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# Environmental Assessment

## North Half Overstory Removal Project

Middlebury & Rochester Ranger Districts, Green Mountain National Forest  
Addison, Washington and Windsor Counties, Vermont



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## List of Acronyms

APE	Area of Potential Effects (for Archeological Resources)
BA/BE	Biological Assessment/Biological Evaluation
BBS	North American Breeding Bird Survey
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
DEIS	Draft Environmental Impact Statement
DFC	Desired Future Condition
DN	Decision Notice
EA	Environmental Assessment
EIS	Environmental Impact Statement
FEIS	Final Environmental Impact Statement
FONSI	Finding of No Significant Impact
FWS	Fish and Wildlife Service
GMNF	Green Mountain National Forest
GMFLNF	Green Mountain & Finger Lakes National Forests
IBAT	Indiana bat
ID Team, IDT	Interdisciplinary Team
LWD	Large woody debris
MA	Management Area
MIS	Management Indicator Species
NEPA	National Environmental Policy Act
NFS lands	National Forest System lands
NTMB	Neotropical Migratory Bird
PIF	Partners in Flight
TES	Threatened, Endangered and Sensitive Species
VQO	Visual Quality Objective
VRMS	Visual Resources Management System
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
VAST	Vermont Association of Snow Travelers

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## PREFACE

### *Relationship Between the Forest Plan And Site Specific Analysis*

In January 1987, a comprehensive land management planning effort was concluded with the approval of the Green Mountain National Forest Land and Resource Management Plan. Most noteworthy in this effort was the high degree of public involvement used to identify issues and alternative management approaches. An environmental impact statement (EIS) was prepared in conjunction with the Forest Plan to document the analysis process. This document was completed in accordance with the National Environmental Policy Act (NEPA) and the Council on Environmental Quality (CEQ) implementing regulations for NEPA.

The signing of the Record of Decision for the Final EIS for the Forest Plan in 1987 represented the first level of decisionmaking related to land and resource management planning. This decision determined the desired future condition of the Green Mountain National Forest and established the standards and guidelines under which future projects would be implemented.

The second, and final, level of decisionmaking begins with the site-specific analysis of proposed management practices and projects designed to achieve the goals and objectives of the Forest Plan. The North Half Overstory Removal Project Environmental Assessment (EA) documents the site-specific analysis of a proposal being considered at this level of decisionmaking. The environmental analysis was initiated when the proposed project, commonly referred to as the Proposed Action, was ready for detailed evaluation in accordance with NEPA procedures. These procedures afforded interested and affected publics the opportunity to participate through scoping. This EA outlines alternatives for implementing the project, notes any needed mitigation measures, and discloses the relevant environmental consequences. There is a 30-day public comment period on this EA. Consideration of these comments, along with the results of the analysis, guide the decisionmaker in making an informed decision that will be documented in a Decision Notice (DN). Actual implementation of Forest Plan direction occurs when the selected actions described in the DN are carried out on the ground.

## SUMMARY

The Green Mountain National Forest proposes to conduct forest management activities by means of a timber sale. The harvesting of timber in this sale would complete the two-cut shelterwood system used to regenerate young trees. The shelterwood system consists of two closely timed harvests. In this proposal, the Overstory Removal Cut, which is the second step of the two-cut shelterwood harvest system would be applied to fifteen Northern hardwood and five oak stands. The first shelterwood cuts occurred between 1992-95; one stand was harvested in 1984.

The project area is located at various locations on the Middlebury and Rochester Ranger Districts and is within the Green Mountain National Forest, Vermont. Most of the compartments and stands in this proposal are located in Addison County, Vermont, with the exception of Compartment 150, Stand 3, which is located in Washington County, and Compartment 98, Stand 11, which is located in Windsor County.

The purpose of this project is to accomplish goals and objectives set in the Forest Plan for Management Areas (MA) 3.1, 4.1 and 4.2: to provide for a variety of healthy forest stands of different ages; improve deer winter habitat and produce valuable saw timber and pulpwood.

Field observations indicate it is important to release young trees from the shade of the overstory trees in the near future. The trees in the overstory that are “sheltering” the younger seedlings and saplings were meant to remain there for 6 to 7 years after the first shelterwood cut. The new young stands have been field checked, and the temporary sheltering has worked because there are adequate numbers of young trees. More over, the large overstory sawtimber trees are now shading them and inhibiting their growth. Finally, valuable trees could be harvested and sold before succumbing to old age, wind throw, wood staining or other wood defects caused by insects and disease.

The Proposed Action would:

- ?? Complete the two-cut shelterwood system and release from shade young Northern hardwood and Northern hardwood/oak stands.
- ?? Improve growing conditions for young trees remaining after harvest.
- ?? Improve forage and wildlife habitat for wintering white-tailed deer.
- ?? Produce valuable saw timber and pulpwood according to Plan guidelines.
- ?? Produce work and income for local wood industry workers.
- ?? Retain a mix of live and dead wildlife reserve trees for habitat and acorn production.
- ?? Maintain recreation opportunities.
- ?? Maintain soil productivity and water quality.
- ?? Maintain fisheries habitat.
- ?? Maintain Visual Quality Objectives.
- ?? Maintain and protect habitat for the rare plant, Jacobs ladder.
- ?? Protect Heritage resources.
- ?? Produce revenues for towns and the treasury.

In addition to the Proposed Action, the Forest Service also evaluated the following alternatives.

### ***Alternative 1 – No Action***

This alternative responds to issues and concerns associated with the impacts of timber harvesting, and harvesting oak trees (issues # 1-5). It addresses issues and concerns that the proposed tree harvest would reduce and negatively impact wildlife habitat and affect winter trail recreation.

Under the No Action alternative:

- ?? The Proposed Action would not be implemented.
- ?? The current terrestrial and aquatic habitat/vegetation composition and trends would remain in place.
- ?? Current management plans and activities covered by previous NEPA decisions would continue to guide management of the project area.

***Alternative 2 – No Harvesting in Oak Stands***

This alternative was developed in order to address the issue raised over application of silviculture and management of oak stands, acorn production and impacts to other resources located within the project area.

This alternative:

- ?? Addresses issues and concerns about harvesting in oak stands, oak regeneration, acorn production and preservation of the mature oak trees. For this reason, the action to be taken would be just like the Proposed Action except that none of the oak stands listed in the Proposed Action would be harvested.
- ?? Produces less deer browse and early successional plants in deer wintering areas than the Proposed Action.
- ?? Produces the least amount (30%) less saw timber and pulpwood than the Proposed Action.
- ?? Maintains more acorns for wildlife forage than the Proposed Action and Alternative 3.
- ?? Maintains soil and water productivity and has less risk of soil and water impacts than the Proposed Action.
- ?? Maintains visual quality objectives and has less visual impact from harvesting than the Proposed Action.
- ?? Has less impact on recreation and use of the Oak Ridge Trail.
- ?? Protects Heritage resources.
- ?? Would require one less temporary license for use of private land for access.
- ?? Produces less revenues and work for the logging industry than the Proposed Action and Alternative 3.

***Alternative 3– Modified Harvesting in Oak stands***

This alternative creates management initiatives to retain more mature oak trees in the project area while improving growing conditions for young oak and hardwood regeneration, though less than the Proposed Action. With harvesting being less intensive in the oak stands, there would be more mature oak trees left on site with the ability to produce acorns for wildlife and future seed. This provides options for future additional regeneration efforts if it is desirable to start the shelterwood process over again. This would be done by adopting a three cut shelterwood system for four oak stands with less than desirable amounts of oak regeneration and where overstory basal area is about 70 square feet per acre or greater. Basal area in these stands would be reduced by about half. These four stands are found in Compartments 46 and 65.

This Alternative:

- ?? Addresses concerns about harvesting in oak stands, oak regeneration, acorn production and preservation of the mature oak trees. For this reason, the action to be taken would be just like the Proposed Action except that, the second cut (Seed Cut) of the three cut shelterwood system would be applied to four oak stands.
- ?? Produces less deer browse and early successional plants in deer wintering areas than the Proposed Action, but more than No Action and Alternative 2.
- ?? Produces 16 % less saw timber and pulpwood than the Proposed Action.

- ?? Maintains more acorns for wildlife forage than the Proposed Action but less than Alternative 2 and No Action.
- ?? Maintains soil and water productivity and has a similar risk of soil and water impacts as the Proposed Action but more than Alternative 2.
- ?? Maintains visual quality objectives and has less visual impact from harvesting than the Proposed Action but more than Alternative 2.
- ?? Has similar impact on recreation and use of the Oak Ridge Trail as the Proposed Action but less than Alternative 2.
- ?? Protects Heritage Resources.
- ?? Would require one less temporary license for use of private land for access than the Proposed Action.
- ?? Produces fewer revenues and work for the logging industry than the Proposed Action but more than Alternative 2.

Based upon the effects of the alternatives, the responsible official will decide which action would best meet the purpose and need for the project while responding to the issues raised by Forest Service staff and the public.

## INTRODUCTION

### A. Document Structure

The Forest Service has prepared this Environmental Assessment in compliance with the National Environmental Policy Act (NEPA) and other relevant federal and state laws and regulations. This Environmental Assessment discloses the direct, indirect, and cumulative environmental impacts that would result from the Proposed Action and alternatives. The document is organized into five parts:

Introduction: The section includes information on the history of the project proposal, the purpose of and need for the project, and 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 significant issues raised by the public and other agencies. This discussion also includes possible mitigation measures. Finally, this section provides a summary table of the environmental consequences associated with each alternative.

Environmental Consequences: This section describes the environmental effects of implementing the Proposed Action and other alternatives. This analysis is organized by Alternative. Within each section, the affected environment of the Proposed Action is described first, followed by the effects of the No Action Alternative that provides a baseline for evaluation and comparison of the other alternatives that follow.

Agencies and Persons Consulted: This section provides a list of preparers and agencies consulted during the development of the environmental assessment.

Appendices: The appendices provide more detailed information to support the analyses presented in the environmental assessment.

Additional documentation, including more detailed analyses of project-area resources, may be found in the project planning record located at the Rochester Ranger District Office in Rochester Vermont.

## **B. Background**

Timber harvesting is used to help achieve desired conditions and the multiple use mandate of the Forest Service. Specifically, the principal reason for harvesting timber on the GMNF is to help achieve Forest Plan objectives. These include managing and sustaining healthy forests, creating and maintaining wildlife habitat and recreation opportunities, and producing saw timber and pulpwood needed by society (Draft EIS, ROD, 1987 GMNF LRMP).

This Environmental Assessment documents the environmental analysis of the proposed federal action (Proposed Action) in the North Half Overstory Removal Project Area of the Middlebury and Rochester Ranger Districts on the Green Mountain National Forest (GMNF). Initial planning for this project began in 1996 and NEPA analysis was to be completed in fiscal year 1998. However, new issues and information related to threatened, endangered, and sensitive species (TES), specifically the Indiana bat, prompted Forest Service to withhold from making further NEPA decisions in November 1998. A Scoping Letter soliciting public comments on the proposal was originally issued in May of 1999. Comments were gathered and incorporated into the analysis.

Since that time, the Green Mountain and Finger Lakes National Forests (GMFLNF) staff has completed an extensive analysis of its threatened and endangered species program. Documentation of this analysis was presented in the EA for the Proposed Amendment of the Green Mountain National Forest Land and Resource Management Plan for Threatened, Endangered, and Sensitive Species, January 2001. A DN and FONSI followed on September 11, 2001 that amended the GMNF Forest Plan to incorporate new information by way of updated standards and guidelines, resource protection objectives, and monitoring. An integral part of that study was a Biological Opinion (BO) issued by the U.S. Fish & Wildlife Service, which listed certain terms and conditions that need to be applied in regards to potential Indiana bat habitat. That analysis and decision also amended the Forest Plan to incorporate new information regarding the conservation of sensitive species based on a recent update of the Regional Forester's Sensitive Species list (RFSS) on February 29, 2000. The environmental documents for that Forest Plan amendment are hereby incorporated by reference into the North Half Overstory Removal Project analysis.

Completion of the Forest Plan TES amendment allows the Forest Service to move forward with analysis of the North Half OSR Project site-specific proposal (see the Preface for a brief description of the relationship between the programmatic Forest Plan and the implementation of its direction through site-specific proposals). Further public input will be gathered through the appropriate comment period for this EA and considered when a decision for implementation is ultimately prepared.

## C. Forest Management Authority, Policy and Management Direction

The enabling authorities of the USDA-Forest Service are contained in many laws enacted by Congress and the regulations and administrative directives that implement these laws. The Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA), as amended by the National Forest Management Act of 1976 (NFMA), provides the framework for land and resource management planning on national forest system lands, and ultimately requires the establishment and revision of national, regional, and local resource goals and objectives through development of land and resource management plans. The GMNF Land and Resource Management Plan (Forest Plan) describes the “local” resource goals and objectives for the GMNF. Achievement of these goals and objectives is the purpose of the planning process provided in these regulations (Federal Register, Sept. 30, 1982). Essentially, NFMA provides the process of going from the programmatic direction of the Forest Plan to a specific project Proposed Action. Agency policies and procedures for implementing the planning regulations (36 CFR 219) include Forest Service Manual (FSM) 1920 and Forest Service handbook (FSH) 1909.12.

The National Environmental Policy Act of 1969 (NEPA) establishes policy, goals, and means for protecting the environment (40 CFR 1500). NEPA essentially provides a process for starting with a specific proposed federal action, conducting an environmental analysis that includes public participation, and preparing the necessary documentation, including a decision document. Agency policies and procedures for implementing these regulations include FSM 1950 and FSH 1909.15.

There are many other laws and regulations that guide Forest Service analyses. Among these are the Multiple-Use Sustained Yield Act, the Endangered Species Act, the Clean Air Act, and the Clean Water Act. The laws and regulations noted in the above paragraphs, along with other appropriate laws not listed, are hereby incorporated into this analysis.

Authorization for the actions proposed in the North Half Overstory Removal project analysis is found in the Forest Plan (USDA-Forest Service 1987). Activities are proposed in three different Management Areas (MA), including MA 3.1A (Forest Plan pg. 4.102-4.106), MA 4.1 (Forest Plan pg. 4.107-4.114) and MA 4.2 (Forest Plan pg. 4.115-4.116). The management strategies, or prescriptions, are stated for each MA on the pages noted above, along with standards and guidelines specific to each MA. General standards and guidelines are listed on Forest Plan pages 4.15-4.90, and usually apply to practices called for, or allowed, in more than one management prescription. This section, in particular pages 4.61-4.69, also describes how the various harvest practices can be applied. In addition, Appendix A2 of the Forest Plan, pages A.02-A.09, describes choices of vegetation management practices, silvicultural systems, selection of silvicultural systems, and harvest methods.

## D. Purpose & Need for Action

The purpose of this project is to accomplish the objectives set forth in the Forest Plan for Management Areas (MA) 3.1, Plan pages 4.102-4.106, and MA 4.1 and 4.2, Plan pages 4.107-4.116, which is to provide for a variety of forested stands of different ages, species and sizes; to improve deer winter habitat; to produce valuable saw timber; and to provide better growing conditions for those young trees that need to be released from the shade of the older, overstory trees.

In accord with the Forest Plan, even-aged silviculture practices are appropriate for achieving these objectives (see Plan page 4.62). Specifically, a method of even aged silviculture known as the shelterwood harvest system should be used to regenerate species somewhat intolerant of shade (see Plan, page 4.64).

This project proposal involves completing the shelterwood regeneration process started in previous years for 19 timber stands. These stands were originally selected in the 1980's for the shelterwood system of regeneration because they met Forest Plan conditions and guidelines for regeneration harvest. An assessment of the stand conditions showed that all stands had attained rotation age and/or were comprised of too many dying or low quality trees or trees were sparsely stocked and were not fully utilizing the site. These stands, and their original timber sales, were located as follows.

On the Middlebury District they were:

- 1992 - Spruce Lodge Sale, Compartments 26 and 28
- 1994 - Huntley Brook Sale, Compartment 42
- 1992 - Oxbow Sale, Compartment 46
- 1991-1993, Toll Road Sale, Compartment 50
- 1995 - Bryant Mountain Sale, Compartment 65
- 1992 - Widows Clearing Sale, Compartment 69

On the Rochester District they were:

- 1992 - Clark Brook Sale, Compartment 44
- 1992 - Gulf Brook Sale, Compartment 58
- 1993 - Perkins Brook Sale, Compartment 98
- 1984 - Mills Brook Sale, Compartment 150

To regenerate these stands, the first step of the two-step shelterwood cutting was implemented from 1992-1995 (with the exception of the one occurring in 1984) to create young stands of oak and hardwoods to replace stands of older trees that were deteriorating or had reached the designated cutting age of 80 years or older (see page 4.63 of the Plan). During these sales, 40 to 70 percent of the low quality and mature trees were harvested from 19 different stands located on both the Middlebury and Rochester Ranger Districts.

These actions started the reforestation process by increasing sunlight to the forest floor and exposing soil for seeds, reducing competition from the larger trees for sun and nutrients, and improving the growing condition for the new crop of young replacement trees.

The overstory trees left on site according to the proper shelterwood system protocols were intended to provide seed and shade for about 6 to 7 years after the first harvest. Removal of most of the overstory was planned to occur following establishment of a new stand of young trees certified by stocking surveys.

Since the first harvest, the nineteen stands in this project grew into dense thickets of seedlings and saplings. To validate the need for additional action, all of the stands were field checked by the Forest and District Silviculturist to verify that sufficient numbers of new young trees are growing on the site and are ready for more sunlight and growing room. It was also found that the treatments were needed now as the overstory is beginning to shade out the seedlings and inhibiting their growth.

Final stocking surveys were conducted after three growing seasons to determine if adequate numbers of young trees had grown back in the site. Stocking surveys certify that all stands are adequately stocked with acceptable trees. The surveys showed the new stands had developed as planned and it was time to increase the sunlight for the new trees by removal of the larger overstory trees shading them. The new crop of trees in these stands is comprised of about 10,000 trees per acre that are “sheltered” by the larger trees. Total stocking per acre of desirable tree species (i.e. maples, birches, ash, oak) is several thousand per acre. These trees range in size from one inch to about five inches and range in height from five to twenty feet tall.

Action is needed to remove most of the “shelter” by cutting many of the larger, remaining overstory trees that are shading the young trees. This action would provide more sunlight for the remaining younger trees to grow vigorously, fully occupy the site, and complete the regeneration process by establishing a new forest stand.

Another action of particular concern that occurred after the first harvest was the planting of oak seedlings in the stands of Compartments 46 and 65 to supplement existing seedlings. Oak is recognized in the Forest plan (pg. 4.30) as an uncommon species that should be maintained or increased from one to three percent (Plan pg. 4.28) where practical. Tree shelters were placed over oak seedlings to protect and provide enhanced growing conditions. These small trees are now about one to four inches in diameter and are about four to twenty-five feet tall. Our observations show the component of surviving oak seedlings and saplings in these stands have not competed as well with the faster growing, more shade tolerant species such as beech, sweet birch, sugar and striped maple. This is largely because of the extended time period that the overstory has remained, shading the new oak seedlings that need more sunlight at this stage of their growing cycle.

Young oak seedlings can tolerate some small amounts of shade but need sunlight and good growing conditions to compete well and to thrive. Some oak seedlings that were once present in these stands have died due to shading and competition from Northern hardwood seedlings. Although overall stocking of new trees in all nineteen stands is adequate, the total amount of surviving oak is becoming less in some stands as time for removal is delayed further. The proposed removal of the overstory trees is needed to promote the growth of the oak seedlings and saplings, and to maintain or increase the amount of this desirable species.

## FOREST PLAN OBJECTIVES FOR VEGETATIVE COMPOSITION

An important component of the Purpose and Need is to meet Forest Plan objectives for vegetative structure and composition. As has been shown through monitoring, each year the GMNF continues to fall behind in accomplishment of Forest Plan objectives for desired condition (U.S.D.A. Forest Service, 2001). Structural diversity (size class) is critical for habitat goals. Altering the vegetative composition improves species diversity and provides a variety of age classes needed for many wildlife species. Vegetative composition objectives are expected to be accomplished primarily through commercial timber sales (Ibid, p. 38), using regeneration harvests such as the shelterwood cuts proposed in this project. The Monitoring and Evaluation Report for 2000 (U.S.D.A. Forest Service, 2001), on page 41, states that for the period from 1987 to 2000, regeneration cuts for hardwoods are being done at a rate of 37 percent of anticipated in the Forest Plan. The report also states that other harvesting is considerably below desired levels for the conditions desired. Harvests for aspen management are only being done at about 14 percent, and harvests to convert stands to softwoods at 74 percent. Selection harvest for the above period have been completed at only 52 percent of Plan level and thinning harvests at 23 percent of Plan level. These figures are most likely even lower due to a very reduced harvesting level in 2001 and up to the present time. The most pronounced impact of this reduction in harvesting is the inability to create early successional habitat through regeneration harvests. Approximately 65 percent of the GMNF's vertebrate species utilize this young, regenerating, open or partially open forest habitat. It is important to note that this habitat, as part of an overall mix of forest conditions, is in short supply in New England.

Timber harvesting would work toward accomplishing Forest Plan objectives for vegetative composition while providing wood products for public consumption, and in turn, meet Forest Plan direction to move the project area closer to the desired future condition for the three Management Areas. Regeneration harvests are needed to improve species diversity and create the early successional habitat necessary to maintain viable populations of the vertebrate species that rely on this type of habitat niche.

## E. Proposed Action

The action proposed by the Forest Service to meet the purpose and need is to conduct forest management activities by means of the North 1/2 Overstory Removal (N 1/2 OSR) timber sale. The sale would complete the final step of the shelterwood system, referred to as the Removal Cut in nineteen Northern hardwood and oak stands. The Proposed Action involves the sale of timber and pulpwood to the highest bidder, followed by cutting and removal by the purchaser of designated overstory trees in nineteen Northern hardwood and oak stands as shown in Figures 1 through 4 and Table 1.

