral of stand 1/4a. However, the total acres of PWO has been expanded by four acres. There are few opportunities to create large PWOs over 10 acres because of sloping terrain, rocky soils, wet ground and limited accessibility for large equipment to maintain openings. Evaluating existing PWOs within the analysis area, stand 7/1 was a good candidate to create a large PWO within because it is on relatively flat terrain, is not very rocky, has good accessibility since it is adjacent to a main access road, is relatively dry and FR 460 serves as a firebreak during prescribed burning. For this alternative, 24 acres from expansion of the PWOs would be removed from the production land base.

Stand 1/30 is deferred from treatment until further field review by the Forest Botanist and Forest Hydrologist to determine areas to be classified as “Outstanding Exemplary Community.”

Forest Health and Productivity

Effects would be the same as Alternative 2.

Cumulative Effects on Timber Resources

Alternative 1: No Action

Species Diversity

This alternative will not contribute incrementally to the effects of timber harvest or land clearing within the Analysis Area over the 20-year period from 1998-2018. Without timber harvest now or over the next 10 years; species, age class and structural diversity will remain static or diminish on National Forest lands within the South Pond HMU. Diversity may be enhanced by natural disturbance, such as a weather event, fire, disease or an infestation that can create forest openings and provide some limited opportunities for shade intolerant plant species. However, on National Forest lands, regenerating and young stands will age and grow closer to the surrounding canopy. This will have the effect of reducing sunlight to the forest floor and reducing regeneration of shade intolerant species. Mature stands of the short-lived (50-60 years) paper birch and aspen community types will continue to age towards mortality, many to be replaced by shade tolerant species now growing in the understory of these stands.

Within the Project Area itself, some of the aspen-paper birch within compartment/stand 6/34 would be replaced by shade tolerant hardwoods and eventually dropping out of the species mix. The same is possible for white pine seedlings within stands 6/37 and 6/42 as they are out-competed by spruce/fir and shade tolerant northern hardwoods.

This project is within four compartments of the South Pond HMU (1, 6, 7 and 8) and within the next ten years we may enter this HMU to evaluate harvest opportunities in other compartments (9, 10, and 23). The extent of foreseeable future harvesting is not yet known and will be determined by future stand exams.

The opportunity to harvest within the northern portion of the Mill Brook HMU will continue to be analyzed.

Timber harvest on private lands has and will continue to result in temporary changes in age class and distribution.

There would be no cumulative effects on vegetation from improvements to septic system at the South Pond Recreation Area. It is a relatively small project and doesn't require many trees to be harvested to accomplish its objectives

Forest Health and Productivity

The cumulative effects would be the same as direct and indirect effects.

Action Alternatives 2 and 3

Species Diversity

These Action Alternatives will contribute incrementally to the effects of timber harvest or land clearing within the Analysis Area over the 20-year period from 1998-2018. These effects are consistent with those effects anticipated and analyzed in the 2005 FEIS (USDA-Forest Service, 2005b, pp 3-73 to 3-164).

Even-aged harvests and the Permanent Wildlife Opening expansions would have the effect of reducing the acres in closed canopy forest and contributing to age class variation within the forested landscape. Table 8 compares the cumulative timber harvesting within the South Pond HMU and other stand regenerating activities on MA 2.1 lands for the alternatives.

Table 8. Cumulative harvest (acres) on National Forest (NF) Lands in South Pond HMU. Even-aged regeneration harvest and PWOs are noted in parentheses

Harvest Time Frame	Alt 1	Alt 2	Alt 3
Harvesting on NF acres in the past 10 years	1,133 (154)	1,133 (154)	1,133 (154)
Proposed NF acres for harvest	0	1031 (137)	1007 (124)
Cumulative NF acres harvested from 1998-2018 % of MA 2.1 0-10 age class	1,133 (154) 1.3%	2164 (291) 2.4%	2140 (278) 2.4%

Within the northern portion of the Mill Brook HMU (Compartments 2, 3 and 4) approximately 10% or 356 acres of MA 2.1 (3,610 acres) lands has seen timber harvested within the past ten years. The proposed Mill Brook vegetation management project would harvest approximately 1,066 acres of which 56 acres would use even-aged management.

Table 9 below combines the past harvesting and proposed harvesting within South Pond and Mill Brook HMU for the alternatives.

Table 9. Cumulative harvest (acres) in South Pond and Mill Brook HMUs. Even-aged regeneration harvest and PWOs are noted in parentheses

Harvest Time Frame	Alt 1	Alt 2	Alt 3
Acres harvested in the past 10 years	1,489 (277)	1,489 (277)	1,489 (277)
Proposed harvest acres	0	2,097 (193)	2,073(180)
Cumulative acres harvested from 1998-2018 % of MA 2.1 in the 0-10 age class	1,489 (277) 1.8%	3,586 (470) 3.0%	3,562 (457) 3.0%

Of the 3,080 acres of private lands within the proclamation boundary adjacent to the South Pond HMU and private lots within the northern portion of Mill Brook HMU, approximately 80% (2,533 acres) is in forested lands. The remaining 20% is in residential lots, and agriculture or marsh lands. Of this 80%, approximately 22% (550 acres) has been final harvested (ie. clearcuts and final shelterwood removal) within the past ten years. It is likely

that light timber removals has occurred within the cumulative effects area (CEA), but it is not apparent on aerial photographs. Of the 550 acres; 166 acres is now in the later phase of regeneration age, and in the next three years will move into the young age-class with closed canopy conditions; 134 acres bordering the east side of the South Pond HMU was recently harvested in 2003/2004 and; 250 acres located within the Mill Brook HMU was harvested in 2006.

Two individual parcels totalling 199 acres owned by one company will likely be harvested using a shelterwood prescription within the next five years. It is unknown what the residual basal area will be after harvest and whether it qualifies as a clearcut according to Forest Service standards.

Table 10 shows the cumulative effects of past, proposed and future logging within the cumulative effects area (27,264 acres of which 24,184 acres of National Forest lands and 3,080 acres of private lands).

Table 10. Cumulative harvest (acres) on National Forest and private lands. Even-aged regeneration harvest and PWOs are noted in parentheses

Harvest Time Frame	Alt 1	Alt 2	Alt 3
Harvesting on NF and private acres in the past 10 years	2,039 (827)	2,039 (827)	2,039 (827)
Proposed NF acres for harvest	0	2,097 (193)	2,073(180)
Proposed Private acres for harvest	199 (199)	199(199)	199 (199)
Cumulative NF and private acres harvested from 1998-2018 % of land in the 0-10 age class	2238 (1026) 3.7%	4,335(1219) 4.4%	4,311(1206) 4.4%

There are no known residential or industrial developments or land use changes proposed for private lands within the Analysis Area. They will continue to be managed, either as forest or agricultural lands.

There would be no cumulative effects on vegetation from the watershed restoration project, improvements to South Pond Recreation Area or road construction. These are relatively small, isolated projects and don't require many trees to be harvested to accomplish objectives.

Forest Health and Productivity

The cumulative effects would be the same as direct and indirect effects. The majority of the northern hardwood and softwood stands are at least 80 to 90 years old and growth is slowing. By harvesting now, sites supporting these slow growing trees would be restocked with younger, more rapidly growing trees and therefore the average future growth per acre would increase (USDA Forest Service. 2005b). Overall, by removing diseased, damaged and low

quality trees within stands, it promotes healthy vigorous future forest that increase in value over time due to higher quality residual trees.

3.4 Non-Native Invasive Plants

Non-native invasive species (NNIS) pose a serious threat to plant and animal community health and diversity. Because exotic species, by definition, have been transplanted outside their original range, they often lack natural controls (e.g., disease, predators, parasites, or climate), which allows them to out-compete and eventually replace more sensitive native species. Not only do they compete with native species for resources, but they also cause loss of habitat and food for wildlife, alter soil structure and chemistry, alter fire regimes and plant succession, serve as reservoirs for pathogens, and hybridize with natives to compromise local genetic diversity. Once NNIS become established, they are extremely difficult to eradicate, and the resulting change in community plant composition can alter ecosystem dynamics and functions over time. With any management activity that requires the use of heavy equipment brought in from off-site, disturbs the soil, and/or increases sunlight exposure to the ground, there is a high risk of transporting and spreading NNIS to or from the Project area.

Under Executive Order 13112 (February 3, 1999), Federal agencies whose actions may affect the status of invasive species shall not authorize, fund, or carry out actions that are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere unless the agency has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species.

Roads: The majority of NNIS locations observed within the vicinity of the WMNF have been along roads and highways, and in developed areas. Roads, as fragmenting agents, increase the amount of forest-edge habitat on the landscape. The resulting “road-effect zone” is subject to alterations of the microclimate, as well as to frequent and intense disturbance activities, the combined effects of which tend to favor the growth of opportunistic NNIS (Parendes and Jones 2000; Forman and Deblinger 2000). Moreover, roads also serve as major corridors for the dispersal of invasive plants through the spread of seed propagules (e.g., seeds or vegetative fragments) that attach to vehicle hardware (Westbrooks 1998; Parendes and Jones 2000; Lonsdale and Lane 1994).

Skid trails: Skid trails and haul roads within timber sales serve as the primary conduits for non-native species invasion for the same reasons outlined above.

Riparian Areas: Several studies have found that riparian areas that have high native species richness also have high non-native species richness, due in part, to the availability of virtually unlimited resources (i.e., high levels of light and nutrients), as well as a relatively constant state of intermediate disturbance (via flooding and bank scouring) that results in continual structural and compositional changes (Stohlgren et al. 2001; Stohlgren et al. 1998, and Planty-Tabacchi et al. 1996). Moreover, streams and rivers form a connected network throughout the landscape, and thus, facilitate the spread of both native and non-native species at a large geographical scale.

Disturbance, therefore, in and around riparian areas, would greatly increase the risk of introducing and spreading non-natives to these vulnerable ecological communities.

Affected Environment for Non-Native Invasive Plants

The White Mountain National Forest has been working with The New England Wildflower Society to determine species and locations of non-native invasive plant species. Findings to date have produced a list of invasive species that exist on or near the National Forest. The majority of locations observed have been on the perimeter of the National Forest, primarily along roads, highways and in developed areas such as towns, residential areas and recreation areas.

One species of NNIS, reed canary grass (*Phalaris arundinacea*) was located during project surveys for the North Killkenny Vegetation Management Project Area (2005, 2006 unpublished WMNF botany reports). While this species is on the WMNF NNIS list and its population tracked, it is not a species of great concern and it does not require control actions (C. Mattrick, 2006 unpublished botany report).

There are numerous infestations of NNIS on private land with some cultivation of NNIS in home landscapes around North Pond adjacent to the project area. Documented NNIS in these locations include burning bush, knotweed, goutweed, and coltsfoot.

Determination of Risk

Forest Service Manual (FSM) 2080.44.6 outlines the responsibilities of Forest Service line officers to determine the risk of NNIS introduction or spread as part of the NEPA process for proposed actions. Risk assessments are to be completed for any ground disturbing activities (FSM 2081.03). For projects having moderate to high risk of introducing or spreading non-native invasive plants (as determined by project Risk Assessments), the project decision document must identify specific control measures that should be undertaken during project implementation to reduce the potential environmental effects of NNIS (FSM 2081.03-1). Given the implementation of the 2005 Forest Plan standards and guidelines for controlling the introduction or spread of NNIS (USDA Forest Service 2005a, Chapter 2, pages 11-12), and the absence of NNIS populations in and around the Project Area (except the one sighting of reed canary grass which is not of concern), the overall risk rating assigned for the North Killkenny Vegetation Management Project is “Low” (NNIS Risk Assessment in Project File).

The Analysis Area for direct and indirect effects on non-native invasive species is the Project Area, because this is where vehicles and equipment will have access and operate on the ground. These vehicles and equipment, as well as gravel, seed and mulch brought to the Project Area from off-site are the most likely entry for non-native invasive species (NNIS). Newly created openings are also potential entry sites, due to introduction of shade intolerant NNIS by wildlife. **The temporal scope for direct and indirect effects on non-native invasive species** is the time period that encompasses active harvest operations and connected actions because this is when NNIS would most likely be introduced into the project area.

The Analysis Area and rationale for cumulative effects on non-native invasive species is the same as Vegetation (see Section 3.3). **The temporal scope for cumulative effects on non-**

native invasive species is ten years in the past and ten years in the future (1998 to 2018). This allows consideration of temporary openings established by timber harvest over the past ten years (anything over ten years will have re-established a canopy, blocking sun from shade intolerant NNIS plant species), and the ten years it will take the temporary openings established by the Action Alternative to re-establish a closed canopy. It also encompasses construction and residential development that may have or could introduce NNIS during this period. This time frame also allows consideration of the invasive plant inventory conducted by the New England Wildflower Society during 2001 and 2002 that covered 220,000 acres across the National Forest and adjacent lands, including the Cumulative Effects Analysis Area (USDA-Forest Service, 2005b, Chapter 3, pages 154 to 158).

Direct and Indirect Effects for Non-Native Invasive Plants

The analysis looks at the risk of infestation and spread of non-native invasive species especially in roads, landings, seed tree cuts, clearcuts and newly created PWOs.

Alternative 1: No Action

Alternative 1 would not introduce new migration routes or sites for invasive species. There would be no direct or indirect effects from timber harvest, road construction, stream restoration or other activities. NNIS could still be introduced by vehicles travelling on Forest Roads in the Project Area or road maintenance activities along these roads.

Action Alternatives 2 and 3

Implementing the 2005 Forest Plan standards and guidelines (USDA Forest Service 2005a, Chapter 2, pages 11-12) reduces but does not eliminate the possibility of introducing NNIS. Potential locations where activities proposed in the Action Alternatives could introduce or spread NNIS include road restoration on Forest Roads, proposed construction of new winter roads and log landings, permanent wildlife opening expansion, skid trails, improving the septic system at South Pond Recreation Area, and the watershed and stream rehabilitation projects.

The potential for NNIS to migrate into the Project Area from surrounding areas is greatest in clearcuts, patch cuts and seed tree cuts where the canopy is removed. Migration is typically through wildlife or wind transporting seeds, and the risk is greatest one to two years after harvesting, when native plant species are starting to revegetate sites. The risk of this occurring is very low in the Project Area since there are no established NNIS species in or adjacent to any of the stands proposed for treatment. The potential for this effect would be greatest for Alternative 2 which proposed 137 acres of these types of treatment and least for Alternative 3 which proposed 124 acres.

Cumulative Effects for Non-Native Invasive Plants

All Alternatives

No infestations or individuals of NNIS were located during project surveys of the North Kilkenny Vegetation Management Project Area with the exception of reed canary grass which does not require control actions (WMNF unpublished data 2005, 2006, Project File).

While there are no known locations of NNIS within the Project Area, there are numerous infestations of NNIS on private land within the cumulative effects area. This includes cultivation of documented NNIS such as burning bush, knotweed, goutweed, and coltsfoot in home landscapes around North Pond. Thus there is a greater likelihood of introducing and/or spreading NNIS within the North Pond area as a result of activities on private lands. There also is a risk of NNIS becoming established in harvest areas on adjacent private lands. The New Hampshire Best Management Practices (BMPs) provide no specific guidelines for reducing or controlling the introduction or spread of NNIS through activities associated with timber harvest (www.dred.state.nh.us/divisions/forestandlands/reference). The New England Wildflower Inventory 2001/2002 inventory found that two-thirds of the invasive plant occurrences were found on private land outside the National Forest, and almost half of all occurrences were intentionally planted (USDA-Forest Service, 2005b, Chapter 3, pages 154 to 155). There are no restrictions on introduction of non-native invasive species on private lands, particularly in residential development, where NNIS often shows up in gardens.

Even in the absence of known NNIS populations in the Project Area and incorporating the 2005 Forest Plan standards and guidelines, the cumulative effect of implementing the Action Alternatives is an increased risk of introducing NNIS into the Project Area. This risk is inherent to the activities proposed in the Action Alternatives, and contributes to the greater risk from past, present and future activities on surrounding private lands, but the incorporation of the 2005 Forest Plan standards and guidelines reduces this risk.

3.5 Soils

3.5.1 Soil Erosion and Compaction

Affected Environment for Soil Erosion and Compaction

The project area contains soils common to the White Mountain National Forest and are moderate to well-drained fine sandy loam or sandy loam. The project area is too low on the landscape and gentle in slope to have dry debris slides that would lead to mass movement of shallow gravelly soils. It is low enough on the landscape to have deep soil slumps; however, field review indicated this soil hazard does not exist here (Colter 2006). Therefore, soil erosion and compaction are the only potential physical hazards that could result from the Proposed Action.

The Project Area is a mix of northern hardwood and softwood Ecological Land Types (ELTs). Ecological Land Typing is useful for making decisions about the method of harvesting to use (even- or uneven-aged management) and the season when harvesting can occur to minimize soil disturbance. Table 11 lists the ELTs represented in the Project Area.

Table 11. Ecological Land Type (ELT) by Forest Stand

Stands	ELT	Description
All of 1/31, 1/32 and 1/70 and Portions of 1/4, 1/23, 1/23a, 1/26, 1/39, 6/3, 6/8a, 6/10, 6/22, 6/34, 6/48, 6/50 and 7/34	115G	The climax species for this ELT is sugar maple and beech and subclimax species of red maple and yellow paper birch. It is usually found on broad basin-like areas on lower mountain slopes. The soil type is moderately drained, fine sandy loam. Surface soil erosion is high. These soils are moderately suitable for summer operations.
All of 1/63 and Portions of 6/2, 6/3, 6/4, 6/5, 6/6, 6/8, 6/8a, 6/10, 6/13, 6/17, 6/34, 6/50, 7/4 and 8/33	115A	The climax species for this ELT is fir, spruce & hemlock with subclimax species of yellow birch, red maple & paper birch. It is usually found lower slopes and intervals at lower elevations with slopes less than 45%. The soil type is moderately well drained, and is a fine sandy loam. Surface soil erosion is high. These soils have moderate to low suitability for summer operations.
Portions of 1/4 and 6/3	105	The climax species for this ELT is beech with subclimax species of red maple and paper birch. The soil type is a sandy loam. Surface soil erosion is moderate and is well drained. This soil has low suitability for summer operations.
All of 6/9 and Portions 6/8, 6/10 and 6/48	102C	The climax species for this ELT is beech and sugar maple with subclimax species of yellow birch, paper birch and red maple. It is a moderately deep soil on hardwood ledge. The soil type is sandy loam. Surface soil erosion is high and is well drained. This soil has low suitability for summer operations.
Portions of 7/35 and 7/48	15J	The climax species for this ELT is a red spruce and balsam fir with subclimax species of yellow birch sugar maple, and paper birch. It is usually found on mountain slopes. The soil type is moderately well drained and is a very fine sandy loam. Surface soil erosion is moderate. This soil has a moderate suitability for summer operations.
All of 6/37, 6/39, 6/41, 6/42 and 6/45 and Portions of 8/3	11	The climax species is spruce and fir with subclimax species of red maple and white pine. It is an outwash soil. The soil type is well drained loamy sand with high suitability for summer operations
All 1/18a, 1/76, 6/13a, 7/1, 7/8 and Portions 1/18b, 1/23, 1/23a, 1/26, 1/39, 6/2, 6/4, 6/5, 6/6, 6/8, 6/13, 6/17, 6/22, 6/48, 7/4, 7/24, 7/34, 7/35 and 7/48	115C	The climax species for this ELT is sugar maple and beech, with subclimax species of yellow birch, red maple & paper birch. It is usually found lower slopes and intervals at lower elevations with slopes less than 45%. The soil type is moderately well drained, and is a fine sandy loam. Surface soil erosion is high. These soils have high suitability for summer operations.
Portions 1/18b and 7/35	2D	The climax species for this ELT is a red spruce and balsam fir with subclimax species paper birch. It is a softwood ledge usually found on mountain slopes. The soil type is moderately well drained and is a fine sandy loam. Surface soil erosion is high. This soil has a low suitability for summer operations
Portions of 6/17 and 7/24	105D	The climax species for this ELT is beech, spruce, and hemlock with subclimax species of aspen, paper birch and red maple. It is found

Stands	ELT	Description
		on lower mountain slopes. Surface soil erosion is moderate. The soil type is deep washed till, moderately drained, loamy sands, with high suitability for summer operations.

Soil Erosion

Surface soil erosion is typically a concern related to roads and skid trails. Some of the soils in the Project Area are rated as having a high surface soil erosion hazard relative to other soils on the White Mountain National Forest (USDA-Forest Service 1986a). This rating is for conditions without forest cover or any mitigation measures. However, the 2005 FEIS notes that “research findings and on-the-ground experience for all [soil] hazard classes confirm that accelerated soil erosion due to roads and skid trails can be reduced, and its effects on streams largely eliminated, by timely application of well-known best management practices.” (USDA-Forest Service, 2005b, p 3-29) The State of Maine recently published monitoring data that supports the conclusion that properly applied Best Management Practices (BMPs) will mitigate effects from soil erosion (Maine Department of Conservation, Maine Forest Service 2003 and Maine Forestry Best Management Practices Use and Effectiveness 2001-2003, 2005). Though the results of a similar study in New Hampshire have not yet been published it is assumed that the effectiveness of New Hampshire’s BMPs would be similar since both state’s BMPs are similar.

Roads and skid trails are a concern for soil erosion because they may expose mineral soil (Patric 1976). The act of cutting trees is not a source of soil erosion because it does not expose mineral soil (Stone et al. 1978). Classified, all-season roads in the Project Area are maintained to Forest Service standards that help prevent concentration of water on the road surface.

New Hampshire BMPs would be followed to minimize erosion on skid trails during and after harvest operations. Slash from delimiting trees at the log landings would also be spread on skid trails to reduce potential for erosion and compaction. Previously-used skid trails and landings within the Project Area have stabilized over time and several are re-vegetated. Waterbars (i.e., BMPs) are in place on skid trails and there is no evidence of accelerated soil erosion on temporary skid trails and landings that were surveyed during field surveys. (Colter 2006).

Soil Compaction

Improper harvesting operations can reduce forest productivity of forest stands by compacting soils to the extent that germination and root growth are inhibited; or by creating nutrient deficiencies. Aside from skid trails, compaction is seldom a concern on properly conducted logging operations (Hornbeck and Leak 1992). Because more intensive mechanized harvesting systems can cause soil disturbance over a larger area of a harvest unit (Martin 1988), the timber sale administrator would monitor mechanized systems for evidence of increased compaction and take measures such as shutting down the sale or moving to another area if impacts are likely to occur.

Soil compaction can also become a concern if skid trails are used when wet. BMPs recommend planning harvest operations during appropriate soil and weather conditions and would be applied to this project. Again, slash from delimiting trees at the log landings would also be spread on skid trails to reduce potential for compaction.

Research shows that immediately following winter harvesting, increases in bulk density occurred in the upper 8 cm of soil on skid trails, but this was not significantly different than control values three years following logging (Donnelly et al. 1991). Holman et al. (1978), working in areas near a spruce-fir site in Maine concluded that the top 3 inches of mineral soil were compacted to a greater degree than the 3-6 inch depth. They also concluded that compacted soils can be restored to their original bulk density by freezing and thawing, wetting and drying, root penetration, and animal activity. They found that in non-skid trail areas of the harvest area, bulk density returned to pre-cut levels within one year. Bulk density of skid trails in winter harvest areas returned to normal after two winters. Field investigation of some of the skid trails within the Project Area and on the Forest confirmed these results (Colter 2006).

Existing log landings from previous sale activity are well located and stabilized, and field inspection of some of the landings found no signs of soil erosion and little effects from soil compaction as a result of the last harvest activity in 1997 (Colter 2006). Landings are not considered a significant source of soil erosion (Stone et al. 1978), but sometimes present concerns about soil compaction. However, research reveals that bulk density of soil returns to pre-harvest levels 2-3 years after harvest (Donnelly et al. 1991).

The analysis area for direct and indirect effects on soil erosion and compaction is the stands proposed for treatment in the North Kilkenny Vegetative Management Project. A part of analyzing the direct and indirect effects on soil erosion and compaction is considering how the soils have responded to effects of past similar actions. **The temporal scope for soil erosion and compaction** is three years after completion of the proposed actions which represents the time it takes for soils to return to pre-harvest bulk densities.

The analysis area for cumulative effects on soil erosion and compaction is the watersheds that the project area is within as part of the Upper Ammonoosuc River watershed. The total acreage of the watersheds is approximately 9,900 acres. This scale is not so large that it spatially dilutes the cumulative sum of effects on soil resources, nor is it so small that it fails to identify and consider use and potential use on both National Forest and private lands relative to the proposed project.

The temporal scope for cumulative effects on soil erosion and compaction is sixteen years in the past and ten years beyond the Proposed Action and its alternatives (1990-2018). This period was chosen; (1) to incorporate the last timber harvesting operations on National Forest lands within the analysis area (War Camp, Rocky Pond, Fogg Brook and Higgins Brook); (2) to consider present effects on soil resources resulting from any past soil disturbing actions; (3) to allow time for the proposed activities to occur and be completed, and; (4) to consider any other foreseeable soil disturbing activities. This time frame allows consideration of multiple uses, and provides enough time for the expected recovery of soils from erosion and compaction resulting from timber harvesting, as well as the projected recovery time from future activities. Evidence of erosion and compaction beyond the

expected time frame would imply that the soil is not recovering as expected, and effects from this and future activities could be additive and cumulative.

Direct and Indirect on Soil Erosion and Compaction

Effects are analyzed in terms of Forest Service Soil Quality Standards (USDA-Forest Service Handbook, Supplement R9RO 2509.18-2005-1). The standards define thresholds for soil characteristics that are used as indicators of detrimental soil disturbance.

Alternative 1: No Action

The direct effects for Alternative 1 may be localized soil erosion related to on-going maintenance of Forest roads and the old skid trails near FR 208. In the absence of activities such as timber harvest, no increase in surface soil erosion or soil compaction is expected with this alternative because there is no road construction or re-established use of existing skid trails and landings. No indirect effects are expected from this Alternative. See the Water Resources Report of this document for analysis of indirect effects of sedimentation.

Action Alternatives 2 and 3

Approximately 5.5 miles of road maintenance is proposed for Alternative 2 and 4.5 miles is proposed for Alternative 3. Road maintenance may involve cleaning culverts, blading the road surface and road resurfacing. Although road maintenance may initially cause ground disturbance, improving and maintaining roads can prevent future erosion. Research has shown that maintenance, such as resurfacing roads with a layer of gravel, reduces sediment losses (National Council for Air and Stream Improvement, Inc. 2000). Resurfacing and replacing culverts would help maintain the road and prevent future erosion problems (Moll et al. 1997). This is true also for access to log landings.

Alternative 2 proposes 1.0 miles of road construction and Alternative 3 proposes 0.7 miles of road construction. The soil type where this would take place is moderately to well-drained sandy loam with slopes less than 20 percent. There is some soil erosion potential from new construction due to exposure of mineral soil, but all road construction would follow Forest Plan Standards and Guidelines as well as New Hampshire BMPs to minimize the soil erosion potential.

Upon completion of the timber harvest, all roads would be rehabilitated to BMP standards, which have proven to be effective in preventing soil erosion (BMP New Hampshire 2004; Maine Forest Service 2003 and 2005; Stafford, et.al. 1996).

Table 12. Ground Disturbance by Alternative

Activity	Alt 1	Alt 2	Alt 3
Skidder crossings on perennial streams	0	4	4
Existing Landings (number/acres)	0/0	11/8.25	9/6.00
New Landings (number/acres)	0/0	3/2.25	3/2.25
Roads Construction (miles/acres)*	0/0	1.0/2.4	0.7/1.7

Activity	Alt 1	Alt 2	Alt 3
Road Maintenance (miles/acres)	0/0	5.5/13.2	4.5/10.8
Skid Trails (miles/acres)	0/0	21.3/51.6	20.9/50.7
Rehabilitate an unnamed perennial stream (miles/acres)	0/0	0.6/1.4	0.6/1.4
Stabilize sections of old skid trails near FR 208 (miles/acres)	0/0	0.8/1.9	0.8/1.9
Total Disturbed Acres	0	81	75
Total % of Project Acres Disturbed	0%	7.9%	7.4%

*1 mile of road/skid trail at an average disturbance width of 20' = 2.4 acres of disturbance/mile

The majority of the activity area is moderately sloped, with some steeper area, however the proposed projects would occur only on slopes of 35 percent or less. The slope lengths are short enough to limit potential for notable soil erosion. The combination of moderately sloped terrain with post-harvest measures in accordance with Forest standards and guidelines and BMPs (such as stabilization and waterbars) should prevent soil erosion and promote revegetation (BMP New Hampshire 2004; Maine Forest Service 2005 and 2005; Stafford, et.al. 1996).

Under Alternative 2, approximately 30% of the proposed stands would be harvested only in the winter and under Alternative 3 approximately 40% would be winter harvest only. The remaining stands would be harvested in summer/fall/winter (Table 2). With frozen soils, proper skid trail locations, and careful closeout at the end of operations, minimum surface soil erosion or soil compaction is likely to occur (BMP New Hampshire 2004; Maine Forest Service 2005 and 2005; Stafford et.al. 1996). Over-snow operations would produce very little compaction, since operations will not have direct contact with mineral soil and any effects from compaction would disappear by the following winter. Harvesting and skidding within stands during summer or fall on expose mineral soil, (particularly on the main skid trails) would likely cause some surface soil erosion due to the loss of organic cover. However, proper skid trail layout and management such as utilizing breaks in terrain and avoiding steep slopes in accordance with Forest Plan standards and guidelines (USDA-Forest Service 2005a, p 2-30) and limiting operations to dry conditions (New Hampshire BMPs) would largely minimize or avoid soil erosion. It is expected that soils should fully recover from any compaction within three years of the end of operations (Donnelly et al. 1991).

Under Alternative 2, eleven existing and three new log landings are proposed for use during harvest and for Alternative 3, nine existing and three new log landings are proposed for use during harvest operations. The landings are well placed because of their gentle terrain and well-drained soils. Truck traffic and skidder operation would churn the soil surface and expose mineral soil leading to on-site soil erosion within the boundary of the log yard however, the combination of careful site selection and management of the log yard during use would limit the extent of erosion and prevent long-term soil erosion impacts. At the time of sale closeout, the log landings would be graded and stabilized to prevent erosion before they can revegetate, and to accelerate recovery from temporary soil compaction (FSH 2509.22, Section 6.38).

To improve wildlife habitat, approximately twenty six acres in Alternative 2 and thirty acres in Alternative 3 are proposed for prescribed fire. Prescribed burning would occur either in late spring, when the snow cover has melted, or in late summer/early fall, when temperatures have cooled. While some surface soil organic matter may be lost, actual experience does not indicate that prescribed burning affects rainfall infiltration rates. This is because most of the site continues to remain covered by organic matter and mineral soil aggregation is not changed. The magnitude of these potential effects after prescribed fire is less than those of wildfires, since the prescribed fire is typically of low severity (Landsburg and Tiedemann 2000).

Sedimentation of streams is the most likely indirect effect from road maintenance, culvert removal, skidding and stream crossings, stream. See the Water Resources (Section 3.7) for an analysis of indirect effects of sedimentation.

There will be little effect expected from replacement of the septic leach field at the South Pond Recreation Area because this area is already a disturbed site and the foot print of disturbance will not grow beyond it. Forest Plan Standards and Guidelines as well as New Hampshire BMPs will be followed to minimize the soil erosion potential onto the adjacent soil next to the site.

