



United States  
Department of  
Agriculture

Forest  
Service

May 2006

# BATCHELDER BROOK VEGETATION MANAGEMENT PROJECT

Town of Warren  
Grafton County, New Hampshire

## 30 Day Comment Report



Prepared By  
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## **Batchelder Brook Vegetation Management Project Environmental Analysis Summary**

The Pemigewasset Ranger District of the White Mountain National Forest is proposing the following management activities for the Batchelder Brook Project (Alternative 2: Proposed Action):

All acres, miles, and volumes in this document are approximate.

- Silvicultural treatments on 737 acres resulting in 3.0 million board feet of timber on National Forest land within the Upper Baker Habitat Management Unit (HMU), using both even-aged and uneven-aged management;
- Conduct non-commercial timber stand improvement on 138 acres;
- Conduct non-native invasive species eradication using mechanical treatment, hand pulling, or treatment with registered herbicide on ¼ acre;
- Enhance 1 acre of the existing Carr Mountain Trailhead parking area;
- Conduct two acres of wildlife habitat improvement for grouse and beaver in a portion of one stand;
- Use prescribed burning or mechanical site preparation on 54 acres to promote regeneration of oak in three stands, white pine and oak in one stand, and aspen in another stand;
- Construct 1.0 mile of a snowmobile by-pass trail for use during timber harvesting activities; and
- Perform maintenance on 3.0 miles of two existing Forest Service roads.

This Proposed Action is intended to implement the 2005 White Mountain National Forest Land and Resource Management Plan (Forest Plan) and the analysis in this Public Comment Report is tiered to the Final Environmental Impact Statement and Record of Decision (ROD) for the Forest Plan (USDA-Forest Service, 2005b). This project level analysis is made within the established framework of the Forest Plan.

The Forest Plan is a strategic, programmatic document that does not make project-level decisions. All Forest management, including project plans and decisions, outstanding and future contracts, agreements, and permits, must comply with the Forest Plan.

Site-level project planning associated with the proposed Batchelder Brook project, started with evaluation of how the site could contribute toward meeting the Forest-wide goals and objectives and the purpose and desired condition of the 2.1 management area within which the project is proposed. This site-level project environmental analysis tiers to the Final Environmental Impact Statement (FEIS) for the Forest Plan. This means that the project's environmental analysis document incorporates, by reference, the information in the FEIS without having to repeat it.

The 3,700 acre Project Area encompasses 737 acres of National Forest lands proposed for timber harvest and the road system used to access the timber. It is located in the Town of Warren, Grafton County, New Hampshire, on the Pemigewasset Ranger District of the White Mountain National Forest.

An Interdisciplinary Team of Forest Service resource specialists developed the proposal based an analysis of existing habitat conditions. Analyzing the land capability, current conditions and landscape needs, the Forest Service developed habitat management objectives for the Upper Baker HMU. Comparing the existing conditions in the Compartments to the habitat management objectives of the HMU, the IDT identified a need to manage individual stands to move the Project Area towards the

Desired Future Condition (DFC) as defined by HMU objectives. This includes establishing regenerating stands of northern hardwood and aspen-birch and perpetuating stands of mixedwood, pine and spruce-fir.

The Interdisciplinary Team has also considered a No Action alternative and action alternatives 3 and 4 that are responsive to issues identified during scoping. Alternative 3 considers no timber harvesting activities in the South Carr Mountain Inventoried Roadless Area. Alternative 4 does not propose any clearcuts or overstory removal activities. The No Action Alternative and the three Action Alternatives are summarized in Table 1 below, and the Action Alternatives are described in detail in Chapter 2. An analysis of effects for each alternative is included in Chapter 3.

The Forest Service uses the most current and complete data available. GIS data and product accuracy may vary. They may be: developed from sources of differing accuracy, accurate only at certain scales, based on modeling or interpretation, incomplete while being created or revised, etc. Using GIS products for purposes other than those for which they were created may yield inaccurate or misleading results. The Forest Service reserves the right to correct, update, modify, or replace GIS products without notification. Note also, that, generally, numbers used have been rounded, and this may yield some inconsistencies.

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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 30-Day Comment Report 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 Public Comment Report discloses the direct, indirect, and cumulative environmental impacts that would result from the Proposed Action or its alternatives. This document has five parts:

- 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 provides a summary table displaying environmental effects (management indicators).
- 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. Effects are described and analyzed in a format similar to the FEIS.
- Agencies and Persons Contacted: This section provides a list of preparers, agencies and persons consulted during the environmental analysis for the Batchelder Brook project proposal.
- Appendices: The appendices provide more detailed information useful to support the analyses presented in this 30 Day Comment Report; projects maps, response to comments, design features and mitigation measures, literature cited, glossary, and how to comment.

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

This Public Comment Report is not the final environmental analysis for this project. It includes information for each chapter and is substantially complete for the Proposed Action and the alternatives considered. The White Mountain National Forest sought public input on the Proposed Action for the Batchelder Brook Vegetation Management Project in an October 2005 Scoping Report and a February 2006 Scoping report that was developed under the 2005 White Mountain National Forest Land and Resource Management Plan. (USDA-Forest Service, 2005) This Public Comment Report is an analysis of environmental effects that are consistent with the newly released 2005 LRMP. The

environmental analysis will be completed upon receipt of public input, and will be used to inform the decision regarding this project by the Responsible Official.

This 30-Day Comment Report has sufficient analysis of environmental effects of the Proposed Action and alternatives (including No Action) to allow for site-specific comments. By submitting timely comments during this 30-day period, you will have standing to appeal the decision of the Responsible Official. Appendix G contains specific instructions on how to submit your comments.

## **1.1 Tiering to the 2005 Final Environmental Impact Statement for the White Mountain National Forest Land and Resource Management Plan (FEIS)**

The analysis for this project is tiered to the Final Environmental Impact Statement and Record of Decision for the 2005 White Mountain National Forest Land and Resource Management Plan (USDA-Forest Service, 2005b, FEIS). Tiering is described in Forest Service Handbook (FSH) 1909.15 as a process of summarizing and incorporating by reference from other environmental documents of broader scope to eliminate repetitive discussions of the same issues and to focus on the actual issues ripe for decision. (USDA-Forest Service, 1992, FSH 1909.15, Chapter 42.1) The Handbook specifically notes that the EIS for a land and resource management plan is an example of a “broad” EIS prepared for a program or policy statement. (USDA-Forest Service, 1992, FSH 1909.15, Chapter 22.31).

The Land and Resource Management Plan (also called the Forest Plan) is the “principal tool for preserving, protecting and managing the resources that comprise the White Mountain National Forest, while at the same time making those resources available to the public for a variety of uses.” (USDA-Forest Service, 2005b, FEIS) The Forest Plan is a programmatic document that implements the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA), as amended by the National Forest Management Act of 1976 (NFMA). The Forest Plan implements NFMA by providing “for diversity of plant and animal communities based on the suitability and capability of the (White Mountain National Forest) in order to meet overall multiple-use objectives and within the multiple-use objectives of a land management plan.” (16 USC 1604(g)(3)(B)).

The Forest Plan sets management direction for the White Mountain National Forest through the establishment of short term (10-15 years) and long-range goals and objectives. It prescribes the standards, practices, and the approximate timing and vicinity of potential actions that are necessary to achieve these goals and objectives. The Forest Plan prescribes monitoring and evaluation needs to ensure that direction is carried out, measures quality and quantity of actual operations against predicted outputs and effects, and forms the basis for implementing revisions.

Of the 796,700 acres comprising the White Mountain National Forest, approximately 358,000 acres are allocated to General Forest Management (Management Area 2.1) in the 2005 LRMP. However, only a portion of the MA 2.1 lands are considered “suitable lands” where vegetative management is permitted through the use of commercial timber harvesting. Lands in MA 2.1 that are not “suitable” for timber harvest may include wetlands, reserve areas, riparian management zones, steep terrain, or areas that are otherwise inaccessible. These lands, which represent a variety of habitat types, will generally grow naturally into old forest habitat. Suitable lands are typically in lower elevations (below 2,500 feet) where timber management is used to maintain a variety of wildlife habitat conditions and

generates timber products. The acres proposed for timber harvest in the Batchelder Brook Vegetation Management Project are part of this “suitable” land base.

In addition to allocating lands, the Forest Plan provides a strategy to manage well-distributed and suitable wildlife habitat for maintaining “viable populations of existing native and desired non-native vertebrate species” (36 CFR 219.6). The Forest Plan has established blocks of National Forest land called “Habitat Management Units” (HMUs) in which “habitat composition and age class objectives (are) established to help ensure that habitats are well-distributed across the forest and provide a framework for analyzing project impacts to wildlife habitat at a local scale. Blocks vary in size and contain a variety of habitat types and land in a mix of Management Areas.

HMUs were first defined in the 1986 LRMP, and have been the cornerstone of vegetation management on the White Mountain National Forest for the past 19 years. The 2005 LRMP has made some key changes in both the size of HMUs and the objectives by which HMUs are managed.

- **The 1986 LRMP** established each HMU on the basis that it would encompass at least 4,000 acres of National Forest lands designated for “General Forest Management” (Management Area 2.1 and 3.1 lands on which vegetation is managed on a sustained yield basis).
- **The 2005 LRMP** has expanded HMU boundaries to larger, more ecologically-based units, considering Ecological Land Types, Land Type Associations, watersheds, topography or other key landscape and/or geographical features. The expanded HMUs range in size from 6,000 to 49,000 National Forest acres, and may have varying amounts of lands designated for General Forest Management.

Habitat management objectives are developed for each individual HMU, and these objectives must be “based on land capability, current condition in the HMU, and landscape needs to meet management area objectives”. (USDA-Forest Service, 2005a, LRMP, p 2-33) These habitat management objectives are developed for an individual HMU prior to implementation of vegetative management in that HMU.

The Desired Future Condition (DFC) of an HMU is based on the capability of the land specific to the HMU, and is intended to contribute to a diversity of habitats across the National Forest, including various forest types, age classes and non-forested habitats (USDA-Forest Service, 2005a, LRMP, p 1-20). Capability is determined by the Ecological Land Types within the HMU landbase. An Ecological Land Type (ELT) can include an area of a few hundred to a few thousand acres with a well-known succession of forest species on unique soil materials. ELT classification is based on geomorphic history, nature of soil substrata, and potential natural vegetation.

Maintaining a diversity of habitats is essential to meeting the life cycle needs of wildlife species inhabiting the National Forest (DeGraaf et al. 1992, DeGraaf and Yamasaki 2001). Examples of habitat types include “northern hardwood”, “spruce-fir” and “aspen-paper birch”. Age classes are based on stages of natural forest succession, ranging from “regeneration” (0-9 years) to “old” (beyond the age when growth begins to decline, typically the traditional rotation age for each forest type). Wildlife species that require or otherwise use “early-successional” openings will benefit from the availability of forest openings in the regeneration phase of growth, as well as small stands that are maintained as permanent wildlife openings. The same correlation is true of mature and old stands for those species that require or otherwise use “late-successional” vegetation. Early-successional vegetation is characterized most often by dense, ground level plant cover in areas open to direct

sunlight. Late-successional vegetation is more typically characterized by large, mature woody vegetation with a closed canopy (foliage) that blocks sunlight from reaching the ground.

## 1.2 Background

The **Project Area** consists of approximately 3,700 acres of National Forest System lands, located within the Town of Warren, in Grafton County, New Hampshire, managed by the Pemigewasset Ranger District of the White Mountain National Forest (Appendix A, Map 1). It has a history of agricultural use dating back to the early 1800's, and since the early 1900's has naturally reverted back to forest land. Since the 1940's it has been actively managed for wildlife habitat and forest products. The most recent timber harvest in the Project Area were the Clifford Brook and Batchelder Brook Timber sales in the 1990's. Aside from timber harvest, the area offers a wide variety of recreation activities, including hiking, scenic and fall foliage viewing, snowmobiling, mountain biking, snowshoeing, wildlife watching, hunting, fishing, and cutting Christmas trees and firewood.

The **Analysis area** boundaries for this project are commensurate with the area of influence for each resource. This includes Grafton County and portions thereof, the Upper Baker HMU, all management area 2.1 lands within the Upper Baker HMU, the Project Area, and the Batchelder Brook, Patch Brook, and unnamed tributary watersheds within the Project Area.

## 1.3 Purpose of Action

The Purpose of this project is to accomplish resource objectives to meet the overall management direction for the White Mountain National Forest, as established in the Forest Plan.

The Project Area is within land designated as Management Area (MA) 2.1, General Forest Management. The Forest Plan lists the Purpose for MA 2.1 as four-fold (USDA-Forest Service, 2005a, LRMP, p 3-3):

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. Provide opportunities for a full mix of recreational opportunities from low-use hiking trails to highly developed campgrounds, and meet recreation objectives varying from urban to semi-primitive motorized in different locations and varying by season or presence of management activities.
4. Manage high-use or highly developed recreation areas to acceptable social and ecological standards; manage to retain some low-use and less developed areas.

Management of vegetation within the Project Area is intended to meet Forest-wide goals and objectives for habitat, including (USDA-Forest Service, 2005a, LRMP, p 1-20):

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, and oak-pine, 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.

## 1.4 Need for the Action

The Forest Plan describes the Desired Future Condition (DFC) for lands allocated to MA 2.1 as “a mix of deciduous and coniferous forest stands of various types. The stands will vary in size, shape, height, and tree species. Both even-aged and uneven-aged harvest techniques will be used.” To achieve this condition, “silvicultural practices will be used to meet timber, ecological, visual, and recreation objectives. Most stands will provide high quality sawtimber. Suitable habitat will be provided for a variety of wildlife and plant species.” Further, “habitat at the landscape level will include a sustainable mix of young and mature forest. Permanent and temporary openings will occur across the landscape in shapes and sizes that are consistent with scenic objectives in an area. All communities that would naturally be present will be managed so that they are maintained or enhanced” (USDA-Forest Service, 2005a, LRMP, p 3-3).

The Forest Plan establishes the HMU as the base level for identifying existing conditions and land capability, and developing habitat composition and age class objectives that contribute to the DFC. A Need for Action is determined when there is a difference between the existing condition and the desired condition of an HMU. Based on this difference, stands within compartments are identified for silvicultural treatment to achieve the habitat and age class objectives that describe the DFC. An Interdisciplinary Team (IDT) of Forest Service resource specialists chose stands for silvicultural treatment by comparing existing habitat conditions to desired conditions as outlined in the Forest Plan and as determined by developing HMU-specific habitat management objectives. This analysis indicated there is a Need for a more diverse age class and habitat composition (Forest Plan, VII-B-12/13), and for improved stand conditions to insure optimum tree growth and quality of wood products.

The IDT considered many factors when monitoring forest conditions. Forest vegetative conditions change over time as trees mature, and thereby present opportunities in some areas to enhance overall conditions within an HMU. The interdisciplinary team evaluated current conditions in the Upper Baker HMU during numerous on-site visits. Field observations included evidence of well stocked softwood, mixedwood and hardwood stands, with average amounts of disease and mortality where stand treatment would enhance forest diversity. Inventory plot data was collected including tree ages, species composition, tree condition, crown closure, stand density, understory vegetation data, and other components. Inventory data is used to help determine silvicultural prescriptions and to predict stand development following harvest. Other observations and analysis include effects of past management and ongoing recreation uses, evidence of wildlife, surveys for sensitive plants and animals and for invasive species, surveys for Heritage Resources; condition of roads, trails and streams; soil types and land stability; and to evaluate scenery.

The Forest Plan has established Forest-wide composition and age class objectives by habitat type for Management Area 2.1 lands (USDA-Forest Service, 2005a, LRMP, pp 1-20 to 1-22):

- These objectives assume that all MA 2.1 lands that are in the unsuitable land base, regardless of current age class, will be unmanaged and will grow over time into the old age class, forming the old forest habitat within MA 2.1. The amount of unsuitable lands in MA 2.1 may vary widely among the HMUs, so the amount that each HMU contributes to the old age class will vary widely.
- These objectives also assume that within each HMU the percentage of regeneration and young age classes will mimic Forest-wide objectives, but the percentage of mature and old age class will depend on the amount of unsuitable lands in MA 2.1 within the HMU.

In accordance with the Forest Plan, the Forest Service must establish composition and age class objectives for an HMU prior to proposing a project within that HMU (USDA-Forest Service, 2005a, LRMP, p 2-33). By comparing these objectives (Desired Future Condition) of an HMU with the existing composition and age class distribution, the Forest Service can determine if a **Need for Change** within an HMUs MA 2.1 lands exists. Table 1 below provides a summary of this need for change.

<b>Table 1 Upper Baker HMU MA 2.1 Acres of Existing and Desired Habitat Composition</b>			
<b>Habitat Type</b>	<b>Existing Acres</b>	<b>Desired Future Condition Acres</b>	<b>Need (Acres)</b>
Northern hardwoods (regeneration)	137	204 to 341	+ 67 to 204
Mixedwood	1,077	885	- 192
Spruce/Fir	337	1,328	+ 991
Aspen-Birch	314	354	+ 40
Oak-Pine	113	177	+ 64
Hemlock	15	89	+ 74

Table 1 shows that to move towards the habitat and stand structure objectives of the Forest Plan within the analysis area, the following needs exist:

- Need to increase overall habitat types for spruce-fir, aspen-birch, oak-pine, and hemlock;
- Need to reduce overall habitat type for mixedwood; and
- Need to establish regenerating stands in northern hardwood.

Even-aged harvest methods can be used to convert some of the mature northern hardwood stands to a regenerating age class (0-9 years). Uneven-aged harvest (group selection and single tree selection) is used to remove hardwood overstory trees from a spruce/fir understory and thereby increase their softwood component.

There is a need to maintain recreation opportunities in the analysis area. Improved parking for the moderately used Carr Mountain Trail is needed. This improvement would enhance the recreation experience in the Project Area. There is also need to eradicate Japanese knotweed, a non-native invasive plant species from the Project Area. A connected action to construct approximately 1 mile of snowmobile by-pass is needed to reduce user conflicts on Forest Road 401 between timber harvest operations and snowmobiling.

## **1.5 Proposed Action**

The Pemigewasset Ranger District of the White Mountain National Forest proposes to manage forest vegetation to increase wildlife habitat diversity, forest stand health and vigor, and improve recreation opportunity within the Batchelder Brook Analysis area.

**Table 2: Activities Proposed for the Batchelder Brook Project Area**

<b>Activity</b>	<b>Stand Acres</b>	<b>Treatment Acres</b>
<b>VEGETATION MANAGEMENT:</b>		
<b>Even-Aged Management</b>		
Clearcutting	64	56
Shelterwood/Site Prep / Burn / Overstory Removal	71	55
Shelterwood/Site Prep / Overstory Removal	13	13
Thinning	14	14
<b>Uneven-Aged Management</b>		
Group Selection (groups range in size from 1/10 to 2 acres in size)	374	78
Single Tree Selection	164	138
Group Selection and Single Tree combined	60	12 and 48
<b>Total Even and Uneven-Aged Acres</b>	<b>760</b>	<b>414</b>
<b>Timber Stand Improvement (even and uneven-aged)</b>	129	129
<b>Japanese Knotweed - Non-native invasive species eradication (mechanical treatment, hand pulling, or treatment with registered herbicide)</b>	N/A	¼
<b>Wildlife</b>		
Wildlife Habitat Improvement (Grouse and Beaver) Regenerate patches and burn.	<b>10</b>	<b>4</b>
<b>ESTIMATED HARVEST VOLUME</b>		<b>3.7 MMBF</b>
<b>TRANSPORTATION</b>		
Road Maintenance (Forest Roads FR 401 and 479)		<b>3.0 Miles</b>
<b>Recreation</b>		
Mt. Carr Trailhead Improvement		<b>1 acre</b>
Snowmobile Trail By-pass (In use when logging activities occur in the project area)		<b>1.0 miles</b>

\* Million Board Feet

The Proposed Action is designed to fulfill the Purpose and Need for Action as described above and to achieve the desired vegetative conditions described in the Forest Plan. These goals include creating regeneration age habitat, facilitating softwood and oak development, and providing forest products on a sustained yield basis. Other proposed actions such as the South Carr Mountain Trailhead improvement, treatment of Japanese knotweed, creating wildlife openings, and timber stand improvement projects would enhance resources conditions within the Analysis area. The connected action of approximately 1 mile of snowmobile by-pass construction is needed to reduce user conflicts between timber harvest operations and snowmobiling. Table 2 displays the activities considered for the Proposed Action.

National Forest System Roads to be used include FR 401 and FR 479. These roads are currently closed to public motorized traffic and would remain closed during and following implementation of an action alternative if selected.

The following Proposed Action is designed to respond to the Purpose and Need for action by: (1) Providing high quality sawtimber and other forest products; (2) Promoting the desired vegetation and habitat conditions outlined in the Forest Plan; and (3) Providing opportunities for and manage a wide range of recreation of opportunities. A fourth and connected objective is to manage the transportation system in this area to meet the needs of the public.

#### FOREST AND HABITAT MANAGEMENT

- Improve timber quality and species composition in hardwood stands through approximately 15 acres of commercial thinning and 148 acres of single-tree selection treatments;
- Increase early successional habitat by creating approximately 114 acres of hardwood regeneration habitat in the Project Area through clearcutting and shelterwood treatments;
- Enhance softwood composition and improve wildlife habitat through approximately 107 acres of group and single-tree selection harvests;
- Eradicate Japanese knotweed through mechanical treatment, hand pulling, or the application of herbicide;
- Use nine existing landings, and construct one new landing; and
- Place 1 temporary skidder bridge over perennial streams to keep equipment and logs out of brooks.

#### TRANSPORTATION SYSTEM

- Road maintenance on approximately 3.0 miles of existing roads;
- Remove all temporary drainage structures and temporary bridges, treat needed areas for erosion (seeding and waterbars), and return previously closed roads to a closed intermittent status at the conclusion of this project.

#### WILDLIFE IMPROVEMENT

- Wildlife habitat improvement for grouse and beaver.

#### RECREATION MANAGEMENT

- Improve the South Carr Mountain Trailhead parking area.

#### NON-NATIVE INVASIVE SPECIES MANAGEMENT

- Eradicate Japanese knotweed through the use of mechanical, hand pulling, or herbicide treatment.

### **1.6 Connected Actions**

- Promote oak, pine, and aspen regeneration through the use of prescribed fire;
- To insure regeneration objectives are met, timber stand improvement on up to 138 acres may be implemented if needed; and
- Construct approximately 1 mile of a snowmobile by-pass trail to avoid dual use of Forest Road 401 between timber harvest operations and snowmobile use.

## **1.7 Decision to be Made**

The purpose for this 30 Day Comment Report is to provide the District Ranger, the Responsible Official, with sufficient information and analysis to make an informed decision about the Batchelder Brook Project given the Purpose and Need for Action. The District Ranger will consider public input to this 30 Day Comment Report 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 Batchelder Brook Project Area toward the 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 environmental impact to warrant the need for an environmental impact statement?

## **1.8 Public Involvement**

On October 21, 2005 an initial scoping letter soliciting comment on the Batchelder Brook Vegetation Management Project was sent to 255 interested people, abutters, and various agencies and organizations. This project proposal was initially listed in the Quarterly Schedule of Proposed Actions for the White Mountain National Forest during the 4th quarter of 2004 (Oct 1 – Dec 31), and has been listed since. A second scoping notice was mailed on February 28, 2006

Fifteen responses to this initial scoping letter and three responses to the second scoping were received. These responses have been used to define the analysis and formulate design features and mitigation measures.

There is sufficient information and analysis within this 30-Day Comment Report to allow the public to provide comments on the Proposed Action and its alternatives. Members of the public who submit comments in a timely manner (within 30 days of publication of legal notice in the Manchester Union Leader newspaper of record) will have standing to appeal the decision of the Responsible Official. Comments received during this 30-day period will be used to further inform the environmental analysis process and the decision regarding this project by the Responsible Official.

Using the comments from the public and other agencies, the interdisciplinary team developed a list of issues to address.

## **1.9 Issues**

The Interdisciplinary Team separated issues into two groups:

- Issues used to develop alternatives; and
- Other resource related issues

Issues used to develop alternatives were defined as those directly or indirectly caused by implementing the proposed action. They drive alternatives due to the extent of their geographic distribution, the duration of their effects, or the intensity of interest or resource conflict.

Other resource related issues are derived from comments that raise issues that are related to a resource or potential impacts to that resource, but do not drive the development of an alternative to the proposed action. These issues help focus the environmental effects analysis and determine potential mitigation measures but are generally addressed in the context of the environmental consequences section of the document. Appendix C, Response to Initial Scoping Comments, lists public scoping comments and the Forest Service response.

## **Issues Driving Alternatives**

Issue statements clarify the issues driving alternatives and have been grouped into two issue statements for this analysis. Indicators have been developed under each issue statement to provide a meaningful measure that enables the reader to clearly track the issues throughout the environmental analysis document. Two issues were raised through public scoping that resulted in the development of alternatives to the Proposed Action. Each issue has one or more measurement indicator that measure existing conditions and the potential effects of management activities. These indicators highlight differences among alternatives, and are both quantitative and qualitative.

### **Issue 1: Inventoried Roadless Area Characteristics**

This issue relates to impacts from the project associated with the South Carr Mountain Inventoried Roadless Area. Some respondents to the proposal stated concern with the effect of the proposed action on roadless area characteristics. There is a concern with some of the public that the proposed project would reduce the size of the area that qualifies as roadless.

#### Indicator (s):

- Acres of regeneration harvest within the South Carr Mountain IRA;
- Acres of total harvest within the South Carr Mountain IRA; and
- Miles of new road added to the South Carr Mountain IRA.

### **Issue 2: Forest Age Class Distribution**

This issue relates to the total amount of regenerating forest habitats, the size of individual areas of forest that provide these habitats, and their distribution throughout the Project Area. It also focuses on the implications for wildlife species utilizing these habitat types. Some individuals were concerned that the proposed action has too much emphasis on creating early successional forest habitat, at the expense of older forest habitats that may not be available on private lands. There is also concern that the scale and frequency of even-aged harvests (clearcuts and large shelterwoods) exceed natural disturbance patterns.

#### Indicator (s):

- Total even-aged regeneration harvest acres (clearcuts and shelterwoods)
- Individual size of even-aged regeneration harvests (range of sizes in acres)

- Acres of forest in 0-9 yr. age class (early successional wildlife habitat)

### Other Issues

- Although not alternative driving, these issues are associated with resources that are discussed in the environmental effects section and/or in the project file for this environmental analysis: Herbicide use; Forest Health; Fragmentation; Heritage Resources; Prescribed Fire; Recreation; Roads; Socio-economics; Soils; Threatened, Endangered and Sensitive Species (plants and animals); Visual Quality; Water; and Wildlife.

Table 3 compares the measurement indicators with each alternative.

<b>Table 3. Measurement Indicator Comparison of Alternatives</b>				
<b>Measurement Indicators</b>	<b>Alternative 1 No Action</b>	<b>Alternative 2 Proposed Action</b>	<b>Alternative 3 No Harvesting in IRA</b>	<b>Alternative 4 Reduced even-aged Management</b>
<b>IRA Characteristics</b>	<b>ISSUE 1</b>			
Regeneration harvest*	246	278	246	246
Total harvest	766	905	766	1,002
Roads added **	0	0	0	0
<b>Reduced Even-aged management</b>	<b>ISSUE 2</b>			
Total even-aged regeneration harvest acres (clearcuts and shelterwoods)	0	114	82	0
Individual size of even- aged regeneration harvests (range of sizes in acres) CC = Clear Cut SHW=Shelterwood	N/A	Two – 8 acre CC One – 10 acre CC Two – 10 acre SHW One – 11 acre CC One – 11 acre SHW One – 14 acre CC One – 14 acre SHW One – 18 acre SHW	Two – 8 acre CC's One – 10 acre CC One – 10 acre SHC One – 14 acre CC One – 14 acre SHC One – 18 acre SHC	N/A
Added acres of forest in 0-9 yr. age class (early successional wildlife habitat)	0	116	84	0

\* The 22,265 acre South Carr Mountain Inventoried Roadless Area (IRA) currently includes 146 acres of regeneration openings that occurred within the last 10 years. Two future projects within this IRA planned within the next ten years are anticipated to generate 100 acres of regenerated stands. This is a total of 246 acres in past and future regeneration openings. Alternatives 2 would add 32 acres of

regeneration harvest for a total of 278 acres. Alternatives 3 and 4 would not add any additional acres of regeneration harvest. Alternatives 1 and 3 would have 766 acres of total harvest acres over a ten year time frame. Alternatives 2 and 4 would have 905 acres and 1,002 respectively. In order to remain roadless, less than 20% of the 22,265 acre IRA can have total harvest implemented within the last 10 years. This makes the allowable total harvested acres to be approximately 4,453 acres and still qualify for roadless. None of the alternatives will approach this magnitude or prevent a future roadless designation based on cumulative harvested acres.

\*\* Total allowable miles of roads within the IRA are 11.5 miles. In order to remain roadless, the IRA must have less than ½ mile of improved roads per 1,000 acres. Currently 1.9 miles exist in the IRA (a road density of 0.08 miles per 1,000 acres). None of the Alternatives under consideration for the Batchelder Brook Project propose any new road construction. Two miles of potential road construction may occur within the next ten years as a result of two projects which may be implemented within the South Carr Mountain IRA. This may increase the total roads in the IRA to 3.9 miles with an average road density of 0.18 miles per 1,000 acres.

# CHAPTER TWO – ALTERNATIVES

## 2.0 Introduction

This 30 Day Comment Report (Draft EA) explores the differences between four possible future management alternatives for the Batchelder Brook Project Area. Each alternative could be implemented if selected, and together they provide a framework for analyzing different ways to meet the purpose and need stated in Chapter 1. These alternatives illustrate a range of options for guiding natural resource management activities in the Project Area over the next 3 to 5 years.

This chapter includes:

- A description of the management area in which the management activities are considered;
- How the alternatives were developed;
- Alternatives considered but eliminated from detailed study; and
- A description of alternatives considered in detail;

## Management Areas

The Forest Plan allocated all White Mountain National Forest Land among fifteen different Management Areas (MAs). Each MA has a unique purpose, desired condition of the land, and standards and guidelines (see Chapter 3 of the Plan). The Batchelder Brook Project Area is located entirely within MA 2.1 lands.

### MA 2.1 - General Forest Management

This Management Area emphasizes high quality sawtimber and other timber products, a balance of wildlife habitats, visual quality, and a range of recreation opportunities from low-use hiking trails to highly developed campgrounds.

### Desired Future Condition for MA 2.1 General Forest Management Lands

The Forest will be a mix of deciduous and coniferous forest stands of various types. The stands will vary in size, shape, height, and tree species. Both even-aged and uneven-aged harvest techniques will be used. As a result, two different conditions will occur among the stands: some stands will consist of trees of about the same age and size; the remaining stands will consist of a mix of tree sizes and ages ranging from seedlings to very large, mature trees.

Silvicultural practices will be used to meet timber, ecological, visual, and recreation objectives. Most stands will provide high quality sawtimber. Suitable habitat will be provided for a variety of wildlife and plant species. TES species and Outstanding Natural Communities will be conserved. Habitat at the landscape level will include a sustainable mix of young and mature forest. Permanent and temporary openings will occur across the landscape in shapes and sizes that are consistent with scenic objectives in an area. All communities that would naturally be present will be managed so that they are maintained or enhanced.

Along major road corridors, large diameter trees of different species with a variety of bark and foliage characteristics will predominate. Numerous views of broad, changing landscapes will be provided

along roads and trails. Views, ecological processes, and management practices will be interpreted at stationary vista sites.

Recreation opportunities will be diverse, including activities such as hiking, mountain biking, driving for pleasure, snowmobiling, hunting and fishing, roadside camping, and developed camping. Some roads and trails will receive limited use, while others will be heavily used at certain times. Campground development levels will vary among sites, with some offering limited facilities and others providing more amenities. The location of various types and levels of recreation development will be determined by the Recreation Opportunity Spectrum (ROS) objective assigned to specific areas as well as by public demand and feasibility. ROS objectives will include rural, roaded natural, semi-primitive motorized. Within these ROS objectives, there will be substantial non-motorized recreation opportunities. Noticeable human activity in these areas will differ from very evident to absent.

Permanent and temporary roads will provide access to meet land management objectives. Major road corridors will be open for public use. Other roads will be open occasionally to provide for activities such as firewood gathering or hunting access. Most roads will be closed to public vehicular traffic. Selected areas may have snowmobile trails.

## **Development of Alternatives**

As stated in Chapter 1, public comment was sought on the Proposed Action for the Batchelder Brook Vegetation Management Project in an October 2005 Scoping Report and a February 2006 Scoping report (Appendix C describes public involvement in detail). The public contributed to the identification of the two issues currently being addressed. Following an interdisciplinary approach, the Pemigewasset District used these options to lay the groundwork for the management alternatives.

The interdisciplinary team developed two additional alternatives in response to the issues and need for change. While all four alternatives provide a wide range of multiple uses, goods, and services, each addresses the issues in a different way.

The no action alternative and three action alternatives have been brought forward for this environmental analysis process. Each alternative considers in detail different management approaches for the Batchelder Brook Project Area. The alternatives being analyzed in detail share goals and policies common to the Forest Plan. They differ in the emphasis given to particular issues and goals.

## **Alternatives Eliminated from Detailed Study**

### **Expand the existing boundary of the South Carr Mountain Inventoried Roadless Area to encompass the southeastern portion of the Batchelder Brook Project Area**

One public comment stated that the boundary for the South Carr Mountain Inventoried Roadless Area should be extended to incorporate a portion of the Batchelder Brook Project Area. Many public comments related to roadless areas were received during Forest Plan Revision. In response to these comments, the Roadless Area Inventory was reviewed and the planned field verification of Improved Roads was completed during the summer of 2005. As a result, over 19,000 acres were added to the Inventory.

Approximately 13,000 acres of this came from changes in boundaries to reflect more consistent application of inventory criteria. These occurred in the South Carr, Jobildunk, Pemigewasset, and Waterville roadless areas. The remaining increased acres are from a new Sawyer Pond Roadless Area, which was added when field verification of Improved Roads reduced the road density to a level that would meet criteria for roadless. When the Batchelder Brook project was initially being planned, none

of the Project Area was in the South Carr Mountain IRA. The boundary changes to South Carr during the summer of 2005, however, encompassed the northeastern portion of the Batchelder Brook Project Area. The final determination of this IRA boundary was part of the 2005 Forest Plan Revision process and is beyond the scope of this project.

### **2.0.1 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 not conducting any 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. This alternative would not meet Forest Plan expectations for sustained timber products and diverse wildlife habitat in the Upper Baker HMU for the foreseeable future. Choosing this alternative would not preclude proposing activities in this area at a later date.

### **2.0.2 Alternative 2: Proposed Action**

Refer to Section 1.4 for a description for this Alternative.

### **2.0.3 Alternative 3: No Timber Harvesting Activities in the South Carr Mountain Inventoried Roadless Area**

Alternative 3 responds to the issue raised by the public during the scoping period that an Alternative be developed that “Does Not Log or Build Roads in the South Carr Mountain IRA”. This alternative eliminates all timber harvest and timber stand improvement activities *within* the South Carr Mountain IRA. None of the alternatives being analyzed for the Batchelder Brook Project proposes any road construction or reconstruction.

This alternative would move the Upper Baker HMU toward attaining wildlife habitat diversity and sustained timber products objectives and other Forest Plan goals. These goals include creating early successional habitat, increasing softwood development, and providing for sustained timber production.

Alternative 3 responds to the Purpose and Need for action in the following ways:

Promote desired vegetation and habitat conditions outlined in the Forest Plan and produces forest products by:

- Increasing early successional habitat by creating up to 40 acres of hardwood regeneration habitat through clearcutting;
- Enhancing softwood composition and improve wildlife habitat through approximately 149 acres of group and single-tree selection;
- Improving timber quality and species composition in hardwood areas through approximately 11 acres of commercial thinning, 42 acres in shelterwood, and 78 acres of single-tree selection;
- Eradicate Japanese knotweed through mechanical treatment, hand pulling, or the application of herbicide; and
- Use 7 existing landings and creating 1 new landing.

Maintain or improve the existing transportation system needed for management and public access through:

- Road maintenance on up to 3.0 miles of existing road (FR 401 and 479); and
- Treat needed areas for erosion (seeding and waterbars);

Improve wildlife habitat in the area by:

- Regenerating two small patches of aspen near an old beaver pond.

Maintain or improve recreation opportunities in the area by:

- Improving the existing 1 acre Carr Mountain Trailhead; and
- Construct approximately 1 mile of snowmobile trail-by pass which would be used when logging activities occur in the Project Area.

Alternative 3 would provide approximately 1.9 million board feet of sawtimber and pulpwood, and improve future stand quality and productivity.

## **2.0.4 Alternative 4: Reduce Even-aged Management in the Project Area**

### **Alternative 4**

Alternative 4 responds to the issue raised by the public during the scoping period that an Alternative be developed that “considers uneven-aged management alternatives”. This alternative eliminates all clearcuts and shelterwoods prescriptions from the Project Area.

This alternative would move the Upper Baker HMU toward attaining wildlife habitat diversity and sustained timber products objectives and other Forest Plan goals. These goals include increasing softwood development and providing for sustained timber production.

Alternative 4 responds to the Purpose and Need for action in the following ways:

Promote desired vegetation and habitat conditions outlined in the Forest Plan and produces forest products by:

- Enhancing softwood composition and improving wildlife habitat through approximately 550 acres of group and single-tree selection;
- Improving timber quality and species composition in hardwood areas through approximately 62 acres of commercial thinning;
- Eradicate Japanese knotweed through mechanical treatment, hand pulling, or the application of herbicide; and
- Use 9 existing landings and create 1 new landing.

Maintain or improve the existing transportation system needed for management and public access through:

- Road maintenance and/or surfacing on up to 3.0 miles of existing road (FR 401 and 479); and
- Treat needed areas for erosion (seeding and waterbars).

Improve wildlife habitat in the area by:

- Regenerate two small patches of aspen near an old beaver pond.

Maintain or improve recreation opportunities in the area by:

- Improving the existing 1 acre Carr Mountain Trailhead
- Constructing approximately 1 mile of snowmobile trail-by pass which would be used when logging activities occur in the Project Area

Alternative 4 would provide approximately 2.4 million board feet of sawtimber and pulpwood, and improve future stand quality and productivity.

### Design Features and Mitigation Measures

Design features and mitigation measures have been developed to reduce the environmental effects that may be caused by implementing the proposed action or its alternatives. All potential mitigation measures are listed in Appendix D.

## 2.1 Comparison of Alternatives

Table 4 is a summary table comparing the major elements of each alternative.

<b>Table 4. Comparison of Alternatives</b>					
<b>MEASURE</b>	<b>UNIT</b>	<b>Alt 1</b>	<b>Alt 2</b>	<b>Alt 3</b>	<b>Alt 4</b>
<b>PROPOSED HARVEST AREA</b>	Acres	0	737	242	612
<b>Winter Harvest Only</b>	Acres	0	193	137	341
<b>Summer/Fall/Winter Harvest</b>	Acres	0	51	51	51
<b>Fall / Winter Harvest</b>	Acres	0	137	54	234
<b>Clearcut</b>	Acres	0	51	40	0
<b>Shelterwood/Prep/Burn/Overstory</b>	Acres	0	52	42	0
<b>SHELTERWOOD /PREP /OVERSTORY</b>	Acres	0	11	0	0
<b>THINNING</b>	Acres	0	15	11	62
<b>Group Selection Cut</b>	Acres	0	86	50	30
<b>Single Tree Cut</b>	Acres	0	145	78	520
<b>Single Tree &amp; Group Selection Cut</b>	Acres	0	4 & 16	4 & 16	0
<b>Timber Stand Improvement</b>	Acres	0	138	108	138
<b>Harvest Volume</b>	MMBF	0	3.0	1.9	2.3
<b>Japanese Knotweed – Non-native invasive species eradication (mechanical treatment, hand pulling, or treatment with registered herbicide)</b>	Acres	0	1/4	1/4	1/4
<b>Wildlife</b>					

<b>Wildlife Habitat Improvement (grouse and beavers) Regenerate patches and burn</b>	Acres	0	2	2	2
<b>Transportation</b>					
Road Maintenance – Forest Roads 401 and 479	Miles	3.0	3.0	3.0	3.0
<b>Recreation</b>					
Carr Mountain Trailhead Improvement	Acres	0	1.0	1.0	1.0
Snowmobile Trail By-pass (in use when logging activities occur in the Project Area).	Miles	0	1.0	1.0	1.0
<b>Socio-Economic Factors</b>					
<b>Estimated Stumpage Receipts</b>	\$	0	\$445,556	\$291,916	\$368,736
<b>Estimated Sale Costs (Planning, Sale Preparation, and Sale Administration)</b>	\$	\$42,000	\$231,130	\$151,430	\$191,280
<b>Net Value</b>	\$	-\$42,000	\$214,426	\$140,486	\$177,456

# CHAPTER THREE - AFFECTED ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

## 3.0 Introduction

Maintaining native biological diversity is a key component of the White Mountain National Forest's Desired Future Condition (DFC) and management goals. The FEIS for the 2005 Land and Resource Management Plan defines biological diversity as the sum of all natural communities, ecological processes, and species. The FEIS further defines biological diversity in northern New England as "broad communities, such as northern hardwood forest, and isolated communities like cedar swamps. It encompasses processes such as nutrient cycling, the decay that creates snags, and natural disturbance. Species of plants and animals, in all their genetic variations, also are a part of biodiversity." The FEIS states that the challenge of maintaining biological diversity is twofold: "determining how best to conserve biological diversity when it includes forest, open, alpine, and aquatic ecosystems; common and rare species, and innumerable ecological processes; and integrating biodiversity needs with meeting the social and economic aspects of sustainable ecosystem management" (USDA-Forest Service, 2005b, p 3-3).

### Format

Resource issues raised during the initial scoping process (see Section 1.7 and Appendix C) are addressed in this chapter. Each resource section analyzed in detail is organized as follows:

- Issues Related to the Resource
- Mitigation Measures Related to the Resource, including why the mitigation will work
- 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.

In accordance with the June 24, 2005 Council on Environmental Quality (CEQ) Memorandum entitled "Guidance on the Consideration of Past Actions in Cumulative Effects Analysis" (CEQ, 2005), with 40 CFR 1500-1508, and with the January 1997 CEQ publication "Considering Cumulative Effects Under the National Environmental Policy Act" (CEQ, 1997), the cumulative effects analysis for each resource area considers a geographic area and a time frame of past, present and foreseeable future actions "relevant to reasonably foreseeable adverse impacts" on that resource, and "essential to a reasoned choice among alternatives". This consideration does not extend to actions "outside the geographic boundaries or time frame established for the cumulative effects analysis" (CEQ January 1997).

## 3.1 Recreation

- *Temporary snowmobile by-pass trail construction*
- *Harvest units proximity to snowmobile trails*
- *Enhanced parking area for Carr Mountain Trailhead*
- *Recreation use by adjacent private campground*

### Affected Environment

Recreation resources within and adjacent to the Batchelder Brook Project include one trailhead, a small section of one hiking trail, snowmobile trails, and roads used for various recreation activities. The South Carr Mountain Inventoried Roadless Area is addressed separately.

### Hiking Trail

The Carr Mountain hiking trail starts within the southern end of the Batchelder Brook Project Area. The trailhead is located off Clifford Brook Road in the southern end of the Project Area. Presently, the trailhead is not well defined and often the visiting public park vehicles at the end of the road near a summer residence on private land. The trail itself starts on private land. The distance along Clifford Brook Road is approximately ¼ mile between the trailhead parking area and the beginning of the trail. None of the proposed harvest units lie immediately on or adjacent to this portion of Clifford Brook Road. This small section of trail is the only trail located in the Project Area. Table 5, displays the description and use level of the small portion of trail located within the Project Area.