The following would be accomplished by conducting the timber sale and other connected actions:

- ?? Creating and maintaining a mix of forest stands of various types and ages to improve tree species diversity. Growing conditions for young stands made up of shade intolerant tree species such as aspen, paper birch, oak and black cherry and of shade tolerant tree species such as maple, beech and spruce would be improved for the long term. These stands

would provide a component not well represented in a mostly mature forested area (MA 3.1).

- ?? Maintaining recreation opportunities. Public access to NF land would be maintained. Existing truck roads, skid trails and log landings used for hiking, skiing, hunting, picking berries, wildlife viewing and camping would be maintained.
- ?? Maintaining and improving deer wintering condition in MA 4.2. Release of softwood trees would also occur. Winter browse sources would be improved.
- ?? Providing growth of early successional plants used as food sources for deer in non-winter months (MA 4.1 and 4.2).
- ?? Improved growth and periodic removal of high quality saw timber, pulpwood, and firewood would be sustained according to Forest Plan objectives (MA 3.1, 4.1 and 4.2).

All stands would be harvested only in the winter months when the ground is frozen. This would reduce potential soil and water impacts from logging equipment, allow cutting in the leaf off conditions to reduce hazard to loggers operating in these dense thickets, and encourage optimum re-sprouting of seedlings damaged by the felling of large timber. The skidding and yarding of timber would use equipment normally used in the Northeast such as rubber tire skidders, forwarders, feller bunchers, and track mounted vehicles like bull dozers.

A brief description of the stands proposed for harvest, and the Compartments in which they are located, is provided below (see also attached maps). Note that most of the stands are described as Northern hardwood (which consist of sugar maple, yellow birch and beech) and five are red oak/mixed hardwood stands. Though a stand is described as such because this is the dominant tree type, each stand contains some or all of the other tree species described above. Other species such as black cherry, American hophornbeam, basswood, and white ash occur.

To improve growing conditions for young oak and Northern hardwood trees; provide for a diversity of tree types, sizes and ages; create forage and habitat for deer; and produce valuable sawtimber, the overstory removal harvests would occur in the following areas:

### Middlebury District

#### Compartment 26 (Map 1)

Stand 6 and Stand 10 were part of a 1992 timber sale known as the Spruce Lodge sale, located off Forest Road 54 (the Natural Turnpike Road) in the towns of Ripton and Lincoln. Within the total 539-acre compartment, 27 acres would be harvested. Access to these stands would be from off Forest Road 54.

#### Compartment 28 (Map 1)

Stand 2 was also part of the 1992 timber sale mentioned above. Within the total 698-acre compartment, 20 acres would be harvested. Access to this stand would be from Forest Road 54 and 201 (Big Basin Road). Stand 2 cannot be seen from the Emily Proctor Trail, a popular hiking trail that runs through the compartment.

#### Compartment 42 (Map 1)

Stand 15 was originally part of a 1994 timber sale known as the Huntley Brook sale occurring off Forest Road 235 (Huntley Brook Road), located on the north side of Route 125 in the Town

of Ripton. A total of 20 acres would be harvested from within the total 1,091-acre compartment. Access to this stand would be from Forest Road 235.

#### Compartment 46 (Map 3)

Stands 11 and 21 proposed for harvest in Compartment 46 were originally part of a 1992 timber sale known as the Oxbow sale, located on the north side of the North Branch Road in the Town of Middlebury. Between the two stands, a total of 30 acres would be harvested within the 538-acre compartment. Access to Stands 11 and 21 would be from Forest Road 236 (the Oxbow Road).

#### Compartment 50 (Map 3)

Stands 12, 21, 27, 29 and 30 in Compartment 50 were originally part of a timber sale known as the Toll Road sale that occurred during the early 1990's, and was located on the south side of Route 125 in the town of Ripton. The stands range in size from 5 to 15 acres and the acres to be harvested amounts to 44 out of the total 434-acre compartment. Access to these stands would be from Route 125 and Forest Road 296 (Toll Road).

Some of the stands are located in the vicinity of the Oak Ridge Trail, which is a hiking and hunting trail. Although no skidding of timber would occur along the footpath portion of the trail, the footpath would be crossed with a skid trail, as before, to access all of Stand 21. Hauling of logs by truck would occur (as before), on the road part of the trail that joins with Route 125.

#### Compartment 65 (Map 3)

Stands 19 and 20 were part of a 1995 timber sale known as the Bryant Mountain sale, which occurred north of Route 53 and north of Lake Dunmore in the Town of Salisbury. Within the total 935-acre compartment, 22 acres would be harvested. Access to these stands would be from the Upper Plains Road. A temporary license would have to be obtained once again to cross private land.

#### Compartment 69 (Map 3)

Stand 26 was part of a 1992 timber sale known as the Widows Clearing sale which occurred off FR 65 (the South Branch Road, which is on the south side of Route 125) in the Town of Ripton. A February field visit indicates some of the overstory trees are experiencing crown dieback, which is an indication of decline. Out of the total 1,736-acre compartment, 28 acres of this stand would be harvested. Access to this stand would be from Forest Roads 67, 65, and from the Widows Clearing Trail, which is a two-wheel track trail historically used for skidding logs down to the landing area adjacent to the Chatfield parking lot.

#### Rochester District:

#### Compartment 44 (Map 2)

Stand 21 was originally part of a 1992 timber sale known as the Clark Brook II sale occurring off FR 55 (Gulf Brook Road) in the town of Granville. A total of 19 acres would be harvested within the 2,368-acre compartment. Access to this stand would be from off Forest Roads 55 (Granville Road) and 101.

#### Compartment 58 (Map 2)

Stand 29 and Stand 31 were part of a 1992 timber sale known as the Gulf Brook sale, occurring south of FR 55 and FR 101 in the town of Granville. Within the total 1,117-acre compartment, 31 acres would be harvested. Access to these stands would be from Forest Roads 55 and 101.

#### Compartment 98 (Map 4)

Stand 11 was originally part of a timber sale known as the Perkins Brook sale, which occurred off Forest Road 155 (Perkins Road) in the towns of Rochester and Hancock in 1995. Access to this stand would be from Forest Road 155 and a temporary license would need to be obtained again to cross private land. A total of 18 acres would be harvested from within the 929-acre compartment.

#### Compartment 150 (Map 2)

Stand 3 was part of a 1984 timber sale known as the Mills Brook sale that occurred off Route 100 in the town of Warren. Within the total 507-acre compartment, 19 acres would be harvested. Access to this stand would be from the east side of Route 100.

### **Connected Actions**

In connection with the timber harvests, existing roads, skid trails, and landings would be used, provided their reuse is environmentally sound. As an addition to field work already completed, further site visits would occur as needed during sale preparation activities to validate current locations, and designate any relocations needed to avoid wet soils, steep grades and ledge. The landings (the cleared areas where logs are loaded onto trucks) and skid trails would be seeded to grass and closed to access after use. The landings would serve as temporary wildlife openings after the sale is completed. Additional monitoring and evaluation of the stands for response after harvesting or for monitoring effects on threatened and endangered species like Indiana bat may occur.

Following completion of the timber harvest, and depending on funding, implementation of timber stand improvement (TSI) would occur in Compartment 46, stands 11 and 21. This is covered by a previous NEPA analysis and decision called "Forest wide FY 00 Timber Stand Improvement project" and signed on 10/15/2000. The project would involve cleaning and weeding around selected young crop trees growing in plastic tree shelters and around free growing oak, hardwood and softwood seedlings and saplings on 31 acres. This work is needed to further release the young seedlings from competing herbaceous and woody brush. Competing brush and hardwood seedlings and saplings would be cleared within a five-foot radius of the selected crop trees selected on a spacing of about 20 by 20 feet. This is needed to help the development of the young trees and to help maintain the oak and softwood species where competition for growing space is highest. Tree shelters would also be checked and repaired if any damage occurs. Any small, broken or injured stems from the logging or past ice storm would be felled.

Figure 1. Proposed Action - Map 1

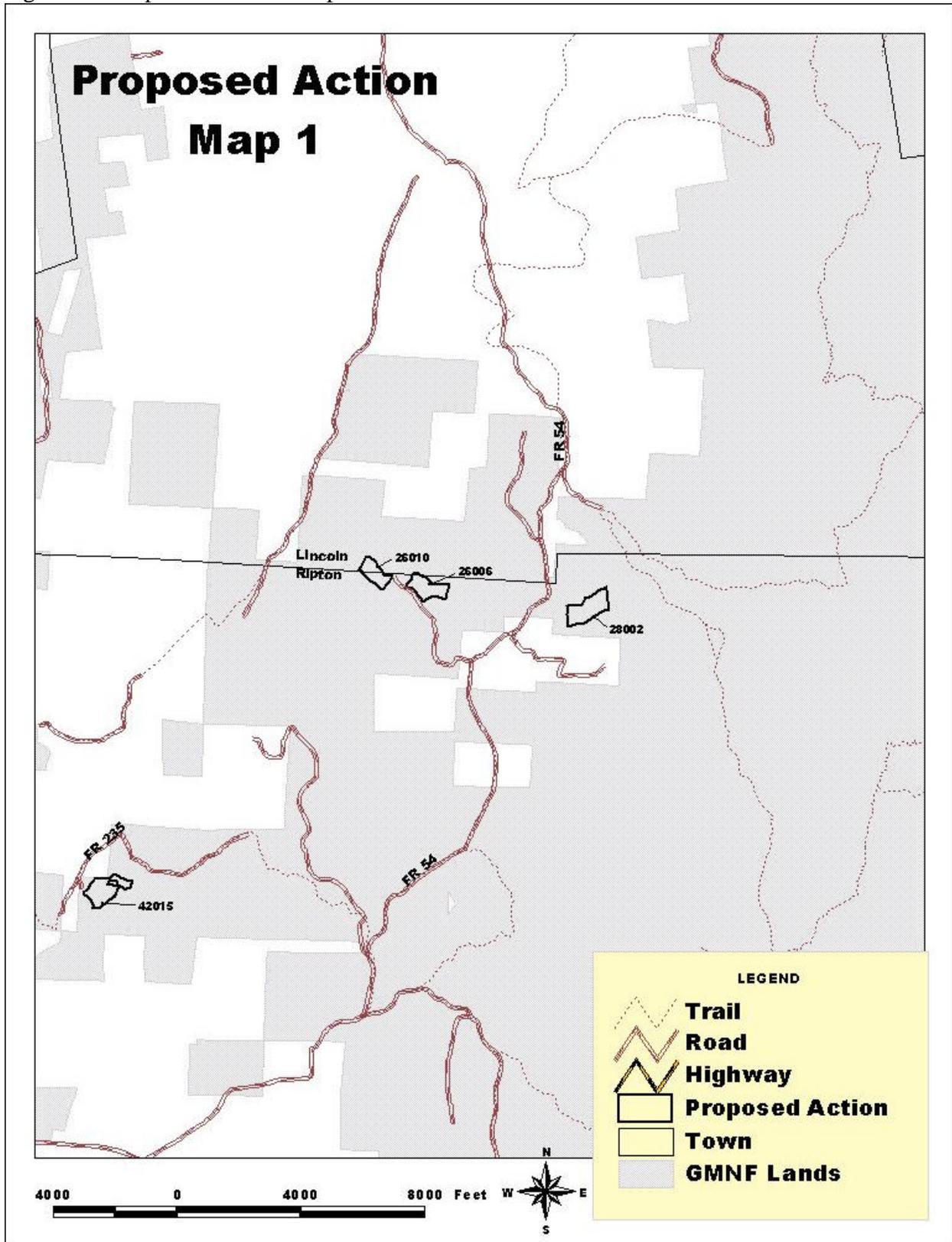


Figure 2. Proposed Action - Map 2

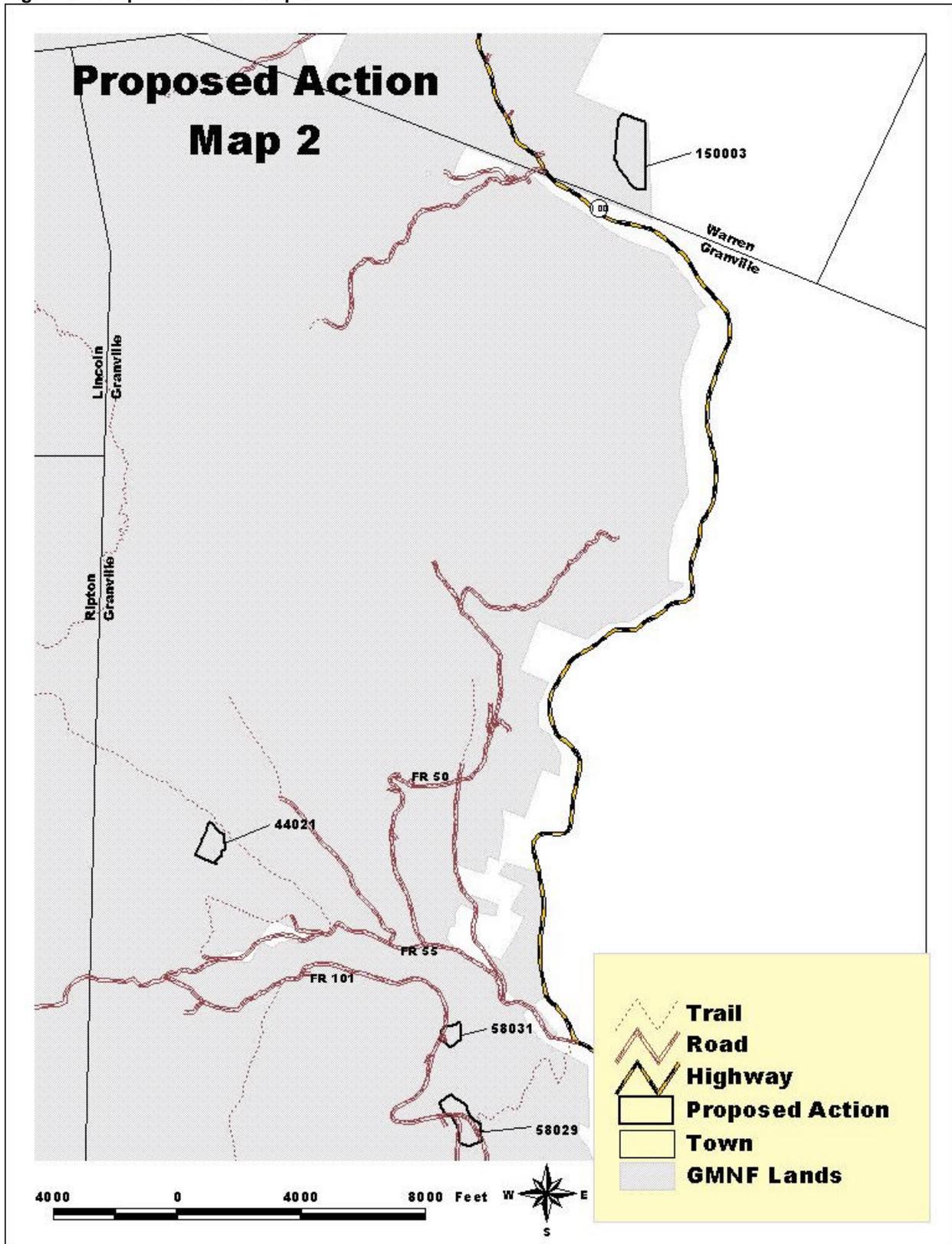


Figure 2. Proposed Action – Map 2

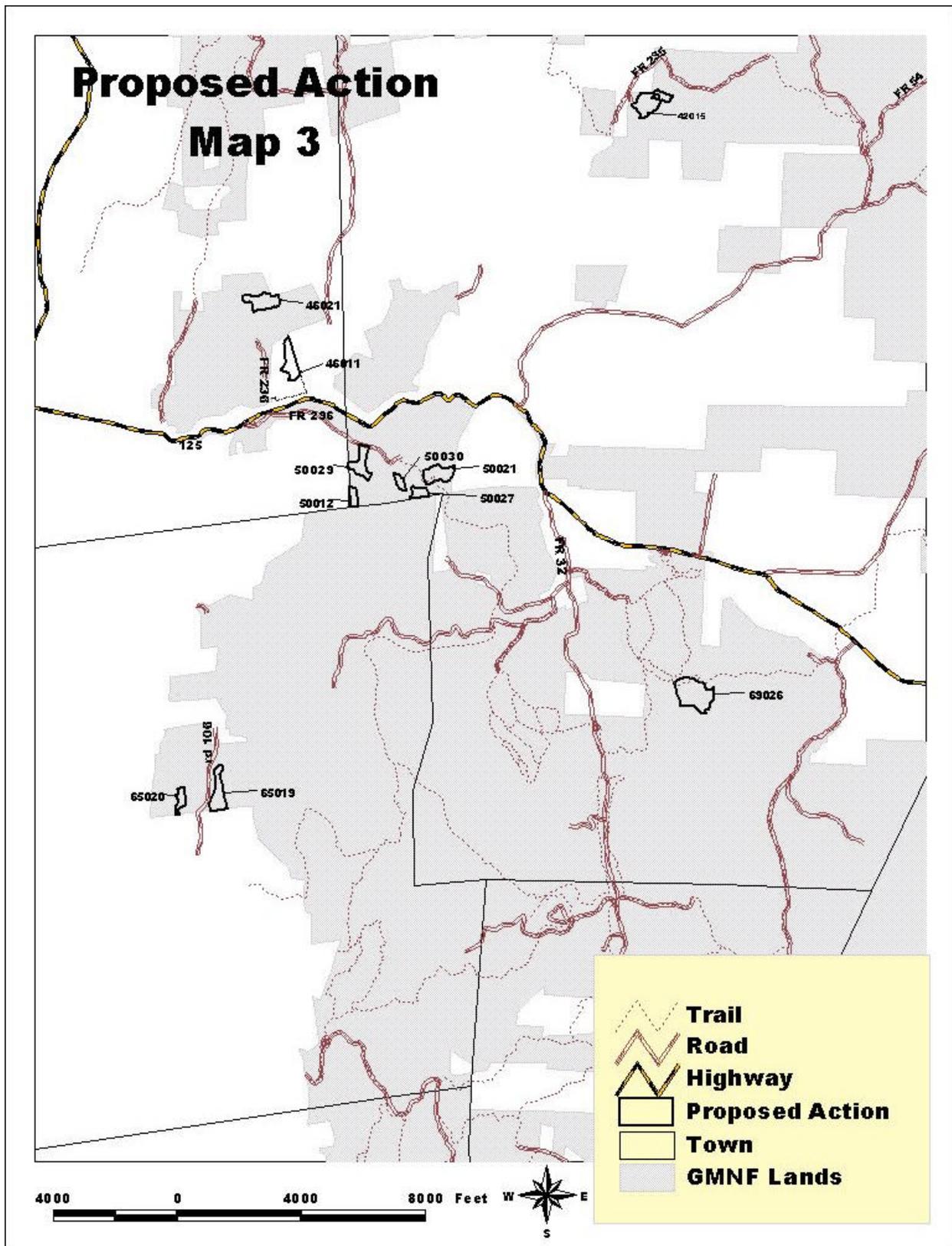


Figure 3. Proposed Action - Map 3

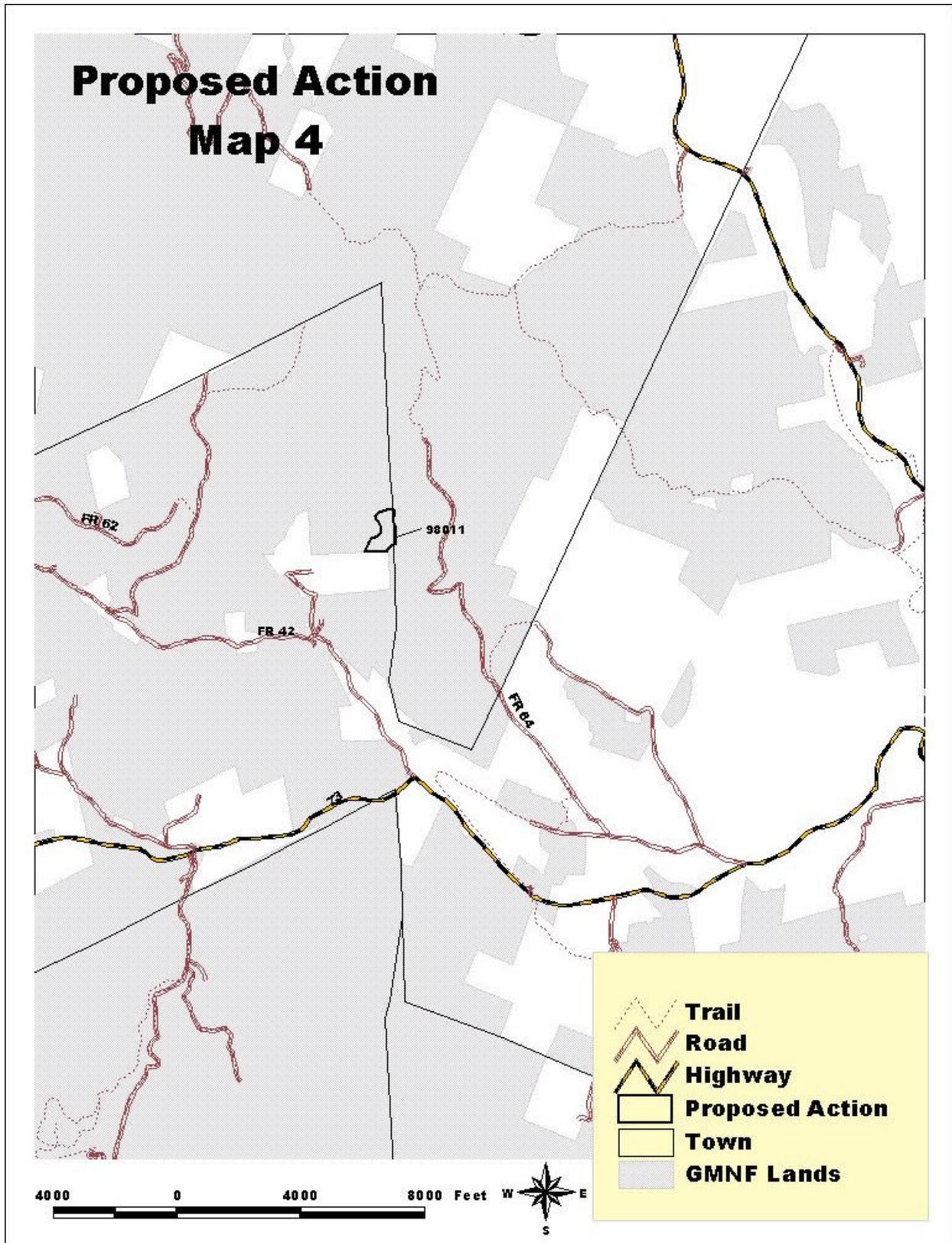


Figure 4. Proposed Action - Map 4

Table 1. Proposed Action

Compartment Stand #	Forest Type	MA	Total Area (acres)	Total Area Cut	Estimated Volume CCF
<b>Compartment 26</b>					
26006	N. Hardwood	3.1	14	14	55
26010	N. Hardwood	3.1	13	13	52
<b>Compartment 28</b>					
28002	N. Hardwood	4.1	20	20	80
<b>Compartment 42</b>					
42015	N. Hardwood	4.1	20	20	80
<b>Compartment 46</b>					
46011	Red Oak	4.1	22	20	80
46021	Red Oak	3.1	10	10	67
<b>Compartment 50</b>					
50012	Red Oak	3.1	8	8	53
50021	Sugar Maple	3.1	15	15	55
50027	N. Hardwood	3.1	6	6	23
50029	N. Hardwood	3.1	10	10	40
50030	N.Hwd & Spruce	3.1	5	5	20
<b>Compartment 65</b>					
65019	Red Oak	4.1	16	16	107
65020	Red Oak	4.1	6	6	40
<b>Compartment 69</b>					
69026	N.Hardwood	3.1	28	28	112
<b>Compartment 44</b>					
44021	N.Hardwood	4.2	21	19	77
<b>Compartment 58</b>					
58029	N.Hardwood	3.1	24	12	50
58031	N.Hardwood	3.1	7	7	28
<b>Compartment 98</b>					
98011	N.Hardwood	4.1	18	18	72
<b>Compartment 150</b>					
15003	N.Hardwood	3.1	19	19	77
			Total Stand Acres 282	Total Harvest acres 266	Total est. MBF 700 Total est. CCF 1168

Note: 1 CCF = 100 cubic feet of solid wood. This method of measurement is changed from the previous measurement of thousand board feet (MBF) per Federal regulations. To determine MBF, divide the total number of CCF by 1.67.