An indirect effect of soil erosion or compaction is the rate and success of revegetation on skid trails and log landings. Studies in Maine and Vermont found that soil compaction on log landings and skid trails lasts 2-3 years after operations cease (Donnelly et al. 1991; Holman et al. 1978). Restocking surveys and field reviews on the White Mountain National Forest indicate that skid trails and log landings are revegetating rapidly and naturally due to well distributed rainfall, abundant seed sources, and favorable seedbeds. Log landings typically revegetate first to raspberries and other herbaceous species, and then to forest species. Skid trails typically revegetate to forest species because the trails are narrow and sunlight is limited, thus herbaceous plants do not typically revegetate these areas.

Watershed Restoration Project - Road Stabilization

The Duke Brook watershed project near stands 1/30 and 1/31 would construct waterbars and add large woody material to the road surface using hand tools. This would intercept soil-laden water and slow velocities, allowing sediment to settle out and water to infiltrate the soils. The goal of the project is to reduce erosion, increase infiltration, and ultimately allow vegetation to reestablish on the road surfaces.

Soil disturbance would occur as a result of waterbar construction. However, this treatment is designed to minimize future erosion, and therefore overall erosion concerns in the watershed are minimized as a result of the proposed project.

Watershed Restoration Project -Channel Stabilization/Habitat Improvement

For the watershed project near stands 7/8 and 7/34, tree placement is expected to aid in sediment and water storage in the unnamed stream. By holding water and sediment longer huge pulses which scour and erode the channel and banks should be reduced.

Minimal erosion may occur as a result of the proposed action. Placement of trees in the stream channel and along banks using hand tools only often requires the trees to be dragged to their destination. This has the potential to expose mineral soil. However, the sediment storage and channel stability gained by this project and the road stabilization project greatly outweigh the negative short-term impacts. Heavy machinery is not proposed for this project, so compaction is not an issue.

Cumulative Effects on Soil Erosion and Compaction

It is possible that additional timber harvest is planned within the cumulative effects area within the next ten years, but at this time no projects have been identified.

Alternative 1: No Action

There will continue to be localized erosion related to on-going maintenance of Forest Roads and private roads, sections of old skid trails near FR 208, recreation trails, and construction of new roads associated with residential development and timber harvest on private lands.

Action Alternatives 2 and 3

Compaction can accumulate on the ground due to repeated activities. However, there is little or no evidence of compaction from previous harvesting activities, implying that the soil has effectively recovered from past activities (Colter 2006). The use of Forest Plan Standards and Guidelines and BMPs would minimize the hazard and duration of effects due to soil erosion and compaction (USDA-Forest Service, 2005b, p 3-29; BMP New Hampshire 2004; Maine Forest Service 2005 and 2005; Stafford, et al. 1996). By using existing skid trails and landings, activities would occur where the soil has already demonstrated the ability to recover quickly from short term effects of harvesting, due possibly to location, soil type, or post-harvest treatments.

Use of BMPs during timber harvest on private lands adjacent to the National Forest lands within the analysis area is expected to limit areas of soil disturbance, and soil erosion and compaction.

Land management activities such as harvesting, prescribed fire, and road and trail construction typically result in site-specific soil erosion that is generally limited to the area of impact. However, since the effects of soil erosion are often of greatest concern in streams and rivers, this analysis of cumulative effects considers cumulative incremental impacts on watersheds. The proposed stream improvement projects may have short-term adverse effects on soils, causing erosion in some specific areas; however, the long-term results of these projects is to stabilize the stream in locations where it is has braided, and to improve stream pool ratios. Both of these objectives would reduce the long-term potential for stream bank erosion and subsequent downstream adverse effects from sedimentation and stream bed loading. The proposed septic leach field replacement at the South Pond recreation would not have any expected cumulative impacts to the soils because the foot print of already disturbed soil will not grow. The prescribed fire units would not be expected to have any cumulative impacts on adjacent land owners, because there will be a control line around the perimeter of

the burn unit to protect adjacent land, and this would serve as a catchment area for any movement of organic matter. This area would then be managed with BMPs to keep the organic matter from any further movement. Another minimizing soil movement factor is the relatively flat terrain on which the units are situated. This will also help keep organic matter from having much movement.

The North Kilkenny project will result in a short-term increase to the amount of ground that has disturbed soils. Referring back to Table 13, the action alternatives result in soil disturbance on 81 acres, or 7.9% for Alternative 2, and 75 acres or 7.4% in Alternative 3.

The cumulative effects watershed (Upper Ammonoosuc River) totals approximately 9,900 acres, with privately-owned lands within it totaling approximately 2,600 acres. In a worst case scenario, if all of these adjacent private lands had or would receive active forest management or residential landscaping over the cumulative effects twenty-six period, this would equate to an average of 100 acres ($2,600 \times .99\%$ disturbance /26 years) acres of private land that might experience some level of soil disturbance in a given year.

Since impacted soils take three years to recover from erosion and compaction, then the amount of adjacent private land experiencing possible effects from soil disturbing activity may be as much as 400 acres (100 acres x 3 years past, plus current year), assuming an average of 15 percent soil disturbance per acre of private land. Then the amount of disturbed soil over this period would be 135 (100 acres x 9 years x .15) acres per year.

If North Kilkenny Vegetative Management Project were implemented in three years, then the impact to National Forest land would be 243 (81 acres x 3 years) acres for Alternatives 2 and 225 (75 acres x 3 years) acres for Alternative 3.

If the North Kilkenny project were implemented during the same three year period using the most impactful alternative (Alternative 2), combined with possible maximum impacts (135 acres) on private land and 81 for public land, it would total 216 acres affected cumulatively.

The amount of the 9,900 acre cumulative effects analysis area that might experience soil erosion and compaction over the course of the North Kilkenny project is a maximum of 216 acres, or 2.2% soil disturbance over the life of the project using the most impactful Alternative (2), the maximum harvest for North Kilkenny (a three year completion), and the worst case scenario on private land.

The action alternatives would cause some cumulative effects from soil erosion and compaction, but these are likely to be site-specific, limited in magnitude and duration, and well within the soil disturbance limits established by the Soil Quality Standards for the Eastern Region of the Forest Service (USDA-Forest Service Handbook, Supplement R9RO 2509.18-2005-1, Section 2.2), as well as the scope of effects anticipated and analyzed in the 2005 Final Environmental Impact Statement (USDA-Forest Service 2005b, pp 3-29 to 3-36).

3.5.2 Soil Productivity

Affected Environment for Soil Productivity

Soils within the Project Area produce northern hardwood forest with differing species mix which will eventually succeed to sugar maple and beech as stands mature. There are a few areas of spruce-fir on moderately well- to poorly-drained fine sandy loams generally found on lower ground, with surface drainages being fairly common.

Early land use records indicate that in the early 1900s the Project Area was lightly culled (meaning a small portion of trees was removed from the area), including softwoods then burned (Goodale 2003). The records do not indicate a history of intense timber harvesting, as is sometimes the case on other parts of the White Mountain National Forest. Early historical records do not exist for all parts of the proposed sale area, but examining the vicinity overall, the records available appear representative

Since those early times, there have been conventional, bole-only harvests in this vicinity. Bole-only harvest means the tops and limbs of the trees have been left in the forest, which in turn means that about 35 percent of the calcium that could be taken from the forest through harvest has, instead, been left on-site. Field examinations indicate that all stands previously harvested have met agency requirements for adequate stocking of years 3 and 5 post-harvest and is consistent with forest wide re-stocking surveys. This is important because restocking is the first step in the re-accumulation of biomass, which is the agency measure used to assure that long-term soil productivity has not been foregone. It is also indicative that the forest response to harvest treatment is consistent with the expectations of silvicultural guides referenced in the 2005 Forest Plan. Any other past, present and future projects listed in the EA are considered to be minute from a soil productivity stand point.

The analysis area for direct, indirect and cumulative effects on soil productivity is the location of the actual harvest activities, since site-specific impacts related to soil or forest productivity are not likely to extend further. **The temporal scope for cumulative effects on soil productivity** is from early harvesting in the early 1900s to ten years into the future, which is the reasonable planning horizon for a future harvest. Early harvesting is considered because land use may affect soil nutrients, including soil calcium (Hornbeck 1990). Future harvest and acid deposition are considered for the same reason.

Direct and Indirect Effects on Soil Productivity

Alternative 1: No Action

The No Action alternative has no direct impact on long-term soil productivity or forest health. The indirect impact of no timber harvest includes no possible changes in available (exchangeable) soil calcium, base saturation, and possible impacts on forest health, productivity, or species composition that are attributed to forest harvest (as compared to acid deposition). (USDA-Forest Service, 2005b, 3-18) Given that acid deposition is the primary mechanism affecting soil acidification, deferring treatment is likely to exert little impact on soil productivity or forest health.

Action Alternatives 2 and 3

The Forest Service has a responsibility for the long-term productivity of the land. Measurement of northern hardwood forest plots since 1931 at the nearby Bartlett Experimental Forest does not indicate statistically-distinguishable change in forest productivity due to human impacts, even including the impacts of acid deposition (Nuegenkapien 1998; USDA- Forest Service, 225b, 3-13).

The quantity of calcium removed in a harvest varies by area and by harvest type and method as shown in Table 13.

Table 13: Calcium Removed (kg/ha) by Harvest Type

Harvest Type	Bole Only	Whole Tree Harvest
Even-aged	350	539
Uneven-aged	88	134

Proposed harvesting in the North Kilkenny Vegetative Management Project is a bole-only tree harvest. Uneven-aged harvest removes approximately 25 percent of the stand and 70% of the forests basal area is left after the thinning. Over time however, even-age harvests remove the same amount of forest as uneven-age methods, so the cumulative impact is nearly the same, though there are instances when uneven-age harvest actually removes more (Adams et al. 1996).

Bole-only, clearcut harvest would remove an estimated 2 percent of the calcium from a site, and a whole-tree harvest clearcut would remove about 4 percent when compared to the total calcium that resides in the soil. Uneven-aged bole-only harvest methods would remove between 1 and <1 percent of the calcium when compared to the total calcium that resides in the soil (USDA-Forest Service, 2005b, pp 3-19). This suggests that 50 percent of the calcium is in the tops and leaves, not 35 percent, which is what the scientific literature now suggests. On this basis, Alternative 3 has potentially the least impact on calcium, while Alternative 2 has the greatest potential impact.

With respect to indirect impacts, based on actual on-site measurements at Hubbard Brook Experimental Forest, over a period of fifteen years at sixty soil pits, soil exchangeable calcium was not lost due to forest harvest (USDA-Forest Service, 2005b, p 3-20). There is no peer-reviewed evidence that soil buffering capacity has declined on the White Mountain National Forest. From the perspective of the agency requirements for assessment of soil productivity based on biomass accumulation, as mentioned previously, research evidence does not indicate any change in observable trends in biomass accumulation since the early 1930s (USDA-Forest Service, 2005b, p 3-13). Also, recent measurements related to forest productivity at Hubbard Brook Experimental Forest and elsewhere on or in the vicinity of the White Mountain National Forest, reveal similar results for both hardwoods and softwoods (USDA-Forest Service, 2005b, p 3-13).

The prescribed burning proposed in the action alternatives would occur either in late spring, when the snow cover has melted, or in late summer/early fall, when temperatures have cooled. Some surface soil organic matter will be lost due to burning, and some nutrients would be affected while other would not. For example, soil calcium would not be reduced by burning, but it can be removed from a site by erosion. Some soil nitrogen would be lost when

the organic matter burns, but nitrogen is not considered to be a limiting factor in tree growth on the White Mountain National Forest.

All former clearcuts in the vicinity have regenerated following prior harvest, and would be expected to do the same following this project. Sometimes there is a concern that organic matter may be lost, causing indirect nutrient consequences. However, it has been found that soil organic matter is not lost but rather is re-distributed in the upper mineral layers during harvest (Johnson et al. 1991 and Johnson et al. 1997).

Research has shown no change in exchangeable soil calcium and soil base saturation, and no change in biomass accumulation as a result of timber harvest. Research is underway to determine additional sources of calcium (possibly deep rooting reserves or non-exchangeable reserves or calcium oxalate) not accounted for in existing studies that could be replenishing the exchangeable calcium reserve that is removed in the short-term by timber harvest (USDA-Forest Service 2005b, pp 3-20 to 3-27).

Cumulative Effects on Soil Productivity

Alternative 1: No Action

Early land use is estimated to remove calcium from harvested forest stands (Hornbeck 1990). Within the analysis area, early forest harvest appears to have been relatively light, so it was probably similar to a thinning or selective harvest. Based on soil nutrient depletion tables, this may have removed <1 percent of the calcium per acre of harvest (Fay 2003).

Atmospheric deposition may also remove calcium from the soil irrespective of timber harvest. The most recent small watershed studies suggest that the cumulative loss of calcium due to atmospheric deposition, considering the buffering effect of mineral weathering, is about 4 percent over 120 years. (USDA-Forest Service 2005b, FEIS, p 3-24) Given that the cumulative effects time period goes back 75 years, it is possible that up to 3 percent of the total soil calcium may have been removed during that time due to atmospheric deposition, and another <1 percent due to early harvesting methods. Atmospheric deposition may continue to deplete soil calcium though evidence it appears that soil and streams are recovering from the possible impacts of acid deposition (USDA-Forest Service 2005b, p 3-26). So, an estimated 4 percent soil calcium may have been lost over 120 years (USDA-Forest Service, 2005b, p. 3-24).

On-site evidence during timber and other inventories has not revealed any unusual dieback or mortality. Stands previously harvested in this vicinity have adequately regenerated (Administrative File). As previously noted, no change in biomass accumulation has been documented at the nearby Bartlett Experimental Forest. Thus, based on on-site evidence and the previously discussed research on biomass accumulation, it does not appear there are issues with soil productivity or forest health.

Action Alternatives 2 and 3

Effects of atmospheric deposition would be no different in the action alternatives than in the No Action Alternative.

The action alternatives have the potential to add new harvest impacts by removal of trees and their biomass. Alternative 2 would remove the most calcium because it proposes 229 acres of even-aged, bole-only tree harvest and 802 single tree selection/groups/thinning bole-only tree harvest acres. Alternative 3 proposes to remove the least amount of calcium because it proposes 156 acres of even-aged bole-only tree harvest and 851 single tree selection/groups/thinning bole-only tree harvest acres. However, modeling of soil exchangeable calcium and base saturation for a northern hardwood forest at the Hubbard Brook Experimental Forest has shown little long-term effect on these factors as a result of timber harvesting. Changes in exchangeable soil calcium and soil base saturation from 1850 to 2000 were nearly the same with and without forest harvesting (USDA-Forest Service 2005b, pp 3-23 to 3-25). By tiering to Forest Plan Standards and Guideline and the FEIS, no adverse effects on soil productivity are anticipated with any of the action alternatives.

3.6 Wild and Scenic and Eligible Wild and Scenic Rivers

In the early 1990s, the White Mountain National Forest completed an assessment of rivers on the Forest to determine their eligibility for potential future inclusion into the National Wild and Scenic River System (NWSRS). During the recent Forest Plan Revision, this assessment was reviewed and updated (USDA Forest Service, 2005a, Appendix C). Forest Plan standards state: “Manage eligible rivers to maintain their classification and eligibility until Congress designates the segments or decides not to designate them.” Additionally, Forest Service Handbook 1909.12 (Chapter 80, rev. January 2006) requires that the outstandingly remarkable values of eligible rivers be protected.

Affected Environment for Wild and Scenic and Eligible Wild and Scenic Rivers

The Forest Plan revision process determined that none of the streams within the North Kilkenny Project Area were eligible for potential inclusion in the NWSRS. Within the surrounding area, specifically the Upper Ammonoosuc Class 5 Watershed, three rivers or segments of rivers were deemed eligible: Mill Brook, the Upper Ammonoosuc, and the West Branch of the Upper Ammonoosuc. There are no designated Wild and Scenic Rivers within the project area or within the Upper Ammonoosuc Watershed.

The North Kilkenny Project Area encompasses several tributaries which flow into Pond Brook and eventually into the Upper Ammonoosuc River more than five miles downstream of the Eligible Wild and Scenic sections of this river.

None of the activities proposed in the North Kilkenny project are located in areas that drain into Mill Brook or its tributaries, which flow into the Upper Ammonoosuc more than 13 miles below the eligible sections of this river.

No issues associated with Wild and Scenic and Eligible Wild and Scenic Rivers have been identified by the ID team or by the public regarding the proposed North Kilkenny Project.

Direct, Indirect, and Cumulative Effects on Wild and Scenic and Eligible Wild and Scenic Rivers

Because none of the proposed activities associated with the North Kilkenny Project are located within drainages that flow into designated or eligible Wild and Scenic Rivers, there would be no direct, indirect, or cumulative effects to designated or eligible Wild and Scenic Rivers as a result of Action Alternatives 1, 2, or 3.

3.7 Water Resources

Mitigation Measures Related to Water Quality (See Appendix D for Monitoring Plan)	
Mitigation	Why Mitigation Works
A 100 foot no harvest Riparian Management Zone would be placed along Duke (Alternative 2) and North Pond Brooks (Alternative 2 and 3).	Studies have shown that partial cuts and the use of streamside zones are effective in reducing water quality changes (Patric, 1980, Aust and Blinn, 2004). This larger no cut zone would increase the flowpath through undisturbed forest soils, reducing the potential for water quality changes in the stream to occur.
A 100 no harvest zone will be placed around a spring within stand 6/22	Studies (Welsch, 1992) have shown that this size buffer provides sufficient filtering of overland flow and provides protection to hydrologic functions of the spring.

3.7.1 Water Quantity

Affected Environment for Water Quantity

The North Kilkenny Vegetative Management Project is located within several watersheds of varying size that drain into the Upper Ammonoosuc River from its west and south slopes. All of these smaller watersheds drain into the Upper Ammonoosuc River as it bends from a predominant northerly to westernly flow path, to where it joins the Connecticut River about 19 miles away near Groveton, NH. These smaller watersheds include Pond Brook, Higgins Brook, and several smaller unnamed tributary watersheds to the Upper Ammonoosuc River watersheds. All watersheds lie within the Upper Ammonoosuc River watershed.

The watershed restoration projects proposed for this project include both a road stabilization project and a channel stabilization/habitat improvement project. The road stabilization project proposes to treat approximately 0.8 miles of unstable roads and skid trails in the watershed through the construction of waterbars and placement of downed trees. The channel stabilization/habitat improvement project proposes to add large woody material to 0.6 miles of stream channel to increase channel stability and improve habitat for aquatic organisms.

Water Resource Features

Water resource features in the project area include streams, riparian areas, wetlands, ponds, and vernal pools.

Water quantity in streams in the Project Area is directly related to the amount of precipitation that occurs throughout the year. At Hubbard Brook, an experimental Forest within the WMNF, 62% of approximately 130cm of precipitation becomes streamflow (Likens and Bormann, 1995) and most of the rest is lost to evapotranspiration. The research at Hubbard Brook is in a forested environment similar to the one found in the Analysis Area. Therefore, the results of this research can be applied to the Proposed Action and alternative.

Research has shown that removal of vegetation through timber harvest can alter evapotranspiration rates. These altered evapotranspiration rates result in changes to streamflow. The magnitude of the change to streamflow depends on the extent of change to the vegetation (Hornbeck, et al 1997). Research at Hubbard Brook indicates that as reductions in basal area approach 25%, a measurable response in annual water yield, may be seen (Hornbeck et al., 1993). These increases became greatly reduced 3 to 4 years after timber harvest, and undetectable 7 to 9 years after harvest. Most of the increase in water yield occurs during summer low flow periods, and channels with increased discharge adjust by changing their bankful width and depth (Hornbeck, et al 1997 and Schumm, 1977).

The Analysis Area for direct and indirect effects on water quantity are the Pond Brook and Higgins Brook watersheds along with several smaller tributary watersheds, and drainage slopes where the proposed stands are located. Watersheds were delineated into smaller subwatersheds of first and second order perennial streams to analyze potential localized effects in closer detail. Some of the intermittent watersheds and slopes were also assessed due to the percentage of treatment in these areas. As water flows downstream, pollutants are mobilized into the watershed, and changes in water yield related to the project merge with other waters within the watershed. These watersheds lies within the larger watershed of the upper Ammonossuc River. **The temporal scale for water quantity** is 10 years in the past and ten years into the future since changes to water quantity are gone within 7-9 years.

The cumulative effects area (CEA) for water quantity is similar to that described in the direct and indirect effects. However, many of the subwatersheds are combined into the larger watershed of Pond Brook for analysis. Because of location, other smaller watersheds couldn't be combined and were analyzed for cumulative effects at the same scale as the direct and indirect effect analysis. These watersheds were selected because they include all the headwaters of the streams which flow through the Project Area; and at this scale, the effects of multiple uses within the watersheds could become additive and result in cumulative effects. Analysis of a larger watershed areas (such as the Upper Ammonoosuc River) would dilute potential cumulative effects to water quantity since, as analyzed, no effects related to the implementation of any of the action alternatives would be detectable even at the smaller scale. The temporal scope for cumulative effects on water quantity is 10 years into the past and 10 years into the future, 1997- 2017. Ten years is adequate for water quantity analysis because research at Hubbard Brook has shown that increases in water quantity following timber harvest became undetectable 7-9 years after harvest (Hornbeck, et al., 1997).

Direct and Indirect Effects on Water Quantity

Alternative 1: No Action

There would be no new direct or indirect effects on water quantity from implementation of Alternative 1 and current on-going management activities would continue, consistent with the 2005 Forest Plan. Streams and riparian area would continue to function much in the same way as present.

Action Alternatives 2 and 3

Using the Hubbard Brook research, where less than a 25% reduction in basal area is determined, no measurable increase in discharge is expected in the channels associated with the subwatersheds of first and second order perennial streams in the project area because the Action Alternatives do not exceed the 25% threshold (Table 14). Because of this, and as described in the Forest Plan EIS, no measurable increase in water yield is expected in the channels associated with any of the sub-watersheds. Therefore, there would be no change in stream stability in the 1st and 2nd order steam channels resulting from an increase in discharge from the proposed timber harvest activities (USDA-Forest Service, 2005b).

Some smaller intermittent watersheds and slopes are proposed for vegetative treatments which would remove greater than 25% of the basal area of their watersheds. These areas will experience increases in water yield in the intermittent and ephemeral channels which drain them. As a result, water quantity is expected to increase in the small intermittent and ephemeral channels which is likely to cause channel adjustments and create more defined channel features.

Table 14. Percent Basal Area Removed in 1st and 2nd order Watersheds

Sub-Watershed	Stream Type	% Basal Area Removed by Alternative		
		1	2	3
Higgins Brook	1 st order Perennial	0	.8	.8
Pond Brook	2 nd order Perennial	0	4.4	4.8
South Interpond Stream	1 st order Perennial	0	3.3	3.3
North Pond Brook	1 st order Perennial	0	14.9	14.9
Devils Hopyard Brook	1 st order Perennial	0	<1	<1
Cold Stream	1 st order Perennial	0	2.7	2.7
Duke Brook	1 st order Perennial	0	23.7	11.6
Beach Brook	1 st order Perennial	0	2.3	1.2

There are four wildlife openings proposed for expansion in Alternative 2 and three wildlife openings in Alternative 3. These openings would be maintained with prescribed fire every 3 to 5 years. Fire has the potential to increase water quantity, however, research indicates that a successful prescribed burn is designed to consume only part of the forest floor fuels. For this project, prescribed fire is proposed only in wildlife openings which are mostly cleared of vegetation. These fires would occur within less than 1% of the watersheds where they are located. Thus, small prescribed burns would have little effect on evapotranspiration, soil,

water storage, and overland flow.

There would not be any effect to water quantity from the watershed or the recreation projects since these projects would not affect stream flow quantities.

Cumulative Effects on Water Quantity

Past and present activities that occur in the cumulative effects area (CEA) watersheds on Forest Service land which have the potential to impact water quantity include timber harvest, roads, trails, developed areas, and fire. Timber harvest and fire have the potential to increase water quantity as described in this report. These increases are temporary and recover within 10 years as vegetation grows back. Roads, trails, and developed areas also increase water quantity through compacted and less permeable surfaces which increase runoff and provide pathways for the movement of water downstream in a watershed, resulting in increases in water quantity during rainfall and snowmelt. Developments for residential and recreational purposes result in the same impervious surfaces which also increase runoff. Increases to water quantity from permanent roads, trails, and developments are long term and last as long as these features are present in the watersheds. Some of these activities occur on private land within the CEA.

No cumulative effects related to increased water quantity are expected in the Analysis Area. As discussed previously, the Action Alternatives are not expected to cause increases in water quantity in the 1st or 2nd order perennial streams. Timber harvest has occurred in portions of the CEA watersheds in the last ten years. When combining this past harvesting with the proposed level of harvest, basal area reductions do not exceed 25% in any 1st or 2nd order perennial streams (data in North Kilkeny Project Planning Record). There is the potential that a timber sale could occur in the CEA in the next ten years. Analysis would occur at this time to ensure that the 25% basal area reduction is not exceeded. Therefore, no increases in water quantity are expected.

It is anticipated that some clearcutting will occur on private lands in the future. Private land accounts for 26% of the CEA watersheds, with most of this land near the outlet of Pond Brook, around North Pond, a parcel of land in Beach Brook watershed, and at the outlets of smaller watersheds such as Duke Brook along the Upper Ammonoosuc River. Except for the parcel of land in Beach Brook watershed, much of this private land around North and South Pond is already developed for residences, cleared land, and camps. If a 120 acre private parcel in Beach Brook watershed in the larger Pond Brook watershed were completely cleared, only 1.4% of Pond Brook would be affected. Therefore, private activities in the watershed should not cause water quantity effects in the streams at the scale of the cumulative effects analysis. It is therefore unlikely that cumulative increases in water quantity or related channel adjustments in streams of the CEA watersheds related to increases in water quantity would be observable as a result of the proposed project activities or when combined with other future activities in the CEA.

There would not be any cumulative effects from the watershed or recreation projects since neither would effect stream flow volumes.

3.7.2 Water Quality

Affected Environment for Water Quality

The State of New Hampshire designates stream reaches within the Project Area as Class B. Class B is the second highest quality with the designated uses including fishing, swimming and other recreational purposes and after adequate treatment, as a water supply. Stream and lake waters in the Project Area are not currently used for public water supply purposes.

In addition, all waters of the National Forest are designated as "Outstanding Resource Waters" (ORW) and water quality and supported designated uses shall be maintained and protected in surface waters that constitute ORW (NHDES, 1999). Some limited point and nonpoint source discharges may be allowed provided they are of limited activity and result in no more than temporary and short-term changes in water quality. Activities may not result in water quality lower than what is necessary to protect the existing and designated uses in the ORW. Site specific Standards and Guidelines, Best Management Practices (BMPs), Soil and Water Conservation Practices are designed to protect and maintain designated uses and prevent degradation should an Action Alternative be selected.

Existing Water Quality

Basic water quality data and water samples were collected from streams in several watersheds in the project area in the fall of 2006. On October 26, 2006, pH measurements in the headwaters of North Pond Brook (near stand 1/63) were 4.5 and 4.6. These values are acidic and may reflect the influence of organic acids related to the wetlands along the length of the stream. A set of samples was taken at this location and sent to the lab for analysis. A pH of 6.2 was measured on the same day within 6/8. pH measurements in Duke Brook, on the north side of the project area varied from 5.6 to 5.1 on December 21, 2006. The values are within the range of values typically seen on the White Mountain National Forest (Hornbeck, et al., 2001). All of these pH values are likely indicative of high total aluminum values, most likely above the chronic standard for aquatic life of 75 ppb based on the forestwide relationship between pH and total aluminum values developed from data in the publication by Hornbeck, et al 2001 and other forest monitoring data (1999-2005, Forest monitoring data).

Field review of streams in the watersheds indicated that sedimentation of streams did not appear to be an issue. Fine sediment is considered not a limiting factor for fisheries support on the WMNF (personal communication, Mark Prout, 2006).

Bacteria levels are monitored at the South Pond recreation Area and elevated levels have been recorded periodically. Onsite bathroom facilities help prevent bacteria levels related to human waste from exceeding standards.

Public Water Supplies

Public Water supplies in the project area include surface water uses and groundwater uses. There are no municipal water supplies within the project area. There is a groundwater well

which provides water for the campground in the watershed above the beach. There are no treatment units proposed within 100 feet of this well. There are surface water uses in the project area. One known spring used as a water supply is located in stand 6/22. Where springs used as water sources are located in areas where harvest activities are proposed, a no cut zone of 100 feet will be used to protect these areas. Another developed surface water source was located in Duke Brook, stand 1/30. Perennial streams used as water sources will have the prescribed riparian zones as outlined in the Forest Plan (USDA Forest Service, 2005a). In addition, associated pipelines or other improvements related to the water uses would be protected during project activities. These measures are expected to protect these public water supplies and maintain water quality.

The Analysis Area for direct and indirect effects on water quality is the same as water quantity. These are the 1st and 2nd order perennial watersheds in the project area which have treatment activities proposed in them. This includes Higgins Brook, Duke Brook, and smaller watersheds within Pond Brook such as Cold Stream, Beach Brook, North Pond Brook, Devils Hopyard Brook, and an unnamed stream referred to as South Interpond Stream for analysis. These watersheds were delineated in order to analyze potential localized effects to water quality in closer detail. **The temporal scale for direct and indirect effects on water quality effects** is 5 years in the past and 5 years into the future since changes to water quality became undetectable 3-5 years after harvest as shown by research at Hubbard Brook (Hornbeck, et al., 1997).

The Analysis Area for cumulative effects on water quality is Pond Brook and Higgins Brook Watersheds and the reach of the Upper Ammonoosuc River between the confluence with Higgins Brook on the upstream side of the project area and Western Unnamed Tributaries at the downstream end of the project area. These areas were selected because they include all the waters of the streams which flow through the Project Area; and, at this scale, the effects of multiple uses within the watersheds could become additive and result in cumulative effects. Analysis of a larger watershed areas (such as the entire Upper Ammonoosuc River) would dilute potential cumulative effects to water quality since, as analyzed, no effects related to the implementation of any of the action alternatives would be detectable even at the smaller scale. **The temporal scope for cumulative effects on water quality** is 5 years into the past and 5 years into the future, 2002- 2012. Five years is adequate for water quality analysis because research at Hubbard Brook has shown that changes to water quality following timber harvest became undetectable 3-5 years after harvest (Hornbeck, et al., 1997).

Direct and Indirect Effects on Water Quality

There are three ways that timber harvest can alter water quality. The first way is from the **chemical changes** that occur in streams after trees are cut. The second way is through **temperature** change. The third way is related to the roads, skid trails, and other disturbed surfaces that cause erosion and subsequent transport of **sediment** into streams.

Water chemistry

Timber harvest has the potential to affect water chemistry at the localized scale. The 2005 Forest Plan EIS stated that impacts to temperature and water chemistry are minimized through the use of Standards and Guidelines and BMPs. These include the use of riparian buffers, watersheds being only partially harvested and staggering harvest (USDA-Forest Service, 2005b, pg 3-51). Riparian buffers are considered the most effective factor for preventing nutrients and sediment from reaching a watercourse (Gilliam, 1994).

Alternative 1: No Action

There would be no new increased direct or indirect effects on water chemistry, temperature, or sediment from implementation of Alternative 1 (No Action) within the project area. Ongoing forest activities would not change water quality or impact existing uses.