<b>Table 5 Description and Use Levels of Hiking Trails in and nearby the Batchelder Brook Project Area</b>		
<b>Trail</b>	<b>Use Level During Peak Season*</b>	<b>Description+</b>
Carr Mountain Trail	Low	3.6 miles from Clifford Brook Rd trailhead to summit of Carr Mt; 2.9 miles from summit to Three Ponds trailhead off Stinson Lake Road.
<small>*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 28<sup>th</sup> Ed. and Pemigewasset Ranger District trails files.</small>		

### Snowmobile Trails

Portions of the Carr Mountain, Three Ponds, and Warren to Woodstock snowmobile trails lie within the Project Area. All snowmobile trails in this area are maintained by the Asquamchumauke Snowmobile Club. Table 6 provides a brief description including use levels, of these snowmobile trails within the Batchelder Brook Project Area. These trails include both those with potential to be directly or indirectly affected by the proposed Batchelder Brook Project. Details are described by alternative in the Direct and Indirect Effects and Cumulative Effects sections following.

**Table 6. Description and Use Levels  
of Snowmobile Trails in Batchelder Brook Project Area**

Trail	Use Level During Peak Season*	Description+
Warren to Woodstock	High (new construction – anticipated to be high use)	9 mile trail that offers well groomed riding opportunities.
Three Ponds	Low	6.5 mile trail that provides rustic backcountry experience.
Carr Mt.	Low	3.6 mile trail that provides rustic backcountry experience.
<p>*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) + From Asquamchumauke Trail System Map and Pemigewasset Ranger District trails files.</p>		

**Adjacent Private Campground**

The northwest corner of the Project Area is adjacent to a private 90 acre campground. This campground offers cabins, recreational vehicle sites, tent sites, pool, playgrounds, and nature trails. Approximately 300 camping sites are available during the summer and twenty-five sites are available year round. Visitors to this campground often pursue recreational activities such as hiking and biking within the Project Area, typically along Forest Road 401.

**Other Recreation Elements**

The hiking trail and snowmobile trails described in the previous section are also utilized by hikers, hunters, anglers, and others during the spring, summer and fall. In addition, FR 401 and FR 479 are used by local citizens for walking. Mountain bikers also travel the roads and trails when conditions allow. The intensity of use for these additional users is very low (0-6 people per day in any one location).

**3.1.1 Direct and Indirect Effects on Recreation**

The Analysis area for direct and indirect effects on recreation is defined as the Upper Baker Habitat Management Unit (HMU). The time frame is the actual duration of the Batchelder Brook Project, expected to be 3-5 years depending on the alternative selected.

Recreation settings for this recreation analysis area are described by the Recreation Opportunity Spectrum (ROS). The ROS defines a range of unique recreation experiences as: Primitive, Semi-Primitive Non-motorized, Semi-Primitive Motorized, Roaded Natural and Rural (Forest Plan, 2005, p.1-10 and Map 1-11). 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. Ninety percent of the MA 2.1 lands in the Project Area are identified as Semi-Primitive Motorized. Semi-Primitive Motorized is 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 southern tip of the Project Area (10%) is identified as Roaded Natural. For areas designated Roaded Natural, the 2005 FEIS states that, “Specified roads, reconstructed for timber harvest access ... are consistent with the objective. The direct impact on the recreation visitor’s experience should occur only during active logging, when equipment and workers are present” (USDA-Forest Service, 2005b, p 3-312).

**Alternative 1: No Action**

Alternative 1 would neither alter nor enhance current recreation opportunities. The Carr Mountain trailhead parking area would not be improved and construction of the snowmobile trail by-pass would not be needed. There would be no harvest units adjacent to trails. Recreation use by visitors to the adjacent private campground would continue.

**Alternative 2: Proposed Action**

This alternative would have short-term, direct and indirect effects on the recreation opportunities and experiences in the analysis area. Short-term effects of timber harvesting activity may impact hikers, snowmobilers, and other users. However, past timber harvest has occurred in the analysis area, and therefore the long-term recreation experience is not expected to change as a result of the vegetation management or other proposed actions. Recreation opportunity improvements are also proposed as part of this alternative.

**Hiking Trail and Trailhead**

The Carr Mountain trailhead would be directly affected by the activities proposed under this alternative. The trailhead would be improved such that it would be readily visible to the public and the existing parking would be clearly defined to accommodate up to four vehicles. The indirect impacts would include greater noise associated with logging operations. View points on this trail are very limited. Views currently include a mix of vegetation, age classes, and openings that are not easily discernable to the average visitor, and the proposed treatments would likely follow this trend.

**Snowmobile Trails**

**Existing Trails**

The direct and indirect effects of this alternative upon snowmobile trails are summarized in Table 7, below.

<b>Table 10: Harvest Units Adjacent to and other direct effects on Snowmobile Trails</b>			
<b>Trail</b>	<b>Harvest Units</b>	<b>Season of Harvest</b>	<b>Effects</b>

Warren to Woodstock	62/11, 44/11 45/11, 9/11, 39/11, 25/12	Fall/Winter	Units 25/12 and 39/11 are a clearcuts and 62/11 is a shelterwood / overstory removal which will affect the view from the trail. The other units are proposed for uneven-aged management and should not be noticeable from the trail.
Three Ponds	45/11, 24/11	Winter	These units are proposed for uneven-aged management and should not be noticeable from the trail.
Carr Mountain	9/13	Winter	This units are proposed for uneven-aged management and should not be noticeable from the trail.

This alternative will have direct and indirect effects on existing snowmobile trails. Use of FR 401 and Clifford Brook Road for timber hauling during the snow season would preclude the grooming of these roads as snowmobile trails. Access to the Three Ponds trail system may be partially compromised for the duration of the proposed project, expected to be 3 to 5 years under this alternative.

The resulting change in forest appearance or views along the snowmobile trails, with nearby harvest units, would not be dramatically different than the Batchelder Brook current conditions. The majority of the harvest units adjacent to snowmobile trails are prescribed for partial harvest, such as group and single tree selection. Several previous timber sales have occurred in this area in the past, and the current forest landscape is varied, including evidence of even and uneven aged vegetation management. Slash from cutting trees would be removed from a 50 foot buffer along the trails to address visual impacts. The visual impacts from partial harvesting in the both the short-term and long-term would be minimal to undetectable depending on the user and residual stand.

**Recreation use by adjacent private campground**

Recreation use by the adjacent campground would likely continue. The season of harvest for this portion of the Project Area would occur during the fall or winter months. Accordingly, recreational use in this area from the campground should be minimized during harvest operations as most campground visitors recreate in this area during the summer months, between Memorial Day and Labor Day.

**All Recreation Uses**

Throughout the year, the analysis area is used for walking, hiking, snowmobiling, and mountain biking. Traffic control signs would be installed to alert foot and vehicle traffic to logging operations. The road and trails would remain open to foot travel. Noise associated with harvest activity may be audible to visitors within one to two miles of logging operations.

The analysis area is also used by hunters. Since this alternative would establish the most early-successional forest stands, future habitat and browse for certain game species would increase.

## **Alternatives 3 and 4**

Alternative 3 would have the least amount of direct and indirect effects on recreation of all the alternatives, except for the no action alternative. All harvest units within the South Carr Mountain Inventoried Roadless Area are deferred under this alternative, which reduces the scale of the project and therefore all potential effects to recreation. Alternative 4 would have similar effects to recreation as Alternative 2.

### **Hiking Trail and Trailhead**

The indirect and direct effects to the Carr Mountain trail and trailhead are the same as that described for Alternative 2.

### **Snowmobile Trails**

Under Alternative 3 there would be no effects to the Warren to Woodstock snowmobile trail in the northern part of the Project Area as harvest activities in the South Carr Mountain IRA would be deferred under this alternative. The effects from the activities considered under this alternative for the section of the trail that uses FR 401 would be the same as that described under Alternative 2. There would be no effects to the Three Ponds snowmobile trail as no activities are proposed in this area under Alternative 3.

Under Alternative 4 the effects would be similar as Alternative 2, with the exception of viewpoints along the Warren to Woodstock trail. The visual impacts from this alternative would be limited as only uneven-aged harvests are considered.

### **Recreation use by adjacent private campground**

For both Alternatives 3 and 4 the effects on the recreation use by visitors from the adjacent campground would be similar to the effects described under Alternative 2.

### **All Recreation Uses**

For both Alternatives 3 and 4 the effects on all recreation uses would be similar to the effects described under Alternative 2.

The analysis area is also used by hunters. Alternative 3 and 4 would establish fewer early-successional forest stands, future habitat and browse for certain game species as compared with Alternative 2.

### **3.1.2 Summary of Direct & Indirect Effects on Recreation**

Table 8, summarizes the direction and indirect effects of all alternatives on recreation in the Project Area.

<b>Table 8: Summary of Direct &amp; Indirect Effects on Recreation</b>	
<b>Alternative</b>	<b>Summary of Direct &amp; Indirect Effects</b>
<b>1</b>	<ul style="list-style-type: none"> <li>▪ Would not alter current recreation opportunities;</li> <li>▪ No additional parking improvements; and</li> <li>▪ No construction of snowmobile-by pass.</li> </ul>
<b>2</b>	<ul style="list-style-type: none"> <li>▪ Construct 1 mile snowmobile by-pass trail;</li> <li>▪ Improve existing Carr Mountain Trailhead (&lt;1 acre);</li> <li>▪ Increased noise and traffic associated with harvesting;</li> <li>▪ Short term changes to forest landscape along some roads and trails; and</li> <li>▪ Improved opening habitat, and browse for some game species.</li> </ul>
<b>3</b>	<ul style="list-style-type: none"> <li>▪ Construct 1 mile snowmobile by-pass trail;</li> <li>▪ Improve existing Carr Mountain Trailhead (&lt;1 acre);</li> <li>▪ Increased noise and traffic associated with harvesting;</li> <li>▪ Short term changes to forest landscape along some roads and trails; and</li> <li>▪ Improved opening habitat, and browse for some game species.</li> </ul> <p>Other effects on recreation similar to Alternative 2 <b>except:</b></p> <ul style="list-style-type: none"> <li>▪ Less impact to Three Ponds snowmobile trail;</li> <li>▪ Less impact to Warren to Woodstock snowmobile trail;</li> <li>▪ Less regeneration harvest, greatly reducing the number of new openings and the amount of browse for certain game species.</li> </ul>
<b>4</b>	<ul style="list-style-type: none"> <li>▪ Construct 1 mile snowmobile by-pass trail;</li> <li>▪ Improve existing Carr Mountain Trailhead (&lt;1 acre);</li> <li>▪ Increased noise and traffic associated with harvesting;</li> <li>▪ Short term changes to forest landscape along some roads and trails; and</li> <li>▪ Improved opening habitat, and browse for some game species..</li> </ul> <p>Other effects on recreation similar to Alternative 2 <b>except:</b></p> <ul style="list-style-type: none"> <li>▪ No early successional openings or additional browse for certain game species.</li> </ul>

### 3.1.3 Cumulative Effects on Recreation

The Analysis area for cumulative effects on recreation includes the Upper Baker HMU. The time frame is the present and foreseeable future (10 years). None of the action alternatives considered in detail in this document would change the long-term recreation opportunities described in the Forest Plan (2005) for the Analysis area for cumulative effects on recreation. Recreation and vegetation management activities have co-existed in this area previously, as evidenced by the use of landings and clearcuts as scenic vistas and the use of roads constructed for timber removal as snowmobile trails. Short term effects from noise and traffic associated with harvest activities and construction of the temporary snowmobile by-pass trail would revert back to Forest Road 401 once the vegetation management is completed.

The lasting, long-term changes to recreation opportunities include improvements to Carr Mountain trailhead. This enhanced recreation opportunity would not conflict with the ROS class identified in the Forest Plan for the analysis area.

Cumulative effects on snowmobile trails, the Carr Mountain hiking trail, and other recreation opportunities are not anticipated, even with multiple vegetation projects occurring. The Carr Mountain trail will remain open to foot and snowmobile traffic during harvesting operations. Other projects planned in the foreseeable future are not expected to have any cumulative effect on recreation resources.

## 3.2 Roadless/Wilderness Character

### Issues related to Wilderness and Roadless:

*Effect that proposed actions would have on roadless and wilderness characteristics of the South Carr Mountain Inventoried Roadless Area.*

#### Introduction

Inventoried roadless areas are lands within a National Forest that meet the criteria found in Table 12 in the Direct and Indirect Effects section below. These criteria are the same as those found in FSH (Forest Service Handbook) 1909.12 that qualify areas for inventory as lands that may have potential for wilderness recommendation. This section of the FSH states: “National Forest System lands in the eastern United States have been acquired over time from private ownership. Criteria for inventorying roadless areas in the East recognize that much, if not all of the land, shows some signs of human activity and modification even though they have shown high recuperative capabilities.”

As part of the recently completed Forest Plan Revision (FPR) process, the White Mountain National Forest conducted an inventory of lands within the National Forest that qualify as roadless. This inventory reconsidered all lands on the National Forest for their roadless area potential, accounting for new land acquisitions, changes to the landscape since the last Forest Plan, and improved computer technology for evaluating areas. Areas that met the FSH inventory criteria were evaluated and considered for wilderness recommendation (FSH 1909.12).

The new inventory includes 27 Roadless Areas totaling over 400,000 acres. The Forest Plan recommended to Congress that 34,500 acres be designated as Wilderness, including the Wild River valley and additions to the existing Sandwich Range Wilderness. The complete Forest Roadless Area Inventory and Evaluation is in Appendix C of the FPR FEIS (2005b). These recommended wilderness areas were assigned to Management Area (MA) 9.1 and will be managed to protect their eligibility for the Wilderness Preservation System. The Batchelder Brook Project does not propose any activities within recommended wilderness or MA 9.1. The remaining Roadless Areas identified during FPR that were not recommended for wilderness designation were assigned to other appropriate Management Areas. This includes the remainder of the South Carr Mountain Inventoried Roadless Area (IRA).

### Affected Environment for Inventoried Roadless and Wilderness

The Batchelder Brook Project Area includes a portion of the South Carr Mountain Inventoried Roadless Area (South Carr Mountain IRA). The South Carr Mountain IRA is comprised of 22,265 acres, it lies in the towns of Warren, Ellsworth, Rumney, and Wentworth, Grafton County, New Hampshire. It is located north and west of the private lands adjacent to the Stinson Lake area, and roughly parallels the Forest boundary near Rattlesnake Mountain, west along Carr Mountain, including Whitcher Hill to the Hubbard

Brook Trail, and bordering the western and southern boundary of the Hubbard Brook Experimental Forest. The eastern boundary generally follows the irregular White Mountain National Forest boundary in the vicinity of Bagley and Burleigh Brooks. The Inventoried Roadless Area is accessed by State Route 25 on the south, 118 on the north, and Stinson Lake Road in the southeast.

The area is accessed via a number of snowmobile trails, including Three Ponds Trail, Annie's Loop, Donkey Hill Cut-off, and Buzzell Brook. The Warren to Woodstock Snowmobile Trail traverses a narrow section of the Inventoried Roadless Area near Patch Hill. There are user-developed snowmobile trails in the eastern portions of the Inventoried Roadless Area, originating from the Stinson Lake area. Hiking access includes the Three Ponds Trail, Mt. Kineo Trail, Carr Mountain Trail, and Rattlesnake Mountain Trail. The Hubbard Brook Trail parallels the northern boundary of the Inventoried Roadless Area.

In the summer of 2005, the Forest Plan Revision process, the South Carr Mountain IRA boundaries were extended to encompass the northeastern portion of the Batchelder Brook Project Area. Approximately 2 miles of the Warren to Woodstock and the Three Ponds snowmobile trail run through this section of the IRA, as does 1/3 mile of Forest Road 401A. Recent and past timber harvest activities are obvious throughout this section. Approximately 11,750 acres of the South Carr Mountain IRA are considered part of the IRA's core area of solitude (Forest Plan, FEIS, Appendix C). The core area is required to be at least 2,500 acres in order for an area to qualify as roadless.

### *Roadless Characteristics*

Roadless characteristics are largely quantitative and objective. They determine whether an area may be considered for recommendation as Wilderness. Since a portion of the Batchelder Brook Project falls within the boundaries of the South Carr Mountain IRA, the effects of the project proposal on the roadless characteristics of this area will be analyzed. Table 9, lists the criteria, their applicability to this analysis, and how effects on the criteria will be measured if applicable.

**Table 9. Inventoried Roadless Area Criteria and Measurement Methods**

Criteria	Criteria Description	Used in this Analysis	Rationale and Measurement of Effects on Criteria
1	The land is regaining a natural, untrammelled appearance.	Yes	Indicates prior and proposed activities within the area, particularly timber harvest. 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.	Yes	Indicates prior and proposed activities within the area including road construction. 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.	No	The area is in 100% National Forest ownership and the Batchelder Brook Project does not propose any changes to 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.	Yes	Indicates existing conditions and proposed activities within the area. Measured by total acres of harvest.
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.	Yes	Indicates existing conditions and proposed road construction within the area. Measured by miles of new road construction.
6	No more than 15 percent of the area is in non-native, planted vegetation.	No	No actions are proposed that are intended to change this condition and no additional wildlife openings are proposed within the IRA. Risks of introducing and/or spreading non-native plant species is detailed in the non-native plant section of this 30 Day Comment Report.
7	Twenty percent or less of the area has been harvested within the past ten years.	Yes	Indicates prior activities, planned or ongoing activities, and planned activities within the area. Measured by total acres of harvest and acres of regeneration harvest.
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.	No	No dwellings are present in this area and no actions are proposed that would change this condition.

Miles of new road construction and harvest acres (differentiated by regeneration harvest) within the South Carr Mountain IRA are the criteria that help disclose effects and define differences between alternatives. Although no new road construction is an element common to all alternatives, new road construction is a criteria that will still be used to help disclose effects on roadless characteristics. The alternatives include differing amounts of harvest acres and regeneration harvest. None of the alternatives consider any new road construction. These activities may effect roadless in terms of the percentage of the area harvested in the past 10 years, and ability to provide a wilderness experience.

### *Wilderness Characteristics*

Once an area has qualified as Roadless, it is evaluated in the Forest Plan Revision process to determine if it has characteristics consistent with wilderness. These wilderness characteristics describe those attributes of an area that may or may not recommend it as wilderness. The effects of the project proposal on the wilderness characteristics of the South Carr Mountain IRA will be analyzed to determine if the proposed actions will affect any future designation of this roadless area as wilderness. Not all of the wilderness characteristics will be evaluated, since only some are affected by the Batchelder Brook proposal.

The following wilderness characteristics will be analyzed:

- **Solitude**, or the degree to which an area provides visitors with a Wilderness experience. Analysis will consider short-term effects and any reduction in the core area of solitude as a result of the project proposal. This effect will be measured by the acres of harvest and new road construction proposed within the core area of solitude.
- **Degree of Disturbance**, or the degree to which an area's natural appearance may be altered. The analysis will consider the effects of timber harvest, road restoration or construction, and construction of the snowmobile by-pass trail which will be the measures for comparing the effects of the alternatives.

Analysis of wilderness characteristics will involve some of the same criteria as the roadless characteristics. However, a proposed project may not affect an area's designation as roadless (because it would not change the quantitative criteria to a point the area would no longer qualify as roadless), but it may still affect an area's wilderness characteristics (because it may affect some change in solitude or degree of disturbance).

The nearest wilderness areas to the Batchelder Brook Project are the Sandwich Wilderness and the Pemigewasset Wilderness, which are approximately 16 and 19 miles respectively from the closest proposed harvest units. The nearest proposed wilderness is the 10,800 acres adjacent to the existing Sandwich Wilderness. This area is located 15 miles from the Batchelder Brook Project Area. US Interstate 93 separates the Project Area from both the Pemigewasset and Sandwich Range Wilderness and proposed wilderness areas.

### Direct and Indirect Effects on Roadless and Wilderness

The Analysis area for direct and indirect effects on roadless and wilderness characteristics for the South Carr Mountain IRA is detailed in the FEIS, Appendix C, Inventoried Roadless Area Evaluations. The analysis area is consistent with the criteria used in the FPR FEIS analysis for inventoried roadless areas and its potential to be studied for wilderness designation. The Forest Plan Roadless Area Inventory has determined that South Carr Mountain IRA includes approximately 22,265 NF acres, with approximately 1.9 miles of improved roads (a density of 0.08 miles per 1,000 NF acres). The analysis will consider the existing characteristics of the South Carr Mountain IRA and how the proposed project may affect the

IRA's roadless and wilderness characteristics. The direct and indirect effects for all alternatives are summarized in Table 10.

**Table 10. Summary of Direct and Indirect Effects on the South Carr Mountain Inventoried Roadless Area and Proposed Wilderness**

<b>Roadless/Wilderness Criteria</b>	<b>South Carr Mountain Inventoried Roadless Area</b>			
<b>Total Acres</b>	22,265			
<b>Harvested Acres</b>				
Acres Allowed in order to Remain Roadless (20%)	4,453 (20% of 22,265)			
Inventoried Harvest Acres *	516			
Treated Acres Added by Batchelder Brook Proposal	<b>Alt 1</b>	<b>Alt 2</b>	<b>Alt 3</b>	<b>Alt 4</b>
	0	139	0	236
<b>Total Harvested Acres</b>	<b>Alt 1</b>	<b>Alt 2</b>	<b>Alt 3</b>	<b>Alt 4</b>
	516	655	516	752
<b>Even-aged Regeneration Harvested Acres (clearcut, shelterwood, and seed tree cuts)</b>				
Inventoried Regeneration Harvest Acres *	146			
Regeneration Harvest Acres Added by Batchelder Brook Proposal	<b>Alt 1</b>	<b>Alt 2</b>	<b>Alt 3</b>	<b>Alt 4</b>
	0	32	0	0
<b>Total Regeneration Harvested Acres</b>	<b>Alt 1</b>	<b>Alt 2</b>	<b>Alt 3</b>	<b>Alt 4</b>
	146	178	146	146
<b>Improved Roads</b>				
Miles Allowed in order to Remain Roadless	½ mile per 1,000 (11.13 miles)			
Inventoried Miles	0.08 per 1,000 (total area 1.9 miles)			
Miles Added by Batchelder Brook Proposal	<b>Alt 1</b>	<b>Alt 2</b>	<b>Alt 3</b>	<b>Alt 4</b>
	0	0	0	0
<b>Snowmobile by-pass trail (3-5 year use)</b>				
Miles added by Batchelder Brook Proposal	<b>Alt 1</b>	<b>Alt 2</b>	<b>Alt 3</b>	<b>Alt 4</b>
	0	1	1	1
<b>Solitude</b>				
Acres Required to Remain Roadless	2,500			

Inventoried Core Acres of Solitude	11, 750
Core Acres after Batchelder Brook Proposal (All Alternatives)	11,750

\* Data from 1997-2006. Other ongoing projects not implemented will be included in cumulative effects section.

### **Alternative 1: No Action Alternative**

Alternative 1, proposes “No Action” in the South Carr Mountain IRA. This Alternative would have no short-term, direct or indirect effects on the South Carr Mountain IRA, or Wilderness characteristics of the analysis area. Under the no action alternative the land would continue to regain a natural, untrammled appearance (Criteria 1), and the forces of nature would continue to dominate, while human improvements would continue to disappear or decline except for trails and other recreational improvements (Criteria 2). Alternative 1 would not create additional sources of noise, air, and water pollution, or unsightly conditions that would have an effect on the wilderness experience (Criteria 4).

The South Carr Mountain IRA currently contains 0.08 miles of improved roads per 1,000 acres; under no action the road density would remain the same (Criteria 5). Approximately 516 acres of harvest have occurred in the past 10 years, which is less than 3 percent of the IRA acreage (Criteria 7).

### **Alternative 2**

Alternative 2 would have temporary short-term, direct and indirect effects on the South Carr Mountain IRA. This alternative proposes 139 acres of harvest within the IRA, including 32 acres of regeneration harvest. This is well below the Forest Service roadless criteria of 20% of the IRA (4,453 acres) being harvested in the last ten years. The timber harvest activities would affect the untrammled, natural appearance of this portion of the IRA, however these effects would be temporary and would not be noticeable to the eye within a decade or two. These affects include the appearance of skid trails, the snowmobile by-pass, stumps, and openings. The remainder of the IRA, outside the immediate harvest area, would continue to regain a natural, untrammled appearance (Criteria 1 and Criteria 7).

The snowmobile by-pass trail proposed under this alternative within the IRA includes the construction of approximately 1 mile of new trail. This trail would only be used during the 3 – 5 years of timber harvest activities associated with the proposed action. Other trails that are present within the IRA are maintained according to Forest Service standards appropriate to the Management Area(s) in which they lie (Criteria 2). None of the proposed improvements or those that are currently maintained are inappropriate for the Management Areas in which they are located.

Some short term exposure to noise and truck traffic, for the duration of the harvest activities (3-5 seasons), would be expected under this alternative. The noise from the snowmobile traffic associated with the by-pass trail would not be noticeably different under this alternative. The by-pass trail parallels the existing Warren to Woodstock snowmobile trail (FR 401). Snowmobile traffic would continue to use FR 401 upon completion of harvesting operations. These effects are very temporary. When harvesting operations are complete, the only noise, air pollution and other impacts to a wilderness experience in the IRA would be those that currently exist from NH Route 25 and 118, and existing roads and snowmobile trails used by visitors. Visibility of harvest operations would exist under this alternative. However, mitigations detailed in the recreation and visual effects sections, such as slash removal, buffers near trails, would greatly reduce the impact of timber management upon the average visitor looking for a wilderness experience (Criteria 4).

The South Carr Mountain IRA currently contains 0.08 miles of improved roads per 1,000 acres. Under this alternative, no additional road construction or reconstruction would be added. The road density would remain 0.08 miles per 1,000 acres (Criteria 5).

Table 11 shows the inventoried characteristics, and the proposed changes potentially affecting those characteristics. A moderate level of past timber harvest and road construction have occurred in the analysis area. The long-term IRA characteristics are not expected to change as a result of the vegetation management or other proposed actions in Alternative 2. The acres of harvest proposed in this alternative would not affect the size of the IRA or its' eligibility as roadless.

Alternative 2 would not have short-term effects upon solitude in the South Carr Mountain IRA. The South Carr Mountain IRA core area encompasses over 11,000 acres. In order to meet roadless criteria, the core area of solitude must be at least 2,500 acres and none of the activities proposed under alternative 2 are within the South Carr Mountain core area of solitude. The wilderness experience available in the South Carr Mountain IRA may be temporarily impacted by harvesting operations due to the presence of motorized equipment, noise and transient air pollution. However, long-term effects on the core area of solitude are not expected and the core area acreage remains well above the 2,500 acre threshold.

This alternative would add to the degree of disturbance in the Analysis area. The timber harvest activities would have a short-term effect that would be reduced as regeneration of vegetation occurs. The effects from the snowmobile by-pass would also be short term and not noticeably different from the existing snowmobile trail.

Alternative 2 would have limited effect on the roadless characteristics of the analysis area, and no effect on its eligibility as a roadless area. None of the proposed actions would result in an irreversible or irretrievable change in the condition of the land or its capability as potential wilderness.

### **Alternative 3**

Alternative 3 would have the least amount of direct and indirect effects on South Carr Mountain Inventoried Roadless Area of all alternatives, except for the no action alternative. No harvest units are proposed within the South Carr Mountain IRA. Noise would be audible during harvest operations in adjacent harvest units located outside of the IRA and from use of the snowmobile by-pass trail. Under Alternative 3, the duration of activity is expected to be 3 to 5 years.

Alternative 3 would have limited effect on the roadless characteristics of the analysis area, and no effect on its eligibility as a roadless area. None of the proposed actions would result in an irreversible or irretrievable change in the condition of the land or its capability as potential wilderness.

### **Alternative 4**

Alternative 4 would have less short-term direct and indirect effects on the South Carr Mountain IRA than Alternative 2. This alternative proposes 236 acres of harvest within the IRA, but no regeneration harvest would occur. This is well below the Forest Service roadless criteria of 20% of the IRA (4,453 acres) being harvested in the last ten years. The timber harvest activities would affect the untrammelled, natural appearance of this portion of the IRA, however effects would be temporary and would not be noticeable to the untrained eye within five years after project completion as no regeneration cuts are proposed under this alternative (Criteria 1 and Criteria 7). The remainder of the IRA, outside the harvest units, would continue to regain a natural, untrammelled appearance without interruption (Criteria 1 and Criteria 7).

The snowmobile by-pass trail proposed under this alternative includes the construction of approximately 1 mile of new trail within the IRA. This trail would only be used during the 3 – 5 years of timber harvest activities associated with the proposed action. Other trails that are present within the IRA are maintained according to Forest Service standards appropriate to the Management Area(s) in which they lie (Criteria 2). None of the proposed improvements or those that are currently maintained are inappropriate for the Management Areas in which they are located.

Alternative 4 would have no effect on road density in the IRA. The duration of the harvest activities would remain the same as Alternative 2 and 3 (3 to 5 years). The short term visibility of harvest operations is similar to Alternatives 2 and 3. With the slash removal zones and mitigations, defined in the recreation and visuals sections, the creation of unsightly conditions contrary to wilderness would be minimized (Criteria 4). This alternative could create some short term exposure to noise and truck traffic. This would be more than Alternative 2 and 3 because of the increased amount of treated acres proposed under this action alternative. Alternative 4 would treat 97 more acres than Alternative 2. Under this alternative no roads will be added to this IRA (Criteria 5).

Past timber harvest and road construction have occurred in the analysis area, and the long-term IRA characteristics are not expected to change as a result of the vegetation management or other proposed actions of Alternative 4.

Alternative 4 would have short-term effects upon solitude in the South Carr Mountain IRA. The South Carr Mountain IRA core area encompasses over 11,000 acres. In order to meet roadless criteria, the core area of solitude must be at least 2,500 acres. None of the activities proposed under Alternative 4 are within the South Carr Mountain core area of solitude. The wilderness experience available in the South Carr Mountain IRA may be temporarily impacted by harvesting operations due to the presence of motorized equipment, noise and transient air pollution. However, long-term effects on the core area of solitude are not expected and the core area acreage remains well above the 2,500 acre threshold.

Alternative 4 would have limited effect on the roadless characteristics of the analysis area, and no effect on its eligibility as a roadless area. None of the proposed actions would result in an irreversible or irretrievable change in the condition of the land or its capability as potential wilderness.

## Cumulative Effects on Roadless and Wilderness

The Analysis area for cumulative effects on roadless and wilderness is the South Carr Mountain IRA. This is the same as the analysis area for direct and indirect effects. The time frame includes the past decade, present, and foreseeable future (10 years). The cumulative effects analysis considers the prior 10-year period in order to be consistent with the FPR roadless inventory criteria regarding harvest in the last ten years. The cumulative effects analysis also considers reasonably foreseeable harvest through 2015, because that is when the inventoried roadless areas would potentially be re-evaluated for roadless values. The cumulative effects on roadless and wilderness are summarized in Table 11 below.

The timber harvest includes data from 1997-2006 and recent projects that included timber harvest in the South Carr Mountain IRA. The same data sources and time periods were used for road density information. Two other projects affecting these characteristics are proposed in the IRA in the foreseeable future. These two projects are addressed in Table 14, under “foreseeable future actions”.

**Table 11. Summary of Cumulative Effects on South Carr Mountain Inventoried Roadless Area and Proposed Wilderness**

<b>Roadless Characteristics</b>	<b>South Carr Mountain Inventoried Roadless Area</b>			
<b>Total Acres</b>	22,265			
<b>Total Harvested Acres</b>				
Acres that could be harvested and still meet roadless criteria (20% of the IRA)	4,453			
Acres Added by Batchelder Brook Proposal	<b>Alt. 1</b>	<b>Alt. 2</b>	<b>Alt. 3</b>	<b>Alt. 4</b>
	0	139	0	236
Acres Added by Other Proposals**	0			
Acres Added by Foreseeable Future Actions	250			
Inventoried Treatment Acres*	516			
<b>Cumulative Acres Treated</b>	<b>Alt. 1</b>	<b>Alt. 2</b>	<b>Alt. 3</b>	<b>Alt. 4</b>
	766	905	766	1,002
<b>Even-aged Regeneration Harvested Acres (clearcut, shelterwood, and seed tree cuts)</b>				
Acres of <b>Regeneration Harvest</b> Added by Batchelder Brook Proposal	<b>Alt. 1</b>	<b>Alt. 2</b>	<b>Alt. 3</b>	<b>Alt. 4</b>
	0	32	0	0
Acres of Regeneration Harvest Added by Other Proposals	0			
Acres of Regeneration Harvest Added by Foreseeable Future Actions	100			
Inventoried Regeneration Harvest Acres	146			
<b>Cumulative Even-Aged Regeneration Harvested Acres</b>	<b>Alt. 1</b>	<b>Alt. 2</b>	<b>Alt. 3</b>	<b>Alt. 4</b>
	246	278	246	246
<b>Improved Roads</b>				
Miles of road that could exist within the IRA and still meet roadless criteria	½ mile per 1,000 acres (11.5 miles)			
Inventoried Miles	0.08 per 1,000 acres (Total miles 1.9)			

	Alt 1	Alt 2	Alt 3	Alt 4
Miles Added by Batchelder Brook Proposal	0.00	0.00	0.00	0.00
Miles Added by Other Proposals	0.00			
Miles Added by Foreseeable Future Actions	2.00			
Inventoried Miles	1.9	1.9	1.9	1.9
<b>Cumulative Miles of Road</b>	3.9	3.9	3.9	3.9
<b>Cumulative Miles per 1,000 acres</b>	0.18	0.18	0.18	0.18
<b>Snowmobile by-pass trail (3-5 year use)</b>				
	Alt 1	Alt 2	Alt 3	Alt 4
Miles Added by Batchelder Brook Proposal	0	1	1	1
Miles Added by Other Proposals	0			
Miles Added by Foreseeable Future Actions	0			
Inventoried Miles	13.5	14.5	14.5	14.5
<b>Cumulative Miles of Snowmobile Trail</b>	13.5	14.5	14.5	14.5
<b>Solitude</b>				
Acres Required to Remain Roadless	2,500			
Inventoried Core Acres of Solitude	11,500			
Core Acres after Batchelder Brook Proposal (All Alternatives)	11,500			
Core Acres after Foreseeable Future Actions	11,500			

\* Acres harvested between 1997-2006.

\*\* No other proposals exists.

As detailed in Table 11, the cumulative effects on the South Carr Mountain roadless and wilderness characteristics would not compromise the ability of the area to continue to meet Forest Service roadless criteria. The Batchelder Brook Project is not expected to have any lasting or substantial direct, indirect, or cumulative effects on the South Carr Mountain IRA or its potential to be recommended for wilderness during the next Forest Plan Revision process.

None of the alternatives change the cumulative effects on road density. Alternatives 2 and 4 would add harvest acres and therefore the largest degree of disturbance to the IRA. However, this level is would not

be substantial enough to change the area's roadless designation or its ability to be considered for wilderness designation in the future.

## Summary and Conclusion

None of the action alternatives considered in detail in this document would change the South Carr Mountain IRA's roadless characteristics. Roadless area values and vegetation management activities have co-existed in this area previously, evidenced by the area's historical treatments and its inclusion in the roadless inventory. The effects from Alternative 3 would be limited to short-term indirect impacts from noise and traffic associated with harvest activities and would not persist once the harvest activities were completed. Alternatives 2 and 4 would have measurable direct and cumulative effects on the roadless criteria, but to a limited degree and would not affect the South Carr Mountain IRAs ability to meet the Forest Service roadless criteria.

Alternative 3 would not have any measurable effects on the wilderness characteristics of the South Carr Mountain IRA. Alternatives 2 and 4 may temporarily affect the wilderness characteristics of the IRA, by impacting the core area of solitude with the noise level associated with timber harvest activities in the stands located outside the core area of solitude. However, these effects would be short-term and would not result in an irreversible or irretrievable change in the condition of the land or its capability as potential wilderness.

## 3.3 Vegetation

### 3.3.1 Timber Resources

Within the Project Area and MA 2.1 lands in the Upper Baker HMU, there is a predominance of northern hardwood forest (77%). Species content, site factors, and other resource values have been analyzed for each stand to determine if even-aged or uneven-aged management is the most desirable type of silvicultural management.

Many of the stands within MA 2.1 in the Upper Baker HMU that have been identified for vegetative treatment are overstocked mature and old northern hardwood; softwood or mixedwood stands; containing trees that have low timber quality; 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) harvesting trees and controlling stocking in these stands would improve the quality and vigor of remaining trees.

#### 3.3.1.1 Affected Environment for Timber Resources

The Analysis area for direct and indirect effects on timber resources is the MA 2.1 lands within the Upper Baker HMU. These are the National Forest lands within the HMU that permit vegetation management using various silvicultural techniques. The analysis area encompasses approximately 8,900 National Forest acres. Approximately 85% of these lands comprise a closed-canopy forest of

mature and old, even-aged, and uneven-aged stands. The amount of closed and open canopy helps to describe the structural diversity within the Analysis area.

Of the stands being proposed for treatment, two stands (19 acres) are mixedwood, three stands (57 acres) are spruce/fir type, and 36 stands (799 acres) are northern hardwoods. These stands have reached a point where a treatment is recommended based upon the current stand condition, management objectives, Forest Plan standards and guidelines, and the respective Silvicultural Guides. Table 12, displays the comparison of silvicultural treatments by alternatives.

<b>Table 12: Comparison of Silvicultural Treatments by Alternative</b>								
<b>Activity</b>	<b>Alternative 1</b>		<b>Alternative 2</b>		<b>Alternative 3</b>		<b>Alternative 4</b>	
	<b>Stand Acres</b>	<b>Treatment Acres</b>						
<b>Even-Aged Management</b>								
Clearcutting	0	0	60	51	49	40	0	0
Overstory Removal	0	0	80	52	43	42	0	0
Thinning	0	0	15	15	11	11	80	62
<b>Uneven-Aged Management</b>								
Single-Tree Selection	0	0	148	145	81	78	523	520
Group Selection	0	0	413	86	246	50	134	30
Group Selection & Single Tree	0	0	21	4 and 16	21	4 and 16	0	0

## **Direct and Indirect Effects**

### **Alternative 1 – No Action**

Under No Action, 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, aspen, and/or oak to stands dominated by beech, sugar maple, yellow birch, and hemlock. Natural disturbances could modify this outcome by temporarily providing an opportunity for the less, shade-tolerant species. A modest increase in spruce/fir species content would be expected at higher elevations or on wet soil types.

Course woody material would be recruited on the forest floor as trees die. Remaining, healthy trees would grow larger. Larger trees would become more susceptible to ice damage, wind throw, and natural or exotic forest pests. Susceptibility to natural forces over time results in natural disturbances. These may occur in small pockets or over larger areas.

Dominant and co-dominant oaks in the overstories of oak stands would continue to control site conditions in these stands. However without periodic disturbance, and silvicultural treatments to reduce competition there would be too much shade. New oak seedlings cannot become established and compete to become trees in these shaded, overstocked stands comprised of shade tolerant hardwoods. The indirect effect of inaction along with the previous losses of young sapling and pole timber sized

oaks lost during the 1980 and 1990 gypsy moth defoliations would continue the trend toward eventual conversion of oak stands to northern hardwood stands.

As discussed, a portion of mature stands should be regenerated periodically to meet the desired future condition set for the MA's within the Project Area and to provide a predictable and sustainable amount of timber to harvest, which in turn maintains habitat in a series of stands in various age classes. A direct effect is that no young stands would be created. An indirect effect of no action would be the timber stands in question would continue to age. With each year that passes there would be a shift to the older age classes. That would continue the overall trend of few stands in the regenerating age classes being represented in the Project Area and in the forest. Most stands currently are in the mature age class of 60 – 119 years. Within the next two years, what few stands that are in the 0-9 year old *regenerating* age class now, in all MA's, would pass into the next age class, the 10-59 year old *young* age class. Older stands would continue shifting toward the mature and over mature categories and would not be affected by harvest.

### **Alternative 2 – Proposed Action**

Implementing the proposed action would maintain a mosaic of vegetative conditions and improve species composition by specifically increasing the amount of aspen and birch, which is a desired future condition in all MA's.

The delayed shelterwood harvests would create growing conditions for species that are tolerant of shade. Delayed shelterwood can also be used for regenerating species that are somewhat tolerant of shade, such as yellow birch and white ash. This type of shelterwood can be effective in regenerating aspen and paper birch when a lower residual basal area of 20-30 square feet per acre is retained. These species can occur in the most open and disturbed locations within these shelterwoods, such as near skid trails, intersections and log landings. Softwood species such as white pine and red spruce and hardwood species such as oak and black cherry may exist as seedlings or saplings in the understory of stands proposed for delayed shelterwood. These species would be released to grow better by the shelterwood harvest and would improve species diversity. Some new seedlings of these species could become established as a result of the harvest and reduction of shade. Species composition in areas harvested with uneven age regeneration harvest would remain largely the same.

There are 60 acres of mature trees that would be regenerated with clearcuts. Overstory removals on 80 acres would perpetuate the existing oak/pine and sugar maple with young growth of the same species targeted by the shelterwood cuts. Species content in clearcut treatments would shift more towards shade intolerants such as aspen, paper birch, and white ash. The disturbance may encourage regeneration of yellow birch, or hemlock. A few species of woody or herbaceous vegetation, that have seeds with a long period of dormancy, such as raspberry and pin cherry, would have an opportunity to germinate and become part of the ecosystem for a period of time. This would increase species diversity.

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 begin 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 have shown successful regeneration in even-aged and uneven-aged harvested stands. This harvest method is most likely to

result in aspen and paper birch representation in the regeneration mix. This method also produces the most productive, managed, early successional habitat.

Stands planned for group selection (90 treatment acres) would have regeneration cuts that are small in size, 1/2 to 2 acres and are located throughout the stand. These groups would regenerate, on average, 20% of the stand area. Group selection would continue to be practiced in these stands in future management entries. Regeneration would tend toward a broad mix of shade-intolerant, intermediate, and shade-tolerant species. Nearly all the species currently represented in the stored seed mix, or those originating from nearby seed trees, would have an opportunity to germinate and grow in these varied light conditions. There would be some variation in species mix from year to year due to seed periodicity and dispersal. 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. The amount of ground disturbance can affect species content. Disturbance would favor the establishment of raspberry, paper birch, and yellow birch.

In stands being treated with a thinning or using single-tree selection, a portion of the stand stocking would be cut and removed to stimulate regeneration and to harvest defective or declining and mature trees. Less than 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 mature or poor quality trees would be cut leaving a stand of smaller trees with a dense understory of tree regeneration and other woody plants. Over time residual tree growth and in growth fills in and returns the stand to full stocking. The residual stand restricts sunlight so that the treatment would favor shade-tolerant plants. Over time, there would be a shift in species toward beech, sugar maple, and hemlock. Eventually other species would be eliminated from the population. Single-tree selection allows managers to improve the quality of shade-tolerant growing stock. Beech trees that are genetically susceptible to beech scale disease or sugar maple trees affected by the sugar maple borer could be harvested and removed from the stocking.

Indirect effects include an increased risk of wind throw 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 wind throw until crowns expand to fill the canopy and the roots become wind firm. Some residual tree damage would occur from harvesting operations, but skid trails would be 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 as a result of prescribed burning in Alternative 2.

In Alternative 2, the prescribed burning in Compartment 11, Stands 1, 55, and 61; and Compartment 13, Stands 1 and 31, would be carried out in order to reduce the litter layer and competition in the understory. Understory vegetation would be cut to lay horizontal on the ground where necessary to reduce the chance for ladder fuels. Some trees can be expected to be damaged through scorching and/or searing. The location of fire control lines using the contour of the slope as a guide and implementation of post-burn erosion control measures where needed would minimize the short-term impact on exposed soil by preventing the erosion of topsoil and aid in re-establishment of vegetation on the site.

Construction of the snowmobile bypass would result in the disturbance and removal of herbaceous plants. Trees smaller than 5" diameter at breast height would be cut and removed from the trail as needed. These trees would be distributed along the bypass.