## F. Decision Framework

The Deciding Official reviews the Proposed Action and the other alternatives, in order to select the alternative that best meets the purpose and need, and addresses issues and concerns while keeping environmental impacts to an acceptable level. Consideration will be given to how well the selected action meets Forest Plan goals and objectives for vegetation composition; promotes the management of oak (desirable species in short supply); improves and maintains deer wintering area habitat; maintains safe winter trails use and logging operations; and sustains recreation opportunities in MA's 3.1, 4.1 and 4.2.

## G. Public Involvement

The proposal was first listed in the Schedule of Proposed Actions in the October 1 – December 31, 1998 issue, and has been included in every publication since then. The proposal was provided to the public and other agencies for comment during scoping: a 12-page proposal was mailed out on May 5, 1999 and a reply was requested by May 21, 1999.

As part of the public involvement process, the agency met with local representatives from the Green Mountain Club, Catamount Trail Association and Mark Lapin, a local Ecologist to discuss their concerns and possible mitigation to the proposal. In addition, we met with an adjacent neighbor several times, (most recently in April 2002) and representative from an adjacent landowner group in June 2002 to discuss use and terms of temporary licenses we sought for access to National Forest system lands (see project file).

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

## H. Scoping and Identification of Issues

The Forest Service separated the issues into two groups: major issues and non-significant issues. Major issues were defined as those directly or indirectly caused by implementing the Proposed Action. Non-significant issues were identified as those: 1) outside the purpose and need of the Proposed Action; 2) already decided by law, regulation, Forest Plan, or other higher level decision; 3) irrelevant to the decision to be made; or 4) conjectural and not supported by scientific or factual evidence; or 5) not enough consequence to be considered throughout the analysis. The Council for Environmental Quality (CEQ) NEPA regulations require this delineation in Sec. 1501.7, "...identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)..." A list of non-significant issues and reasons regarding their categorization as non-significant may be found in Appendix A of this EA.

The Forest Service identified five issues during scoping and they were used to focus the analysis. These issues are described below. Indicators that respond to the issue and that can be used to measure whether that issue can be remedied by implementing different alternatives or mitigation measures are also identified.

**Issue # 1: Silviculture, Management of oak.**

Some people are concerned about the harvesting of oak because it is uncommon on the forest. They believe that because oak regeneration can be difficult to establish and the acorn crop from oaks is important to wildlife, no oak trees should be cut or harvested.

**Response:** Create an alternative that involves no treatment of oak stands (Alternative 2). Analysis that discloses effects of not removing the overstories of oak shelterwood stands. Create an alternative that provides for maintaining trees of suitable size to produce acorns for wildlife forage (Alternative 3).

**Issue #2: Archeology.**

One person is concerned about impacts of the project on archeological resources, including Native American burial and other sites.

**Response:** Development of specific recommended site protection and mitigation measures for the range of alternatives implemented. Develop a monitoring plan to determine that the measures were effective or if other unanticipated actions or processes affect the sites.

**Issue # 3: Fish, Botany, and Wildlife**

Some people are concerned that site-specific analysis within the project areas will not be conducted, and that in order to better assess impacts, site-specific fieldwork needs to be conducted by agency specialists in the areas of aquatic biology, mammal biology, ornithology, and botany.

One person is concerned that not protecting the project areas will result in the continuing decline of woodthrush.

Some people are concerned about the proposals impact on reclusive wildlife species such as black bear, bobcat and fisher.

Some people are concerned about the impacts of the proposal on the Indiana bat's summer, fall, winter and spring habitat requirements. More specifically, there is concern that removal of the remaining, mature trees will decrease suitable roosting and maternity sites for the Indiana bat because the bat does not use those trees traditionally retained for cavity dwelling wildlife, and are known to frequent the same trees and areas repeatedly.

**Response:** Development of an alternative that would not involve removal of any overstory trees (the No Action Alternative). Documentation and disclosure of the effects and the alternatives. Analysis that incorporates discussion of impacts on reclusive species, Indiana bat and the use of wildlife reserve trees for bat habitat. Analysis that incorporates findings on bat monitoring including site specific field checks, and the findings of the Biological Evaluation, Biological Opinion and TES Amendment.

**Issue # 4: Recreation & Visuals**

Some people are concerned about the impacts to cross country skiers from the plowing along FR 54, which also serves as a portion of the Catamount Trail and a VAST Trail, as well as skidding

along the Widows Clearing Trail, which also serves as a portion of the Catamount Trail. They request that the harvesting be done in a short as time as possible, and wonder if alternate routes will be provided. There is also a concern about how logging operations would impact use of the log landing on FR 65 which is also known as the Chatfield parking lot.

Some people are concerned about the impacts of the project on the Emily Proctor Trail.

One person is concerned the proposal will cause an increase in illegal all-terrain vehicle use in the project area, which in turn would cause negative impacts to wildlife, air quality and other environmental amenities.

**Response:** Include an alternative that would not impact trails or trail users (the No Action Alternative). Development of mitigation that reduces or eliminates impacts to trail users on FR 54, Widows Clearing Trail and a portion of the Catamount Trail. Analyze effects of the alternatives on the amount and severity of ATV use that may occur in the project area. Mitigation measures that would help minimize unauthorized vehicle use of closed skid trails. Develop a monitoring plan to help determine if mitigation measures are effective. Disclosure of effects on recreation, trail users and visual quality objectives for the project area.

#### **Issue # 5 Water Quality-Soil Erosion and Hydrology**

One person is concerned about how the timber sale would impact the hydrology of the area, particularly the washing out of roads, given the amount of flooding that has occurred over the last ten years. Will this timber sale cause additional erosion problems?

Some people are concerned about whether the project will have any impact on water quality, and the analysis should include whether such an impact could affect compliance with relevant provisions of the Clean Water Act.

Some people are concerned about nutrient loss in soils as a result of this sale, and that the primary impacts on stream ecology, and the secondary impacts on species dependant on those waters needs to be addressed.

**Response:** Development of an alternative that involves no timber harvesting or road use that could potentially contribute to erosion or sedimentation of streams. Analysis that discloses effects on the project area hydrology and water quality. Analysis that discusses potential to effect soil erosion and GMNF compliance with relevant provisions of the Clean Water Act. Effects analysis that discloses affects on nutrient loss, stream ecology, and secondary impacts to species dependant on project area waters. Development of mitigation measures to reduce impacts to soil and water and a monitoring plan to check for effectiveness.

## ALTERNATIVES CONSIDERED

This chapter describes and compares the alternatives considered for the North ½ Overstory Removal project. This section also presents the alternatives in comparative form, defining the differences between each alternative and providing a clear basis for choice among options by the decision maker and the public. Some of the information used to compare the alternatives is based upon the design of the alternative (i.e., use of private land for access and landing space versus no use of private land or roads) and some of the information is based upon the environmental, social and economic effects of implementing each alternative (i.e., the amount of mitigation and restrictions regarding skid trail and truck road use versus winter sports use.).

### A. Alternatives Considered in Detail

#### Alternative 1 – No Action

Under the No Action Alternative the Proposed Action would not be implemented. The current terrestrial and aquatic habitat/vegetation composition and trends would not be affected by direct human intervention for the short term. The shelterwood system for these stands would not be completed. Young stands would not have growing conditions improved by overstory removal. There would be no tree harvest. No amounts of saw timber or pulpwood would be produced. No deer browse would be provided by treetops, or stump sprouts resulting from felled timber. No early successional vegetation would grow from increases in sunlight or mixing of soil on skid trails, landings or within a stand. No temporary licenses would be needed for access. Current management plans except, those including timber harvest, would continue to guide management of the project area.

This alternative best responds to individuals concerned with the harvesting of oak and the overall impacts of timber harvest (issues # 1-5). It responds to concerns that the proposed tree harvest would reduce and negatively impact wildlife habitat. Current habitat would not be changed by the proposal. However, current trends in loss of forest habitat diversity would continue.

This alternative would not impact winter trail use or recreationists that are bothered by the sights and sounds of logging. This alternative would not address the purpose and need for the project because it would not help maintain healthy hardwood and oak forests by improving growing conditions for a mix of stands of different ages and species. Nor would it create browse for wintering deer. It would not contribute to the production and periodic removal of wood products. No map is provided with this alternative. Please refer to figures 1-4 in the Proposed Action description section to see the stands that would not be harvested.

#### Alternative 2 - No Harvesting in Oak Stands

The Green Mountain National Forest contains few stands of oak compared to Northern hardwoods. In response to issue #1, the Forest Service is investigating the possibility of excluding these stands from the proposed timber harvest.

Alternative 2 would be the same as the Proposed Action except that the five oak stands would not be harvested by an overstory removal cut. Harvest acres would be reduced by about 25% from 266 acres to 204 acres. Thirty percent less saw timber and pulpwood would be produced than with the Proposed Action. This alternative would produce 813 CCF of timber and pulpwood compared to 1168 CCF produced in the Proposed Action. With the dropping of the five oak stands, only one temporary license for access would be needed instead of two. All other prescriptions, stands and acres treated would be the same as in the Proposed Action.

Alternative 2 was developed in order to address concerns raised about preservation of oak stands, harvesting timber in oak stands, particularly how the cutting and removal of oak trees would impact oak regeneration and acorn production (Issue #1).

The existing stands of mature oak trees that stand above the younger trees would remain. Existing acorn production capabilities would be maintained. While this alternative leaves all large oak for future legacy, this alternative would not favor oak regeneration because it would not be released from overstory shade and competing growth. Oak forests would not be sustained in the long term due to the trend of old oaks being replaced by Northern Hardwood species overtime. In the short-term oak forests would be sustained. Valuable oak sawtimber would not be produced. While no oak stands would be harvested, Alternative 2 continues to address most of the purpose and need for the project. This is because some browse would be provided for deer and in winter and summer months, although less than in the Proposed Action would.

Growing conditions would be improved only for young trees in the Northern hardwood stands, high quality saw timber and pulpwood would be produced when the large trees are harvested, and existing tree species diversity would be sustained in most stands through reduced competition and improved growing conditions. In hardwood stands being harvested; the overstory would be reduced from about 30-40 square feet of basal area per acre to about 10 square feet per acre (20-30 trees per acre down to about 7 trees per acre). Trail and recreation opportunities would be sustained.

However, growing conditions would not be improved as much for the young oak stands because they would continue to not get enough sunlight. Increasing the amount of sunlight and reducing competition from Northern hardwoods for growing space and nutrients is important for overall oak tree survival. There is less chance of the existing young oak trees reaching sawtimber size or the size and age needed to produce acorns for wildlife forage than with the Proposed Action or Alternative 3. If young oak trees continue to decline in numbers, tree species diversity would be reduced in the project area.

No additional map is provided for this alternative. Please refer to Table 2 and Figures 1-4 for maps of the stands to be treated with this alternative.

Only the Northern hardwood stands shown in Table 2 would be treated with this alternative.

Table 2. Alternative 2

Compartment Stand #	Forest Type	MA	Total Area (acres)	Total Area Cut	Estimated Volume CCF
<b>Compartment 26</b>					
26006	N. Hardwood	3.1	14	14	55
26010	N. Hardwood	3.1	13	13	52
<b>Compartment 28</b>					
28002	N. Hardwood	4.1	20	20	80
<b>Compartment 42</b>					
42015	N. Hardwood	4.1	20	18	72
<b>Compartment 50</b>					
50021	Sugar Maple	3.1	15	15	55
50027	N. Hardwood	3.1	6	6	23
50029	N. Hardwood	3.1	10	10	40
50030	N.Hwd/Spruce	3.1	5	5	20
<b>Compartment 69</b>					
69026	N.Hardwood	3.1	28	28	112
<b>Compartment 44</b>					
44021	N.Hardwood	4.2	21	19	77
<b>Compartment 58</b>					
58029	N.Hardwood	3.1	24	12	50
58031	N.Hardwood	3.1	7	7	28
<b>Compartment 98</b>					
98011	N.Hardwood	4.1	18	18	72
<b>Compartment 150</b>					
15003	N.Hardwood	3.1	19	19	77
			Total Stand Acres 220	Total Harvest acres 204	Total est. CCF 813 Total est. MBF 487

**Note:** 1 CCF = 100 cubic feet of solid wood. This method of measurement is changed from the previous measurement of thousand board feet (MBF) per Federal regulations. To determine MBF, divide the total number of CCF by 1.67.

### **Alternative 3 – Modified Harvesting In Oak Stands**

This alternative suggests management initiatives established to preserve more large oak trees in the project area than the Proposed Action, while improving growing conditions for most of the young trees present.

In Alternative 3, a modified two cut shelterwood system would be used in the four oak stands instead of the standard two-cut system. Instead of most of the remaining oak and hardwood overstory being removed in one last step as in the Proposed Action, about 50 % of the trees would be harvested in Stands 11 and 21 in Compartment 46 and stands 19 and 20 in Compartment 65. The existing residual basal area of 70-90 sq. ft./acre in these four stands would be reduced by about half, to 30-40 sq. ft./acre. With that, the amount of trees per acre would be reduced from about 50 – 64 trees per acre down to about about 20 – 30 trees per acre. The remaining overstory trees would remain on site indefinitely.

With harvesting being less intensive in the oak stands, there would be more mature oak trees left on site with the ability to produce acorns for wildlife and future seed. This provides options for future additional regeneration efforts if it is desirable to start the shelterwood process over again. With less intensive harvesting, less damage is expected overall to existing seedlings and saplings than in the Proposed Action but more than in Alternatives 1 and 2. However, the disturbance from the logging equipment and the felling of larger trees would help to reduce numbers of the existing hardwood seedlings that dominate, potentially helping to create favorable growing conditions to establish new oak regeneration and release any existing oaks to more sunlight. However, the new, and existing young trees in the understory would continue to develop under more shade than what would occur with the Proposed Action. There would be less shade over these young trees than would occur with Alternative 1 and 2 and therefore more chance of young oaks reaching productive sizes and age.

In addition, six acres would be reserved from the harvest in stand 19, Compartment 65. This would allow for monitoring of oak/hardwood stand development and provide a study area where application of prescribed burning without the reduction of the overstory seed trees could be compared to the harvested areas.

All other hardwood stands and oak stand # 12 in Compartment 50, as described in the Proposed Action would receive the removal cut, which is step two of the two-step cut shelterwood system.

Since all stands would be harvested with this alternative, all temporary access permits would still be needed.

Overstory removal harvest acres would be reduced by about 11% to 237 acres compared to 266 acres in the Proposed Action. About 15% less saw timber and pulpwood would be produced than with the Proposed Action. This alternative would produce 988 CCF of timber and pulpwood compared to 1168 CCF produced in the Proposed Action.

Eleven percent less deer wintering habitat would be improved through browse production by tree-tops left during logging and by subsequent growth of young plants stimulated by increases in sunlight as overstory trees are thinned. This alternative would provide for more acorn production for wildlife forage than the Proposed Action but less than Alternatives 1 and 2.

Sustainability and maintenance of oak stands of various ages needed to sustain oak populations over time at a landscape level would be similar to the Proposed Action, although the additional shading may inhibit oak regeneration to some degree.

Alternative 3 was developed as an alternative to the Proposed Action. It would protect and enhance the growth of young oak trees in harvest areas by allowing more sunlight, while at the same time preserving about 50 percent of the residual mature oak trees, so that they would continue to produce acorns for wildlife. Alternative 3 would address concerns raised about removing oak seed trees when oak regeneration is not surviving as well, or is as numerous as the Northern hardwood regeneration, by leaving more mature oak trees in the forest. It addresses the desire for preservation of mature oak stands, as well as concerns over the environmental impacts to oak ecosystems by logging and using harvesting equipment in oak stands, by harvesting fewer of the oak trees and creating less disturbance to the sites.

This alternative meets more of the requirements of the purpose and need of the original proposal than Alternative 1 (No Action) and Alternative 2. This is because competition for growing space in the four oak stands would be reduced somewhat, a short term increase in sunlight would occur, browse for deer would be created in deer wintering areas from winter harvest of trees, and more high quality and valuable sawtimber would be produced.

No map is provided with this alternative since all stands shown on the maps for Proposed Action would be treated with this alternative. Please see Figures 1-4 for stand locations.

Table 3. Alternative 3

Compartment Stand #	Forest Type	MA	Total Area (acres)	Total Area Cut	Estimated Volume CCF
<b>Compartment 26</b>					
26006	N. Hardwood	3.1	14	14	55
26010	N. Hardwood	3.1	13	13	52
<b>Compartment 28</b>					
28002	N. Hardwood	4.1	20	20	80
<b>Compartment 42</b>					
42015	N. Hardwood	4.1	20	18	72
<b>Compartment 46</b>					
46011	Red Oak	4.1	22	20	40
46021	Red Oak	3.1	10	10	34
<b>Compartment 50</b>					
50012	Red Oak	3.1	8	8	53
50021	Sugar Maple	3.1	15	15	55
50027	N. Hardwood	3.1	6	6	23
50029	N. Hardwood	3.1	10	10	40
50030	N.Hwd & Spruce	3.1	5	5	20
<b>Compartment 65</b>					
65019	Red Oak	4.1	16	16	54
65020	Red Oak	4.1	6	6	20
<b>Compartment 69</b>					
69026	N.Hardwood	3.1	28	28	112
<b>Compartment 44</b>					
44021	N.Hardwood	4.2	21	19	77
<b>Compartment 58</b>					
58029	N.Hardwood	3.1	24	12	50
58031	N.Hardwood	3.1	7	7	28
<b>Compartment 98</b>					
89011	N.Hardwood	4.1	18	18	72
<b>Compartment 150</b>					
15003	N.Hardwood	3.1	19	19	77
			Total Stand Acres 255	Total Harvest acres 237	Total est. CCF 988 Total est. MBF 592

**Note:** 1 CCF = 100 cubic feet of solid wood. This method of measurement is changed from the previous measurement of thousand board feet (MBF) per Federal regulations. To determine MBF, divide the total number of CCF by 1.67.

## B. Alternatives Not Considered in Detail

The following alternatives were also raised during public scoping, but after careful consideration, were dismissed from further analysis for the reasons stated below.

### **Alternative that restores the area to pre-settlement condition**

There is a request that the agency study a restoration alternative, the focus of which would be the gradual return of a portion of the project area to pre-settlement condition.

**Response:** This alternative was considered but dismissed from further analysis. It was not feasible to do this for several reasons, including it is highly debatable and subjective as to what point in time would be considered a “pre-settlement,” condition. In addition, it does not address the purpose and need of the proposal. For a more detailed response, refer to the Utley Brook Environmental Assessment, 1997, on pages 25-26 where the same issue was raised. It is incorporated by reference for this response.

### **Reclassify MA 3.1 Lands**

One respondent would like us to consider moving all MA 3.1 lands to MA 2.1, and evaluate the prospect of re-classifying any land that could be moved to MA 6.2. This would address this person’s displeasure with commercial logging on public lands, and begin a program of forest restoration.

**Response:** Development of such an alternative would not address the purpose and need for this proposal, which is to provide a mix of tree types, ages and sizes, improve deer wintering and other wildlife habitat and produce high quality saw timber. This purpose and need is consistent with the Forest Plan to reach the desired future condition for the project areas. For more detailed information, refer to the Purpose and Need section of this EA.

Also, such an alternative would be outside the scope of this analysis since a detailed Forest Plan level analysis and subsequent Forest Plan amendment would be needed to reclassify these lands.

### **Emphasize Non-motorized Recreational Values**

One respondent stated that alternatives that emphasize the non-motorized recreational values for this area should be developed. They state that the Forest Service recognizes that recreation will provide 31.4 times the income and 38.1 times the number of jobs when compared to logging in National Forests. Providing clean air and water, and intact forests and 38 times the jobs that logging generates will be a net benefit to the public. They inquired as to how will this sale enhance the recreational experience on the Emily Proctor Trail and other trails within the project area, and how will it enhance the visual quality objectives for the project area.