Alternative 2: Scoped Action

Research at Hubbard Brook has indicated that intensive forest harvesting practices, such as clearcutting an entire watershed, have the potential to lower the pH in water. Other research (Wang, et al 2005, Baldigo, et al, 2005) reports a similar effect during less intensive harvest treatments. Water quality data on the forest has indicated that lower pH values are associated with higher total aluminum concentrations (Hornbeck, et al., 2001). The pH of the streams in the watersheds varies from acidic to neutral, however further decreases in pH are a concern due to metal mobilization, including aluminum, and effects on existing uses, such as fish. Acidity has been shown to mobilize inorganic aluminum in the soils, which then enters stream water (Lawrence and Driscoll, 1988). A compilation of research on water quality effects of timber harvest in the northeast showed that when 15% of the basal area within a watershed was removed, downstream water chemistry was not likely to change (Martin, et al., 1986, Wang, et al 2005, Baldigo, et al, 2005, Lawrence and Driscoll, 1988). The 15% threshold is a conservative threshold which can be applied to most watersheds with confidence that this limit would maintain water quality. It is possible that higher levels of basal area could be removed from a watershed without causing water chemistry changes but without additional information, it is difficult to predict which watersheds those are. Forest Plan monitoring is being implemented with assistance from research to further refine these parameters and related thresholds for vegetative harvest in watersheds.

As shown in Table 14, one 1st perennial stream, called Duke Brook, would have more than 15% of the basal area removed within its watershed under actions proposed in alternative 2. Duke Brook, which is a tributary to the Upper Ammonoosuc River, would have 23.7 % of its basal area removed under this alternative. To mitigate water quality changes, a 100 foot no harvest zone will be implemented in stands 1/30, 1/31, and 1/32. Another 1st order watershed, North Pond Brook, would have 14.9% of its basal area removed under Alternative 2. Since this level of harvest is near the threshold for potential effects to water chemistry and the pH of the watershed is below 5, additional stream protection measures would be implemented to ensure water quality is maintained. Thus on North Pond Brook, a 100 foot no cut zone will be implemented within stands 1/63 and 6/4. These larger no cut zones along Duke Brook and North Pond Brook would mitigate potential water quality changes by increasing flowpaths through undisturbed forest soils and reducing the potential for water

quality changes in the stream to occur. Studies have shown that partial cuts and the use of streamside zones are effective in reducing water quality changes (Patric, 1980, Aust and Blinn, 2004). It is therefore possible that changes in water quality, including temporary decreases in pH and concurrent increases in aluminum, as a consequence of the implementation of Alternative 2 would be reduced or eliminated due to these larger buffers. Research has shown that where timber harvest results in water quality changes, macroinvertebrate populations make a full recovery within 2-3 years (Baldigo, et al, 2003).

Under Alternative 2, all other 1st order perennial watersheds streams would have less than 15% of their basal areas removed. The perennial streams in these watersheds would be treated with a no harvest area within 25 feet of perennial stream banks and only limited uneven-aged harvest would be allowed within an additional 75-foot Riparian Management Zone which follows Forest Plan Standard and Guidelines unless prescribed to benefit hydrological or ecological functions of the associated stream or riparian zone.

The recreation project would not have a direct or indirect effect on water chemistry since only incidental trees may be removed (machinery access purposes) to implement this project. The leach field is located over 500 feet from South Pond and will remain in the same footprint and the replacement of the septic lines are located in a grassy area at least 100 feet from the pond. The project is also located in the Beach Brook watershed which is below the 15% basal area removal threshold.

Alternative 3: Modified Scoped Proposal

By changing the harvest prescription of stand 1/18b from a clearcut to group selection, the 15% threshold of the basal area removed in the Duke Brook watershed would be met. As with Alternative 2, North Pond Brook is just below threshold for basal area removal at 14.9%. At this level of harvest the effects to water quality would be unlikely, however additional stream protection measures would be implemented (same rationale as Alternative 2) to ensure water quality is maintained. It is unlikely that changes in pH or other chemical parameters would result as a consequence of the Alternative 3 in all the perennial watersheds.

Under this alternative, all other 1st order perennial watersheds streams would have less than 15% of their basal areas removed. The perennial streams in these watersheds would be treated with a no harvest area within 25 feet of perennial stream banks and only limited uneven-aged harvest would be allowed within an additional 75-foot Riparian Management Zone which follows Forest Plan Standard and Guidelines unless prescribed to benefit hydrological or ecological functions of the associated stream or riparian zone.

Acidity has been shown to mobilize inorganic aluminum in the soils, which then enters stream water (Lawrence and Driscoll, 1988). Since harvesting at the proposed levels is not expected to lower the pH (increase acidity) of streams, it is also not expected to increase the aluminum concentrations at this scale. Therefore, even though aluminum concentrations in the watersheds are unknown, these concentrations should not increase as a result of the proposed project.

The effects from the recreation project are the same as Alternative 2.

Temperature

When forest harvest reduces canopy shading along streams, the potential exists to increase stream water temperatures. In one study, cutting all trees in a watershed at Hubbard Brook in the White Mountain National Forest resulted in a 6 degrees Celsius increase in stream temperature (Pierce, R.S., and J.W. Hornbeck, and G.E. Likens, and F.H. Bormann, 1970). Such increases in stream temperature can be prevented or reduced through the use of buffers with uncut trees along the edges of streams (Davies, 1984 and Staffard, et al 1996).

Alternatives 2 and 3

Forest Plan Guidelines for stream and perennial riparian areas provide for an uncut buffer on all perennial streams unless prescribed to benefit hydrological or ecological functions associated with stream or riparian area. For areas outside the watershed restoration area, the canopy and related shade will remain intact on all perennial streams within the project area. Within the watershed restoration area however, trees may be taken within 75 feet of the channel though continuous canopy and stream temperatures would be maintained along the streambanks.

In addition, no watershed would be entirely harvested, thereby reducing the potential for temperature increases in streams. These practices have been shown to be effective in maintaining cold temperatures during timber harvest activities in New Hampshire and Maine (Pierce, et al 1993).

The recreation project would not have a direct or indirect effect on water temperature since the leach field and septic lines are located more than 25 feet from a perennial stream or pond and are replacements to the existing system.

Sediment

Alternatives 2 and 3

Research has shown that the usual harvest practices, such as those on the White Mountain National Forest, do not result in sediment movement and do not pose a risk to water quality (Brown, 1983). Implementation of the 2005 Forest Plan Standards and Guidelines would minimize any opportunity for sediment to reach the banks of any perennial streams. No harvest would occur within 25 feet of perennial stream banks and only limited uneven-aged harvest would be allowed within an additional 75-foot Riparian Management Zone, except for North Pond Brook (Alternative 2 and 3) and Duke Brook (Alternative 2) where a 100 foot no harvest zone will be implemented. This applies to areas outside the watershed restoration area, for areas adjacent to the watershed restoration project, tree may be harvested within 25 feet of perennial stream channels. This is permitted under the Forest Plan if it benefits the hydrological or ecological function of the associated stream or riparian area.

Approximately 5.5 miles of existing road is proposed for maintenance under Alternatives 2, and 4.5 miles of existing road is proposed for maintenance under Alternative 3. Although

road maintenance may initially cause ground disturbance, improving and maintaining roads for their level of use can prevent future sediment transport. Research has shown that maintenance reduces sediment losses (NCASI, 2000).

Stream crossings can cause increased sediment inputs to streams during installation and use. Four skid trail crossings would be needed in the project area to cross perennial streams. These would be designed to pass bankfull flows and would be located to minimize potential sediment inputs. Following harvest, all temporary crossing structures would be removed, stream banks restored as necessary, and any sediment inputs should be reduced to pre-harvest levels. Sediment problems associated with stream crossings can be very persistent (Stafford et al., 1996), so visual monitoring would occur at stream crossing sites to catch and rectify any problems in the early stage.

The magnitude of effects caused by sediment transport is related to area of disturbance. Areas which lack vegetation and have disturbed soils become the source for sediment transport, particularly near stream crossings (see Table 13). As areas of temporary disturbance (landings, skid trails) revegetate, sediment contributions related to these areas decrease to near zero. Sediment contributions from existing classified roads would continue; however, they would likely return to pre-project levels over time.

In addition, the effectiveness of these BMPs has been monitored in Maine and documented (Maine Department of Conservation, Maine Forest Service, 2005 and Stafford et. al. 1996). This monitoring indicates that “BMPs use was effective in avoiding soil deposition into surface waters on 82% of harvest sites with water bodies present.” WMNF Forest Plan Standards and Guidelines require larger riparian buffers than Maine BMPs. It is therefore likely that the effectiveness of these buffers at avoiding soil deposition into surface waters would exceed 82%.

Recreation

Proposed recreation improvement of replacement of the septic leach field and associated components and replacing storm drain below the parking lot will result in temporary disturbed area during construction. Erosion control practices and site runoff control will be used during construction to contain these direct and indirect effects. In addition, bare soil will be stabilized after construction is completed. By using these common construction BMPs, water quality will be protected and maintained during these activities. An improved septic and drainage system in the parking lot will provide long term protection of water quality by managing waste water and parking lot runoff.

Watershed Restoration Project – Road Stabilization

Within the Duke Brook watershed, there are several old skid trails that have developed intermittent stream channels running down them as a result of concentrated overland flow. In selected locations, woody material would be placed in the trail to slow water flows and allow water to infiltrate the soils rather than form runoff (Burroughs and King, 1989).

Waterbars would also be constructed on skid trails higher up in the watershed to slow the flow of water and reroute water off of the trails into the woods at selected locations. This would reduce sediments from reaching stream channels in the lower reaches.

Vegetative ground cover is essential in preventing future erosion in the Duke Brook watershed. The unstable sections of roads proposed for treatment have little vegetative cover. By reducing overland flow through the construction of waterbars and barriers, vegetation will have the chance to establish along the roads, permanently stabilizing them.

Some soil disturbance would occur as a result of the proposed project. Constructing waterbars would expose and move mineral soil. Dragging of trees to construct barriers may also expose mineral soil. Most of these locations will be away from surface runoff, so increased sedimentation is not expected. However, near stream crossings there is the potential that some sediment could reach surface water. These impacts would be minimal and short term, as the proposed project is designed to reduce future erosion and subsequent sedimentation of streams.

Watershed Restoration Project – Channel Stabilization/Habitat Improvement

Within the Rocky Pond watershed, large woody material in streams increases pool frequency and size, forms and stabilizes gravel bars, increases stream complexity, and reduces flow velocities in streams (Naimen, et al., 2002). This project proposes to add large woody material to streams to restore the natural functioning condition of the channels.

Research has indicated that large woody material forming organic debris dams are vital in controlling sediment transport from a mountainous landscape (Likens and Bilby, 1982). Storage of sediment behind these obstructions not only provides potential spawning gravels for fish, but prevents large accumulations of sediment lower in the watershed.

Chainsaws and other hand tools would be used to cut and place large woody material in streams. No heavy equipment is proposed. Work is expected to result in increased channel stability and improved habitat for aquatic life. Some small temporary increases in turbidity may occur as a result of this project when the trees are dragged into the stream bed. However, the beneficial results of the project outweigh these short-term impacts.

Any direct and indirect effects sediment in water quality resulting from the Action Alternatives are anticipated to be short-term and localized. Most studies show that BMPs are very effective at reducing or eliminating the transport of sediment into watercourses (Maine Department of Conservation, Maine Forest Service, 2005 and Stafford, et al., 1996). Low turbidity measurements indicate that there is currently not an issue with sediment movement into surface waters in the watersheds. BMPs are monitored as part of the forest-wide monitoring of the 2005 Forest Plan. By employing 2005 Forest Plan Standards and Guidelines, site specific Soil and Water Conservation Practices, and New Hampshire BMPs, the Outstanding Resource Waters standards would be met.

Cumulative Effect to Water Quality

Water Chemistry

As described in the Forest Plan EIS, an existing cumulative effect to water chemistry has been caused by atmospheric deposition (USDA-Forest Service, 2005b, pg 3-51, 3-52). A summary of acidic deposition in the Northeast (Driscoll, et al 2001) concludes that the leaching of base cations has delayed the recovery of ANC (acid neutralizing capacity) in lakes and streams and that toxic forms of Al have increased in surface waters.

The lower pH values and concurrent high aluminum levels in the project area are likely influenced by this effect. To protect against cumulative effects of atmospheric deposition on water quality from past and future timber harvest, the 2005 Forest Plan includes a guideline that limits the amount of even-aged regeneration harvest within the watershed of a first or second order perennial stream to no more than 15% of the area of a watershed in a five year period (USDA-Forest Service, 2005a, LRMP, pg 2-29). Past and proposed even-aged regeneration harvesting in the CEA watersheds within the last 10 years was calculated to be below 15% in the 1st and 2nd order watersheds in the project area with the exception of current proposed harvest in Duke Brook in Alternative 2. Though a 100 foot no cut riparian zone should mitigate effects to water quality. This level maintains water quality related to timber harvest.

It is anticipated that some harvesting may occur on private land within the CEA in the next ten years. However, all of the private land in the CEA watersheds would have to be harvested within a five year period for this guideline to be exceeded. This far exceeds current trends of harvest on private land in the CEA watersheds. Because of this, it is unlikely that timber harvest would exacerbate water quality concerns related to atmospheric deposition.

Streams in the project area have not been assessed by the state to determine if they support designated uses. However, research has indicated that watersheds with approximately 10% impervious surfaces have surface waters which are degraded and don't meet water quality standards (Morse and Kahl, 2003). In the CEA watersheds, known landings, roads, skid trails, and hiking and snowmobile trails on public and private land account for less than 2% impervious surfaces. Buildings, driveways, and parking areas on private land could increase these impervious surfaces by an unknown amount. Buildings, driveways, and parking areas, as well as new development in the next ten years, would have to exceed 800 acres in Pond Brook alone to exceed the impervious surfaces threshold. This would exceed current development trends in the CEA watersheds. Therefore, water quality changes related to larger scale impervious developed surfaces is not expected to occur as a result of cumulative activities.

Temperature

Temperature measurements collected in the CEA watersheds indicated cool temperatures which support the existing uses in the watersheds. The proposed project is not anticipated to cause increases in temperature due to the use of BMPs as explained earlier. A cumulative effect related to stream temperature is not anticipated, even when combined with activities on private land.

Sediment

No cumulative effects related to sediment are expected in the Analysis Area. As discussed previously, any direct or indirect effects are expected to be short-term and localized. Road maintenance should reduce potential sediment inputs of existing roads (NCASI, 2000).

No known wildfires have occurred in the cumulative effects area. Permanent wildlife openings are proposed for treatment through prescribed fire and there is the potential that these stands could be re-burned in the next ten years. Since the stands proposed for prescribed fire have a vegetative buffer strip, it is unlikely that any increased erosion from the prescribed fire would reach flowing water. Cumulative effects of prescribed fire on sediment are therefore not anticipated.

The proposed watershed treatments would result in positive cumulative effects to the watershed, including long-term reductions of sediment inputs to streams, increased infiltration and reduced surface runoff.

Sediment problems related to recreational activities in the CEA have not been observed or detected. Sections of the Kilkenny Ridge and Devils Hopyard trails are located within riparian areas may be contributing to increased sediment loads into streams and ponds at localized areas despite mitigations such as water bars. No cumulative effects are expected from the recreation project at South Pond recreation Area, since improvement sites would be revegetated once the work is completed.

3.8 Riparian and Aquatic Habitats

A riparian area is a term used by the Forest Service that includes stream channels, lakes, adjacent riparian ecosystems, floodplains, and wetlands (USDA-Forest Service, 2005a, LRMP). Benefits of a healthy riparian area include dissipating stream energies associated with high flows, filtering sediment, development of diverse channel characteristics to provide habitat for aquatic biota, and protection of stream banks from scour (Verry, et al., 2000).

There is a lack of large woody material in many of the streams in the project area. Some recruitment to the streams is occurring as trees in the riparian area die and fall into the channels. In particular, the small stream called South Interpond Stream for this project which drains stands, 7/8, 7/34, 7/35, and 7/48 is lacking in woody material. The upper part of this watershed had a clearcut area with no wood recruitment. The lower part appears to have been part of a skid trail and trees along its length are young.

The Analysis Area for direct and indirect and cumulative effects on riparian area is Pond Brook, Higgins Brook, Duke Brook and other smaller watershed along the Upper Ammonoosuc as described previously because it includes all perennial and intermittent streams that would be effected by the proposed actions. The **temporal period for direct and indirect effects** is up to one year after completion of harvest activities prior to revegetation of woody and non-woody vegetation.

The temporal scope for cumulative effects on riparian and aquatic habitats is from 1880 to 2030. This time frame was chosen because harvesting in riparian areas began on the White Mountain National Forest in the 1880's, resulting in less than natural levels of large woody material in streams and on floodplains. Research in northern hardwood forested ecosystems has indicated that after 170 years or so trees begin to die and fall over in increasing numbers (Likens and Bilby, 1982). We could therefore expect those trees which are currently in the youngest age class to begin naturally recruiting to streams within the next 170 years. Older trees would provide woody material sooner.

Direct and Indirect Effects on Riparian Areas

Alternative 1: No Action

There would be no new direct or indirect effects on riparian and aquatic habitats from implementation of Alternative 1. Current and on-going management activities would continue, but no new management activities related to this project would be initiated.

Alternatives 2 and 3

Timber harvest has the potential to alter physical stream characteristics, including riparian zones. All stands proposed for treatment with perennial streams and wetlands would have a 25-foot no-cut buffer and an additional 75-foot partial-cut buffer from the banks of the stream. Within this 75-foot partial-cut buffer, only uneven-aged silvicultural practices would be allowed, and a relatively continuous forest canopy would be maintained. North Pond Brook (Alternative 2 and 3) and Duke Brook (Alternative 2) would have a 100 foot no cut zone. These buffers would maintain and protect streams and stream stability from potential timber harvest. In addition, it maintains trees near the stream channels and wetland areas for canopy and future recruitment of large woody material. This pertains to areas outside the watershed restoration project. Areas within the watershed restoration area, may have trees harvested within 25 feet of the stream channel. The effectiveness of riparian buffers at protecting stream stability would be visually monitored during and after harvest.

Watershed improvement projects are proposed under both alternatives within compartments 1 and 7. These projects include stabilization of old skid roads in compartment 1 and in compartment 7, stream function would be improved by adding woody material within the stream channel.

Road Stabilization

Within the Duke Brook watershed, placement of woody material, waterbars, or similar structures would be used to prevent water from concentrating on these old skid roads by dissipating flows and encouraging sediment to accumulate and fill in eroded areas. Up to 200-500 pieces of wood per mile could be used, especially where access by machinery is difficult. Wood would be cut to fit the eroded skid road conditions, and placed for maximum effectiveness. Trees used for this purpose would come from near the treatments areas, usually within 75 feet. According to Forest Plan Standard and Guidelines, trees within 25 feet of the bank of a perennial stream can be cut to benefit hydrological or ecological functions of an associated stream or riparian area. Canopy would be retained and no trees would be

removed that provide stability to channels. Similar treatments are currently being done on the WMNF to stabilize upland slopes impacted by old skid roads (Connor Brook project, 2006). In this way, old skid roads which currently concentrate and intercept water will be stabilized, erosion will be reduced, and sedimentation to streams where these features intersect channels will be greatly reduced.

Channel Stabilization/Habitat Improvement

In the Rocky Pond Watershed, a stream impacted by a past clearcut, was identified as lacking in woody material and related functions. This stream would be treated with up to 200-500 pieces of woody material placed in appropriate locations in the stream and its floodplain. Trees which provide stability and shade would be retained in the streamside area, and canopy would be maintained. This type of treatment has been used successfully in several areas on the WMNF to restore stream function in areas where woody material has been identified as lacking (Great Brook, West Branch of the Upper Ammonoosuc). This type of treatment restores the function of streams provided by wood, including diverse habitat features such as pools and allowing for increased sediment and water storage.

Cumulative Effects on Riparian Areas

Past and present activities that occur in the cumulative effects area (CEA) watersheds on Forest Service land include fire, timber harvest, recreation, and road maintenance and road use. Activities on private land include timber harvest and road maintenance. There is no indication that future activities will deviate in type or scale from present activities. There is a lack of large woody material in streams on the White Mountain National Forest, including the CEA watersheds (USDA-Forest Service, 2005b, pg 3-69).

An existing cumulative effect in the Analysis Area exists due to a lack of large woody material in streams, particularly in the lower reaches of the watersheds. Standards and Guidelines in the Forest Plan (2005) within the WMNF such as riparian buffers are expected to minimize the impacts of timber harvesting on stream stability, as well as retain trees near channels for future recruitment of large woody material. By adding wood, it gets into the stream now, rather than waiting for natural recruitment. Plus approximately 200-500 pieces would be placed within streams which is based on historic levels found within undisturbed streams in the White Mountains (Underwood et al 1998).

On private land, which accounts for 10% of the CEA watersheds, harvesting has occurred in the past and will continue to occur in the future. The state of New Hampshire has a timber harvesting law which states that within 50 feet of the streams in the CEA watersheds “no more than fifty percent of the basal area may be cut or otherwise felled each year, leaving a well distributed stand of healthy, growing trees” (NH Division of Forest and Lands, 2006). By following these regulations and the Standards and Guidelines in the Forest Plan, harvesting is not likely contribute to cumulative effects on riparian and wetlands areas within the cumulative effects watershed areas.

3.9 Wildlife

Affected Environment for Wildlife

Field reconnaissance and literature review (DeGraaf and Yamasaki 2001) indicate that a wide array of wildlife species use the WMNF seasonally or year-round. These species use a variety of habitat types and vegetation age classes to meet their needs. Many species use multiple age classes and habitat types (DeGraaf et al. 1992, DeGraaf and Yamasaki 2001). As a result, managing for all the wildlife species that use the WMNF means providing a broad range of habitat conditions across the Forest (USDA Forest Service 2005a, Chapter 1, pages 20-21).

South Pond HMU

This HMU contains roughly 16,000 acres of National Forest lands in Management Areas 2.1, 6.1, 6.2, and 9.3; approximately 12,000 acres of that is in MA 2.1. The South Pond HMU contains the headwaters of Cold Stream, Fifefield Brook, Fogg Brook, Higgens Brook, Number 9 Brook, Pond Brook and several smaller tributaries. South Pond, North Pond, Rocky Pond, and York Pond as well as many beaver ponds, wetlands, vernal pools, and seeps occur throughout the HMU. The current habitat composition and age class in the South Pond HMU is displayed in Table 15 for MA 2.1, 6.1, 6.2 and 9.3 lands. Existing composition and age class information comes from corporate databases, GIS shapefiles, reviews of stand records and field examinations.

Table 15. South Pond HMU habitat conditions

Habitat	Current Condition (approximate)	Current Condition (approximate)	Regeneration Age Class	Young Age Class	Mature Age Class	Unsuitable for harvest**
	<i>Acres in MAs 6.1, 6.2, and 9.3*</i>	<i>Acres in Management Area 2.1</i>				
Hardwood	1,250	6,400	75	1,291	5,036	755
Mixedwood	650	2,100	17	255	1,814	612
Spruce-fir	600	2,100	69	392	1,671	371
Aspen-birch	1,400	900	0	419	473	135
Oak-Pine	0	40	0	0	0	0
Hemlock (only occurs as inclusions)	0	0	n/a	n/a	n/a	n/a
Wildlife Opening	0	15	n/a	n/a	n/a	n/a
Non-forest	0	200	n/a	n/a	n/a	n/a
TOTAL	3,900	12,000	161	2,357	8,994	1,873

* Most acres outside of MA 2.1 are mature forest, regardless of type, though natural disturbance may result in small amounts of regeneration and young age forest.

** Unsuitable acres are not available for harvest; they could currently be in young or mature age class.

Within the HMU, some of the northern hardwood forest is on ecological landtypes (ELTs) that would naturally support mixedwood or spruce-fir forest. Intensive past management resulted in conversion to hardwood or mixedwood forest habitat as evidenced by spruce-fir understory that is developing. These stands currently support wildlife species that prefer hardwood and mixedwood forest habitat, though stands with a thick spruce-fir understory may have additional species using that understory for food or cover.

The Analysis Area for direct and indirect effects on wildlife is the Project Area because this is the area where wildlife species and their associated habitats may be affected in the short term by harvest activities and the proposed connected actions in this project. **The temporal scope for direct and indirect effects on wildlife** is the time period that encompasses active harvest operations and when connected actions are implemented because this is when wildlife species would be affected by the proposed activities.

The Analysis Area for cumulative effects and rationale on wildlife is the same as Vegetation (see Section 3.3) One of the objectives of wildlife habitat management on the White Mountain National Forest is to work toward the Desired Future Condition (DFC) for Management Area 2.1. This is the only Management Area within which habitat objectives may be established or achieved, and timber harvest is the primary tool for achieving those objectives. Timber harvest, particularly even-aged harvest, can affect habitat composition and age class distribution.

The temporal scope for cumulative effects on wildlife is ten years past and ten years into the future (1998-2018). The temporal scope of ten years was chosen because the benefits of regeneration age class for some species of wildlife diminish after approximately 10 years (DeGraaf and Yamasaki 2001). A look at the existing condition of the South Pond HMU shows a deficiency in the regeneration age class (0-9 years) in the northern hardwood and aspen-birch habitat types.

Direct and Indirect Effects on Wildlife

This section looks at providing habitat diversity for wildlife and is measured by ability to meet HMU objectives.

Alternative 1: No Action

There would be no direct or indirect effects from timber harvest or other proposed activities, such as openings in the forest canopy, tree removal, residual tree damage, snow or soil compaction, or noise from heavy equipment as no harvesting or connected actions would occur the Project Area.

Changes in existing condition of the project area would result from natural processes only. Openings in the forest canopy would only result from mortality of individual trees or disturbance from some other natural event (storm, fire, infestation, etc.). The Project Area would continue to provide a mix of mature northern hardwood, mixedwood, and spruce/fir intermixed with mature pine and aspen. This would favor wildlife species associated with

mature northern hardwoods, mixedwood, and spruce-fir including scarlet tanager and blackburnian warblers. Patches of mature aspen-birch that occur throughout the project area would start to die-out over time. The decline of aspen-birch habitat over time may result in a decline in ruffed grouse in the project area. There would be a lack of regeneration forest habitat in the project area favored by species such as chestnut-sided warblers. Two existing managed permanent wildlife openings would continue to be maintained every 3-5 years using prescribed fire. The other two wildlife openings would not be managed due to their small size. Maintenance would cause a temporary disturbance to wildlife species occupying these sites; prescribed fire usually occurs in early spring before most wildlife species start to nest.

The watershed improvement project would not be implemented. In Compartment 1, ongoing erosion of old roads would continue and; waterflows would not be restored to more natural conditions. In Compartment 7, a small stream would remain unstable which would increase potential for sedimentation. This has the effect of lowering the quality of habitat for macroinvertebrates and other aquatic species such as amphibians and fish in the intermittent and perennial stream systems. This small stream would continue to lack a component of instream large wood.

No roads or landings would be rebuilt. There would be no change to human access to the Project Area and no effects to wildlife from increased human disturbance.

The septic system at South Pond Recreation Area would still be proposed to protect the environment and visitors to the area and a separate analysis would be done. Upgrading the South Pond septic system may cause temporary disturbance of wildlife but would not affect existing habitat condition. It is expected that this type of work would not increase human presence in the area so any type of effect to wildlife will remain similar to what is existing.

Action Alternatives 2 and 3

Active timber harvest operations and connected actions, such as road and landing construction and reconstruction, decommissioning roads, stumping, prescribed burning, and mowing permanent wildlife openings, watershed restoration, and rebuilding the septic system at South Pond would have direct effects to wildlife. Negative effects could include disturbing or displacing wildlife, including nesting birds, during project implementation. Wildlife travel corridors may be temporarily disrupted. Beneficial effects could include increased mobility for some species on snow compacted by skidder traffic, additional browse, and hiding places for wildlife from residual treetops scattered on the ground.

Both Action Alternatives would increase acres of regeneration forest habitat age from proposed clearcuts, patch cuts, seed tree harvest, and expansion of permanent wildlife openings. Alternative 2 would create 137 acres of regeneration forest habitat while Alternative 3 would create 124 acres of regeneration forest habitat. Species desiring mature forest characteristics would be displaced. Over time, wildlife species favoring regeneration habitat such as chestnut-sided warblers, ruffed grouse, white-tailed deer, black bear, and moose would start to inhabit these areas. In these units, site conditions on the forest floor would be hotter and drier for about 2 to 5 years after cutting with increased decomposition of leaf litter (Fay et al. 1994). This could adversely affect some species of amphibians, such as

red-backed salamander (deMaynadier and Hunter 1998). Individual salamanders in large unshaded openings would not likely survive. Amphibians and small mammals in newly created openings also might be more vulnerable to predation. This would be partially mitigated by leaving reserve patches of trees (USDA Forest Service 2005a, Chapter 2, page 35-36).

Uneven-aged or intermediate treatments including individual tree selection, group selection, thinning, improvement harvest, and shelterwood prep and seed would remove some mature trees and release the understory to create more vertical structure and layers. This would create disturbance and open the canopy to partial sunlight. There would be minor changes to shading of the forest floor. The result would be to diversify stand structure and increase understory vegetation and browse availability for wildlife. Alternative 2 proposes 802 acres of uneven-aged or intermediate harvest while Alternative 3 proposes 851 acres.

Alternative 2 proposes the most acres of summer harvest (June-August), while Alternative 3 proposes more winter harvest (Table 16). The season in which a unit is harvested may directly affect wildlife, especially during critical times in the life cycle of a species. Breeding, young rearing, feeding, and winter survival are critical times for wildlife. Individuals could be displaced, harassed, or mortally affected during any season of operation. Summer harvest (June-August) could displace or kill species that use trees for nesting, cover, and foraging such as breeding birds and ground dwelling animals (mammals, amphibians, and reptiles). Fall harvest (August-October) would affect fewer nesting species but could potentially affect autumn breeding species, including some amphibians, species that feed on fall mast (acorns and beechnuts) such as black bear, and small ground-dwelling mammals. Certain species could be affected by winter harvest (December-March). Some species, including owls, breed in winter. White-tailed deer gather or “yard” in areas of lowland conifers in the winter, where cover and warmer temperatures provide protection from the elements, and where they would also be vulnerable to disturbance during this time of year. Species which utilize cavities in winter, such as chickadees and nuthatches; or species which den, such as squirrels and raccoons, could be displaced or killed if roost or cavity trees were harvested. Raptors start to breed in February, with young fledging in June and July (Society for the Protection of New Hampshire Forests, 1997), so they could be affected by both winter and summer harvest.

Table 16. Acres of harvest by season for Action Alternatives

Season	Alternative 2	Alternative 3
Summer/Fall/Winter	218	89
Fall/Winter	516	515
Winter	297	403
TOTAL	1,031	1,007

Summer = 6/30 - 8/1; Fall = 8/1-10/15; Winter = 12/15-3/20

In units with proposed clearcut, patch cut, and seed tree harvest, there would be a lack of recruitment of large dead and down wood (>11” DBH) between 10 and 60 years. Alternative 2 proposed slightly more regeneration forest habitat than Alternative 3. Residual trees in all other harvest units would continue to supply a component of standing and down woody material as trees die, branches break, and annual litter builds up on the ground. Forest Plan

standards and guidelines (USDA Forest Service 2005a, Chapter 2, pages 35-36) require that snags, cavity trees, and downed logs be retained in areas with active timber harvest. This should ensure that adequate dead and down wood is available to wildlife species upon completion of timber harvesting activities.