### **Alternative 3 – No Timber harvesting activities in the South Carr Mountain IRA.**

Alternative 3 proposes the same types of prescriptions described in Alternative 2 but eliminates all proposed timber harvesting and timber stand improvement activities in the South Carr Mountain IRA. The direct and indirect effects would be similar to Alternative 2.

### **Alternative 4 Reduced Even-aged management**

Alternative 4 proposes the same uneven-age treatments as alternative 3 but changes even-aged management prescriptions of clearcuts and overstory removals to thinnings or single tree and group selection. These prescriptions are viable treatments for these stands. The stands prescribed for group selection would be regenerated but over a longer period of time. A portion of the stocking, which is in between the groups and composed of short-lived and/or shade-intolerant species, would die before it can be harvested. Resulting regeneration would be more shade tolerant. In stands being treated using single-tree selection, the larger trees would be cut leaving a stand of smaller trees with a dense 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 shade-tolerant plants. Over time, there would be a shift in species toward beech, sugar maple, and hemlock. Eventually other species would be eliminated from the population.

## **Cumulative Effects on Vegetation**

The temporal scope for cumulative effects on timber resources is ten years past and ten years into the future (1996-2016). Ten years is particularly crucial as a time frame because it represents the length of time after a stand-replacing even-aged harvest when the stand is considered in the regeneration phase of growth (i.e. the canopy is not fully closed and sunlight can penetrate the majority of the ground). A review of the existing condition of the Upper Baker HMU shows a deficiency in the regeneration age class (0-9 years) in the northern hardwood, mixedwood, aspen-paper birch, and spruce-fir habitat types. With an open canopy, the early-successional, shade intolerant species such as aspen and paper birch can become established both at the stand level, and as a component in stands of other habitat types.

The Management Area 2.1 Lands in the Upper Baker Habitat Management Unit Cumulative Effects Area, is used for vegetative cumulative effects analysis through the end of the decade 2016, so that changes in habitat types resulting from different alternatives can be measured across the HMU and compared with forest plan standards. These are the lands that are allocated to vegetative management in the Forest Plan. Similar treatments to those proposed in the Batchelder Brook Project, are anticipated in compartments 8, 9, 10, 15, and 16 through 2016. The time period covers the future (1996-2016), because forested age classes occur in ten-year increments, and regenerating age class is 0-9 years old.

One of the objectives of vegetation 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. Timber harvest is the primary tool for achieving those objectives. Whether cutting individual trees or entire stands, timber harvest can affect age class distribution, species diversity, and overall stand condition. Within the Upper

Baker HMU, habitat objectives are based on the ecological capability of the lands within the HMU, and they contribute to the habitat objectives of the larger National Forest.

### **Alternative 1**

The overall effects would be the same as those discussed under direct/indirect effects but across the cumulative effects area as a whole. There would be no additional harvesting in the No Action Alternative. Regeneration cutting completed in the 1990's in the Batchelder Brook Project Area would continue to grow. By 2008 there would be no early successional habitat in the HMU unless there was a natural event. Approximately 70 acres of clearcutting is anticipated with two other projects in the HMU before the end of the decade. It would provide the only regenerating age class in the Upper Baker HMU at the end of the decade.

This alternative would not contribute incrementally to the effects of timber harvest or land clearing within the Analysis area over the 20-year period from 1996-2016. Without timber harvest now or over the next 10 years; species, age class and structural diversity would remain static or diminish on National Forest lands within the Upper Baker 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 would age and grow closer to the surrounding canopy. This would have the effect of reducing sunlight to the forest floor and reducing early-successional habitat for wildlife. Mature stands of the short-lived (50-60 years) paper birch and aspen community types would 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, oak regeneration in Compartment 11, Stands 3, and 61 and Compartment 13, Stands 1 and 13 would lose ground to hardier northern hardwoods, and persist only as a component of this stand. The existing spruce-fir throughout the proposed harvest units, may eventually drop out of the species mix. The same is possible for advance regeneration of pine in Compartment 11, Stands 3, and 61 and Compartment 13, Stands 1 and 13, although it is more likely that pine would be retained as a component in these stands.

Timber harvest on private and public lands has and will continue to result in temporary changes in age class and distribution similar to that which occurs on National Forest land. Residential development is likely to continue at the same pace, resulting in small openings created in some forested areas for individual house lots. Concentrated development will most likely be the exception rather than the rule in this area.

Residential use can result in long-term changes to the landscape, including the introduction of grassy openings, ornamental plants and artificial feeders in a manicured setting, and an increased human influence on surrounding lands. Openings around the houses and outbuildings will contribute to edge effect for wildlife and 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 also 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.

### **Alternatives 2-4**

Treatments would be applied to the Project Area to achieve Forest Plan objectives. Proportionately similar amounts of treatments are anticipated for one other project within the Upper Baker HMU over the next ten years. Both Alternatives 2 and 3 create a regenerating age class in the northern hardwood and spruce/fir types. Alternative 4 does not create any new regenerating age class.

The increase in the regenerating age class in Alternatives 2 and 3 also results in a decrease in the mature and/or over-mature age classes, depending on which stands are harvested. Because the northern hardwood stands available for regeneration are primarily in the mature age class, there is an overall decrease in the mature age class in both action alternatives.

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 19<sup>th</sup> 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 lower elevation areas may have been managed for domestic livestock.

Since 1996, a total of 88 treated acres on MA 2.1 lands have been harvested within the Upper Baker HMU. The 88 acres were treated in 1997 and comprised 13 acres of uneven-aged management using group selection harvest and 75 acres of even-aged management using clear cut and patch cut harvest. This harvest activity occurred within the Project Area with the implementation of the old Batchelder Brook Timber Sale. The 88 acres harvested in 1997 are presently transitioning from a regeneration age class to a young age class. There is no evidence of abnormal residual damage from previous harvest activities.

Private ownership within the Cumulative Effects Analysis area is primarily in parcels of 250 acres or less. A variety of activities are taking place on these private lands, including timber harvests, residential development, developed camping opportunities, and gravel pits. Timber harvests have occurred in the form of commercial thinnings, group and individual tree selection cuts and clearcuts. Trends within the Cumulative Effects Analysis area are consistent with those identified in the 2005 FEIS (USDA-Forest Service, 2005b, pp 3-80 to 3-86), which show a continuing loss of forested land and gradually decreasing parcel size across Vermont and New Hampshire.

A look at the lands directly adjacent to the Project Area reveals ownership patterns similar to that described by the 2005 FEIS. To the northwest of the Project Area there is a privately owned 90 acre campground and seasonal trailer park. Approximately 1,600 acres of private land are managed forest lands. The remaining acreage ranges from 5 acres to 170 acre lots. Many parcels have owners who do not live on the property, but the property may have structures, most likely a second home or an old cabin or homestead that was part of land when it was purchased. The larger parcels could be subdivided and sold as residential lots, continue as managed forest lands, or left to grow naturally. The residential parcels will likely continue as such, and the other smaller parcels could be maintained as vacation or investment properties, or converted to residential.

For National Forest lands within the Cumulative Effects Analysis area, in the foreseeable future there is potential for additional vegetation management activities within the Upper Baker HMU 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 within the Upper Baker HMU. The need for vegetation management activities within the HMU would be dependent on site specific assessment over the next decade of existing conditions and opportunities to meet habitat objectives.

Effects of activities on private lands within the Analysis area are the same as those described for Alternative 1.

### 3.3.2 Non-Native Invasive Species

#### 3.3.2.1 Affected Environment for Non-Native Invasive Plants

**The Analysis Area for direct and indirect effects on non-native invasive plants** is the Project Area, because this is where vehicles and equipment associated with the proposed project actions would 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 Analysis Area for cumulative effects of non-native invasive species** is the MA 2.1 lands within the Upper Baker HMU, and the adjacent public and private land in surrounding Towns. The private property includes a mix of upland hardwoods, softwood, mixedwood intermixed with lakes, ponds, wetlands, perennial and intermittent streams, and residential development. **The temporal scope for cumulative effects of non-native invasive species** is the past and future ten years (1996 to 2016). This considerations 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), the ten years it will take the temporary openings established by the Proposed Action and its alternatives to re-establish a closed canopy, and construction and residential development that may have or could introduce NNIS during this period. This time frame also allows consideration of the forestwide invasive plant inventory conducted by the New England Wildflower Society (2001 and 2002) that covered 220,000 acres across the National Forest and adjacent lands, including portions of the Cumulative Effects Analysis Area (USDA-Forest Service, 2005b, Chap. 3-154-155).

The White Mountain National Forest has been working with The New England Wildflower Society to determine locations of non-native invasive plant species, resulting in 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, and residential and recreation areas.

**Roads:** Roads increase the amount of forest-edge habitat on the landscape. The resulting “road-effect zone” can alter microclimates (e.g. increases in light and temperature and a decrease in relative humidity) and frequent and intense disturbance activities (maintenance and traffic), the combined effects of which tend to favor the growth of opportunistic NNIS (Parendes and Jones 2000; Forman and Deblinger 2000). Roads can 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 vehicles (e.g., tires and undercarriages) (Westbrooks 1998; Parendes and Jones 2000; Lonsdale and Lane 1994). Resulting weed infestations can extend from the road’s edge to 250 meters into the adjacent forest, or beyond (Saunders et al. 1991; Primack 2000; Forman and Deblinger 2000). A Wisconsin study found that non-natives were most prevalent within 15 meters of the road; however, a few species penetrated up to 150 meters into the adjoining hardwood forest (Watkins et. al. 2003).

**Skid trails:** Skid trails and haul roads within timber sales can serve as the primary conduits for non-native species for the same reasons outlined above. A study on managed forest landscapes in Upper Michigan

found that understory plant richness was significantly greater in haul roads than in skid trails and forest, due in large part to a greater percentage of introduced species (Buckley et al. 2002). This increase in non-natives was due predominately to elevated levels of photosynthetically active radiation (a measure of light intensity), soil moisture, and compaction along the road edges. The discrepancy between haul roads and skid trails is likely due to improved conditions (e.g, graded and graveled) and increased traffic along the former. A study in Utah supports this reasoning, finding that roadside habitats adjacent to paved and improved surface roads contain a greater cover of both exotic and native species than similar habitats adjacent to less-impacted four-wheel-drive tracks, a trend that extended well beyond the road cut into adjacent, interior plant communities (Gelbard and Belnap 2003).

**Riparian Areas:** Several studies found that riparian areas that have high native species richness also have high non-native species richness, due 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). Also, streams and rivers form a connected network throughout the landscape, thus facilitate the spread of both native and non-native species at a large geographical scale. Disturbance in and around riparian areas, would greatly increase the risk of introducing and spreading non-natives to these vulnerable ecological communities.

Several invasive plant species (Japanese knotweed and barberry) were documented in Compartment 13, Stands 3) within the Project Area during a site-specific botanical survey (Fife 2004). These documented locations and other site-specific field reviews were used to evaluate the likelihood of NNIS spreading into the Project Area and the environmental consequences of their potential establishment.

### **3.3.2.2 Direct and Indirect Effects for Non-Native Invasive Plants**

#### **Determination of Risk**

Forest Service Manual 2080.44.6 outlines the process to determine the risk of NNIS introduction or spread as part of the NEPA process for proposed actions. Given the implementation of the 2005 LRMP standards and guidelines for controlling the introduction or spread of NNIS, and the few known NNIS populations in and around the Project Area, the overall risk rating assigned for the Batchelder Brook Project is “very low” (USDA-Forest Service, 2005e, NNIS Risk Assessment).

#### **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, or other activities. NNIS could still be introduced by vehicles travelling on Forest Road #401 and 479, or road maintenance activities along these roads. There would be a lost opportunity to eradicate the Japanese knotweed and barberry within the Project Area.

#### **Action Alternatives 2, 3, and 4**

Implementing the 2005 LRMP standards and guidelines 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 roads FR 401 and 479, log landings, and skid trails, and constructed fire lines around stands prescribed for burning.

The potential for NNIS to migrate into the Project Area from surrounding areas is greatest in clearcuts where the canopy is removed. Migration is typically through wildlife or wind transporting seeds, and the risk is greatest for 1-2 years after harvesting, when native plant species are starting to revegetate the sites. The potential effect of NNIS migration into clearcuts is greater in Alternative 2 (51 clearcut treatment acres), followed by Alternative 3 (40 clearcut treatment acres). There would be no potential for migration of NNIS into clearcuts in the Project Area under Alternative 4 (no even-aged management proposed).

### **3.3.2.3 Cumulative Effects for Non-Native Invasive Species**

While there are few known locations of NNIS within the Cumulative Effects Analysis Area, there is a greater likelihood of introducing and/or spreading NNIS within this area as a result of activities on private lands than on National Forest lands. The forestwide NNIS inventory (New England Wildflower Society 2001 & 2002) 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, FEIS, pp 3-154 and 3-155). 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 though there are known NNIS populations within the Cumulative Effects Analysis Area, and with incorporating the 2005 LRMP standards and guidelines, the cumulative effect of implementing the Proposed Action or one of the action alternatives incurs a minor risk of introducing NNIS into the Analysis Area.

## **3.4 Soils**

### **3.4.1 Soil Erosion and Compaction**

#### **3.4.1.1 Affected Environment for Soil Erosion and Compaction**

The analysis area for direct and indirect effects on soil erosion and compaction are the stands proposed for treatment as part of the Batchelder Brook Vegetative Management Project. Under Alternatives 2 and 4, the project analysis area totals 875 acres. Under Alternative 3 the Project Area is 559 acres. The project analysis areas lie within the Batchelder Brook, Unnamed Tributary, and Patch Brook. 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 analysis area has soils common to the White Mountain National Forest, where soils 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 indicates this soil hazard does not exist here (Colter, 2006). Therefore, soil erosion and compaction are the potential physical hazards resulting 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 which method of harvesting to use (even or uneven-aged management) and in what seasons harvesting can occur to minimize soil disturbance. Table 13 lists the ELTs represented in the Project Area. Where clear-cutting has occurred, regenerated stands clearly show adequate stocking.

<b>Table 13. Ecological Land Type (ELT) by Forest Stand</b>		
<b>Stands</b>	<b>ELT</b>	<b>Description</b>
Parts of stands: 11-19, 11-55, 11-03, 11-01, 11-45, 11-48, 11-44, 11-61, 11-39, 12-23 and 12-25	115G	The climax species for this ELT is sugar maple and beech and red maple and yellow paper birch as subclimax species. 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.
Parts of stands: 11-04, 11-06, 11-55, 11-19, 11-08, 11-22, 11-30, 11-39, 12-25, 12-23, 12-32, 12-28, 12-57, 12-04, 12-07, 13-03, 13-09, 13-20, 13-05 and 13-30	115a	The climax species for this ELT is fir, spruce & hemlock with a 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.
Parts of stands: 13-04 and 13-31	415A	The climax species for this ELT is a spruce and fir with a subclimax species of yellow birch, sugar maple, and paper birch. It is usually found lower slopes and intervals at lower elevations with slopes less than 30%. 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.
Parts of stands: 11-01 and 11-62	415C	The climax species for this ELT is beech and sugar maple with subclimax species of yellow birch, paper birch and red maple. It is found on lower mountain slopes and intervals. Surface soil erosion is high. The soil type is friable, non-plastic, well drained, fine sandy loams, with high suitability for summer operations.
Parts of stands: 11-62	402C	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.
All of stands: 11-09, 11-23, 11-60, 11-24, 12-06, 12-11, 12-33, 12-10; Parts of stands: 11-06, 11-44, 11-62, 11-04, 11-30, 11-22, 11-21, 11-08, 11-61, 12-25, 12-23, 12-28, 12-07, 12-04,	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.

**Table 13. Ecological Land Type (ELT) by Forest Stand**

Stands	ELT	Description
12-57, 12-32, 13-04, 13-31, 13-30, 13-05, 13-20, 13-09, 13-03, 13-01 and 13-26		

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.

**Soil Erosion**

Surface soil erosion is typically a concern related to roads and skid trails. 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, FEIS, pg 3-29) The State of Maine recently published monitoring data that supports the conclusion that properly applied Best Management Practices will mitigate effects from soil erosion (Maine Department of Conservation, Maine Forest Service, 2005. Maine Forestry Best Management Practices Use and Effectiveness 2001-2003) and while the results of a similar study in New Hampshire have not yet been published, Maine and New Hampshire BMP’s are similar. It is therefore assumed that the effectiveness of these BMP’s is also 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). Authorized, all-season roads in the Project Area are maintained to Forest Service standards that help prevent concentration of water on the road surface. BMP’s 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) (Mitigation, see Appendix D). Previously used temporary roads and landings have stabilized, and several are re-vegetated. Water-bars are in place on skid trails and there is no evidence of accelerated soil erosion on them (Colter, 2006).

**Soil Compaction**

While improper harvesting operations could reduce forest productivity of subsequent timber stands by compacting soils to the extent that germination and root growth are inhibited, or by creating nutrient deficiencies; aside from skid roads, compaction is seldom a concern on properly conducted logging operations (Hornbeck and Leak 1992). Although more intensive mechanized harvesting systems can cause soil disturbance over more of a harvest unit (Martin 1988), the timber sale administrator would monitor mechanized systems for evidence of increased compaction and take measures to mitigate this effect if it appears likely to occur (See Appendix D).

Soil compaction can also become more of a concern if skid trails are used when wet. Best Management Practices recommend planning harvest operations during appropriate soil and weather conditions. Slash from delimiting trees at the log landings would also be spread on skid trails to reduce potential for compaction (and erosion) (Mitigation, see Section 2.0.4 & Appendix D).

Research shows that immediately following winter harvesting, increases in bulk density occur in the upper 8 cm of soil on skid trails, but these differences were not appreciably different than control values 3 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 trails confirmed these results in the analysis area, as none of the main skid trails exhibited residual effects of compaction from harvesting activity in the Batchelder Brook and Clifford Sales Timber Sale of the early 1990's, the last time some of these trails were used (Colter, 2006).

Existing log landings from previous sale activity are well located and stabilized, and field inspection found no signs of soil erosion or effects from soil compaction as a result of the last harvest activity in 1996 (Colter, 2006). Landings are not considered a noteworthy source of soil erosion (Stone et al 1978), but may 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). Soil Quality Standards for the Eastern Region of the Forest Service require that soil disturbance (exposure of mineral soil) should be limited to no more than 15% of a Project Area (USDA-Forest Service Handbook, Supplement R9RO 2509.18-2005-1, Section 2.2).

### 3.4.1.2 Direct & Indirect Effects on Soil Erosion and Compaction

Table 14, displays the ground disturbance by alternative.

**Table 14. Ground Disturbance, by Alternative**

<b>Activity</b>	<b>Alt 1</b>	<b>Alt 2</b>	<b>Alt 3</b>	<b>Alt 4</b>
Existing Landings (acres)	0	6.75	5.25	6.75
New Landings (acres)	0	0.75	0.75	0.75
Roads Construction (miles/acres)*	0/0	0/0	0/0	0/0
Road Maintenance (miles/acres)	0/0	3.0/7.2	2.5/6	3.0/7.2
Skid Trails (miles/acres)	0/0	14.2/34	4.5/10.8	14.2/34
Snowmobile Trail Bypass Construction (miles/acres)	0/0	1/2.4	1/2.4	1/2.4
Mt. Carr Trailhead Improvement (acres)	0	1	1	1
Total Disturbed Acres	0	52.1	26.2	52.1
Total % of Project Area Disturbed	0%	6.0% of 875 ac.	4.7% of 559ac.	6.0% of 875ac.

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

\*\*hiking trail width =5ft

### **Alternative 1: No Action**

The direct effects for Alternative 1 may be localized soil erosion related to on-going maintenance of Forest classified roads. 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 reconstruction, 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 2-4**

The Action Alternatives propose to develop a parking area for the Mt.Carr trailhead. This 1-acre parking area would utilize an existing log landing. New ground disturbance is expected to be minimal due to the parking area being located on an already disturbed site.

Approximately 3.0 miles of existing road is proposed for reconstruction or maintenance under Alternative 2 and 4, and 2.5 miles of existing road is proposed for reconstruction or maintenance under Alternatives 3. Road reconstruction allows for a higher level of use than the road was originally designed for, such as summer and fall use on a road originally designed for winter use only. This would involve improved drainage and surfacing on the roads. Road maintenance may involve cleaning culverts, blading the road surface, and/or road resurfacing. Although road reconstruction and maintenance may initially cause ground disturbance, improving and maintaining roads for their level of use can prevent future erosion. Research has shown that maintenance, such as resurfacing roads with a layer of gravel, reduces sediment losses (NCASI, 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.

All Action Alternatives propose 2.4 acres of new snowmobile trail bypass construction. The soil type is moderately to well drained, sandy loam with slopes less than 20%. There is some soil erosion potential from new construction because mineral soil is exposed but all road construction would follow Forest Plan Standards and Guidelines as well as BMP's to minimize the soil erosion potential. Following use, the road would be rehabilitated to BMP standards, which have proven effective in preventing soil erosion (Maine Forest Service, 2002 and 2005, Stafford, et.al. 1996).

The majority of the activity area is moderately sloped, with steep slopes in some locations. The lengths of these slopes 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 BMP's, such as stabilization and water bars, should prevent soil erosion and promote revegetation (Maine Forest Service, 2002 and 2005, Stafford, et.al. 1996) Most of the land was first managed for agriculture by early settlers. Timber harvesting under National Forest ownership began in the 1950s and has been conducted on the average of every 15 years in the Project Area.

Non-native invasive species (NNIS) have been documented in the Patch Brook watershed. Japanese Knotweed, is proposed for removal through herbicide use.

Glyphosate is an herbicide which binds readily with soil particles, which limits its movement in the environment. Studies have indicated that since it binds strongly to soils it is unlikely to enter waters

through surface or subsurface runoff. It can reach waters when the soil itself is washed away, but it remains bound to soil particles and unavailable to plants (summarized by Tu et al., 2001). Glyphosate remains unchanged in the soil for varying lengths of time, depending on soil texture and organic matter content. The half-life of glyphosate in soil can range from 3 to 249 days. Soil microorganisms break down glyphosate (USDA-FS, 1997). Studies have shown no adverse effects on soil microorganisms, including soil nitrogen cycling processes (USDA-FS 1984). The recommended formulation for this chemical is sold as Rodeo<sup>®</sup> because it does not contain surfactants, which have the potential to be mobile and pollute surface or groundwater sources (Tu et al., 2001).

The application method proposed for the Japanese Knotweed population is cut stem. This involves cutting the stem of the plant, and then injecting or wiping the herbicide into the exposed stem. This method would avoid contact of the herbicide with surrounding soil or water and limit the amount applied. Spraying of herbicides is not proposed. The State of New Hampshire would determine the terms and conditions under which the proposed herbicide use is approved. Conditions may include providing notice of treatment, posting signs, adjusting application rates, etc. All state standards would be abided by and all permits would be obtained prior to the start of work.

Manual control of non-native invasive species (NNIS) may also be used in the Project Area. This could include cutting, hand-pulling, and excavation. Excavation can cause soil disturbance and subsequent sediment mobility. However, any increases in sediment would likely be small and the effects of such increases would be short-term.

The harvest units will be harvested only in the winter or have the option of winter harvesting (refer to the tables in chapter two for the specific units). With frozen soils, proper skid trail location, and careful closeout at the end of operations, minimum surface soil erosion or soil compaction is likely to occur (Maine Forest Service, 2002 and 2005, Stafford, et.al. 1996). Over-snow operations should produce very little compaction since operations would not have direct contact with mineral soil, and any effects from compaction should disappear by the following winter. Harvesting and skidding on stands during summer or fall would expose mineral soil, particularly on the main skid trails, and it is likely there would be site specific instances of surface soil erosion from loss of organic cover. Planned layout and management of skid trails, using breaks in terrain and avoiding steep slopes in accordance with Forest Plan standards and guidelines (USDA-Forest Service, 2005a, LRMP, pg 2-30), and limiting operations to dry conditions (Maine BMP's) would largely minimize or avoid soil erosion. Some temporary compaction would be expected on main skid trails but this would be minimized by mitigation measures (see Section 2.0.4 and Appendix D), and soils should fully recover from any compaction within three years of the end of operations (Donnelly et al., 1991).

In Alternatives 2 and 4, nine existing and one new log landings are proposed for use during harvest. For Alternative 3, seven existing and one 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 the landings can revegetate, and to accelerate recovery from temporary soil compaction (FSH 2509.22, Section 6.38).

Five stands in the Project Area are proposed for prescribed fire to help promote oak and white pine regeneration and to improve wildlife habitat. 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 restoration, culvert removal, skidding, stream crossings, stream restoration and watershed rehabilitation. See the Water Resources Report of this document for an analysis of indirect effects of sedimentation.

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 and 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. Well distributed rainfall, abundant seed sources, and favorable seedbeds all contribute to rapid revegetation. 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 enough that sunlight is usually limited, so herbaceous plants do not re-invade on these locations.

The potential effect of timber harvesting on forest productivity is indirect. 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 forest productivity due to human impacts, even including the impacts of acid deposition (Nuegenkapan, 1998 and FEIS 3-13).

All former clearcuts in the vicinity have regenerated following 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; Johnson et al 1997).

### **3.4.1.3 Cumulative Effects on Soil Erosion and Compaction**

**The Analysis area for Cumulative effects on soil erosion and compaction** is the Batchelder Brook, Unnamed Tributary, and Patch Brook watersheds. The total acreage of the watersheds is approximately 5,100 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 ten years in the past, and ten years beyond the Proposed Action and its alternatives. These periods were chosen to incorporate the last timber harvesting operations on National Forest lands within the analysis area (Batchelder Brook and Clifford Sales Timber Sale of the early 1990's), to consider present effects on soil resources resulting from any past soil disturbing actions, to allow time for the proposed activities to occur and be completed, and 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.

Although possible, no additional timber harvest is planned on National Forest lands within the Cumulative Effects Analysis area over the next ten years, and no other projects are anticipated within this area during this time frame that would use the skid trails or landings. The Forest authorized roads in the Cumulative Effects Analysis area would continue to be maintained and used for public and administrative access.

### **Alternative 1: No Action**

There will continue to be localized erosion related to on-going maintenance of Forest roads and private roads and driveways, and construction of new roads associated with residential development and timber harvest on private lands.

### **Action Alternatives 2-4**

Compaction can accumulate on the ground due to repeated activities. However, there is little or no evidence of compaction from previous harvesting activities (Batchelder Brook and Clifford Sales Timber Sale of the early 1990's) on National Forest lands (Colter, 2006), implying that the soil has effectively recovered from this activity. Use of 2005 LRMP standards and guidelines and BMP's would minimize the hazard and duration of effects due to soil erosion and compaction (USDA-Forest Service, 2005b, FEIS, pg 3-29; Maine Forest Service 2002 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 BMP's 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. Impacts of residential development depend on the amount of clearing, excavation and landscaping for each site. Given the moderately sloped terrain of the Cumulative Effects Analysis area, the potential for steep, erosive access roads and building lots is less than it might be elsewhere within and adjacent to the National Forest. Landscaping and erosion control measures will determine whether effects of residential development are short-term or long-term.

Land management activities such as harvesting 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 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 effects from sedimentation and stream bed loading.

The Batchelder Brook project would result in a short-term increase in the amount of the Analysis area that has disturbed soils. Referring back to Table 14, the Action Alternatives result in soil disturbance on 52.1 acres, or 6.0% of the 875-acre Project Area in Alternative 2 and 4, and soil disturbance on 26.2 acres, or 4.7% of the 559-acre Project Area in Alternative 3.

The amount of private land within the cumulative effects watershed, (the Batchelder Brook, Unnamed Tributary, and Patch Brook) is approximately 1,105 acres. If all of these adjacent private lands were to receive active forest management or residential landscaping over the cumulative effects ten-year period, this would equate to an average of 44 acres of private land that might experience some level of soil disturbance in a given year.

Impacted soils take three years to recover from erosion and compaction. The amount of adjacent *private* land experiencing possible effects from soil disturbing activity may be as much as 176 acres (3 years past, plus current year). Assuming an average of 15% soil disturbance per acre of private land, then the amount of disturbed soil over this period would be 59 acres per year.

Referencing Table 14 above and rounding numbers up, if Batchelder Brook Vegetative Management Project were implemented in three years; then the impacted National Forest would be 156 acres (Alt 2 and 4), and 78 acres for Alternative 3.

If Batchelder Brook Vegetative Management Project was implemented during the same three year period using the most impactful Alternative (#2), combined with possible maximum impacts (59 acres) on private land and 52 acres for public land, a total of 111 acres would be affected cumulatively.

The amount of the 5100-acre Cumulative Effects Analysis area that might experience soil erosion and compaction over the course of the Batchelder Brook Vegetative Management Project is a maximum of 111 acres, or 2.2 percent soil disturbance over the life of the project using the most impactful Alternative (#2), the maximum harvest for Batchelder Brook (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. These effects 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 FEIS (USDA-Forest Service, 2005b, FEIS, pp 3-29 to 3-36).

## **3.4.2 Soil Productivity**

### **3.4.2.1 Affected Environment for Soil Productivity**

The Forest Service defines soil productivity as “the inherent capacity of the soil to support the growth of specified plants, plant communities or sequences of plant communities.” Soil productivity may be expressed in a variety of ways including volume or weight/unit area/year, percent plant cover, or other measures of biomass accumulation. (USDA-Forest Service, FSH 2509.18)

The 2005 FEIS identifies a general concern and analyzes in detail the potential impacts of acid deposition and timber harvest on soil productivity, including the cumulative impacts of these factors. The main focus of this analysis is on soil calcium, based on research on watershed studies (Federer et al, 1989; Likens et al., 1998; Bailey et al., 2003), experimental watershed acidification (Fernandez et al., 2003), and retrospective soil analysis (Lawrence et al., 1997; Bailey et al., 2005). This analysis for the Proposed Action and its alternatives incorporates by reference the soil productivity analysis in the FEIS.

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 1930's to ten years into the future, which is the reasonable planning horizon for a future harvest (see Vegetation Section, 3.3). 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.

### **3.4.2.2 Direct and Indirect Effects to 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 harvest is that calcium in the trees would not be removed from the site. 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 direct effects of the Action Alternatives can be demonstrated by comparing even-aged harvest (clearcut, seed tree cut, shelterwood seed and prep cut) to uneven-aged harvest methods (individual tree and group selection cuts). The Action Alternatives would each have 79 acres of even-aged harvest and 220 acres of uneven-aged harvest. This distinction is made because the quantity of calcium removed in the short-term by timber harvest varies by area and by harvest method. A conventional bole-only clearcut harvest removes about 350 kilograms per hectare of calcium or 3.2% of the total estimated pool from a northern hardwood site. Selection harvest removes about 87.5 kg/ha of calcium or <1% of the total estimated pool from a northern hardwood site. (USDA-Forest Service, 2005b, pp 3-17 to 3-19). The estimated soil calcium loss therefore might be 2-3%. In the short term, clearcutting removes the greatest amount of calcium at an individual site. All proposed harvesting in the Action Alternatives is considered bole-only; because, while whole tree skidding is permitted, tops and limbs would be returned to the harvested stands wherever possible. Whole tree skidding in summer or fall is likely to remove a portion of the leaf matter during the process, but it would still be deposited on the forest floor and retained within the Project Area.

The effects on soil productivity from mechanical scarification in both Action Alternatives would be minimized by leaving random areas of coarse and fine woody debris on site and mixing soil and organic matter rather than removing all the organic matter, thus reducing the chance of erosion and loss of nutrients.

Prescribed burning of stands 1 and 17 in Alternative 2 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, but some nutrients are not affected by burning. For example, burning would not reduce soil calcium, 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.

With respect to indirect effects, referring to the 2005 FEIS, 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) 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)

### **3.4.2.3 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% 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, p 3-24) Given that the cumulative effects time period goes back 75 years, it is possible that up to 3 percent of the base 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, but there would be no additional loss due to timber harvest.

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. 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 would add new potential harvest impacts by removal of trees and their biomass. However, referring to the 2005 FEIS, 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)

The cumulative effect on soil productivity, including estimated calcium depletion, of the bole only timber removal proposed in the Action Alternatives - in combination with early forest harvest and atmospheric deposition over the past 75 years, and the next 10 years – potentially is only slightly more than the No Action Alternative.

## 3.5 Water Resources

### Design Features Related to Water Resources (Section 2.0.4)

Herbicides would not be applied to plants when the forecast indicates a possibility of rain. This is designed to prevent the potential of herbicides washing off plants during heavy rainfall.

The following soil and water conservation practices are emphasized for this project (*LRMP, Forest-wide, water resources, Soil and Water Conservation Practices, S-1, p 2-30*). Combined with Standards and Guidelines and BMP's applied site specifically, these are expected to be effective in meeting water quality standards (USDA-Forest Service, 2005b, EIS, pg 3-54).

- The operating period of timber sale activities are limited to specific season of harvest and/or ground conditions specified in the timber sale contract to minimize environmental effects. This will be monitored by the Timber Sale Administrator.
- Skidding patterns are designed to fit the terrain to control the volume, velocity, concentration, and direction of runoff water in a manner that will minimize erosion and sedimentation. This preventative practice would be achieved by minimizing the length of skid trails, locating the skid trails in advance, adding drainage features such as waterbars, and designing skid trails to cross streams at right angles. This will be implemented by the Timber Sale Administrator.
- Upon completion of harvesting operations, skid trails will be closed and bare ground seeded as needed in areas where soil erosion potential occurs, such as steep ground and near stream crossings. The Timber Sale Administrator will designate the areas of disturbed soils that must be treated and monitor effectiveness of treatment.
- Minimize the erosive effects of water concentrated by roads by practices such as constructing cross drainage structures and dispersing runoff away from surface water. This is a preventative practice which would be monitored by the Timber Sale Administrator until the ground is stabilized.
- The number of stream crossings are minimized. Necessary crossings are designed to provide for unobstructed flows during bankfull conditions, as well as for the passage of debris and aquatic organisms. All temporary stream crossings would be removed following use. The Timber Sale Administrator would visually monitor stream crossing sites to catch and rectify any problems in the early stage. This monitoring would continue until the area has successfully stabilized.
- Maintain proposed and existing roads to prevent rutting and failures. Adequate maintenance and/or restriction of use can minimize erosion problems. The Timber Sale Administrator would visually monitor roads proposed for use and prescribe corrective measures as needed.

Batchelder Brook Vegetative Management Project is located in the Batchelder Brook (1370 acres), Unnamed Tributary to the Baker River (360 acres), and Patch Brook (3390 acres) watersheds. The total acreage of the watersheds is approximately 5,100 acres. It lies within the 10-digit hydrologic unit

code (HUC) Baker River watershed (0107000103), and is aligned east to west with the outlet to the west.

### **3.5.1 Water Quantity**

#### **3.5.1.1 Affected Environment for Water Quantity**

**The Analysis area for direct and indirect effects on water quantity** is the Batchelder Brook, Unnamed Tributary, and Patch Brook watersheds. These watersheds were delineated into smaller subwatersheds of first and second order perennial streams to analyze potential localized effects in closer detail. Water quantity in streams in the Analysis area is directly related to the amount of precipitation that occurs throughout the year. At Hubbard Brook, 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 on the White Mountain National Forest similar to the one found in the Analysis area. Therefore, the results of this research can be applied to the Proposed Action and its alternatives.

#### **3.5.1.2 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. Current and on-going management activities would continue, consistent with the 2005 LRMP; but no new management activities would be initiated as a result of this proposal.

##### **Action Alternatives 2-4**

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 3-4 years after timber harvest, and became undetectable 7-9 years after harvest. Most of the increase in water yield occurs during the summer in periods of low flow (Hornbeck, et al 1997).

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 those sub-watersheds, because the Action Alternatives do not exceed the 25% threshold (Table 15). As described in the Forest Plan EIS, although there may be small localized effects, no measurable increase in water yield is expected in the channels associated with any of the sub-watersheds, and there would be no change in stream stability resulting from an increase in discharge from the proposed timber harvest activities (USDA-Forest Service, 2005b, EIS). Table 15, displays the percent of basal area anticipated to be removed from the Project Area.

**Table 15. Percent Basal Area Removed**

Sub-Watershed	Stream Type	% Basal Area Removed by Alternative			
		1	2	3	4
Clifford Brook (1820 acres)	Perennial	0	3	3	3
Patch Brook (3390 acres)	Perennial	0	2	2	2
Batchelder Brook (1370 acres)	Perennial	0	5	1	6
Unnamed Tributary (360 acres)	Intermittent	0	14	10	13

Fire also has the potential to increase water quantity. However, research on prescribed fire indicates that a successful prescribed burn in forests is designed to consume only part of the forest floor fuels. Prescribed burns do not normally consume canopy material except for some smaller trees in dense stands and possibly occasional scorching of larger trees. Thus, understory burns, such as those proposed in the Batchelder Brook Project, have little effect on canopy interception, evapotranspiration, soil water storage, and overland flow (Baker, 1990). Prescribed fire would occur in approximately 1% of the Clifford Brook, Patch Brook, and Batchelder Brook watersheds and approximately 3% of the Unnamed Tributary watershed. Although there may be small localized effects, due to the small scale of burning it is unlikely that the proposed underburning would increase water quantity in the watershed.

### 3.5.2 Water Quality

#### 3.5.2.1 Affected Environment for Water Quality

**The Analysis area for direct and indirect effects on water quality** is the Batchelder Brook, Unnamed Tributary, and Patch Brook watersheds. The State of New Hampshire designates these reaches as Class B. Class B is the second highest quality, considered acceptable for fishing, swimming and other recreational purposes and, after adequate treatment, for use as water supplies. Surface waters in the Analysis area are not currently used for public water supply purposes.

Under New Hampshire antidegradation provisions, all waters of the National Forest are designated as "Outstanding Resource Waters" (ORW). Water quality shall be maintained and protected in surface waters that constitute ORW (NHDES, 1999). Some limited point and nonpoint source discharges may be allowed, provided that they are of limited activity that results in no more than temporary and short-term changes in water quality. Activities may not result at any time in water quality lower than that necessary to protect the existing and designated uses in the ORW. Such temporary and short-term degradation shall only be allowed after all practical means of minimizing such degradation are implemented (USDA-Forest Service, 2005a, LRMP, pg 2-30). Site specific Standards and Guidelines, Best Management Practices (BMP's), Soil and Water Conservation Practices, and other mitigations elsewhere in the EA which are designed to protect and maintain designated uses and prevent degradation would be used should an Action Alternative be selected.

Basic water quality data was collected on October 15, 2004 on Batchelder Brook. Measurements were: pH = 6.44, conductivity = 16µS/cm, temperature = 48.5°F and turbidity = 0.0 NTUs. Additional

measurements were taken the same day on Patch Brook and resulted in the following values: pH = 6.13, conductivity = 13µS/cm, temperature = 49.6°F and turbidity = 0.0 NTUs. Water quality measurements in Hurricane Brook (tributary of Patch Brook) were: pH = 6.66, conductivity = 25µS/cm, temperature = 50.8°F and turbidity = 0.3 NTUs. Aluminum concentrations in the watershed are unknown. Field review of streams in the watersheds indicated that embeddedness was low, so sedimentation of streams did not appear to be an issue.

The values measured in the watersheds are within the range of values typically seen on the White Mountain National Forest (Hornbeck, et al., 2001).

Streams in the Batchelder Brook, Unnamed Tributary, and Patch Brook watersheds have not been assessed by the state to determine if they support designated uses (NHDES, 2004). The Aquatic Resources report indicates that the watersheds support a coldwater fishery. It is therefore likely that the Aquatic Life designated use is supported. There is no bacteria data in the watersheds. However, the Forest Plan EIS indicates that bacteria counts taken across the forest were highest at high-use recreation sites (swimming areas). There are no swimming areas in the analysis area, so it is likely that bacteria levels are low and that the designated use of primary and secondary recreation is supported (USDA-Forest Service, 2005b, EIS, pg 3-40). Like all Northeast states, New Hampshire has a fish consumption advisory for fish taken from all freshwaters due to mercury. The source of this mercury is atmospheric deposition (NHDES, 2004). See the Aquatic Resources Report for further information on the status of fisheries in the Project Area.

### **3.5.2.2 Direct and Indirect Effects on Water Quality**

#### **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). The current condition would remain. Ongoing forest activities would not change water quality or impact existing uses.

#### **Action Alternatives 2-4**

Timber harvest has the potential to affect stream temperature and 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 BMP's. These include the use of riparian buffers, watersheds being only partially harvested, and staggered harvest (USDA-Forest Service, 2005b, EIS, pg 3-51). Riparian buffers are considered the most effective factor for preventing nutrients and sediment from reaching a watercourse (Gilliam, 1994).

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. Water quality data on the forest has indicated that lower pH values are associated with higher total aluminum concentrations (see Batchelder Brook Project Planning Record). Since the pH of the stream is already slightly acidic, further decreases in pH are a concern due to metal mobilization, including aluminum, and resultant effects on existing uses, such as fish. A Hubbard Brook study concluded that clearcutting about 15% of a watershed did not measurably change the basic chemistry of the major 1<sup>st</sup> and 2<sup>nd</sup> order perennial streams in the watershed (Martin, et al., 1986). All perennial streams in the Analysis area are 1<sup>st</sup> or 2<sup>nd</sup> order. As calculated, no more than 2% of a perennial watershed would be treated by even-aged

regeneration harvesting methods, including clearcutting (data in Batchelder Brook Project Planning Record) under any Action Alternative. It is therefore unlikely that changes in pH would result as a consequence of the Action Alternatives. In addition, the basal area calculations from the water quantity analysis show that no more than 6% of a perennial watershed and 14% of an intermittent watershed would be removed using any harvesting method. This low level of harvesting further supports the conclusion that it is unlikely that changes in pH would occur as a result of the proposed harvest.

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. Although aluminum concentrations in the watersheds are unknown, these concentrations should not increase as a result of the proposed project. Forest Plan monitoring will monitor select watersheds, including those receiving timber harvest, to ensure that changes in parameters such as pH and aluminum are not changing as a result of forest activities.

Research has shown that the usual harvest practices, such as those used on the White Mountain National Forest, do not result in large nutrient losses or sediment movement and do not pose a risk to water quality (Brown, 1983). Implementation of the 2005 LRMP 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.

Non-native invasive species (NNIS) have been documented in the Patch Brook watershed. The species, Japanese Knotweed, is proposed for removal through herbicide use. It is located approximately 800 feet from Clifford Brook, the nearest mapped stream.

Glyphosate is an herbicide which binds readily with soil particles, which limits its movement in the environment. Studies have indicated that since it binds strongly to soils it is unlikely to enter waters through surface or subsurface runoff. It can reach waters when the soil itself is washed away, but it remains bound to soil particles and unavailable to plants (summarized by Tu et al., 2001). The recommended formulation for this chemical is sold as Rodeo<sup>®</sup> because it does not contain surfactants, which have the potential to be mobile and pollute surface or groundwater sources. Rodeo<sup>®</sup> is registered for aquatic use (Tu et al., 2001).

The application method proposed for the Japanese Knotweed population is cut stem. This involves cutting the stem of the plant, and then injecting or wiping the herbicide into the exposed stem. This method would avoid contact of the herbicide with surrounding soil or water and limit the amount applied. Spraying of herbicides is not proposed. State standards require that herbicides not be applied within 25 feet of surface waters without special permitting and mitigations to protect water quality. In addition, when herbicides are proposed for use within a 5-mile distance of a public water supply intake, further permitting is required by the state of New Hampshire. As part of the permitting process, the state of New Hampshire will determine the terms and conditions under which the proposed herbicide use is approved. Conditions may include providing notice of treatment, posting signs, monitoring water quality, adjusting application rates, etc. All state standards would be abided by and all permits would be obtained prior to the start of work.