**Response:** Again, such an alternative would not meet the purpose and need for the proposal, and would require a detailed Forest Plan level analysis (see response above). Moreover, the proposal and alternatives would not negatively impact the Emily Proctor Trail and other trails in the long term. Visual quality objectives would be maintained. The sights and sounds of timber harvesting are consistent with what can be expected in the

Management Areas (3.1, 4.1 and a limited amount of 4.2). The recreational impacts would be of short duration, lasting as long as the timber harvest. While some summaries of the effects of the national timber sale program can be helpful it is also important to look at local effects of active forest management in Vermont. According to The Economic Importance of Vermont's Forests, March 2001, Northeast State Foresters Association, "The forest-based manufacturing economy provides employment for almost 7,500 people and generates payrolls of almost \$200 million. Forest-related recreation and tourism provides employment for 2,393 and generates payrolls of \$33 million. In addition, "Each 1,000 acres of forestland in Vermont supports 1.6 forest-related manufacturing jobs and 0.5 forest-related tourism and recreation jobs. For more information, refer to the Economic, Recreation and Visual resource sections of the Environmental Consequences Section of this EA.

### **Manage Area for Forest-Interior Species**

One person requests that we develop an alternative to manage this area for forest-interior species, and we consider a change in MA.

**Response:** Refer to the responses above, regarding how a change in MA would not meet the purpose and need of the proposal, and be outside the scope of this analysis. In addition, interior species would actually gain some benefit from this proposal, while at the same time there would be only minor adverse impacts, which would not alter their long-term use or desirability of the area. See also the cumulative effects section for Interior Species in the Environmental Consequences Section of this EA.

### **Delay Overstory Removal**

One respondent stated that all of the stands proposed appear to be good candidates for delayed overstory removal. A request was made to analyze the implications of delayed removal of the overstory in these stands and provide as a context for this decision, a report on the conditions and health of the understory and overstory in the stands where delayed removal was used.

**Response:** This was not considered as an alternative because it would not address the purpose and need. Based on our current knowledge of the stands and Forest Plan direction these stands would not be good candidates. See page A.04 in the Forest Plan regarding application of delayed shelterwood, which states, "The delayed shelterwood must be applied starting with the initial cut, it is not simply the application of a standard shelterwood without a removal cut. Shelterwood trees of adequate health and vigor to live for at least another 40 years must be left. These trees should have sufficiently small crowns to allow the new regeneration to grow up around them". In addition, the stands proposed in this project were not deemed as candidates for the delayed shelterwood removal criteria found in Forest Plan p. 4.64) due to the current stand conditions, remoteness of these areas and the minimal visual impacts with the removal harvests. For these reasons, this is an alternative considered but dismissed from further analysis.

### **Leave More Northern Hardwood trees per acre**

Consider leaving more Northern hardwood trees (12 -18) per acre, as it seems this could be done without detriment to the understory.

**Response:** This comment is noted. Please see the description of various alternatives and the Proposed Action for a description of how many trees will be cut and reserved. According to our field observations, Forest Plan and silvicultural guides, it is time to remove most of the overstory of these young developing stands to improve growing conditions and provide valuable wood products while improving deer wintering habitat. Leaving additional trees per acre in the Northern hardwood stands would not provide benefits to the young stands or other resources.

## C. Mitigation Measures Common to All Alternatives

In response to public comments on the proposal, mitigation measures were developed to ease some of the potential environmental, social and recreational impacts the various alternatives may cause. The following mitigation measures would be applied to any of the action alternatives.

### Botanical Resources

- ?? Stand 15 in Compartment 42, formally part of the Huntley Brook sale, would have the removal harvest acreage reduced by two acres from 20 acres to 18 acres. The purpose of this change would be to protect patches of Jacob's ladder (*Polemonium vanbruntiae*) and its associated habitat, found during surveys of that area. These new patches were either present during the previous timber sale or developed as a result of it. Since we cannot be sure when the plants developed, these two acres would be reserved and protected from disturbance from this sale. Moreover, monitoring plots would be established in the reserved acres to check the post harvest effects on sensitive plant species. This area would make a good comparison location for other monitoring areas, which have shown some evidence that timber harvests on previous sales may have been beneficial for the establishment or maintenance of the Jacob's ladder. No equipment or ground disturbance would occur in this area.
- ?? In stands where butternut trees occur, do not harvest them as part of this project.
- ?? Exclude from any overstory removal activities the small sites where ginseng, large yellow lady's slippers, and sweet joe-pye weed have been found. The Forest Botanist should be involved in sale layout, to ensure that this occurs.
- ?? Monitor the effectiveness of each of the above mitigation measures, after the project is complete.

### Recreation

- ?? Annual coordination and communication with the winter sports and trail community and adjacent landowners to share information regarding operations of the sale will occur each fall prior to December first, the start of sale operating period.
- ?? The cutting schedule in the timber sale contract would be dictated by an order of operations to mitigate trail impacts. This is to reduce the number of winter trails impacted by winter logging at one time, reduce concurrent use of the truck roads by skiers and snowmobilers and to encourage timely completion of units that are accessed by these trails before other units are opened for harvest. The order is: 1) Stand 10, Compartment 26, 2) Stand 6, Compartment 26. 3) Stand 2, Compartment 28. 4) Stand 26, Compartment 69.

- ?? An alternative trail route for a portion of the Catamount Cross Country Ski Trail has been identified. This route would be used when a portion of the Widows Clearing Trail is used for skidding logs. It has been checked in the field by Forest Service and Catamount Trail Association staff and is acceptable. It would follow established portions of the adjacent Water Tower and Robert Frost Trails.
- ?? Information, directions and a map for alternative cross country skiing and snowshoeing trail routes would also be posted at the Oak Ridge Trail Trailhead when the Oak Ridge Trail is temporarily closed during winter logging in Compartment 50.
- ?? Logging activities would be restricted from weekends and holidays, and after 6:00 p.m. on weekdays, in order to mitigate the effects on trail users. Affected trails, and plowed roads used as winter trails, will be well blazed and signed to notify both the trail users and the loggers, of each other's presence. Those units, which have direct impacts on trail users, would be scheduled early in the sale to attempt to limit impacts to one winter season.
- ?? All trails and trailheads affected by logging activity will be returned to their pre-sale condition by July 1 following the cutting and acceptance of the units being completed.
- ?? The landings, truck access roads and skid trails will be checked at least weekly by the timber sale administrator for sign of unauthorized off highway vehicle use including mountain bikes and all terrain vehicles (ATV's). These roads and trails will be closed when logging operations are done by removal of all temporary bridges, culverts and crossings. Also, skid trails will be closed with water bars, and seeded. Any use will be mapped and documented on the Timber sale inspection report by the Sale Administrator and passed on to and coordinated with law enforcement for investigation.

### **Visual Resources**

- ?? For improving visual appearance of the harvest and for concerns about the private land with a camp adjacent to Compartment 46, stand 11, locate wildlife reserve trees far enough back from the property line so they would not fall into private property.
- ?? To maintain trailside vegetation and to frame existing vistas, the Landscape Architect will assist in designating reserve trees at the trailside edges of stands 27 and 30 (Oak Ridge Trail) in Compartment 50, Stand 26 in Compartment 69, (Widow's Clearing Trail), and the roadside edges of stands 29 and 31 in Compartment 58 (FR 101).
- ?? Retain as much vegetation as practical on the west edge of the landing adjacent to Rt. 100 to help screen the landing. The landing used for the harvest of stand 3 in Compartment 150 would use a curved entry to minimize sight of the landing itself.

### **Heritage Resources**

- ?? The Forest Archaeologist and Sale Administrator will work together to ensure that the seven Heritage Resources sites identified within the "area of potential effects" (APE) are marked on the ground with a buffer zone delineated, are included on the Contractor's map(s), and protected/avoided for the duration of the project.

### **Soil and Water Resources**

- ?? All stands will have filter and buffer strips consistent with the Standards and Guidelines and table in the Forest Plan on page 4.19. Other Soil and Water Standards

- and Guidelines found on Plan pages 4.21- 4.26 would be followed as they apply. In this table are the guidelines we would follow for establishing filter and buffer strips on areas with different slopes. For example a slope of 10 percent would require a filter strip of 65 feet wide and a slope of 30 percent would have a filter strip of 125 feet.
- ?? Exclude all wetlands from any overstory removal activities. If access to the site can only be accomplished by moving equipment across a wetland, do so only on solidly frozen ground. Leave a buffer strip of 80 to 100 feet between the wetland edge and any logging activity.
  - ?? FR 236 would be the logging truck access road to stands 11 and 21 in Compartment 46. Three hundred feet of FR 236 is within 15-40 feet of a stream (inside the filter strip), and surface drainage from the road drains directly into the stream via the ditch line and one dip. The road and ditch line along this section is 90% vegetated and the road is hardened with gravel and cobbles. To minimize sedimentation, we would only allow use of the road when it is frozen hard, such that soil disturbance would not occur.
  - ?? Skidder bridges would be needed to cross over streams at the following locations. Two bridges are on the skid road to stand 21, Compartment 44 and one bridge is on the skid road to stand 3, Compartment 150. Bridge sites would undergo 401 Water Quality Certification review. These temporary bridges would be removed following use under the terms of the timber sale contract, and the stream banks returned to their original shape, and re-vegetated.
  - ?? The landing for stand 21, Compartment 44 is located along side FR 55. It is partially inside the stream filter strip by 20-30 feet. Since the landing slopes slightly away from the stream, the risk of sedimentation is low. However, the landing edge would be monitored by the Sale Administrator to assure that no sediment drains toward the stream. If needed, preventative action (place hay bales or a snow berm on the edge of the landing near the stream; or do not use the east edge of the landing) would be taken to prevent sedimentation. The landing would be seeded and mulched after the sale to provide vegetative cover and allow native plants to grow in over time.
  - ?? A small portion of the landing for stand 3, Compartment 150 is within stream filter strips. Edges of the landing would be at least 50 feet from both the Mad River, and a small ephemeral stream to the north. Hay bales and/or snow berms would be used as needed to prevent sediment from getting into the streams. Soils at the landing are somewhat poorly drained, so extra caution will be exercised by the Sale Administrator to assure that the ground is well frozen before use. The landing would be seeded and mulched after the sale to provide vegetative cover and allow native plants to grow in over time.
  - ?? Approximately 0.1 mile east of the landing for stand 3, Compartment 150, the skid road is within 30-40 feet of a small ephemeral stream for a distance of 350 feet; and within 10-15 feet for 25 feet, with a soil berm in between. Water bars on this section of skid trail would be drained to the southeast, away from the stream. Extra caution would be taken by the Sale Administrator to only allow use of the skid road when it is frozen. These measures would prevent any sediment from the skid road from getting into the stream.
  - ?? Stands 6 and 10 in Compartment 26, and stand 2 in Compartment 28 are about 30% somewhat poorly drained soils (wetter than other stands in the sale). To prevent

- rutting and excessive soil disturbance, trail condition would be monitored more closely than normal. Corduroy (logs placed in the road to strengthen it) may also be used on short sections of existing skid roads through wet areas. These actions would protect the soil from rutting.
- ?? All stands in Compartment 50 are on soils with a high erosion hazard. The high hazard is due to the high amount of organic matter in the upper part of the soil. The Sale Administrator would monitor harvest activities in these stands more closely and frequently to prevent erosion, sedimentation and rutting problems.
  - ?? In Compartment 65, an existing ford would be used to cross the ephemeral stream on the haul road to Stand 19. The ford is on firm, sandy and gravelly soils, and it has gradual approaches. These factors, plus the winter-only use would be favorable for minimizing sedimentation. The crossing is a poor location to install a culvert because the stream bank slopes are very gentle. Installing a culvert would result in more soil disturbance and possibly more sedimentation than a ford.

**Wildlife**

- ?? The east edge of stand 29 in Compartment 58 is bordered by a several acre wetland and pond. To best protect habitat for species that live near the wetland edge, we would reserve live trees (as opposed to the usual mix of live and dead trees in Plan amendment for bats) within the 300 feet that exhibit characteristics described in the reserve tree section of the forest plan (p. 4.31-4.33) and follow FWS guidelines for Indiana bat reserve trees. This would maintain the forest floor shading, and allow for the accumulation of additional large woody debris on the ground over the long term since most of the current overstory would be reserved.
- ?? All conservation measures in the recent amendment to the Forest Plan regarding TES would be followed.

## D. Comparison of Alternatives

This section provides a summary of the effects of implementing each alternative. Information in the table is focused on activities and effects where different levels of effects, indicators or outputs can be distinguished quantitatively or qualitatively among alternatives.

**Table 4. Comparison of Alternatives.**

	<b>Proposed Action</b>	<b>Alternative 1</b>	<b>Alternative 2</b>	<b>Alternative 3</b>
<b>Acres harvested</b>	266	0	204	237
<b>Acres of oak harvested</b>	62	0	0	56
<b>Acres of seedlings released to grow</b>	266	0	204	266
<b>Length of time to complete sale</b>	15 months	0	10 months	13 months
<b>Oak trees retained in overstory of oak stands after harvest</b>	Least amount: 5-7 per acre	Most, about 40-60 per acre (No oaks cut, no change from current conditions)	Most, about 40-60 per acre (No oaks cut, no change from current conditions)	More: about 20-30 per acre
<b>Miles of trails impacted</b>	15.4	0	15.4	15.4
<b>Acres of deer browse, winter forage produced</b>	Most	No Change	Least	90% of Proposed Action
<b>Amount of Sawtimber, pulpwood produced</b>	1168 CCF	None	813 CCF	988 CCF
<b>Cost to implement (estimated)</b>	\$42,700	0	\$30,000	\$36,600
<b>Revenues generated (estimated)</b>	\$266,600	0	\$185,600	\$225,800

# ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED ACTION AND ALTERNATIVES

This section summarizes the physical, biological, social and economic environments of the affected project area and the potential changes to those environments due to implementation of the Proposed Action. This section is organized by issue, affected environment, direct effects, indirect effects and cumulative effects. It also presents the scientific and analytical basis for the comparison of alternatives presented in the chart above.

## A. The Proposed Action

### Issue #1 – Silviculture-Oak management

Some people are concerned about the harvesting of oak because it is uncommon on the forest. They believe that because oak regeneration can be difficult to establish and the acorn crop from oaks is important to wildlife, no oak trees should be harvested.

#### Affected Environment

Forested conditions are found on about 95 percent of the GMNF's 385,000 acres. Several distinct forest types are present on the GMNF (Table 5; Fig. 5) including Northern hardwoods (American beech, sugar maple, red maple, yellow birch, white ash, and black cherry), softwoods (red spruce, balsam fir, white pine, red pine, and hemlock), pioneers (paper birch and aspen), oaks (red and white oak), and permanent openings (old fields, pastures, lakes, ponds, and marshes). Seventy-one percent of the trees are saw timber sized (generally 9" Diameter Breast Height and greater) and older than 60 years of age (Table 5; Fig. 6). About one-third of GMNF, (141,000 acres) is considered commercial forestland where trees may be cut to produce the desired future condition and levels of outputs envisioned by the Forest Plan, such as improved forest growth, health, and species diversity. Between 1987 and 1996, approximately 1,900 acres of forested land each year received silvicultural treatments that moved the forest toward a desired future condition.

**Table 5 - Forest types and age classes on the Green Mountain National Forest, VT, 1999.**

Forest Type	Acres	%	Age Class (years)	Acres	%
Northern hardwoods	310,835	83	0-19	18,725	5
Softwoods	29,960	8	20-39	18,725	5
Aspen & Paper Birch	18,725	5	40-59	26,215	7
Openings	11,235	3	60-79	71,155	19
Oak	3,745	1	80-99	101,115	27
			100+	93,625	25
			Uneven age	44,940	12

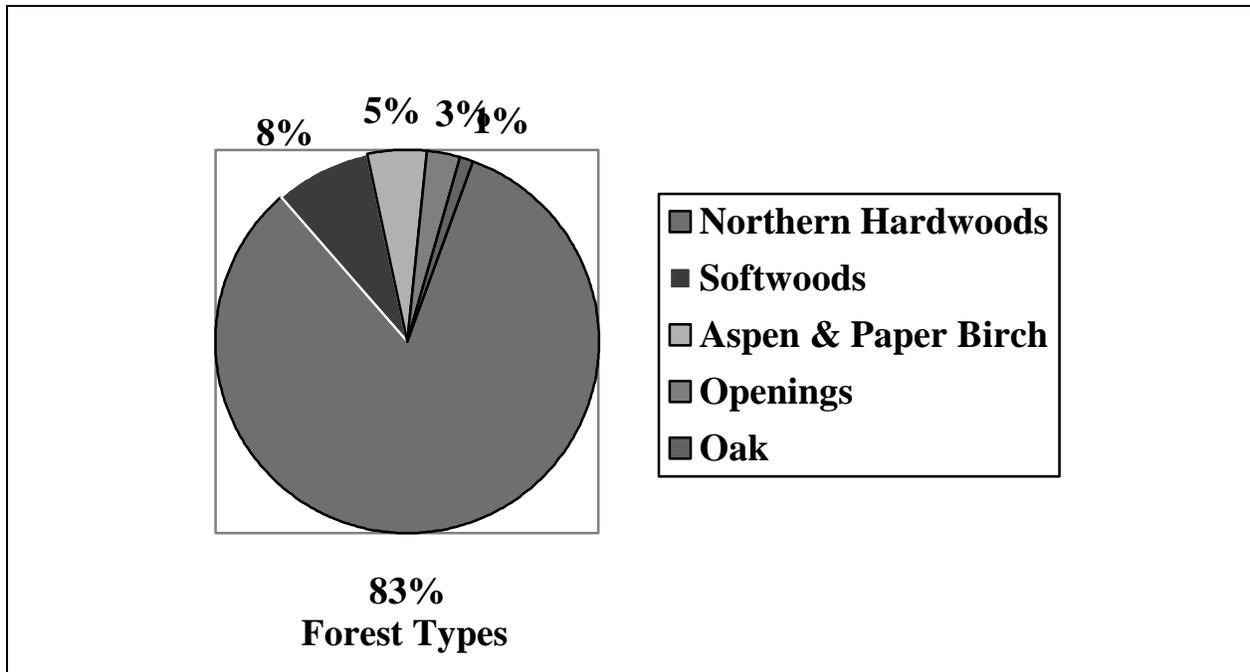


Figure 5. Percent of total forest land by forest types on the Green Mountain National Forest, Vermont, 1999.

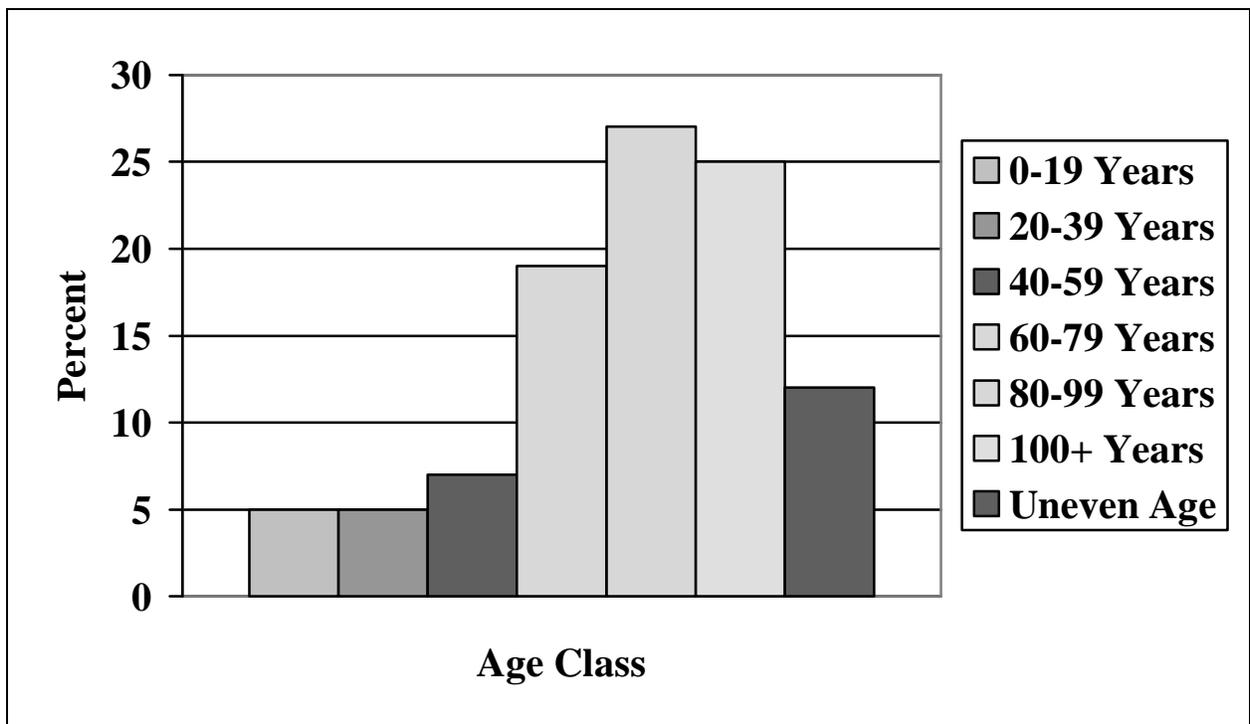


Figure 6. Percent of total forest land by age class on the Green Mountain National Forest, Vermont, 1999.

### **Oak Forests In The Affected Area**

The western most edge of the Green Mountain national Forest is where the oak- hickory forests of the Champlain Valley meet the Northern hardwood forests of birch, beech and maple. This area is known as the “oak belt” and it runs north to south along the forest boundary. The oak belt encompasses low elevation, well drained, loamy soils to steep, shallow to bedrock areas found along the western escarpment where mixes of oaks and conifers grow on ledges and cliffs. These areas support some of the deer wintering areas found on the Middlebury District because of the forage and topography that limits snow depths. These oak stands were developed after repeated disturbance and land use that included grazing, burning and other agricultural activities that ended in the mid to late 1800s. Since oaks have adapted survival strategies that put growth and energy reserves into root systems when disturbed, they are better able to survive repeated disturbance. When the disturbance is ended, trees with the stronger root system can compete better with other trees and sometimes dominate a site. Such is the case with oak stands on the Middlebury District. Various tracts of land were acquired over the years that had oak stands on them. Oak is considered an uncommon vegetation type in the Forest Plan and as such will be maintained or increased where practical.