Whole tree harvesting would not be allowed under either Action Alternative. Trees would be dragged to the landing, limbed, and the tops dragged back in the woods. Unless the tops are placed along skid trails and compacted, they would provide a one-time input of browse for species such as moose and white-tailed deer during the winter months.

Under Alternative 2, four existing permanent wildlife opening would be expanded through timber harvest into adjacent stands. One wildlife opening would be increased from 3 to 5 acres, one from 1 to 10 acres, one from 1 to 6 acres, and one from 3 to 14 acres. One of these areas (stand 1/23a) would be stumped. These openings would be maintained in the future every 3 to 5 years by prescribed fire, mowing or mechanical equipment such as chain saws and/or brush saws. Brush would be piled and burned. Under Alternative 3, three existing permanent wildlife opening would be expanded through timber harvest into adjacent stands. One would increase from 1 to 10 acres, one from 1 to 6 acres, and one from 3 to 14 acres. A prescribed burn plan would be developed for these stands that would include site-specific mitigation measures for resource protection, fire management, and safety of firefighters. Prescribed burns would cause a temporary disturbance to wildlife species occupying these sites in early spring. Burning usually occurs before most wildlife species start to nest in these areas. Stumping and mechanical treatments would occur in the late summer and fall. Wildlife species would be disturbed and temporarily displaced by these treatments but would likely return to these sites upon completion of the work. Direct effects of prescribed fire in the expanded wildlife openings may vary for different species and conditions (Anderson 1994). In general, while some evidence of vertebrate mortality has been reported, the most common opinion is that vertebrates are rarely killed in fires (Lyon et al. 1978). Prescribed fire and mowing would cause a temporary loss of understory which would result in a temporary loss of habitat for wildlife species associated with understory vegetation (including regenerating hardwood, spruce-fir, and hemlock, shrub layers, herbaceous ground vegetation, and soft mast). However herbaceous and shrubby vegetation would grow back quickly providing this habitat condition for three to five years until the site is burned or mowed again.

Under both Action Alternatives, decommissioning 0.5 miles of roads may limit human access slightly in the long term as roads slowly revert to a vegetated state. Approximately 0.7 miles of new road construction would allow increased human access to portions of the Project Area. Any effects to wildlife from increased human access would not change from existing conditions because these roads would be gated or barricaded with rocks to prevent vehicular access. The amount of roads that people could walk on would be similar as to what is currently present. People would continue to use the area for Recreation activities. The creation of regeneration forest habitat and permanent wildlife openings may benefit game species such as moose, bear, and white-tailed deer affording better hunting opportunities in this area.

In the long term, implementation of the proposed watershed project would stabilize segments of old roads, intermittent, and perennial streams and minimize the chance of future

sedimentation in perennial streams and provide long term benefit to instream habitat. In areas where wood is placed in a stream, some species would benefit from increased pool habitat and instream cover. It is expected that abundance and diversity of macroinvertebrates would increase in the streams providing an additional source of food for amphibians and fish. Large pieces of down wood in the riparian area may benefit some wildlife species by providing denning habitat and cover.

Recreation maintenance projects at South Pond Recreation Area would have the same direct and indirect effects described in the “No Action” Alternative.

Cumulative Effects on Wildlife

Alternative 1: No Action

Mature northern hardwoods, spruce-fir, mixedwood intermixed with mature aspen-birch, would continue to dominate the South Pond and Mill Brook HMUs. Past harvesting in these HMUs and adjacent private land has resulted in some increased habitat diversity.

Under the No Action Alternative, timber harvest would not be used to diversify wildlife habitat by providing regeneration forest habitat, increasing the amount of permanent wildlife openings, or maintaining and/or increasing the amount of aspen-birch, spruce-fir and pine habitat in the South Pond HMU. Over time, dead or dying trees or small groups of trees may continue to fall to the ground and open limited portions of forest floor to sunlight and regeneration. Early-successional habitat types such aspen-birch would still be present in 10 years, but they would begin converting towards northern hardwoods or softwood types. There is potential for future timber harvesting in the Mill Brook HMU in the next ten years which would diversify wildlife habitat by increasing regeneration forest habitat and young spruce-fir. This alternative does not preclude future options for creating early successional habitat or diversifying community types through future stand entries to change stand structure and age class distribution in the South Pond HMU. However, the ability to meet the wildlife habitat management goals outlined in the 2005 Forest Plan (USDA-Forest Service, 2005a, Chapter 1, pages 18-19) in the reasonably foreseeable future for age class and habitat is somewhat uncertain. Interior forest dwelling species would be expected to increase in numbers while early successional species would decline in the Analysis Area. Some existing regeneration forest habitat in the South Pond HMU and Mill Brook HMUs as well a proposal to create some of this habitat type in the Mill Brook HMU over the next ten years would provide a component of this habitat in the Analysis Area. The larger even-age harvests that have been or may be created on surrounding private land would also provide habitat for early successional species while other areas with uneven-aged treatments would favor wildlife species that inhabit mature forest.

The seven existing managed permanent wildlife opening in South Pond HMU and the one existing permanent wildlife opening in the Mill Brook HMU would continue to be maintained every 3 to 5 years with prescribed fire. This would cause a temporary disturbance to wildlife species occupying these sites in early spring. Burning usually occurs before most wildlife species start to nest. The effects of prescribed fire on wildlife are the same as under direct and indirect effects.

The watershed improvement project would not be implemented and the cumulative effects would be the same as the direct and indirect effects of the “No Action” Alternative. The benefits of the proposed watershed projects in Mill Brook are the same as described for the North Kilkenny watershed project under direct and indirect effects.

The transportation corridor that has been established in the Analysis Area over the years to facilitate timber harvesting may have resulted in some increased human access to the area. Human use appears to have been fairly low in these areas and effects to wildlife are most likely minimal.

Ongoing recreation maintenance projects throughout the Analysis Area including the upgrade of the South Pond septic system may cause temporary disturbance of wildlife but would not affect existing habitat condition. It is expected that this type of work would not increase human presence in the area so any type of effect to wildlife would remain similar to what is existing.

Action Alternatives 2 and 3

The existing habitat condition and associated wildlife species in the Analysis Area as a result of activities in the past ten years is the same as described for the No Action Alternative.

Under the current and proposed future activities, mature northern hardwoods, spruce-fir, and mixedwood would continue to dominate the Analysis Area. Harvesting proposed under both Action Alternatives and proposed future harvest in the Mill Brook HMU would diversify wildlife habitat within the South Pond and Mill Brook HMUs, including establishing northern hardwood regeneration forest habitat, maintaining a component of pine and aspen-birch, expanding existing permanent wildlife openings, creating a new permanent wildlife opening, providing young spruce-fir habitat, and favoring spruce-fir on softwood sites. Proposed harvests on adjacent forest lands also would diversify wildlife habitat by establishing regeneration forest habitat. However some of the proposed harvest on private land may reduce the amount of spruce-fir habitat in the area by using even-aged management. This may allow northern hardwoods to outcompete spruce-fir over time.

The transportation corridor that has been established in the Analysis Area over the years to facilitate timber harvesting may have resulted in some increased human access to the area. The effects of decommissioning the roads on National Forest lands would result in a slight reduction in humans being able to access this area. New road construction proposed in the South Pond HMU would allow some increased access into the area. Human use appears to have been fairly low in these areas and effects to wildlife are most likely minimal. Any effects to wildlife from increased human access in the Analysis Area would not change from existing conditions as all roads would be gated or barricaded with rocks to prevent vehicular access. The amount of roads that people could walk on would be similar as to what is currently present. People would continue to use the area for Recreation activities. The creation of regeneration forest habitat and increase in permanent wildlife openings in the Analysis Area may benefit game species such as moose, bear, and white-tailed deer affording better hunting opportunities in this area.

Cumulative effects for the recreation maintenance projects at South Pond Recreation Area and watershed improvement projects within the South Pond and the Mill Brook HMU would have the same cumulative effects described in the direct and indirect effects of the Action Alternatives.

Table 17. South Pond HMU: Existing (MA 2.1), Desired and Results of Action Alternatives

Forest Type	Total Acres in MA 2.1 (approximate)		Regeneration Acres				Young Acres			Mature Acres			MA 2.1 lands unsuitable for harvest
	E	P	E	D	Alt 2	Alt 3	E	Alt 2	Alt 3	E	Alt 2	Alt 3	
NH	6,400	5,800	75	256	171	156	1,291	1,291	1,291	5,036	4,954	4,956	755
Mxd	2,100	2,300	17	21	17	17	255	255	255	1,814	1,784	1,793	612
S/F	2,100	2,600	69	43	69	69	392	392	392	1,671	1,666	1,666	371
Asp/bir	900	900	0	134	20	18	419	419	419	473	453	455	135
Oak/Pine	40	40	--				15	15	15	22	22	22	
TOTAL	12,000	12,000	161	454	277	260	2,372	2,372	2,372	9,016	8,879	8,883	1,873
WLO	16				37	41							

E=existing, P = potential acres based on ELT capability, D=desired maximum acres.

NH = Northern Hardwood, Mxd = Mixedwood, S/F = Spruce/Fir, Asp/bir = Aspen/Paper Birch, WLO = Actively Managed Permanent Wildlife Openings (The acreage of WLOs will be increased dependent on the quality of potential sites as defined in USDA Forest Service 2005c).

Table 18. Mill Brook HMU: Existing (MA 2.1), Desired and results of Proposed Action

Forest Type	Total Acres in MA 2.1 (approximate)		Regeneration Acres			Young Acres		Mature Acres		MA 2.1 lands unsuitable for harvest
	E	P	E	D	Proposed Action	E	Proposed Action	E	Proposed Action	
NH	6,500	5,400	96	258	143	978	978	5,387	5,340	955
Mxd	900	300	0	9	0	58	58	873	873	405
S/F	700	2,400	0	14	0	0	37	710	705	212
Asp/bir	900	900	9	128	9	48	48	806	774	148
Hemlock	10	10	--	--		--	--	8	8	
TOTAL	9,000	9,000	105	409	152	1,084	1,121	7,784	7,700	1,720
WLO	1				10					

E=existing, P = potential acres based on ELT capability, D=desired maximum acres.

NH = Northern Hardwood, Mxd = Mixedwood, S/F = Spruce/Fir, Asp/bir = Aspen/Paper Birch, WLO = Actively Managed Permanent Wildlife Openings (The acreage of WLOs will be increased dependent on the quality of potential sites as defined in USDA Forest Service 2005c).

Effects of creating northern hardwood regeneration age class

Both Action Alternatives, the future harvest proposed within the Mill Brook HMU, and harvesting on adjacent private lands would establish northern hardwood regeneration habitat in the Analysis Area (Tables 17 and 18). While harvests proposed on National Forest lands would not meet the regeneration forest habitat goals for northern hardwood in the South Pond and Mill Brook HMUs, a component of this habitat would occur across the landscape over the next ten years. The regeneration forest habitat created on adjacent private lands would provide some additional habitat for species favoring this habitat type. This habitat type is ephemeral on the landscape favored by a certain suite of species for approximately ten years (DeGraaf et al 1992). Forest wide less than 1% of the Forest is in regeneration age class and the goal is to have 3% to 4% in this condition (USDA Forest Service 2005a, Chapter 2, page 21, USDA Forest Service 2005b, Chapter 3, page 85). This would benefit species which are associated with shrub layers, herbaceous ground vegetation, soft mast, and minimal overstory components. Up to 150 species will use northern hardwood regeneration habitat for all or part of their life cycle (DeGraaf et al. 1992, DeGraaf and Yamasaki 2001) including chestnut-side warbler which is the Management Indicator Species for this habitat type (USDA Forest Service 2005b, Chapter 3, page 167). Forest-wide bird surveys and Regional breeding bird survey data indicate chestnut-sided warblers are declining (USDA Forest Service 2005b, p 3-171).

Effects of creating aspen-birch regeneration age class and maintaining this habitat type

Both Action Alternatives propose to create aspen-birch regeneration habitat by a seed tree harvest (Table 18). The proposed action in the Mill Brook HMU would not create any aspen-birch regeneration habitat (Table 19). It is unlikely that the proposed harvests on private land would create aspen-birch habitat. While the regeneration harvest proposed under both Action Alternatives would maintain the aspen-birch component within the South Pond HMU, the amount of this type in the Analysis Area would slowly start to decline. Without some type of disturbance aspen-birch succeeds to northern hardwoods or softwoods. However, a component of aspen-birch would likely be maintained in the Analysis Area where group selection or shelterwood prep harvest occurs on spruce-fir, mixedwood, and northern hardwood sites that have a paper birch component. This might regenerate small inclusions or single stems of aspen-birch that could be managed in the future for aspen-birch habitat. Forest wide approximately 10% of the Forest is in aspen-birch with approximately 5% in paper birch. (USDA Forest Service 2005a, Chapter 2, page 21, USDA Forest Service 2005b, Chapter 3, page 85). Aspen-birch regeneration forest habitat is used by approximately 150 species of wildlife (DeGraaf et al. 1992, DeGraaf and Yamasaki 2001) including ruffed grouse which are the Management Indicator Species for this habitat type (USDA Forest Service 2005b, Chapter 3, page 168). This type of harvest also benefits species associated with shrub layers, herbaceous ground vegetation, soft mast, and minimal over story components (DeGraaf et al 1992). Up to 100 species of wildlife will use mature aspen-birch for all or part of their life cycle. It is well known that male aspen-birch buds and catkins are an important food source for ruffed grouse (DeGraaf et al. 1992), which is the management indicator species for this habitat type. Species that use mature aspen-birch trees would even benefit from having these tree species as a component of mature northern hardwood, mixedwood, or spruce-fir habitats. Breeding bird survey from the Forest show no trends in ruffed grouse numbers, however regional bird surveys show a decline in the region to the north of the Forest while increasing to the south of the Forest (USDA Forest Service 2005b, Chapter 3, page 174).

Effects of reducing mature northern hardwoods, mixedwoods, and spruce-fir habitat age class

Both Action Alternatives, the proposed harvest in the Mill Brook HMU, and the harvests occurring on adjacent private lands would reduce mature northern hardwoods, mixedwood, and spruce-fir habitat in the Mill Brook HMU (Tables 18 and 19). However mature northern hardwoods, mixedwood, and spruce-fir would still be the dominant habitat in the Analysis Area. Harvesting on approximately 20% of the private land considered in the Analysis Area surrounding private lands has resulted in a mix of mature forest intermixed with larger regeneration cuts over 100 acres in size. Mature forest is still dominant over much of this area. There also is an abundance of mature habitat in the non-managed lands of the South Pond and Mill Brook HMUs, with approximately 4,000 acres in South Pond HMU and approximately 8,000 acres in Mill Brook. Forestwide there is an abundance (81%) of mature age class across the Forest (USDA Forest Service 2005a, Chapter 2, page 21, USDA Forest Service 2005b, Chapter 3, page 85). Up to 150 species of wildlife will use mature northern hardwoods, mixedwoods, and spruce-fir for all or part of their life cycle (DeGraaf et al. 1992, DeGraaf and Yamasaki 2001) including scarlet tanagers which are the Management Indicator Species for mature northern hardwoods and blackburnian warblers which are the Management Indicator Species for mature softwoods (USDA Forest Service 2005b, Chapter 3, page 168). Population trends have been stable for scarlet tanagers on and adjacent to the Forest over the past four decades but during that time there have been some years where populations declined and other years where populations increased (USDA Forest Service 2005b, Chapter 3, page 172.). Breeding bird survey data collected in the Project Area showed scarlet tanager numbers to stable between 1992 and 2004 (unpublished WMNF data 1992-2004). Breeding bird surveys from the Forest and Region show no trends in blackburnian warbler numbers indicating populations are stable. Regional bird surveys show a decline in the region to the north of the Forest while increasing to the south of the Forest. There is some evidence that numbers may be declining south of the Forest and increasing to the north (USDA Forest Service 2005b, Chapter 3, page 173).

Effects of overstory removal to increase young spruce-fir

None of the proposed treatments in the Action Alternatives would increase young spruce-fir although some of the uneven-aged treatments in spruce-fir and mixedwoods would increase the understory spruce-fir component (approximately 450 acres under both Action Alternatives). Approximately 30 acres of proposed treatments in the Mill Brook HMU would remove the spruce-fir overstory and 70 acres would increase the spruce-fir understory using uneven-aged treatments in spruce-fir and mixedwoods (Table 19). A percentage of the harvest on adjacent private lands also would increase young spruce-fir after removing the spruce-fir overstory. These overstory removal treatments in spruce-fir would favor species associated with dense softwood undergrowth while the uneven-aged treatments might provide some habitat features favored by these species as well. Forestwide approximately 2% of the Forest is in young spruce-fir and the goal is approximately 3-6% (USDA Forest Service 2005a, Chapter 2, page 21, USDA Forest Service 2005b, Chapter 3, page 85). Up to 100 species of wildlife will use young softwoods for all or part of their life cycle (DeGraaf et al. 1992, DeGraaf and Yamasaki 2001) including snowshoe hare and magnolia warbler, the Management Indicator Species, for regenerating softwoods (USDA Forest Service 2005b, Chapter 3, page 172). Population trends have been stable for magnolia warbler on and adjacent to the Forest but like the scarlet tanager there have been some years where populations declined and other years where populations increased.

Effects of expanding permanent wildlife openings

Expanding three or four permanent wildlife openings in the Action Alternatives, two in the Mill Brook HMU (one existing and one new) would increase the amount of this habitat in the Analysis Area. Currently, there are seven managed permanent wildlife openings in the South Pond HMU and one managed permanent wildlife opening in the Mill Brook HMU. There are no known wildlife openings on adjacent private land. Most of the openings in the Analysis Area are small. Expanding the size of existing permanent wildlife openings in these areas would provide higher quality habitat for species associated with this habitat (USDA Forest Service 2005c). It is expected that maintenance treatments in these areas would increase the percentage of grass, forbs, and soft mast such as blueberries providing a source of browse, hiding cover, and nesting habitat for some species of wildlife (DeGraaf et al. 1992). These areas would be used by a similar suite of species that use regeneration forest habitat including chestnut-sided warblers. Research has found that a wide variety of species are associated with these areas (Chandler C. 2006, Chandler R. 2006, DeGraaf et al. 1992).

3.10 Federal Threatened, Endangered & Proposed Species (TEPS) and Regional Forester Sensitive Species (RFSS)

Affected Environment for TEPS/RFSS

General habitat condition of the Project Area was determined from past field reviews of stand condition, which is stored in District compartment records. Several field reviews were also conducted within the Project Area in 2005 and 2006 by Forest Service staff for planning of this project (Project File).

In 2006, botanical field surveys were conducted in the Project Area (2006 WMNF unpublished botany reports). Most of the stands and the roads were surveyed and no TEPS plant species were observed. Plant surveys of permanent wildlife openings (stands 1/8, 6/20 and 7/33) were conducted in 2005 (2005 WMNF unpublished botany report) and no TEPS plant species were observed. One rare species, ciliated aster (*Symphyotrichum ciliolatum*) was recorded adjacent to one of the wildlife openings.

The Analysis Area for direct and indirect effects on TEPS/RFSS is the Project Area, since the impact of the Action Alternatives on TEPS/RFSS is dependent on the presence of individuals and/or specific habitat. **The temporal scope for direct and indirect effects on TEPS/ RFSS** is the time period that encompasses active harvest operations and connected actions because this when TEPS and RFSS species would most likely be affected by the proposed activities.

The Analysis Area and rationale for cumulative effects on TEPS/RFSS is the same as Wildlife (Section 3.8) with the exception of Canada lynx. The Analysis Area for Canada lynx is Lynx Analysis Unit (LAU) 1 which includes all of the Kilkenny Unit of the White Mountain National Forest. The area of an LAU has to be at least the size used by one individual lynx. LAUs on the WMNF were delineated based on center ridge systems (thought to be primary travel corridors for lynx). Watercourses and roads were used as boundaries because these features may serve as a

“hurdle” for lynx during portions of the year, although probably not a barrier (USDA Forest Service 2006). LAU 1 is centered around the Pilot and Pliny Ranges. **The temporal scope and rationale for cumulative effects on TEPS/RFSS** is the same as Wildlife (Section 3.9).

Biological Evaluation

A Biological Evaluation (BE) for Federally Threatened, Endangered, and Proposed Species (TEPS), and Regional Forester Sensitive Species (RFSS) was completed on February 9, 2007 for the Action Alternatives (BE, Project Planning Record). The process and the sources examined to determine potential occurrence of TEPS or RFSS presence are listed in the BE.

Based on a review of all available information, it was the Forest Service Biologist’s determination that potential habitat may occur within the Project Area for one federally threatened species and nine Regional Forester Sensitive Species:

Canada Lynx (*Lynx canadensis*) – Federally Threatened
Eastern small-footed myotis (*Myotis leibii*) - Regional Forester Sensitive Species
Northern bog lemming (*Synaptomys borealis sphagnicola*) - Regional Forester Sensitive Species
Brown’s Ameletus Mayfly (*Ameletus browni*)- Regional Forester Sensitive Species
Third Ameletus Mayfly (*Ameletus tertius*)- Regional Forester Sensitive Species
Bailey’s sedge (*Carex baileyi*) - Regional Forester Sensitive Species
Broad-leaved Twayblade (*Listera convallarioides*) - Regional Forester Sensitive Species
Heartleaf Twayblade (*Listera cordata*) - Regional Forester Sensitive Species
Mountain Sweet-Cicely (*Osmorhiza berteroi*) - Regional Forester Sensitive Species
Sweet Coltsfoot (*Petasites frigidus var palmatus*) - Regional Forester Sensitive Species

The BE details direct and indirect effects to these species. Under both Action Alternatives, there may be minimal direct effects to Canada lynx but designated lynx habitat would be maintained or enhanced under both Action Alternatives. There may be minimal direct and/or indirect effects to eastern small-footed myotis foraging and roosting habitat. There is a slight potential to displace northern bog lemming, although the potential for presence of this species in the Project Area is low. There may be some minimal direct effects during active harvesting operations and watershed improvement projects to Brown’s and Ameletus mayfly habitat. Bailey’s sedge could have minimal direct effects from proposed work along roads, but in the long term habitat would be maintained or enhanced if this species was present. The potential for presence of broad-leaved twayblade, heartleaf twayblade, mountain sweet cicely, and sweet coltsfoot is low. There is potential for some direct and indirect effects on these species from timber harvest, skid trail layout, and watershed improvement projects.

Effects Determination and Rationale – Federally Threatened Species

Canada Lynx

All Alternatives *may affect but would not likely adversely affect individual Canada lynx or associated habitat.*

Rationale

- 1) Based on the recent lynx sightings (New Hampshire Fish and Game Department 2006) on the northern part of the Forest and the presence of some suitable habitat, it is assumed that Canada lynx could occur in the Project Area although the potential is low due to the relative few sightings of lynx on the Forest in the past few decades (USDA Forest Service 2005b, Appendix G, Page 69, USDA Forest Service 2006a,c).
- 2) All Action Alternatives could directly affect a Canada lynx by displacing an individual during active harvest operations or connected actions (road and landing construction and reconstruction, prescribed fire, watershed improvements, and reconstruction of the septic system). These effects would be of short duration.
- 3) Under the No Action Alternative there would be the loss of opportunity to increase understory spruce-fir in mixedwood and spruce-fir habitat through timber harvest activities. Natural disturbance in mixedwood and spruce-fir stands would likely result in some increases in understory spruce-fir.
- 4) In the short term designated suitable lynx habitat would be maintained or slightly increased and denning habitat would be maintained at greater than 10% of LAU 1 under all Action Alternatives. In the long term northern hardwood habitat on sites with a softwood tendency would be managed to move these sites towards spruce-fir habitat. These treatments would adhere to lynx habitat standards and guidelines in the Forest Plan (USDA Forest Service 2005a, Chapter 2, page 14-16)
- 5) The proposed reconstruction of roads and landings and construction of new winter roads would not affect Canada lynx habitat as these roads would be closed and gated upon completion of active timber harvest operations so human activity would not increase from existing condition (USDA Forest Service 2005a, Chapter 2, page 16)

Effects Determination and Rationale –Regional Forester Sensitive Species (RFSS)

Eastern small-footed myotis

The No Action Alternative would have *no impact* on eastern small-footed myotis. Both Action Alternatives *may impact individual eastern small-footed myotis, but would not likely cause a trend to federal listing or loss of viability.*

Rationale

Most literature indicates that eastern small-footed myotis roost under rocks on hillsides and open ridges, in cracks and crevices in rocky outcrops and on talus slopes, as well as in buildings (USDA Forest Service 2005b, Appendix G, pages 224-227). The likelihood that individual bats are roosting in trees in Project Area is considered low.

Construction, reconstruction, and maintenance of roads, trails, and permanent wildlife openings and creation of openings through clearcuts or expansion of

permanent wildlife openings have and will continue to provide foraging habitat for this species. Decommissioning 0.5 miles of roads in the South Pond HMU and 2.4 miles in the proposed Mill Brook HMU may result in a slight decrease in foraging habitat in the long term as roads slowly revert to a vegetated state.

The implementation of Forest Plan Standards and Guidelines (USDA Forest Service 2005a, Chapter 1, pages 20 and 21, Chapter 2, pages 24-26 and 33 to 36) to maintain a diversity of habitat conditions well distributed across the Forest, reserve large wildlife trees, retain standing dead trees where possible, and maintain riparian habitats in areas managed for vegetation should ensure that adequate habitat is maintained for eastern small-footed myotis.

Northern Bog Lemming

The No Action Alternative would have *no impact* on northern bog lemming. Both Action Alternatives *may impact individual northern bog lemmings, but would not likely cause a trend to federal listing or loss of viability.*

Rationale

- 1) Northern bog lemmings are extremely rare in New England. The likelihood of an individual occurring in the project area or cumulative effects analysis area is considered low.
- 2) Identifiable riparian habitat or wet areas are usually excluded from harvest units minimizing the risk of disturbing an individual animal or associated habitat.
- 3) The implementation of Forest Plan Standards and Guidelines (USDA Forest Service 2005a, Chapter 1, pages 20 and 21, Chapter 2, pages 24 to 26 and 33 to 34) to maintain a diversity of habitat conditions well distributed across the Forest and maintain riparian habitats in areas managed for vegetation in areas managed for vegetation should ensure that adequate habitat is maintained for northern bog lemming.
- 4) The State of New Hampshire provides guidelines to private landowners to protect streams during active timber harvesting (Society for the Protection of New Hampshire Forests 1997).

Brown's Ameletid Mayfly and Third Ameletid Mayfly

The No Action Alternative would have *no impact* on Brown's ameletid mayfly or third ameletid mayfly. Both Action Alternatives *may impact individual Brown's ameletid mayfly and third ameletid mayfly but would not likely cause a trend to federal listing or loss of viability.*

Rationale

- 1) Both species of mayflies may occur in perennial streams in the project area.
- 2) The implementation of Forest Plan Standards and Guidelines (USDA Forest Service 2005a, Chapter 2, pages 24 to 26, Chapter 2, pages 33 to 34) protects perennial streams from increased sedimentation by maintaining a 25-foot no-harvest buffer and a wider Riparian Management Zone with limited harvest. (USDA-Forest

Service, 2005a, G-1 and G-2, pp 2-24 to 2-25).
3) The State of New Hampshire provides guidelines to private landowners to protect streams during active timber harvesting (Society for the Protection of New Hampshire Forests 1997).
4) Stabilizing the segments of old roads and intermittent and perennial streams and in need of watershed improvements should minimize the chance of future sedimentation into perennial brooks in the project area, providing a long term benefit to instream habitat.

Bailey’s sedge

The No Action Alternative would have *no impact* on Bailey’s sedge. All Action Alternatives *may impact individual plants of Bailey’s sedge but would not likely cause a trend to federal listing or loss of viability*.

Rationale
1) There are currently no known occurrences of Bailey’s sedge on the Forest so the likelihood of this species occurring in the Project Area is low. Plant surveys did not identify this species in the Project Area.
2) Roadside ditches, log landings, and wildlife openings would continue to provide suitable habitat for this species.
3) Forest Plan Standards and Guidelines maintain a diversity of habitats (USDA Forest Service 2005a, Chapter 2, pages 20-21, Chapter 2, pages 33 to 34) and protect streams and riparian areas (USDA Forest Service 2005a Chapter 2, pages 24-26).
4) The State of New Hampshire provides guidelines to private landowners to protect streams and riparian areas during active timber harvesting (Society for the Protection of New Hampshire Forests 1997).

Broad-leaved Twayblade and Heartleaf Twayblade

The No Action Alternative would have *no impact* on broad-leaved twayblade and heartleaf twayblade. Both Action Alternatives *may impact individual plants of broad-leaved twayblade and heartleaf twayblade but would not likely cause a trend to federal listing or loss of viability*

Rationale
1) The likelihood of these species occurring in the Project Area is low. The project area was searched by qualified individuals at an appropriate time of year to identify this species. No individuals were located. Small pockets of habitat may occur in the project area.
2) Identifiable wet seepy areas are usually excluded from harvest units minimizing the risk of disturbing individual plants or associated habitat
3) Forest Plan Standards and Guidelines protect streams and riparian areas (USDA Forest Service 2005a Chapter 2, pages 24-26).
4) The State of New Hampshire provides guidelines to private landowners to protect streams and riparian areas during active timber harvesting (Society for the Protection

of New Hampshire Forests 1997).

Mountain Sweet Cicely

The No Action Alternative would have *no impact* on Mountain Sweet Cicely. Both Action Alternatives *may impact individual plants of Mountain Sweet Cicely but would not likely cause a trend to federal listing or loss of viability.*

Rationale

- 1) The likelihood of this species occurring in the Project Area is low. The project area was searched by qualified individuals at an appropriate time of year to identify this species. No individuals were located.
- 2) Very little semi-rich northern hardwood habitat was identified in the project area.
- 3) Roadside ditches, log landings, and wildlife openings may provide suitable habitat for this species.
- 4) Forest Plan Standards and guidelines minimize the potential for new infestations of non-native invasive species.

Sweet Coltsfoot

The No Action Alternative would have *no impact* on sweet coltsfoot. Both Action Alternatives *may impact individual plants of sweet coltsfoot but would not likely cause a trend to federal listing or loss of viability. Alternative 3 provides more protection to potential habitat than Alternative 2.*

Rationale

- 1) The area was surveyed by a qualified individual but at a time of year when this species may already have gone dormant. No individual plants were observed during survey efforts, but it is possible this species may occur in or adjacent to cedar wetlands in Compartment 1.
- 2) Under Alternative 3, stand 1/30 is deferred from harvest so the cedar wetland can be better delineated prior to any future harvests that may occur in this area.
- 3) Forest Plan Standards and Guidelines protect streams and riparian areas (USDA Forest Service 2005a Chapter 2, pages 24-26).
- 4) The State of New Hampshire provides guidelines to private landowners to protect streams and riparian areas during active timber harvesting (Society for the Protection of New Hampshire Forests 1997).

3.11 Habitats of Concern

Four types of habitat of concern are considered: exemplary communities, vernal pools/seeps, bear-clawed beech trees, and deer wintering areas (deer yards). **The Analysis Area and temporal scope for direct, indirect, and cumulative effects** is the same as described for Wildlife (Section 3.9).