By selecting an herbicide without surfactants and applying the herbicide in a way which specifically targets each individual plant, as well as following any additional terms and conditions required by the state of New Hampshire, the risk to water quality should be minimized. The specimen label on

Rodeo<sup>®</sup> indicates that heavy rainfall within 2 hours of application may wash the product off the foliage (Rodeo<sup>®</sup> Specimen Label, 2002). To ensure that the proposed herbicide does not have the potential to be washed off a plant, herbicides would not be applied when the forecast indicates a possibility of rain. This should further minimize the likelihood of the chemical reaching surface water.

Manual control of non-native invasive species (NNIS) may also be used in the Project Area. This could include cutting, hand-pulling, and excavation. Hand-pulling and excavation can cause ground disturbance and subsequent sediment mobility. However, the site is located approximately 800 feet from Clifford Brook, the nearest mapped stream. No sediment is expected to reach Clifford Brook.

A parking area is proposed for development at the Carr Mountain trailhead. This 1-acre parking area would utilize an existing log landing. The log landing is currently vegetated with grasses. New ground disturbance and exposed mineral soils is expected to be minimal due to the low visitor use of the trailhead. Grasses are expected to remain on site, holding the soil in place. A 25-foot buffer between the parking area and Clifford Brook should further reduce the likelihood of sediment reaching surface water.

Alternatives 2-4 propose the construction of approximately 1 mile of a snowmobile trail bypass. Some ground disturbance would occur as a result of clearing this trail. By following Forest Plan Standards and Guidelines and BMP's, movement of sediment off site should be minimal. The trail would utilize the existing bridge over Batchelder Brook, so no new stream crossings are required.

Approximately 3 miles of existing road is proposed for maintenance under Alternatives 2 and 4, and 2.5 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. One new haul road crossing is proposed across Patch Brook under all Action Alternatives. Permanent abutments already exist at this site. Field review indicated that the abutments have caused no hydrologic impacts on the stream. A snowmobile crossing is located just upstream of this haul road crossing. Following the sale, the snowmobile trail crossing would be relocated to the haul road crossing location. By moving the snowmobile crossing location, the number of crossings on Patch Brook would be reduced. Following the 2005 LRMP, this bridge would be designed to pass bankfull flows. In addition to the haul road crossing, numerous skid trail crossings would be needed in the Project Area. Two of these crossings would be bridges across perennial streams. Crossings of intermittent streams may be bridges or culverts. All skidder crossings would be designed to pass bankfull flows, as determined by a qualified person. They would all be located so as 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. This monitoring would continue until the crossing sites have successfully stabilized.

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. This area of disturbance associated with the Action Alternatives, as well as the number of new stream crossings, is shown in Table 16. Alternatives 2 and 4 would disturb

approximately 53 acres, while Alternative 3 would disturb approximately 26 acres. This amounts to approximately 1% of the Analysis area for Alternatives 2 and 4, and 0.5% of the Analysis area for Alternative 3. As areas of temporary disturbance (landings, skid trails, snowmobile trails) revegetate, sediment contributions decrease to near zero. Sediment contributions from classified roads would continue; however, they would likely return to pre-project levels over time. Table 16, displays ground disturbance by alternative.

<b>Table 16. Ground Disturbance by Alternative</b>				
<b>Activity</b>	<b>Alt 1</b>	<b>Alt 2</b>	<b>Alt 3</b>	<b>Alt 4</b>
New Haul Road Stream Crossings (count)	0	1	1	1
Skidder Crossings on Perennial Streams (count)	0	2	2	2
Existing Landings (acres)	0	6.75	5.25	6.75
New Landings (acres)	0	0.75	0.75	0.75
Roads Construction (miles/acres)*	0/0	0/0	0/0	0/0
Road Maintenance (miles/acres)	0/0	3.0/7.2	2.5/6	3.0/7.2
Skid Trails (miles/acres)	0/0	14.5/35	4.5/10.8	14.5/35
Snowmobile Trail Bypass Construction (miles/acres)	0/0	1/2.4	1/2.4	1/2.4
Mt. Carr Trailhead Improvement (acres)	0	1	1	1
Total Disturbed Acres	0	53.1	26.2	53.1
Total % of Analysis Area Disturbed	0%	1%	0.5%	1%

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

Five stands in the Project Area are proposed for prescribed fire to help promote oak and white pine regeneration and to improve wildlife habitat. The most considerable water quality response to fire is increased sediment and turbidity (Landsburg and Tiedemann, 2000). However, 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). A minimum 25-foot riparian buffer on mapped perennial streams should minimize sediment from reaching the banks of perennial streams. Since the stands proposed for prescribed fire have a riparian buffer, it is unlikely that any increased erosion from the prescribed fire would cause water quality standards to be exceeded.

Nitrate and nitrite are the primary chemical constituents of concern from forest burning (Landsburg and Tiedemann, 2000). Research has shown that stream nitrate responses for prescribed fire are lower than stream nitrate responses in wildfire. In addition, research shows that unburned buffer strips between the streams and riparian areas and the area proposed for burning could minimize effects of fire on stream chemistry (Landsburg and Tiedemann, 2000). A 25-foot riparian buffer on mapped perennial streams should help filter nutrients before they reach a waterbody.

Any direct and indirect effects on water quality resulting from the Action Alternatives are anticipated to be short-term and localized. Most studies show that BMP's are very effective at reducing or eliminating the transport of sediment into watercourses (summarized by Stafford, et al., 1996). Low turbidity measurements show that there is currently not an issue with sediment movement into surfaces

waters in the watersheds. The Timber Sale Administrator would monitor the Project Area to ensure the implementation and effectiveness of Standards and Guidelines and BMP's. If conditions are not met, the operator would be shut down until problems were resolved. BMP's are also monitored as part of the forest-wide monitoring of the 2005 LRMP. Use of 2005 LRMP Standards and Guidelines, site specific Soil and Water Conservation Practices, and New Hampshire BMP's in every facet of the Action Alternatives would meet the Outstanding Resource Waters standard by maintaining water quality and protecting designated uses.

### 3.5.3 Cumulative Effects on Water Quantity and Water Quality

**The Analysis area for cumulative effects on water resources** is the Batchelder Brook, Unnamed Tributary, and Patch Brook watersheds. These watersheds were selected because it includes 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 (the Baker River) would dilute potential cumulative effects. Therefore, cumulative effects are analyzed for the smaller watersheds. All waters within the cumulative effects area are 1<sup>st</sup> or 2<sup>nd</sup> order streams. **The temporal scope for cumulative effects on water resources** is 10 years into the past and 10 years into the future. Ten years is adequate for water quantity analysis because research at Hubbard Brook has shown that increases in water quantity following large-scale clearcuts became undetectable 7-9 years after harvest (Hornbeck, et al., 1997). Ten years is also adequate for water quality analysis because research at Hubbard Brook has shown that the sum of measured ions (cation-anion summary) had returned to levels found before harvest within 5 years following treatment (Hornbeck, et al., 1986).

Past and present activities that occur in the cumulative effects area (CEA) watersheds on Forest Service land include timber harvest, recreation, and road maintenance and use. Activities on private land include timber harvest, road construction and maintenance, and residential development. There is no indication that future activities will deviate in type or scale from past and present activities. Trends of population growth and increased recreation are expected to continue. Atmospheric deposition occurs throughout the Northeast, including the CEA watersheds.

#### Water Quantity

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. Timber harvest has occurred in the CEA watersheds in the last ten years. However, when combining past harvesting with the proposed level of harvest, basal area reductions do not exceed 25% (data in Batchelder Brook Project Planning Record). While some harvesting may occur on private land, no additional timber sales are planned on Forest Service land in the CEA watersheds in the next ten years. It is therefore unlikely that cumulative increases in water quantity would be observable as a result of the proposed project.

#### Water Quality

An existing cumulative effect on water chemistry exists due to atmospheric deposition. In addition to the existing cumulative effect, timber harvest can alter water quality through temperature change, chemical change, and sediment transport.

## *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. A cumulative effect related to stream temperature is not anticipated, even when combined with activities on private land.

## *Water Chemistry*

As described in the Forest Plan EIS, an existing cumulative effect to water chemistry is atmospheric deposition (USDA-Forest Service, 2005b, EIS, pg 3-51, 3-52). To protect against cumulative effects of atmospheric deposition on water quality from past and future timber harvest, the 2005 LRMP 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 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 accounts for approximately 3% of the area. It is anticipated that some harvesting may occur in the CEA watersheds on private land in the next ten years. However, approximately half of the private land in the CEA watersheds would have to be treated with even-aged regeneration harvest 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.

Private lands and inholdings constitute less than 30% of the CEA watersheds. As mentioned previously, streams in the CEA watersheds 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 (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 would 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 435 acres to exceed the impervious surfaces threshold. This would exceed current development trends in the CEA watersheds. Therefore, water quality changes related to impervious developed surfaces is not expected to occur.

Non-native invasive species in the CEA watersheds have not been treated with herbicides in the past. Should any of the Action Alternatives be selected, herbicides may be applied to Japanese Knotweed. These sites would be revisited, and potentially retreated, in subsequent growing seasons to target seed bank germinates and/or resprouts. No other herbicide formulations or treatment locations are planned for use in the CEA watersheds at this time. By following the protocols and mitigations described in direct/indirect effects, it is unlikely that herbicide treatments in the CEA watersheds would cause water quality standards to be exceeded.

## *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). Forest Plan Standards and Guidelines and BMP's should prevent the Carr Mountain trailhead parking area and snowmobile trail bypass from causing measurable sediment inputs to streams. No major erosion problems related to

recreation were observed in the CEA watersheds. No recreation projects are anticipated in the Analysis area in the next ten years other than those currently proposed as part of the Batchelder Brook Project.

Although wildland fire occurred historically in the CEA watersheds, no wildland or prescribed fire has occurred in this area during the time frame analyzed. Five stands are proposed for treatment through prescribed fire. 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 along mapped perennial streams, it is unlikely that any sediment from the prescribed fire would reach streams. Cumulative effects of prescribed fire on sediment are therefore not anticipated.

Manual treatment of NNIS may be used under any of the Action Alternatives. If manual treatment is used it is likely that the population would need to be treated repeatedly, both within a season and over several years. Although one of the manual treatment methods, excavation, has the potential to disturb the soil, it is unlikely that this soil disturbance would be to the extent that water quality standards in the CEA watersheds would be exceeded.

In summary, the Action Alternatives present a low risk of adding to cumulative effects on water quality.

## **3.6 Riparian and Aquatic Habitats**

### **3.6.1 Affected Environment for 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).

**The Analysis area for direct and indirect effects on riparian and aquatic habitats** is the Batchelder Brook, Unnamed Tributary, and Patch Brook watersheds.

There is a lack of large woody material in 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.

### **3.6.2 Direct and Indirect Effects on Riparian and Aquatic Habitats**

#### **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.

#### **Action Alternatives 2-4**

Timber harvest has the potential to alter physical stream characteristics, including riparian buffers. All stands proposed for treatment 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. These buffers should maintain and protect streams and stream stability from timber harvest. In addition, it maintains trees near the stream channel for future recruitment of large woody material. The effectiveness of riparian buffers at protecting stream stability would be visually monitored during and after harvest.

### **3.6.3 Cumulative Effects on Riparian and Aquatic Habitats**

**The Analysis area for cumulative effects on riparian and aquatic habitats** is the Batchelder Brook, Unnamed Tributary, and Patch Brook watersheds. This scale watershed was selected because it includes all the headwaters of the streams which flow through the Project Area; and, at this scale, the effects of multiple uses within the watershed could become additive and result in cumulative effects. **The temporal scope for cumulative effects on riparian and aquatic habitats** is from 1880 to 2176. 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.

Past and present activities that occur in the cumulative effects area (CEA) watersheds on Forest Service land include timber harvest, recreation, and road maintenance and use. Activities on private land include timber harvest, road construction and maintenance, and residential development. 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, EIS, pg 3-69).

An existing cumulative effect in the Analysis area exists due to a lack of large woody material in streams. Mitigations 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. On private land, which accounts for less than 30% of the CEA watersheds, harvesting has occurred and will likely 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, harvesting on private land will not likely contribute to cumulative effects on riparian and aquatic habitats.

### **3.6.4. Affected Environment for Fisheries and Aquatic Species**

The analysis area for direct and indirect effects on fisheries and other aquatic species is the Project Area, which contains perennial streams (Clifford, Hurricane, Patch, and Batchelder Brooks), an unnamed tributary, a beaver flow area, and 3 vernal pools (see also the Water Resources and Riparian and Aquatic Habitats Sections). Based on stream surveys, site-specific field reviews, and stocking records, Clifford, Patch, and Batchelder Brooks are occupied by common aquatic insects

(macroinvertebrates) and coldwater fishes Eastern brook trout (*Salvelinus fontinalis*) and dace, which are suspected to occur in perennial portions of the unnamed tributary (USDA-FS 1990, 2004, 2006; NHFG Fish Stocking Records 2006). Atlantic salmon (*Salmo salar*) are considered a species of concern on the WMNF. Interagency efforts are ongoing to re-establish a self-sustaining population in the Merrimack River Basin. Annually since 1994, the Baker River is stocked with hatchery reared Atlantic salmon (ATS) fry. Salmon fry were stocked into Clifford and Batchelder Brooks in past years. Salmon fry may migrate upstream into the perennial portions of the headwater streams within the Project Area, and then they migrate downstream to the ocean as smolts. Adult salmon do not return to the upper Pemigewasset watershed (including the Baker River) due to impassable dams on the lower Merrimack River system.

The existing riparian vegetation (see the Riparian and Aquatic Habitats Section) in the Project Area functions to retard sediment delivery into stream courses, maintains stream bank stability, and provides streamside shade to maintain cooler summer instream water temperatures for fish habitat in Clifford, Hurricane, Patch, and Batchelder Brooks and the unnamed tributary. The riparian area also provides leaf matter and wood debris recruitment onto the forest floor as suitable amphibian and reptile habitat. The riparian vegetation provides approximately 75% of the food base via organic matter such as fruits, twigs, and leaves, which functions as an energy source (allochthonous) for the food chain in the aquatic ecosystems associated with the Batchelder Brook Project Area.

The wetter portions of the Project Area (beaver flow area, three vernal pools, riparian, and streams) provide habitat for common amphibians and reptiles. The 12 species of salamanders and 10 species of frogs that occur in New Hampshire have extensive ranges outside of the state (NHFG 1996). There are seven species of turtles, one of which (box turtle) may be an introduction since no evidence of breeding has been reported. Wood and snapping turtles are documented statewide, while painted turtles have a northern limit of their range in the White Mountain section and the common musk turtle are mostly absent from that area which includes the Batchelder Brook Project Area. The Blanding's and spotted turtle is dependant on marshy wetlands and are found primarily in the Gulf of Maine Coastal Plain. The box, musk, Blanding's and spotted turtles are assumed absent from the Batchelder Brook Project Area due to lack of suitable habitat and no known documented occurrence (the Project Area is located outside of their known range).

### **Federal Threatened, Endangered, Proposed; Regional Forester Sensitive; and Other Aquatic Species of Concern**

The Project Area does not contain suitable habitat such as slow moving rivers with sandy bottoms and cut banks and exposed gravel areas for the Regional Forester-listed Sensitive wood turtle (*Clemmys insculpta*). The fast flowing perennial streams with rocky substrate (Clifford, Hurricane, Patch, Batchelder Brooks) and the unnamed tributary and their wooded riparian zones, and the wetter habitat (beaver flow and 3 vernal pools) provide potential marginal habitat for the wood turtle. However, there are no known documented occurrences of wood turtle and none detected during stream / riparian surveys (USDA-FS 1990, 2004, 2006) or Forest Service interdisciplinary team field reviews. See the prior discussion of potential occurrence of Atlantic salmon (other specie of concern) within portions of Clifford and Batchelder Brooks.

### **3.6.5 Direct & Indirect Effects**

The effects of vegetation management on fisheries and aquatic species are similar to those described for water quality and quantity in the Water Resources Section. In general, direct effects from vegetation management on aquatic and semi aquatic species and their habitat can include immediate

changes in the water quality parameters of turbidity and instream temperatures. Turbidity caused by suspended fine sediment from surface erosion entering stream courses can clog breathing gills and intake feeding structures in fishes and aquatic insects. Turbid water can decrease a trout's ability to visually locate food and mates by sight. Turbidity can force resident fish and other aquatic species out of their immediate territories until the water clears. An indirect effect of turbidity is sedimentation, which can affect fish populations long-term. For example, the aquatic organisms upon which fish feed can be eliminated from their substrate habitat by scouring sediment, eventually affecting fish distributions and growth, especially the fry stage. Heavy sedimentation of the interstitial spaces of gravel and cobble substrate can smother bottom-dwelling insects and eggs and fry of gravel nesting fish such as trout. Removal of riparian vegetation providing streamside shade can increase instream temperatures thereby affecting fish populations long-term. Loss of streamside shade can cause warmer instream temperatures thereby decreasing the amount of dissolved oxygen available in the water. Warmer instream temperatures increase a trout's demand for dissolved oxygen, hence affecting fish and aquatic biota survivorship. The effects of vegetation management on amphibian and reptile species are similar to those described under the Riparian and Aquatic Habitats and Wildlife Resources Sections, such as travel impediments or increased forest floor temperatures from solar warmth.

### **Alternative 1: No Action**

There would be no direct or indirect effects on fishes or aquatic or semi-aquatic species or their habitat from implementation of Alternative 1.

### **Alternatives 2, 3 and 4**

The action alternatives could cause localized and short-term direct effect of turbidity on aquatic habitat from soil generated during harvest activities (including construction of 1 mile of snowmobile bypass trail) and transported into wet areas and streams. However, bridges, winter mitigation, and Forest Plan Riparian Standards and Guidelines would protect beaver flow areas, vernal pools, riparian areas and streams. The FP S&Gs would reduce the potential localized and short term direct effect of turbidity from vegetation management, prescribed burning, and Japanese knotweed eradication on fishes or other aquatic species. The action alternatives would cause minimal to no potential for indirect effects of sedimentation of habitat of these species. The action alternatives would not cause any permanent terrestrial travel barriers (i.e. paved roads) for RFSS wood turtle, or instream migration barriers or water diversions for Eastern brook trout or OSC Atlantic salmon.

### **3.5.6 Cumulative Effects on Fisheries and Aquatic Species**

The Analysis Area for cumulative effects on fisheries and semi- and aquatic species is the same as described in the Riparian and Aquatic Habitats Section and the Batchelder Brook Project BE. The **temporal scope** includes the past and future 10 years (Forest Plan timeframe). The recently completed Warren to Woodstock Snowmobile Trail and past vegetation management projects (within the same sub-watersheds and HMUs as the Batchelder Brook Project Area) adhered to FP S&Gs that protected riparian and stream habitat. State laws would provide some protection of stream habitat on private land adjacent to the HMU. There would be no cumulative effects on Eastern brook trout, OSC Atlantic salmon, RFSS wood turtle or other aquatic or semi aquatic species or their habitat (see also the BE in the project file for additional information on the wood turtle).

### 3.7.0 Wild and Scenic Rivers

There are no rivers within or adjacent to the Project Area that are potentially eligible for designation under the Wild and Scenic Rivers Act (USDA-Forest Service, 2005a, LRMP, pg C-2).

## 3.8 Wildlife Resources

### 3.8.1 Affected Environment for Wildlife Resources

The 2005 Land and Resource Management Plan established Forest-wide age class and species composition objectives for wildlife habitat management in MA 2.1 lands (USDA-Forest Service, 2005a, LRMP Chapter I, pg. 20-22):

- To achieve the forest-wide objectives, Habitat Management Units (HMUs) were established across the WMNF. Composition and age class objectives are set for each Habitat Management Unit based on the land capability, which contributes to the Forest-wide objectives, but do not necessarily mirror those objectives.
- The Need for Change to the composition and age class within the HMU is determined by comparing the existing situation with the Desired Future Condition. Change to the composition and age class of the habitat types in the HMU is achieved by managing the suitable forest lands in MA 2.1.
- Within the HMU, land unsuitable for management in MA 2.1 (regardless of current age class) and non MA 2.1 land and will not be managed and will form the old age class within the HMU. The amount of non-MA 2.1 lands and MA 2.1 unsuitable lands may vary widely among the HMUs, so the amount that each HMU contributes to the old age class will vary widely.
- To meet the objectives for regeneration and young age classes, stands in the mature and old age classes in the suitable land base of the HMU will be considered for treatment using even-aged methods (clearcut, seed tree cut, shelterwood cut). Stands that are managed using uneven-aged methods (individual and group selection) will generally remain in the mature or old classes, as these methods do not remove enough of the canopy to regenerate the entire stand at one time. Intermediate harvests (thinning, timber stand improvement) may affect the condition of a stand, but not the age class.

The Upper Baker HMU contains approximately 15,181 acres of National Forest land. Of this total, 8,852 acres are in MA 2.1 lands, and the remainder in MAs 6.1, 6.2, and 8.3. Of the 8,852 acres of MA 2.1 lands in the Upper Baker HMU, approximately 1,822 acres are unsuitable for timber production. In the Upper Baker HMU, the lands suitable for timber production and to achieve the composition and age class objectives of the HMU, amount to 7,030 acres. These habitat objectives for the Upper Baker HMU were determined by analyzing the Ecological Land Types (ELT) within the suitable land base to establish the long-term capability for producing the particular habitat types. The habitat objectives for the Upper Baker HMU are displayed in Table 17.

**Table 17. Upper Baker HMU - Current & Desired Objectives for MA 2.1**

Habitat Type	Current (% of MA 2.1 in HMU)	Desired (% of MA 2.1 In HMU)	Desired Age Class Objectives			
			Regeneration (% of MA 2.1 In HMU)	Young (% of MA 2.1 In HMU)	Mature (% of MA 2.1 In HMU)	Old Age (*) (% of MA 2.1 In HMU)
Northern Hardwood	77	66	3-5%	15-25%	51-63%	19%
Mixedwood	12	10	1%	5%	59%	35%
Spruce-Fir	4	15	1-2%	3-6%	59-63%	33%
Aspen-Birch	4	4	14-17%	42-51%	31-43%	1%
Oak-Pine	1	2	n/a	n/a	n/a	n/a
Hemlock	0	1	0	0	64%	36%

Regeneration = 0-9 yrs all types.

Young = 10-59 yrs for northern hardwoods and mixedwood and 10-39 yrs for all other types.

Mature = 60-119 yrs for northern hardwood and mixedwood and 40-89 yrs for all other types.

Old = (\*) MA 2.1 lands unsuitable for harvest; 120 yrs + for n. hardwoods & mixedwood; 90+ yrs all other types.

When comparing the Existing Composition with Desired Future Condition, the overall acres of spruce-fir fall well short of the objective. Over the very long term (one to two hundreds of years), some mixedwood and northern hardwood stands will convert to spruce-fir. Uneven-aged management of mixedwood and northern hardwood stands with a spruce-fir component will gradually favor spruce-fir over several several decades.

Much of the aspen-birch type on the WMNF is degenerating and immediate regeneration might not result in pure aspen-birch stands. Implementing regeneration harvest to meet the age class objectives for the next 10 years would result in further loss of aspen-birch. The 2005 FEIS describes the age class objectives for the first decade to regenerate higher levels of aspen-birch before it degenerates further, eventually allowing for long-term maintenance within the specified age-class regime (USDA-Forest Service, 2005f).

Management of aspen-birch is focused primarily on maintaining the percentage of the stand currently in this habitat type. This may mean converting some mixedwood or northern hardwood stands to aspen or paper birch where it has a good chance of survival, and letting the aspen-birch convert to another habitat type where it has a low capability of survival. Management of “other” habitat types, such as oak-pine and hemlock, as well as permanent wildlife openings, will focus on maintaining these types and establishing new openings where uplands “rank high in providing herbaceous or shrubby habitat features and have some type of access for maintenance.” (USDA-Forest Service, 2005f)

Table 18 shows the age class objectives, by habitat type for the Upper Baker HMU.

**Table 18. Upper Baker HMU MA 2.1 Acres of Existing and Desired Habitat Composition**

<b>Habitat Type, by Age Class</b>	<b>Existing Acres</b>	<b>Desired Acres*</b>
<b>Northern Hardwood</b>	<b>6,816</b>	
Regeneration	137	204 - 341
Young	808	1,022 - 1,704
Mature	5,870	3,478 - 4,294
Old	These acres were combined with mature.	1,314
<b>Mixedwood</b>	<b>1,077</b>	
Regeneration	0	11
Young	11	54
Mature	1,067	636
Old	These acres were combined with mature.	374
<b>Spruce-Fir</b>	<b>337</b>	
Regeneration	0	3 - 7
Young	8	40 - 20
Mature	329	198 - 211
Old	These acres were combined with mature.	112
<b>Aspen-Birch</b>	<b>314</b>	
Regeneration	11	44 - 53
Young	136	122 - 160
Mature	167	97 - 135
Old	These acres were combined with mature.	4
<b>Oak-Pine</b>	<b>113</b>	
Regeneration	0	n/a
Young	8	n/a
Mature	104	n/a
Old	These acres were combined with mature.	11
<b>Hemlock</b>	<b>15</b>	
Regeneration	0	
Young	10	
Mature	5	10
Old	These acres were combined with mature.	5

**Desired Future Condition:** Consistent with 2005 Forest Plan goals, S&Gs, and land capability.

**Existing Composition:** Based on Forest Service CDS database of stand types.

\* Unsuitable acres are combined into old under desired future condition suitable. Within the HMU, National Forest lands in MA 2.1 that are in the unsuitable landbase, regardless of current age class, will be unmanaged and will grow over time into the old age class, forming the old forest habitat in MA 2.1.

The White Mountain National Forest Terrestrial Habitat Management Reference Document provides additional guidelines for management of wildlife habitat at the HMU level (located in the project file):

- Forest-wide composition objectives address northern hardwood, mixedwood, softwood, aspen-birch, and opening habitat types. HMU-specific objectives are developed for oak-pine and hemlock forest.
- Regenerating forest habitat that is created by stand-replacing natural disturbance on MA 2.1 lands are counted toward the regeneration age class in an HMU.
- The condition of private land or lands in other Management Areas in the HMU are considered (large blowdown area in MA 6.1, regeneration forest created through non-commercial cutting, or a large clearcut on adjacent private lands).
- Social factors may indicate that higher or lower levels of even-aged regeneration harvest are appropriate. This could affect age-class objectives in an individual HMU, as long as MA 2.1 regeneration habitat objectives are achieved at the Forest level. If the HMU includes an area popular for moose viewing or hunting, even-aged regeneration harvest at levels higher than proposed in the MA 2.1 objectives could be beneficial.
- Individual stands may be identified at the project level in which timber harvest should not occur which would contribute to the long-term old age class.
- Forest that has been managed through uneven-aged harvest methods is considered mature forest, regardless of the age of the oldest trees, because the regular removal of trees and all accompanying activities results in a stand that is ecologically, functionally different from an unmanaged old forest.
- Salvage may be appropriate after stand-replacing natural disturbance in MA 2.1.

**The Analysis Area for direct and indirect effects on wildlife** is the managed portion (MA 2.1 land) of the Upper Baker HMU. This is because the habitat objectives for the Upper Baker HMU are based on the capability of the MA 2.1 lands within the HMU. The Analysis Area encompasses 8,852 National Forest acres.

**The Analysis Area for cumulative effects on wildlife** is the Upper Baker HMU totaling approximately 15,181 acres. The HMU was chosen because: 1.) the habitat objectives are based on ecological land capability and provide a measurable assessment of how the Proposed Action and alternatives contribute to the Forest-wide habitat objectives defined in the 2005 LRMP; and 2.) activities on adjacent private lands in surrounding Towns that are contiguous with or otherwise geographically connected to the National Forest proclamation boundary and the Project Area. Consideration of activities on the lands outside the HMU is at a scale that provides a meaningful context for a reasonable determination of effects, and 3.) the HMU scale includes species with wide home ranges.

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 the past and future ten years (1996-2016). 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 Upper

Baker HMU shows a deficiency in the regeneration age class (0-9 years) in the northern hardwood, mixedwood, aspen-birch, and spruce-fir habitat types.

Within the MA 2.1 lands in the Upper Baker HMU, approximately 1,240 acres of uneven-aged harvest and 29 acres of even-aged harvest (clearcuts) occurred in the past 10 years. There may be some additional timber harvest planned in the Upper Baker HMU over the next ten years. Timber management activities have been conducted on private lands in the past ten years and will likely continue over the next ten years. Some adjacent private lands are being cleared for residential development or other commercial uses. For a full discussion of the trends on the private lands within the cumulative effects Analysis Area, see Section 3.3 (Vegetation).

### **3.8.2 Direct and Indirect Effects on Wildlife Resources**

#### **Alternative 1: No Action**

There would be no direct or indirect effects on wildlife or their habitat from timber harvest (or construction of 1 mile of snowmobile bypass trail) such as openings in the forest canopy, residual tree damage, snow or soil compaction, or noise from harvest equipment or snowmobiles or prescribed burning. Openings in the forest canopy would result from mortality of individual trees or natural disturbance events (icestorm, fire, infestation, windthrow, etc.). There would be a lost opportunity to remove the approximate ¼ acre of Japanese knotweed located adjacent the Clifford Brook Road.

#### **Action Alternatives 2, 3, and 4**

##### **Direct Effects**

Active timber harvest operations and connected actions, such as road and landing restoration, snowmobile trail bypass, prescribed burning in oak/pine stands and Japanese knotweed removal would increase human presence into the Project Area short-term. Direct effects could include displacing wildlife, including nesting birds, or altering travel mobility patterns of some species, including amphibians and reptiles, and small and large mammals. Beneficial effects of harvesting could include increased mobility for some species on snow compacted by skidding, and additional browse for moose and deer from residual treetops scattered on the ground.

Alternative 2 proposes approximately 129 treatment acres of even-aged regeneration harvests (clearcut, shelterwood, and thinning). Alternative 3 proposes 93 treatment acres of the same even-aged harvests. Alternative 4 proposes 62 treatment acres of even-age harvests (thinning only). Under the action alternatives, site conditions on the forest floor within the harvest units would be hotter and drier for about 2 to 5 years after cutting with increased decomposition of leaf litter. 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 clearcuts also might be more vulnerable to predation. Leaving reserve patches of trees throughout these units would continue to provide some habitat for these species. Also, the even-aged treatments would create habitat diversity in the Project Area and increase understory vegetation and browse availability for wildlife

Alternative 2 proposes approximately 247 treatment acres of uneven-aged harvests (groups, single tree, and group and single tree combined). Alternative 3 proposes 144 treatment acres of the same even-aged harvests. Alternative 4 proposes 550 treatment acres of uneven-aged harvests (30 group and 520 acres single tree only). These treatments 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 to a lesser concentrated extent than even-aged harvests.

Alternative 2 and 4 propose no stands for summer or fall only harvest (June-August); 20 stands for winter only harvest (December-March); 13 stands for fall/winter harvest (August-October and December-March); 3 stands for summer/fall/winter harvest (June-March); and 5 stands for all season. The season in which a unit is harvested may directly affect wildlife, especially during critical times in the life cycle of a species such as breeding, young rearing, feeding, and winter survival. Individuals could be displaced, harassed, or killed during any season of operation. Summer harvest (June-August) could affect species that use trees for nesting, cover, and foraging (breeding birds) and affect 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 affected 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.

In Alternatives 2 and 3, direct effects of prescribed fire from the proposed underburns may vary for different species and conditions. Any burning would occur between Nov. 1 and May 15<sup>th</sup> thereby avoiding impacts to nesting birds. If a raptor nested before May 15<sup>th</sup> in a burn (or harvest unit), they are often vocal (such as Northern goshawk) and would likely be detected during harvesting and pre-burn inspections of the area. No raptor nests were found during site-specific surveys. The nearest known goshawk nest is located outside the Project Area on private land. Any active raptor nest that was detected in a burn or harvest unit would be protected. In general, prescribed fire has few discernible impacts on birds and large and small mammals. Prescribed fire may decrease the abundance of invertebrates with some recovery or increases in a year to two, which is related to litter cover and depth. Prescribed fire has relatively little direct mortality and little effect on overall amphibian abundance and diversity (Fire in Eastern Oak Forests: Delivering Science to Land Managers Conference, 2005).

### **Indirect Effects**

#### ***Effects of creating northern hardwood regeneration age class***

Forest wide less than 1% of the Forest is in regeneration age class (USDA Forest Service 2005b). The action alternatives 2 and 3 propose to establish northern hardwood regeneration habitat by even-aged harvests. There are currently 137 acres of existing northern hardwood regeneration and a desired future condition of between 204 to 341 acres in the Upper Baker HMU. The creation of regeneration

age class habitat 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).

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

There are 11 acres of existing regeneration age class aspen-birch compared to a desired future condition of 44 to 53 acres for MA 2.1 land in the Upper Baker HMU. The action alternatives 2 and 3 would maintain the aspen-birch regeneration habitat via clearcuts. Clearcuts would benefit species associated with shrub layers, herbaceous ground vegetation, soft mast, and minimal over story. Early successional aspen and paper birch is used by approximately 150 species of wildlife (DeGraaf et al. 1992, DeGraaf and Yamasaki 2001). In the long term, these harvests would maintain the aspen-birch component within this HMU. Without some type of disturbance aspen-birch succeeds to northern hardwoods or softwoods. 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).

#### ***Effects of reducing mature and old northern hardwoods habitat age class***

The action alternatives would cause a relatively minor decrease in the amount of mature and old northern hardwood acres within the Project Area. This would cause a minimal short term change in the amount of existing mature and old age class in the MA 2.1 lands in the HMU, as there is an abundance of young age class in this HMU that will move into mature habitat relatively soon. Also, there is an abundance (81%) of mature and old age class across the Forest (USDA Forest Service 2005b, p 3-84). Up to 150 species of wildlife will use mature and old northern hardwoods for all or part of their life cycle (DeGraaf et al. 1992, DeGraaf and Yamasaki 2001).

#### ***Effects of uneven-aged treatments on mature spruce-fir, hemlock, northern hardwood, and mixedwood.***

The proposed uneven-aged treatments would maintain the mature character of the treated stands. The group selection harvests would perpetuate spruce-fir and would move pine, northern hardwood or mixedwood types towards spruce-fir. This would meet some of the long term goals of the Upper Baker HMU to maintain a percentage of mature age class within each habitat type and move stands with softwood ecological land types towards a spruce-fir habitat type. The uneven-aged treatments would provide habitat for wildlife that use closed canopy, beech mast, dead trees or softwood cover (DeGraaf et al. 1992). Up to 150 wildlife species will use mature and old forest habitats for all part of their life cycle (DeGraaf et al. 1992, DeGraaf and Yamasaki 2001).

#### ***Effects of shelterwood treatments with underburning or mechanical site prep on mature or old oak/pine.***

Alternative 2 proposed approximately 52 acres of shelterwood/site prep/burn/overstory removal treatments in stands with an oak-pine component in Compartment 11 (Stands 1 & 61) and Compartment 13 (Stands 1 & 31). Alternative 3 proposes approximately 43 acres of the same treatment in Compartment 11 (Stand 61) and Compartment 13 (Stands 1 and 31). These treatments

would maintain the mature character of these stands and encourage regeneration of oak and pine over existing northern hardwoods or spruce/fir/hemlock regeneration. One of the objectives in the Upper Baker HMU is to maintain the existing component of oak and pine. Mature oak-pine is used by approximately 150 species of wildlife (DeGraaf et al. 1992). There would be a temporary loss of understory vegetation in these stands from proposed site prep treatments and prescribed burning, which would result in a temporary loss of habitat for wildlife species that use understory vegetation (including regenerating hardwood, spruce-fir, and hemlock, shrub layers, herbaceous ground vegetation, and soft mast).

### ***Effects of timber harvest on dead and down wood***

In the proposed clearcuts and shelterwood units, there would be reduced input of larger dead and down wood (>11" DBH) post-harvest between 10 and 60 years. 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 buildups on the ground. The 2005 LRMP standards and guidelines for retaining wildlife trees in harvest units for future large cavity trees and dead/down wood (USDA-FS LRMP, 2005a, I-35), in conjunction with the abundance of mature habitat within the managed and unmanaged portions of this HMU, would ensure an adequate amount of cavity trees and dead and down wood is available for wildlife that use these habitat features.

In summary, the action alternatives would cause relatively minor, localized, and short term effects of conversion of vegetation age class at the stand scale within the Project Area. The conversion of mature forest into regeneration age class or a type conversion within a heavily forested landscape such as the WMNF is generally not considered forest fragmentation. The action alternatives would promote a diversity habitat within the HMU, with no conversion of National Forest land into non-forested areas (permanent agriculture, highways, or land developments). The action alternatives (including 3.0 miles of pre-haul road maintenance, 1.0 mile of snowmobile bypass trail, Japanese knotweed eradication, and grouse/woodcock habitat improvement) would maintain habitat connectivity across the HMU for wildlife and would cause no adverse effects of fragmentation or interruption of natural patterns of wildlife mobility or habitat connectivity within the Project Area or the HMU. All alternatives would not interrupt the natural processes of windthrow, ice storm, drought, disease characteristic of the region.

Forest-interior (edge-avoiding) birds are vulnerable to brood parasitism by the brown headed cowbird and predation by blue jays, raccoons and red squirrels, particularly in forests fragmented with agricultural land with pasture used by cattle. Local studies suggest nest predation of forest interior species in largely forested landscapes is not influenced by the presence of clearcuts. A study by DeGraaf and Angelstam (1993) on depredation of artificial ground and cup nests in even-aged seedling/sapling, pole, and mature stands of northern hardwood forest in the White Mountain National Forest found no increase in the nest predation rate in the early stages of stand growth, nor was rate of predation related to stand area. Another study in the same forest type compared predation rates in large blocks of managed areas vs. remote reserved areas. No differences in nest predation rates were found for either ground or shrub nests between the even-aged clearcut regenerated areas and the reserved forest blocks (DeGraaf 1995). On the WMNF, the first two years of ongoing forestwide bird monitoring detected six cowbirds within managed, un-managed, and remote areas and during wetland inventories. Conversely, forest interior ovenbirds were found over 90 percent of the survey points (USDA-FS 1993, Monitoring Report). Relevant studies on the WMNF show no increase in brown-headed cowbirds (Yamasaki et al. 2000). Based on Breeding Bird Surveys (1966-98), species showing significant population declines within Partners In Flight Physiographic Area 28 (includes WMNF)

show declining trends for the brown-headed cowbird (Rosenberg and Hodgman 2000). Studies in the Midwest also suggest parasitism rates by cowbirds may be dependent on the landscape context and levels of permanent forest fragmentation (agriculture, industry, and housing development) more so than the distribution of temporary openings created by regulated timber harvesting (Thompson 1992 cited in Harlow et al. 1997). Since occurrence of cowbird and elevated predation rates are usually an indication of forest fragmentation, the results of these local and relevant studies and White Mountain National Forest bird monitoring suggest that hardwood-dominated forests in northern New England are not fragmented by even-aged management. The action alternatives would not introduce new predators already known or expected in the Project Area (owl, raccoon, mink, marten, fisher, fox, coyote, bear, bobcat), nor alter existing predator-prey relationships (species or their signs noted during site-specific surveys and field reviews of the Project Area, and wildlife monitoring data in adjacent watersheds & HMUs, and the Warren to Woodstock Snowmobile Trail BE).

### **3.8.3 Cumulative Effects on Wildlife Resources**

#### **Alternative 1: No Action**

The mature northern hardwoods and mixedwood would continue to dominate the Project Area and the HMU under this alternative. Alternative 1 would add a cumulative effect to the lack of regeneration age class diversity on MA 2.1 lands within the Project Area, in the HMU, and at the New England landscape level. Dead or dying trees would continue to fall to the ground via natural disturbances and create small canopy openings allowing sunlight to the forest floor causing limited regeneration. This alternative would not meet the need for maintaining diversity for the full range of wildlife species that inhabit the WMNF. Early-successional habitat types such as aspen and paper birch would still be present in 10 years, but would have matured and possibly begun converting towards northern hardwoods or softwood types. This alternative does not preclude future options for creating early successional habitat or diversifying community types. However, the ability to meet the wildlife habitat management goals outlined in the WMNF LRMP (USDA-Forest Service, 2005a, Chap. I, pgs 18-19) in the reasonably foreseeable future for age class and habitat is somewhat uncertain. The Forest Service would continue to maintain the road system within the Project Area and visitors would continue to use the area. The No Action would not add a cumulative effect of increased human use in this HMU associated with vegetating management. Increased development of surrounding private lands may result in some increases in human use in this HMU over time resulting in increased disturbance of wildlife. The potential for agriculture and developments on private lands would continue to affect wildlife habitat adjacent to the Upper Baker HMU.

#### **Action Alternatives 2, 3, and 4**

Past and recent FS activities (vegetation management and Warren to Woodstock Snowmobile Trail) have affected wildlife habitat on managed lands within the HMU. Harvesting and other activities on private land (likely to continue) have also affected wildlife habitat adjacent to the HMU. However, MAs 6.1, 6.2. & 8.3 lands within the Upper Baker HMU are not subject to vegetation management and large mature northern hardwoods and mixedwood would continue to dominate the HMU and provide habitat for wildlife that use mature and overmature hardwood. The action alternatives to various degrees would meet some of the objectives for providing wildlife habitat diversity within the Upper Baker HMU, including establishing regeneration age class, maintaining oak-pine and aspen-birch, grouse/woodcock habitat improvement, and favoring spruce-fir on softwood sites. Prescribed fire and Japanese knotweed eradication are not expected to cause any cumulative effects. No new roads would be constructed, and 3.0 miles of road maintenance and 1.0 mile of snowmobile bypass trail is proposed

under all action alternatives. The action alternatives would likely cause some increased human presence in the HMU from FS management activities, and likely increase human presence adjacent to the HMU from road building and development of surrounding private lands. This could result in increased disturbance of wildlife due to human presence.

## **3.9 Federal Threatened, Endangered, Proposed, & Sensitive Species (TEPS)**

### **3.9.1 Affected Environment for TEPS**

Multi-year, multi-seasonal and site-specific surveys and field reviews were conducted within the Project Area (NHNHI 1992; BCM 2004; Fife 2004; NHFG 2005; USDS-FS 2004 & 2006c). Also, several field reviews by resource specialists (including biologist and botanist) and numerous field visits by biological and forestry technicians were conducted within the Project Area. Information from these site-specific surveys along with prior Biological Evaluations of TEPS for projects within the same and/or adjacent watersheds and HMUs (Warren to Woodstock Snowmobile Trail BE) and results of wildlife monitoring data gathered in adjacent watersheds and HMUs having similar habitat as the Project Area was used to infer potential species and habitat occurrence.

For the same reasons previously described in the Wildlife Section (3.7), the **Analysis Area for direct and indirect effects on TEPS** species and their habitat is MA 2.1 lands in the Project Area. **The Analysis Area for cumulative effects for TEPS** species and their habitat is the Upper Baker HMU (except the Project Area was used for plant resources). **The temporal scope for cumulative effects for TEPS** is the past and future ten years past (1996-2016), for the same reasons described in the Wildlife Section (3.7).

### **Biological Evaluation**

A Biological Evaluation (BE) for Federally Threatened, Endangered, Proposed and Regional Forester Sensitive Species (TEPS) was completed for the Proposed Action and the alternatives (Project Planning Record). The process and the sources used to determine potential TEPS species or habitat occurrence 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 portions of the Project Area for one Federally ESA-listed species (Indiana bat); three Regional Forester Sensitive wildlife species (Eastern small-footed myotis, northern bog lemming, wood turtle); and two plant species (American ginseng and Bailey's sedge). The BE details the potential direct, indirect, and cumulative effects to these species. The effects determinations are summarized below.

### **Effects Determination and Rationale – Federally-listed Endangered Species:**

#### ***Indiana bat***

The Proposed Action and all alternatives would cause **no effect** to individual Indiana bat (*Myotis sodalis*). There is no federal designated critical habitat for this bat in NH.