During Forest Service inventory of forested areas, groups of trees were identified as oak stands if they contained about fifty percent (or sometimes less) of oaks mixed with other hardwood and softwood trees. On the Middlebury District, most of the forest is comprised of Northern hardwoods. However, about 4 % of the land is in oak forest types. This equals about 2,400 acres in 77 stands. Of that, only 52 stands or about 58 %, (1400 acres) are oak stands suitable for timber management where these strategies for sustaining oak forests can be used. Oak seedlings do not establish themselves and survive in the shade of larger trees. Without disturbance and new regeneration, we believe existing oak stands will eventually be replaced by Northern hardwood stands. The Proposed Action includes treatments for five of those oak stands (1% of suitable oak stands), totaling about 62 acres (4% of suitable oak acres). See the Proposed Action.

Oak stands in Vermont have undergone about six outbreaks of defoliation since the gypsy moth (*Lymantria dispar*) was introduced into Vermont. Gypsy Moth outbreaks generally follow a cycle of about every 7-10 years. It was after the recent outbreaks in the Middlebury District in 1980 and 1990 that corresponding field inventories found mortality and decline of oak trees and stands from defoliation and impacts from secondary pathogens like two- lined chestnut borer (*Agilus bilineatus*) and shoestring root rot (*armillaria mella*). Oaks in this area were also growing more slowly due to overstocking and these past stresses. Concern grew about sustaining an oak forest and oak stands that originated from agricultural disturbance that now consist of mostly mature oaks with little to no oak reproduction.

Efforts at thinning out damaged and declining trees and regenerating new stands of oak with uses of prescribed fire occurred in the Middlebury District with the Leicester Hollow Sale (1981) and the Oxbow Sale (1984). New Forest Plan standards and guidelines regarding use of the shelterwood system and building on our observations were adopted in the Plan in 1987. Other timber sales implementing the needed forest management followed and were successful in regenerating some amounts of oak. Overstory removal following a two cut shelterwood was successfully completed in the Partridge Oak Sale in 1992 and in the Chandler Ridge Sale in 1998. Oak stands in these planned sale areas were impacted by defoliation again in 1990, so harvesting the overstory was delayed for two growing seasons so the stands could recover from these impacts. Gypsy moth is no longer believed to be the threat it once was due to natural and

introduced pathogens, which now appear to effectively control populations. Annual detection monitoring by Forest Health staff from the Durham New Hampshire field office (State & Private Forestry) still occurs to monitor this threat.

### Silvicultural Systems and Harvest Methods

Several types of silvicultural methods are applied in forested stands to produce the desired future condition and levels of outputs envisioned by the Forest Plan for a management area (USDA 1987). Both even-aged and uneven-aged management systems are considered on the GMNF, with the ultimate selection of a specific treatment based upon the long-term Forest Plan objectives for the management area and the resource conditions that exist within the stand (Table 6). Regarding concerns over habitat management for Indiana bat, current Forest Plan standards and guidelines require retaining a minimum of 5 trees of suitable roosting quality for Indiana bats, per acre harvested during all silvicultural treatments. *See details of the 9/11/2002 TES Amendment to GMNF LRMP.*

**Table 6. Estimated range of silvicultural activities accomplished in fiscal years 1997- 2000 and likely to be accomplished by continued implementation of the Forest Plan through FY 2002.**

Silvicultural Treatment	Unit Measure	1997	1998	1999	2000	2001	2002
Clearcuts	Acres <sup>a</sup>	100	30	30	65	53	30
Shelterwood	Acres	150	650	200	52	70	250
Intermediate even-age	Acres	450	450	250	237	450	450
Selection cut	Acres	350	350	550	400	551	500
Non-commercial thinning	Acres	0	100	100	0	250	250

<sup>a</sup>An acre is an area about the size of a football field, excluding the end zones.

Even-aged silvicultural techniques are used where long-term objectives are to manage for trees that are relatively close in age (+ or - twenty years), for an established length of time (rotation age), with the eventual intention to establish a new stand of seedling regeneration to replace the trees currently in place. This type of management can be accomplished by applying a series of commercial and noncommercial treatments throughout the life of the stand, some of which take place during the initial phases of stand development (regeneration treatments, precommercial thinning), some during the mid-life of a stand (intermediate thinning, timber stand improvements) and some nearing the rotation age for the stand (reforestation treatments to establish seedlings, regeneration harvests such as shelterwoods or clearcuts). For the most part, seedlings are produced through natural regeneration processes. Sometimes, artificial regeneration (planting) is used when seed source is lacking or seedlings fail to develop. Repeating even-aged treatments across the landscape results in a multi-aged forest composed of even-aged stands.

Uneven-aged silvicultural techniques are used where long-term management objectives are to maintain continuous forest cover with a variety of age and size classes present within the same stand. Management activities occur periodically (approximately 20 years apart) with each entry intended to establish some seedling regeneration. The objective for selecting an uneven-age treatment may vary, but often it is related to visual, recreational or site (wetness) concerns. The factors considered in the application of an uneven-aged harvest are the same as those considered for even-aged harvest: stand density, stand structure and species composition. However the type

of structure and composition are quite different than those sought under even-aged treatments. Three types of uneven-aged treatments are used: improvement cuts, individual tree selection, and group selection. Often individual tree and group selection are used together in the same stand.

### **Direct and Indirect Effects**

The Proposed Action prescribes completion of an even-age management system, specifically, the removal cut, which is the final harvest of the two-step shelterwood system, subject to Plan standards and guidelines. All of the 266 acres of the 14 Northern hardwoods and 5 oak stands would be treated with this harvest. As shown in Table 1, harvest would occur on approximately 100 acres of MA 3.1, 147 acres of MA 4.1, and 19 acres in MA 4.2.

For all stands, except oak stands 11 & 21 in Compartment 46 and 19 and 20 in Compartment 65, overall stand densities of overstory trees would be reduced from 30-50 square feet per acre (20—40 trees per acre) to about 10 square feet of basal area per acre (about 5-7 trees per acre).

The remaining overstory would be composed of about 5-7 trees per acre, down from about 20 to 40 trees per acre. The reserve trees would be made up of live and dead trees and would be of the species that exist there now. In oak stands, oak trees would be the predominate species retained.

The understory of these stands contain mostly Northern hardwoods (beech, birch and maple) along with other shade intolerant species such as aspen and white birch and shade tolerant species such as striped maple and red spruce.

The five oak stands shown on Table 1 have similar species as the hardwood stands, along with mixes of red, white and chestnut oak. Oak seedlings occur in patches in the stands because acorns drop from trees rather than being windblown and are scattered by mammals that bury them for food and forget them. This diversity of tree species in the stands would be maintained after the removal cuts. Hardwood and oak seedlings and saplings would have improved growing conditions because of more sunlight reaching the ground and less competition for nutrients. Species diversity at the stand level would be maintained.

For the five oak stands listed above, overall stand densities would also be reduced down to about 10 square feet of basal area, down from the existing average basal areas ranging about 40-50 square feet per acre in Compartment 50, stand 12. Down, from about 60 square feet per acre in Compartment 65, stand 19 and down from about 80 square feet of basal area per acre in stand 20. In Compartment 46, stands 11 and 21 would have basal are reduced from about 70 square feet per acre down to about 10. After harvest, the remaining overstory in these oak stands would be composed of about 5-7 live and dead wildlife reserve trees per acre, down from about 30 to 60 trees per acre. These oak stands have a higher density of overstory trees than the Northern hardwood stands, which produced more shade. The makeup of understory trees in these stands is similar to the oak and hardwood species mixes mentioned above but, there are more shade tolerant and intermediate tolerant species like beech, sweet birch and maple mixed in. This overall tree species diversity would be maintained. However, oak stems would be able to compete better once the overstory shade is reduced.

During logging of the overstory trees, some seedlings and saplings in the understory would be damaged or snapped off by the individual larger trees falling on them. This damage cannot be

avoided by conventional logging with chainsaw and skidder operations. Less damage would occur if feller–buncher were used. Even less if helicopter harvesting were employed.

However, a conventional logging system using a skidder and /or a small dozer and log truck is anticipated. Regardless of logging system used, due to large numbers of the smaller trees (10 – 20 thousand trees per acre) present, many of these trees that would be damaged in winter months would re-sprout, so this damage is temporary and would not inhibit overall stand development. About 5 to 10 % of the small trees might be damaged. Within about three growing seasons, logging slash has settled, most bent trees have straightened up and snapped stems have re-sprouted. Damage to the understory trees would be further minimized because the sale administrator would monitor logging operations, dictate where equipment can be driven, and monitor the amount of damage to the residual stand. Contract clauses requiring purchaser compliance in minimizing damage to the residual stand and penalties for non-compliance would be in place. This has worked in the previous sales mentioned.

In the oak stands listed, post sale damage to the understory trees would be about 25% greater than that in hardwood stands due to the higher basal area and subsequent higher numbers of overstory trees that would be felled during logging. These stands would recover from this damage in ways similar to the hardwood stands. In addition, oak stems damaged in this way may be more able to re-sprout, regain height and better compete with other damaged Northern hardwood species because oaks can develop a larger root system when suppressed and therefore have better resprouting ability when compared to Northern hardwoods (Gottschaulk 1993, Leak 2002, personal communication). The larger root to shoot ratio in oaks makes them better resprouters and logging disturbance may help reduce total numbers of competing hardwood stems and provide conditions favorable for oak resprouting and better growth of undamaged understory oaks than all the other alternatives.

In this alternative, the post sale condition would find understory seedlings and saplings of all oak and hardwood stands having the least competition for sunlight and nutrients and more growing space for developing and producing high quality saw timber sooner than in the No Action and other alternatives. The remaining large oak and Northern hardwood overstory trees (about 5-7 per acre) would be spaced in groups or singly throughout the stands.

Each harvest method has beneficial effects on forest stands as a whole. Growth and vigor are influenced by the amount of growing space individual trees have. The Proposed Action would improve growth and vigor the most by improving growing conditions. Species composition is an important consideration from a wildlife standpoint as well as regarding value of wood products that are produced. While species composition would not change much in the Northern hardwood stands, oak species in the oak stands would have a better chance to compete with Northern Hardwoods and survive overtime with the Proposed Action due to improved growing conditions and less competition when compared to Alternatives 1, 2 and 3.

Changes in growth and vigor are indirect effects. Recruitment of new trees and their subsequent development are delayed effects that occur over time following treatment of the stand. While recruitment and regeneration of the new stands has already occurred, some shift of species and abundance of them would occur. Again, it is felt the Proposed Action has the most chance of improving growing conditions for best long-term development of oak and Northern hardwood seedlings into future sawtimber, a goal for these MAs.

### **Cumulative Effects**

The Proposed Action would produce a small impact to the transportation system because only three other outyear sales are being planned (two in Manchester, one in Middlebury) as our timber sale program is restarted. Therefore there would be no adverse cumulative impact to the transportation system from timber sales. The overstory removal harvests proposed in this project would occur in only five of the seventy-seven oak stands found on the Middlebury District and that would not create any cumulative adverse impacts to the amount of oak forests. The previous treatments and shelterwood harvests made changes in the ages and amounts of oak and Northern Hardwood trees present. This proposal would not change that but create conditions that would help in sustaining surviving oak and hardwood seedlings and saplings in stands of different age classes that already exist. While there is some timber harvesting occurring now on private lands adjacent to Compartment 50, there is no large amount of clearcutting or liquidation of oak or Northern hardwood forests occurring there or on other private lands adjacent to this project. Most of the project area is surrounded by National Forest System lands and is not interspersed with large forest industry holdings so there would not be any negative cumulative effects from shelterwood removal harvests on private land adjacent to harvests in this proposal. With only one other National Forest timber sale being planned in the immediate future (Old Joe project) and based on past, present and future conditions there would be no negative cumulative effects on the areas oak forests, GMNF's timber base or timber resources with implementing this alternative. The exact areas and amounts of timber sales in the immediate future are not known at this time except for two projects (Greendale and Nordic) being planned for the Manchester District. The trend of acres and type of harvest through 2002 has been estimated in Table 6.

## **Issue #2 – Archeology**

One person is concerned about impacts of the project on archeological resources, including Native American burial and other sites.

### **Affected Environment**

All archaeological resources and historic properties, including Native American burials, are protected by the National Historic Preservation Act, Archaeological Resources Protection Act, Native American Graves Protection and Repatriation Act, and other Federal laws. At a minimum, the proposed "area of potential effects" (APE) – consisting in this case of the identified stands and access routes to get to them -- is surveyed for archaeological and historic sites. Significant sites are identified, and appropriate mitigation measures are recommended. Any adverse affect to a significant site, which cannot be mitigated, needs the specific review and concurrence of the State Historic Preservation Officer (SHPO). Over the last 20 years, the Forest has rarely seen fit or had the need to intentionally have an adverse affect on an historic property within an APE. Instead we protect sites and their information by avoiding and buffering them, using seasonal restrictions (e.g., "over snow" conditions), conducting data recovery projects, and/or otherwise mitigating possible adverse effects.

The evolution of land-use patterns on the North half of the Green Mountain National Forest has a familiar ring to students of Vermont history. Low-density Native American uses – including hunting, procurement of stone for tools, travel across the mountains, collection of medicinal plants, and observances at traditional/sacred sites -- occurred in the uplands and mountains over

the several thousand years prior to Euro-American settlement in the late 18<sup>th</sup> century (Lacy 1994). Historic period peoples brought more intensive extractive industries like mining and logging to the region, hand-in-hand with the establishment of farms and villages more than 200 years ago. Early- and mid-19<sup>th</sup> century sheep/textile industry, charcoal and iron production, and lower-elevation logging boomed, then faded by the 3<sup>rd</sup> quarter of the 1800s as improved transportation systems (especially railroads), new markets, a changing economy, an emphasis on flood-plain agricultural technologies, and shifting & consolidating populations paved the way for larger dairy farms, upland timber harvesting, and abandonment of hardscrabble upland farm properties (see Albers, 2000).

By the time of the Great Depression in the 1930s, poor logging practices, bad market access, and the 1927 Flood had left thousands of upland acres as either cut-over (often environmentally degraded) areas or abandoned farm fields and pasture. The risks for destructive erosion, flooding and fire were all heightened. Establishment of the Forest in 1932 (under the Weeks Act authority to protect the headwaters of navigable streams/watersheds) and the work of CCC crews between 1933-1942, laid the baseline for recovery of these upland areas.

Today, most of the once cut over and abandoned landscape has been nurtured and re-grown to a healthy, productive forest. Evidence of the historic land-use patterns remains in the form of numerous archaeological and historic sites, in some of the age structure and mix of species in the forest, and the occasional “cultural landscape”.

Because the “area of potential effect” (APE) under consideration in this EA – i.e., the identified stands and the access to them -- has been derived from earlier, somewhat larger projects, each of them has already been subject to an archaeological survey which identified sites that could be affected. A total of 7 historic archaeological sites were identified in the APE. These areas and sites were revisited between 1998-2001 in anticipation of this proposal.

**Table 7. Heritage Resource Site Presence and Mitigation Measures.**

Comp	Stand	Old Sale name	Heritage Review	#Sites	Site ref #s	Mitigation	Alts w/poss. Affects to sites
26	6, 10	Spruce Lodge	8.10.89	3	Lnn047.00 Lnn048.00 Lnn049.00	Flag/avoid Flag/avoid (no affect)	#2, 3, 4
28	2	Spruce Lodge	8.10.89	-			
42	15	Huntley Brook	5.15.89	-			
46	11, 21	Oxbow	8.10.89	-			
50	12, 21, 27, 29, 30	Toll Road	2.9.90	2 (s18) 1 (s4)	Rpn048.00 Rpn048.01 Mdy019.00	Flag/avoid Flag/avoid Flag/avoid	#2, 3, 4
65	19, 20	Bryant Mountain	6.12.91	-			
69	26	Widow's Clearing	5.5.89	-			
44	21	Clark Brook	2.15.95	1 (s19)	Gne032.00	Flag/avoid	#2, 3, 4
58	29, 31	Gulf Brook	12.11.90	-			

98	11	Perkins Brook	9.11.97	-			
150	3	Mills Brook	7.22.80	1 (near landing)	Wrn024.00	Flag/avoid	#2, 3, 4

### Direct Effects and Indirect Effects

The operation of logging equipment in an area has the potential to affect sites by disturbing both the physical remains (e.g., foundation walls) and the spatial relationship of various artifacts and features to one another, which is the basis for deriving much of the information about a site. Each of the sites identified in the APE can be protected from this kind of disturbance through on-the-ground identification (e.g., flagging) and avoidance.

Our monitoring has demonstrated that, when implemented, these measures have proven to be effective in the past (USDA Forest Service, 1998). They are identified in this document as Mitigation Measures and will be monitored. The State Historic Preservation Office concurs with these measures, and the GMNF's liaison with the Abenaki Nation has received information about this project.

### Cumulative Effects

In 1998 we completed a monitoring study of 14 timber sales conducted on the north half of the Green Mountain National Forest. Each of the sample sales had at least one heritage site identified within the project's Area of Potential Effect. Potential direct site impacts were anticipated to occur primarily from logging machinery, and skid road and landing construction and use. Our conclusion was that of the 94 total sites identified in these projects, all but two were protected from impact, primarily through the implementation of "buffering" mitigation measures. Disturbance to the two other sites was due to a lack of communication – not a lack of effectiveness of the mitigation measures when implemented. Sites in the Overstory Removal Project will be protected using similar methods, which are effective 98% of the time. The only other future Forest Service timber sale planned for this section of the GMNF is the Old Joe project. Similar measures would be put in place to protect heritage resources. Based on past, present and future anticipated actions, there would be no cumulative effects to any Heritage sites.

## Issue #3 –Fish, Botany, Wildlife

Some people are concerned that site-specific analysis within the project areas will not be conducted, and that in order to better assess impacts, site-specific fieldwork needs to be conducted by agency specialists in the areas of aquatic biology, mammal biology, ornithology, and botany.

One person is concerned that not protecting the project areas will result in the continuing decline of woodthrush.

Some people are concerned about the proposals impact on reclusive wildlife species such as black bear, bobcat and fisher.

Some people are concerned about the impacts of the proposal on the Indiana bat's summer, fall, winter and spring habitat requirements. More specifically, there is concern that removal of the

remaining, mature trees will decrease suitable roosting and maternity sites for the Indiana bat because the bat does not use those trees traditionally retained for cavity dwelling wildlife, and are known to frequent the same trees and areas repeatedly.

## **Fish**

### **Affected Environment**

The affected environment for analysis of the Proposed Action is the same as for all alternatives. It consists of the harvest units of the Proposed Action, and all associated skid trails, landings and low standard haul roads. There are several streams located in the project area. These are described in more detail in the Soil and Hydrology issue section of this document.

The affected environment includes all the watersheds with proposed harvest units located throughout the north half of the forest. Loss of stream habitat and degradation of fisheries habitat and aquatic biota are the parameters of concern for the analysis. Fisheries resources have been degraded by historic land use practices in these watersheds. Road construction and maintenance, residential and commercial development, and loss of riparian areas from forest management and agriculture have been the largest factors causing degradation of stream ecosystems. Except for road maintenance, all other activities occur on private lands in the watersheds. On National Forest lands, there has been increased emphasis on watershed protection and restoration in recent years. This effort has also included a priority to protect, restore and enhance stream habitat and aquatic biota. We have also developed successful partnerships with other agencies and conservation organizations that share similar watershed and habitat restoration goals.

Today on the Forest, riparian areas continue to recover from early 1900s logging and agricultural practices that left many riparian areas devoid of vegetation. Current GMNF S&G's and desired future conditions will allow for riparian forests and a "natural wood regime" function (trees/wood entering stream channels) to recover in stream ecosystems. This is not always the case on adjacent private lands where lack of riparian (stream bank) vegetation continues to be identified by citizens and local community watershed organizations in most watersheds as a major cause of soil erosion and channel/bank instability that contribute to both water quality and habitat degradation.

Many stream habitat restoration and fisheries enhancement projects have been implemented in project area watersheds. These projects will, cumulatively and over the long term, enhance stream/riparian habitats for fish, macro invertebrates, and other aquatic biota, and improve ecosystem integrity. Some examples are: stream bank stabilization, riparian re-vegetation and addition of large woody debris to improve habitat quality and channel morphology in sub-watersheds of the Middlebury and White Rivers.

Fish habitat and population surveys have been conducted in all watersheds (Mad, Middlebury, New Haven, and White Rivers) associated with the project. Brook trout is the main species found in streams within the project area. Trout abundance generally averages over 1000 per mile in most streams. Since 1990, a range of approximately 500 to 3000 trout per mile has been documented through annual monitoring in this part of the Forest. Slimy scuplin, Blacknose dace, and Longnose dace have also been found in Blue Bank brook and the South Branch Middlebury

River. Limited numbers of Rainbow trout have been documented in the upper Mad and White River watersheds. Also, a few anadromous Atlantic salmon have been observed in Clark brook, a tributary to the White River. Salmon are not stocked in Clark Brook but are stocked in downstream locations in the White River. Juvenile salmon often move upstream to seek available habitat, particularly during their second year in a stream and as seasonal habitat requirements change.

Fish habitat in area streams can be characterized as good based on habitat surveys conducted over the past ten years. Survey analyses and summaries indicate that there are opportunities to enhance fisheries habitat. However, these streams are currently a lower priority based on forest-wide needs, and will not be pursued at this time. Water quality and riparian areas are also in good condition. Recent macro invertebrate (aquatic insects) monitoring by VTDEC indicate good ecological integrity in streams located in headwater areas including the project area.

Fishing for brook trout is locally popular in many project area streams. Stream populations are maintained through natural reproduction and fluctuate annually based on variety of biological and environmental factors.

### **Direct and Indirect Effects**

Timber harvesting activities with the Proposed Action would have negligible effects on stream habitat and aquatic biology. There is likely to be a small amount of soil erosion but we know the extent would be very limited for several reasons. First, the items listed in the mitigation measures section works to minimize erosion and stream sedimentation. These measures have been successfully used in recent sales.