Exemplary Communities

A landscape analysis and/or field reviews have been conducted for exemplary communities within or directly adjacent the Project Area (Sperduto 1993, Nichols and Sperduto 1996, WMNF unpublished botany reports 2006). Adjacent to stand 6/17 is Rocky Pond and associated upstream pondlets and feeder streams. This complex of ponds is classified as a clear softwater lake/pond and is considered exemplary because the three ponds were close together in an undisturbed condition (Sperduto 1993, Nichols and Sperduto 1996). Northern hardwoods along the west shore of South Pond and near the rim of Devil's Hopyard (portions of stands 1/39, 1/70 and 1/71) were identified as potential old growth. Field reviews were conducted in the fall 2006 to more accurately determine the area exhibiting potential old growth characteristics. A northern white cedar seepage swamp was identified in the area stands 1/30 and 1/31 (Nichols and Sperduto 1996). They stated "the swamp is marginal in terms of size and vigor of the cedar population as compared to other examples in the state further north..... The northern white cedar seepage swamp is locally significant in that few examples of this community occur in the White Mountain National Forest..." The northern white cedar seepage forest is also designated by the 2005 Forest Plan as an outstanding natural community (USDA Forest Service 2005b, Appendix G, page 2-13). Field reviews by the Forest botanist found that "much of the cedar seepage swamp community may be located adjacent to stands 1/30 and 1/31, in areas to the south and east not proposed for treatment. However, portions of the outstanding natural community may exist in the eastern portion of stand 1/30.

Direct and Indirect Effects on Exemplary Communities

Alternative 1: No Action

The No Action Alternative would have no direct or indirect effects on exemplary communities as no harvesting or connected actions would occur the Project Area.

Action Alternatives 2 and 3

Under both Action Alternatives, there would be no direct or indirect effects to clear softwater lake/pond communities in the vicinity of Rocky Pond since a 300 foot buffer would be established between the community and the portion of stand 6/17 proposed for treatment.

There would be no direct or indirect effects on the potential old growth areas near the west shore of South Pond since stand 1/71 is currently designated as unsuitable for timber harvest. The 2006 field review conducted by the Forest botanist, Chris Matrick, delineated portions of stands 1/39 and 1/70 exhibiting potential old growth characteristics and no harvest would occur in the areas.

Under Alternative 2, timber harvest proposed in the eastern portion of stand 1/30 might negatively affect the cedar seepage forest. There would be no direct or indirect effects to the cedar seepage under Alternative 3 as stand 1/30 is deferred from harvest.

In the long term, the proposed watershed projects may benefit the cedar seepage forest as natural hydrologic regimes would be restored in Compartment 1.

Cumulative Effects on Exemplary Communities

There would be no cumulative effects to the potential old growth areas in Compartment One, the softwater lake/pond community or cedar seepage forest, as these areas has not been disturbed over the past ten years and would not be disturbed by any future foreseeable projects in the next ten years.

Vernal Pools/Seeps

Vernal pools are valuable habitat to certain species of amphibians and reptiles; and seeps provide a source of water for wildlife during winter months, as well as providing habitat for rare plants (Calhoun and deMaynadier 2004, Society for Protection of New Hampshire Forests 1997). Seeps and vernal pools most likely would form in low lying areas with compacted sediments or underlying ledge where drainage is poor. During field visits by White Mountain staff, wet seep areas and/or vernal pools were identified in or directly adjacent to stands 1/4a, 1/23a, 1/30, 1/31, 1/ 63, 6/2, 6/3, 6/4, 6/8, 6/17, 6/39 and 6/42 (field notes in Project File).

Direct and Indirect Effects on Vernal Pools/Seeps

Alternative 1: No Action

The No Action alternative would have no direct or indirect effects on vernal pools or seeps as no harvesting or connected actions would occur the Project Area.

Action Alternatives 2 and 3

There could be direct effects from both Action Alternatives. While riparian areas and identifiable seeps are excluded from the harvest area, there is a risk of impacting unidentified wet areas such as vernal pools and seeps during harvesting or mechanical site preparation operations. The proposed watershed improvement project, septic system work at the South Pond Recreation Area, and maintenance of permanent wildlife openings would have no effect on vernal pools or seeps since none exist within these areas.

Cumulative Effects Vernal Pools/Seeps

Past timber harvest and connected actions may have impacted unidentified vernal pools and seeps. However, most identifiable wet areas and vernal pools were excluded from harvest areas in the past ten years. Timber harvest operations and associated landing and road construction on private lands may result in the loss of vernal pools and seeps within the Analysis Area, but the Action Alternatives would not contribute to that loss.

The 2005 LRMP provides a 25' no-harvest buffer around naturally occurring vernal pools and seeps. Further protection is given by requiring an additional 75-foot Riparian Management Zone with limited harvest and requiring slash and treetops be removed from pools (USDA-Forest Service, 2005a, Chapter 2, page 24-25).

Bear-clawed Beech Trees

Black bear use a diversity of habitats to obtain a source of green vegetation in the spring, berries and insects during the summer, and hard mast, such as acorns or beechnuts, during the fall (Rogers and Allen 1987). The Project Area contains a component of beech, which is the primary hard mast producer in this area. Concentrations of bear-clawed beech are considered an important habitat feature for black bear. Bear-clawed beech trees were observed during field reviews in stands 1/18, 1/23, 1/76, 6/ 22, and 6/48.

Direct and Indirect Effects on Bear-clawed Beech Trees

Alternative 1: No Action

Alternative 1 would have no direct or indirect effects on bear-clawed beech trees as no harvesting or connected actions would occur the Project Area.

Action Alternatives 2 and 3

Both Action Alternatives could directly affect bears feeding in beech trees during the fall. Some of the stands that have a beech component could be harvested in the fall when bears might be present. Most likely bears would be temporarily displaced during active harvest and would likely move to adjacent hardwood stands until harvesting activities ended. It is unlikely that proposed prescribed burning would affect bears feeding in beech as the areas targeted for burning are in permanent wildlife openings.

The Action Alternatives could result in a slight reduction in fall foraging habitat from the removal or loss of some bear-clawed beech trees. Reserving bear-clawed beech trees and any disease-resistant beech trees would minimize this effect. Moreover there is an abundance of mature and old northern hardwoods habitat with a beech component within the South Pond that would not be affected under the Action Alternatives.

Cumulative Effects on Bear-clawed Beech Trees

Mill Brook and South Pond HMUs have an abundance of mature northern hardwoods and mixedwood, which will continue to provide a source of hard mast for wildlife. Cumulatively, past, present and future timber harvest may have resulted or could result in some loss of bear-clawed beech trees within the Analysis Area. It is unknown to what extent bear-clawed beech trees have been affected by timber operations or residential development on private lands in the Analysis Area; but there has likely been some loss of these trees, with more likely to happen with future harvest and development.

Deer Wintering Habitat

The State of New Hampshire recommends managing deer wintering habitat by interspersing mature softwoods with small openings to perpetuate critical softwood cover, maintain high quality browse production, and ensure deer mobility throughout an area during the harsh winter months (Reay et al. 1990, Society for the Protection of New Hampshire Forests 1997).

There are two documented historical deeryards in or near the Project Area (USDA Forest Service, 1978). The Rocky Pond/ Location Hill Deer Yard is in Compartment 6 and encompasses approximately 500 acres. The Higgins Brook Deer Yard is in Compartments 7 and 8 and encompasses approximately 699 acres. In the late 1970's, approximately 50 deer wintered in the Higgins Brook yard. More recent field surveys and track counts of the area have recorded very little deer activity in either of these areas (Field Notes in Compartment Record and Project Files).

Harvests proposed in 6/17 and 8/33 are within the historical deeryard areas.

Direct and Indirect Effects on Deer Wintering Habitat

Alternative 1: No Action

Alternative 1 would have no direct or indirect effects on deer wintering habitat as no harvesting or connected actions would occur the Project Area.

Action Alternatives 2 and 3

There would be minimal to no direct effects as no deer are known to winter in this area at present.

Indirect effects of timber harvest would an increased source of browse in this area for white-tailed deer that may move into this area in the future. The proposed harvest in the existing spruce/fir and mixedwood areas would stimulate softwood regeneration, possibly providing winter cover for deer in the future.

None of the other connected actions would have an effect on deer wintering habitat.

Cumulative Effects on Deer Wintering Habitat

The 2005 Forest Plan contains guidelines that would ensure that deer wintering habitat is maintained Forest-wide (USDA Forest Service, 2005a, Chapter 2, page 34).

Past and future harvests in the Analysis Area have a goal of increasing the amount of spruce-fir habitat on the Forest, releasing existing spruce-fir understory in spruce-fir and mixedwood habitats intermixed with pockets of browse.

Timber harvest on private lands within the Analysis Area that emphasize group selection cuts in softwood or mixedwood stands would enhance deer wintering habitat. However, even-aged harvest in softwood or mixedwood on private lands could diminish the amount of wintering habitat available to white-tailed deer.

3.12 Heritage Resources

Affected Environment for Heritage Resources

A Cultural Resource Report (CRRR #07-2-1, project file) was completed for the Project Area based on field surveys and a review of historic maps and literature. The New Hampshire State Historic Preservation Office (SHPO) is reviewing the cultural resource report.

There are no known Heritage Resource sites within or adjacent to the Project Area which are eligible for or are being evaluated for the National Register of Historic Places nor were any pre-historic cultural resource sites identified.

Scoping of local Native American groups has indicated no concerns that any special areas would be disturbed by proposed timber harvest. A careful search of records and local histories has not indicated any unusual activities or camp locations.

The Analysis Area for direct, indirect and cumulative effects to heritage resources is Compartments 1, 6, 7 and 8 since it encompasses the 1,007 acre Project Area. The 2005 Forest Plan goals state that the White Mountain National Forest will “identify, evaluate, preserve, protect, stabilize, interpret and when necessary, mitigate for loss of heritage resources at a Forest-wide and project level.” A Design Feature implementing the 2005 Forest Plan standards and guidelines requires that known sites be flagged and avoided, and that operations cease when new sites are discovered until an archaeologist or paraprofessional can evaluate the findings and determine how to proceed (see Section 2.0.4) Any effects to heritage resources are specific to past, present and potential disturbance to specific sites. **The temporal scope for direct, indirect and cumulative effects on heritage resources** is ten years past and ten years into the future from when proposed actions will occur (1998-2018). This is to take into account the last earth disturbing activities that occurred in these compartments; Rocky Pond (1998), War Camp (2001), Fogg Brook (2006) and Higgins Brook (2007) Timber Sales. An analysis of effects for the Proposed Action and its alternatives will consider how well heritage sites identified for those sales were protected at that time, and how well they have been preserved since that time. A look ten years into the future will consider any additional earth disturbing activities that could potentially affect these compartments in the near planning horizon.

Direct, Indirect and Cumulative Effects on Heritage Resources

Alternative 1: No Action

This alternative would not have any effects on heritage resources.

Action Alternatives 2 and 3

All known sites within Compartments 1, 6, 7 and 8 have been identified and only one is within the proposed harvest area. This site has been designated as a reserve area and extends 50 feet from the nearest identifiable site feature. It will be avoided during winter harvest operations and logging equipment would not be permitted within it. Also, skidding across stone walls outside of reserve areas would be permitted at designated crossings only. There are possible indirect effects on undiscovered artifacts due to fall harvest. Alternative 3 proposes an additional 106 acres of winter only harvest which would provide greater protection to undiscovered artifacts than Alternative 2. Design Features for the Action Alternatives would eliminate or lessen any impacts to undiscovered artifacts caused by timber harvesting, road restoration, permanent wildlife opening expansion,

prescribed burning, stream restoration or watershed rehabilitation work. The timber sale contract also provides protection to cultural resources through cancellation or modification of the contract if cultural resources are identified during harvest operations.

A review of the cultural resource report for the War Camp, Rocky Pond, Higgins Brook and Fogg Brook showed that no cultural resources were found within or adjacent to harvest units. No other earth disturbing activities are planned at this time in these compartments over the next 10 years.

3.13 Air Resources

Affected Environment for Scenic Resources

The proposed North Kilkenny Brook Vegetative Management Project is located within the White Mountains airshed, which is the air over the forest. The Project Area is located on the north eastern slopes of the predominately east-west trending valley of the Upper Ammonoosuc River. Regional winds move from west to east. Local winds are dominated by mountain valley dynamics interacting with large-scale atmospheric movements.

In the White Mountain National Forest, the Class I air quality areas are located in the Presidential Range-Dry River Wilderness and the Great Gulf Wilderness Area. The Project Area is about 19 miles away from the Presidential Range-Dry River Wilderness Area, the nearest Class I air quality area.

There are six major federally regulated air pollutants called National Ambient Air Quality Standards (NAAQS). They are ozone, carbon monoxide, nitrogen dioxide, particulate matter, sulfur dioxide, and lead. The Project Area is not located in a nonattainment area for any of the NAAQS. Ozone appears to originate around large urban centers and migrates northward to the White Mountain region during times of high temperature and high levels of solar radiation.

Existing emissions in the air or air pollution that occurs in the airshed are mostly related to regional and industrial sources. Local sources such as vehicle emissions and dust from roads are a small source of emissions. Fire contributes particulates and carbon monoxide to the air. Dust from roads contributes particulates. Automobile emissions are associated with carbon monoxide, hydrocarbons, nitrogen dioxide, and lead. While in the presence of sunlight, some of these pollutants combine to form ozone.

None of these air pollutants currently exceed New Hampshire or federal ambient air quality standards except for short time periods from wood stoves, wildland fires, and prescribed fires. On occasion, ground-level ozone in the area exceeds air quality standards. This occurs mostly in summer months due to weather and air flow, and is not frequent enough for the area to be categorized as a nonattainment area. Wildland and prescribed fire do not occur in the area at a large scale. Most fires in the White Mountain National Forest are less than 5 acres in size. However, on occasion fires have exceeded 100 acres in size.

The analysis area for direct/indirect effects on air resources include the Higgins Brook watershed, South Pond/North Pond watershed, Pond Brook watershed, and an unnamed watershed surrounding FR 208 (Percy Road). This airshed was selected because the potential effects to air quality generated by the proposed activities are likely limited to those areas of operation within the airshed, and they are not expected to extend any further. Outside the valley air pollution enters the larger air mass and is diluted. The ridges within this airshed form a boundary to local air pollution effects by blocking movement of pollutants, keeping the pollutants within the valleys. The temporal scale for direct and indirect effects is during and several hours after burning of the proposed activities as smoke dissipates into the environment.

The **cumulative effects area for air quality** is the same as was described in the direct/indirect effects. This was selected because at this scale the effects of multiple uses within the airshed could become additive and result in cumulative effects. **The temporal scope is** from 1998-2018. This time frame was selected in order to include any activities in the past which could add to cumulative effects, as well as looking far enough into the future so that the effects of the project and any known future activities are fully considered.

Direct and Indirect Effects on Air Resources

Alternative 1 – No Action

No activities are proposed and no additional emissions are expected to take place in the Project Area, beyond what occurs now. Forest Service roads will continue to receive their scheduled level of maintenance. Vehicle use will continue in the Project Area. These existing emissions are currently contributing to the air quality condition described in the affected environment as well as the larger scale air quality issues discussed in the cumulative effects section of this report.

Action Alternatives 2-3

The primary source of concern for air quality is the prescribed burn proposed in 4 PWOs. For Alternative 2, approximately 21 acres would be burned and approximately 25 acres for Alternative 3. The major pollutant of concern in smoke from fire is fine particulate matter, both PM10 (particulate matter less than 10 microns in diameter) and PM2.5 (particulate matter less than 2.5 microns in diameter); (USDA Forest Service, 2002). Carbon monoxide (CO) concentrations also increase as a result of smoke emissions (US Environmental Protection Agency, 2001).

For Alternatives 2 and 3, the Forest First Order Fire Effects model was run to predict smoke emissions for the proposed prescribed fire. This program considers the region, vegetation type, and the season of burn. In the wildlife habitat burns, the model predicted 862 lbs/acre of carbon monoxide, 72 lbs/acre of PM2.5, and 84 lbs/acre of PM10 would be emitted by the fire. The total duration of flaming and smoldering of the fire was predicted to be an average of 10 minutes in wildlife habitat burns.

Public notification of the proposed prescribed burn would be given prior to the start of a burn. Potential health effects of high exposure of PM2.5 and PM10 emissions include respiratory symptoms and aggravation of heart or lung disease (USDA Forest Service, 2002). Potential health effects of high exposure of CO include reduced blood-oxygen levels (US Environmental Protection

Agency, 2001). However, increases in these emissions are short-term and localized. Smoke plumes may degrade air quality in an area for just a few hours before moving and dispersing. As of 2002, prescribed fires were not considered to be a major cause of nonattainment of NAAQS (USDA Forest Service, 2002). It is therefore unlikely that 26 acres for Alternative 2 and 30 acres for Alternative 3 of prescribed fire would cause nonattainment of NAAQS for these parameters, particularly since not all stands would be burned at once.

An additional concern to air quality is the use of heavy equipment and gas-operated tools during timber harvest and road maintenance operations. Ground level ozone is worst during summer months, so fall or winter harvest would minimize this effect so that ozone is unlikely to form at elevated levels as a result of the proposed activities. Approximately 51% of the stand acreage would be harvested in the fall or winter. Because of the limited duration of operation, season of operation, and the relative amount of this emission-generating equipment, it is unlikely that the proposed operations would cause the NAAQS to be exceeded.

Cumulative Effects on Air Resources

Many of the cumulative effects to air quality occurring in the White Mountain National Forest come from upwind, thousands of miles away in the Midwest. Large coal burning plants and other industrial emission sources contribute oxides of sulfur and nitrogen that have resulted in acid rain. This in turn has led to the acidification of ponds and streams across the forest where the buffering capacity is low. This is discussed further in the water resources report. Some large sources within the state and region also contribute to these effects.

As described in the affected environment section of this report, ground-level ozone in the Project Area occasionally exceeds air quality standards, but not frequently enough to be considered in nonattainment. All of the New England states, except Maine, will have a compliance deadline for 8-hour ozone of June 2010 (US Environmental Protection Agency, 2004). Maine will be in compliance by June 2009 (US Environmental Protection Agency, 2004).

The New Hampshire Department of Environmental Services has reported that there are no stationary sources of air pollution within the cumulative effects area (NHDES, 2004a).

Alternative 1 – No Action

No local emissions related to the proposed action would occur. The existing condition and trends as described in the affected environment would remain much the same. The same activities that currently are occurring on the Cumulative Effects Area would continue to occur. Future vehicle emissions are likely to increase as more visitors come to the White Mountain National Forest. This would contribute to ground level ozone when conditions are suitable. Cumulative effects from regional, industrial, and local sources would continue to occur with the same trends.

Action Alternatives 2-3

The Action Alternatives would result in the same emission-producing activities as was discussed in the direct/indirect effects section of this report. None of these emissions are expected to contribute to existing cumulative effects already present in the cumulative effects area. This conclusion is

reached because, as discussed in the direct/indirect section of this report, the emissions related to the Action Alternatives are expected to be local to the Project Area and of limited extent. These limitations are due to the limited duration of these emissions. Effects of activities both on and off Forest Service lands are not expected to cause NAAQS to be exceeded within the time frame analyzed.

3.14 Scenic Resources

Affected Environment for Scenic Resources

The 2005 Forest Plan states the goal of Scenery Management on the White Mountain National Forest is to “conduct all management activities to be consistent with assigned Scenic Integrity Objectives, realizing the importance to local communities and Forest users of a natural-appearing landscape, distinct from the human-made environment dominant in the East.” (USDA-Forest Service, 2005a, p 1-16)

SMS develops “Scenic Integrity Objectives” that provide an indication of the alteration allowed in the landscape. These objectives range from unaltered (Very High) to heavily altered (Very Low). As part of the Plan Revision for the White Mountain National Forest the Forest Service conducted an inventory using the SMS process to establish and assign Scenic Integrity Objectives to the Forest land base, and developed new or revised standards and guidelines that incorporate past experience and research on the perceptions of Forest visitors.

Part of the process of developing Scenic Integrity Objectives was to first establish “Concern Levels”, which is a relative scale used to compare degree of public importance placed on landscapes viewed from travel corridors and use areas. These are identified as Levels 1, 2, and 3 (with 1 the highest level). There are two hiking trails (Kilkenny Ridge and Devil’s Hopyard), one snowmobile trail (Rocky Pond Trail), several Forest roads (NH Route 110, FR 64, FR 65, FR 65A and the FR 460) and the South Pond Recreation Area within these compartments. The Kilkenny Trail receives moderate use and is rated a Concern Level 2. The Devils’ Hopyard Trail receives low usage and is rated a Concern Level 3. The Rocky Pond snowmobile is a connector trail that runs from York Pond Road to Route 110 north of South Pond. It is located within Compartments 6, 7 and 8 and borders or passes through twelve of proposed stands. It has a Concern Level 3 since it averages less than 50 vehicles per day. All Forest and unauthorized roads within Compartments 1, 6, 7, and 8, are also a Concern Level 3, because they average less than 50 vehicles per day. New Hampshire Route 110 is a Concern Level 1, because it is a State Highway that receives greater than 150 vehicles per day. The South Pond Recreation Area has a Concern Level 2 because its number of “Visitor Day Use” is 500 to 8,000 individuals per season (USDA-Forest Service, 2005d, Scenery Management System).

The 2005 Forest Plan establishes a MA 2.1 guideline that “in evaluating cumulative effects for viewed landscapes from concern level 1, open, higher elevation viewpoints affording expansive or large scale views, no more than 9% of the acreages within the view should be treated with regeneration vegetation management activities within a 30 year period (USDA-Forest Service,

2005a, G-1, p 3-6). For the Analysis Area, there are no viewpoints that provide these large scale views.

SMS also assigns a “Scenic Class” to landscape areas on the White Mountain National Forest. This measures the relative importance, or value, of discrete landscape areas having similar characteristics of scenic attractiveness, user concern, and distance zone (USDA-Forest Service, 2005d). Compartments 1, 6, 7 and 8 have four Scenic Classes. The foreground (the detailed landscape generally found from the observer to ½ mile away) view from NH Route 110 is in a Scenic Class 1, which has the highest public value. The remaining areas are Scenic Classes 2 and 4, with two small pockets assigned to Scenic Class 6. The 2005 LRMP ranks Scenic Class 2 and 4 areas as having Moderate Scenic Integrity Objectives, while Scenic Class 6 has a Low Scenic Integrity Objective (USDA-Forest Service, 2005a, pp 2-26 and 2-27).

For areas within MA 2.1 with a “High Scenic Integrity” Objective, openings created should be minimally evident from trail, road, or use area vantage points. Maximum observed size should not exceed 4-5 acres” (USDA-Forest Service, 2005a, p 3-6). For a “Moderate Scenic Integrity” Objective, the guideline applies to areas “viewed from superior viewpoints”, where “clearcuts and other noticeable openings should be informal in distribution and designed to be in scale with the observed landscape.” The guidelines further state that, “as a starting point, observed acreages of 10 acres normally achieve a Moderate Scenic Integrity Objective.” (USDA-Forest Service, 2005a, p 3-8) There are no superior viewsheds within or defined by the Analysis Area. The observed acreage guideline would apply to any treated stand within the Analysis Area.

The Analysis Area for direct and indirect effects on scenic resources includes National Forest lands within Compartments 1, 6, 7 and 8 designated as MA 2.1 (5,552 acres), and potential viewpoints within or outside the compartment. This area was selected because it encompasses the 1,007 acre Project Area, which may have activities affecting scenic resources, and viewpoints looking into the compartment. Part of analyzing the direct and indirect effects on scenic resources is looking at how the proposed activities contribute to the scenic resource as it currently exists. **The temporal scope for direct and indirect effects on scenic resources** is within one year of ground disturbing activities, prior to re-vegetation. This time period was chosen because it represents the time when the visual contrast between disturbed and non-disturbed areas is most observable.

The Analysis Area for cumulative effects on scenic resources includes those National Forest lands within Compartment 1, 6, 7 and 8, potential viewpoints within or outside the compartment, and the adjacent private lands that may be viewed from these same viewpoints or from within the compartments. This area was selected because it encompasses not only the Project Area and surrounding National Forest lands, but the adjoining private lands. It allows consideration of how the National Forest lands contrast with or complement the adjoining private lands, and it considers how this contrast or complement appears from set viewpoints.

The temporal scope for cumulative effects on scenic resources is 10 years past and 20 years into the future (1998-2028) from when the project could occur. The last vegetation management and ground disturbing activities in this area took place as part of the Rocky Pond (1998), War Camp (2001), Fogg Brook (2006) and Higgins Brook (2007) Timber Sales. This time frame allows consideration of whether, or how much these activities are still evident on the landscape. The analysis looks 20 years into the future because the 2005 FEIS states that it takes about 20 years for

signs of timber harvest activities to “become essentially unnoticed by the casual visitor.” (USDA-Forest Service, 2005b. p 3-312). This allows consideration of the additive effect of foreseeable activities on the scenic resource.

Direct and Indirect Effects on Scenic Resources

The majority of the even-aged harvests would be visible only from viewpoints along the snowmobile trail since there are no high elevations trails or roads that look into these areas.

Alternative 1: No Action

No harvesting is proposed under Alternative 1. With this alternative, there would be little or no change in the visual environment from that which currently exists within the Project Area. Any changes in the existing forested landscape would result from natural causes. As areas harvested during earlier sales reach maturity, the existing mosaic pattern resulting from those activities would be replaced by a consistent vegetative texture with few naturally occurring openings. Without new openings in the canopy, either through human manipulation of the canopy or natural occurrences, the vegetation would not offer as much diversity of tree species, such as paper birch and aspen, or age classes as there would be if openings were present. There would be no direct and indirect effects on scenic resources.

Improvements made to the septic system near the South Pond Recreation Area will have minimum visual effects to visitors and hikers. The septic system and leach field is outside the day use area and is hidden by trees. Any ground disturbing activities would not be evident, especially during the leaf-on period. There will be some visual ground disturbance from installation of new septic lines to the host site and replacement of old clay storm drains below the parking lot. Areas of exposed soil will be grass seeded and the visual effects would be short term.

Action Alternative 2: Scoped Proposal

NH Route 110 passes through mountainous, forested landscapes with alternate areas of open lands with views of the Upper Ammonoosuc River. Both the Spruceville Road (which turns into the Rocky Pond Road), and South Pond Road (and spur roads) pass through residential areas prior to entering the National Forest and the Analysis Area. Once onto National Forest lands, the landscape is more wooded with a close canopy that offers limited views to low ridgelines to the east or west.

Views from NH Route 110

Both Forest road 208 (Percy Road) and unauthorized road 2284 are directly off of NH Route 110 and are barely visible to vehicles. For FR 208, due to the angle of its entrance from an overgrown opening on Route 110, it is almost invisible to vehicles driving on NH Route 110, especially those traveling southbound. As the road is improved, approximately 50 feet would be seen due to its curving layout and steepness. FR 2284 is also almost unperceivable because of young saplings growing in the roadway. During road improvement, approximately 150 feet will be visible to motorist as the road climbs uphill and then it would disappear from sight as it flattens out.

There would be evidence of management activities within stand 1/30 from NH Route 110 near FR 208. The guidelines for managing the scenic resource along a road with a High Scenic Integrity Objective limit the size and shape of openings. The shelterwood cut in this stand would retain a minimum of 40-50 sq. ft. of basal area of overstory trees. This stand will be more open and offer longer foreground views into the stands, but it would not be considered openings.

Approximately fourteen acres of stand 6/9 is located in an area with a Moderate Scenic Integrity Objective and eleven acres are located in an area with a High Scenic Integrity Objective. This stand is located on a flat bench atop a very steep slope leading down to NH Route 110 (0.3 miles away). There are no viewpoints looking into this stand and it is not evident from any road, trail or use area vantage points.

The elevation and aspect of stand 1/18a makes it unnoticeable from viewpoints along Route 110.

Views from Kilkenny Ridge and Devil's Hopyard Hiking Trails

There would very little or no evidence of management activities along the Kilkenny or Devil's Hopyard trails. Stand 6/4 is approximately 150 feet away from the Kilkenny Ridge trail and would be treated using uneven-aged treatments. Logging slash may be visible during leaf-off periods, but would not be evident during leaf-on. These effects will be short lived as regeneration in the understory becomes established and the slash decomposes. Logging activity will not be evident from the Devil's Hopyard trail due the trail's low elevation and that the stands proposed for harvest (1/39 and 1/70) are located more than 900 feet away.

Large patches within stand 7/24 will also not be noticeable from roads or hiking trails. This stand is located on a flat bench approximately 425 feet above the Kilkenny Ridge Trail and would be hidden from view by foreground trees. There are no high elevation viewpoints that look into this stand.

Views from North and South Pond and South Pond Recreation Area

There are approximately 51 camps along North and South Ponds. There will be evidence of management activities along here, as well as Forest Roads FR 64, FR 65, and FR 65A. All the stands proposed for treatment along these roads would be managed using uneven-aged treatments. Single tree and small group selection treatments would result in removal of 1/4 to 1/3 of the basal area. The stands would continue to appear natural, and would regain foliar density within a few years as forest floor vegetation grows back and tree canopies increase in size due to the added sunlight. In some instances, uneven-aged management may enhance visual quality by extending the view into the stand. To minimize visual impacts to drivers on these roads, all slash would be removed 50 feet from edges of the roads and then lopped to 3 feet within the next 25 feet. Also, any noticeably damaged trees would be removed to minimize the visible evidence of the harvest.

The seed-tree cut (6/34) would not be visible to residents along South Pond because the location of the stand on flat terrain, above the pond would be hidden by trees in the foreground. This treatment would also not be visible to visitors at the South Pond Recreation Area because the topography of the land across from the beach (a ridge running east west through stand 6/22) would block views into the proposed stand.

Direct and indirect effects from improvements to septic system at the South Pond Recreation Area would be the same as the “No Action” Alternative.

Views from Rocky Pond Snowmobile Trail

The Rocky Pond snowmachine trail is located within an area with a “Moderate Scenic Integrity Objective”. According to the Forest Plan, “Observed opening acreages will vary under different situations and in relationship to the viewing position. As a starting point, observed acreages are approximately 10 acres.” (USDA-Forest Service, 2005 p. 3-8).

Approximately 4.6 miles of the Rocky Pond snowmobile trail is on Forest Service land and travels through 1.3 miles of regeneration age stands and 3.3 miles of mature, closed canopy stands dispersed along the trail. As snowmobilers travel on the Rocky Pond Trail harvesting activities would be evident. Stands with uneven aged treatments would be more open and have a greater sight distance into them. Residual tree damage may be evident, but it usually occurs on the lower portion of the bole and may be hidden by snow cover. Regeneration harvests would add approximately 0.6 miles of trail through regeneration age trees. This would create more open, expansive views and snowmobilers would have improved views of South Pond and Rocky Ponds. In all harvested stands, slash from harvest activities would be visible. To minimize visual impacts to snowmobilers along the Rocky Pond trail, slash within 25 feet of the trail edge would be removed and then lopped to 3 feet within the next 25 feet.

Table 19. Visibility of Clearcuts, Seed Tree Cuts and Patchcuts from Viewpoints along the Rocky Pond Snowmobile Trail for Alternatives 2 and 3

Viewpoints	Stand/Visible Units (Acres)
Rocky Pond Snowmobile Trail	6/34: 16
	1/39: 2.9
	1/70: 1.9
	6/13a: 10
	7/1:11
Total Visual Acres	41.8

To accomplish our wildlife habitat objective of regenerating aspen-paper birch, a sixteen acre seed tree cut is proposed (stand 6/34) and would be located on both sides of the snowmobile trail. Since the harvest would reduce the overstory below 30 basal area, approximately 5% of the stand would be retained in uncut patches at least 0.25 to 0.5 acres in size.