*Rationale*

- 1) Indiana bats are likely not present on the WMNF and there is very limited roosting habitat available to the occasional male that might (though unlikely) occur on the WMNF (USDI-FWS 2005).
- 2) Forest Plan Wildlife S&Gs for reserve trees (not specific to Indiana bats but applicable to all tree-roosting bats) would maintain habitat. Implementation of the Wildlife S&Gs for site-specific projects should be considered sufficient for no effect determinations on timber harvest, wildlife management, and recreational management projects (USDI-FWS 2005).
- 3) There are no recent voucher specimens or photo documented occurrences of Indiana bat in NH. Recent multi-year mist net surveys of NH woodland bats included portions of the Batchelder Brook Project Area detected no Indiana Bat (BCM 2002, 2004). The 2005 LRMP standards and guidelines maintain adequate habitat for woodland bats by providing a diversity of habitat conditions well distributed across the Forest, reserving large wildlife trees in areas managed for vegetation, retaining standing dead trees where possible, and maintaining riparian habitats (USDA-FS LRMP 2005a, I 20-22, II 33-36).
- 4) There is no Federally-designated critical habitat in NH and no documented winter hibernacula (caves) or swarming habitat used by Indiana bat, and no documented maternity colonies or lactating female Indiana bat within NH. The closest hibernaculum is located in Brandon, VT., Located approximately 68 air miles southwest from the Project Area.

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

*Eastern small-footed myotis*

The Proposed Action and Alternatives 3 or 4 would cause ***no impact*** to Eastern small-footed myotis (*Myotis leibii*). Under the No Action alternative, there would be a lost opportunity to create openings in the forest canopy, which might provide foraging habitat for woodland bats.

*Rationale*

- 1.) 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 (Erdle and Hobson 2001). The likelihood that individual bats are roosting in trees in the Project Area is considered low.
- 2.) WMNF LRMP S&Gs maintain adequate habitat for eastern small-footed myotis by providing a diversity of habitat conditions well distributed across the Forest, reserving large wildlife trees in areas managed for vegetation, retaining standing dead trees where possible, and maintaining riparian habitats (USDA-Forest Service, 2005a, pp 1-20 to 1-22, 2-33 to 2-36).

*Northern Bog Lemming*

The No Action alternative would cause *no impact* on wood turtle. The Proposed Action or Alternative 3 or 4 ***may impact individuals, but would not likely contribute to a trend towards Federal listing or***

**cause a loss of viability to the population or species** of Northern bog lemming (*Synaptomys borealis sphagnicola*).

<i>Rationale</i>
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- |   |
|---|
| 1.) There are no known documented occurrences in the Project Area and the likelihood of occurrence is low to none.  |
| 2.) Winter harvest is proposed for the majority of stands and there are limited amounts of potential habitat in the Project Area that is excluded from harvest and burning.   |
| 3.) 2005 LRMP S&Gs maintain adequate habitat for northern bog lemming by providing for a diversity of habitat conditions well distributed across the Forest and maintaining riparian habitats (USDA-Forest Service, 2005a, I-20 to I-22, II-33-36). |
| 4.) State laws provides some protection for larger streams and wetlands on private lands which might be used by Northern bog lemming.   |

**Wood turtle**

The No Action alternative would have *no impact* on wood turtle. The Proposed Action or Alternative 3 or 4 **may impact individuals, but would not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species** of wood turtle (*Clemmys insculpta*)

<i>Rationale</i>
------------------

- |   |
|---|
| 1.) There are no current or historic occurrences in the Town of Warren or the Project Area.   |
| 2.) There are limited amounts of potential habitat within the Project Area.   |
| 3.) Riparian areas are protected and standards and guidelines maintain adequate habitat for wood turtle by providing for a diversity of habitat conditions well distributed across the Forest (USDA-Forest Service, 2005a, I-20-22, II-33 -36). |
| 4.) Any change in habitat caused by the action alternatives would be relatively minor.  |

**American ginseng and Bailey’s sedge**

The Proposed Action or Alternative 3 or 4 **may impact individuals, but would not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species** of American ginseng (*Panax quinquefolius*) or Bailey’s sedge (*Carex baileyi*).

<i>Rationale</i>
------------------

- |   |
|---|
| 1.) There are historic and recent documented occurrences of American ginseng within portions of two stands in the Project Area, which would be avoided with no cut buffers. |
| 2.) There are limited amounts of potential habitat within the Project Area for Bailey’s sedge.  |
| 3.) Multi-year and site-specific plant surveys found no other TEPS-listed plants, and wet areas where some RFSS plants prefer to grow are avoided.                          |
| 4.) Any change in habitat caused by the action alternatives would be relatively minor.  |

## 3.10 Rare and Unique Features

### 3.10.1 Other Species of Concern for the WMNF

#### 3.10.1.1 Affected Environment Species of Concern

The White Mountain National Forest conducted a **Species Viability Evaluation** (SVE) in for plant and animal species that might have potential viability concern on the Forest (USDA-Forest Service, 2005c). Through the SVE process, a list was developed of species that are likely to occur on the Forest whose viability, either within their entire range or only within the White Mountain National Forest, is a concern now or in the next 20 years; or whose viability might become a concern depending on factors that management of the WMNF could impact. These species are referred to as **Other Species of Concern (OSC)**. The list of OSC, probability of occurrence in the Project Area, and complete analysis of effects are found in Appendix B (Located in the Project Record).

The Project Area contains potential habitat for the following OSC having very low probability of occurrence within portions of the Project Area; however none of these species were detected during multi-year, multi-seasonal and site specific surveys and field reviews within the Project Area (NHNHI 1992; Fife 2004; USDA-FS, 2004, 2006). Habitat requirements for these species are discussed in USDA-Forest Service, 2005c.

#### **OSC with Very Low Probability of Occurrence within the Project Area.**

American marten ( <i>Martes americana</i> )	Autumn coral root ( <i>Corallorhiza odontorhiza</i> )
Bay-breasted warbler ( <i>Dendroica castanea</i> )	Douglas knotweed ( <i>Polygonum douglasii</i> )
Rusty black bird ( <i>Euphagus carolinus</i> )	Ciliated aster ( <i>Symphotrichum ciliolatum</i> )
Atlantic salmon ( <i>Salmo salar</i> )	Boulder beach tiger beetle ( <i>Cicindela ancocisconensis</i> )
Brown's Ameletid mayfly ( <i>Ameletus browni</i> )	Black lordithon rove beetle ( <i>Lordithon niger</i> )
Third Ameletid mayfly ( <i>Ameletus tertius</i> )	
Northern wild comfrey ( <i>Cynoglossum virginianum</i> var. <i>boreale</i> )	
Yellow lady's slipper ( <i>Cypripedium parviflorum</i> var. <i>pubescens</i> )	

#### 3.10.1.2 Direct and Indirect Effects to Other Species of Concern

**The Analysis Area for direct, indirect, and cumulative effects to Other Species of Concern** is the same as described in the Biological Evaluation. **The temporal scope for cumulative effects on Other Species of Concern** is the past and future 10 years (1996-2016), for the same reasons described in the BE.

##### **Alternative 1: No Action**

The No Action would cause no adverse effects to the OSC plants or wildlife shown in the table above. Habitat favored by the American marten, bay-breasted warbler, rusty black bird, and rove beetle would continue to mature within the Project Area.

##### **Action Alternatives 2, 3 and 4**

Because site-specific surveys found no OSC plants and the majority of stands would be harvested in the winter, the action alternatives would cause no adverse effects to the OSC plants with low probability of occurrence in the Project Area.

There is very low potential for a short-term and localized increase in soil erosion during timber harvest operations and associated road and landing construction, which could result in temporary disturbance of instream habitat (turbidity and sedimentation) if erosion entered the streams. However, the 2005 LRMP S&Gs protect 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 & 2, II 24-25). These S&Gs would essentially avoid effects on riparian habitat where there is a low potential the Brown's and third Ameletid mayflies and boulder beach tiger beetle could occur at some stage of their lifecycles.

The rove beetle is associated with fungi and likely occurs in leaf litter and deadwood on the ground (L.Rowse per. comm. with D. Chandler 2005). The majority of the units would be harvested during the winter, thus minimizing potential effects to beetles. Mature and old mixedwood and hardwood would remain in the larger HMU, providing habitat for the rove and tiger beetles. There would be no adverse effects to these beetles.

The action alternatives would release some mature trees and encourage softwood regeneration in mature northern hardwoods, pine, spruce/fir, hemlock, and mixedwood habitat. This would maintain and enhance long-term softwood and mixedwood habitat for bay-breasted warbler. Because beaver flow areas and streams are avoided and the majority of stands would be harvested in the winter, the action alternatives would cause no effects to the rusty blackbird or the Atlantic salmon.

American marten use a variety of habitats, but prefer habitat where basal area is greater than 80 square feet. In the short term, the action alternatives may cause a slight increase in acres of habitat with basal area below 80 square feet. For stands with an intermediate or uneven-aged treatment, this effect would only last for ten years as basal area would not fall below 60 square feet, and stands may grow approximately 2 square feet per year (Leak et al 1987). When regeneration harvests move into the young age class (10 to 59 years old), many have a basal area above 80 square feet. There would still be mature and old habitat with basal area greater than 80 square feet throughout the managed and nonmanaged portions of the Upper Baker HMU, thus no adverse effects to marten.

### **3.10.1.3 Cumulative Effects on Other Species of Concern**

The black lordithon rove beetle has survived on the landscape despite the large scale clearing of land for agriculture and timber harvest that occurred in the late 1800s and 1900s. While it continues to be rare in New Hampshire, it appears this species may be expanding to new areas as forest habitats in the Region continue to maintain a strong mature component (L.Rowse pers. comm. with D. Chandler, 2005). Any future timber harvest within the HMU would not adversely affect Brown's and third Ameletid mayflies or black lordithon rove and boulder beach tiger beetles because the 2005 LRMP standards and guidelines effectively buffer and protect riparian habitat along perennial streams on National Forest lands (USDA-Forest Service, 2005a, II-24 - 25). State laws in New Hampshire provide some protection of riparian habitats on private lands.

American marten were reintroduced to the White Mountain National Forest in the mid-1970s (USDA-Forest Service, 2001a), and are slowly increasing in numbers, particularly in the north. Breeding Bird

Survey data (1980-1994) showed a continent-wide 12.2% decrease for the bay-breasted warbler: However, surveys show population fluctuations mirror spruce budworm outbreaks (USDA Forest Service 2001a). The WMNF LRMP goals and objectives, and standards and guidelines that maintain mature and old northern hardwood and mixedwood habitat (USDA-Forest Service, 2005a, I 20-21, and G-4), and protect dead and down wood (USDA-Forest Service, 2005a, G-3 and G-4) would maintain adequate habitat Forest-wide for marten and bay-breasted warbler. Under the action alternatives (including construction of snowmobile bypass trail), the majority of the HMU would still have an abundance of mature habitat that would provide habitat for marten and bay-breasted warbler. The action alternatives would not cause cumulative effects to marten or bay-breasted warbler.

In summary, the action alternatives would cause no cumulative effects to the plant or wildlife species shown in the table above. Without such FP S&G protections on private lands adjacent to the HMU, residential development and timber harvesting may affect habitat for wildlife species off forest.

### 3.10.2 Habitats of Concern

The following four habitats of concern were considered: outstanding natural communities, vernal pools/seeps, bear-clawed beech trees, and deer wintering areas. **The Analysis Areas for direct, indirect and cumulative effects to Habitats of Concern** is the MA 2.1 lands within the Project Area. **The temporal scope for cumulative effects on Habitats of Concern** is the past and future ten years (1996-2016), for the same reasons described in the Wildlife Section.

#### 3.10.2.1 Outstanding Natural Communities

The WMNF FEIS (USDA-FS 2005, III-297) identified outstanding natural communities that would receive additional protection (old growth enriched upland forest; montane circumneutral cliffs and associated talus; northern white cedar communities; and pitch pine-scrub oak woodland). Based on multi-year, multi-seasonal, and site-specific surveys and on a NHMHB database check, no known documented outstanding natural communities occur in the Project Area. There would be no direct, indirect, or cumulative effects on outstanding natural communities from the No Action or the alternatives.

#### 3.10.2.2 Vernal Pools / Seeps

Vernal pools and seeps provide habitat for rare plants and certain species of amphibians and reptiles and a source of water for wildlife (Tappan 1997, Taylor et al. 1996, Society for Protection of New Hampshire Forests 1997, Carlson and Sweeney 1999). Vernal pools and seeps form in low lying areas with compacted sediments or underlying ledge where drainage is poor. During site-specific surveys and field reviews three vernal pools were identified and GPS points were mapped within the Project Area (Biologist Weloth per. comm. with Forestry Technician Williams, 2006). The WMNF LRMP provides a 25-foot no-harvest buffer around naturally occurring vernal pools and seeps (USDA-Forest Service, 2005a, G-1, p 2-24). Further protection is given by requiring an additional 75-foot Riparian Management Zone with limited harvest (USDA-Forest Service, 2005a, G-2, p 2-24), and requiring that slash and treetops be removed from pools (USDA-Forest Service, 2005a, G-4, p 2-25). The No Action or the action alternatives would cause no direct, indirect, or cumulative effects to vernal pools or seeps within the Project Area. Timber harvest operations, residential development, and road construction may result in impacts to vernal pools and seeps on private lands adjacent to the HMU.

### **3.10.2.3 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 red oak and beech, which are the primary hard mast producers in this area. Concentrations of bear-clawed beech are considered an important habitat feature for black bear. Bear-clawed beech trees were observed in portions of the Project Area during field reviews (NHFG 2005; USDA-FS 2005). 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 or parts of skid trails or landings that cannot be moved because of land features or in even-aged regeneration cuts designed to create regeneration age-class. Regeneration harvests are usually located away from areas with a heavy concentration of bear-clawed beech trees. Beech trees may be retained to meet requirements for reserve patches or wildlife trees.

#### **No Action**

The No Action would cause no direct or indirect effects on bear-clawed beech trees.

#### **Action Alternatives 2, 3 and 4**

The action alternatives (including construction of 1 mile of snowmobile bypass trail) could cause the direct effect of temporary displacement of bears feeding in beech trees during active fall harvest. Bears would likely move to adjacent hardwood stands in the area until harvesting activities end. The proposed fall burning would likely not affect bears feeding in beech trees because burning is prescribed for predominantly oak/pine stands that do not have a large beech component. The action alternatives would cause the indirect effect of a slight reduction in fall foraging habitat from the removal of some bear-clawed beech trees. Reserving bear-clawed beech and any disease-resistant beech trees would minimize this effect. There is an abundance of mature and old northern hardwoods habitat with a beech and red oak component within the Upper Baker HMU that would not be affected under the action alternatives. Connected actions would not affect bear-clawed beech trees. The Japanese knotweed eradication would cause no effects to bear clawed beech trees.

#### **Cumulative Effects**

Past, present and future timber harvest (and the recent Warren to Woodstock Snowmobile Trail Project) may have resulted or could result in some loss of bear-clawed beech trees within the HMU. This HMU has an abundance of mature northern hardwoods, mixedwood, and some oak/pine type, which will continue to provide a source of hard mast for wildlife including black bears. It is unknown to what extent bear-clawed beech trees have been affected by timber operations or residential development on private lands adjacent the HMU, but there has likely been some loss of these trees, with more loss likely to happen with future harvest and development on private land.

### **3.10.2.4 Deer Wintering Habitat**

Multi-year and multi seasonal site-specific field reviews detected moderate levels of recent deer use (summer and winter fecal pellets, browsing pressure, bark scarred trees, and scattered game trails) throughout the Project Area (Fife 2004, USDA-FS 2004, 2005; 2006; NHFG 2005). These reviews

indicated white-tailed deer do occupy, use, and travel through the Batchelder Brook Project Area at various times of the year. NH fish and Game manages white-tailed deer as a game species harvested annually and their populations are considered viable in the state and on the WMNF, with deer trends fluctuating (NHFG 2005; USDA-FS 2005c).

In New England during severe winter conditions, white-tailed deer use dense softwood stands (often hemlock) as overwintering habitat (yard) and browse nearby hardwoods and softwoods adjacent to or within the concentrated softwoods (Reay et al. 1990). Pre-project level monitoring of the Batchelder Brook Project Area included site-specific field reviews of the softwood component. Reviewers ensured the proposed project would follow WMNF Forest Plan S&Gs that would avoid impacts to softwood habitat necessary to support wintering populations of white-tailed deer. Historic Forest Service data indicated a deer wintering area in the vicinity of Peaked Hill and Patch Brook (USDA-FS Multi-dated Compartment Records). The softwood component within the stands north of Clifford Brook and in the vicinity of Peaked Hill were examined to determine deer use (NHFG 2005; USDA-FS 2005). Recent deer and moose signs were evident in Compartment 12 / Stand 4 near Peaked Hill. The north facing hemlock strip associated with Peaked Hill (not proposed for treatment) had evidence of deer winter activity. There was evidence of deer wintering activity (past bark scars and browsing) in the hemlock component of Compartment 13/Stand 9 located along the Forest Service boundary. The availability of quality wintering areas for deer can be a limiting factor in their survival. Spruce-fir or hemlock stands are the basic cover component of most wintering areas. A management goal for most wintering areas, regardless of species composition, is to prolong the useful life of the area by perpetuating shelter, maintaining deer mobility and access throughout all non-regenerating segments of the wintering area, and providing preferred accessible browse. As a minimum, at least 50% of the entire wintering area should be in “functional shelter” at all times. Functional shelter is defined as softwood cover at least 35 feet tall, with at least 70% crown closure (Reay et al. 1990). Also, 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 is recommended (Society for the Protection of New Hampshire Forests 1997; NHFG 2005).

### **Alternative 1: No Action**

Alternative 1 would have no direct effect on deer wintering habitat. However, the No Action would have an indirect effect of adding to the decline of early successional age class as potential browse for deer within the Project Area.

### **Action Alternatives 2, 3 and 4**

The action alternatives (including 1 mile of snowmobile bypass trail) would cause the direct effect of an increase in the amount of limbs and tops on the ground from timber harvest, which would provide a localized, short-term source of browse for deer when they need it the most for overwinter survival. In the long term, removal of individual trees and groups would enhance the existing softwoods, possibly providing winter cover for deer in the future. The proposed prescribed burning (Alternatives 2 and 3) and Japanese knotweed eradication would not occur in deer wintering habitat. In the long term, prescribed fire may increase some oak regeneration within the Project Area, providing a source of hard mast in the future. Mobility patterns of large mammals such as deer traveling to, from, or within the Project Area would not be adversely affected. Large mammals have large home ranges, and appear to adjust quickly to displacement from human activity and may adjust their foraging behavior to avoid human activity. The snowmobile bypass trail would not introduce any additional effects of

snowmachine activity on deer wintering habitat and would occur in relatively the same location adjacent to the existing snowmachine trail (all located outside of deer wintering habitat).

## **Cumulative Effects**

The recent Warren to Woodstock Snowmobile Trail Project and past vegetation management within and near the Batchelder Brook Project Area adhered to Forest Plan S&Gs that protected deer wintering habitat. The WMNF LRMP contains guidelines that ensure deer wintering habitat is maintained in the HMU and Forest-wide (USDA-Forest Service, 2005a, G-6). Timber harvest on private lands adjacent the HMU that emphasize individual and group selection cuts in softwood or mixedwood stands would enhance deer wintering habitat. However, even-aged harvest in softwood or mixedwood and clearing for residential development on private lands could diminish the amount of wintering habitat available to white-tailed deer.

### **3.11 Heritage Resources**

#### **3.11.1 Affected Environment for Heritage Resources**

A Cultural Resource Report (CRRR #06-4-1, project file) was completed for the Project Area based on field surveys and a review of historic maps and literature. This report has been approved by the New Hampshire State Preservation Office.

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.

**The Analysis area for direct, indirect and cumulative effects to heritage resources** are Compartments 11, 12, and 13 since these compartments encompasses the 737 acre Project Area and any other National Forest lands within the compartments which may have activities affecting heritage resources. The 2005 LRMP 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.” And a Design Feature implementing the 2005 LRMP standards and guidelines requires that known sites be flagged and avoided, and that operations cease if 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. An inventoried heritage site within the Analysis area may have been affected by past actions, but will be avoided in any proposed or future actions.

**The temporal scope for cumulative effects on heritage resources** is 26 years past and ten years into the future (1980-2016). This scope takes into account the last earth disturbing activity in Compartments 11, 12, and 13, the 1990 Batchelder Brook Timber Sale. A Cultural Resource Report was prepared for that sale that identified sites to be flagged and avoided. An analysis of effects for the Proposed Action and its alternatives would consider how well heritage sites identified for the 1990 sale were protected at that time, and how well they have been preserved since that time. A look 10 years into the future will consider any additional earth disturbing activities that could potentially affect Compartments 11, 12, and 13 in the near planning horizon.

### **3.11.1.2 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 the Project Area have been identified and designated as reserve areas. These reserve areas extend 50 feet from the nearest identifiable site feature and would be avoided during harvesting operations and site preparation (logging equipment would not be permitted within them). 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 summer and fall harvest. 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, mechanical site preparation, stream restoration or watershed rehabilitation work (see Section 2.0.4). 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.

No other earth disturbing activities are planned at this time in Compartments 11, 12, and 13 over the next 10 years.

## **3.12 Air Resources**

### **3.12.1 Affected Environment for Air Resources**

#### **Air Resources**

#### **Affected Environment**

The proposed Batchelder 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 eastern slopes of the predominately north-south trending valley of the Baker 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 25 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. Merrimack County, located 20 miles away from the Project Area, is the closest nonattainment area to the project.

It is in nonattainment for 8-hour ozone (USEPA, 2006). 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.

### **Direct/Indirect Effects on Air Resources**

The direct/indirect effects airshed includes the Baker River Headwaters watershed and the Wentworth Warren Tributaries watershed. This airshed was selected because the potential effects to air quality generated by any of 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.

#### **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 classified 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.

#### **Alternatives 2-4 Action Alternatives**

The primary source of concern for air quality from the proposed project is the prescribed burn proposed in units 1/11 (26 acres), 55/11 (2 acres), 61/11 (13 acres), 2/13 (15 acres) and 31/13 (18 acres) under Alternatives 2 and 3. Under Alternative 4, only unit 55/11 is proposed for prescribed fire. No more than two stands would be burned per day under any Alternative. 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); (USFS, 2002). Carbon monoxide (CO) concentrations also increase as a result of smoke emissions (USEPA, 2001).

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

mixed-wood stands, the model predicted 1822 lbs/acre of carbon monoxide, 151 lbs/acre of PM2.5, and 178 lbs/acre of PM10 would be emitted by the fires. In the northern hardwood stands, the model predicted 3669 lbs/acre of carbon monoxide, 285 lbs/acre of PM2.5, and 337 lbs/acre of PM10 would be emitted by the fires. In the wildlife habitat burn (unit 11/55), the model predicted 923 lbs/acre of carbon monoxide, 77 lbs/acre of PM2.5, and 90 lbs/acre of PM10 would be emitted by the fire.

The total duration of flaming and smoldering of the fire was predicted to be 20 minutes in the mixed-wood stands, 45 minutes in the northern hardwood stands, and 9 minutes in the wildlife habitat burn. Public notification of the proposed prescribed burn would be given prior to the start of the burn. Potential health effects of high exposure of PM2.5 and PM10 emissions include respiratory symptoms and aggravation of heart or lung disease (USFS, 2002). Potential health effects of high exposure of CO include reduced blood-oxygen levels (USEPA, 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 (USFS, 2002). It is therefore unlikely that up to 74 acres 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 80% 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**

The cumulative effects area (CEA) for air quality is the same as was described in the direct/indirect effects section of this report. This was selected because at this scale the effects of multiple uses within the airshed could become additive and result in cumulative effects. The time frame analyzed is from 1995-2015. 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.

Prescribed fire could be used more than once in the stands proposed in order to achieve the result of promoting pine and oak regeneration and wildlife habitat improvement. As discussed above, the project is not located in a nonattainment area. Prescribed fire most often occurs in the spring or fall, when ozone is not a concern. It is possible, however, to burn in the summer if conditions allow.

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. The source of this ozone is large urban centers. All of the New England states, except Maine, will have a compliance deadline for 8-hour ozone of June 2010 (USEPA, 2004a). Maine will be in compliance by June 2009 (USEPA, 2004b). Once all counties in New England are in compliance with standards, less 8-hour ozone will be moving into the White Mountains from the urban areas, which should minimize the temporary exceedances which occur in the Project Area.

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

### **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 CEA 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.

### **Alternatives 2-4 – Action Alternatives**

The Action Alternative 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.

## **3.13 Scenic Resources**

### **3.13.1 Affected Environment for Scenic Resources**

The 2005 LRMP states the goal of Scenery Management (SMS) 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). Scenic Management Systems 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 few trails or use areas within Compartments 11, 12, and 13. The nearest hiking trail is the Carr Mountain Trail, with the trailhead and trail located in Compartment 13. This trail has low use, no viewpoints relative to Compartments 11, or 12, has a Concern Level 2. The trail begins in Compartment 13 and travels for 0.2 miles through the compartment. The nearest snowmobile trail is the Three Ponds Trail and is located within Compartment 11. It also has near ground views relative to the compartment, and has a Concern Level 1. Of the two classified roads in or adjacent to Compartments 11, 12, and 13, FR 401 has a Concern Level 3, and FR 479, the Clifford Brook Road has a Concern Level 1 (USDA-Forest Service, 2005d, Scenery Management System).

The 2005 LRMP establishes a MA 2.1 guideline for evaluating cumulative effects for viewed landscapes from established “Concern Level 1 open, higher elevation viewpoints affording expansive or large scale views.” (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 11, 12, and 13 actually have four Scenic Classes. The foreground (the detailed landscape generally found from the observer to ½ mile away) view from NH Route 25 and NH Route 118 is in a Scenic Class 1, which has the highest public value. Most of the rest of the compartment is in Scenic Class 2, with two small pockets assigned to Scenic Class 4 and 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).

Within MA 2.1, for areas with a “High Scenic Integrity Objective, created openings should be minimally evident from trail, road, or use area vantage points. Maximum observed size should not exceed 4-5 acres.” In the analysis area, this would apply to Compartment 11, Stands 1, 3, 5, 9 and 20 (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.

### **3.13.2 Direct and Indirect Effects on Scenic Resources**

The Analysis area for direct and indirect effects on scenic resources includes those National Forest lands within Compartments 11, 12, and 13 designated as MA 2.1 and potential viewpoints within or outside the compartment. This area was selected because it encompasses the Project Area, any other National Forest lands within the compartment 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.

## **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.

## **Action Alternatives 2 and 3**

NH Route 118 west to FR 401 passes through mountainous to rolling terrain that is alternately wooded and open, with views of the Moosilauke ridgeline to the west. Batchelder Brook Road begins as a town road and passes through a private campground. Once the road enters the National Forest, and the analysis area, there is a noticeable change to a densely wooded edge, sometimes with the canopy closed overhead, that offers no views to ridgelines. FR 479 is virtually level and travels through a similarly wooded landscape from NH Route 25 to the Carr Mountain Trailhead, there is private property with an old farmhouse.

There would be evidence of management activities along Forest Road 479 with the Action Alternatives. 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 seed cut in stand 1/13 will retain about 40-50 sq. ft. of basal area of overstory within the stand. Site preparation, whether it is with prescribed burning or mechanical treatment, would open the understory considerably for a few years after the treatment. It is located 0.3 miles from the nearest point on the trail and should not be visible from the trail or road. Group selection activity in stand 3/13 would appear as small openings in the forests. Over time, there would be a variety of sizes and textures as these areas regenerate several types of tree species. The site preparation and harvest activities in stands 1/13 and 3/13 are consistent with 2005 LRMP guidelines and are the kind of treatment anticipated by the analysis in the 2005 FEIS for a High Scenic Integrity Level road.

The 2005 FEIS states that, for “High Integrity” areas of the Forest, “they exhibit some level of vegetation management activity that has occurred, but where the characteristic landscape fully dominates when viewed.” “Moderate Integrity” is indicative of those compartments where vegetation management is occurring, the existing landscape character still dominates within these compartments, and deviation from the existing landscape character is minimal.” “Low Integrity” is where management activities dominate the view. (USDA-Forest Service, 2005b, p 3-445)

With the exception of stands 1/13, and 3/13 the Project Area is mostly “Moderate Integrity” with some areas of “Low Integrity” identified. Integrity assignment does not change based on alternatives.

There would be short term effects on scenic resources from the potential use of prescribed burning in 55/11 in Alternatives 2 and 3. The proposal is for a low-intensity ground burn to promote advance regeneration in these stands. If the burn is done in the spring, vegetation would cover the visual effects of the burn within a month or two. There may be some charring of tree trunks at their base, but this, too,

should not be noticeable after a season or two. If the burn is done in the fall, it would be covered by snow in the winter, and advance regeneration should be established in the following growing season. Direct and indirect effects of road resurfacing, permanent wildlife opening expansion activities and invasive species treatment will include visual signs of ground disturbance which will diminish over the next several seasons as those areas are re-vegetated.

Alternative 2 would show the most evidence of management activities. Stand 3/13 along FR 479 has had previous harvest activities. The proposal harvest would not appear more altered than the current condition.

Within the portion of the Analysis area that has a Moderate Scenic Integrity Objective, Stands 26/13 and 30/13 are proposed as clearcut. They are irregular shaped, and probably have no viewed position other than directly overhead where a 6 and 8 acre opening would be observed. Further, to meet wildlife reserve standards, 5% of the stand (0.5 acre) would be retained in uncut patches at least 0.25 acres in size that would interrupt the larger opening (USDA-Forest Service, 2005a, p 2-35).

The remainder of the analysis area is consistent with the 2005 LRMP guidelines, and the treatment anticipated by the analysis in the 2005 FEIS, 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 4**

Alternative 4 would show the least evidence of management activities. The increase in single tree selection harvest would be consistent with the 2005 LRMP guidelines and the treatment anticipated by the analysis in the 2005 FEIS, which states that “Moderate Integrity is indicative of those compartments where vegetation (habitat) management is occurring.” (USDA-Forest Service, 2005b, p 3-445)

### **3.13.3 Cumulative Effects on Scenic Resources**

The Analysis area for cumulative effects on scenic resources includes those National Forest lands within Compartments 11, 12, and 13, potential viewpoints within or outside the compartment, and the adjacent private lands that may be viewed from these same viewpoints or from within the compartment. 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 complements 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 16 years past and 20 years into the future (1990-2026). The last vegetation management and ground disturbing activities in Compartments 11, 12, and 13 took place throughout the 1990s. This time frame allows consideration of whether, and 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.

## **Alternative 1: No Action**

Minimal visual evidence remains in the analysis area of the timber harvest operations from the 1990's Batchelder Brook Timber Sale. With this alternative, the compartment would continue to have this unmanaged appearance. There may be timber harvest proposed in the future, either in the compartment or on adjacent private lands. For now and the foreseeable future, Forest Roads 401 and 479, which provide the only public access to Compartments 11, 12, and 13, 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.

This alternative would have no effect on the scenic resources within the analysis area. The adjacent ridgelines and low elevation summits would continue to have no open viewpoints into the Analysis area, and the roads would remain wooded with short sightlines and no view of the adjacent ridgelines.

## **Action Alternatives 2 and 3 and 4**

It is possible that Stand 1/13 will be re-entered for an overstory removal. If the entry is in 20 years, however, the understory would have grown into a young stand with a secondary canopy, and the overstory removal would not create an opening. Within the remainder of the compartment, if a re-entry is earlier than 20 years, the signs of this timber harvest may still be visible on the landscape. The design of the re-entry would have to account for the cumulative effect on the Moderate Integrity of this analysis area of any new treatments.

It is also possible that stands 55/11, 61/11 and 1/13 may be treated with prescribed burning at a later date, depending on the success of earlier burns to regenerate oak. These burns would again be low in intensity, with visual effects of the repeated burn areas disappearing with an increase in understory vegetation over time. No cumulative effects are expected from the road maintenance from other activities associated with the project proposal.

Within the analysis area, most of the land accessing FR 401 and FR 479 is privately owned, and not subject to the 2005 LRMP standards and guidelines for scenic resources. Along the town road section of Batchelder Brook Road there is a private campground with numerous seasonal rentals adjacent to the road. Before FR 479 crosses onto National Forest, there are several private homes.

The total acres in opening status from any viewpoint is within Forest Plan Standards of less than three percent of the viewed area.

## **3.14 Socio-Economics**

### **3.14.1 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. The Forest Plan (page 1-3 - goals) recognizes the Forests contribution to regional economies. The Forest Plans' Final Environmental Impact Statement (FEIS pages 3-491 to 3-520) provides detailed information regarding the economic environment the Forest operates in and the recent revenue contributions to regional and state governments. It also indicates that

trends in revenue from rooms and meals within four Counties in and adjacent to the White Mountain National Forest has steadily increased over the last 15 years. On page 3-492, Figure 3-48 shows that employment (jobs) for the Forest Region has increased most dramatically for government, and slightly in 'services' and 'retail', and has dropped slightly for 'manufacturing'. The Chapter concludes on page 3-520 by stating that "Overall, economic impacts from recreation exceed all other economic impacts combined", that "the presence of the White Mountain National Forest is a major attraction for visitors in the Forest Region", and that "The loss of land dedicated to producing commercial timber appears to be a continuing trend off-Forest (Thorne and Sundquist, 2001)". And finally, that "This has implications for the Forest in that the economic importance of its lands that permit timber management will likely continue to rise".

There is a steady demand for timber products sold by the National Forest, as reflected by bids on timber sales. Typically, average bid prices on National Forest timber equal or exceed those received on private land. This is especially true for sawtimber.

There are several sawmills and forest product-based manufacturers within close proximity of the Project Area that purchase timber from the White Mountain National Forest. Secondary manufacturing of wood products (furniture, pallets, and dozens of specialty products) are scattered throughout Vermont, New Hampshire and Maine. Secondary wood products such as milled wood are supplied to manufacturing businesses and retailers throughout the east. Despite the reduction in mills and jobs, there remains a steady demand for timber products sold by the National Forest, as reflected by bids on timber sales.

The proposed sale units are all located within Town of Warren, Grafton County, New Hampshire. The main travel route providing access to the Project Area is NH Route 25 and 118. 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 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) conducting environmental analysis and decision documents.

Another 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 is to provide high quality sawtimber, the National Forest Management Act directs that decisions to harvest and method of harvest not be based solely on the greatest dollar return or the greatest output of timber. Project design and mitigation measures that reduce sale volume and sale value may result in improved resource protection and increased wildlife habitat features across the project area, and cumulatively over time across the forest.

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

- New Hampshire taxes the value of timber harvested by the timber purchaser. The revenue goes to the towns in which the timber is harvested. This tax averages about 10% of the value harvested. Batchelder Brook Project would provide timber tax directly to the Town of Warren.
- The Twenty-Five Percent Fund Act of 1908 directed that 25% of all monies received from a National Forest during any fiscal year be reimbursed to the towns in which the National Forest is located to be used “for the benefit of public schools and/or public roads.” For the proposed project, 25% of gross timber receipts would be returned to the Town of Warren.

While one purpose for harvesting timber in the Batchelder Brook 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.

The Analysis area for direct, indirect and cumulative effects on socio-economics is Grafton 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 (1996-2016). 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).

### **3.14.2 Direct and Indirect Effects on Socio-Economics**

#### **Alternative 1: No Action**

Businesses, Town of Warren, and Grafton County would 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, 3, and 4**

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 19). 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 410 and 479 road maintenance 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.

### 3.14.3 Cumulative Effects on Socio-Economics

<b>Table 18. Economic Characteristics by Alternative</b>				
<b>Measure</b>	<b>Alt 1</b>	<b>Alt 2</b>	<b>Alt 3</b>	<b>Alt 4</b>
<b>Harvest Volume (MMBF)</b>	0	2.9	1.9	2.4
<b>Net Stumpage Receipts</b>	0	\$445,556	\$291,916	\$368,736
<b>Total Cost</b>	\$42,000	\$271,804	\$153,900	\$194,400
<b>- Sale Analysis</b>	\$42,000	\$104,400	\$68,400	\$86,400
<b>- Sale Prep</b>	0	\$91,350	\$59,850	\$75,600
<b>- Sale Admin.</b>	0	\$39,150	\$25,650	\$32,400
<b>Net Value</b>	-\$42,000	\$173,752	\$138,016	\$174,336
<b>Unit Cost \$/MMBF</b>	\$42,000	\$59,914	\$72,640	\$72,640
<b>Potential Contribution to 25% Fund</b>	0	\$111,389	\$72,979	\$92,184
<b>Potential 10% Timber Tax Revenue to Warren</b>	0	\$44,555	\$29,198	\$36,873

Alternative 1 does not harvest timber, but it does not preclude the harvest of timber in the future. Alternatives 2, 3, and 4 would generate revenue for local communities and would 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. History has indicated there is and would continue to be demand for timber products locally and nationally. Cumulative effects of associated activities including road maintenance, prescribed burning, and mechanical site preparation are not anticipated. Table 18 displays economic characteristics by alternatives.

Treatments that emphasized improvement to the quality of sawtimber in the harvested stands would be an economic factor in the future, but not within the next 10 years.

Alternative 1 does not harvest timber, but it does not preclude the harvest of timber in the future. The action Alternatives would generate revenue for regional communities and would 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 regionally and nationally. Long term cumulative effects include the increased future value of trees left as improved growing stock in the single tree selection and thinning units.

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. Moosewatch, Haystack, Smarts Brook, Hix Mountain, Mack Brook, Clear Brook, Right Angle and Camp 7 timber sales have and/or continue to generate funds to several local townships. The Batchelder Brook Project would provide a revenue source to Warren.

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.

Action alternatives may have some short term effects on tourism and road maintenance costs. Increased road damage and road maintenance costs may be linked to the amount of harvesting (increased road use), and is also effected by road use restrictions when road surfaces are soft from excessive moisture, frost/thaw, or heat.

# CHAPTER FOUR – PREPARATION AND CONSULTATION

## 4.0 Introduction

The following individuals have participated in development and analysis of the proposed action and all other alternatives and will participate further during subsequent environmental analysis until a decision document is complete.