Second, previous monitoring of timber harvest effects on Soil, Water and Fisheries Resources on the GMNF by Forest Service and VTDEC personnel showed that S&Gs and mitigation measures were effective in protecting water quality, stream habitat and fish and macro invertebrate populations (refer to specific information contained under Issue 5 – Proposed Action, Direct and Indirect effects section).

Additionally, Forest Plan S&G's for fisheries resource protection would be implemented. The most important S&G's for this sale are: stream filter strips to keep harvest activities away from stream and stream banks, preventing sedimentation and associated degradation of critical spawning and rearing habitats for aquatic biota; protecting habitat quality by providing a vegetative canopy over streams for maintaining desirable stream temperatures; retaining large diameter trees in riparian areas for future recruitment of organic matter and large woody debris to provide habitat diversity in stream ecosystems; maintaining fish passage in perennial streams through bridge construction at locations where stream crossings are proposed. A sale administrator would also visit the sale periodically to assure that S&G's are implemented and effective, and apply immediate corrective measures if problems were identified.

Based on this information, the direct and indirect effects of the Proposed Action on Fisheries and other aquatic resources would be minor.

### **Cumulative Effects**

The cumulative effects analysis area would be the same as that described for the affected area. The direct and indirect impacts of the Proposed Action on the Fisheries and Aquatic Resources

would be minor, adding little or nothing to the overall cumulative input. Over the long term, we expect these minor adverse effects to be offset by the positive effects of our past, present, and future watershed restoration and stream habitat enhancement projects. One unit from this project would occur near Perkins brook in Rochester. Perkins Brook is a tributary to Bingo Brook. Harvesting is planned to occur on the west side of Bingo Brook as part of the future Old Joe project. Because of distance between harvest units, probable differences in timing between harvests, and use of mitigation measures like stream filter and buffer strips that are proven to work, the harvest from this project coupled with those from the Old Joe project would not create negative impacts to soil or water. In addition there is no large-scale timber harvesting, or other projects we are aware of occurring on adjacent private land. Therefore, based on past, present and future conditions, implementation of the Proposed Action would not result in cumulative adverse effects to fisheries and aquatic resources.

## Botany

### Affected Environment

The affected environment consists of Northern hardwoods, Northern hardwoods mixed with spruce, sugar maple stands, and red oak stands. The forest canopy in these Northern hardwoods stands generally consists of sugar maple (*Acer saccharum*), American beech (*Fagus grandifolia*), and yellow birch (*Betula alleghaniensis*), with other species occasionally mixed in. Common understory plants of these stands include Jack-in-the-pulpit (*Arisaema triphyllum*), Canada mayflower (*Maianthemum canadense*), foamflower (*Tiarella cordifolia*) shining clubmoss (*Huperzia lucidulum*), evergreen wood fern (*Dryopteris intermedia*), and Christmas fern (*Polystichum acrostichoides*). Richer sites, and also sugar maple stands, often include some basswood (*Tilia americana*) and white ash (*Fraxinus americana*) in the overstory, and blue cohosh (*Caulophyllum thalictroides*), wild ginger (*Asarum canadense*), and maidenhair fern (*Adiantum pedatum*) in the understory. The most enriched of these Northern hardwoods and sugar maple sites may provide potential habitat for a number of plants on the Regional Forester's Sensitive Species (RFSS) list. Hardwoods mixed with spruce have a strong red spruce (*Picea rubens*) component, and generally a less diverse understory; these are not usually good potential habitat for any of the plant species on the RFSS list. The red oak stands that are part of this project show some signs of enrichment. Red oak (*Quercus rubra*), American beech (*Fagus grandifolia*), red maple (*Acer rubrum*), and white birch (*Betula papyrifera*) are the common trees in the overstory, while wild sarsaparilla (*Aralia nudicaulis*), blue-stemmed goldenrod (*Solidago caesia*), witch hazel (*Hamamelis virginiana*), and maple-leaved viburnum (*Viburnum acerifolium*) are common in the understory. These sites provide potential habitat for some plants on the RFSS list. Some of the stands in this project also include small wetlands that would be excluded from sale activity, as a mitigation measure.

### Direct, Indirect and Cumulative Effects

Based upon the analysis of effects in the BE, determinations were made that although the activities associated with the Proposed Action may impact individuals or habitat for 19 Sensitive plant species, they are not likely to contribute to a trend towards Federal listing or to a loss of viability to the population or species. Four mitigation measures for plants have been suggested, which are discussed in detail in the BE (see Appendix I). If mitigation measures are followed, no direct, indirect, or cumulative effects to any plants on the RFSS list would occur.

## Wildlife

### Affected Environment - Wildlife

The affected environment consists primarily of Northern hardwood communities including Northern hardwoods mixed with spruce and sugar maple stands. It also includes red oak and red oak-Northern hardwood communities. The various stands have a past history of timber management and disturbance. The affected environment for the Proposed Action is the same as for all alternatives. It consists of the harvest units of the Proposed Action, and all associated skid trails, landings and low standard haul roads. There are several streams located in the project area. The Proposed Action consists of completing the overstory removal on 266 acres across a larger landscape. The wildlife environmental consequences section will be separated into six categories, Threatened, Endangered, and Sensitive Species, Management Indicator Species, Reclusive Species, Neotropical Migratory Songbirds, Management in MA 4.1, and Snags and Down Woody Debris.

### THREATENED, ENDANGERED, AND SENSITIVE SPECIES

A Biological Evaluation (BE) was prepared for Threatened, Endangered, and Sensitive (TES) Species for the Overstory Removal Project. This document can be found in Appendix B. The BE involved a pre-field analysis of available information, followed by field review of all stands proposed for any kind of activities, including timber harvest. The BE is the document wherein the likelihood of occurrence, habitat needs, disclosure of effects for all alternatives, and determination of findings regarding TES species is displayed. A summarization of this information for wildlife is presented below. The BE for this project has determined that no Threatened or Endangered Species (T&E) will be negatively effected by this action and implementation will not jeopardize continued viability of any Regional Foresters Sensitive Animal Species (RFSS), nor lead to the listing and protection of a RFSS under ESA.

### TES Animals

One Endangered species (Indiana bat) and one RFSS (Eastern small-footed bat) were identified as possibly having potential roost sites near or in the project area.

Recent studies of Indiana bat migration from the Barton Hill Graphite Mine, Mineville, NY has revealed that the migration to summer roost sites is shown to be between ten and twenty five miles. During spring detection, none of the migrating bats tracked in 2001 and 2002 occupied the GMNF. The spring 2002 detection survey flew the western slope of the Green Mountains from Burlington to Rutland covering most of the Middlebury Ranger District. The occurrence of the tracked female Indiana bats in 2002 found that they occupied lower elevation sites (< 1000') and the Vermont habitat was a landscape dominated by semi-open agricultural lands with the forested portions of the area a secondary feature of the sites. Some of the Indiana bats also preferred to roost close to the edge of the open fields. The New York sites didn't have the same dominance of active agriculture but the roost sites were at similar elevations, near smaller open areas and evidence of past or current agriculture was present.

A single male Indiana bat (*Myotis sodalis*) was caught on the extreme western edge of Compartment 46, Middlebury, VT in 2001. It was tracked to a roost tree in a managed oak and Northern hardwood stand about ½ mile west of stands 11 and 21. The roost tree was a dead red maple in a small opening that had been girdled as part of a previous thinning to improve growing conditions for oaks and other valuable hardwoods. This male Indiana bat was determined to be

roosting about ½ mile outside of the project area. Exit counts where this bat was roosting found that no other bats were roosting with the male Indiana bat. Solitary males can have larger ranges than females and this could explain why this bat was near GMNF lands while females remained in the valley.

Surveys conducted within ¼ mile of stands 11 and 21, using US Fish & Wildlife Service's netting protocols, did not locate any Indiana bats in 2001. Spring migration monitoring in 2002, when radio-tagged Indiana bats were followed from their hibernaculum, found no Indiana bats migrating into the GMNF. These radio-tagged bats settled six or more miles west of the edge of the National Forest. All of the Middlebury Ranger District as well as areas north and northwest of the GMNF were flown during the detection flights in 2002 with no signals found in the Green Mountains. Summer, 2002 surveys were conducted near known roost trees approximately 3 to 4 miles west of the edge of GMNF lands with 2 female Indiana bats and 1 Eastern small-footed bat being caught along the Middlebury River netting site. Surveys conducted further upstream on the Middlebury River near GMNF lands and Compartment 50 (Toll Road), of the project area only caught the more common little brown and northern long-eared bats. Surveys conducted on and near GMNF lands in Compartment 65 (Bryant Mountain), of the project area caught three Eastern small-footed bats and one female Indiana bat.

Radio telemetry protocol has not been established that would insure safety to tagged Eastern small-footed bats and also to biologists or volunteers tracking the bats so no transmitters were attached to the small-footed bats. A radio transmitter was attached to the female Indiana bat to help establish roosting habits for that individual. Preliminary results show that the Indiana bat traveled to the Bryant Mountain site (Lake Dunmore 2 net site) from the same woodlot in Salisbury used by other Indiana bats in 2001 and 2002 (Kiser and von Ottengen; pers.comm.). There is a 3 ½ mile unobstructed travelway from the roost area to the net site where the Indiana bat was captured. Extensive telemetry work within a 2 ½ to 3 mile area around Bryant Mountain has discovered that this Indiana bat is roosting where other Indiana bats have been found in Salisbury and not close to where it was caught (Burbank pers. comm). This new information reaffirms data that has been collected showing that low elevation agricultural woodlots within the Champlain Valley are important Indiana bat roosting areas. This particular area in Salisbury may be very important to Indiana bats since it is known that Indiana bats migrate from a known hibernaculum in Mineville, NY to the site for the summer, preferred summer roost trees are present and these trees can hold many bats, pups have been caught at the site, an Indiana bat hibernating in the Brandon Silver Mine in the winter of 2002 had been caught and tagged at the site in 2001, and the female Indiana bat caught at Bryant Mountain was found to roost at the Salisbury site.

Current or recent forest management is evident at most of the roost sites. Road networks within the wooded stands are extensive and remain open either through mowing, repeated entries, or ATV use (Burbank pers. comm.). Efforts are continuing to look at canopy closure, stand composition, and light levels at these identified sites to better understand summer roost sites in the Northeast. Efforts to more closely follow Forest Plan vegetation management guidelines that create a mosaic of age classes with large upland opening habitat along the western edge of the Champlain Valley may allow Indiana bats to extend their range to the east. The loss of multi-age forests with high snag numbers, pesticides, and pollution are problems that may likely contribute to further population decline. Active forest management, creating habitat conditions similar to those found at and around known roost sites may improve habitat along the western edge of the

GMNF lands. Changes in management direction to increase multi-aged forests with large open areas on the western portions of the GMNF would move the forested habitats closer to what is used by Indiana bats. There are currently no projects planned that could address these types of habitat improvements.

Documented occurrences of Indiana bats and as of yet undocumented occurrences of both Indiana bats and Eastern small-footed bats (2002 Final Report not completed), within the Compartments 46, 50, and 65 part of the project area during the summer are known. None of the other TES (T&E or RFSS) species tracked for the GMNF are known to have documented occurrences within the project area.

### **Direct and Indirect Effects**

Potential habitat (roost trees) exists in the project area for one federally listed species (Indiana bat) and one RFSS (Eastern small-footed bat). As stated in the Biological Evaluation (Appendix B), it has been determined that both these species are “unlikely to occur” in the project area during winter months when the project is implemented, and that for the Regionally Sensitive species, implementation of the Proposed Action or any of the alternatives will not likely contribute to a trend towards federal listing or a loss of viability to the population or species. It is possible that Indiana bats may be present near the Compartments 46 and 65 part of the project area during the summer and Eastern small-footed bats may be present in the Compartment 65 part of the project during the summer.

Indiana bat roost sites may be improved along the forested edges of the OSR stands since travel way conditions, (open skid trails) into the adjacent stands will be unrestricted by low to medium level brush following treatment. Potential future roost sites caused by the overstory trees declining and eventually dying will be reserved. Approximately 5 to 7 trees per acre will remain within the OSR stands. Corridor conditions more closely resembling those found in stands containing Indiana bats. The shelterwood stands within the project area provides good foraging areas. The project area is also further than five miles from known hibernacula and activities will be implemented during hibernation.

The Reasonable and Prudent Measures and Terms and Conditions found in the *Biological Opinion of the Effect of the Land and Resource Forest Management Plan and Other Activities on Threatened and Endangered Species in the Green Mountain National Forest and Incidental Take Statement* issued by the U.S. Fish and Wildlife Service on February 16, 2000 would be followed. In order to comply with the Fish and Wildlife Biological Opinion, analysis of effects for these two species was carried forward because it has been determined that Indiana bats and Eastern small-footed bats are possible within the project area. The possibility of occurrence is limited to the summer and most likely limited to the Compartment 46, 50, and 65 stands within the project area.

The Proposed Action or any of the alternatives will not change the foraging potential of the N ½ OSR stands. The most potential future roost trees would be available in Alternative A, the No Action Alternative. Reserving all the trees does not necessarily equate to actual roost sites and following the Reasonable and Prudent Measures and Terms and Conditions stated above will maintain possible roost site habitat in the future. The project will have no positive or negative effects to hibernating Indiana or Eastern small-footed bats. Potential roost trees adjacent to the project area will be available to bats until they are no longer useful (tree falls down or bark falls

off). The LRMP standard and guideline to reserve at least 5 trees per acre as suitable or potential roost trees will maintain potential roost sites within the project area. Bats may be indirectly affected by the removal of former roost trees similar to when roost trees fall down. However there is no indication that Indiana bats or Eastern small-footed bats are currently using the OSR stands. Completing the proposed project will not prevent bats from occupying the project area in the future.

### **Cumulative Effects**

Past timber harvesting activities in or adjacent to the N1/2 OSR project area, including those areas in the vicinity of the Silver Mine, have been very small in scale and have done little to increase suitable habitat for Indiana bats. The forest has been growing, stand densities have been increasing, and little early successional habitat or open areas have been created.

As has been described above, the proposed harvesting for the N1/2 OSR Project would only slightly increase the amount of suitable habitat. None of the action alternatives would provide the habitat necessary to attract Indiana bats on a permanent basis. The N1/2 OSR Project also lacks two very important roost tree species, dead American elm and shagbark hickory.

The North Half Overstory Removal Sale (N1/2 OSR) is not a typical project area and is small shelterwood removals spread across the Northern Half of the Forest. Future harvests can be expected to be similar in size and scale to the Old Joe project. The implementation of the Old Joe project on National Forest land, and the possible return entry to the Old Joe Sale in about seven years to remove the overstory from the proposed shelterwood harvest in stand 19 of compartment 158 are the only foreseeable actions within the area. The Old Joe project would impact 313 acres and the reentry into Old Joe for the overstory removal would impact only about eight acres, and since it would provide little or no additional open area, would have no impact. The N1/2 OSR sale is a proposed series of final harvests of past shelterwood sites and likewise, would result in no impact, positive or negative.

We can also expect some small-scale future harvesting to occur on private lands. There are no large industrial private timberlands in the project area. Any timber harvesting done on these small private lots would most likely be not greater in size and scale than the Old Joe or the N1/2 OSR proposals, and therefore result in little or no measurable impact.

In conclusion, the overall cumulative effects on habitat conditions would show a continued decline in foraging habitat as the project area and nearby areas grow more forested with higher stand densities. The continued lack of, and further decrease, in early successional habitat and open areas would limit feeding and movement. Of greater consequence to Indiana bats is the current and expected condition of agricultural lands in and around the GMNF. As the GMNF habitat conditions continues to move further away from the known preferred Indiana bat habitat such as that found in the Champlain Valley region (open stand conditions where sunlight reaches roost trees; forest edges; early successional habitat and forest openings; mixture of forested areas and open or semi-open areas interspersed with past or present agricultural areas), it is highly unlikely that the population will expand into the project area.

### **Management Indicator Species**

The Management Indicator Species (MIS) program is designed to assist with assessment of Land and Resource Management Plan (LRMP) implementation. MIS can be equated to a coarse

screen monitor of Forest Service's requirement to provide for a diversity of plant and animal communities, the coarse screen being a wider, broader scale perspective of plant and animal diversity as measured by MIS. In conjunction with our Threatened, Endangered and Sensitive (TES) species program, which is thought of as the finer screen that provides a closer detailed look at TES species, we are able to assess how LRMP implementation may affect biodiversity at a variety of levels. Looking at forest-wide trends of MIS as a result of management actions and, more importantly, the habitat community they represent, also provides the resource manager with one means to help determine the status of the Forest's vertebrate community as a whole, as well as the status of the various wildlife species that each MIS is a proxy for. MIS analysis also helps the resource manager predict the relative significance of proposed management practices to fish and wildlife at the project level, and at Forest level when combined with similar actions in different places (ie. over a more expansive scale).

Our MIS program has identified 14 communities of importance for the animals of the Green Mountain National Forest (GMNF), as shown in Table 8. For each of these communities, we have identified a vertebrate species that occupies and relies upon each respective community.

**Table 8. Management Indicator Species And Associated Habitats**

<b>Management Indicator Species</b>	<b>Habitat Community Represented</b>
Chestnut-Sided Warbler	Hardwood Sapling
Barred Owl	Mature Hardwood
Snowshoe Hare**	Regenerating, Young Softwood
Blackpoll Warbler	High Elevation, Mature Softwood*
White-Tailed Deer**	Low Elevation, Mature Softwood
Ruffed Grouse**	Regenerating, Young Aspen And Birch
Beaver	Aspen And Birch
Yellow-Bellied Sapsucker	Mature Aspen And Birch
Gray Squirrel**	Mature Oak
American Woodcock**	Upland Opening
Brook Trout	Stream
American Bittern	Marsh
Peregrine Falcon	Cliff
Tree Swallow	Beaver Flowage

\* Green Mountain National Forest is a population source or provides a unique habitat community

\*\* Green Mountain National Forest is increasingly important for recreational hunting

We continue to monitor both the availability of these communities on the GMNF, and population trends of the respective vertebrates that utilize the communities. Population trends of these 14 vertebrates can be assessed at a variety of scales; Forest-wide, Statewide, and region-wide (northern New England). Population trends of MIS across large scales are very difficult to determine with certainty. The intent of the MIS program is to compare assessments at these differing scales to determine how LRMP implementation affects biodiversity, as represented by MIS, within the Forest, State and northern New England region, and then look to see, at any

particular size and scale, whether or not any project level habitat manipulation can be expected to produce a change to these larger scale population or community availability trends.

**Trends in Populations And Associated Habitat Communities**

The GMNF is split between two physiographic areas, Northern New England (27) and Eastern Spruce-Hardwood Forest (28). The Northern New England area includes southern Maine, southern New Hampshire and Vermont, western Massachusetts, and New York's Taconic Highlands. The Eastern Spruce-Hardwood Forest, the largest physiographic area in the Northeast, ranging from the coastal plains in Maine and the Maritime Provinces to the high Appalachian peaks in the White Mountains of New Hampshire and Green Mountains of Vermont.

MIS population and habitat community trends shown in Appendix E reflect both physiographic areas. These trends are summarized in Table 9. Habitat community and population trend information can be found in Appendix E.

**Table 9. Trends In MIS Populations And Habitat Communities They Represent**

MIS Species	Population /1 and Habitat Community Trends /2					
	New England		Vermont		GMNF	
	Population	Habitat	Population	Habitat	Population	Habitat
Chestnut-Sided Warbler	-* 27 & 28	?	-*	? **	?	? **
Barred Owl	+27, +**28	?	+	? **	?	? *
Snowshoe Hare	?	?	?	?	?	?
Blackpoll Warbler	?27, -**28	?	-*	?	+**	?
White-Tailed Deer	?	?	?	?	?	?
Ruffed Grouse	-**27, **28	?	?	?	?	? *
Beaver	+** 27 & 28	?	+**	?	+**	?
Yellow-Bellied Sapsucker	0	?	+**	?	?	? **
Gray Squirrel	0	?	?	?	?	? *, ? A
American Woodcock	-* 27 & 28	?	+	?	?	?
Brook Trout	- 27 & 28	?	0	?	0	?
American Bittern	-	?	+	?	?	? A
Peregrine Falcon	+	?	+	?	+	?
Tree Swallow	0	?	+*	?	?	?

/1 -\*\* = significant decrease; -\* = moderate decrease; - = decrease;  
 0 = stable; + = increase; +\* = moderate increase; +\*\* = significant increase;  
 ? = trend uncertain

/2 ? = habitat increasing; ? A = habitat increasing through purchase;  
 ? \* = moderate increase; ? \*\* = significant increase; ? = stable habitat;  
 ? = habitat decreasing; ? \* = moderate decrease; ? \*\* = significant decrease

**27 = Northern New England; 28 = Eastern Spruce-Hardwood**

Because the ranges of MIS species extend well beyond the GMNF boundary, and can be found throughout Vermont and the northern New England region, any single project implemented on GMNF lands holds virtually no significant change to availability of habitat for the species. Similarly, because all of our MIS except for peregrine falcon are abundant, any single project is not likely to alter populations for the Forest, State or region. An assessment of how MIS populations are expected to respond to a range of LRMP alternatives can be found in the EIS for

LRMP analysis [Draft EIS pages; 2.50-2.61, 3.14-3.15 and 4.60-4.63]. These population predictions are related directly to community availability of each LRMP alternative (Appendix E. N1/2 OSR).

### **Direct and Indirect Effects**

Looking at the direct and indirect effects of proposed management actions on forest resources, such as MIS, at the project level through the NEPA process answers localized concerns. What is most important, as noted above, is integrating this small piece of information into the broader scales.

The proposed N 1/2 OSR project will not alter acreage of any of these 14 communities. The hardwood and oak sapling communities have been established by completing the initial shelterwood regeneration cuts many years ago. Removing the remaining overstory trees in those affected stands will not change the community type. Likewise, at the larger scales such as watershed or Forest-level and beyond, there would be no change to community habitat amounts or availability trends. Since community availability would not change, populations of MIS using those communities would not be affected by the proposed management activities of the N 1/2 OSR project. The only changes likely to occur to populations would result from migration or immigration since MIS are mobile. This type of change would not affect population trends at the local level, or at the Forest, State or regional scales.