Continuing south on the Rocky Pond snowmachine trail, approximately 4.8 acres of stands 1/39 and 1/70 would be visible across South Pond during leaf-off. These stands are over 0.7 miles from the trail. Locating reserve areas midslope should minimize the visual acreage.

Continuing south, the Rocky Pond snowmobile trail passes through two stands (6/13a and 7/1) proposed for regeneration harvest. To meet wildlife standards, 5% of the stands would be retained in uncut patches of 0.25 to 0.5 acres in size that would interrupt the larger opening (USDA-Forest Service, 2005a, p 2-35). The proposed clearcut and PWO would meet the guidelines of the “Moderate Scenic Integrity Objective.”

There will be no direct or indirect visual effects for the watershed restoration projects since these areas are not visible from any low lying or high elevation viewpoint nor from any road, hiking trail or snowmobile trail

The remainder of the Analysis Area is consistent with the 2005 Forest Plan guidelines, and the treatment anticipated by the analysis in the 2005 Final Environmental Impact Statement, which states that “Moderate Integrity is indicative of those compartments where vegetation (habitat) management is occurring.” (USDA-Forest Service, 2005b, p 3-445)

Action Alternative 3: Modified Proposal

The effects would be very similar to Alternative 2. With the deferral of stand 1/30, no harvesting activity would be visible along NH Route 110 near the Percy Road (FR 208).

Cumulative Effects on Scenic Resources

Alternative 1: No Action

There is visual evidence of management activities from the Higgins Brook timber sale along FR 460 and private property to the southeast of the project area. There may be possible timber harvest on a private 116 acres in-holding within Analysis Area. For now and the foreseeable future, Forest roads which provide public access into the Analysis Area will continue to pass through a relatively flat, heavily wooded landscape with the occasional small opening, and little foreground view beyond the forest at the road edge.

No cumulative effects are expected from the improvements to the septic system at the South Pond Recreation Area. Once this project is completed, disturbed areas would revert to their natural conditions and would not be disturbed for the next ten years.

Action Alternatives 2 and 3:

Views from NH Route 110

It is possible that stand 1/30 (only for Alternative 2) may be re-entered within the next twenty years, but by this time the understory would have grown into a young stand and an overstory removal of mature trees would not create any openings.

Views from Kilkenny Ridge and Devil’s Hopyard Hiking Trails, and North and South Pond and South Pond Recreation Area

It is possible to see approximately 40 acres of a 166 acre clearcut on private land which is about 8 years old from the start of the Kilkenny Ridge Trail. It is noticeable due to color and height variations on the landscape.

A 116 acre shelterwood proposed on private land would not be visible from any roads, trails (hiking and snowmobile) or recreation areas within the Analysis Area due to its location and aspect on the terrain. A major ridge blocks the views from the Rocky Pond snowmobile trail and South Pond

Recreation Area, and its distance (0.5 miles) and position on the landscape makes it invisible from low elevation hiking trails.

The remainder of harvesting on private lands is not visible to hikers, homeowners along North Pond and visitors to South Pond Recreation Area since these areas are located on low lying trails and roads with foreground trees blocking view.

No cumulative effects are expected from the improvements to the septic system at the South Pond Recreation Area, road construction, stream restoration and watershed rehabilitation project. Once these projects are completed, they will revert to their natural condition and will not be disturbed for the next ten years

Views from Rocky Pond Snowmobile Trail

The seed-tree cut (6/34) and three stands proposed for clearcuts (6/13a, 1/39, 1/70 and 7/1) would be visible from the snowmobile trail. Careful placement of seed trees and reserve areas, should minimize the visual impacts. Northern hardwoods, and especially paper birch, and aspen are fast growing species and within three years, all but the PWO areas will be fully stocked. Since the majority of the snowmobile trail travels through closed-canopy stands, these treatments will provide an alternative view with differing stand ages and tree species.

The snowmobile trail would also pass through an additional ¼ mile of private property that had been harvested using even-aged techniques in 2003/2004. The majority of the larger trees have been harvested and what remains is thick patches of young growth dispersed throughout 132 acre.

All of the proposed regeneration harvests are well distributed along the landscape at varying elevations and aspects and are in scale with the observed landscape. The sum of the visible even-aged harvest acres from any given viewpoint along the snowmobile trail is less than 1% of the total viewshed seen from that viewpoint and meets Forest Plan guidelines (USDA- Forest Service, 2005a, p. 3-6)

3.15 Socio-Economics

Affected Environment for Socio-Economics

The northern New Hampshire and southern Maine economies rely on the forest products industry that provides some of the highest-paying jobs in the area. There are several sawmills and forest product-based manufacturers within close proximity of the Project Area and they purchase timber from a variety of sources, including commercial timber lands, private lands, state and town forests, and the White Mountain National Forest.

There is a steady demand for timber products sold by the National Forest, as reflected by bids on recent timber sales (Lower Loop, Peaked Hill, Connor Brook, CAT 16, Farwell Mountain). Typically, average bid prices on National Forest timber equal or exceed those received on private land. This is especially true for sawtimber.

The proposed sale units are all located within the towns of Milan and Stark, Coos County, New Hampshire. The main travel routes providing access to the Project Area are the South Pond road, Spruceville road and NH Route 110. These roads have been used for hauling timber in the past, and continued use for this purpose would not represent a change in expectations for people who regularly travel these roads.

There are numerous costs with implementing a vegetative management project on the National Forest. One significant cost is for Analysis: planning the project and analyzing alternatives and potential environmental effects. This includes: 1) surveys (silvicultural, biological, soil, hydrological and cultural resource); 2) supporting analysis (roads, visual objectives and field data); 3) literature reviews; 4) public involvement; 5) interdisciplinary team planning meetings and; 6) preparation of environmental assessment and decision documents.

Another significant cost is incurred with project implementation, including timber sale preparation (project layout, development of stand prescriptions, boundary marking, marking trees for cutting, contract preparation and appraisal, and advertisement) and timber sale administration (laying out skid trails, contract administration, site inspections, accounting, and supervising road work).

While one purpose for harvesting timber in the North Kilkenny Project Area would be to provide high quality sawtimber, the National Forest Management Act provides the direction that a harvesting system should not be selected because it will give the greatest dollar return or the greatest unit output of timber. What may be considered a loss in commercial terms may be considered a gain in wildlife habitat values.

Communities within which National Forest timber is harvested are reimbursed for the value of that timber through two separate funds.

- The State of New Hampshire has a tax on the value of timber harvested that is paid by the timber purchaser to the towns in which the timber is harvested. This tax averages about 10% of the value harvested, although it is actually based on the species cut. If the timber is harvested in an unincorporated town, the timber tax is paid to the county. In the case of the North Kilkenny project, the Towns of Milan and Stark would receive timber tax directly, while Coos County would receive tax returns for timber harvested in unincorporated towns in the Project Area.
- The Twenty-Five Percent Fund Act of 1908, as amended, directed that 25% of all monies received from a National Forest during any fiscal year should be reimbursed to the state in which the National Forest is located, to be used “for the benefit of public schools and public roads of the county or counties in which such National Forest is situated.” For the North Kilkenny project, 25% of gross timber receipts would be returned to Coos County.

The Analysis Area for direct, indirect and cumulative effects on socio-economics is Coos County because it will be the beneficiary of any economic activity generated by the Proposed Action and its alternatives. The County and its communities are also likely to absorb costs related to the project, including road and highway maintenance. **The temporal scope for cumulative effects on socio-economics** is ten years past and ten years into the future from when the harvest would occur (1998-2018). This time frame allows consideration of investments in infrastructure by the

County that are pertinent to the Proposed Action and its alternatives, as well as economic activity within the Analysis Area. It also considers future economic activity within a typical economic planning period (5-10 years).

Direct and Indirect Effects on Socio-Economics

Alternative 1: No Action

Businesses, the towns of Milan and Stark, and Coos County will not generate revenue through indirect economic activity associated with a logging operation. This alternative would not meet the Forest Plan Forest-wide goals of recognizing “the Forest’s support to local economies” and managing vegetation “to provide both healthy ecosystems and a sustainable yield of high quality forest products, with special emphasis on sawtimber and veneer.” (USDA-Forest Service, 2005a, pp 1-3 and 1-17). The cost of analysis (project planning and environmental analysis) for this project is approximately \$42,000, regardless of the alternative selected.

Action Alternatives 2 and 3

Timber harvesting in the Action Alternatives could generate revenue for local businesses through indirect economic activity associated with the logging operation. The Action Alternatives would meet Forest Plan Forest-wide goals of recognizing “the Forest’s support to local economies” and managing vegetation “to provide both healthy ecosystems and a sustainable yield of high quality forest products, with special emphasis on sawtimber and veneer.” (USDA-Forest Service, 2005a, pp 1-3 and 1-17)

The cost of analysis would be the same as Alternative 1 (\$42,000); but there would be additional costs associated with implementing the Action Alternatives (Table 10). The cost of timber sale preparation and administration is a fixed cost included in all vegetation management projects regardless of the size of the sale, while the cost of the site preparation and is specific to the project proposal.

The costs of FR 460 road resurfacing, improvements to the septic system at South Pond Recreation Area, stream restoration and watershed rehabilitation are considered resource enhancements with non-commodity benefits. There are non-commodity benefits associated with the timber management and wildlife opening expansion activities, as well. These include removing poor quality and small diameter trees so that future economic value of the residual stands will improve, allowing trees to reach sawlog size in a shorter time period, and maintaining diverse wildlife and ecosystem habitats.

Table 20. Economic Characteristics by Alternative

Measure	Alt 1	Alt 2	Alt 3
Harvest Volume (MBF)	0	3,660	3,395
Net Stumpage Receipts*	\$0	\$301,500	\$287,900
Total Costs	\$42,000	\$144,400	\$137,000
• Sale Analysis	\$42,000	\$42,000	\$42,000
• Sale Preparation	\$0	\$69,500	\$64,500

Table 20. Economic Characteristics by Alternative

Measure	Alt 1	Alt 2	Alt 3
• Sale Administration	\$0	\$32,900	\$30,500
Net Value	(\$42,000)	\$157,100	\$150,900
Unit Cost \$/MBF	NA	\$39.45	\$40.35
Potential Contribution to 25% Fund	0	\$39,275	\$37,725
Potential 10% Timber Tax Revenue to Milan and Stark	0	\$15,710	\$15,090

* includes estimates for road restoration costs

Cumulative Effects on Socio-Economics

Alternative 1 does not harvest timber, but it does not preclude the harvest of timber in the future. Alternatives 2 and 3 would generate revenue for the towns of Milan and Stark through the 25% fund and the 10% timber tax. It would also provide a continued source of quality sawtimber and other forest products on a sustained basis; and would support continued employment in harvesting, manufacturing, transportation, and associated forest products industries. Experience has indicated there is and would continue to be demand for timber products locally and nationally. Cumulative effects of associated activities including road resurfacing, permanent wildlife opening expansion, stream restoration, watershed rehabilitation, recreational improvements and prescribed burning are not anticipated.

Revenue generated cumulatively from timber harvesting on National Forest lands and on private lands in the cumulative effects Analysis Area for this project continue to be a source of revenue for local town budgets. Rocky Pond, War Camp, Fogg Brook and Higgins Brook timber sales have and/or continue to generate funds to several local townships.

All of these existing sales and proposed projects emphasize improvements in vegetative species and structural diversity, in the overall health of these ecosystems, and attempt to assure the quality of residual hardwood and softwood trees for potential future projects that would provide sustainable contribution to the stability of local and regional economies.

CHAPTER FOUR – PREPARATION AND CONSULTATION

4.1 ID Team Members and Forest Service Contacts

The following individuals participated in development and analysis of the proposed action and all other alternatives as well as subsequent preparation of the environmental assessment.

Interdisciplinary Team:

Katherine Stuart	District Ranger
Pat Nasta	District NEPA Coordinator
Lesley Rowse	District Wildlife Biologist
Gail Wigler	District Forester
Jeffrey Williams	District Silviculturist
Robert A. Colter	Forest Soil Scientist
Livia Crowley	Forest Hydrologist
Dave Neely	Assistant District Ranger- Recreation

Forest Service Personnel consulted for professional and technical assistance:

Chris Mattrick	Forest Botanist
Jay Milot	Forest Fisheries Technician
Karl Roenke	Forest Archeologist
Chris O'Brien	District Heritage Paraprofessional
Reg Gilbert	District Timber Sale Administrator
Robert Mengel	District GIS Coordinator
Randy Harrington	District Forest Technician
Jon Jakubos	Forest Engineering Technician

4.2 Other Agencies and Individuals Contacted

Other agencies and organizations consulted for professional and technical assistance:

Will Staats	New Hampshire Fish and Game
James McConaha	New Hampshire State Historic Preservation Office

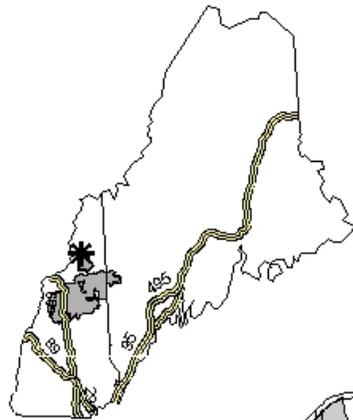
NORTH KILKENNY VEGETATION MANAGEMENT PROJECT

Environmental Assessment

APPENDICES

- Appendix A: Project Maps**
- Appendix B: Scoping Comments**
- Appendix C: Mitigation Measure**
- Appendix D: Literature Cited**
- Appendix E: Glossary**

Map 1 - North Kilkenny Project
Location & Vicinity Maps
White Mountain National Forest
Androskoggin Ranger District
Towns of Milan & Stark
Coos County, New Hampshire



Legend

* Project Areas

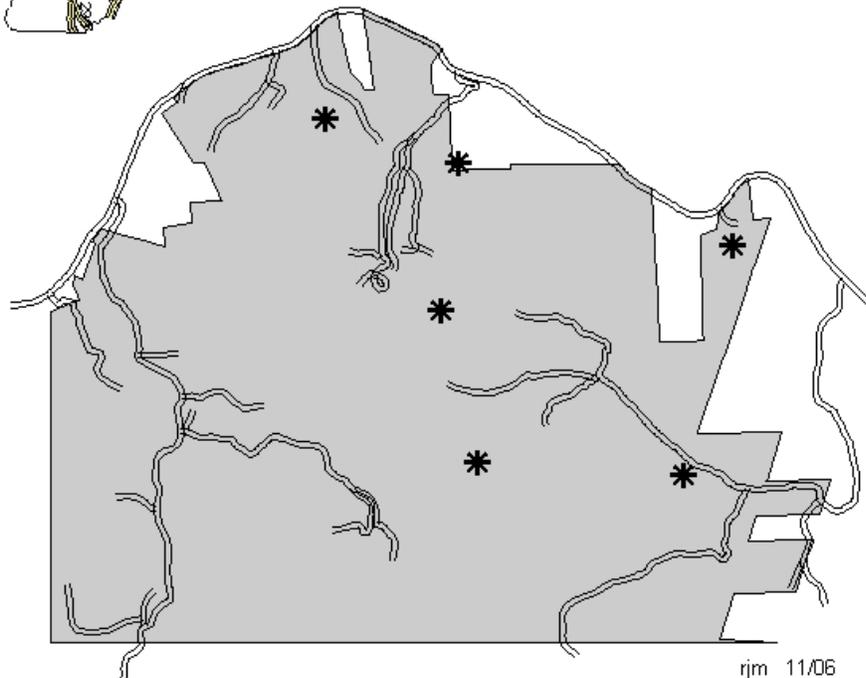
== Transportation System

■ Androskoggin Ranger District

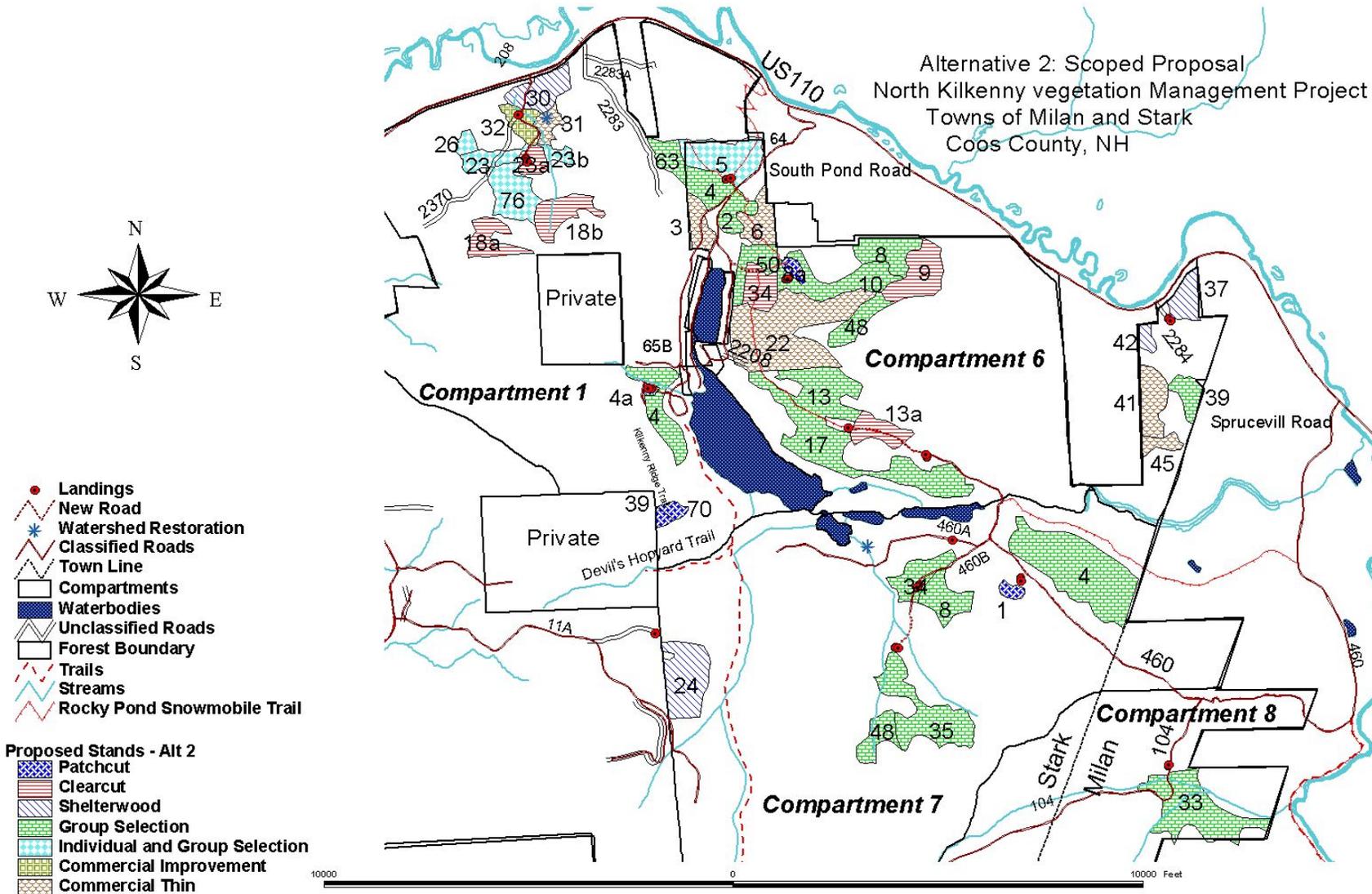
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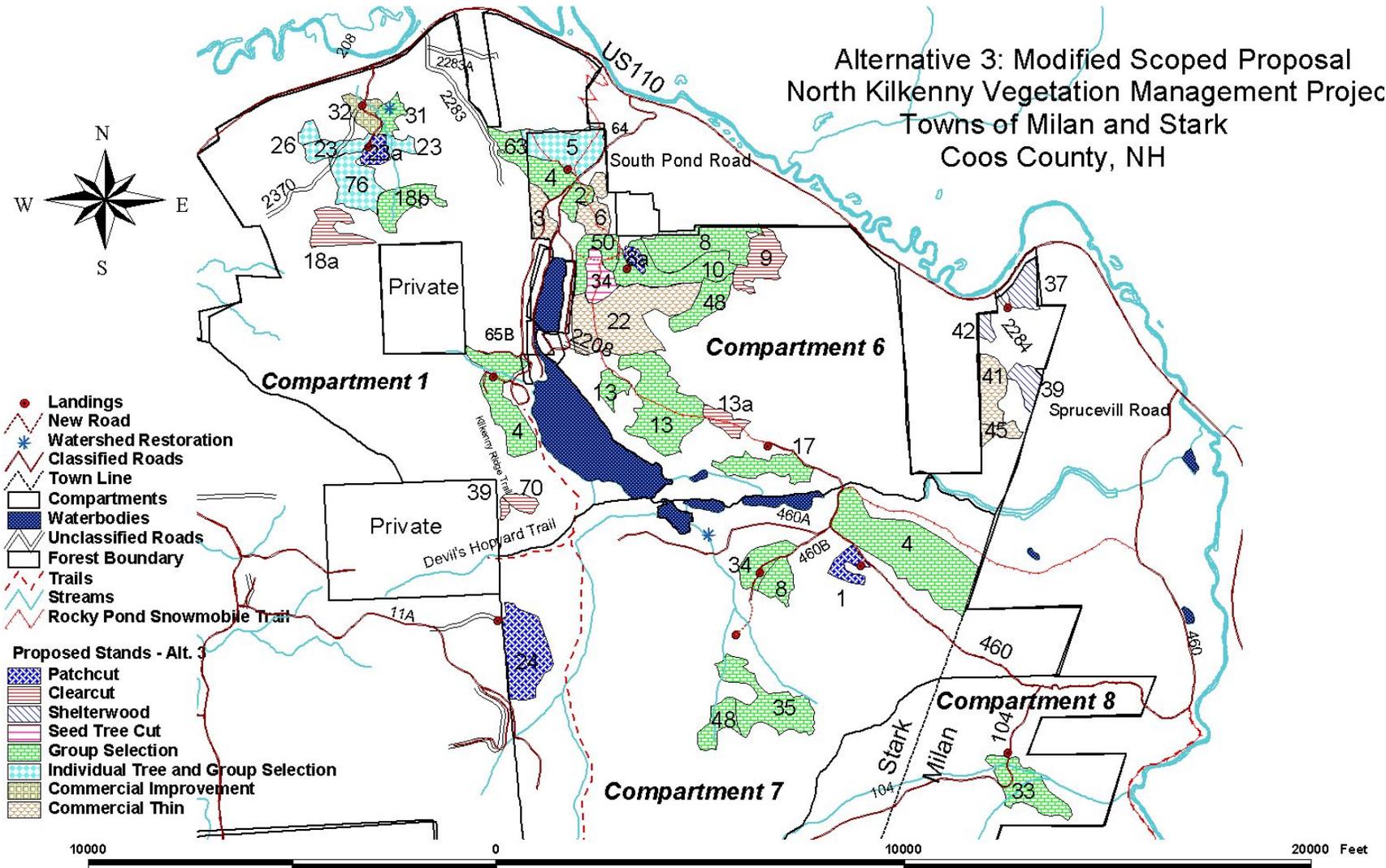
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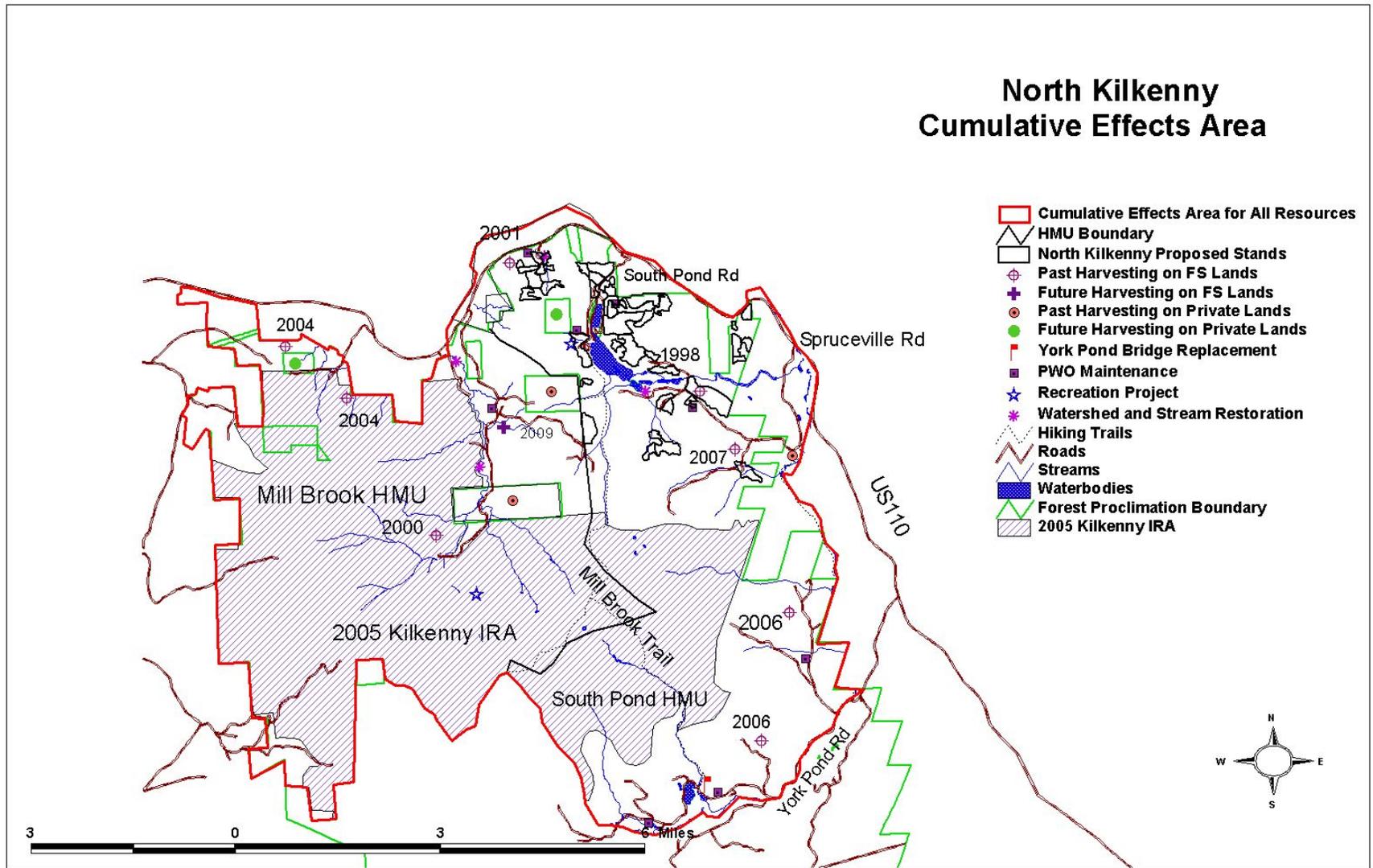
Alternative 2: Scoped Proposal
 North Kilkenny vegetation Management Project
 Towns of Milan and Stark
 Coos County, NH



Alternative 3: Modified Scoped Proposal
 North Kilkenny Vegetation Management Project
 Towns of Milan and Stark
 Coos County, NH



North Kilkenny Cumulative Effects Area



APPENDIX B – List of Scoping Comments and Responses

Each comment received during the February and March 2005 scoping period was reviewed to identify specific issues and concerns. Each comment is listed with a response of how the comment was addressed and where supporting information can be located in the EA.

We appreciate the time all respondents spent reviewing and commenting on the North Kilkenny Project Scoping Letter. Thank you for your thoughtful comments.

Where possible in the following discussions, the respondent is quoted directly and in the context of their full comments. All correspondence is filed and available for public inspection in the Peaked Hill Project Planning Record located at the Androscoggin Ranger Station in Gorham, NH.

Comments and responses are grouped by category:

1. Support for Proposed Project
2. Vegetation
3. Aquatics
4. Wildlife and Exemplary Communities
5. Recreation
6. Visuals
7. Transportation
8. Watershed
9. Soils
10. Air Quality
- 11 Maps
12. General Comments

1. Project Support

1. **Comment:** “The quality timber offered from the White Mountain National Forest provides an important part of the raw material source for our industry while providing wildlife habitat and many other benefits for the citizens from NH and beyond. The North Kilkenny project supports this important part of New Hampshire’s economy.

1. A commenter is in support of the North Kilkenny Vegetation Management Project. This project achieves many goals highlighted in the new Forest Plan including:

- Maintaining early successional habitat
- Increasing softwood and aspen habitat composition
- Improving timber resources through the removal of lower quality, individual trees, and or species in pre-commercial thinning, single tree or group selection and other harvesting activities.
- Improving or maintaining the transportation system on the forest.

2. The literature is clear about the need for additional early successional wildlife habitat in New Hampshire and the region...it behooves the WMNF to deliver on this need in its vegetation projects.

3. We see no reason why any of the proposed actions would have any effect on the character of the inventoried roadless area.

3. Comment: “I support the proposed action alternative as is presented in the Scoping letter. These prescriptions were arrived at by lengthy and detailed discussions with the input of resource professionals raising a variety of issues related to natural resources and public concerns.”

4. Comment: “The proposal outlined in your letter seems to be satisfactory.”

5. Comment: “The plan does seem thoughtful and responsive not only to the natural environment, but also to the local economy. While I count myself as an environmentalist, too often environmentalist ignore that wood is a renewable resource and perhaps the most appropriate “farming” for northern New England. Logging can create early successional habitat and selective cutting can support different kinds of forests; it also supports a human way of life that we associate with the Northern Woods.”

6. Comment: “I am quiet familiar with area chose for this work and believe it to be a very good choice for the proposed action, these secondary growth areas are not of much commercial value except for chipper wood and clearing them would broaden these test areas. I can remember when these areas were very highly productive of game such as deer, partridge and rabbits.”

Response: Thank you for your comments in support of this project.

2. Vegetation

1. Comment: “It isn’t clear to me about cutting the individual trees and groups – Regarding oak and yellow birch at what size do they say cut? Do they come back to the same area in 15 years? In that length of time hardwood doesn’t grow that much. Maybe my thinking is wrong. Maybe they come back to the same compartment but not necessarily the same location.”

Response: Individual tree and group selection are uneven-aged management techniques which maintains a continuous forest canopy and provides growing space for new species (mostly intermediate shade tolerant) to become established. The result is a diverse stand of differing age and diameter classes and species mix. Individual trees selected for harvest are those at high risk of mortality, damaged, diseased or of poor form, rather than just by size. Groups are usually placed in pockets of low quality hardwoods or areas to promote intermediate shade tolerant hardwoods (sugar maple and yellow birch) or softwoods. Again, tree size and diameter is not the focus of group placement.

Fifteen years after a harvest, the species composition of the stand is very similar to what it was prior to harvest, though the composition might shift slightly to include more intermediate shade tolerant species in groups (i.e. more sugar maple and yellow birch regenerated). This can be seen in stocking survey data taken three years after harvest showing that species

regenerated in the understory are identical to those in the overstory. Stand exams did not find any oak in proposed stands.

The composition of species on a site is influenced by the land capability which takes into account soil type, climate and geology of the land.. Looking at the project area, we identified several hardwood stands that are growing on soils that support softwoods or mixedwood stands. Through silvicultural treatments, we are trying to match forest communities with soil types to promote healthy, vigorous stands.

2. Comment: “logging every fifteen years is far far too often an invasion of nationally owned by taxpayer forests and in fact is continual stress for the vegetation.”