Interdisciplinary Team:

Dave Batchelder	District NEPA Coordinator
John Neely	Fire Forestry Technician
Jennifer Burnett	Recreation Forestry Technician
Clara Weloth	District Fish and Wildlife Biologist
Steve Wingate	Forester / Silviculturalist

Forest Service Personnel consulted for professional and technical assistance:

John Williams	Timber Sale Administrator
Janice Mulherin	Forester
Karl Roenke	Forest Archeologist
Jim Hill	Forestry Technician & Heritage Paraprofessional
Gary Miner	Forestry Technician & Harvest Inspector
Anna Johnston	Biological Technician
Tracy Weddle	Forest Hydrologist
Andy Colter	Forest Soil Scientist
Mary Gephart	Engineering Technician
Chris Mattrick	Forest Botanist
Kathy Fife	Forestry Technician - Plants

## 4.2 Other Agencies and Individuals Contacted

Other agencies and organizations consulted for professional and technical assistance:

Karen Bordeau	New Hampshire Fish and Game Wildlife Biologist
James McConaha	New Hampshire State Historic Preservation Office

# ***BATCHELDER BROOK VEGETATION MANAGEMENT PROJECT***

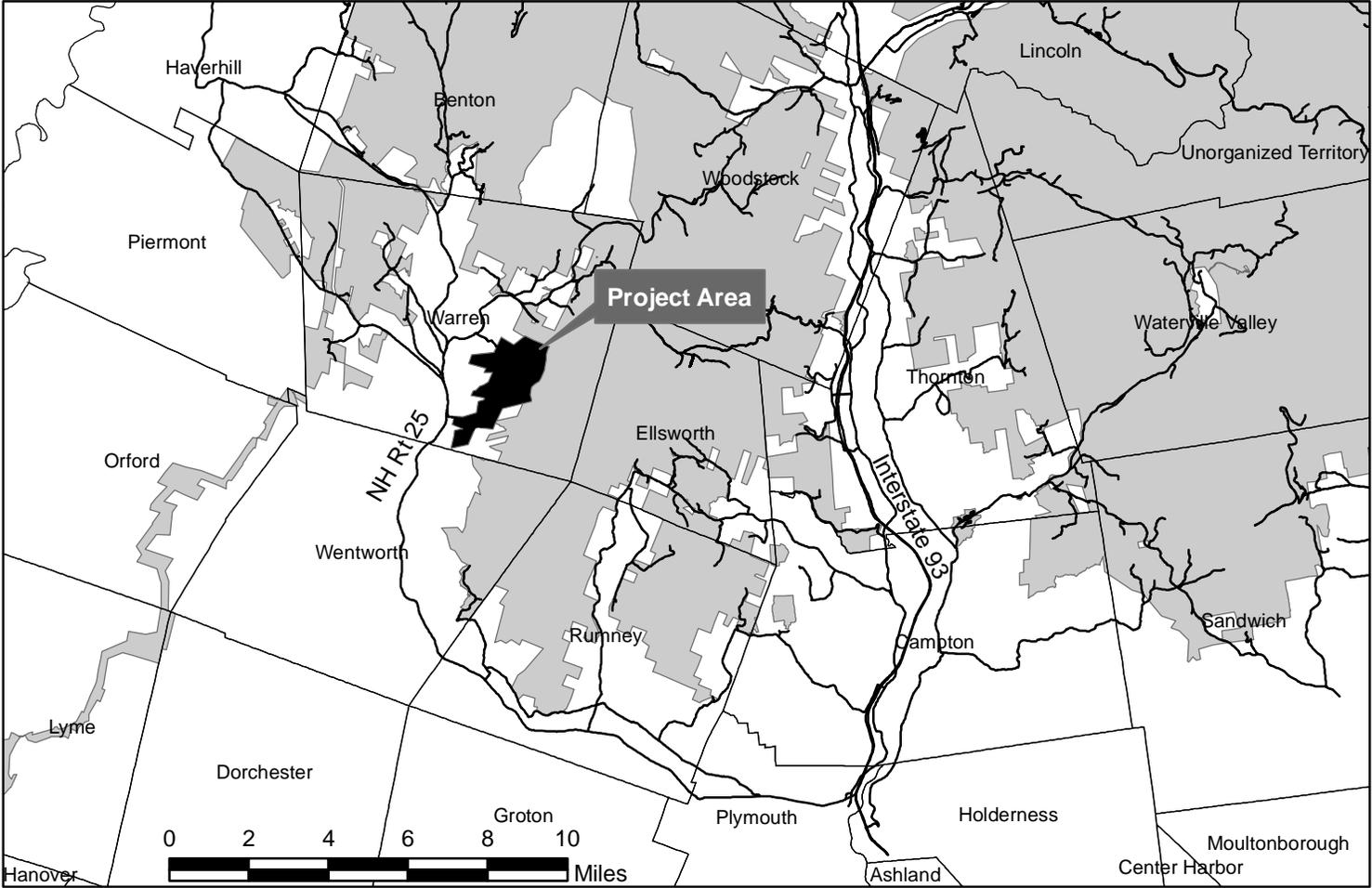
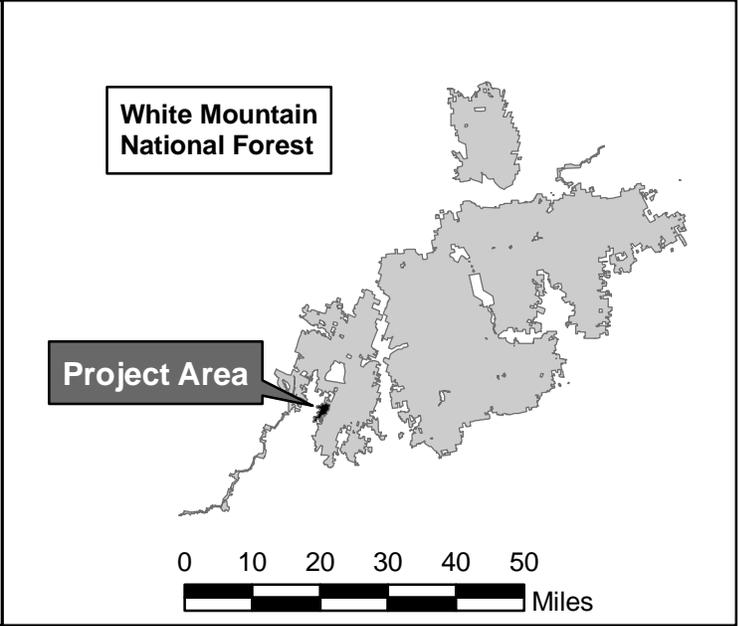
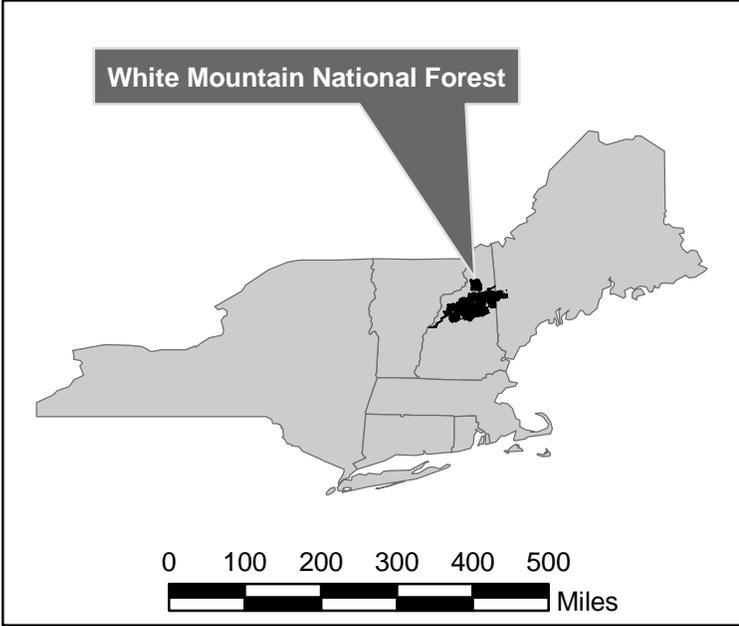
## **Public Comment Report**

### **APPENDICES**

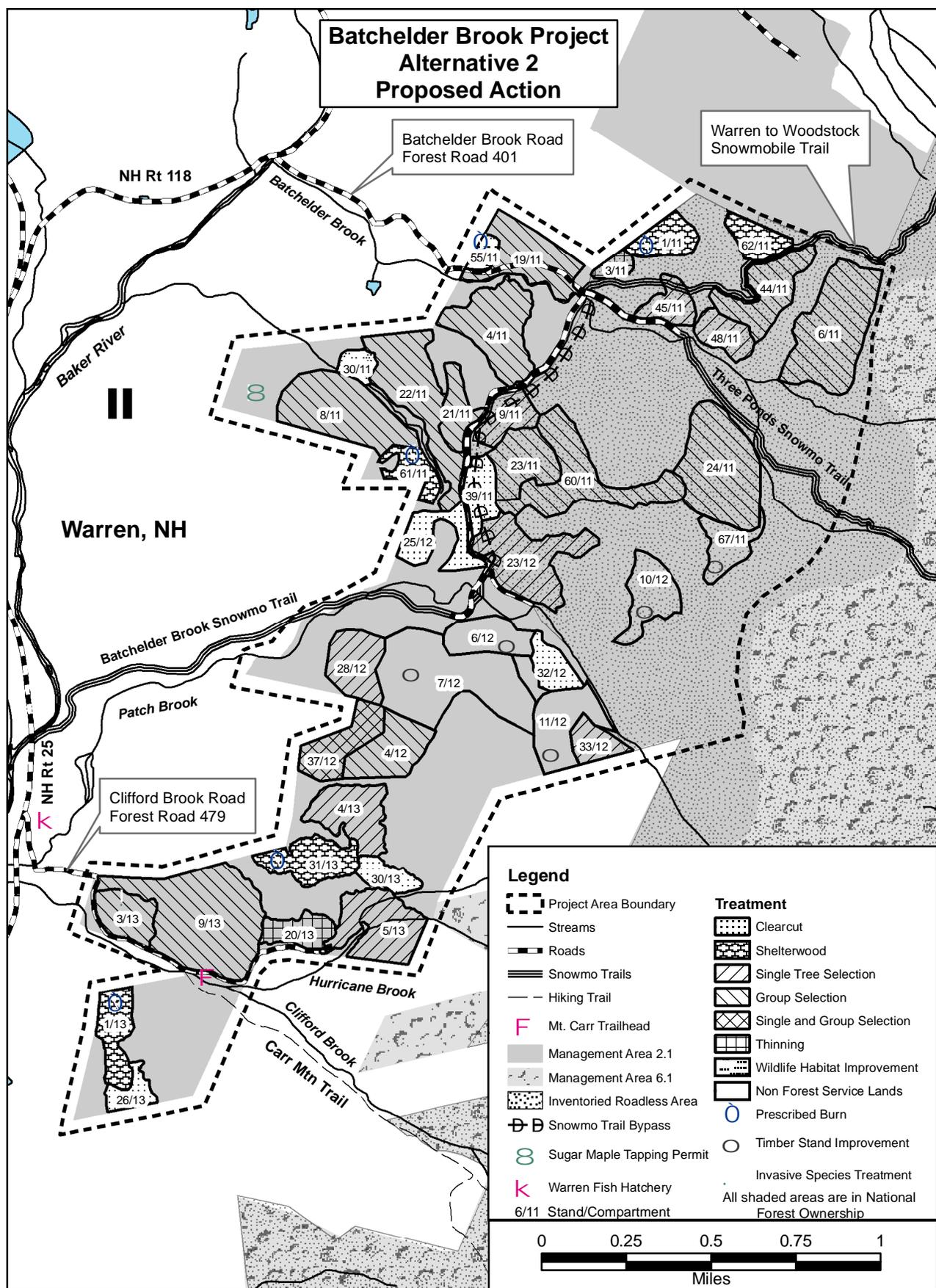
- Appendix A: Project Maps**
- Appendix B: Species with Potential Viability Concerns**
- Appendix C: Response to Scoping Comments**
- Appendix D: Monitoring Plan for Mitigation Measures**
- Appendix E: Literature Cited**
- Appendix F: Glossary**
- Appendix G: How to Comment**

**APPENDIX A – PROJECT MAPS**

# Batchelder Brook Project Vicinity Map



# Batchelder Brook Project Alternative 2 Proposed Action



Warren, NH

Warren to Woodstock  
Snowmobile Trail

Batchelder Brook Road  
Forest Road 401

NH Rt 118

Baker River

Batchelder Brook Snowmo Trail

Three Ponds Snowmo Trail

Patch Brook

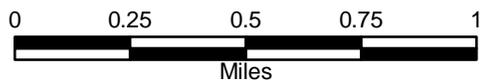
Clifford Brook Road  
Forest Road 479

Hurricane Brook

Clifford Brook  
Carr Mtn Trail

### Legend

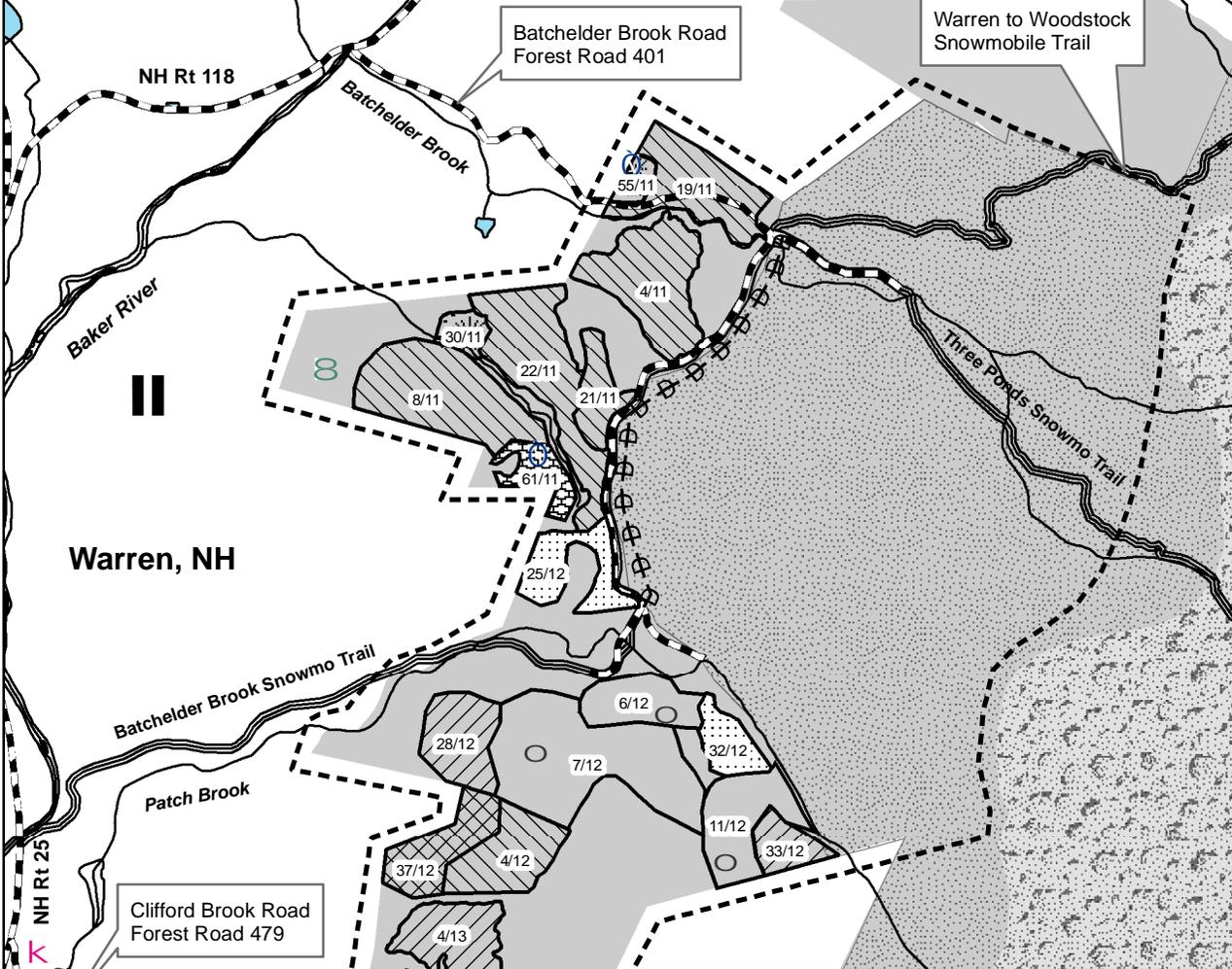
- Project Area Boundary
  - Streams
  - Roads
  - Snowmo Trails
  - Hiking Trail
  - Mt. Carr Trailhead
  - Management Area 2.1
  - Management Area 6.1
  - Inventoried Roadless Area
  - Snowmo Trail Bypass
  - Sugar Maple Tapping Permit
  - Warren Fish Hatchery
  - Stand/Compartment
- Treatment**
  - Clearcut
  - Shelterwood
  - Single Tree Selection
  - Group Selection
  - Single and Group Selection
  - Thinning
  - Wildlife Habitat Improvement
  - Non Forest Service Lands
  - Prescribed Burn
  - Timber Stand Improvement
  - Invasive Species Treatment
  - All shaded areas are in National Forest Ownership



# Batchelder Brook Project

## Alternative 3

No timber harvesting or TSI in the South Carr Mtn. IRA

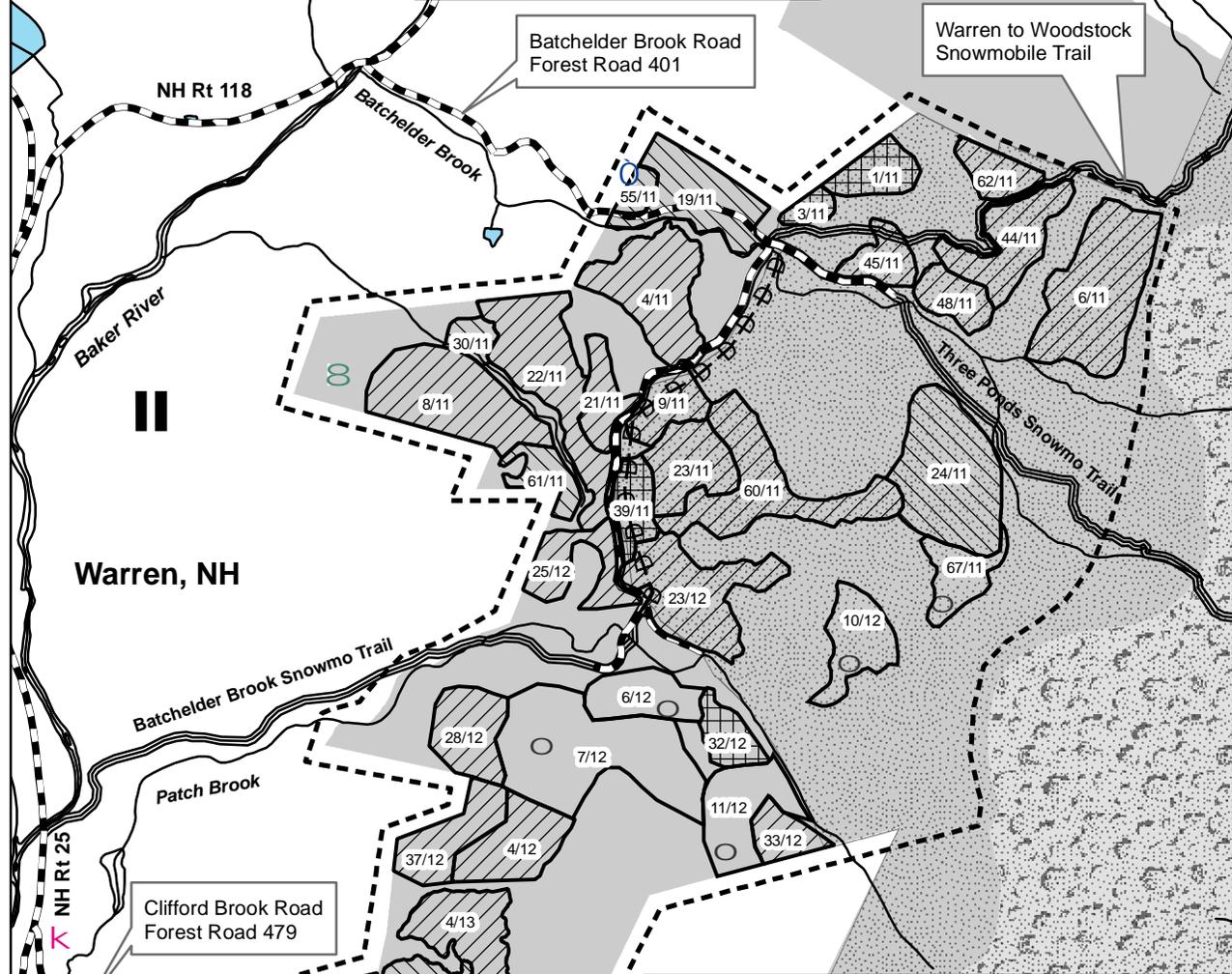


### Legend

- |                            |   |
|----------------------------|---|
| Project Area Boundary      | Clearcut  |
| Streams                    | Shelterwood                                       |
| Roads                      | Single Tree Selection                             |
| Snowmo Trails              | Group Selection                                   |
| Hiking Trail               | Single and Group Selection                        |
| Mt. Carr Trailhead         | Thinning  |
| Management Area 2.1        | Wildlife Habitat Improvement                      |
| Management Area 6.1        | Non Forest Service Lands                          |
| Inventoried Roadless Area  | Prescribed Burn                                   |
| Snowmo Trail Bypass        | Timber Stand Improvement                          |
| Sugar Maple Tapping Permit | Invasive Species Treatment                        |
| Warren Fish Hatchery       | All shaded areas are in National Forest Ownership |
| Stand/Compartment          |   |

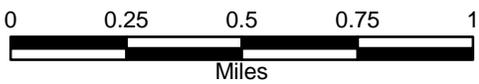


**Batchelder Brook Project  
Alternative 4  
Reduced Even-aged Management**

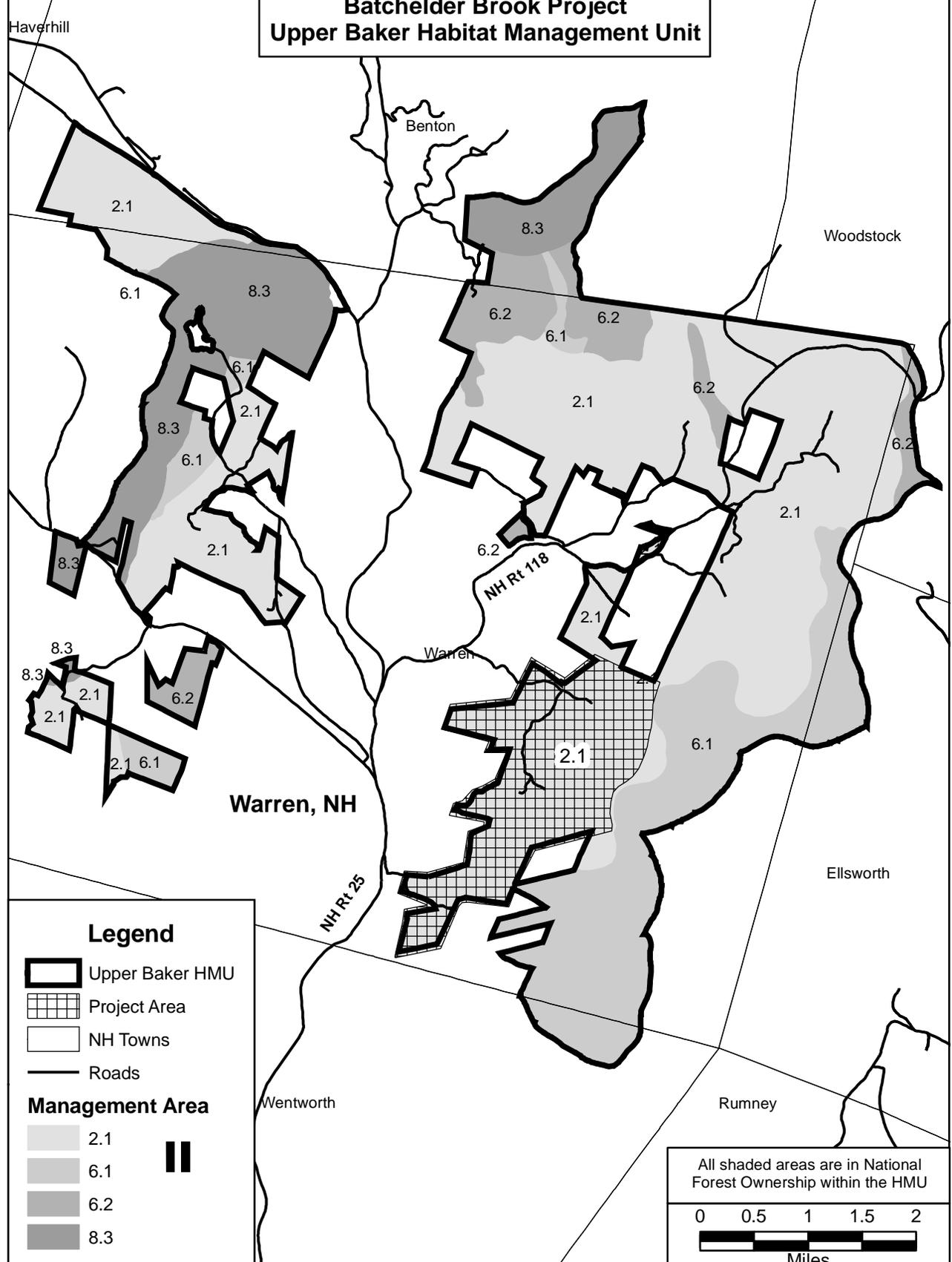


**Legend**

Project Area Boundary	Single Tree Selection
Streams	Group Selection
Roads	Thinning
Snowmo Trails	Non Forest Service Lands
Hiking Trail	Timber Stand Improvement
Mt. Carr Trailhead	Invasive Species Treatment
Management Area 2.1	Prescribed Burn
Management Area 6.1	
Inventoried Roadless Area	
Snowmo Trail Bypass	
Sugar Maple Tapping Permit	All shaded areas are in National Forest Ownership
Warren Fish Hatchery	6/11 Stand/Compartment



# Batchelder Brook Project Upper Baker Habitat Management Unit



**Legend**

-  Upper Baker HMU
-  Project Area
-  NH Towns
-  Roads

**Management Area**

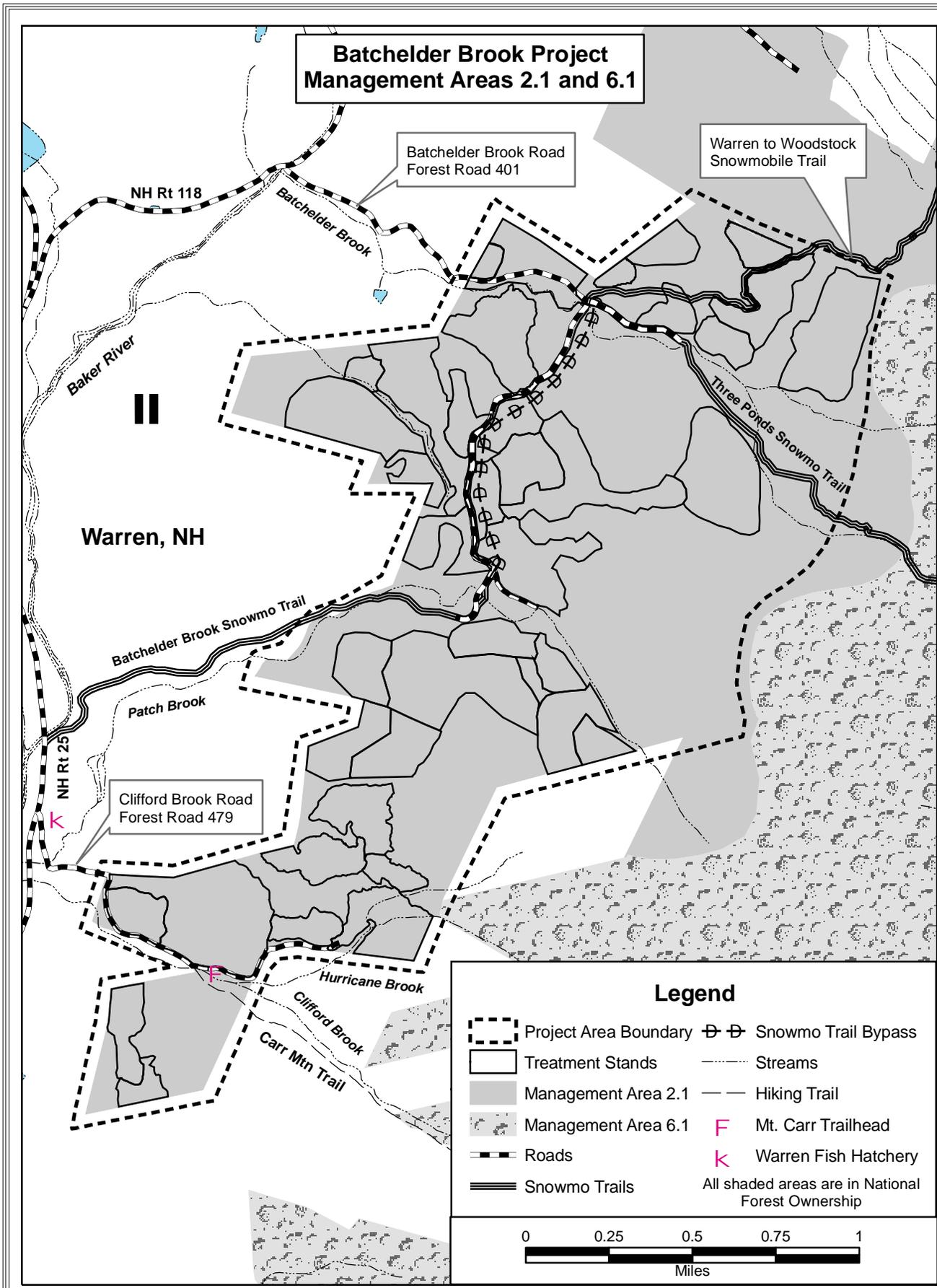
-  2.1
-  6.1
-  6.2
-  8.3

All shaded areas are in National Forest Ownership within the HMU

0   0.5   1   1.5   2

  
Miles

# Batchelder Brook Project Management Areas 2.1 and 6.1



Warren, NH

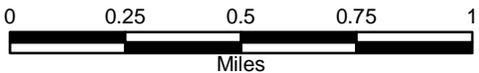
Batchelder Brook Road Forest Road 401

Warren to Woodstock Snowmobile Trail

Clifford Brook Road Forest Road 479

## Legend

- Project Area Boundary
  - Treatment Stands
  - Management Area 2.1
  - Management Area 6.1
  - Roads
  - Snowmo Trails
  - Snowmo Trail Bypass
  - Streams
  - Hiking Trail
  - Mt. Carr Trailhead
  - Warren Fish Hatchery
- All shaded areas are in National Forest Ownership



## APPENDIX B – Other Species of Concern

**Table 19. Species identified during the Forest Plan Revision Process having a potential viability concern on the WMNF (USDA-FS 2005c), which are not on the Regional Forester’s Sensitive Species (RFSS) list for the WMNF (USDA-FS 2000). Multi-year, site-specific surveys were conducted within the Project Area (NHNHI 1992; Fife 2004; USDA-FS 2004, 2006). The probability of occurrence within the Project Area and the potential effects of the Proposed Action and alternatives on these species are shown in Table 1.**

<b>Table 19. SPECIES WITH POTENTIAL VIABILITY CONCERN ON THE WMNF</b>				
<b>Species</b>	<b>Habitat Requirements</b>	<b>Suitable Habitat Present Within the Project Area?</b>	<b>Documented / or Suspected Occurrence Within Project Area?</b>	<b>Would Alternatives Adversely Affect Species or Habitat?</b>
<b>MAMMALS</b>				
<b>American Marten</b> <i>Martes americana</i>	Uses coniferous, mixed, and deciduous forest that is 30+ tall with at least 80 ft <sup>2</sup> of basal area. Prefers structural complexity in stands, including large hollow trees or downed logs.	Conifer, mixed, and deciduous forest 30+ tall with 80 ft <sup>2</sup> basal area present.	Suspect could occur within portions of the Project Area.	No. The action alternatives would not substantially affect the spruce/fir, mixed wood, and deciduous forest types and cause no adverse effects.
<b>BIRDS</b>				
<b>Bay-breasted Warbler</b> <i>Dendroica castanea</i>	Primarily mature coniferous forests (use mixed forests) up to 4,000'. Prefers the thick lower vegetation at edges of small forest openings.	Mature spruce / fir and mixed forest types are present. Few thick edges of forest openings.	Suspect could occur within portions of the Project Area.	No. The action alternatives would not substantially affect the spruce/fir or mixed wood type and would create openings with thick lower vegetation at the edge of clear cuts. There would be no adverse effects.
<b>Rusty Blackbird</b> <i>Euphagus carolinus</i>	Northern ponds, wetlands, beaver ponds typically between 1000' to 4000' in elev. Nests found in spruce & fir.	A beaver flow is located in the north part of the Project Area. There are no wetlands in the Project Area.	Suspect could occur in the Project Area near the beaver flow area, which is located outside of harvest units.	No. The No Action and all action alternatives would not adversely affect this species or suitable habitat. FP S&Gs protect and avoid aquatic habitat.
<b>Three-toed Woodpecker</b> <i>Picoides tridactylus</i>	Year-round resident of spruce/fir zone, which typically occurs above 2,500 ft. Breeds in mature coniferous forest with clumps of snags 10-12" diameter. May prefer flooded or swampy areas.	Project Area is below 2,500 ft. and no flooded or swampy areas.	Not suspected to occur within the Project Area due to non-suitable habitat.	No. The No Action and all action alternatives would not affect this species or suitable habitat.
<b>Pied-billed Grebe</b> <i>Podilymbus podiceps</i>	Freshwater emergent marsh and water bodies usually ≥ 12 acres with both open water and emergent vegetation.	No emergent marsh and large water bodies in the Project Area.	Not suspected to occur due to non-suitable habitat.	No. The No Action or all action alternatives would not affect this species or suitable habitat.

AMPHIBIANS				
<b>Jefferson Salamander</b> <i>Ambystoma jeffersonianum</i>	Mixed wetland and forested habitat. Breed in vernal to semi-permanent pools. Surrounding habitat mature forest with rocky soils, a duff layer, pit and mound topography, large (>10cm) logs, and relatively closed canopy. Usually below 1,700 ft. elev. Avoids floodplains.	Small wet areas may occur within the Project Area, but are usually avoided during unit layout.	No. Doubtful occurrence on the WMNF (USFS 2005c). Only one individual that was a pure specimen has only been documented in the SW corner of NH.	No. The No Action or all action alternatives would not affect this species or suitable habitat.
FISH				
<b>Atlantic Salmon</b> <i>Salmo salar</i>	Larger streams of the Merrimack and Connecticut River watersheds. Also Saco River watershed below Hiram Falls.	The Baker River tributary is outside the Project Area and stocked with salmon, they could move into the smaller streams in the Project Area.	Yes. Salmon are not recently stocked in the smaller streams in the Project Area, but they could migrate upstream into them from the Baker River.	No. The No Action or all action alternatives would not adversely affect this species or suitable habitat. FP S&Gs protect and avoid aquatic and riparian habitat.
INVERTEBRATES				
<b>Boulder Beach Tiger Beetle</b> <i>Cicindela ancocisconensis</i>	Open sand / mix sand & cobble of mid-sized rivers; feed & live on sandy areas exposed by receding rivers; common in Saco River downstream of WMNF.	There are no exposed sandy areas of receding mid-sized rivers within the Project Area.	Not suspected to occur within the Project Area due to no suitable habitat.	No. The No Action and all action alternatives would not affect this species or suitable habitat.
<b>Black Lordithon Rove Beetle</b> <i>Lordithon niger</i>	Late-successional or old growth northern hardwood or mixed coniferous forest below 2,500'. On the WMNF, only known from The Bowl RNA.	There is no old growth northern hardwood, but some late successional mixed coniferous forest within the Project Area.	Remote chance could occur within mixed coniferous portions of the Project Area.	No. The action alternatives would perpetuate the hardwood & spruce / fir type. Much of the harvest activity is proposed during winter season when beetles are dormant.
<b>A Big-headed Fly</b> <i>Nephrocerus slossonae</i>	Late successional or old growth northern hardwood or mixed coniferous forest above 1,500'. Non-aquatic. On the WMNF, only known to occur in old growth forest in the Bowl RNA.	No old growth. Few old age class hardwood & mixed conifer stands > 1,500' within the Project Area.	Remote chance could occur within portions of the few stands of old age hardwood & mixed conifers > 1,500' within the Project Area.	No. The action alternatives would perpetuate hardwood & conifers. Winter harvest would avoid dormant flies. The No Action or action alternatives would not adversely affect this species or suitable habitat.
<b>Brown's Ameletid Mayfly</b> <i>Ameletus browni</i>	Larvae prefer erosional areas in cold, fast-moving headwater streams that usually are well-oxygenated, of relatively high pH, with canopy cover and rocks or boulders present. Adults typically remain along streambanks near emergence sites.	There are fast moving perennial headwater streams within the Project Area.	Suspect could occur within perennial portions of fast moving headwater streams in the Project Area.	No. The No Action and all action alternatives would not adversely affect this species or suitable habitat. FP S&Gs Riparian buffers would avoid and protect aquatic habitat.

<p><b>Third Ameletid Mayfly</b> <i>Ameletus tertius</i></p>	<p>Larvae found in small and large streams in secondary depositional areas and on submerged grasses and detritus along margins of riffles and transitional areas. Adults typically remain along streambanks near emergence site. Streams area usually well-oxygenated, of relatively high pH, with canopy cover and rocks or eroding banks.</p>	<p>There are fast moving perennial headwater streams within the Project Area.</p>	<p>Suspect could occur within perennial portions of fast moving headwater streams within the Project Area.</p>	<p>No. The No Action and all action alternatives would not adversely affect this species or suitable habitat. FR S&amp;Gs Riparian buffers would avoid and protect aquatic habitat.</p>
<p><b>Southern Pygmy Clubtail</b> <i>Lanthus vernalis</i></p>	<p>Small, shady spring-fed creeks with clean sandy or mud substrates &amp; shallow running water.</p>	<p>Upper perennial portion of tributaries within Project Area have gravel, cobble, &amp; boulder substrates.</p>	<p>Not expected to occur due to non-suitable habitat (no sandy or mud substrates with running water.</p>	<p>No. The No Action and all action alternatives would not affect this species or suitable habitat.</p>
<p><b>Forcipate Emerald</b> <i>Somatochlora forcipata</i></p>	<p>Spring-fed streamlets in sub-alpine hillside fens with floating vegetation or pools with flowing groundwater in fen areas. Avoid open, sunny fen areas. Lay eggs in mud-bottom streamlet pools.</p>	<p>There are no sub-alpine hillside fens within the Project Area.</p>	<p>Not expected to occur due to non-suitable habitat within the Project Area.</p>	<p>No. The No Action and all action alternatives would not affect this species or suitable habitat.</p>
<p><b>Ebony Boghunter</b> <i>Williamsonia fletcheri</i></p>	<p>Low elevation sphagnum bogs adjacent coniferous or mixed coniferous /deciduous forests. Absent from most bogs without sphagnum. Larvae develop in shallow pools (6” - 12”) in sedge fens or sphagnum mats with open pools not choked with heaths. Uses openings in forest rather than completely open upland habitat.</p>	<p>There is no low elevation sphagnum bogs adjacent to coniferous or mixed coniferous / deciduous forested areas within the Project Area.</p>	<p>Not expected to occur due to non-suitable habitat within the Project Area.</p>	<p>No. The No Action and all action alternatives would not affect this species or suitable habitat.</p>

Suitable Habitat = Meets species’ life history requirements such as food, cover / shelter, water, breeding, and young rearing. Species’ range and suitable habitat definitions were taken largely from DeGraaf et al. 1992; DeGraaf and Yamasaki 2001. See BE Literature Cited and / or Reviewed for further sources of information considered in determining suitable habitat needs. The determination of no occurrence of a species within the Project Area considers the potential for occasional or incidental and infrequent travel through or flyover of a species in the Project Area.

**Table 20. Species identified during the Forest Plan Revision Process having a potential viability concern on the WMNF, which are not on the Regional Forester’s Sensitive Species (RFSS) list for the WMNF (USDA-FS 2000). Multi-year, site-specific plant surveys were conducted within the Project Area (NHNHI 1992; Fife 2004).**

<b>Table 20. SPECIES WITH POTENTIAL VIABILITY CONCERN ON THE WMNF.</b>				
<b>Species</b>	<b>Habitat Requirements</b>	<b>Suitable Habitat Present Within the Project Area?</b>	<b>Documented / or Suspected Occurrence Within Project Area?</b>	<b>Would Alternatives Adversely Affect Species or Habitat?</b>
<b>PLANTS</b>				
<b>Missouri Rock-cress</b> <i>Arabis missouriensis</i>	Restricted to semi-open richer sites. Typically south or west-facing slopes below 1,500'. Associated species include red oak, ash, basswood, sugar maple.	The few S or W facing stands <1,500' have closed canopy. Red oak in part of Project Area.	Not expected to occur due to non-suitable closed canopy habitat. Site-specific surveys found none.	No. The No Action and all action alternatives would not affect this species or suitable habitat.
<b>Alpine Bearberry</b> <i>Arctostaphylos alpina</i>	Typically on the exposed end of the dry/mesic heath meadow system of alpine communities. <i>A. alpina</i> is usually found in small, isolated populations on ridgelines of the Presidential Range.	No.	No. Not expected to occur due to non-suitable habitat. Site-specific surveys found none.	No. The No Action & all action alternatives would not affect species or suitable habitat
<b>Pickering’s Reed Bent-grass</b> <i>Calamagrostis pickeringii</i>	Acid peat bogs, wet shores, and dry mountainous streambeds. Sunny gravel areas of rivers close to the high water mark. Cobbled riverside sand/gravel barrens adjacent to high energy rivers. <sup>5</sup>	No.	Not expected to occur due to non-suitable habitat. Site-specific surveys found none.	No. The No Action & all action alternatives would not affect species or suitable habitat.
<b>Cut-leaved Toothwort</b> <i>Cardamine concatenata</i>	Moist rich woods, wooded bottoms, and calcareous rocky banks, talus, ledges. Prefers vernal deciduous openings and closed canopy in summer.	No.	No. Not expected to occur due to non-suitable habitat. Site-specific surveys found none.	No. The No Action or alternatives would not affect species or suitable habitat.
<b>Rocky Mountain Sedge</b> <i>Carex backii</i>	Shady calcareous to neutral, dry-mesic, rocky oak-hardwood and limestone hardwood habitat. May occur on calcareous to neutral rock outcrops and ledges.	Oak hardwood present. No rocky, dry mesic, limestone soils or outcrop ledges in Project Area.	Not expected to occur due to non-suitable habitat. Site-specific surveys found none.	No. The No Action & all action alternatives would not affect species or suitable habitat.
<b>Hair-like Sedge</b> <i>Carex capillaris</i>	Calcareous snowbank communities, wet rocks in alpine, and wetter areas of dry-mesic heath alpine habitats. <sup>1,2</sup>	No.	No. Not expected to occur due to non-suitable. Site-specific surveys found none.	No. The No Action & all action alternatives would not affect species or suitable habitat.

<b>Head-like Sedge</b> <i>Carex capitata ssp. arctogena</i>	Dry or wet acidic rocky or gravelly soil in alpine. Arctic & alpine environments on peat & gravels. <sup>1,2</sup>	No.	No. Not expected to occur per non-suitable habitat. Site-specific surveys found none.	No. The No Action & all action alternatives would not affect species or suitable habitat.
<b>Meagre Sedge</b> <i>Carex exilis</i>	Bogs and fens, often in association with <i>Sphagnum</i> moss.	No.	No. Not expected to occur per non-suitable habitat. Site-specific surveys found none.	No. The No Action & all action alternatives would not affect species or suitable habitat.
<b>Scirpus-like Sedge</b> <i>Carex scirpoidea</i>	Strongly associated with rocky summits, outcrops, & cliffs. Only known from open ledges & subalpine. Dry, calcareous soils in the subalpine, or on ledges. <sup>1,2</sup>	No.	No. Not expected to occur due to non-suitable habitat. Site-specific surveys found none.	No. The No Action & all action alternatives would not affect species or suitable habitat.
<b>Pale Painted-cup</b> <i>Castilleja septentrionalis</i>	Cool, wet ravines, along alpine brooks; in wet alpine & subalpine meadows. Moist organic to gravelly soils to calcareous cliffs. Found in snowbank/wet meadow/streamside ravine alpine communities. Moist peaty or gravelly calcareous soils in subalpine ravines. <sup>1,2</sup>	There is no alpine habitat in the Project Area.	No. Not expected to occur due to no-suitable habitat in Project Area. Site-specific surveys found none.	No. The No Action & all action alternatives would not affect species or suitable habitat.
<b>Fogg's Goosefoot</b> <i>Chenopodium foggii</i>	At cliff bases, on rocky slopes and outcrops, and in sparsely wooded areas; associated with circumneutral habitats	There are no cliffs or rocky slopes in the harvest units or Project Area.	No. Not expected to occur due to no-suitable habitat in Project Area. Site-specific surveys found none.	No. The No Action & all action alternatives would not affect species or suitable habitat.
<b>Autumn Coralroot</b> <i>Corallorhiza odontorhiza</i>	Found in a variety of deciduous and mixed forest habitats. Requires mycorrhizal host, but details unknown.	There is deciduous and mixed forest habitat in the Project Area.	Suspect low potential could occur in portions of the Project Area. Site-specific surveys found none.	No. The No Action & all action alternatives would not adversely affect species or suitable habitat.
<b>Northern Wild Comfrey</b> <i>Cynoglossum virginianum var. boreale</i>	Enriched hardwood, mesic red oak hardwood, or transition limestone hardwood. In rich mesic woods on sandy or rocky soil with understory light. Favors S & W aspects. May occur on ledges, open woods & clearing, disturbed weedy sites. <sup>2</sup>	There some red oak, but no limestone or sandy rocky ledges within the Project Area.	Suspect low potential could occur in the northern hardwood with an oak component. Site-specific surveys found none.	No. The No Action & all action alternatives would not adversely affect species or suitable habitat.
<b>Yellow Lady's-Slipper</b> <i>Cypripedium parviflorum var. pubescens</i>	Rich deciduous woods and swamps, often along the edges of spring run-off streams. Moist to wet low areas. <sup>2</sup> Mesic woods. <sup>2</sup>	There are deciduous hardwoods in the Project Area.	Suspect low potential could occur in portions of the Project Area. Site-specific surveys found none.	No. The No Action & all action alternatives would not adversely affect species or suitable habitat.
<b>Alpine Willow-herb</b> <i>Epilobium anagallidifolium</i>	Occurs on damp moss or wet rock in alpine areas, and cool, wet ravines, along alpine brooks, and moist areas of recent snow runoff. Sometimes it is found on talus in the alpine.	No alpine areas in the Project Area.	No. Not expected to occur due to no-suitable habitat in Project Area. Site-specific surveys found none.	No. The No Action & all action alternatives would not affect species or suitable habitat.

<b>Boreal Bedstraw</b> <i>Galium kamtschaticum</i>	Rich seep habitats with non-channelized flowing surface water; found in cool, wet hardwood, mixed, or conifer woods, swamps, and stream sides.	There are no wet hardwoods, seeps, or swamps in the Project Area.	No. Not expected to occur due to non-suitable habitat. Site-specific surveys found none.	No. The No Action & all action alternatives would not affect species or suitable habitat.
<b>Moss Bell-heather</b> <i>Harrimanella hypnoides</i>	Snowbank communities, wet seeps, ledges, and crevices in alpine habitats. Alpine summits. <sup>2</sup>	There are no snowbank, wet seeps, ledges, crevices or alpine.	No. Not expected to occur per non-suitable habitat. Site-specific surveys found none.	No. The No Action & all action alternatives would not affect species or suitable habitat.
<b>Alpine Azalea</b> <i>Loiseleuria procumbens</i>	Barren alpine areas <sup>1</sup> and dry-mesic heath and snowbanks and the Diapensia-azalea-rosebay dwarf shrubland communities.	There is no alpine habitat in the Project Area.	No. Not expected to occur due to non-suitable habitat. Site-specific surveys found none.	No. The No Action & all action alternatives would not affect species or suitable habitat.
<b>Northern Woodrush</b> <i>Luzula confusa</i>	Alpine & arctic meadows and hillside on the mountains. <sup>2</sup> Wet ravine alpine and subalpine communities. In forested habitat in openings created by rock ledges in oak-pine and jack pine communities.	There is no alpine habitat in the Project Area.	No. Not expected to occur due to no suitable habitat present. Site-specific surveys found none.	No. The No Action & all action alternatives would not affect species or suitable habitat.
<b>Smooth Sandwort</b> <i>Minuartia glabra</i>	Non-calcareous rocky summits and outcrops up to 3,000 ft. elev. <sup>2</sup> . Found in forested habitat in openings created by rocky ledges.	There are no high mountain rocky summits, outcrops or ledges in the Project Area.	No. Not expected to occur due to no suitable habitat present. Site-specific surveys found none.	No. The No Action & all action alternatives would not affect species or suitable habitat.
<b>Prairie Goldenrod</b> <i>Oligoneuron album</i>	Occurs mostly on dry, calcareous cliffs & ledges or open fields & roadsides. NH sites are on calcareous soil or bedrock.	There are no calcareous cliffs and ledges or bedrock within the Project Area.	No. Not expected to occur due to non-suitable habitat. Site-specific surveys found none.	No. The No Action & all action alternatives would not affect species or suitable habitat.
<b>Northern Adder's Tongue</b> <i>Ophioglossum pusillum</i>	Early-successional, seasonally moist to wet habitats, and open fens, bogs, marsh edges, pastures, old fields, grassy shores, wet thickets, cedar and hardwood swamps, floodplain woods, wet swales, damp sand, and roadside ditches. Found in some WMNF maintained wildlife openings.	Suitable habitat present in portions of the Project Area.	Few wildlife openings in the Project Area. Site-specific surveys found none.	No. The No Action & all action alternatives would not adversely affect species or suitable habitat.
<b>Mountain Sorrel</b> <i>Oxyria digyna</i>	Very moist rocky slopes and ledges in alpine ravines <sup>1</sup> ; alpine streambanks and ravines; snowbanks and headwalls. Above 3,500 ft elev. in northern New England.	No alpine habitat in the Project Area.	No. Not expected to occur due to no-suitable habitat present. Site-specific surveys found none.	No. The No Action & all action alternatives would not affect species or suitable habitat.
<b>Viviparous Knotweed</b> <i>Persicaria viviparum</i>	Moist alpine meadows <sup>1</sup> . Wet, mossy rocks, cool or damp slopes, gravels, and seeps in alpine and subalpine areas.	No alpine habitat in the Project Area.	No. Not expected to occur due to non-suitable habitat. Site-specific surveys found none.	No. No Action & all action alternatives would not affect species or suitable habitat.