In conclusion, the Proposed Action or any of the alternatives to the Proposed Action will not change the habitat character of the harvest units or the communities they belong to. Therefore, there would be no measurable direct or indirect effects on MIS populations or habitat communities with the implementation of the N 1/2 OSR project.

### **Cumulative Effects**

Since there would be no site-specific effect to MIS, there would be no additive cumulative long-term effect as a result of the N 1/2 OSR project to MIS populations or community availability. However, some general habitat trend observations can be made.

Continuing to develop projects at the scale of the N 1/2 OSR project will be beneficial to species requiring mature forests since those habitat communities are increasing on the forest as well as regionally. Disturbance dependent species will continue to be impacted by habitat loss unless more intense integrated forest management is proposed which would maintain a wider distribution of communities and age classes. Clearcutting, which is a controversial issue to some publics, is being practiced very sparingly on public lands and when applied, size limitations do not allow an increase of suitable regenerating hardwood and oak habitats within project areas of any more than 1/2 of one percent.

At the same time, mature habitats will increase by one to three percent in the same area over the same time period. This helps MIS species like barred owls, yellow-bellied sapsuckers, and blackpoll warblers and their variants but puts species like chestnut-sided warblers, ruffed grouse, and snowshoe hare and their variants at risk of losing habitat. In some areas regionally, these habitat communities are currently found on private land but as has been shown in other areas with declining emphasis on integrated forest management or agriculture, the availability to these communities is temporary and land management objectives to maintain important communities on private land cannot be controlled. This decline or loss of young, early successional habitat

communities on private land will further increase the needs to provide these young community types on public land.

### **Reclusive Species**

Reclusive species that currently inhabit the GMNF (e.g., black bear, fisher) have stable populations. Other reclusive species such as those discussed in the TES section, gray wolf, mountain lion, and Canada lynx are not known to occur on the GMNF. In the previously completed shelterwood cuts, some species that use this habitat community most likely use the stands proposed for treatment. Physical evidence indicates that black bear and fisher are present in the project area. Species would continue to use or avoid the stands following implementation of the overstory removal proposal similar to the way they are currently using the stands and project area. Leaving or removing all the overstory trees will not affect how these species use or don't use the areas.

Species that tend to avoid contact with humans, such as fisher, would choose not to use the area during project operations. Migratory species, in general, and hibernating species would also not be affected during winter operations. Since these stands are small in size and also spread out over a larger area, impacts to reclusive species would be minor and only for a very short period of time. Avoidance is easily accomplished with a largely undisturbed landscape around the OSR stands within which these animals can roam. Reclusive species also have the ability to move or feed at night, avoiding interacting with humans.

The removal of the overstory trees within the project area as described in the Proposed Action would allow human disturbance to occur within the cutting units during the winter. Unlike other Forest Service projects which are designed within sub watershed or compartment sized areas, the N1/2 OSR will treat nineteen separate stands spread across a larger area. This further isolates each treatment area and reduces the impacts of human disturbance of area sensitive species. Each stand is between five and twenty eight acres and will require a short duration of time needed to complete the harvests.

**Black Bear.** The black bear in Vermont is a species sensitive to human disturbance and prefers remote habitats (Blodgett, personal communication). It is an omnivorous feeder relying heavily on soft mast such as fruits and berries; hard mast such as beechnuts and acorns; herbaceous matter such as grasses and sedges; and lesser amounts of meat from carrion, rodents, and insects.

Due to its varied feeding habits, the black bear is adapted to numerous types of habitats such as woodlands, wetlands, fields, and shrubby openings. However, the shyness of the Vermont black bear limits the availability of suitable habitat. A high degree of human presence such as that found around residential developments and high use roads (greater than 1,000 vehicles per day) can prevent bears from using or accessing high quality habitat. Field surveys have shown the project area to be important to bear due to the low level of human intrusion.

Bears utilize several habitat components found in the project area, including wetlands, non-forested openings and beech stands. One limiting factor is the lack of early successional habitat. Early successional habitat is an excellent source of shrubs, soft mast, and grasses. Logging operations that create slash, produced by even age regeneration cuts such as clearcuts and shelterwoods used in the creation of early successional habitats, provide a proliferation of den sites that are preferred sites in extensive managed forests (DeGraaf, personal communications;

Shedd, 2001). Because beechnuts are an important autumn food source, retention and accessibility (for bears) of mature beech trees is essential for continued bear use during the late summer and autumn. Beech that have been climbed by bears are reserved in the project area. Beech is also a component of the understory and those young beech will eventually mature and produce nuts in the fall.

**Fisher.** The fisher is the largest member of the weasel family known to exist in Vermont. It prefers mature coniferous and mixed hardwood-softwood forests. Fisher also inhabit cut over forested areas and old burns. The fisher's diet consists mainly of small mammals, birds, frogs, fish, carrion, and occasionally fruit and nuts. It is the primary predator of porcupines and one of the few predators capable of killing porcupines while escaping damage from the quills. This species, once extirpated in Vermont, was successfully re-introduced during the 1950's. Today, the species is trapped in Vermont for its fur. The fisher is known to exist in the project area.

**Pine Marten.** Martens prefer closed-canopy forests with large trees and large diameter dead and down woody material for feeding, breeding, and wintering cover. They do not seem to favor heavily logged areas or openings during the winter. The marten is generally associated with pole and mature sized coniferous and mixed stands (DiStefano et al. 1990), although some people feel that hardwood stands with scattered softwood pockets are adequate marten habitat (Elowe, personal communications). The project area is dominated by Northern hardwood habitats; softwoods do frequently mix in with these hardwood stands, with occasional stands being dominated by conifers. Martens feed primarily on voles and other small rodents. During non-winter months, they will also feed on a wide variety of other foods such as amphibians, reptiles, insects, birds, eggs, and various fruits and berries associated with open areas and brush fields.

This species was extirpated from Vermont in the first half of the 20th century and is listed by the State as an endangered species (Vermont Fish and Wildlife Department, 1990). The Vermont Fish and Wildlife Department began re-introducing the marten in 1989 into areas that contained suitable habitat. Within the boundaries of the Green Mountain National Forest, 114 marten were released over a three-year period. No martens were released in the North Half Overstory Removal project area, the nearest releases occurring more than 30 miles south of this project area. Surveys, including track counts, track plate and photographic "sets", and visitor interviews have been conducted to determine introduction success. To date, these surveys have been insufficient to determine success, population status or distribution.

**Lynx.** The lynx is a short-tailed cat (like the bobcat), which inhabits the boreal (coniferous forest) belt across Canada. Its primary prey species is the snowshoe hare. It also feeds on grouse, ptarmigan, porcupine, squirrels, deer, beaver, mice and small mammals. Lynx are considered endangered in Vermont, with no known occurrences within the project area, or GMNF. Since this species is not known to exist within, or nearby to, the project area, it will be dropped from further discussion in this assessment for reclusive species. See the Threatened, Endangered, and Sensitive Species effects section and the BE for further discussion.

### **Direct and Indirect Effects on Reclusive Species**

Black bear, fisher, and pine marten are considered "reclusive" due to their tendency to avoid human contact, which is not surprising, given the history of hunting and trapping of these species in Vermont. By definition, these species seek habitats removed from human presence and affects associated with humans (particularly hunting and trapping). The amount of disturbance resulting

from the proposed harvesting activities would be minor. All harvesting would occur in winter months only.

Fisher, which can be active during the day as well as at night, may come in contact with humans during project implementation. Since the marten population, if existing in Vermont, is most likely very low, and since no documented sightings have been made in the project area, the chance of contact between marten and humans during harvesting operations is extremely low.

Black bears would be in hibernation during project implementation. The timber sale is expected to last about two to three years, possibly more if weather conditions preclude normal winter operating. Unseasonable weather pattern can allow bears to move in the winter. The same, unseasonable weather conditions would create a situation not suitable for hauling or skidding and would temporarily close logging operations. The treetops and logging slash left following completion of the activities are an excellent source of future black bear den sites and also provide dead and down woody material on the forest floor. Black bears are known to choose areas such as these for den sites and in a recent study in Vermont, slash piles were the second most common den site used (Shedd, 2001).

Black bears will have the beneficial effect of having more potential den sites to use over the next decade within the project area. The tops and logging slash, and other large woody debris created by blowdown or fallen snags will maintains structure on the forest floor. Black bears will grub for beetles and other invertebrates that use the large woody debris. Unlike other sale areas where seasonal re-entry near harvested stands occurs, once these stands have been harvested they will return to the current level of little or no winter human disturbance.

Given the vast amounts of habitat that would remain undisturbed during the winter months (i.e. no large developments around the project area is National Forest), the reclusive species could easily avoid the particularly small amount of human intrusion caused by the management activities in the proposed North Half Overstory Removal project.

Overall, impacts to reclusive wildlife species associated with human disturbance caused by the proposed harvesting would likely remain unchanged from that currently occurring, due to (1) the small amount and scale of the additional disturbance, and (2) the opportunity for reclusive species to easily avoid any kind of disturbance.

### **Cumulative Effects for Reclusive Species**

The area in general appears to have been attractive to reclusive species in the past. The characteristics of the area show no evidence to the contrary. This is most likely due to the area being fairly heavily forested, mostly in National Forest with little private lands, and having relatively low levels of human use. In turn, past harvests have been small and scattered, and have had little or no impact on reclusive species in or near the project area.

The N 1/2 OSR Project, as stated above, would result in only minor effects to reclusive species. Some of these impacts would be positive by way of an increase in habitat diversity and early successional habitat, and others would be negative by way of potential human disturbance from harvesting activities or recreation (see the Recreation section for discussion of other human use effects of the area).

Future vegetative treatments hold potential to improve the habitat suitability by increasing habitat diversity, and therefore potentially increasing foraging and feeding opportunities. This would help keep the area attractive to reclusive species. The habitat suitability for these species also depends heavily upon the level of human use of the area. Keeping intrusions such as that expected by the OSR project small in scale and temporary over the course of the year (seasonally) and over time, would only result in acceptable minor adverse impacts and would not alter long-term use or desirability of the area. The Old Joe timber sale project under analysis now would have several timber harvest units occur about 1/2 mile from one unit included with this project (Compartment 98, stand 11). The effects of harvesting a single 18 acre overstory removal unit from this project and coupled with the effects of the harvesting in the future Old Joe project vicinity would not create any measurable cumulative effects to reclusive species nor create a significant increase in human disturbance due to recreation or logging activities.

In conclusion, considering past, present, and foreseeable future actions in and near the project area, there would be no significant cumulative impacts to reclusive species from the proposed harvesting activities.

### **Neotropical Migratory and Area Sensitive Songbirds**

The Green Mountain National Forest is concerned about the decline of numerous songbird populations in the eastern United States. In an effort to assess the implications of GMNF management for these birds, Clayton Grove of the GMNF researched and developed a document disclosing the positive and negative impacts associated with GMNF management direction (C.Grove, 1992). This assessment indicates that nearly 60 different bird species are likely to be utilizing habitats within the N1/2 OSR project area; of these 60 species, approximately 2/3 are Neotropical migratory birds. Many of these songbirds prefer, and reach their greatest reproductive potential in, large, contiguous blocks of habitat. The Proposed Action would not impact Neotropical migratory songbirds (NTMB), including area sensitive songbirds, because habitat communities would not be altered. NTMB's that prefer young sapling stands would have begun utilizing the OSR stands as the sapling component was released following the shelterwood treatments. Neotropical Migratory Birds that prefer more closed canopy conditions like those present prior to the shelterwood cut would avoid the OSR stands. Activities that could fragment contiguous blocks of mature forest habitat for some songbirds have already occurred.

### **Direct and Indirect Effects**

The following descriptions come from the Old Joe Environmental Assessment because it has similar actions and effects. It explains how different NTMB's are affected by vegetation management treatments and gives examples of some NTMB's expected to be found within these areas. This background information will also help clarify the expected effects of the Proposed Action. The initial shelterwood regeneration harvest effectively opens the existing forest canopy, allowing more sunlight to reach the forest floor, which results in a growth of tree and shrub species underneath the remaining mature trees. Opening the canopy negatively impacts NTMB species that nest in canopies of mature forests (species like great crested flycatcher and blackburnian warbler). Some species, like the black-throated blue warbler and ovenbird are likely to have habitat conditions improve, as these treatments will encourage understory growth, which are habitat components these species rely upon.

The second harvest (overstory removal) essentially removes a majority of the remaining mature trees growing in a seedling/sapling stand, simplifying the stand habitat diversity to one of strictly

seedlings and saplings with limited, reserved, mature trees. Some species, like the black-throated blue warbler and ovenbird, are likely to lose suitable nesting habitat from the elimination of the overstory. Some species, like the wood thrush would have likely lost suitable nesting habitat following the first shelterwood cut. The removal of the remaining overstory will not reduce suitable nesting habitat and will not effect wood thrushes that would be found in the adjacent forested stands. Other species, like the chestnut-sided warblers and indigo buntings, are likely to find greater quantities of suitable habitat after removal of the overstory because their preferred habitats are unshaded shrub and regeneration areas.

The Proposed Action would not impact Neotropical migratory songbirds (NTMB) because existing habitat communities would not be altered. NTMB's that prefer young sapling stands would have begun utilizing the OSR stands as the sapling component was released following the first shelterwood harvest. Neotropical Migratory Birds that prefer more closed canopy conditions like those present prior to the shelterwood harvest would avoid the OSR stands. An example of this would be the wood thrush.

The Proposed Action will occur during the winter when NTMB species are not present. Cavity nesting birds or mammals that use trees with holes in them could lose available cavity trees, however most known cavity trees currently available within the project area are maintained as reserve trees. Forest Plan guidelines require trees to be reserved as "wildlife trees" to help maintain cavity trees within all types of cutting units. Where available, one den tree and one replacement tree per acre would be left. When cavity trees are not present, two replacement den trees per acre will be left. The aging condition of the forest implies that there is not a shortage of cavity trees near the project area. Observations in the project area indicate adequate numbers of potential and actual cavity trees. The requirements to leave wildlife trees as well as bat roost trees will maintain a minimum of five to seven trees per acre within the OSR stands that can be used by cavity dwellers or nesting birds. An indirect benefit of reserved trees is the ability of these trees to provide different benefits to wildlife during the latter part of their life cycle and after those reserve trees have died. An example of this would be when a live cavity tree used by cavity nesters starts to decline or die back. This tree may lose its function as a cavity tree but may then provide a roost site for woodland bats as the tree continues to die. It may maintain roosting areas for bats after it has died until the bark falls off or the tree falls down. Once it has fallen down it would become down woody material until it decays.

### **Cumulative Effects**

In the Assessment of Green Mountain National Forest Management for Neotropical Migratory Songbirds, (C.Grove, 1992), impacts associated with long-term and continued forest management are discussed (see Assessment pages 12 through 20). As expected, some species are likely to find improved habitat conditions resulting from long-term, wide-spread forest management implementation through regeneration of stands by even aged harvesting methods, such as clearcuts and shelterwood cuts. Moderate scale implementation across a small part of the National Forest, such as one quarter to one third of the GMNF land base, would improve conditions for some migratory songbirds. The Green Mountain National Forest Land and Resource Management Plan, 1987, developed a habitat matrix that will improve habitat conditions for songbirds that need seedling and sapling stands. The long-term goal of the Plan within certain parts of the Forest is to maintain seedling and sapling stands by cutting the overstory at a recommended rotation age.

By completing projects where even aged regeneration cutting is used, a management objective that maintains ten percent of the area in a seedling or sapling condition can be met. An example of this management objective can be found in MA 3.1. Subsequently, other areas designated for continuous forest canopy are maintained for migratory songbirds that utilize contiguous forested areas (area sensitive songbirds). The management strategy for these parts of the Forest is to have a continuous forest canopy with trees of all age classes spread throughout the area. An example of this management objective is described in MA 2.1 areas. A third guild of migratory songbirds is one associated with open habitats such as fields, meadows, or shrub openings. The lack of open habitats on GMNF lands, as well as the trends on private land, limit available open habitats. This trend is expected to continue into the future.

As discussed in the Assessment, habitats provided by the GMNF are potentially some of the "highest quality breeding habitats for Neotropical Migratory birds" in southern Vermont, recognizing that conservation efforts for these birds must go beyond the National Forest boundaries. The management of 5% of the land base in Vermont (the total extent of the GMNF), in and of itself, is unlikely to significantly impact populations of any of the songbirds utilizing the Green Mountain National Forest. It is, arguably, of greater importance for the GMNF to be positioned so as to provide habitats that are regionally lacking, or in decline, in particular, early successional habitat, thereby insuring the continued opportunity for birds needing these habitats in the changing conditions of the future.

This single project holds no significant long-term cumulative impacts to NTMB species, including area sensitive species, currently utilizing the North Half Overstory Removal area. The relatively small-scale actions of the past have had little or no impacts on NTMB, other than perhaps a continued decline in early successional, open or semi-open habitats. The North Half Overstory Removal project would not change the habitat communities and therefore, produce no impacts to NTMB populations. Reasonably foreseeable actions are expected to remain small in size and scale in and near the project area, and therefore, would have little or no additive cumulative impact. As discussed above, the GMNF could contribute in the future to those habitats that are lacking regionally, such as early successional habitat interspersed among the forested conditions. It is this that may provide the most beneficial overall long-term cumulative impact.

Some Neotropical Migratory Birds as well as some resident birds would see slight, site-specific, short term benefits from the completion of the N1/2 ORS project because of their habitat association with regenerating hardwood or oak stands. Other NTMBs that are associated with mature forested habitat communities continue to benefit from the available habitat adjacent to the project area. The MIS analysis completed for the Old Joe project (June, 2002) shows that, at the current level of management within the GMNF boundary, mature habitat communities are increasing. Because of the relatively small amount and scale of the proposed harvesting, the effects (either positive or negative) would be minor, and result in no detectable change to the population of any songbird species inhabiting the project area. Because of this finding, there would be no adverse cumulative effects to area sensitive species.

The proposed activities would occur during the winter months and would not conflict with nesting efforts of NTMB species. Those species that prefer mature habitats would find those habitat conditions over much land adjacent to the OSR stands and would be impacted the least. Those species seeking open or brushy areas, and areas of early successional habitat, would find

only little benefit because of the small amount of harvesting that would create these conditions, and the fact that these conditions are also greatly lacking over the entire project area and surrounding forests. This lack of early successional habitat and its impacts to those NTMB species needing those conditions is a concern over the entire GMNF.

#### **Actions In Management Area 4.1**

Management Prescription 4.1 emphasizes Deer Wintering Areas and provides suitable, stable habitat to meet deer needs during the winter. Large stands of trees having the same age are undesirable since little browse is available and the risk of disease would be higher. One of the management priorities for deer wintering areas should be to provide browsing areas within or adjacent to existing deer wintering areas. The previous shelterwood cuts established browsing areas within the stands. The removal of the overstory trees will augment the current available browse by adding tops, stump sprouting and some additional flushes of new hardwood growth within feeding range of white-tailed deer. White-tailed deer are known to feed in areas like this while operations are ongoing and will likely not be impacted by the operations. Where deer wintering areas occur next to the N1/2 OSR stands, the browse created by the treetops left following harvesting will supplement existing browse. Except when there is above average snowfalls, deer will be able to get to this additional food throughout the winter. The overstory removal activities will create some additional regeneration around where the overstory trees have been cut. Some stump sprouting will occur and ground disturbance caused by extracting the overstory trees will knock back a small percent of the saplings. This can create a new flush of hardwood browse important to white-tailed deer and snowshoe hare. This new growth along with the herbaceous material that will revegetate the skid trails is expected to maintain or possibly increase the amount of browse per acre within the project area.

#### **Direct and Indirect Effects within Management Areas 4.1**

Slight changes in available browse for white-tailed deer may occur as a result of the Proposed Action. This increase in browse will be isolated within the stands and will not result in changes to habitat communities represented on the GMNF. This additional resprouting will not produce a measurable increase the acres of regenerating hardwoods but may maintain the stand in a sapling condition for a longer period of time. The Proposed Action, (266 acres) has the greatest potential to maintain winter browse when stump sprouting and sapling regeneration is added to the currently available browse. The stump sprouting and regrowth from cut trees will provide available browse for white-tailed deer further into the next ten-year growing period by implementing the Proposed Action. Further emphasis on even-aged management within the hardwood portions of MA 4.1 stands will maintain and improve winter browse. An increase in projects that provide a variety of age classes in hardwood stands within MA 4.1 will provide quality white-tailed deer habitat.

#### **Cumulative Effects**

Vegetation Management projects that used even aged regeneration treatments and have been completed within the last 15 – 20 years are at a stage now where browse will become less available to deer. Vegetation treatments during the past five years on the Middlebury or Rochester Ranger Districts have not produced the amount of browse through timber harvesting of the previous decade. This decline in regeneration cutting means that browse areas are not being produced to replace those that were created in the 1980's. The only other National Forest Project with deer wintering area improvements is the Old Joe proposal. Hardwood browse will

be created during logging activities. The greatest improvement in available browse will occur within clearcuts, shelterwood cuts, or group selection cuts. Since less than ½ of 1 percent of the Old Joe project area will see an increase of browse and no other actions on public land are anticipated within the next 5 years, there will be a cumulative decrease of browse as these stands mature. There are no actions planned to improve thermal cover within deer wintering areas in the near future and the thermal properties of the wintering areas will be maintained or degrade over time. Actions on private land may produce browse patches during stand improvement such as selection cutting or thinning. The choice and spacing of harvested trees on private land logging operations sometimes creates small open patches where groups of sawtimber-sized trees have been cut. Both of these actions are small or isolated. The cumulative effects will be a decline in available hardwood browse for deer as trees grow out of feeding height. Current white-tailed deer population estimates on GMNF land are less than Wildlife Management Unit Objectives for Area I. White-tailed deer populations on the GMNF are expected to remain stable but will continue to have fewer deer per acre than in other WMU's outside of the Forest. Based on these past, present and future considerations there would be no adverse cumulative effects within deer wintering areas.