Response: Uneven-aged management techniques, such as individual tree selection, improvement cuts and commercial thinning promote a forest of varying age classes and species mix. With this system, a portion of each age and size class is harvested on a regular cutting cycle of 15 to 20 years to provide growing space for new trees and maintain a continuous high forest canopy. This cutting cycle is also based on stand density (basal area), area to be harvested and growth rates for northern hardwoods. Within 15 years of harvest, a stand will go from a residual basal area of 70ft² to 100ft² (Leak et al, 1987). This is an opportune time to harvest stands and obtain forest products as well as maintain good growth rates on residual trees. If stands become too crowded, tree growth slows and regeneration of intermediate shade tolerant species such as sugar maple and yellow birch are out-competed by shade tolerant species. There is also a guideline in the Forest Plan that states selection cuts should be made on a 15 to 20 year entry interval. (USDA-Forest Plan, 2005a. p 3-6)

Prior to proposing stands for silvicultural treatments, stands are evaluated on growth and mortality rates along with other factors. There is no evidence of continual stress on the vegetation within stands from past harvest activity. In fact northern hardwoods, especially sugar and red maple, and yellow birch exhibited good growth rates after past harvest activities. Also, the regeneration opportunities for sugar maple and yellow birch are increased due to the addition of sunlight reaching the forest floor.

There are several proposed stands that are show signs of insect damage and disease. This causes additional stress on the infected trees and increases their susceptibility to environmental damage (ie. ice and wind). Harvesting these trees will open up growing space to recruit future healthy trees that can better endure stress and lead to a more productive forest.

3. Comment: “As ever, I comment on the concept of returning to stands logged only 15 years ago for further action. We need more BIG trees and fewer regenerating areas, especially in light of the private development on adjacent lands.”

Response: Please see the above response for the rational for entering stands on a 15 to 20 year cycle. Private development tends to convert forested lands to housing lots. Changes in the landscape include the introduction of grassy openings, ornamental plants and artificial feeders in a manicured setting, and an increased human influence on surrounding lands. Many residences will maintain openings around the houses and outbuildings that will contribute to edge effect for wildlife, but the grassy habitat typical of a residential lawn would not produce

the variety of plants needed to support many wildlife species that require a diverse range of herbaceous and woody vegetation for food and cover. Housing lots will not contribute to natural stand diversity within the surrounding forest in the same way that even-aged harvest of northern hardwoods, paper birch and aspen generates a variety of young woody vegetation and herbaceous plants that contribute to stand and wildlife habitat diversity.

Looking at the South Pond Habitat Management Unit (HMU) objectives and wildlife objectives, one goal is to have 3-4% of the HMU in regeneration age northern hardwoods, currently there is 1%. The objective for mature age trees in the HMU is to maintain 44-50% in this age class, currently more than 79% of the HMU is in mature northern hardwoods forest types. As for private lands surrounding the National Forest, approximately 80% is in forested lands and the remainder is agricultural and wet lands, and residential housing. There are no known housing or industrial developments proposed on adjacent lands.

4. Comment: “i oppose “providing high quality saw timber for alleged “sustained yield”. The forest needs protection, not logging.”

Response: The White Mountain National Forest’s Land and Resource Management Plan was approved in 2005 and guides the management of the Forest for the next 10 to 15 years. The Forest Plan helps meet the mission of the Forest Service which is “to sustain the health, diversity, and productivity of the nation’s forest and grasslands and to meet the needs of present and future generations.” The Plan recognizes how important forest management is to people and their social and economic well-being. The outputs and uses of the Forest that result from achieving the desired conditions and objectives will continue to provide jobs, products and recreation opportunities.

Approximately 53% of the Forest emphasizes dispersed recreation with unroaded landscapes and does not permit vegetation management. These areas provide for older forest conditions that are valued for both their ecological and social values. Included within this management emphasis are 148,500 acres (18% of total Forest acres) of Congressionally-designated Wilderness.

The remaining 47% of the National Forest emphasizes the full range of Recreation opportunities: non-motorized trails, backcountry camping, developed recreation, areas, ski areas, snowmobiling; as well as timber management activities. These areas provide young forest habitat that is important for some wildlife species. (USDA-Forest Service, 2005a. pp 1-12 to 1-13)

5. Comment: An individual was concerned that the Forest Service is proposing an eight acre clearcut near a 116 acre even-aged harvest that took place in the late 1990’s on private land.

Response: The even-aged harvest on private lands is moving into the later phase of regeneration age and within the next three years will be in the young age class. Visits showed this stand to be over 15 feet tall and no longer considered open canopied. It currently does not provide forest regeneration (0-9 year age class) habitat required by certain wildlife species.

The reason for selecting a portion of these stands (1/39 and 1/70) is that many of the trees in this area incurred ice storm damage from the 1998 Ice Storm. It would also move the HMU close to its early successional habitat objectives. The proposed clearcut on Forest Service lands meets the Forest Plan guideline that new regeneration cuts should not be located adjacent to previous regeneration areas until the average height of the new stand is at least 15 feet (USDA Forest Service, 2005a. p. 2-32).

6. Comment: “Are there additional actions which could be taken in this project area to INCREASE the total of White Pine? This is our most majestic species.”

Response: There is one proposed stand that is classified as a pine community (6/42) and another that is classified as a mixedwood with a pine component (6/37). Both these stands are located on outwash, sandy soils which best support pine growth and regeneration. Pine seedlings are very slow growing during their first five years and are often outcompeted in height growth by shade tolerant northern hardwoods. The shelterwood prescription would open up the stand and allow at least 50% full sunlight to reach the canopy floor. This gives pine seedlings the growth advantage over other species and allows them to move into the midstory rather than spend years in the understory. Also, by proposing fall harvest, mineral soil is exposed through ground scarification and provides a seedbed for pine regeneration.

7. Comment: “I don’t understand having a silvicultural prescription of “Clearcut” for Stand 18b since your map clearly shows a stream going right through it and I believe that the Forest Plan states that uneven-aged silviculture practices shall be used within RMZ as stated below...please change the prescription to an uneven-aged one.”

Response: The GIS database does show an intermittent stream running through stand 18b. This stream was digitized based on contour lines rather than actual field reconnaissance and misrepresents what is actually on the ground. Field verification identified that there is no intermittent stream or stream channel within this stand. Irregardless, any stream within a clearcut would be protected using Forest Plan standards and guidelines. We did however decide to change the prescription to uneven-aged management to maintain water quality and ph levels within the lower reaches of this stream.

8. Comment: “Seeing the cedar forest was great. Unit 30 (where the cedar is located) is proposed for a shelterwood cut. Doesn’t that mean most of the understory is cut and some seed trees are left but eventually it’s an even aged cut? How would the cedar be protected?”

Response: Based on comments from the public and the interdisciplinary team, Alternative 3 proposes deferring this stand from treatment. Yes, a shelterwood would remove many understory trees and retain dominant trees to serve as a future seed source. Then within a selected time period, these seed trees would be removed, leaving a young stand. There is less likely to be stand damage to residual trees when a higher percentage of trees are removed because it gives the operator more room to maneuver. Also, careful placement of skid trails prior to harvesting a area reduces stand damage. Provisions in the timber sale contract allow the Forest Service to seek damages if an operator is negligent and causes unwarranted stand damage.

9. Comment: “Unit 30, comp. #1 and Unit 4, comp. #7 were cut in 1998 and 2001 respectively. I thought the Forest Service was in favor of long rotation cycles. I felt Unit 4 was a good cut and told the USFS personnel that it was a good example of careful logging. In the Environmental Assessment, please explain the need to go back to these stands so soon.

Response: As stated above stand 1/30 is deferred from treatment in Alternative 3. Stand 7/4 was indeed operated in 2001 under the Rocky Pond Timber Sale. The balsam fir component, which is a short rotation species, has suffered serious decline due insect damage and that it is overmature. The purpose of the re-entry is to perpetuate a continuous cover of mature softwood by diversifying the present age classes. Harvesting patches dominated by overmature balsam fir will accelerate spruce and fir regeneration while salvaging a portion for high quality forest product as stipulated in the WMNF Forest Management Plan. Care will be taken to maintain spruce, hemlock and white pine as they are longer rotational species.

10. Comment: I’m a little perplexed that you’re already going back to these recently cut areas. I’m sure that there are areas that could use a little thinning that were cut 20-50 years ago. I hope the EA can explain what seems to me like a shift in silvicultural practices or an attempt to get the cut out for the district.”

Response: As stated in the WMNF Forest Management Plan, “Selection cuts should be made on a 15 to 20-year entry interval, depending on individual site conditions.” This guideline provides general direction for the vegetation management program. Entries may be delayed or expedited due to on the ground conditions, such as higher than normal insect or disease induced mortality, or if resource goals were not accomplished such as regenerating intermediate shade tolerant species (sugar maple and yellow birch) within an uneven-aged stand. As a general guideline, areas within a Habitat Management Unit are eligible for potential vegetation management treatment every 15 to 20 years.

11. Comment: “If Unit 33, comp 8 needs cutting now why wasn’t it part of the Higgins Brook sale in 2005-2006? In the EA, please consider this and the fact that the private land to the east has just been logged.”

Response: This stand was considered in the Hidden Bear Environmental Analysis (Higgins Brook was the timber sale generated by this EA) but because two other softwood stands were proposed within the area, the stand was deferred from treatment at this time. The prescription for this stand is small groups (1/10 to 1/20 acre) and it will be maintained as a mature softwood stand. The goal of this treatment is to enhance growth on young softwood seedlings in the understory as well as in the trees in the mid and overstory, and promote additional softwood regeneration to achieve our HMU objectives for perpetuating softwoods on the forest.

There has been timber harvesting on private property adjacent to the Forest Service boundary on approximately 134 acres. We are proposing uneven-aged treatment which differs from the harvest on private land. Had even-aged treatment been proposed for stand 8/33, we would

have considered changing the prescription due to this harvest. However, the proposed treatment will maintain this stand as mature softwood.

12 Comment: I support the proposed action to combine harvest methods to clear cut small area and patch cut larger areas within N. Kilkenny. I support the number of acres to be targeted for these proposed harvests but do think that the area sizes are too small to be commercially feasible. I would like to see larger areas utilized where edaphic and hydrological conditions warrant to greater realize the goals and objectives of the Forest Plan.”

Response: According to our Forest Plan, the maximum size of regeneration harvest is 30 acres and we try to achieve this acreage whenever possible. However, there are many factors such as forest type, terrain, rockiness of the soil, slope, visual concerns, Recreation concerns and soil wetness (to name a few) that dictate clearcut size and location.

The sizes of the proposed clearcuts range from 10 to 22 acres. If these stands were proposed for harvest individually, factors such as skidding distance, percent of sawlogs, tree quality, road restoration costs, miles of snowplowing, market conditions, and hauling costs would effect the commercial viability. However, the clearcuts are grouped with other stands which makes them cost effective to harvest. Though the best interest of the Forest Service is for these sales to be profitable in monetary terms, it is not our only objective. The wildlife benefit of regeneration harvest is very valuable.

The Forest recently sold two small sales of 70 acres or less with uneven-aged management prescriptions and had several interested bidders. We are hoping that these small sales will appeal to a wider audience of both large and small operators.

13. Comments: “ I would like to see efforts to patchcut aspen/birch area followed by efforts to maintain these species...managing for self regeneration offers opportunities to ascertain the role of factors that limit such regeneration and to determine which factors determines the shift in population from aspen/birch to spruce/fir.”

Response: Both aspen and paper birch are early successional species that are shade intolerant. The preferred method to maintain these species is to regenerate stands using even-aged treatments such as seed tree cuts or large patches cuts or they will succeed to their climax species. Ecological Land Types (ELTs) dictate what climax species will eventually dominate a stand based on unique soil materials, geology and climate . Based on the ELT for stand 6/50, over time it will naturally succeed to sugar maple, beech and white ash.

14. Comment: “I cannot support the efforts that “favor” the development or encroachment of spruce/fir over other species blends because the goals of species diversity are so poorly met in spruce/fir tracts....I do support the diversification of softwoods into mixedwood stands and favor the development of stands similar to the forest one we looked at on the Tour: 1/63 and 6/4.”

Response: Table 20 in the Wildlife Report compares existing forest community to potential acres that could grow this forest type based on land capability. Within the South Pond HMU, spruce/fir grows on 2,100 acres though the potential acres that can support a spruce/fir community is 2,600 acres.

15. Comment: “Page 4: paragraph 4 Throughout the public tour, reference was made to “returning” areas to a spruce/fir mix and that regeneration efforts were to be made to accomplish that goal. But this paragraph specifically proposed increasing regeneration age class northern hardwoods as well as maintaining white pine stands. Was this changed instituted in response to our many comments concerning maintaining or increasing hardwood fractions. Or are these two different objectives?”

Response: For spruce/fir stands there are two management objectives; (1) perpetuate spruce/fir and (2) maintain mature softwood habitat. Through uneven-aged treatments such as group selection, the mature characteristics of the stand are maintained while growth on regeneration in the understory is enhanced. Based on HMU analysis, there is a need to create regeneration habitat within northern hardwood community types. To meet this objection we are proposing even-aged techniques that will convert the stand from mature habitat to regeneration age habitat.

3. Aquatics

1. Comment: “logging changes stream temperatures, making them hotter so that the fish living in them dies from the heat.”

Response: Forest Plan Guidelines for stream and perennial riparian areas provides for an uncut buffer on all perennial streams adjacent to the project area. In this way, the canopy and related shade will remain intact on all perennial streams, waterbodies, and delineated wetlands with the project area. Combined with partial treatment of watersheds so no watershed will be entirely harvested greatly reduces the potential for temperature increases in streams. These practices have been shown to be effective in maintaining cold temperatures during timber harvest activities in New Hampshire and Maine (Pierce, et al 1993).

4. Wildlife/Exemplary Communities

1. Comment: “The cedar stand should be considered an outstanding natural community, not available for harvest. Since there is some reproduction in adjacent disturbed areas some surrounding land should be preserved.”

2. Comment: “I am disappointed to see that Stand 30, Compartment 1 is still in this project... I believe it should be treated as an “Outstanding Exemplary Community” as defined in the Forest Plan and be deleted from this project since one of the Forest Plan Goals is that “Outstanding natural communities” will be preserved.”

Response to 1 and 2: Compartment 1, Stand 30 contains a northern white cedar seepage forest, a natural community designated by the Forest Plan as an outstanding natural community on the White Mountain National Forest and thereby deserving of conservation. The New Hampshire Natural Heritage Bureau (NHNHB, 2006) does not list this particular community in its exemplary community database. A survey of this area by NHNHB in 1996 (Nichols & Sperduto, 1996) did identify the community but called it “a marginal occurrence

in terms of size and vigor of the cedar population as compared to other examples in the state further north”.

Based on internal concerns and comments received revolving around the protection of this outstanding natural community and other issues raised, a modified proposed action was developed that drops Compartment 1, Stand 30 from the North Kilkenny VMP. This stand would receive no treatment at present, but would be available for future treatment following the mapping of the exemplary natural community and the installation of a protective buffer around the community and its associated hydrologic resources. This northern white cedar seepage forest outstanding natural community would then be permanently deferred from all future projects, but the lands outside the mapped community, yet within stand 30 would be available for vegetation management in the future.

If the original proposed action is selected a protective buffer around the northern white cedar seepage forest and its associated hydrologic resources will be established in spring 2007 and reserved from treatment.

3. Comment: “There is one area upon which I can not support harvest operations; the area of mixed old growth pine and cedar. I feel that this is an unusual combination of species not represented elsewhere on the Forest and should not be disturbed...I feel it is inadvisable and inappropriate to attempt a species shift from spruce/fir when the cedar/pine has such an unusual value... I would like to see the area resized and remapped to avoid the small cedar swamp and its component species and to minimize all possible hydrologic and invasive species.”

Response: See response to comments 1 and 2. In addition, the pine in stand 1/30 although tall and in some cases large, does not qualify as old growth. The term old growth applies to a forest or community not an individual species or individual specimen. The definition of old growth Forest set for in the Forest Plan (USDA, 2005) requires an abundance of trees at least 200 years old with little evidence of past timber harvest, and other defining characteristics. The presence of relatively recent skid trails and roads in this area, as well as cut stumps throughout the stand indicate recent vegetation management activity. The NHNHB conducted a survey of this area in 1996 (Nichols and Sperduto, 1996) and found no evidence of old growth forest. They did core one twenty inch diameter northern white cedar and determined its age to be 75 years. One area of Old Growth Forest was identified during project surveys for the North Kilkenny VMP. This area has been mapped and dropped from consideration for this and future vegetation management activities.

The WMNF invasive plant database reveals no such species in the immediate vicinity of this stand and few in the overall area (Unpublished data 2006, New England Wild Flower Society 2002). Timber sale contracts have standard provisions to prevent introduction of invasive plants and their propagules via equipment and vegetation management activities.

4. Comment: “I support the efforts to increase the development and diversification of shade intolerant species in the understory of harvested area. Specifically I would encourage the Forest to develop management plans for rare, threatened, endangered or rarer [sic] sensitive species in these areas.”

Response: Per the Forest Plan (USDA 2005) all TES plant species occurrences must have site prescriptions (i.e. management plans) developed. This process is underway. Any site without a currently available site plan is automatically given a minimum buffer of 100 feet from any management action. No TES plant species were found in any area proposed for treatment in the North Kilkenny VMP.

5. Comment: “such logging means death for the wildlife and birds that make that area their home. they rely on the habitat and the food sources in that area which are just decimated over 21,000 acres.”

Response: A certain number of individual species may be displaced or killed during active logging operations. However logging also benefits wildlife by providing an array of habitats. The wildlife strategy was developed based on research that indicated that a diversity of forest types and age classes is needed to provide for the habitat needs for the full array of wildlife species that inhabit the White Mountain National Forest (DeGraaf et al. 1992, DeGraaf and Yamasaki 2001). See comments 6 and 7 regarding providing a balanced mix of habitat for wildlife on the WMNF.

6. Comment: “A balanced mix of habitat (scoping report p. 4) requires considering not just regeneration age class but all habitat and age class objectives (Plan 1-21). These should be considered for MA 2.1 in the entire South Pond HMU, not just the northern portion. The scoping report does not indicate that you have considered the objective for 15% of Ma 2.1 in the old age class for northern hardwood forest and 21% for mixedwoods... “Goals should be considered when planning projects and activities, and management should move the Forest toward these desired conditions” (Plan Preface iii). “Habitat management objectives must be developed...” (Plan 2-33).

7. Comment: “I also don’t like to see the oldest Stands in the project (18a, 18b) by Year of Origin (1835) being clearcut for early successional habitat. There is PLENTY of early successional habitat being created all over NH/ME... areas that contain older trees is sadly lacking and getting worse every year...please change all even-aged management prescriptions to uneven-aged management.”

Response to Comments 6 and 7: Every Forest Plan includes habitat goals and objectives to move the Forest toward a stated desired future condition. The 1986 Forest Plan included Habitat Management Units (HMUs) as a way to meet those habitat goals and objectives and provide a diversity of habitats across the forest landscape (including forest types, age-classes, and non-forested habitats). The Forest Service decided to retain the HMU framework in the revised 2005 Forest Plan, because it has been an effective way to ensure that projects will move the Forest toward habitat composition and age class objectives for MA 2.1 lands (USDA Forest Service 2005a, Chapter I, pages 20-22). The HMU framework is specific to the WMNF. Input from internal and external forestry and wildlife experts (including input from research) supported the HMU approach as a reasonable way to help the forest achieve our habitat objectives. A more detailed description of the ecological perspective used during Forest Plan revision to develop habitat goals and objectives, and discussion of the role of Habitat Management Units (HMUs) in achieving the desired future conditions is available in a

document in the Forest Plan revision administrative record titled “WMNF Ecological Approach” (available in project file).

The WMNF Forest Plan goal for wildlife habitat management is to provide habitat diversity across the Forest, including forest types, age classes, and non-forested habitats. Objectives include maintaining high quality mature forest and old forest habitats on a majority of the Forest, and provide regeneration age forest and open habitats to sustain biological diversity and support species that prefer those habitats (USDA Forest Service 2005a, Chapter I, page 20). Habitat Management Units were established forest-wide (watershed based) to apply the forest-wide habitat composition and age class objectives on the ground. The Proposed Action (and action alternative at various degrees) would move the Project Area towards the South Pond HMU DFC.

Analysis of the South Pond HMU indicates approximately 80% (approximately 9000 acres) of the MA 2.1 lands and 97% (approximately 3,800 acres) of the lands outside MA 2.1 are in the mature age class. The total acreage in the South Pond HMU is approximately 15,700 acres. We do not separate out existing old age class at the HMU level. The following excerpt from the “age_class_revision_rationale.doc” (available in the Project File) explains the rationale for this:

“Stand-level year of origin data does not always provide an accurate picture of habitat condition because it is derived from a few of the largest and oldest trees. From a habitat perspective, stands that have had trees removed every couple decades often function as mature habitat, regardless of the age of the oldest trees, because there is less decadence, dead wood, and fewer large trees and snags than would occur in unmanaged old forest.

As implementation of the revised Forest Plan began, the wildlife cadre on the Forest realized that there is no reasonable way to distinguish mature forest habitat stands from those that provide old forest habitat across an HMU using currently available data. Therefore the decision was made to combine the mature and old age classes for HMU-level analysis, labeling it mature forest habitat since all of it meets or exceeds the criteria for that habitat. Since the WMNF does not have any known species that require old (instead of mature) forest habitat, combining the two age classes will not substantially alter the analysis of habitat suitability in an HMU.”

Approximately 1900 acres (16%) of the MA 2.1 that are not suitable for timber harvest and 3900 acres in lands outside MA 2.1 (where no timber harvest can occur) in the South Pond HMU have the potential to develop into old-growth forest. At the landscape level, this habitat is left to the natural process of forest succession for development of old-growth characteristics available to wildlife species that use cavities, snags, downed large woody material, fungi, moss, lichens, insects, and closed canopy with sparse under-story conditions.

There is a need to increase forest regeneration habitat (0-9 year old age class) within the South Pond HMU. Many of the birds associated with this habitat type are declining as well as their associated habitats (Chandler 2006, DeGraaf and Yamasaki 2003). There is no guarantee that any early successional habitat located outside the WMNF will remain forested due to the increasing development surrounding the forest.

8. Comment: “Permanent wildlife openings would have the stumps removed...(scoping report p. 6). Stump removal should be optional. Unless required for efficient mowing it is an unnecessary expense and the disturbance may destroy natural vegetation and encourage invasive weeds.”

Response: Only one of the four permanent wildlife openings proposed for expansion (1/23a) may have suitable terrain to remove stumps and allow the option of either mowing or prescribed fire to maintain the area in an open condition. Wildlife openings are only stumped if access and terrain would allow an area to be mowed. We could not mow openings if we did not remove the stumps. We try to diversify methods to maintain permanent wildlife openings as we only have a few days annually where we can use prescribed fire. Hand brushing, which is very time consuming and expensive, is generally only used to treat overgrown portions of an openings.

9. Comment: “26 new acres of PWOs (permanent wildlife openings) seems excessive in light of the thousands of regenerating acres on the WMNF and the aforementioned adjacent private development.”

10. Comment: “I support the harvest activity as described, with especially emphasis on small clear cuts and multiple sized patch cuts. I would like to see these areas and their landing and truck turn arounds eventually designated as Permanent Wildlife Openings as is possible”

Response to Comments 9 and 10: The goal for permanent wildlife opening habitat on the WMNF is to maintain them close to existing levels(USDA Forest Service, 2005a, Chapter I, p 21). New opening may be created on a limited basis where they are lacking on the landscape or where an opportunity for high quality habitat is present (USDA Forest Service 2002b). High quality habitat is based on habitat parameters such as vegetative composition, size, and topography (USDA Forest Service 2002b and 2005c). Some recent research indicates larger openings are more favorable to some of the bird species that breed in these areas (Chandler 2006).

Prior to selecting sites to manage as a PWO, a review of the Project Area was made to determine opportunities to provide high quality habitat. We decided to expand the three existing PWOs to a minimum of 5 acres since our goal is to have them be an average size of 5 to 10 acres (USDA Forest Service 2005c). The landings are too small to manage as PWOs. Clearcuts, seed tree cuts and patchcuts are not managed as PWOs because the goal of these treatments is to regenerate northern hardwoods and aspen-birch.

11. Comment: “I would like to see these areas (PWOs) monitored for invasive and TES species recovery and with time, potentially reclassified as Lynx Analysis Units, if their altitude and aspect upon completion qualifies for such reclassification.”

Response: A botanical survey for TEP&S and invasive species was conducted for all permanent wildlife openings on the Androscoggin Ranger District in 2005. A botanical survey of the proposed North Kilkenny project area was conducted in 2006 for TEP&S species and invasives. No TEP&S invasive plant species were found in these PWOs. Once established, permanent wildlife openings are monitored every few years to assess need for maintenance. At this time they are checked for the presence of invasive plants.

The openings described in the proposed action are included within Lynx Assessment Unit (LAU) 1. The White Mountain National Forest used the criteria described in The Canada Lynx Conservation Assessment and Strategy (Ruediger et al. 2000) to define Lynx Assessment Units (LAUs) and percent of suitable, unsuitable, denning, and non-lynx habitat across the Forest (USDA Forest Service 2005b, Appendix G, page 71, USDA Forest Service 2006) . Permanent wildlife openings are considered non-lynx habitat.

12. Comment: “After discussing the project with several friends who own property in the area and “hunt” there, the deer population is practically non-existent. They found the last logging did not create habitat but drove the deer over 110 to Percy Peaks. They also feel the herd had been decimated by coyotes – and you’ve introduced wolves. We see no value to the N.F.S. efforts so far except keeping the loggers busy.

Response: The WMNF manages habitat for all the wildlife species that occur on the Forest, including white-tailed deer. The Forest works closely with New Hampshire Fish and Game Department in managing white-tailed deer habitat. Currently, white-tailed deer populations are below desired levels in the northern portion of the White Mountain National Forest but have been increasing since an all time low in 1983 (NHFGD 2005 Wildlife Harvest Summary). The State Harvest Summary which addresses population goals for white-tailed deer can be found at http://www.wildlife.state.nh.us/Hunting/Hunting_PDFs/Wildlife_Harvest_2005.pdf.

Wolves are extirpated from New Hampshire.

13. Comment: “Can the North Kilkenny project be expanded to include removal of beavers and beaver dam from a major South Pond feeder stream?”

Response: The biologist conducted a field review of the beaver wetland in question. The beavers have created a large wetland complex on Cold Stream. Beavers are a natural part of low gradient stream systems on the White Mountain National Forest. Their ponds provide a diversity of habitat for wildlife and can provide excellent trout habitat in the first few years they are created. The beaver dam that the commenter is concerned about is not affecting any infrastructure. Over time the beavers will likely move on and the beaver dam will breach and the pond will drain. There is no reason to remove the dam at this time.

5. Recreation

1. Comment: “I agree completely with the septic improvement.”

Response: Thank you for your comment.

2. Comment: “Please continue your current philosophy to not allow any form of motorized recreation in the White Mountain National Forest such as ATV’s, dirt bikes, scooters, etc. which could adversely impact your program.”

Response: Thank you for your comment. The 2005 Land and Resources Management Plan (LRMP) provides for motorized recreation on designated snowmobile trails only, consistent with State laws governing these sports. Summer motorized trail use is prohibited.

3. Comment: In regard to the Rocky Pond snowmobile trail, “We would be happy to work with you to insure that any shared use of the trail/road is done so with all due consideration to user safety. We would continue to encourage you to keep the trail open for winter use during your proposed timber activities, as this is an area that receives very high winter Recreation trail use and provides snowmobile trail connection between the City of Berlin and Town of Groveton. We do have concern about the length of proposed shared use for the southern portion to compartment six, seven and eight; 2.9 miles is a long expanse of shared use road and we would encourage you to allow for a portion of the road to be unplowed to allow for safer use by trail users and also limit timber hauling to weekdays with no vehicular road use on week-ends and holidays.”

Response: The Rocky Pond snowmobile trail will be open to recreation use during the contract period, including for winter motorized recreation. Contract provisions will restrict timber hauling to mid-week periods only and prohibit hauling on weekends and federal holidays. We agree that 2.9 miles is a long expanse for dual use and every effort will be made to safely provide for shared use during hauling operations, however because of the width of FR 460 it may not be feasible to leave an unplowed lane. Additionally, desirable silvicultural prescriptions and/or ground conditions for most of the stands to be accessed by FR 460 primarily dictate a need for frozen ground operating conditions, limiting the option of harvesting and hauling outside the winter snowmobiling season. By working with the purchaser and subcontractors, every effort will be made to concentrate harvest activities requiring use of FR 460 to as narrow a window as possible in the interest of minimizing impacts to snowmobile users.

4. Comment: An individual would like to see the snowmobile trails in the project area upgraded to ATV standards so if the Forest Service ever permits ATV use, trails would be in place.”

Response: The 2005 Land and Resources Management Plan for the White Mountain National Forest prohibits summer motorized trail use for the 15 to 20 year period covered by the plan – through at least the year 2010. At that time issue of whether to provide summer motorized recreation will likely be reexamined. Any decision to commit time, resources, and funding for summer motorized trail design and construction would most appropriately follow a decision made in a future Forest Plan to authorize that use.

5. Comment: An individual would like to see the Rocky Pond snowmobile trail remain open during harvesting activities.

Response: The Rocky Pond snowmobile trail will remain open during harvesting activities with some necessary limitations for dual use (see response 3, above).

6. Comment: “I would like to see snowmobile and winter ATV use sharply restricted and/or completely removed from the areas south and east of the pond. Efforts to reroute these trails closer to the main roads would successfully satisfy both the Recreation demand and ecological needs of potentially re-established species. The stated objective of “minimizing adverse

ecological effects” can be used to justify efforts to reroute these trails; especially when trash, traffic, noise and emission pollution have documented adverse affects on wildlife.”

Response: Thank you for your comment. The Rocky Pond snowmobile trail was the result of years of cooperative planning with the State of New Hampshire, the local snowmobile club, local communities, and interested parties. The trail provides a key link between NH corridor trails and several North Country communities, offers a pleasant riding experience for winter recreation enthusiasts, and meets LRMP goals for recreation including offering a range of recreation opportunities, providing snowmobiling opportunities on designated trails, and emphasizing the importance of the natural setting for this activity. During the analysis process for the trail, several alignments were examined; the final location was determined to best meet a variety of considerations including cost of construction, minimizing increased habitat fragmentation by limiting new trail construction, and providing a quality trail riding experience in a natural setting. Effects to wildlife were analyzed and considered during the planning process. A Decision Notice and Finding of No Significant Impact were signed by District Ranger George Pozzuto in 2001.

7. Comment: “I would like to see additional walking trails established in the vicinity of the Ponds in response to the change in demographics of trail use and the increasing age of the average trail user.”

Response: The White Mountain National Forest currently maintains approximately 1400 miles of shared-use trails available for recreation use. In part because of the density and extent of this system, the 2005 LRMP limited additional trail development to no more than 25 miles during the 15-25 year period covered by the plan. Visitors to this area currently have the South Pond Recreation Area and the Kilkenny Ridge and Devil’s Hopyard Trails, as well as the Rocky Pond Snowmobile trail available for easy walking opportunities. The first .5 miles of the Kilkenny Ridge Trail is designed and maintained to meet universally accessible trail standards and offers accessible fishing opportunities as well. No additional trail development is planned as part of this project, though nothing in any alternative would preclude such development if deemed necessary in the future.