<b>Alpine Timothy</b> <i>Pheleum alpinum</i>	Wet meadows, wet ravines, and damp shores in the alpine zone <sup>1</sup> .	No alpine habitat in the Project Area.	No. Not expected to occur per non-suitable habitat. Site-specific surveys found none.	No. The No Action & all action alternatives would not affect species or suitable habitat.
<b>Jack Pine</b> <i>Pinus banksiana</i>	Dry or sterile sandy or rocky soil <sup>2</sup> . Rocky summits, outcrops & ledge; well-drained loamy sands. In WMNF, occurs from 2,200-4,000 ft elev. Needs high level of sun to become established.	No sandy soils or rocky summits in the Project Area.	No. Not expected to occur due to no-suitable habitat present. Site-specific surveys found none.	No. No Action & all action alternatives would not affect species or suitable habitat.
<b>Alpine Meadow Grass</b> <i>Poa pratensis ssp. alpigena</i>	Alpine meadows <sup>1</sup> . Nutrient poor soils in alpine/subalpine dry-mesic heath and meadow communities.	No alpine habitat in the Project Area.	No. Not expected to occur due to no-suitable habitat. Site-specific surveys found none.	No. No Action & all action alternatives would not affect species or suitable habitat.
<b>Douglas Knotweed</b> <i>Polygonum douglasii</i>	Exposed rocky slopes and hillside ledges in well-drained soil where little other vegetation grows <sup>1</sup> . Can also grow in nutrient-enriched hardwood forests.	No exposed rocky slopes or hillside ledges. Some enriched hardwood forest occurs in Project Area.	Suspect could occur in enriched hardwood forest in the Project Area. Site-specific surveys found none.	No. No Action & all action alternatives would not adversely affect species or suitable habitat.
<b>Algae-like Pondweed</b> <i>Potamogeton confervoides</i>	Strongly acidic soft-water bogs, lakes & ponds at various elevations. Found in slow-flowing acidic streams & muddy shores with ample vegetation; found at depths $\leq 15'$ or deeper. Not known to occur in beaver ponds.	No strongly acidic soft-water bogs or lakes or slow-flowing acidic streams or muddy shores with lots of vegetation in Project Area.	No. Not expected to occur due to no suitable habitat. Site-specific surveys found none.	No. No Action & all action alternatives would not affect species or suitable habitat.
<b>Yellow Rattle</b> <i>Rhinanthus minor ssp. groenlandicus</i>	Dry-mesic heath communities and snowbank, wet ravine and meadows in alpine/subalpine zone.	No alpine/subalpine zone present.	No. Not expected to occur due to no suitable habitat. Site-specific surveys found none.	No. No Action & all action alternatives would not affect species or suitable habitat.
<b>Lapland Rosebay</b> <i>Rhododendron lapponicum</i>	Dry-mesic alpine heath communities in alpine. Tolerant of dessication; occurs on well-drained, thin, acidic, gravel-stony soils. Does not grow on rock outcrops. Rocky barrens and sub-alpine woods.	No alpine occurs in the Project Area.	No. Not expected to occur due to no suitable habitat. Site-specific surveys found none.	No. No Action & all action alternatives would not affect species or suitable habitat.
<b>Silverleaf Willow</b> <i>Salix argyrocarpa</i>	Moist soils in alpine or subalpine streamside and ravines <sup>1</sup> .	No alpine habitat in Project Area.	No. Not expected to occur per no suitable habitat. Site-specific surveys found none.	No. No Action & all action alternatives would not affect species or suitable habitat.
<b>Dwarf Willow</b> <i>Salix herbacea</i>	Cool, wet alpine ravines, snowbank communities, and along alpine brooks <sup>1</sup> . Grassy, sandy, or rocky alpine areas; often on thinner soils than other snowbank/wet ravine species.	No alpine habitat in Project Area.	No. Not expected to occur due to no suitable habitat present. Site-specific surveys found none.	No. No Action & all action alternatives would not affect species or suitable habitat.

<b>Satin Willow</b> <i>Salix pellita</i>	Wetland obligate. River or streambanks, floodplain forest/moist thickets, forested swamps and lake or pond shores. Alluvial or gravelly riverbanks, shores, or swamps. <sup>2</sup>	No floodplain forest, thickets, forested swamps, lakes, or ponds in the Project Area.	No. Not expected to occur due to no suitable habitat present. Site-specific surveys found none.	No. No Action & all action alternatives would not affect species or suitable habitat.
<b>Three-leaved Black Snake Root</b> <i>Sanicula trifoliata</i>	Limy deciduous woods below 1500'. Most occurrences on steep slopes. Associates w/ dense lush ground cover & relatively closed canopy. Found near clearcuts & cliffs indicating takes advantage of sunny sites	There are no limy deciduous woods below 1500' or dense lush ground cover within the Project Area.	No. Not expected to occur due to no suitable habitat present. Site-specific surveys found none.	No. No Action & all action alternatives would not affect species or suitable habitat.
<b>Alpine Brook Saxifrage</b> <i>Saxifraga rivularis</i>	Moist alpine soils, often at the head of moist alpine ravine, moist soils in rock crevices in disturbed areas. <sup>1</sup> May be a nitrophile.	No alpine in the Project Area.	No. Not expected to occur due to no-suitable habitat. Site-specific surveys found none.	No. No Action & all action alternatives would not affect species or suitable habitat.
<b>Arizona Cinquefoil</b> <i>Sibbaldia procumbens</i>	Steep, moist meadows in alpine regions. <sup>1</sup> Occurs at bottom of a snowfield in Tuckerman's.	No alpine in the Project Area.	No. Not expected to occur due to no-suitable habitat. Site-specific surveys found none.	No. No Action & all action alternatives would not affect species or suitable habitat.
<b>Rock Goldenrod</b> <i>Solidago calcicola</i>	Moist rich woods, rocky or gravelly thickets, talus and cliffs. Open canopy and nutrient richness are key factors.	No moist rich woods, rocky or gravelly thickets, talus and cliffs.	No. Not expected to occur due to no suitable habitat. Site-specific surveys found none.	No. The No Action or action alternatives would not affect species or suitable habitat.
<b>Anderson's sphagnum</b> <i>Sphagnum andersonianum</i>	Low hummocks in very poor ericaceous fens.	No fens in the Project Area.	No. Not expected to occur due to no-suitable habitat. Site-specific surveys found none.	No. No Action & all action alternatives would not affect species or suitable habitat.
<b>Angerman's Sphagnum</b> <i>Sphagnum angermanicum</i>	Poor fens, including at edges of ponds	No fens in the Project Area.	No. Not expected to occur due to no-suitable habitat. Site-specific surveys found none.	No. No Action & all action alternatives would not affect species or suitable habitat.
<b>A Sphagnum</b> <i>Sphagnum brevifolium</i>	Known from poor and intermediate fen habitats. Occupies low hummocks and wet carpets, but seems to prefer high-level carpets.	No fen habitats in the Project Area.	No. Not expected to occur due to no-suitable habitat. Site-specific surveys found none.	No. No Action & all action alternatives would not affect species or suitable habitat.
<b>A Sphagnum</b> <i>Sphagnum flavicomans</i>	Medium to tall hummocks in bogs and poor fens. An indicator species for the <i>Sphagnum rubellum/Vaccinium oxycoccus</i> dwarf heath moss lawn in NH.	No bogs or fens in the Project Area.	No. Not expected to occur due to no-suitable habitat. Site-specific surveys found none.	No. No Action & all action alternatives would not affect species or suitable habitat.

<b>Lindberg's Sphagnum</b> <i>Sphagnum lindbergii</i>	Restricted to alpine and subalpine peatlands, forming carpets in high elevation heath balds and bogs; prefers peatlands with full sun, low to medium nutrient levels, & pH of 4.0-6.0	No alpine in the Project Area.	No. Not expected to occur due to no-suitable habitat. Site-specific surveys found none.	No. No Action & all action alternatives would not affect species or suitable habitat.
<b>A Sphagnum</b> <i>Sphagnum majus ssp. norvegicum</i>	Occurs in lawns in poor sedge fens and along pond margins.	No sedge fens in the Project Area.	No. Not expected to occur per no-suitable habitat. Site-specific surveys found none.	No. No Action & all action alternatives would not affect species or suitable habitat.
<b>Pylaes' Sphagnum</b> <i>Sphagnum pylaesii</i>	Forms mats over moist or wet rock or is submerged in fen pools; prefers acidic conditions.	No fen pools in the Project Area.	No. Not expected to occur per no suitable habitat. Site-specific surveys found none.	No. No Action & all action alternatives would not affect species or suitable habitat.
<b>Alpine Meadow-sweet</b> <i>Spirea septentrionalis</i>	Cool wet ravines and snowbank communities in alpine and subalpine habitats.	No cool wet ravine alpine and subalpine habitats.	No. Not expected to occur due to no suitable habitat present. Site-specific surveys found none.	No. No Action & all action alternatives would not affect species or suitable habitat.
<b>Ciliated Aster</b> <i>Symphotrichum ciliolatum</i>	Open woods, clearings & dry to moist thickets, shores, clearings; occurs in openings in pine barrens & dry hardwood & red spruce hardwood forest, & clearings & roadsides. Prefers scattered small or large openings in the forest canopy, not necessarily early-successional habitat.	Open woods & dry northern hardwood forest, roadsides & scattered small openings in the forest canopy present.	Suspect low potential could occur within the northern hardwood community type and roadsides within the Project Area. Site-specific surveys found none.	No. The action alternatives would perpetuate the hardwood type. Winter harvest would avoid plants that are dormant. No Action and all alternatives would cause no adverse effects.
<b>Narrow False Oats</b> <i>Trisetum spicatum</i>	Open, exposed habitats; associated with rock ledges, crevices, and waterfalls. Dry-mesic heath and snowbank / wet ravine alpine / subalpine communities.	No rock ledges, crevices, and waterfalls or dry - mesic heath and snowbank / wet ravine alpine / subalpine communities.	No. Not expected to occur due to non-suitable habitat. Site-specific surveys found none.	No. No Action & all action alternatives would not affect species or suitable habitat.
<b>Northeastern Bladderwort</b> <i>Utricularia resupinata</i>	Pond, lake and bog shores and margins as well as some wet ditches. Prefers clear, acidic waters with sandy, muddy, or peaty shores. May require low water levels to bloom, and needs a slightly higher than average water temperature.	No pond, lake, bog shores, margins or wet ditches or clear, acidic waters with sandy, muddy, or peaty shores.	No. Not expected to occur due to non-suitable habitat. Site-specific surveys found none.	No. No Action & all action alternatives would not affect species or suitable habitat.
<b>Mountain Hairgrass</b> <i>Vahlodea atropurpurea</i>	In northern New England, is limited to the alpine / subalpine zone, especially herbaceous snowbank communities.	No alpine / subalpine zone, especially herbaceous snowbank communities.	No. Not expected to occur due to non-suitable habitat. Site-specific surveys found none.	No. No Action & all action alternatives would not affect species or suitable habitat.

<sup>1</sup> = Storks and Crow (1979)

<sup>2</sup> = Gleason and Cronquist (1991)

<sup>3</sup> = Royal Botanical Gardens (2000)

<sup>4</sup> = Plants For A Future (2000)

<sup>5</sup> = Engstrom and Sperduto (1994, 96)

*Occurrence of a species within the Project Area also considered ELTs and forest types present. For information on Regional Forester R9-listed Sensitive Species (USDA-FS 2000), see the BE in the Project File.*

## APPENDIX C – Response to Scoping Comments

### Response to Scoping Comments

Below is an overview of the comments received in response to the Batchelder Brook Scoping Report. Fifteen responses were received from state agencies, non-profit organizations and interested individuals. Comments were categorized and incorporated into scoping comment statements, which were then sent to the Batchelder Brook Interdisciplinary Team for review and response..

We appreciate the time respondents spent reviewing the Scoping Report and thank you for your thoughtful comments.

The comments are arranged by the following broad category headings:

1. Support of Proposed Project
2. Alternatives
3. Vegetation
4. Wildlife
5. Endangered, Threatened, and Sensitive Species
6. Fragmentation
7. Water
8. Soils
9. Socio-Economic
10. Heritage
11. Visuals
12. Recreation
13. Herbicide
14. South Carr Mountain Inventoried Roadless Area
15. Prescribed Burning
16. Mitigations
17. Cumulative Effects
18. Optimality of Harvest
19. Environmental Analysis
20. Compartments and Stands
21. Roads
22. Hubbard Brook

### Support of proposed Batchelder Brook Project

**The Forest Service should approve the project and move the condition of the forest closer to the forest plan objectives.**

Thank you for supporting the Batchelder Brook Project. Comment noted.

## **Alternatives**

### **The Forest Service should develop an alternative that does not consider any timber harvesting activities in the South Carr Mountain Inventoried Roadless Area.**

In response to this issue Alternative 3 has been developed. Alternative 3 does not propose any timber harvesting activities in the South Carr Mountain Inventoried Roadless Area.

### **The Forest Service should develop an uneven-aged alternative to the proposed action**

In response to this issue Alternative 4 has been developed. Alternative 4 does not propose any clearcuts or overstory removals.

## **Vegetation**

### **The Forest Service should locate and preserve the oldest remaining stands and trees in the project area.**

Analysis of the existing condition of vegetation type and age class within the Upper Baker HMU indicates that the mature / old age class is represented within MA 2.1 land and in the other MAs within the larger HMU. The Proposed Action would defer areas with mature trees for future development of older aged stands within the MA 2.1. We are not sure of the amount and location of the extensive pole timber stands the commenter is referring to. However, it is important to keep young age class (pole size vegetation) as a component in achieving an array of age class diversity within the Project Area.

### **The Forest Service should not harvest old growth forest as part of the proposed Batchelder Brook project.**

Based on multi-year and site-specific botanical surveys within the Project Area, Interdisciplinary-team field reviews, and a review of compartment and stand data (USDA-FS 2005a), there are no stands specifically identified as old growth forest (the 2005 WMNF Forest Plan definition is 200 years or older with seeps and ground flora indicators of enrichment). A past study by Carbonneau (1986) used systematic sampling in an attempt to locate old growth forest stands in NH. Twelve sites meeting the study's criteria for old growth were surveyed. Eight sites were located in the White Mountain region, but none were located within the Batchelder Project Area. Furthermore, the district biologist reviewed the publication, "Ecological Inventories and Natural Communities of NH (NHNHB & The Nature Conservancy 2004) to help determine there is no old growth forest within the Project Area.

Forest-wide age class objectives for wildlife habitat management include maintaining high quality mature forest and old forest habitats on a majority of the Forest (WMNF LRMP 2005, I-20). Approximately 54% of the Forest is in MAs where timber harvest, developed recreation, and permanent road construction are usually not allowed (MAs 2.1a, 5.2, 6.1, 6.2, 6.3, 8.1, 9.3, 9.4) totaling approximately 404,000 acres (WMNF-FEIS 2005, III-80-81).

### **The Forest Service should not harvest any low elevation old growth or potential old growth forests in the project area.**

There are no stands specifically identified as low elevation old growth forest within the Project Area. The Proposed Action and alternatives include deferral of low elevation areas of mature trees on MA 2.1 land and defers land unsuitable for harvest in MA2.1 (approximately 1,822 acres) within the HMU for development of mature forest within the Project Area.

**The Forest Service should explain what the approximate percentage of the management area in all age classes.**

The proposed Project Area is located in the Upper Baker Habitat Management Unit (HMU). Vegetation management would occur on suitable land in MA 2.1 within the HMU. Analysis of the existing condition of the HMU showed the approximate percent by age class and habitat type in MA 2.1 as follows:

Hardwood	=	2% regen; 12% young; 86% mature & old.
Mixedwood	=	0% regen; 1% young; 99% mature & old.
Spruce-Fir	=	0% regen; 2% young; 98% mature & old.
Aspen-Birch	=	3% regen; 43% young; 53% mature & old.
Oak-Pine	=	0% regen; 7% young; 93% mature & old.
Hemlock	=	0% regen; 64% young; 36% mature & old.

The early successional age class (0 to 9 yrs) is the least represented age class across all habitat types in MA 2.1 land and within the entire HMU. The old age class (120 yrs. + for northern hardwood and mixedwood and 90+ for the other types) is combined with the mature age class and is represented in MA 2.1 lands as shown above.

**The Forest Service should describe the likelihood of mature and old growth habitat creation on non-federal land near the project area.**

The Cumulative Effects analysis in the Wildlife Section of the 30-Day Comment Report addresses activities on private land adjacent to the HMU, including vegetation management and development.

**The Forest Service should explain the current age class percentages on the forest and how natural disturbances are assessed.**

Assessment of age class distribution within the Project Area was determined using the WMNF Habitat Management Unit Analysis Tool, which is based on the Forest Service Combined Database System (CDS). Stand exam data was updated in CDS to reflect the on the ground site conditions prior to generation of the current age class distribution in the Upper Baker HMU.

Please also see the previous response to comment regarding natural disturbances. Based on stand exam and multi-field reviews, there are no mid- to large scale natural disturbances within the Project Area except for occasional and localized small-scale pockets of windthrow.

**The Forest Service should recognize that without mature stands the area will not represent the diversity of habitats natural to the area.**

The WMNF Forest Plan (USDA-FS, 2005) defines the young age class as 10 to 59 years for northern hardwood and mixedwood, and 10-39 for the other types. Analysis of the Upper Baker HMU indicates approximately 86% of the 2.1 land in the HMU is in the mature/old age class. There will be

opportunity for old forest to develop on lands in MA 2.1 that are unsuitable for timber harvest (steep & rocky) and on lands outside MA 2.1 that are not subject to timber harvest (MA 6.1, 6.2, 8.3) within the entire HMU.

**The Forest Service should describe the likelihood of the creation of early successional habitat on non-federal land.**

The Cumulative Effects analysis in the Wildlife Section of the 30-Day Comment Report addresses activities on private land adjacent to the HMU, including vegetation management and development.

**The Forest Service should explain the difference between a group selection harvest and a single tree selection harvest.**

The intent of a group selection prescription is to regenerate a stand in an uneven-aged method, over a 100 to 120 year time frame. A group selection treatment typically harvests approximately 20% of the trees from the stand where the group selection occurs. An example would be a 40 acre northern hardwood stand. Of this 40 acre stand, approximately 8 acres (20%) would be harvested. Groups range in size from 1/10 acre to 2 acres. Group size is dependant upon silvicultural opportunities available in any given stand. Group selection in this 40 acre stand might be comprised of 3, two acre groups and 2 one acre groups.

In stands being treated using single-tree selection, a portion of the stand stocking would be cut and removed to stimulate regeneration and to harvest defective or declining and mature trees. Less than 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 larger trees would be cut leaving a stand of smaller trees with a dense understory of tree regeneration and other woody plants. Over time residual tree growth and in growth fills in and returns the stand to full stocking. The residual stand restricts sunlight so that the treatment would favor shade-tolerant plants. Over time, there would be a shift in species toward beech, sugar maple, and hemlock. Eventually other species would be eliminated from the population. Single-tree selection allows managers to improve the quality of shade-tolerant growing stock.

**The Forest Service should explain what percentage of canopy trees are removed from a stand receiving single tree selection.**

If 138 acres are treated from 164 acres of stands in the single tree selection, this does not mean that approximately 84% of the canopy trees will be removed. This means that of the 164 total stand acres, 26 acres are not being treated at all. This may be due for a number of reasons, such as operability or site specific silvicultural opportunity. Typically in single tree prescriptions less than 1/3 of the growing stock is harvested. Accordingly, if 138 acres are being treated with single tree selection, than no more than thirty-three percent of the growing stock from the treated acres would be removed.

**The Forest Service should explain if early successional habitat is defined from the time of the last Forest Service treatment without reference to actual vegetation conditions on the ground.**

The WMNF Forest Plan (USDA-FS, 2005) defines early successional forest habitat as primarily tree species that require an open canopy and high levels of light and that typically colonize an area after

stand-replacing disturbance (the age class is 0 to 9 years old). Forest openings often contain raspberries and other shrubs and grasses, which are important wildlife habitat.

**The Forest Service should explain where the Japanese knotweed is located in the project area.**

During site-specific plant surveys of the Project Area, a 20 x 80 foot wide patch of Japanese knotweed was documented in the corner of Stand 9 near the National Forest Boundary line marker and Clifford Brook Road in the Town of Warren, NH.

**The Forest Service should explain the effects of the proposed project on small whorled pogonia.**

The Batchelder Brook BE determined and the 30-Day Comment Report will disclose that there is no probability of occurrence of small whorled pogonia within the Project Area. Multi-year and site specific plant surveys found no small whorled pogonia within the Project Area. There would be no direct, indirect, or cumulative effects and no mitigation or monitoring required for this species.

**The Forest Service should explain what species of plants and animals would be affected by the proposed project.**

The BE and the 30-Day Comment Report describe the vegetative conditions (including plants and communities) and the wildlife habitat and species present or likely to occur within the Project Area, based on results from multi-year and site-specific plant surveys and field reviews within the Project Area.

**The Forest Service should describe any outstanding natural communities found in the project area.**

Please see the previous response to comment regarding plants and wildlife. The BE and the 30-Day Comment Report describe the sources of information used to describe the existing condition of the affected environment within the Project Area and describe the potential effects of the Proposed Action and alternatives on plant and wildlife resources. There are no outstanding natural communities within the Project Area.

**The Forest Service should explain what “winter” season of harvest means.**

Winter season of harvest means between December 15 and March 20 of any given calendar year. The Batchelder Brook Project is anticipated to be implemented over 3 to 5 years. Winter season of harvest for this project could start as early as December 15, 2006.

**Wildlife**

**The Forest Service should explain why there is a need to increase early-successional habitat to improve wildlife habitat diversity.**

The Purpose and Need is based on the Goals and Objectives identified in the WMNF forest Plan (USDA-FS 2005a). These include providing “a diversity of habitats across the Forest, including various forest types, age classes, and non-forested habitats” (p.I-20). A range of habitat composition

percent objectives were evaluated in the Final Environmental Impact statement (FEIS) that accompanied the Forest Plan (USDA-FS 2005b). Species that use regeneration hardwoods include (but are not limited to) moose, white-tailed deer, black bear, cedar waxwing, chestnut-sided and mourning warblers, and common yellowthroat. Species that use regeneration softwoods include (but are not limited to) moose, snowshoe hare, bobcat, yellow warbler, purple finch, dark-eyed junco and magnolia warbler.

**The Forest Service should identify what management indicator species use early successional habitat.**

The FEIS for the revised WMNF Plan (USDA-FS 2005) identified several MIS whose population changes are believed to indicate effects of management activities on other species of selected biological communities...(36 CFR 219.19). Two of these WMNF MIS include the chestnut-sided warbler (regeneration hardwoods) and the MIS magnolia warbler (regeneration softwoods). The Batchelder Brook Project EA will disclose potential effects to wildlife and their habitat from the Proposed Action and alternatives. The chestnut-sided warbler is a Partner's in Flight High Priority species. Analysis of breeding bird survey data on the WMNF since 1992 showed a statistically significant declining trend of 5 bird species on the WMNF including the chestnut-sided warbler (MacFaden and Capen, 2000). The population decline on the WMNF mirrors that seen in the five Partners In Flight subsections surrounding the Forest. Data from the national Breeding Bird Survey routes (Sauer et al., 2003) showed the average number of chestnut-sided warblers declined. This decline is most likely due to a decreasing trend in early successional habitat throughout its range. The magnolia warbler population trends on the WMNF were not statistically significant (MacFaden and Capen, 2000). Within the larger range, data also reflect a stable trend overall, although this appears to result from a combination of increasing and decreasing trends on individual transects. Northern NH and ME show declining trends, while southern NH and northern VT display increasing trends (Sauer et al., 2003). Note MIS were not identified based on lack of habitat. Rather, they were selected because they best represented other species that also have similar habitat requirements (see Forest Plan FEIS for more details). Analysis of the Upper Baker Habitat Management Unit (in the project record) showed a need to increase early successional habitat to meet the Forest Plan objectives for habitat diversity.

**The Forest Service should try to achieve its wildlife habitat objectives as the visiting public enjoys seeing wildlife on the forest.**

At our visitor centers, many forest users have commented that they enjoy watching wildlife and your comment is noted. The Purpose and Need of the Proposed Action would move the Project Area towards the Forest Plan goals for providing a diversity of wildlife habitats across the WMNF. The other action alternatives would also move the Project Area towards the goal, but to a lesser degree.

**The Forest Service should explain the grouse and beaver habitat improvement project.**

The proposed grouse and beaver habitat improvement is planned near an old beaver pond. The dominant vegetation near the beaver pond is red spruce and balsam fir. Within the fir and spruce there are some aspen trees growing. Patch cuts no greater than 2 acres would be designed around the aspen trees. The cleared area around the aspen and the subsequent prescribed burn of the cleared area should promote aspen sprouting and serve to maintain the aspen component in this stand near the old beaver pond.

**The Forest Service should serve as a refuge for late successional species and not create early successional habitat through timber harvesting activities.**

The 30 Day Comment Report discloses that early successional habitat is not abundant in areas outside the White Mountain National Forest (Forest Statistics for NH: 1983-1997). In fact, there is a declining trend in early successional habitat region-wide in New England. Also, there is no guarantee that any early successional habitat located outside the WMNF would remain forested due to the increasing development surrounding the WMNF. The natural disturbance regime on the WMNF is often localized and infrequent and often creates only a small portion of early successional habitat. Land unsuitable for harvest in the MA 2.1 portion of the Upper Baker HMU (approximately 1,822 acres) would be left for development of older stands. Furthermore, MAs 6.1, 6.2, and 8.3 within the HMU and entire Wilderness Areas located outside of the HMU provide a large, contiguous area of uneven-age, contiguous forested habitat. 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.

**The Forest Service should serve as a refuge for late-successional species because early successional habitat is abundant in areas outside the forest.**

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 (LRMP 2005, I-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 alternatives at various degrees) would move the Project Area towards the Upper Baker HMU DFC.

The 30-Day Comment Report discloses that early successional habitat is not abundant outside the WMNF. In fact, there is a steady decline in this age class across the new England landscape. There is no guarantee that any early successional age class forest located outside of the WMNF would remain in a forested condition vs. being converted into developed land. In New England, catastrophic disturbances from wind-throw and fire occur at intervals of about 1,150 and 800 years, respectively (Lorimer 1977 cited in DeGraaf and Yamasaki 2001). Some localized, mid- to large-size natural disturbances (some severe) do occur in the Northeast (including the WMNF), but they are infrequent, sporadic, and unpredictable. Past field reviews and over-flights of the WMNF documented that the 1998 ice storm event affected mostly the hardwood forest type in other parts of the Forest (such as the Kilkenny Range) located outside of the Batchelder Brook Project Area. The 1998 ice storm did not create early successional habitat within the Project Area (multi-FS field reviews) or the HMU. Although wind has a dramatic effect on overstories, it has little impact upon successional trends and overall species composition. The majority of wildlife on the WMNF (approximately 150 species) use northern hardwood regeneration habitat for all or part of their life cycle (DeGraaf et al. 1992, DeGraaf and Yamasaki 2001).

**The Forest Service should meet the basic requirements of the 1982 National Forest Management Act Rule.**

The regulations promulgated at 36 CFR 219.19 instruct the process for development or revision of Forest Plans. The planning area refers to the entire Forest, not an individual project area. The WMNF incorporated the direction of 36 CFR 219.19 and the Forest Service Manual into the revised WMNF Forest Plan (USDA-FS 2005). Analysis of wildlife habitat condition and its distribution across the landscape, management indicator species, and species viability were completed as part of the Forest Plan revision. In addition, the WMNF completed a comprehensive evaluation of monitoring data within the forest-wide planning area entitled, "*Evaluation of Wildlife Monitoring and Population Viability; WMNF MIS*" (USDA -FS 2001), which included some of the same MIS as in the revised Forest Plan. MIS may be affected by individual project actions or no actions. However, viable populations of MIS are to be maintained or monitored in the Forest-wide planning area. Our analysis at the project level references the forest-wide viability analysis and we also analyze the existing habitat condition within the HMU. The HMU is a tool to meet the goal of managing for a diversity of habitat condition distributed across the forest. The HMU information is summarized in the 30-Day Comment Report and in the Project File. We also conduct botanical surveys for rare plants and outstanding natural communities. The results of these analyses are disclosed in the BE and the 30-Day Comment Report.

**The Forest Service should describe the results of its bat monitoring, evaluation, and surveys in and adjacent to the project area.**

Please see the previous response to comment regarding plants and wildlife. The BE and the 30-Day Comment Report describe the multi-year, multi-seasonal, and site-specific wildlife surveys (including forest bats surveys) and habitat reviews that were conducted within the Project Area. The BE and 30-Day Comment Report describe the potential effects of the Proposed Action and alternatives on plant and wildlife resources including TEPS species.

**The Forest Service should explain effects of the proposed action on wildlife species that utilize early successional habitat.**

The BE and Wildlife Section of the 30-Day Comment Report describe the potential effects of the Proposed Action and alternatives on wildlife and their habitat within the HMU and the Project Area, including the creation of early successional habitat.

**The Forest Service should explain the effects of the proposed project on avian species.**

The BE and the Wildlife Section of the 30-Day Comment Report describe the existing condition of the affected environment and the likelihood of occurrence of plant and wildlife species and their habitat. The 30-Day Comment Report and the Wildlife Functional Report (project record) describes the potential effects of creation of early successional habitat on song birds including nest predation.

**The Forest Service should save some of the beech and oak mast trees in the project area.**

The Wildlife Section of the 30-Day Comment Report describes the importance of bear-clawed beech trees and softwood cover as deer yard areas, and describes the protection measures taken to ensure bear-clawed beech trees and deer yards are retained. The Forest Service and the NH State Fish and Game Wildlife Biologists reviewed portions of the Project Area and also recommend retaining the bear-clawed beech trees and protecting deer yards. A large percent of the bear-clawed beech trees

would be reserved (marked for no cutting) and deer yards are avoided through sale layout by Forest Service personnel.

**The Forest Service should explain the effects of the proposed project for species on the Regional Forester's Sensitive Species list.**

The Batchelder Brook Project BE used the current Regional Forester Sensitive Species list and described the information used to determine species and/or habitat occurrence within the Project Area. The BE and the Wildlife/TEPS Sections of the 30-Day Comment Report describe the surveys (including plants) and field reviews for species and/or habitats within the Project Area. The BE and 30-Day Comment Report disclose the potential effects to wildlife and plants (including TEPS species) from herbicide application and the creation of open canopy and early successional habitat.

**The Forest Service should explain the effects of the proposed project on Goshawks.**

Please see the previous response to comment regarding fish and wildlife surveys. Multi-year, multi-seasonal, and site-specific plant, wildlife, and stream surveys detected no goshawk or other raptor nests. Multiple field reviews by numerous FS personnel revealed no raptor or goshawk activity or nests. The Wildlife Section of the 30-Day Comment Report describes the WMNF Forest Plan Standard and Guidelines for protection of wildlife trees and raptor nests. The Wildlife Section of the 30-Day Comment Report discloses that the majority of the stands are proposed for winter harvest under Alternative 2 and the other action alternatives.

**Endangered, Threatened, and Sensitive Species**

**The Forest Service should ensure that this project will not impact the viability of proposed endangered, threatened and sensitive species.**

The Forest Service protects resources during all land disturbing activity. The District Biologist completed a Biological Evaluation of the potential effects to Federally-listed Threatened, Endangered, Proposed and Regional Forester-listed Sensitive Species (TEPS) from the Proposed Action and alternatives of the Batchelder Brook Project. The Batchelder Brook BE determined there would be no effect, and /or no impact, and /or may impact, but not likely to cause a trend towards federal listing to TEPS species having documented occurrence or low probability of occurrence within the Project Area.

**The Forest Service should provide the commenter with the Biological Evaluation used for the Batchelder Brook Project.**

The Batchelder Brook Project BE addresses Federally-listed Threatened, Endangered, Proposed and Regional Forester-listed Sensitive Species. The findings of the BE will be disclosed in the 30-day Comment Report and the 30-Day Comment Report. MIS identified in the revised Forest Plan are addressed in the project record. Copies of these documents will be provided to the commenter.

**Fragmentation**

**The Forest Service should review updated aerial photographs when considering the effects of the proposed project on forest fragmentation.**

Aerial photographs from 1995 and 1987 and digital ortho-photography from 2003 were used as a tool to analyze various aspects of the Batchelder Brook project. Type or age class conversion within a heavily forested landscape such as the WMNF is generally not considered forest fragmentation. Permanent conversion of forest to non-forest (i.e. industry and housing developments) can be considered forest fragmentation. The Biological Evaluation and the Environmental Assessment consider the potential cumulative effects of the Proposed Action and alternatives on resources.

## **Water**

### **The Forest Service should assess the impacts of the proposed project on the Outstanding Resource Waters designated by the State of New Hampshire.**

Use of 2005 LRMP Standards and Guidelines, site specific Soil and Water Conservation Practices, and New Hampshire BMPs in every facet of the Action Alternatives would meet the Outstanding Resource Waters standard by maintaining water quality and protecting designated uses. See Water Resources section in the 30-Day Comment Report.

### **The Forest Service should explain the effects of the proposed project on water resources.**

The Batchelder Brook Project BE, the Water, and the Aquatic Sections of the 30-Day Comment Report describe the existing condition of the affected environment and the likelihood of occurrence of fish and aquatic species and their habitat within the Project Area. The 30-Day Comment Report and the Wildlife & Fisheries Functional Reports (project record) describes the potential effects of herbicide treatment and the creation of early successional habitat on aquatic and semi-aquatic species.

### **The Forest Service should explain the effects of the proposed project on aquatic species.**

The BE and the Aquatic Section of the 30-Day Comment Report describe the existing condition of the affected environment and the likelihood of occurrence of fish and aquatic species and their habitat within the Project Area. The 30-Day Comment Report and the Wildlife & Fisheries Functional Reports (project record) describes the potential effects of creation of early successional habitat on aquatic and semi-aquatic species.

### **The Forest Service should explain the effects of the proposed project on water quality.**

The effects of the proposed project on water quality are discussed in the Water Resources section of the 30-Day Comment Report.

### **The Forest Service should explain the effects of the proposed project on flooding.**

No effects on flooding are anticipated from the proposed project. See Water Resources section in the 30-Day Comment Report.

## **Soils**

### **The Forest Service should assess the impacts of the proposed timber harvesting activities on forest health and soil resources.**

The effects of the proposed project on soil resources are discussed in the Soil Resources section of the 30-Day Comment Report.

## **Socio-Economics**

### **The Forest Service should explain how wood products would contribute to the economic viability of local communities.**

All of the timber sales sold recently from the WMNF have been sold to businesses or individuals from the United States. The majority of these are from Maine, New Hampshire, and Vermont. Communities within which National Forest timber is harvested are reimbursed for the value of that timber through two separate funds.

- New Hampshire taxes the value of timber harvested by the timber purchaser. The revenue goes to the towns in which the timber is harvested. This tax averages about 10% of the value harvested. Batchelder Brook Project would provide timber tax directly to the Town of Warren.
- The Twenty-Five Percent Fund Act of 1908 directed that 25% of all monies received from a National Forest during any fiscal year be reimbursed to the towns in which the National Forest is located to be used “for the benefit of public schools and/or public roads.” For the proposed project, 25% of gross timber receipts would be returned to the Town of Warren.

As described in the “Economic Impact of Forest Related Activities on the Economy of the Forest Region” section of the Forest Plan FEIS (Chapter 3, Social and Economic) and subsequent sections, recognizes that increased levels of timber harvesting articulated in the Forest Plan compared to recent history is estimated to generate a 16.6 percent increase in jobs and a 20.8 percent increase in income compared to current levels. These increases will be due in part to increased levels of timber management compared to recent levels, and in response to increased levels of recreation use on the Forest.

The Forest Service has a legal mandate established by Congress to provide commercial timber for the nation on a sustainable basis. While the WMNF provides a wide range of timber products, the focus of management is to provide high quality sawlogs, and current market trends indicate that there is extremely strong demand for high quality timber. One of the great benefits of a well implemented “integrated resource management” program on the WMNF is to serve as an example of how high quality forest products can be provided to society in a manner that is compatible with heavy recreation use.

In recent years, the value of timber sold from the WMNF annually has been substantially higher than the annual cost of the timber program, including overhead. Stumpage prices from WMNF timber sales reflect the sale of “average conditions.” Bidders are required to incur numerous costs such as seeding, slash disposal, road improvements including construction, reconstruction, bridging and erosion control measures such as water barring and other drainage features. They are aware of the work required on sales put up for bid and adjust their bids accordingly.

The Forest Service offers timber for sale in accordance with the laws and regulations governing bidding procedures on National Forest timber sales, and in cooperation with the Small Business Administration. Current regulations require that sales be set aside specifically for small businesses in the event that large businesses are getting an excessive number of successful bids. Small business bidders also have the option of having the Forest Service contract for more expensive road construction packages rather than expecting a small business to do that work.

**The Forest Service should explain how many separate timber sales and payment units are expected from the Batchelder Brook proposal.**

The Batchelder Brook Project is planned to be two separate timber sales; the southern portion of the project area would comprise the Hatchery Sale and the northern two thirds of the project would be the Hillock Sale. The Hatchery sale would consist of 12 payment units and the Hillock sale would be comprised of 24 payment units. This is typical for a project of this size on the White Mountain National Forest.

**Heritage**

**The Forest Service should explain the effects of the proposed project on heritage resources in the project area.**

The effects of the proposed project on water heritage resources are discussed in the Heritage Resources section of the 30-Day Comment Report.

**Visual Resources**

**The Forest Service should explain what visual impacts would be noticed from NH Routes 25 and 118.**

No noticeable visual impacts will be noticed from New Hampshire Routes 25 and 118. See the Scenic Resource section of the 30-day Comment Report.

**The Forest Service should explain the effects of the proposed project on visual resources in the project area.**

The effects of the proposed project on visual resources are discussed in the Visual Resources section of the 30-Day Comment Report.

**Recreation**

**The Forest Service should explain the effects of the proposed project on recreation resources in the project area.**

The effects of the proposed project on recreation are discussed in the Recreation Resources section of the 30-Day Comment Report.

**The Forest Service should explain the difference between the Three Ponds hiking trail and the Three Ponds snowmobile trail.**

There are portions of the Three Ponds hiking trail that are separate and distinct from the Three Ponds snowmobile trail. The portion of the trail from Stinson Lake Road to just north of Foxglove Pond is used as both a hiking trail and a snowmobile trail. At this point the hiking trail and the snowmobile diverge. The hiking trail goes around a swamp at Foxglove Pond and starts to ascend towards the west side of Witcher Hill. It crosses the height of land then descends and crosses Blodgett Brook and continues to the Hubbard brook trail on Forest Road 211. After passing Foxglove pond the snowmobile trail separates from the hiking trail and heads northwest towards Patch Hill, where it connects to the Warren to Woodstock snowmobile trail and Butch's Camp snowmobile trail.

**The Forest Service should make certain that the snowmobile and hiking trails in the project area are kept open during timber harvest activities.**

The snowmobile and hiking trails in the project area are proposed to be kept open during timber harvest activities. See the Recreation Resource section of the 30-Day Comment Report.

**The Forest Service should explain what will happen to the snowmobile by-pass trail after the project is completed.**

The snowmobile by-pass is proposed to reduce user conflict between snowmobile users and operations associated with the proposed timber harvest activities. Once the timber sale is complete and there is no potential for user conflict of Forest Road 401 the snowmobile by-pass will not be used again until the next planned entry for this project area, which is approximately 15 to 20 years in the future.

**Herbicide**

**The Forest Service should explain how herbicide will be used in the project area.**

We will be using an aquatic formulation of glyphosate, such as Rodeo. This is an herbicide which has no documented impacts to aquatic organisms not any mammal species. It targets amino acids specific to plants and no found in mammals – including humans. There have been no independent studies that have revealed any carcinogenic effects of glyphosate. It is rated “E” by the EPA which is the lowest ranking for potential carcinogenic effects assigned to chemicals. This herbicide binds to soil particles and is therefore unavailable for uptake by any soil organism and cannot be washed from the soil particle by water – therefore even if the soil were to slump into an aquatic environment the chemical is bound to the soil particle until it decomposes into non-toxic compound in 4—60 days.

All FS employees applying herbicides would be licensed by the federal and state government or under the direct supervision of a licensed applicator. All applicators would be required to follow label application instructions and provided with the required safety equipment including, pesticide gloves, long sleeve shirt, long pants, and safety glasses. Additionally respirators would be worn during foliar applications or while mixing herbicides.

Herbicides would be applied with a cut stem treatment which allows the direct application of the chemical to the plant to be treated. There is no overspray, drift or impact to non-target species or resources. Season of application has no impact on any potential for inadvertent spread. This would be tied to treatment type not season.

Herbicides such as glyphosate have been used on a very limited basis on the WMNF in the past. 2005 was the first time they were used to control NNIS. Preliminary follow-up monitoring revealed successful control of the target species with no adverse effects to the surrounding environment or resources. Further monitoring will take place in 2006 and future years at these sites. Off site similar treatments by such organizations as The Nature Conservancy and the New England Wild Flower Society have revealed no long term impacts to soil, water, animal or plant resources and have proved highly effective in the control of NNIS. We do not have a long track record of using herbicides to control NNIS on the WMNF so are relying on data from off-Forest projects by other entities at the current time. We will be closely monitoring treatments occurring on the WMNF as they occur and in future years.

The proposed cut stem treatments would take place from late summer through late autumn. The herbicide treatment to control NNIS is required to take place prior to most project activities. The type of treatment proposed is extremely target specific. Herbicides are applied only to the individual plants to be controlled. No foliar applications are scheduled for this project area, but if they were to be used no application would take place if there were a forecast of precipitation for two to three days. This is an adequate amount of time for the herbicide to be absorbed by the plant and dry. Once dried the chemical cannot be washed from the treatment surface. Regardless, treatments proposed in this project are slated to occur in the late summer with a cut stem application.