8. Comment: “ Page 4: paragraph 6: Page 9: paragraph 2: Can you consider composting facilities as part of the upgrade to the septic system?...there is plenty of evidence from composting facilities at western National Parks that suggest a re-evaluation of their use in seasonal situations..”

Response: The existing septic has functioned well at this location and is an effective waste treatment system. Upgrades to the system can be made for approximately \$17,000 – a fraction of the cost of decommissioning and removing the current septic system and toilet building and constructing a new composting toilet capable of handling the high use levels at the Recreation Area. Additionally, composting toilets require consistent manipulation of the waste piles to promote effective breakdown of material, whereas traditional septic designs require considerably less direct maintenance and consequent exposure. Composting toilets have been used with great success in remote backcountry locations and to supplement traditional flush systems at front country locations on this National Forest, however because the existing, effective system at South Pond can be replaced and maintained at a lower cost, conversion to a composting system is not recommended at this site at this time.

6. Visuals

1. Comment: “Relative to this specific project, stand 34 is prescribed as a 20 acre aspen clearcut on the westerly slopes of Location Hill. This clearcut is likely to be very viewable by visitors to the South Pond Recreation Area, and particularly to boaters on South Ponds. If it is judged that people who utilize South Pond are sensitive to clearcuts, then it may be appropriate to modify the plan. On the other hand if these people are likely to be wildlife enthusiasts, then the clearcut will provide opportunities for wildlife observation and should remain as an integral component of the project.”

Response: Using topographic maps and a three dimensional terrain and vegetation modeling program, the seed tree cut proposed for stand 6/34 can not be seen from residential homes along North Pond or from either North or South Pond during leaf-on period. A very small percentage of the harvest may be visible during leaf-off period. The reason this stand is not visible is due to its location on a flat bench above the pond with mature trees growing in the foreground. Though this stand is not visible, approximately 5% of the stand would be retained in uncut patches at least 0.25 to 0.5 acres in size, and two to four paper birch trees would be retained as a seed source.

7. Transportation

1. Comment: “i oppose upgrading of snowmobile trail to be used for forest “products” hauling. This is national land paid for by national taxpayers, not a yard for local lumber barons to use at will and scamming the public by the ludicrously [sic] low monies paid for taxpayer lumber.”

Response: The Rocky Pond snowmobile system is comprised of both un-maintained logging roads and current access roads (FR 460 and FR 104) in the Analysis Area. We are proposing to upgrade portions of these roads to improve logging access which has the added effect of benefiting snowmobilers.

2. Comment: “safety of the residents especially emergency access to the residences while the only road is blocked by a heavy transportation equipment. Regarding a smaller number of people in the area off season, it would be better if the operation will be limited to fall and winter time only. I propose to change the Season of Operation of stands 6/9, 13a, 22 and 50 to FW.”

Response: Safety is a big concern for the Forest Service during all logging operations for both the operator and private citizens. None of the proposed landings, where logging equipment would be situated, are located on public access roads. Road access to private residences and the South Pond Recreation Area will be open throughout the logging operation. There may be a possibility of temporary delays as equipment is moved in and out sale area.

As for operating season, stands 6/13a is S/F/W and will be accessed by the Rocky Pond road and will not affect the South Pond Road. Stands 6/22 and 6/50 will be operated F/W. Stand 6/9 can be operated on S/F/W depending on ground conditions. By harvesting this stand in the summer, visitors to South Pond Recreation Area and residents of South/North Ponds may

encounter several logging trucks a day on the South Pond Road. We have used the South Pond Road in the past for hauling timber and have not had any past safety issues or concerns.

- 3. Comment:** “Limited access to our homes during operation requires a publicly available timber traffic schedule or the traffic info line.”

Response: See above response. You can call the Gorham office for the location and time frame of harvesting and hauling activity. For any additional information, our timber sale administrator can contact you.

- 4. Comments:** “Road damage – the roads 64, 64A, 64A Spur, and probably 2285 are maintained according to WMNF Road Permits by the South Pond Association – this takes close to ¾ of our dues and a lot of physical work. The commercial operation of timber harvesting should include maintaining used roads during the operation and repair of all damages. It would be a nice compensation for using a private part of road 64 that does not belong to NF.”

Response: The Forest Service and/or private contractor employed by the Forest Service is responsible to repair any damage that incurs from harvest operations to Forest Service or private roads within the Project Area. Any road repairs and closure would occur when road conditions are appropriate for this work. The southern portion of FR 64 beyond the Forest Service boundary (along North Pond) and FR 2285 will not be needed for logging activities.

- 5. Comment:** “Who decided and when was it decided which roads were included in the "Roads Data Base"? To some it might seem like an end-run around the two roadless inventories to classify or reclassify skid roads as classified.”

Response: Based on Forest Service Handbook 7712.1 - Roads Analysis: “The Responsible Official shall incorporate an interdisciplinary roads analysis into project-scale analyses and assessments to inform planners and decision makers of road system opportunities, needs, and priorities that support land and resource management plan objectives. Conducted by an interdisciplinary team, the roads analysis process provides Responsible Officials with critical information needed to identify and manage a minimum road system that is safe and responsive to public needs and desires; is affordable and efficient; has minimal adverse effects on ecological processes, ecosystem health and diversity, and productivity of the land; and is in balance with available funding for needed management actions.:

This project provides a good opportunity to look at the road system within the analysis area and make proposed changes to meet current and future needs. There are many unauthorized roads on the Forest (roads we know are on the ground, but were never assigned a permanent status) and with public and Forest input, a final determination will be made as to whether we want to maintain these roads as permanent system roads. Many of the unauthorized roads we are proposing to change to Forest roads were used in the past by log truck for hauling wood products rather than log skidding.

- 6. Comment:** “I support leaving the culverts and maintaining to avoid ponding adjacent to and eventually over the road surfaces. I can not support and do object to plans to waterbar and close the roads as these can serve as access for necessary monitoring functions in the future. I support

leaving the bridge structures in place for continued forest activities; especially those devoted to easily accessing the site for monitoring activities. I consider it irresponsible to first build and then destroy these roads, landings, culverts and bridges when their expense can be justified for further continued analysis and eventual reuse.”

Response: Once a harvest is completed the culverts are removed from the road bed, water bars are installed and the road is blocked to vehicle traffic. Because these roads are inaccessible (except by foot traffic), they may not be visited for several years and are not monitored on a regular basis. We pull the culverts for the reasons you mentioned, to prevent ponding and water running down roads caused by culverts being plugged by leaves and woody debris. Waterbars are effective, because they direct the flow of water into ditches and distribute excess water at various locations along the roadway. They also redirect run-off so it doesn't flow into streams. Though roads are closed from vehicle traffic, they are open to foot traffic, bicycles and administrative use of ATVs. It is not uncommon to walk one to two miles to perform monitoring work. The snowmobile bridge will remain at Pond Brook (FR 460) and access to areas across the pond will remain unchanged.

All the roads and landing needed for logging, will either remain open to vehicle traffic or have the culverts pulled, water bars installed and allowed to revegetate to native grasses or shrubs. By properly closing these roads, when we come back in 10 to 20 years, there is minimum work and expense required to bring them up to haul road standards. For example, it has been at least 10 years since FR 460 was used for timber harvesting. Because of proper closure practices (waterbars and grass seeding), the road bed is in good shape with no ruts or gullies, the ditches are in good condition and will only require installation of culverts to make it usable for hauling.

7. Comment: I support the expansion of Forest Road 460B and construction of additional landing areas as needed...I do wish to see snowmobile access limited to areas on the periphery of the Forest and would support closure of the interior portions of FR 460 and FR 64 to better protect the Lynx Analysis Units and adjacent Permanent Wildlife Openings.

I support the construction of 1,350 feet of new road to the Rocky Pond snowmobile trail if that new road and its new landing were unavailable to winter or summer vehicle access. This would serve to limit mechanized access and to restrict snowmobile access to peripheral area only.”

Response: Upon completion of the timber sale, the newly constructed road (FR 64B) will be blocked with either boulders or a metal gate and only administrative use of ATV would be allowed to maintain the Permanent Wildlife Opening. We also do not want this road to be accessible by snowmobiles.

8. Comment: “I do not support removing the temporary truck bridge and would prefer to see it used to mitigate the difficulties to continued monitoring activities.”

Response: To safety log stands across Pond Brook, the wooden snowmobile would be overlaid with a metal bridge to support log trucks and personal logging vehicles. Upon completion, the metal bridge would be removed and the wooden bridge would remain in place. There would be no change in access to areas across from Pond Brook.

9. Comment: “I cannot support efforts to decommission roads. FF 2283a may provide little in terms of long term distance and maneuverability; however it does provide ready access to the boundary between Forest and private property. As such it would provide and should be maintained to provide access for invasive species evaluation; the effects of adjacent habitation on TES species and their extirpation, effects of water withdrawals etc. Let’s leave the road in place for long term studies.”

Response: Part of the Roads Analysis is to determine which roads are needed for long-term vegetation management. Evaluating both FR 2283 and FR 2283a, it was determined that only FR 2283 is necessary to access the entire 140 acre parcel. Though FR 2283a is proposed for decommissioning it will continue to be used by foot travel to access the Forest Service boundary as well as for monitoring. We have no plans to destroy the road, rather it will revert back to natural vegetation.

10. Comment: “FR 104 is already classified; I cannot support the change in status...it would be far wiser to maintain this road for the purposes of evaluation and potential stream improvements in Higgins Brook.”

Response: The majority of FR 104 will remain as classified, we are just proposing to remove the last 0.1 miles which appear on the roads database. Again, part of the Roads Analysis is to maintain an accurate database and verify that roads in the database correspond to what is actually on the ground.

11 Comment: “Why remove the classification “unclassified roads”? I do not understand the reasoning behind this proposal.”

Response: Unclassified roads are roads on the National Forest System lands that are not managed as part of the forest transportation system, such as abandoned travel ways and unplanned roads. Currently, these roads are somewhat overlooked since they have no assigned road data such as maintenance and use levels. By reclassifying these roads to Forest roads, data will be assigned to meet their long term road management objectives and they can be monitored more closely since they are on the permanent roads database.

8. Watershed

1. Comment: “I completely agree with the watershed improvement. I believe it is a must to do – especially skid trails in a clearcut on a grade need to be channeled toward a brook or man made drainage.”

Response: Thank you for your comment.

2. Comment: “ I appreciate the discussion that ensued regarding hydrology on the project area and was satisfied to see that a number of changes were made to unit boundaries to further protect water resources. Olivia’s expertise was pivotal in helping reshape sale units to avoid potential conflicts to water by harvesting activity.”

Response: Thank you for your comment.

- 3. Comment:** “The need to restore riparian conditions seems to indicate that in the past, uncut buffers have been inadequate. Significant intermittent and ephemeral streams may need uncut buffers.”

Response: There are several on-going stream restoration projects on the forest that are adding woody material into stream channels to improve riparian habitats. It is true that historic logging practices may have caused a lack of woody material in riparian zones as discussed in the Riparian and Aquatic Section (Section 3.8). Protection measures to intermittent and ephemeral streams during harvesting activities are determined on a site-by-site basis (USDA Forest Service, 2005a, pg. 2-25). Currently we are leaving an average of 70 basal area within 100 feet of the intermittent stream channel to provide shade and woody material recruitment into streams. Also trees growing within the stream bank are retained to maintain bank stability. According to research within hardwood forests, 80 % of the wood inputted into stream channels occurs within 30 feet of the stream (McDade, M.H., F.J. Swanson, W.A. McKee, J.F. Franklin, and J. Van Sickle. 1990).

- 4. Comment:** “A separate issue is possible drinking water pollution: most of residents living along east shore of the North Pond uses surface water coming from the Compartment 6 logging areas. An extensive logging operation will have an impact in this matter.”

Response: A documented spring located in the area where harvest activities are proposed will have a no harvest zone of 100 feet to protect. Perennial streams used as water sources will have the prescribed riparian zones as outlined in the Forest Plan (USDA Forest Service, 2005a). In addition, associated pipelines or other improvements related to the water uses would be protected (no cut zones) during project activities.

- 5. Comment:** “Concerning the proposed tree felling and water barring of seriously damaged stream-beds, I urge you to consider the trade-off between the loss of the canopy cover and root systems of the felled trees (up to 24" in diameter) and the benefits derived from slowing down the flow rate. Often two wrongs don't make a right. Water bars would work wonders in time.”

Response: After harvesting activity in stand 1/31, where possible, waterbars would be installed in old skid trails through the use of machinery which would lessen the amount of sediment added to stream channels. Tree recruitment would occur within 75 feet of the channel at site specific locations and a continuous forest canopy would be maintained. Trees that are stabilizing the stream channel or located within unstable area such as slumps would be retained. Most of the trees available within the 75' zone average 12-14”.

- 6. Comment:** “I also don't understand having a silvicultural prescription of “Clearcut” for Stand 18b since you state in the Scoping Report, pg 5, that there are already issues with water run-off in existing skid roads...isn't doing a clearcut going to make the problem worse.”

Response: Your concerns were echoed by the forest hydrologist and Alternative 3 modified the stand prescription to group selection.

7. Comment: “I can not support the addition of wood or vegetation back into streams that do not naturally support such deposition...if those streams were able to support and maintain debris residues they would already do so. If stream hydraulics and velocity studies are accurate, these streams have too great a flow volume accompanied by seasonal velocities that remove debris. Artificial additions will not be permanent and will be rapidly removed by the very hydraulic forces they were designed to impede...There is nothing to be gained by spending valuable time and ranger based resources on this objective. I think this objective should be dropped from the Androscoggin Ranger District’s proposal”

8. Comment: “I support the re-routing of water sources back to source streams but cannot support harvest for the sole purpose of re-channeling water off of old skid trails. If the skid trails are to be re-used and this activity can be combined with other harvest and silvicultural treatments, then it makes sense to accomplish this objective.”

Response to 7 and 8: During field reconnaissance of the project area, two areas were identified (a stream reach and a complex of old skid trails) where watershed restoration work would greatly improve their hydrological conditions. Since we are in these areas to silviculturally treat stands, it is an opportune time to improve conditions by dissipating erosive water energy flowing down skid trails and adding wood material to improve aquatic habitat. (Water Quality Section (Section 3.72). Because the skid trails were not properly closed (ie. waterbars), several have turned into intermittent channels due to constant water flow. Once treated with woody material and waterbars, these skid trails will not likely be used in the future.

These streams do support woody material, but due historic logging practices woody material in the channel was removed and tree that would served as future wood recruitment were harvested. Thus high energy flows is not the cause of lack of woody material. The result of adding woody material would allow the stream to regain properly functioning conditions.

9. Comment: “It seems as if the amount of wood planned 200-500 pieces per mile is excessive and would sharply limit any possible use for mountain bicycle recreation and would seriously impede three season foot traffic.”

Response: The count of 200-500 piece of wood per mile may seem excessive, but looking at undisturbed streams on the White Mountain, wood counts approached 300 pieces per mile (Underwood et al 1998). The amount of wood to be added to stream channels will vary depending on site specific conditions. Wood would be either grouped together or placed individually at site specific areas to address site specific problems. For this project, wood would be added to two different watersheds to restore habitat and improve water flow patterns. The first watershed project area is within stands 1/30 and 1/31. Recreational use in this area is mostly by hunters and locals taking a walk in the woods. There is no evidence of mountain bike use in the area. FR 208 and FR 2370 will not be impacted by the watershed project and can continue to be used by recreationists. The project site is not accessible by roads, hiking trails travel corridors or incidental trails (which mountain bikers are authorized to use) and thus the impact to mountain bikers and hikers would be negligible.

The second location is the lower reaches of an unnamed stream that flows into Rocky Pond. Again, people who use FR 460B (mostly hikers and hunters) will not be affected by the stream restoration project since the project is approximately 600 feet from the roadway and there is no road or trail access to the project site.

The purpose of putting wood into these streams is to resolve resource issues such as erosion and bank stability which may (though not in this project) compromise mountain bike opportunities. Both these areas are not part of a mountain bike trail nor are they maintained for mountain biking.

10. Comment: “I would like to see the old skid roads maintained in a less demanding format; waterbars where absolutely necessary, old culverts where still necessary and only the occasional log length to slow water and ice sheeting. I think that understory brush and trees less than 12 inches in diameter would be more sufficient; tree larger than that have a harvest value that should not be wasted on road surfaces but 16-24” is too large for mere surface stabilization.”

Response: After a sale is closed, waterbars are installed on all haul and skid roads and site specific locations on skid trails. All culverts are removed from temporary roadbeds, unless there is a need to access a permanent wildlife opening. Waterbars along with woody material would be placed in site specific locations to mimic the forest floor and slow down water flows. Larger trees (12-16”) are comparable in size to a waterbar and would tend to remain in place better than smaller trees since anchors are not used. Depending on the specific site conditions, different size trees may be required to accomplish resource protection objectives.

The average diameter of trees available to place into stream channels is 12-16 inches. There are very few trees within stand 1/31 larger than 16 inches.

9. Soils

1. Comment: “Whole tree harvesting should not be allowed. It is certain to remove more nutrients and organic matter than bole only harvest. To comply with Vegetation Management (Plan 2-29), it must be demonstrated for each stand that there is sufficient nutrient concentration and also nutrient replenishment capacity.”

Response: Whole tree harvesting will not be allowed on this sale.

2. Comment: “Consider how to mitigate damage by compaction, and scarring and root damage to the residual stand.”

Response: To reduce soil damage resulting from ground compaction, stands that are wet would be harvested during frozen ground conditions; or if proposed for summer/fall harvested, wet areas would be avoided during timber marking. Also slash would be laid on skid trails to reduce compaction. The use of preplanned and existing skid trails would direct where logging machines can go and limit ground disturbance. Refer to the Soil Section (Section 3.5) of the EA for the effects and uses of Best Management Practices to minimize soil impacts from logging.

10. Air Quality

1. Comment: “prescribed burning is especially bad, since it pollutes the air. this burning releases fine particulate matter and mercury in to the air. such fine particulate matter cause lung cancer, heart attacks, strokes, pneumonia, allergies and asthma.”

Response: See the Air Resource Section (Section 3.13) in regard to effects from prescribed burning of permanent wildlife openings. The public is notified prior to any prescribed burning.

11. Maps

1. Comment: “I’ve only got one suggestion to all scoping maps. The maps are great but it would help if at least one route # of a nearby road was marked on the map.”

Response: Thank you for your suggestion to improve the maps in the scoping document. The route numbers for all the roads in the Analysis Area are listed on the EA maps. We apologize for any confusion.

12. General Comments

1. Comment: “I continue to be in support of the sustainable yield timber harvest and wildlife habitat improvement on the White Mountain National Forest as prescribed in the 2005 Forest Plan. We should strive to achieve the plans annual target figures for both of these categories and not fall short as occurred in prior years under the 1986 Plan.”

Response: Thank you for your support. Our goal is to meet our Habitat Management Unit objectives while being responsive individual concerns and issues as well as protecting all resource within the area.

2. Comment: “I view the planned erosion control and South Pond Septic Maintenance as ordinary Forest stewardship and maintenance work that we taxpayers retain the Forest Service to perform as a matter of regular routine. It should not be necessary to run these two elements of the project through the analytic process.”

Response: The reasons for including these projects in the Environmental Analysis is to (1) to inform a diverse public audience of projects proposed for the area and provide them with an opportunity to comment and; (2) have resource specialist analyzed the effects of all projects so unanticipated issues do not arise during project implementation.

3. Comment: “To be consistent with Plan definitions (Plan Glossary, pp 9 and 23), the term “Early successional habitat” in Table 2 should be changed to “Regeneration habitat.” (Pierce Beij)

Response: We agree that the term “early successional habitat” listed in Table 2 of the scoping document should be changed to “regeneration forest habitat” and have made the change in the EA document.

4. Comment: “logging promotes global warming, logging promotes heat islands, logging causes terrible erosion. each tree holds 400 gallons of water and when cut down that water is released.”

Response: When trees are harvested, the carbon within the tree is not released to the environment or atmosphere until the products associated with the tree are either burned or decay. If the tree is used for lumber, the carbon is stored until the wood eventually rots. If parts of the tree are used for paper, the carbon is stored until the paper is no longer recycled. If parts of the tree are burned for fuel, the carbon is released to the atmosphere. In the end, these outcomes are no different than what happens to a tree that is not cut and eventually dies in the forest. Either way, the carbon is released to the environment.

The key is what happens to the land where the tree is cut. As long as the land still supports tree growth instead of another use such as agriculture or development, the new forest will ultimately use the carbon that was released by harvested trees or trees that die naturally.

In actuality, a young forest takes in and stores more carbon than it releases because there is less death and decay of woody material. Once a forest reaches maturity, it reaches equilibrium between the amount of carbon it uses in photosynthesis and the amount that is released by plants, animals and microbes.

As for water yields in regard to harvesting, research has shown that removal of vegetation through timber harvest can alter evapotranspiration rates. These altered evapotranspiration rates result in changes to streamflow depending on the extent of change to the vegetation (Hornbeck, et al 1997). Research at Hubbard Brook indicates that as reductions in basal area approach 25%, a measurable response in annual water yield, may be seen (Hornbeck et al., 1993). For this project, none of the subwatersheds will have more than 25% basal area removal so no measurable increases in water yield should occur.

Early logging practices cause did cause erosion, but with the implementation of Best Management Practices, erosion concerns from a vegetation management projects are almost negligible. See the Soil analysis of the EA (Section 3.5) for erosion effects.

5. Comment: “My friends laughed when I asked them to comment. They feel it is a done deal so there’s no point to comment.”

Response: The objective of scoping is to solicit public and resource specialists opinions to better design management projects. Comments are most valuable when they are specific to the proposed actions. Based on site specific comments, we often modify our original proposal to address resource concerns and issues. All comments are very closely read and discussed by the interdisciplinary team and are either addressed through “Response to Comments” or in the action alternatives. The scoping letter was mailed to over 250 people and is posted on the internet so to reach a wide audience of both local and non-local groups and citizens. For this project, after a public field tour and receiving written comments, a new alternative was developed and design features were created to address resource concerns. We rely on public comments and support to make good resource decisions and accomplish the goals of the White Mountain National Forest.

APPENDIX C – Monitoring Plan for Mitigation Measures

Mitigations to Maintain Water Quality on Duke and North Pond Brook

1. Water quality within a watershed would not be expected to change if a reduction in basal area is 15% or less and where it is exceeded (15% to 25%), use of a larger no cut riparian zones would be implemented.

Objective: To minimize changes to water chemistry, larger no harvest zones along Duke Brook and North Pond Brook will mitigate water quality changes by increasing flowpaths through undisturbed forest soils and reducing the potential for water quality changes in the stream to occur.

Methods: For Alternative 2, a 100 foot no harvest zone will be implemented within the Duke Brook watershed in stands 1/30, 1/31 and 1/32. For Alternatives 2 and 3, a 100 foot no cut zone would be implemented within the North Pond Brook watershed in stands 1/63 and 6/4

Implementation Monitoring: Timber Sale Markers will assure that no trees are marked for harvested within the designated no cut zones along Duke and North Pond Brooks. Post marking evaluations by district personnel will be entered in project implementation records.

2. Water quality of a spring within stand 6/22 would be maintained by applying a 100 foot no harvest buffer around it. Studies (Welsch, 1992) have shown that this size buffer would provide sufficient filtering of overland flow and would protect the hydrologic functions of the spring.

Objective: To minimize effects to water quality, a no harvest area around the spring would protect it from soil disturbance and maintain water temperature.

Methods: Apply a 100 foot no harvest zone around a spring in stand 6/22.

Implementation Monitoring: Timber Sale Markers will assure that no trees are marked for harvested within the designated no cut zone adjacent the spring. Post marking evaluations by district personnel will be entered in project implementation records.

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APPENDIX E – Glossary

Basal Area (BA) - The area of the cross section of a tree a 4.5 feet above the ground, generally expressed as total Basal Area per acre. Under uneven-aged management, usually 30 to 40 percent of the basal area is removed. Under even-aged management, 30 to 100 percent of the basal area is removed depending upon the needed silvicultural treatment.

Ecological Land Type (ELT) - An area of land 100s to low 1,000s of acres in size with a well known succession of forest species on unique soil materials. Ecological Land Type classification is based on geomorphic history, nature of soil substrata, and potential natural vegetation.

Even-aged Management - A timber management system that results in the creation of stands where trees of essentially the same age grow together. Harvest methods producing even-aged stands are clearcut, thinning shelterwood, and seed tree.

Clearcutting - removal in a single harvest of the entire stand to prepare the area for rapid seed germination and growth of a new even-aged stand of shade intolerant trees. Shade intolerant trees are tree species that need full or near full sunlight to regenerate and grow.

Salvage Cut - Trees are harvested after some natural disturbance in order to salvage potential wood products before the trees become less valuable or unmerchantable. Depending on the severity of damage, the harvest may consist of harvest of individual trees or of groups of trees. In severe cases, all trees in a stand may be removed to begin a new stand. Disturbances include but are not limited to wind, ice storms, fire, insect infestations and disease.

Seed Tree – A harvest that leaves five or so dominant trees per acre as a seed source for the regenerating stand. A seed tree harvest appears similar to current clearcut units in that both prescriptions leave individual trees standing per acre within a unit to meet silvicultural or other resource objectives.

Shelterwood - This harvest method provides a source of seed and shade protection for regeneration. The original stand is removed down to a prescribed basal area, in two or more successive harvests. The first harvest is ordinarily the seed cutting (sometimes called the regeneration cut). A second harvest often follows a number of years later once regeneration is well established, and is referred to as a final harvest or shelterwood removal harvest. An even-aged stand results.

Thinning - Thinning operations where the harvested material can be sold on the market as opposed to pre-commercial thinning.

Overstory Removal – Mature trees are removed to release regeneration once it has become established, for example in a shelterwood final harvest.

Forest Product - Sawtimber, millwood, pulpwood, and chipwood are the raw products utilized from a tree in a minimum piece length of 8 feet.

Sawtimber minimum piece specification requires a minimum diameter outside bark of 9.0 inches for softwood and 11.0 inches for hardwood and 40 percent sound wood.

Pulpwood minimum piece specification requires a minimum diameter outside bark of 5.0 inches and 50 percent sound and reasonably straight.

Habitat Management Unit (HMU) - A large unit of land with boundaries commensurate with compartment boundaries, and which includes a mix of habitat types. At least one of these types must be a pond or stream with wetland potential.

Habitat Type - A small unit of land from a few to over 100 acres lying within a given climatic mineralogical zone and supporting a distinct successional sequence of vegetation growing on a unique type of soil material.

Indicator Species - A plant or animal species adapted to a particular kind of environment. The arrangement of habitats (by tree species and age group) reflects requirements for selected wildlife species. They are designated a management indicator species. Their presence is sufficient indication that specific habitat conditions are also present. These species represent groups of other species with similar habitat requirements.

Interdisciplinary (ID) Team - A group of individuals with skills for management of different resources. Team member interaction provides necessary insight to all stages of the process.

Land Capability – Inclination of an area to grow a particular broad community due to soil, climate and geology, if management were not applied. In many places on the Forest, the current community is different from land capability for the same area because past management altered the vegetation on the site. Given enough time without additional management, the vegetation will revert to the community indicated by land capability.

Neotropical Migratory Birds (NTMB): Birds that spend summer in the northern portions of North America and winter in the tropics and neotropics of North and Central America.

Projected Existing Condition of Habitat Management Unit - The existing acres of the community type by age class would change over time. The expected changes are projected to a future year that becomes the existing condition for that community type by age class.

Riparian Management Zone - A term used by the Forest Service which includes stream channels, lakes, adjacent riparian ecosystems, flood plains, and wetlands.

Road restoration - rebuilding a road to the standard originally constructed. For example, replacing temporary drainage structures, temporary removal of waterbars or other drainage features to allow for traffic, clearing vegetation that obstructs visibility and smoothing and grading road surfaces.

Road construction – building new road.

Temporary road – a low standard road constructed for a single entry with a minimum of disturbance and that is waterbarred and closed following use.

Scenery Management System - Refers to the acceptable degree of alteration of the characteristic landscape:

Very High (Unaltered) – the valued landscape character “is intact” with only minute if any deviations.

High (Appears Unaltered) – the valued landscape character “appears intact”. Deviations may be present, but must repeat the form, line, color, texture and pattern common to the landscape character so completely and at such scale that they are not evident.

Moderate (Slightly Altered) – the valued landscape character “appears slightly altered”. Noticeable deviations must remain visually subordinate to the landscape character being viewed.

Low (Moderately Altered) – the valued landscape character “appears moderately altered”. Deviations begin to dominate the valued landscape character being viewed, but they borrow valued attributes such as size, shape, edge effect and pattern of natural openings, vegetation type changes from outside the landscape being viewed.

Very Low (Heavily Altered) – the valued landscape character “appears heavily altered”. Deviations may strongly dominate the valued landscape character. Deviations must be shaped and blended with the natural terrain so that elements such as unnatural edges, roads, landing and structures do not dominate the composition.

Seep – Woodland seeps are small areas, usually less than a ¼ acre, on headwall slopes where groundwater flows to the surface and saturates the soil for some or all of the growing season. Drainage from these areas may create small streams or may return underground. (Flatebo, et al. 1999)

Silviculture - A combination of actions whereby Forests are tended, harvested, and replaced.

Stand (Forest) - A community of naturally or artificially established trees of any age sufficiently uniform in composition, constitution, age, spatial arrangement, or condition to be distinguishable from adjacent communities, thereby forming a silvicultural or management entity. A Hardwood Stand is defined as a stand which at least 75 percent of the overstory and understory are hardwood trees. A Softwood Stand is defined as a stand which at least 65 percent of the overstory and understory is softwood (conifer) trees. A Mixed wood Stand is defined as a stand with hardwoods trees mixed with softwoods trees. The 25 to 65 percent of this stand consists of red spruce, balsam fir, and eastern hemlock.

Streams - Non-perennial and perennial are two types of stream that the quantity of water can be measured.

Intermittent Streams - Streams with a defined channel that the quantity of flowing water can be measured except during the dry summer months.

Perennial Streams - Streams with a defined channel that the quantity of flowing water can be measured year round.

Uneven-aged management - The application of a combination of actions needed to maintain continuous high-forest cover, recurring regeneration of desirable species, and the orderly growth and development of trees through a range of diameter or age classes to provide a sustained yield of forest products. Harvesting is usually regulated by specifying the number or proportion of trees of particular sizes to retain within each area, thereby maintaining a planned distribution of size classes. Harvest methods that develop and maintain uneven-aged stands are individual selection, improvement, and group selection, and salvage.

Individual Tree Selection - A method where individual trees are selected and harvested in a stand while maintaining a prescribed number of trees in each diameter class ("Q" Factor).

Improvement Cut - An interim step to developing an uneven-aged stand structure by removing lower quality stems, leaving a residual basal area of about 65-70 sq.ft. (hardwood) or 80 to 100 sq.ft. (mixedwood) per acre.

Group Selection - A harvest method that describes the silvicultural system in which trees are removed periodically in small groups, resulting in openings that do not exceed an acre or two in size. This leads to the formation of an uneven-aged stand, in the form of a mosaic of age-class groups in the same forest stand.

Volume - The measure of quantity forest products (sawtimber, pulpwood, and chipwood).

Board Foot - A measure of lumber volume for sawtimber. The cubic equivalent of a piece of lumber 12 inches wide, 12 inches long and 1 inch thick. MBF is the measure for 1000 board feet.

Cord - A measure of volume for pulpwood and millwood. One cord equals one stack of wood measuring 4 by 4 by 8 feet or the equivalent of 500 board feet.