### **South Carr Mountain Inventoried Roadless Area**

**The Forest Service should re-draw the South Carr Mountain Inventoried Roadless Area boundary so that it encompasses the southeastern portion of the Batchelder Brook project area.**

The 2004 Forest Plan Revision Roadless Area Inventory (USDA Forest Service.1986a and 1986b) constitutes an on-the-ground field review of roadless characteristics for the White Mountain National Forest (including the Batchelder Brook Project Area). This inventory was conducted in accordance with Forest Service Manual and Handbook direction (Forest Service Manual 1920 – Land and Resource Management Planning; Forest Service Manual 1909.12 – Land Management Planning Handbook) and Eastern Region direction for Roadless Area Inventory (USDA Forest Service. August 13, 1997, Eastern Region, Roadless Area Inventory for Forest Plan Revision).

The commenter has proposed an alternative boundary for the South Carr Mountain Inventoried Roadless Area. Final determination of the IRA boundary is part of the Forest Plan Revision process and is beyond the scope of this project. The effects of the proposed harvests would not remove the area from the Roadless Area Inventory. No road restoration, reconstruction or construction is proposed within the South Carr Mountain IRA.

**The Forest Service should consider the effects of the proposed project on unroaded or uninventoried areas in and adjacent to the project area.**

The reference to “unroaded areas” cites a term and definition that are no longer applicable. Originally described in Interim Directive 7710-2001-1 and 7710-2001-2, the direction to address road management activities in inventoried roadless and contiguous unroaded areas was removed from the Forest Service Directive System by Amendment Number 7700-2003-2, effective December 16, 2003,

which superseded both ID 7710-2001-1 and 7710-2001-2. The Forest Service Manual no longer includes Chapter 7712.16 through 7712.16d, which had described “contiguous unroaded areas”.

### **Prescribed Burning**

#### **The Forest Service should explain the prescribed burning activities proposed in the Batchelder Brook Project**

Prior to the prescribed burn a shelterwood seed cut will lower the basal area to 70 or 80 sq/ft/acre, targeting trees in the mid canopy layer and leaving the dominant trees to provide shelter and a seed crop. After the shelterwood is completed the prescribed burn will remove accumulated surface fuels and reduce the understory, further improving conditions for white pine and red oak regeneration.

Once the shelterwood and prescribed burn are completed the stand will be allowed to naturally regenerate. If funds are available seedlings may be protected with fencing to discourage browsing by deer and other wildlife species. It is unlikely that oak or pine seedlings will be planted due to the costs of time and labor involved.

In 2004 the WMNF began using prescribed fire to improve conditions in white pine stands on the Androscoggin Ranger District. The results of those burns have been encouraging enough to continue the program on other districts. The WMNF has consulted with local, state, and research foresters and biologists to ensure that prescribed burning in these stands can be an effective method to regenerate white pine and red oak.

Pre and post monitoring plots were established in pine-oak stands targeted for burning. By revisiting these plots the WMNF will be able to determine how effective prescribed fire was in regenerating the desired species. At this time it is too early to gauge the success levels of the burns on pine and oak regeneration.

As mentioned above we have conducted prescribed burns in pine and oak stands since 2004. There has not been enough time to fully gauge the effects of fire on the stand. Our observations show that understory vegetation and ground cover in the burn units were reduced without excessive mortality of mature seed trees. We will continue to monitor these stands to determine how effective these burns were at regenerating oak and pine.

### **Mitigation Measures**

#### **The Forest Service should discuss mitigation measures and the effectiveness of mitigation measures in its environmental assessment document.**

During project planning, we evaluate Forest Plan Standard and Guidelines and BMPs to determine if any additional protection measures need to be incorporated into the project. These additional measures become our site specific mitigation measures and are developed using the professional judgment of resource specialists who have years of education and experience in their field. The intent of each mitigation measure and who is responsible for implementation is clearly stated in Appendix D and was developed to minimize resource effects, improve wildlife habitat and provide for public safety.

All the mitigation measures (with the exception of prescribed burning) listed in Appendix D will be incorporated into timber sale contract clauses and maps, or sale layout and marking guidelines and implemented by the sale administrator or marking crew.

Because many of these mitigation measures are developed into timber sale contract clauses, the sale administrator documents the effectiveness of the mitigation measures through weekly (or sometimes bi-weekly) inspection reports. Some of the specific items that the administrator is monitoring on a weekly basis are slash disposal; erosion control; landing, temporary roads and skid trails; road closure and maintenance; and damage to residual trees. If these mitigations are not being effectively implemented on the ground or if any new resource is discovered within the project area, then the sale administrator has the authority to shut down the operation to allow further research or terminate operations. By evaluating these measures on a continual basis, we can determine rather quickly whether these mitigation measures are working and can adjust them in the near future if they prove to be ineffective.

As for prescribed burning, these mitigation measures have been used in past with positive results. By informing the public of burning plans prior to operations, there have not been any safety incidents.

These mitigation measures have been successfully implemented on similar past projects as seen on District post-harvesting monitoring trips which review the effectiveness of mitigation measures (USDA Forest Service. Androscoggin District post-harvesting monitoring reports).

## **Cumulative Effects**

**The Forest Service should conduct a cumulative effects analysis that includes all projects that the historical record reveals, since vegetation has been altered as a result.**

Cumulative effects analysis in the Batchelder Brook 30 day Comment Report is consistent with the June 24, 2005 CEQ Memorandum entitled “Guidance on the Consideration of Past Actions in Cumulative Effects Analysis” (*CEQ, June 24, 2005*), in which the Council on Environmental Quality clarified “the extent to which agencies of the Federal government are required to analyze the environmental effects of past actions ... in accordance with Section 102 of the National Environmental Policy Act ... and the CEQ Regulations for Implementing the Procedural Provisions of NEPA, 40 CFR parts 1500-1508.” This guidance clarified the following parameters when considering present effects of past actions:

1. “In determining what information is necessary for a cumulative effects analysis, agencies should use scoping to focus on the extent to which information is ‘relevant to reasonably foreseeable significant adverse impacts’, is ‘essential to a reasoned choice among alternatives’, and can be obtained without exorbitant cost (*40 CFR 1502.22*).”
2. “Based on scoping, agencies have discretion to determine whether, and to what extent information about the specific nature, design, or present effects of a past action are useful for the agency’s analysis of the effects of a proposal for agency action and its reasonable alternatives.”
3. “Agencies are not required to list or analyze the effects of individual past actions unless such information is necessary to describe the cumulative effect of all past actions combined.”

4. "The CEQ regulations, however, do not require agencies to catalogue or exhaustively list and analyze all individual past actions. Simply because information about past actions may be available or obtained with reasonable effort does not mean that it is relevant and necessary to inform decision making."

In accordance with the guidance in (*CEQ June 24, 2005*), in 40 CFR 1500-1508, and in the January 1997 CEQ publication "Considering Cumulative Effects Under the National Environmental Policy Act" (*CEQ, January 1997*), the cumulative effects analysis for each resource in the Batchelder Brook 30 day Comment Report considered a geographic area and a time frame of past, present and foreseeable future actions "relevant to reasonably foreseeable significant adverse impacts" on that resource, and "essential to a reasoned choice among alternatives". The EA should not consider actions "outside the geographic boundaries or time frame established for the cumulative effects analysis" (*CEQ January 1997*).

### **Optimality of Harvest Methods**

**The Forest Service should ensure that the proposed project complies with 16 USC § 1604 (g)(3)(F).**

Choosing the optimum harvest method for regenerating a particular stand is influenced by the silvicultural requirements of the species on the sites, existing stand conditions, issues raised during the analysis, prior experiences in the area, and direction from the Forest Plan. The first step is to assign a silvicultural prescription to each stand after a field examination. This prescription is based primarily on the biological requirements of the stand and the objectives of the Management Area. This prescription is then subject to interdisciplinary analysis, with special consideration given to the issues raised during scoping and the alternatives developed. In some cases, prescriptions may be modified in order to mitigate other resource concerns such as visual quality, water quality, or composition guidelines. Regardless of the alternative, the proposed harvest method is always sufficient to ensure adequate regeneration stocking of the stand. The use of clearcutting is the optimum method for promoting the regeneration of certain species in the project area. These activities are consistent with the Forest Plan, in particular for regeneration of the paper birch, northern hardwood, red maple, and balsam fir/paper birch/aspen forest types. Likewise the use of even-aged management through shelterwood prescriptions is consistent with the direction for the Management Areas in the project area. Potential environmental, biological, esthetic, engineering, and economic impacts have been assessed. See Chapter 3 of the 30-Day Comment Report.

### **Environmental Analysis**

**The Forest Service should consider preparing an Environmental Impact Statement for the Batchelder Brook project because of potential effects on the South Carr Mountain Inventoried Roadless Area.**

FSH 1909.15, Chapter 20.6 states that an EIS is required if a proposed action "would substantially alter the undeveloped character of a roadless area of 5000 acres or more". The 30-Day Comment Report examines the proposed action and alternatives in light of possible effects on the 8 criteria from FSH 1909.12, Ch. 7.11 used for determining eligibility for roadless consideration. The environmental analysis discloses that the Batchelder Brook project would not reduce the area's eligibility for roadless consideration in the future, any more than previous management reduced its eligibility in the recent Forest Plan Revision, completed in 2005.

**The Forest Service should prepare an Environmental Impact Statement for the proposed project because it is highly controversial.**

The National Environmental Policy Act of 1969, or NEPA, is promulgated through regulations found in 40 CFR 1500-1508. Projects likely to have "significant" effects on the quality of the human environment require an EIS (40 CFR 1502.3). Among the factors to be evaluated in determining significance are "the degree to which effects are likely to be highly controversial" (1508.27[b]4) and "the degree to which the action may establish a precedent for future actions with significant effects" (1508.27[b]6) "Controversy" in NEPA refers to scientific controversy over effects, and the effects of the proposed action on forest resources are well-established and not controversial (see 30 Day Comment report 3). Likewise, "precedent-setting" in NEPA refers to decision that may apply to future decisions or lead to additional actions.

**The Forest Service should ensure that a substantially complete draft environmental document is available for the public during the 30-Day Comment period required by 36 CFR 215.**

This Batchelder Brook 30-Day Comment Report provides a meaningful opportunity for the public to comment on the substantially complete environmental analysis of the proposed project before a final decision is made.

**Compartment and Stand Data**

**The Forest Service should explain how compartment and stand data is compiled and used.**

The District Silviculturalist site visited the area the summer and fall of 2004 and 2005. The area was assessed for stand condition, age and forest type. The data was updated to include changes in Management Area designation to reflect the 2005 Forest Plan.

The project area is typical of many conditions found across the Forest. The District Silviculturist used aerial photography and the existing data to field check the stand boundaries. He also took 10 factor prism plots recording species composition, stand condition, age, diameter and other notes to determine the stand prescription. The compartment and stand records were updated March and April of 2006. The actual ground truthing of stand conditions took place in the summer and fall of 2004 and 2005. Stand inventory data continually being assessed on the ground. Each year, compartments across the Forest are re-inventoried and the data is updated. The aerial photography that was used for this project was flown in 1995. It was also compared with digital orthophoto-graphy from 2003.

**The Forest Service should explain how and why stand boundaries sometime change**

This often the case when a large stand is only partially treated. The reasons for this are many. During the stand inventory, often only part of a stand is actually visited. During sale layout and preparation, the entire area is field checked and determined whether a treatment is appropriate at this time. Sometimes for example, wet sites or steep slopes are found and a new stand is created to reflect that condition. In smaller stands, the area treated and stand acres may also be different. This would be the case if the untreated area is too small (less than 4-8 acres). Stand boundaries are based on a number of factors, timber type being one. Some of the other factors that are considered include: age, condition,

soil type, management area, slope, productivity or past treatment. All units to be harvested are field visited. Many units are also GPS to determine location.

## **Road Management**

### **The Forest Service should explain proposed road management activities in the project area.**

The Forest Plan FEIS, and Appendix D (Roads) clearly indicates that the objectives for road management on the Forest are towards the maintenance and reconstruction (when funding is available) of the existing road system and decommissioning of un-needed roads. Planned new construction is minimal (1 mile per year), and will only be associated with vegetative management, and any new roads constructed will not remain open to long term public motorized use. Based on a project level analysis there are no roads which need to be decommissioned or classified within the Batchelder Brook project area. All the Forest Roads in the project will remain open to non-motorized travel.

There is no need for new roads or road reconstruction for the proposed project. Table B-04 of the Forest Plan outlines the amount of new road construction and road reconstruction planned through 2015, and the effects of this are addressed in the resource areas affected (Chapter 3, Forest Plan FEIS). The project-level environmental analyses of transportation needs conducted for the Batchelder Brook project area ensures the long-term transportation requirements are met. Based on the transportation needs anticipated for the project area no minor modifications are necessary to the overall system through decommissioning or the addition of unclassified roads to the system.

We consider hunting and fishing access, as well as maintenance and protection of the investment, when managing the transportation network and developing closure guidelines. The Forest Service works closely with the Fish and Game departments of Maine and New Hampshire to authorize the retrieval of legally taken game on roads closed to public motorized vehicle travel, using highway legal vehicles, when conditions will not damage the roadway. Additionally, guideline G-8 in the Wildlife section of Chapter 2 of the Forest Plan allows for opening roads normally closed to public motorized travel for access to hunting and fishing areas when resource concerns permit and to accomplish state wildlife management goals.

### **The Forest Service should explain the effects of the proposed project on traffic patterns in the project area.**

As a result of timber harvesting activities from the proposed project, traffic patterns would increase on Forest Roads 401 and 479, Clifford Brook Road, Batchelder Brook Road, and NH Routes 25 and 118. In order to reduce conflict with use of the private campground adjacent to the project, forest products would not be transported on Forest Road 401 between May (Memorial Day) and September (Labor Day). The Town of Warren currently has three operating saw mills so the incremental increase in traffic on the two Town roads and NH Routes 25 and 118 would not create unfamiliar traffic use for the Town.

## **Hubbard Brook Experimental Forest**

### **The Forest Service should explain if the proposed project would have impacts upon the Hubbard Brook Experimental Forest.**

No direct, indirect, or reasonably foreseeable effects are anticipated from the proposed Batchelder Brook project on the Hubbard Brook Experimental Forest. The closest management activity proposed in the project is located two miles west of the Hubbard Brook Experimental Forest and Hubbard brook watershed.

## APPENDIX D – Design Features and Mitigation Measures

In addition to all applicable Forest-wide standards and guidelines listed in the Forest Plan (Chapter 2), the following specific design features and mitigation measures are planned for all action alternatives.

### **Design Features Common to All Action Alternatives**

The Proposed Action has been designed and would be implemented in accordance with Forest Plan Forest-wide and MA 2.1 standards and guidelines (USDA-Forest Service, LRMP 2005).

Design Features are highlighted applications of the Forest Plan standards and guidelines. They clarify, where necessary, how these standards and guidelines may apply to specific actions in the project proposal. Design Features for action alternatives include:

- Where harvest units abut snowmobile trails within or adjacent to units, logging slash will be removed within 50 feet of these features. (*LRMP, Forest-wide, Vegetation Management, clarifies G-2, p 2-29, and G-8, p 2-30*);
- During marking of the proposed units, protect raptor nest trees and report their presence to the District Biologist, who determines if further mitigation is needed.
- Retain some of the trees with bear claw marks where appropriate (*LRMP, Forest-wide, Wildlife, meets G-1 on p 2-35*);
- Known heritage site locations will be flagged and avoided during all harvesting and ground disturbing activities. If unknown heritage sites or artifacts are discovered during project implementation, harvest activities will be halted until the Forest archaeologist and/or Pemigewasset District paraprofessionals can evaluate the findings and recommend how to proceed (USDA-Forest Service, 2005a, *Forest-wide, Heritage Resources, G-1, p 2-7*);
- Prescribed fire treatments will have fire lines placed at terrain breaks to ensure protection of streams and any associated wildlife corridors. (USDA-Forest Service, 2005a, *MA 2.1, Wildland Fire, G-1, 2-33*);
- Remove slash within 50 feet of Forest Roads 401 and 479, the Warren to Woodstock snowmobile trail, and National Forests boundaries. Lop and scatter slash for an additional 50 feet to within 3' of the ground along FR 401 and 479 to maintain scenic quality. (USDA-Forest Service, 2005a, *Vegetation Management, G-8, p 2-30*) and ;
- Hazard safety signs will be posted on FR 401, 479, and the Warren to Woodstock and Three Ponds Snowmobile trail during harvest activity (*Specific to Project Area*).

### **Design Features Related to Soils Resources**

The following soil conservation practices are emphasized for this project (*LRMP, Forest-wide, Water Resources, Soil & Water Conservation Practices, S-1, p 2-30 and , Forest-wide, Vegetation Management Practices, G-5, p 2-30*). These Standards and Guidelines (BMPs), are expected to be effective in meeting soil quality standards (USDA-Forest Service, 2005b, FEIS, pg 3-54):

- Where exposure of mineral soil is expected, skid roads should generally be located on grades of less than 20 percent, with only short steeper pitches.
- Upon completion of operations at a landing, the area of disturbance will be graded and stabilized as needed to prevent erosion before the site can revegetate and to accelerate recovery from temporary soil compaction;
- The operating period of timber sale activities are limited to specific season of harvest and/or ground conditions specified in the timber sale contract to minimize adverse soil and water environmental effects. This will be monitored by the Timber Sale Administrator.
- Skidding patterns are designed to fit the terrain to control the volume, velocity, concentration, and direction of runoff water in a manner that will minimize erosion and sedimentation. This preventative practice would be achieved by minimizing the length of skid trails, locating the skid trails in advance, adding drainage features such as waterbars, and designing skid trails to cross streams at right angles. This will be implemented by the Timber Sale Administrator.
- Upon completion of harvesting operations, skid trails will be closed and bare ground seeded as needed in areas where soil erosion potential occurs, such as steep ground and near stream crossings. The Timber Sale Administrator will designate the areas of disturbed soils that must be treated and monitor effectiveness of the treatment.

### **Design Features Related to Water Resources**

Herbicides would not be applied to plants when the forecast indicates a possibility of rain. This is designed to prevent the potential of herbicides washing off plants during heavy rainfall.

The following soil and water conservation practices are emphasized for this project (*LRMP, Forest-wide, water resources, Soil and Water Conservation Practices, S-1, p 2-30*). Combined with Standards and Guidelines and BMP's applied site specifically, these are expected to be effective in meeting water quality standards (USDA-Forest Service, 2005b, EIS, pg 3-54).

- The operating period of timber sale activities are limited to specific season of harvest and/or ground conditions specified in the timber sale contract to minimize environmental effects. This will be monitored by the Timber Sale Administrator.
- Skidding patterns are designed to fit the terrain to control the volume, velocity, concentration, and direction of runoff water in a manner that will minimize erosion and sedimentation. This preventative practice would be achieved by minimizing the length of skid trails, locating the skid trails in advance, adding drainage features such as waterbars, and designing skid trails to cross streams at right angles. This will be implemented by the Timber Sale Administrator.
- Upon completion of harvesting operations, skid trails will be closed and bare ground seeded as needed in areas where soil erosion potential occurs, such as steep ground and near stream crossings. The Timber Sale Administrator will designate the areas of disturbed soils that must be treated and monitor effectiveness of treatment.
- Minimize the erosive effects of water concentrated by roads by practices such as constructing cross drainage structures and dispersing runoff away from surface water. This is a preventative practice which would be monitored by the Timber Sale Administrator until the ground is stabilized.
- The number of stream crossings are minimized. Necessary crossings are designed to provide for unobstructed flows during bankfull conditions, as well as for the passage of debris and aquatic organisms. All temporary stream crossings would be removed following use. The

Timber Sale Administrator would visually monitor stream crossing sites to catch and rectify any problems in the early stage. This monitoring would continue until the area has successfully stabilized.

Maintain proposed and existing roads to prevent rutting and failures. Adequate maintenance and/or restriction of use can minimize erosion problems. The Timber Sale Administrator would visually monitor roads proposed for use and prescribe corrective measures as needed.

**Mitigation Measures Common to All Action Alternatives**

Mitigation measures are employed to provide additional resource protection above that required by Forest Plan standards and guidelines. A mitigation helps to meet project objectives and reduces unwanted effects. Mitigations for action alternatives include:

- Tops and limbs from harvested trees would be scattered on skid trails where needed to reduce compaction, soil displacement and erosion during and after operations (*LRMP, Forest-wide, Vegetation Management, exceeds G-5, p 2-30 and Water Resources, exceeds S-1, p 2-30*).

Mitigation	Why Mitigation Works
<p>Harvested trees may be skidded whole to landings. Tops and limbs will be scattered on landings and skid trails as needed to reduce compaction and erosion during and after operations, during the snow-free season and otherwise as needed. Sale administrator is responsible for determining when and how much is needed, and for evaluation monitoring success of the mitigation during harvest.</p>	<p>Placing slash from de-limbing in the skid trails reduces compaction (Martin, 1988). Slash collected on the skid trail will cushion the effects of compaction for tracked vehicles (Oregon State University Extension Service, 1983). Winter harvest minimizes soil erosion, and skidding in the snow-free season may lead to site-specific erosion (USDA-Forest Service, 2005b, FEIS, pp 3-30, 3-31). To minimize compaction, operate on a cushion of slash, or over snow (Poff, 1996). A surface layer of 2” or greater will provide protection from compaction (Poff, 1996).</p>

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## APPENDIX F – Glossary

**Age Class:** A distinct aggregation of trees originating from a single natural disturbance or regeneration cutting

**Aquatic Ecosystem:** The stream channel, lake, or estuary bed, water biotic communities, and the habitat features that occur therein.

**Aspen-Birch Habitat:** Forest habitat in which the canopy is comprised almost entirely of aspen species or paper birch. For implementation purposes, this habitat includes forest types 91-95 in our database, but stand conditions, not typing in CDS should be relied on to define habitat.

**Basal Area:** The area of the cross section of a tree at 4-1/2 feet above the ground. Generally expressed as total basal area per acre.

**Biological Diversity:** The sum of all natural communities, ecological processes, and species.

**Biomass:** The weight of a forest, usually expressed in kilograms per hectare.

**Board Foot:** A measure of lumber volume in a tree. The cubic equivalent of a piece of lumber that is 12 inches wide, 12 inches long and 1 inch thick. Often used variations are MBF (thousand board feet) and MMBF (million board feet).

**Clearcutting:** The removal in a single cut of the entire standing crop of trees. It prepares the area for rapid seed germination and growth of a new even-aged stand. A variation of clearcutting, known as “clearcutting with reserves,” may be conducted. This practice involves retaining reserve trees or groups of reserve trees to attain resource goals other than regeneration.

**Compartment:** A small subdivision of forest area for the purpose of orientation, administration, and silvicultural operations. It is defined by permanent boundary features.

**Cord:** A unit of gross volume measurement for stacked, round wood based on external dimensions, generally implies a stack of wood 4’x4’x8’ containing 128 cubic feet.

**DBH (Diameter Breast Height):** Diameter measurement of a tree at 4-1/2 feet above the ground. Used to determine tree volume.

**Early-Successional Forest Habitat:** Forest habitat that is comprised primarily of tree species that require an open canopy and high levels of light and that typically colonize an area after stand-replacing disturbance (e.g. aspen-birch forest).

**Early Successional Species:** Those plant or animal species characteristic of early forest successional stages.

**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.

**Ephemeral Stream:** A watercourse or portion of stream which flows briefly in direct response to precipitation or snowmelt in the immediate area.

**Even-Aged Management:** A timber management system that results in the creation of stands in which trees of essentially the same age grow together. Cutting methods producing even-aged stands are clear cut, shelterwood, or seed tree.

**Even-Aged Regeneration Harvest:** Cutting method that produces even-aged stands; clearcut, shelterwood, or seed tree.

**Forest Productivity:** The amount of living biomass (weight of above ground wood) present on an acre of forest land when measured at different time intervals, e.g., every five years. This is also known as net productivity.

**Goals:** Broad statements that describe conditions the Forest will strive to achieve through implementation of the Forest Plan. They are generally timeless and not measurable, and their achievement is not required. Goals should be considered when planning projects and activities, and management should move the Forest toward these desired goals.

**Group Selection:** The uneven-aged-cutting 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 stand. It may be applied in combination with single-tree selection.

**Guidelines:** A required course of action or level of attainment. It is intended to move the Forest toward desired conditions in a way that permits operational flexibility to respond to variations in conditions. Guidelines can be modified or not implemented if site-specific conditions warrant a deviation. The rationale for deviating from a guideline must be documented in a project-level analysis and signed decision.

**Habitat Management Unit (HMU):** A block of Forest land in which habitat composition and age class objectives will be established to help ensure that habitats are well-distributed across the Forest and provide a framework for analyzing project impacts to wildlife habitat at a local scale. Blocks vary in size from about 6,000-49,000 acres, and contain a variety of habitat types and land in a mix of Management Areas.

**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).

**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.

**Intermittent Stream:** A watercourse that only flows at certain times of the year, when it receives water from some surface source (rainfall or snowmelt) or from the intermittent spring, and ceases to flow during other periods of the year.

**Land Capability:** Inclination of an area to grow a particular broad community (i.e. hardwoods, spruce-fir), 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 (as indicated by the Ecological Landtype) 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.

**Log Landing:** log decking area, including up to 500 feet of travelway connecting the landing to a classified road.

**Management Area (MA):** The grouping of land areas allocated to similar management goals such as Management Area 6.2 that puts emphasis on a non motorized dispersed recreation management goal.

**Management Prescription:** Management practices and intensity selected and scheduled for application on a specific area to attain multiple-use and other goals and objectives.

**Mature Forest Habitat:** Stands in which the overstory is in the mature age class. Mature forest habitat is typically made up of trees that are eight inches or more in diameter. Mortality is just beginning in these stands, resulting in a few scattered canopy gaps and a small number of snags and cavities in the overstory. Most snags and down logs are small in diameter and within the intermediate or understory layers. Depending on site conditions, thinning and uneven-aged harvest methods can be used in this habitat without impacting habitat quality. Some uneven-aged harvest may enhance vegetative and structural diversity.

**MBF (Thousand Board Feet):** A measure of one thousand board feet of wood fiber volume either in log form or after conversion into lumber.

**MMBF (Million Board Feet):** A measure of one million board feet of wood fiber volume either in log form or after conversion into lumber.

**Mineral Weathering:** The slow release of elements from mineral soil, pebbles, stones and boulders over time that contribute to forest soil nutrition.

**Mixedwood Forest Habitat:** Also referred to as hardwood-softwood forest habitat. Forest habitat in which the canopy is comprised of a mix of northern hardwoods and hemlock, pine, spruce, or fir. Typically this is a northern hardwood stand with at least 25% made up of softwood species. For implementation purposes, this habitat is usually typed as forest type 87 in the CDS database, but stand conditions, not typing in CDS should be relied on to define habitat.

**MMBF (Million Board Feet):** A measure of one million board feet of wood fiber volume either in log form or after conversion into lumber.

**Motorized Use:** Use of vehicles such as snowmobiles, ATVs, helicopters, etc. for transportation on the WMNF by the general public. In Wilderness, this term also refers to any motor-powered implement such as chainsaws, power drills, etc.

**Multiple Use:** Managing National Forest resources in a manner to best meet the needs of the American people, recognizing that not all uses can occur on all acres and that changing needs and conditions over

time will change the combination and intensity of use. Productivity of the land and sustainability of ecosystems is maintained, and the interrelationships among resources and the effects of use are monitored and evaluated. Multiple use management does not necessarily prescribe the combination of uses that will give the greatest dollar return or the greatest unit output.

**Natural Community:** A system of interacting plants and their common environment, recurring across the landscape, where the effects of human intervention are minimal.

**Natural Disturbance:** A change in vegetative composition, age class, or structure due to natural occurrences, such as wind, fire, or landslides that are not caused or directly affected by human activity.

**Northern Hardwood Forest Habitat:** Forest habitat in which the canopy is comprised almost entirely of deciduous hardwood trees, such as sugar maple, American beech, yellow birch, etc. For implementation purposes, this habitat includes forest types 76, 81-86, 88-89 in our CDS database, but stand conditions, not typing in CDS should be relied on to define habitat.

**Oak-Pine Forest Habitat:** Forest habitat in which the canopy is comprised primarily of oak or pine species. For implementation purposes, this habitat includes forest types 2-3, and 41-55 in our database, but stand conditions, not typing in CDS should be relied on to define habitat.

**Objectives:** Are measurable accomplishments intended to move the Forest towards the desired conditions described in the goals. Objectives are generally achieved through site-level projects or activities. However they are not the same as “targets,” which are dependent on budgets and their accompanying direction.

**Old Growth Forest:** Uneven-aged (three or more age classes) forest with an abundance of trees at least 200 years old, multiple canopy layers, large diameter snags and down logs, and a forest floor exhibiting pit-and-mound topography. There should be little or no evidence of past timber harvest or agriculture. Northern hardwood old growth consists primarily of sugar maple and American beech; softwood old growth is largely made up of spruce and hemlock. Stands need to be at least 10 acres in size to be identified as old growth. Anything smaller is a patch of old trees within a younger stand, not a habitat type in its own right.

**Overstory Removal** – Mature trees are removed to release regeneration once it has become established, for example in a shelterwood final harvest.

**Patch Cutting:** A term used to describe a cutting system used in even-aged management. It defines a clearcut 2 to 10 acres in size.

**Perennial Streams:** Permanently present surface water. Flows occur throughout the year, except possibly during extreme drought or during extreme cold when ice forms.

**Prescribed Fire:** Any fire ignited by management actions to meet specific objectives. A written, approved prescribed fire plan must exist, and NEPA requirements (where applicable) must be met prior to ignition.

**Regeneration Forest Habitat:** Forest in which almost all the trees are 0-9 years old with less than 30 square feet of basal area in a mature overstory. Can be created through natural disturbance (e.g. wind,

fire) or the following silvicultural treatments: clearcutting, seed tree harvest, and shelterwood harvest to 30 basal area or less or with removal harvest within 10 years of original harvest.

**Regeneration Harvest:** A timber harvest that removes selected trees in the existing stand to a density that allows for the establishment of a new stand.

**Riparian Area:** Geographically delineable areas with distinctive resource values and characteristics that are comprised of aquatic and riparian ecosystems.

**Riparian Ecosystem:** A transition between the aquatic ecosystem and the adjacent terrestrial ecosystem; identified by soil characteristics or distinctive vegetation communities that require free or unbound water.

**Riparian Management Zone:** This zone begins 25' from the bank. The width of the zone depends on the stream order or size of the pond.

**Road:** A motor vehicle travel corridor over 50 inches wide, unless designated and managed as a trail. A road may be classified, unclassified or temporary.

**Road, Forest:** As defined in Title 23 Section 101 of the United States Code (23 U.S.C. 101), any road wholly or partially within, or adjacent to, and serving the National Forest System and which is necessary for the protection, administration, and utilization of the National Forest System and the use and development of its resources. Forest roads may be classified, unclassified or temporary.

**Road, Classified:** Road wholly or partially within or adjacent to National Forest System lands that are determined to be needed for long term motor vehicle access, including state roads, county roads, privately owned roads, National Forest System roads, and other roads authorized by the Forest Service.

**Road, National Forest System (NFS):** A classified forest road under the jurisdiction of the Forest Service. The term "National Forest System road" is synonymous with, and replaces, the term "forest development road" as used in 23 U.S.C. 205.

**Road, Temporary:** Road authorized by contract, permit, lease, other written authorization, or emergency operation, not intended to be part of the Forest transportation system and not necessary for long-term resource management.

**Road, Unclassified:** Roads on National Forest System lands that are not managed as part of the Forest transportation system, such as unplanned roads, abandoned travel corridors, and off-road vehicle tracks that have not been designated and managed as a trail. This includes those roads that were once under permit or other authorization and were not decommissioned upon the termination of the authorization (36 CFR 212.1).

**Road, Unauthorized:** A road that is not a Forest road or a temporary road and that is not included in a Forest transportation atlas. An unclassified road may be authorized or unauthorized. A classified road is authorized (unless it is decommissioned).

**Road, Decommissioning:** Activities that result in the stabilization and restoration of unneeded roads to a more natural state (36 CFR 212.1; FSM 7703). Activities used to decommission a road include, but are not limited to: reestablishing former drainage patterns, stabilizing slopes, restoring vegetation,

blocking the entrance to the road, installing waterbars, removing culverts, reestablishing drainage-ways, removing unstable fills, pulling back road shoulders, scattering slash on the roadbed, completely eliminating the roadbed by restoring natural contours and slopes, or other methods designed to meet the specific conditions associated with the unneeded road (FSM 7712). One or many of the methods described may be used as deemed necessary. Decommissioning removes the road from the Forest transportation system.

**Road, Maintenance:** The ongoing upkeep of a classified road necessary to regain or restore the road to the approved road management objective (FSM 7712.3). Regular maintenance is on going, Restoration maintenance recovers a closed, dormant road to its intended operating condition.

**Road, Objective Maintenance Level:** The maintenance level assigned to a road, dependent on future road management objectives, traffic needs, budget constraints, & environmental concerns.

**Road, New Construction:** Ground-disturbing activity that results in the addition of Forest classified or temporary road miles.

**Road, Reconstruction:** Activity that results in the improvement or realignment of an existing classified road as defined.

**Sawtimber:** Trees suitable in size and quality for producing logs that can be processed into dimension lumber.

**Scenery Management System (SMS):** Tool and process developed by USDA Forest Service that provides an overall framework for the orderly inventory, analysis, and management of scenery.

**Scenery Management System, Scenic Integrity Objective:** Measure of the degree to which a landscape is visually perceived to be intact and whole; an indication of the degree of deviation from the character valued by users for its aesthetic appeal. The Scenery Management System identifies the following levels of scenic integrity.

**Very High (Unaltered):** Refers to landscapes where the valued landscape character “is intact” with only minute if any deviations. The existing landscape character is expressed at the highest possible level.

**High (Appears Unaltered):** Refers to landscapes where 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):** Refers to landscapes where the valued landscape character “appears slightly altered.” Noticeable deviations must remain visually subordinate to the landscape character being viewed.

**Low (Moderately Altered):** Refers to landscapes where 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 or architectural styles from outside the landscape being viewed.

**Very Low (Heavily Altered):** Refers to landscapes where the valued landscape character “appears heavily altered.” Deviations may strongly dominate the valued landscape character. They may not borrow from valued attributes such as size, shape, edge effect and pattern of natural openings, vegetation type changes or architectural styles within or outside the landscape being viewed.

However deviations must be shaped and blended with the natural terrain (landforms) so that elements such as unnatural edges, roads, landings, and structures do not dominate the composition.

**Scoping:** Includes internal and public involvement to determine the range of issues to be addressed in an environmental analysis.

**Seed Tree Cutting:** An even-aged harvest method which involves the removal in one cut of the mature timber from an area with a small number of seed bearing trees left singly or in groups for regeneration.

**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.

**Shelterwood Cutting:** The even-aged cutting method that describes the silvicultural system which provides a source of seed and/or protection for regeneration. The old crop (the shelterwood) is removed in two or more successive cuttings. The first cutting is ordinarily the seed cutting (a regeneration cut) though it may be preceded by a preparatory cutting, and the last cut is usually the removal cut.

**Silviculture:** The art and science of controlling forest establishment, composition, structure, and growth.

**Single Tree Selection Cutting:** An uneven-aged cutting method where individual trees are selected and cut in a stand while maintaining a prescribed number of trees in each diameter class.

**Slash:** Debris left after logging, pruning, thinning, or brush cutting, and large accumulation of debris after wind or fire. It includes logs, branches, bark, and stumps.

**Soil Productivity:** Inherent capacity of a soil to support the growth of specified plants, plant communities, or a sequence of plant communities. Soil productivity may be expressed in terms of volume or weight/unit area/year, percent plant cover, or other measures of biomass accumulation.

**Special Use Permit:** A type of special use authorization that provides permission, without conveying an interest in land, to occupy and use national forest land or facilities for specific purposes, and that is both revocable and terminable. A permit is not transferable. There are different classes, categories, and designations of special use permits.

**Spruce-Fir Forest Habitat:** Forest habitat in which the canopy is comprised almost entirely of balsam fir or red spruce. For implementation purposes, this habitat includes forest types 11-19 in our database, but stand conditions, not typing in CDS should be relied on to define habitat.

**Stand:** 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.

**Standards:** A course of action that must be followed, or a level of attainment that must be reached, to achieve management goals and objectives. In general standards limit project-related activities. Deviations from standards must be analyzed and documented in a Forest Plan amendment.

**Suitability:** The appropriateness of applying certain resource management practices to a particular area of land, as determined by an analysis of the economic and environmental consequences and the alternative uses foregone. A unit of land may be suitable for a variety of individual or combined management practices.

**Suitable Forest Land:** Land that is to be managed for timber production on a regulated basis.

**Sustained-Yield:** The achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of the National Forest System without impairment of the productivity of the land.

**TES Species:** Plant or animal species that are designated as threatened or endangered by the U.S. Fish and Wildlife Service or that are designated as sensitive by the Regional Forester.

**Timber Production:** The purposeful growing, tending, harvesting, and regeneration of regulated crops of trees to be cut into logs, bolts, or other round sections for industrial or consumer use.

**Timber:** Wood retaining many of the recognizable characteristics of a tree: round, bark covered and tapering, but without limbs and leaves. In the wood industry usage it may be “standing timber,” that is the portion of the living tree with characteristics of value to the wood using industry or cut trees not yet processed beyond removing limbs and tops.

**Travel Corridor (sometimes referred to as Travelway):** A discernible route not likely to recover naturally within one year. These routes were at one time meant for one or more types of four wheel or tracked vehicles. Examples include timber skid routes, temporary roads, and abandoned roads. These do not include Forest System Trails, incidental trails, or classified Forest System roads.

**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 diameters or age classes to provide a sustained yield of forest products. Cutting is usually regulated by specifying the number or proportion of trees of particular sizes to retain within a stand, thereby maintaining a planned distribution of size classes. Cutting methods that develop and maintain uneven-aged stands are single-tree selection and group selection.

**Unsuitable Forest Land:** Forest land that is not managed for timber production because (a) the land has been withdrawn by Congress, the Secretary, or the Chief; (b) the land is not producing or capable of producing crops of industrial wood; (c) technology is not available to prevent irreversible damage to soils, productivity, or watershed conditions; (d) there is no reasonable assurance that lands can be adequately restocked within 5 years after final harvest, based on existing technology and knowledge, as reflected in current research and experience; (e) there is at present, a lack of adequate information to respond to timber management activities; or (f) timber management is inconsistent with or not cost efficient in meeting the management requirements and multiple use objectives specified in the Forest Plan.

**Vegetation Management:** Manipulating vegetation to reach desired habitat or ecosystem goals. See also Timber Management.

**Vernal Pool:** Naturally occurring, depression wetlands that temporarily hold water in the spring and early summer, drying up typically in mid to early summer. They are isolated without an inlet or outlet. They are fishless and allow for successful breeding of certain amphibians and invertebrates.

**Wildlife Opening:** Terrestrial opening dominated by native grasses, forbs (e.g., goldenrod, ferns, meadowsweet), and/or shrubs (e.g., blackberries, raspberries, blueberries, alder) that is maintained in a non-forested condition naturally or through stumping, mowing, prescribed burning, brushing, or other means to benefit wildlife. It must remain in shrubby or herbaceous vegetation and have minimal (<15%) overstory canopy conditions. Only areas that are maintained primarily for wildlife benefits are considered wildlife openings; other herbaceous openings exist on the Forest and may provide wildlife habitat, but they are not considered wildlife openings for the purposes of this Plan.

**Wildlife Tree:** A live tree greater than 18" dbh with 2 or more main defects that can be used as cavities. In aspen and paper birch communities, the dbh should be greater than or equal to 14 inches.

**Young Forest Habitat:** Results from growth of regenerating forest habitat. It also is created when the overstory is removed from a shelterwood harvest more than 10 years after the original harvest. Canopy trees are typically shorter than at maturity and small in diameter, usually less than eight inches.

## APPENDIX G – How To Comment

This Public Comment Report for the Batchelder Brook Vegetation Management Project is an environmental analysis document that seeks public input on the Proposed Action, to identify additional issues and concerns specific to the proposal. By providing the background, description and analysis of effects of the Proposed Action and the alternatives identified to this point, this Public Comment Report also serves as formal notice of the official 30-day comment period.

This will be the last opportunity for the public to comment on this project prior to a decision by the Responsible Official. Federal regulations allow only those who submit *timely* comments during this 30-day formal comment period to be eligible to appeal the final decision for this Proposed Action and its alternatives.

**To assure your comments are received and considered, follow these instructions.**

**30-DAY COMMENT PERIOD:** This is the formal 30-day public comment period. During this comment period the public has the opportunity to provide meaningful input regarding this Proposed Action. Those who provide comments during the 30-day comment period will be eligible to appeal the final decision under the regulations. There will be no other public comment period for this project. 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 Dave Batchelder at 603-536-1315 (TTY 603-536-3281).

**TO BE TIMELY** your comments must be received within 30 calendar days following the publication date of the legal notice in the **Manchester Union Leader**. When the comment period ends on a Saturday, Sunday or Federal holiday, comments will be accepted until the end of the next Federal working day. If you do not have access to the Union Leader, you can access the White Mountain National Forest web page (plans and projects) at ([www.fs.fed.us/r9/forests/white\\_mountain](http://www.fs.fed.us/r9/forests/white_mountain)), or call Dave Batchelder at 603-536-1315 (TTY 603-536-3281) for the publication date.

Individuals and organizations wishing to be eligible to appeal must provide the following information:

- Name and Address;
- Title of the Proposed Action (*Batchelder Brook Vegetation Management Project*);
- Comments on the Proposed Action, along with supporting reasons that the Responsible Official should consider in reaching a decision; and
- Signature or other verification of identity upon request; identification of the individual or organization who authored the comments(s) is necessary for appeal eligibility.

**COMMENTS** should be addressed to Pemigewasset Deputy District Ranger Brian Lloyd as follows:

- **Written comments** must be postmarked by the Postal Service, e-mailed, FAXed or otherwise submitted by 11:59 pm ET on the 30<sup>th</sup> calendar day following publication of the legal notice.
  - **Mail:** Send to Dave Batchelder, District NEPA Coordinator, Pemigewasset Ranger Station, 1171 NH Route 175, Holderness, NH 03245. Letters can be hand delivered Monday through Saturday, 8:00am-4:30pm.
  - **FAX:** Send to Attn: Dave Batchelder at 603-536-5147.

- **E-mail:** Send to (comments-eastern-white-mountain-ammo-pei@fs.fed.us), and you must include an identifiable name. Comments submitted as electronic documents must be in plain text (.txt), rich text format (.rft) or Word (.doc) format. You should receive an automated electronic acknowledgement as confirmation of receipt of your comments. If you do not receive acknowledgement, it is your responsibility to ensure timely receipt by other means.
- **Oral comments** may be submitted Monday through Friday, 8:00am-4:30pm, by phone (603-536-1315-Voice, 603-536-3281- TTY) or in person; and must be received by close of business on the 30<sup>th</sup> calendar day following publication of the legal notice.

## **Where this Project is in the Forest Service NEPA Process**

**Step One** - Need for a Project: Forest Service or some other entity identifies need for a project.

**Step Two** - Proposal: Forest Service or proponent develops detailed, site-specific proposal

**Step Three** – SCOPING (Public Input) The Forest service solicits public input on the site specific proposal to define the scope of environmental analysis and range of alternatives to be considered **YOU** provide site-specific input: suggest issues, alternatives, mitigation measures

**Step Four** - Develop Reasonable Range of Alternatives:

If proposal fits categorical exclusion: Forest Service makes & documents decision

If scoping determines need for EA or EIS: Forest Service develops alternatives



### **Step Five - Environmental Analysis (Formal Notice & Comment Period)**

Forest Service performs analysis of environmental effects, identifies preferred alternative, solicits formal public comment (30-Day Comment Period)

**YOU** provide timely comments on the analysis & acquire standing

**Step Six** – Decision: Forest Service makes decision to implement one of the alternatives

**Step Seven** – Appeal: Those with standing have 45 days to appeal Forest Service decision

**Step Eight** – Implement: Forest Service implements the project

**Step Nine** - Monitor and Evaluate: Forest Service monitors and evaluates project results