### **Snags, Dead Trees, and Down Woody Debris**

Some people are concerned about the impacts of the project on wildlife using snags, dead trees and down woody debris

#### **Direct and Indirect Effects**

The availability of hard and soft snags, dead trees, and dead and down woody material will not decline as a result of the Proposed Action. Standing dead trees and large woody debris are not commercial forest products normally removed during timber harvests. Since dead trees are not removed as forest products here, the continual aging of the forest and the cycle of life and death of trees will maintain the availability of snags, dead trees, and woody debris in the forest.

The N ½ OSR project would not occur during most reptile or amphibian spring migration and would not remove any potential reptile or amphibian habitat. Species that avoid regeneration cuts such as red-backed salamander would have chosen not to inhabit the OSR stands after the shelterwood cuts and retaining or removing the overstory trees at this time will not change this condition. The small size and wide distribution of the OSR stands across a large area will mean that the National Forest lands will continue to provide an area of great size around these stands for reptiles and amphibians. An NEWILD search summary found that 15 out of 17 reptiles and amphibians known to occur on the GMNF of having a home range within the GMNF will utilize the OSR stands in their current condition. No activities will occur in wetlands. Compartment 58, Stand 29 is next to a marshy wetland. Mitigation measures will be in place to protect an adequate buffer strip between the edge of the wetland and harvesting activities. All the shelterwood overstory trees will be reserved within this area. As disclosed in the BE for the N ½ OSR project, if a snag that could be a potential bat roost tree needed to be dropped for safety reasons, it would be done during winter operations and would have no effect to Indiana bat, Eastern small-footed bat, or any other woodland bat species. The need to cut hazard trees within harvesting areas is rare. Loss of any potential bat roost trees as a result of the N ½ OSR project to returning bats would have the same effect as if the tree fell over during the winter.

Random sampling of snags and down woody material within the project area was completed within some of the proposed OSR stands. Two control sites were also sampled to show a comparison between actively managed stands and known conservation reserves. The two control sites were a mature maple-beech stand on Snake Mountain and Middlebury College's Battell Preserve. In addition to a sampling of the OSR stands, a recently harvested clearcut was sampled. Down woody material was separated into three categories; small diameter (2" – 8"), medium to large diameter (9" – 24"), and very large diameter (over 24"). The breakdown in size classes is a way to show short-term and long-term availability of ground structure. The concern that the OSR stands could be lacking snags and down woody debris was not shown to be the case. The size distribution of down material between actively managed and passively managed stands is similar, particularly in the medium to large and very large size classes.

The Battell site, which is a hemlock-red pine community, was the only area exhibiting a very large component of down material. The trees in Northern hardwood communities appear to break down at smaller diameters thus it would be uncommon, even within non-managed hardwood stands, to find very much down woody material over 24 inches in diameter at any given time. A measurable difference in down material between the managed and unmanaged stands is within the small diameter component. The non-managed areas exhibited less understory vegetation and so a smaller amount of this small material is on the ground. Within both control sites, there were areas that could be described as open understories. On the other hand, where site preparation has been completed in the shelterwood and clearcut stands, there is a greater amount of small material is on the ground. Also within the recently cut OSR stands, there is a percent of down material made up of logging slash. Some of this is small diameter material but also some is medium sized and will be available for a longer time. The proposed OSR treatments will add more logging slash to the ground. The reserve tree component that will be left within the OSR stands will also provide large down material in the future. No measurable effects, positive or negative, can be drawn between any of the alternatives.

The numbers of hard and soft snags are similar between the sites. Since snags are not a forest product removed during commercial logging operations on National Forest lands, it is expected that the number of snags in the OSR stands and the number of snags in other areas would not be dramatically different. The sampling of snags within OSR stands and unmanaged stands indicates that this assumption is correct.

### **Direct and Indirect Effects**

Occasionally it is necessary to knock over snags that are determined to be hazardous to people or logging operations. In the few incidents where standing snags need to be knocked over or cut down to avoid unsafe practices and risk of injury, they then become woody debris on the ground. The effects would be similar to natural events where snags fall down. The utility of the standing snag is lost and the structure of woody debris on the ground increases by having an additional down log in the area. Winter operations would insure that summer roosting and nesting is not directly disturbed. The Reasonable and Prudent Measures and Terms and Conditions found in the *Biological Opinion of the Effect of the Land and Resource Forest Management Plan and Other Activities on Threatened and Endangered Species in the Green Mountain National Forest and Incidental Take Statement* will maintain currently suitable and potential roost trees. Over time these potential roost trees will become snags and eventually for some, down woody material. Effects to TES reptiles and amphibians are found in the N ½ OSR Biological Evaluation. Other reptile and amphibian populations will not be negatively affected by the Proposed Action.

## Cumulative Effects

There are no indications that snags or down woody material is lacking. There are no plans to eliminate snags, large woody debris, or other stand structural components currently available to wildlife. The trends are that habitat communities on the GMNF are aging and the amount of mature and over mature forests is increasing. This will increase the amount of snags as trees die and the amount of large woody debris as those trees fall over. Cumulatively, this component of the forested communities will continue to be maintained or will increase.

## Recreation

### Affected Environment

The primary recreation activities occurring in the project area are driving for pleasure, hiking, hunting, cross country skiing and snowmobiling. State Route 125 from East Middlebury to Hancock is designated as one of two Vermont Scenic Highways. Forest Roads (FR) 54, 55 and 101 are important recreational travelways within the project areas. FR 54, between the Towns of Ripton and Lincoln, becomes part of the Catamount Trail, a long distance cross country ski trail, as well as Vermont Association of Snow Travelers Corridor 30 (VAST C30) snowmobile trail during the winter months. The number of skiers on this road portion of the Catamount Trail is relatively low. However, VAST C30 is a high use main artery to the local snowmobile trail system. A scenic drive in the non-winter months, FR 54 provides public access, including Wilderness access, for other recreational pursuits. Forest Roads 55 and 101 in Granville, are part of VAST C100, and also provide access to Wilderness, hiking trails and primitive camping sites, in the non-winter months.

Other trails in the project area include the Widow's Clearing (also a portion of the Catamount Trail), Oak Ridge, Alphonse Quesnel, Emily Proctor and the Bowl Mill Snowmobile Trail. Widow's Clearing Trail is a part of the longer Catamount Trail, and is also open to mountain bikes in the summer and fall months. It is connected with the Water Tower ski trail system. This trail gets a moderate amount of winter use, and very little mountain bike use. Oak Ridge Trail is a hiking trail that also is used by a small amount of skiers and snowshoers during the winter months. Alphonse Quesnel Trail, also known as VAST C7A, is a heavily used snowmobile trail, which passes through the project area on FR 235. This trail has a history of unauthorized ATV and 4WD pickup use. Increased Law Enforcement presence has had an impact in reducing this use, and additional enforcement efforts and monitoring of the situation is planned (see Mitigation Measures section and the Monitoring Plan). Emily Proctor Trail is a low to moderately used hiking trail, with low use in the winter. The access road, FR 201, is not normally plowed, and winter trail use access is from a plowed parking lot located on FR 54 near the intersection with FR 201. The Bowl Mill Snowmobile Trail is a secondary, feeder trail with low use, primarily by a few local people accessing VAST C100 from the village of Granville.

The only developed recreation sites in the project area are trailhead parking lots. These include the Chatfield Parking Lot, located off FR 67, which provides parking for the Widow's Clearing Trail, and for access to VAST Trails in the vicinity. Other lots are, the Oak Ridge Trail Parking Lot, located on VT Rte 125, and the Emily Proctor/Cooley Glen Trail Parking Lot on FR 201.

All the proposed sale units, except one, are within Management Areas (MA) 3.1 and 4.1. One unit is MA 4.2, which provides for semi-primitive recreation experiences. There are no trails or recreation areas impacted by this unit. MA's 3.1 and 4.1 are managed for roaded natural recreation opportunities in an intensely managed but naturally appearing environment. Roaded natural experiences occur in a setting, which offers high levels of interaction with the natural environment, and an equal probability of affiliating with other people. Within roaded natural areas, resource modification and utilization is evident but is harmonized with the natural appearing environment (ROS Users Guide). Vegetation management activities are compatible with roaded natural recreation.

### **Direct Effects**

The sites and sounds of timber harvesting would have a negative impact on some people recreating in the project area in the winter. However, these sights and sounds are consistent with and should be expected in roaded, natural areas (MA's 3.1 and 4.1) and occasionally in MA 4.2 where semi-primitive recreation is emphasized. While the noise of skidders and chainsaws may negatively affect some recreationists to varying degrees based on their distance from the source, the impacts would be intermittent and short-term, lasting only as long as the timber sale, and when the activities are in progress. Snowmobilers should not be affected by these noises, as the sounds of their snowmobiles will probably override any logging sounds.

Forest Road 54 would be plowed from the intersection with FR 59 north to two sale units, a distance of about 3.4 miles. This road also serves as a portion of the Catamount Cross Country Ski Trail and VAST Corridor 30 Snowmobile Trail. Plowing of FR 54 would have a negative impact on these winter trails due to possible mid-season thaws, possible damage to snowmobiles from exposed gravel and rocks on the roadbed, and the danger of log trucks sharing the same travelways as trail users. To mitigate this unsafe situation, several measures would take place. FR 54 is currently being plowed from the intersection with FR 59, north to a private road, a distance of about 2.4 miles, to allow access to a private residence. Only after authorized vehicles are allowed to use the road. The road is plowed under conditions to minimize the impact to winter trail users. It is plowed full road width, including pullouts, for safety considerations, and the plow is raised several inches to keep a layer of snow on the road. 15 MPH Speed limit signs are currently posted at both ends of the road, and at several places along this portion of the road.

Similar plowing conditions and signage would be followed for the additional one-mile of road to be plowed for the logging operation. Large signs would be mounted to warn all road and trail users of logging activities. Additional signs stating that log-hauling operations are underway would be posted each day that loggers are working, and removed at the end of the day. Timber activities would be limited to weekdays only, with no activities occurring weekends, holidays, and weekdays after 6:00 pm. These two sale units would be the first to be cut in order to minimize the impact to one season. These mitigation measures have been effectively used on many timber sales on the GMNF and there has never been a reported accident of any kind involving snowmobiles or skiers and log trucks. The same portion of FR 54 was plowed for several winter seasons during the Spruce Lodge Timber Sale, occurring in the early 1990's, with concurrent skiing and snowmobiling activities without incident.

One sale unit would occur near the Widow's Clearing Trail, and the landing would occupy part of the Chatfield Parking Lot. This parking lot has been maintained to provide winter trail use parking to access Widow's Clearing Trail and VAST C7A. Most of the parking lot would be

unaffected by the landing, and would remain open. The area used for the log landing would be posted closed to unauthorized vehicles during the duration of the timber operation.

Approximately 0.9 mile of the Widow's Clearing Trail, which is also part of the Catamount Trail, would be used to skid logs to the landing. It would be closed to trail users during the logging operation. The Forest Plan (page 4.55) states that when a trail is closed due to management activities, an alternate route will be provided. The temporary alternate route would bypass this portion of the Widow's Clearing Trail by using existing trails through Middlebury College lands and through the Robert Frost and Water Tower trail system. Parking and access would be provided at the Robert Frost Trail Parking Lot and the Robert Frost Wayside Parking Lot. Trail closure signs and logging activity signs would be placed at appropriate locations, including the Chatfield parking lot. Catamount Trail blazes would be placed along the relocated trail. This sale unit would be scheduled to occur early in the sale to minimize the impact to this trail. To maintain a cross-country skiing, and mountain biking, opportunities, the Widow's Clearing Trail would be returned to pre-sale conditions, following the cutting and acceptance of the sale unit as completed, by July 1.

One sale unit would occur near the Emily Proctor Trail, which is a side trail accessing the Long Trail. This trail receives a moderate amount of summer hiking use, and a low amount of winter snowshoe and skiing trail use. As in the previous Spruce Lodge sale, the sale unit landing would be just above the trailhead parking area, on FR 201. Forest Road 201 is not normally plowed and winter trail access is from a plowed parking lot near the intersection with FR 54. Forest Road 201 would remain closed and signed during the logging operation period. The sites and sounds of the timber harvesting operation would be minimal to the winter trail users. Although the sounds of skidders and chainsaws could be heard from the trail, winter use is minimal. Few people would actually be affected by the sounds, therefore this negative effect is considered minimal. The sale unit is not visible from the trail. However, the skid trail would cross the Emily Proctor Trail in one location. The trail would be well blazed from the trailhead past the skid trail crossing. The sale purchaser, representative and loggers would be made aware of the trail by the sale administrator and temporary flagging along the trail location. This sale unit would be scheduled to occur third in sequence to limit the affect on the trail to one season early in the sale.

In order to access five sale units in the Oak Ridge Trail area, the road portion of the trail (FR296), about one mile, would be used for hauling logs. No skidding of logs would occur on the trail. However, one unit would be accessed by directly crossing the trail in one location. Due to the safety concerns of mixing winter trail users and haul trucks on the same road, the Oak Ridge Trail and parking lot would be closed during the harvesting operation. FR 296 is much narrower than FR 54, which would remain open as discussed earlier. Since Oak Ridge Trail is primarily a hiking trail and gets very little winter use, the impact of closing the trail should be minimal. Information and directions to other nearby trails for similar experiences would be posted. Other portions of the Oak Ridge Trail would remain open and could be accessed from other locations. Robert Frost, Water Tower, Wilkinson, Widow's Clearing, and Abbey Pond Trails are nearby and could be used as alternatives.

### **Indirect Effects**

Other winter trails that would be affected by the proposed alternative would be VAST C7A on FR 235, VAST C100 on FR 101, and the Bowl Mill snowmobile trail. Weekend, holiday and

weekday after 6:00 pm restrictions would be used to minimize impacts. Hauling Operations Under Way, Caution, and Speed Limit signs would be posted.

The reopening of old skid trails could possibly increase unauthorized ATV use in the project area. However, the probability of increasing or introducing illegal ATV use into these areas is negligible. This is because much of the project area does not have a history of unauthorized ATV use. Some unauthorized ATV use has occurred within the project area in Compartments 42, 50 and 65 near and around private residences, leased camps and seasonal camps. ATV use occurs on FR 296, the Toll Road, to access private property. Use on the Oak Ridge Trail and within the sale units has not been a problem in the past, and is not likely to increase with the reopening of some of the skid roads. ATV and 4WD trucks have been a problem on FR 235, also known as Norton Farm road and the Alphonse Quesnel Trail. While this road is near stand 2, Compartment 4, these vehicles have not used the skid trail system in unit 2; there is no evidence that reopening the skid trails in stand 2 would increase this use. Gates on FR 235 and near FR 54 are planned for installation during the summer of 2002.

### **Cumulative Effects**

Because the snowmobile trails and the Catamount Trail are connected throughout the north half of the forest, the affected environment for assessing the cumulative effects of sights and sounds of timber harvesting related to the this project is the entire north half of the forest.

Past timber harvesting in the area has had the same sights and sound impacts on the experience on the trail users and other recreationists in the project area. Past timber sales have had an adverse, but minor cumulative effect on the quality of winter trail use in the area. Past sales required the plowing on sections of the snowmobile trail system and on the Catamount Trail. There is no documented evidence that these activities caused a long-term disruption to the recreational use of the area. Recreational users are no longer impacted by these previous activities due to their short duration.

The Proposed Action will continue the trend of providing reduced quality recreation opportunities for snowmobiling and cross country skiing in the area for a short period of time. Mitigation measures as previously mentioned would reduce the duration and degree of impact. Due to the nature of the Proposed Action, no section of any winter trail should be impacted for more than one or two years.

An area currently being analyzed for the proposed Old Joe Timber Sale Project is near one unit of this proposal, (compartment 44, stand 11,) and will affect part of the Chittenden Brook cross country ski trail by the plowing of the road. A temporary bypass trail is part of that proposal, which would reduce the impact of this winter recreational trail and therefore, would have no cumulative effects with these proposed treatments.

## **Visual Quality Objectives**

### **Affected Environment**

The Forest Plan establishes visual quality goals for the management prescriptions within the Overstory Removal project area. These goals are based on criteria defined in the National Forest

Visual Management System Handbook (U.S.D.A. Forest Service 1974). The goals vary depending on whether activities can be seen from certain areas, viewer sensitivity, and the recreation opportunity spectrum (ROS).

The affected environment includes views seen from the roads and trails described in the recreation section above. From onsite views (within ½ mile) as viewed from the Clark Brook Trail, Emily Proctor Trail, Rt. 125 and Rt. 100, the road and trailside zones have a high visual sensitivity and should meet the Retention VQO (Visual Quality Objective). Here alterations made by people are not to be visually evident. Onsite views from the remaining roads and trails such as the Oak Ridge Trail in Compartment 50, have a moderate visual sensitivity and should meet the Partial Retention VQO. Here alterations made by people must appear subordinate within the surrounding natural appearing landscape.

Offsite views (greater than ½ mile) into the project area can be seen from the Long Trail (Mt. Grant and Mt. Roosevelt) and the shelter location on the Emily Proctor Trail. All three vistas are located within the Bread loaf Wilderness. Maintenance of vistas is not permitted in this Wilderness. The vistas at Mt Grant and the Emily Proctor Shelter are growing in, restricting views that were once even more spectacular than now. The vista at Mt Roosevelt is situated on a rock outcrop, which limits vegetative growth. Therefore this vista will likely continue to remain.

From offsite views, the Partial Retention VQO is the goal on the upper part of the more noticeable peaks and ridges in the roaded natural 3.1 and 4.1 M.A.s. On the lower slopes in 4.2 M.A. a VQO of Partial Retention is also the goal. The Modification VQO is the goal on the lower slopes in the roaded natural 3.1 and 4.1 M.A.s. Here, alterations may dominate the original surrounding landscape.

Close range aerial photographs of some of the stands now proposed for harvest in the Proposed Action and alternatives, taken in leaf off conditions during 2001, show the effects of the first stage of shelterwood. In general, from this aerial perspective, these stands show a distinction in texture between them and the uncut adjacent stands. However, there is not a sharp contrast, rather it is a subtle change more noticeable in leaf off conditions. From on site views, these cut stands tend to look more park like in that the remaining trees are well spaced from each other, with new seedling growth scattered between mature trees. Original layout of the stands and subsequent timber harvest were laid out carefully to minimize negative effects of the visual resource.

Evidence of tree stumps from past timber harvest is apparent in these stands. Dead standing trees and some fallen trees are also visible. Some were deliberately left after the 1<sup>st</sup> stage of the shelterwood to provide seed, and to support wildlife while others were created naturally due to old age, wind throw, insects or disease.

The previous harvest of the hardwood stands in this project area thinned out most of the trees and created opportunities for offsite views (temporary vistas) to people traveling on the roads and trails adjacent to them. These include stands 29 and 30, located along the Toll Road and Oak Ridge Trail in compartment 50, Widows Clearing Trail (comp. 69, stand 26), and the 2 stands located along FR 101 (Comp 58, stands 29 and 31). Some of the overstory seed trees that were reserved in the previous harvest, such as large white pines visible about 100 yards to the west from the Oak Ridge Trail in compartment 50, stand 30, provide a big tree component to these

views. As part of any of the action alternatives, some of these pine trees will again be reserved from any of the proposed harvests as wildlife reserve trees and to help maintain the view of these pines as seen from the trail.

### **Direct and Indirect Effects**

All proposed vegetative treatments have been reviewed by the Landscape Architect through field visits, consultation with the District Silviculturist, Recreation Technicians, computer terrain model analysis, and/or map review.

The stand characteristics created by overstory removal are that of a young, dense thicket of seedlings and saplings. With the Proposed Action, as larger overstory trees are felled and logging equipment used for harvesting work in the stands, there will be some unavoidable damage to the young trees in the understory. Some small trees would be snapped off, bent over and damaged. Sometimes the damage affects hundreds of small trees per acre but often the total stocking of young trees in these types of stands number in the thousands per acre. While the short term visual impact is noticeable and not appealing, this effect is within the usual and customary range of effects produced by harvesting Northern hardwoods and oaks via the shelterwood system, which has been widely applied on the Forest. These effects have been discussed during development of the Forest Plan and other recent timber sale NEPA analysis such as Chandler Ridge Sale.

However, the adverse visual impact -\*to these young trees would be short-term because many of these trees would straighten up or resprout quickly. This is because the logging is proposed for winter months when roots are protected. Snow, good skid trail layout, restrictions on size and type of logging equipment, contract penalties for excessive damage to the residual stand and sale administration would help moderate this damage as well. Many of young trees damaged in winter will likely resprout. After about three winters and three growing seasons, the stands recover and this damage is no longer apparent. This has been the case for other stands harvested near roads and trails such as those near the Minnie Baker Trail in Salisbury or the Blueberry Hill ski trails in Goshen and for stands located all around Moosalamoo Campground in Goshen. With overstory removal, not as much tree residue remains on the ground as in a clearcut, since most of the trees were already harvested and therefore the harvest residue has already had a chance to decompose. Also, the seven to ten year old trees are big enough in some cases to screen the ground surface and hide cut treetops.

Original layout of the stands and subsequent timber harvest of the 1<sup>st</sup> stage of the shelterwood were laid out carefully to minimize negative effects of the visual resource.

Although stands proposed for harvest are located near the Clark Brook Trail, Emily Proctor Trail, Long Trail, Rt. 125 and Rt. 100, timber harvest would not be visible from these trails due to such factors as terrain, evergreen vegetation, and the set back from the roads and trails.

The landing for comp 150, stand 3 was used for the prior entry and then closed down. As vegetation has grown up, this old landing is not obvious from the road. During logging operation the landing would be reopened and would be visible to Rt. 100. The landing would be designed with a curved entry to minimize sight of the landing itself. Existing alders and other vegetation that edge the landing on the west side near Route 100 would be retained to screen the landing.

Comp. 44, stand 21 is the only stand in the project proposal that is located in a semi primitive ROS (Recreation Opportunity Spectrum) area. However, the harvest proposed for all alternatives here would not have a negative effect on the ROS or visual quality objectives.

The previous harvest of Comp 58, stands 29 and 31 (along FR 101) and Comp 69, stand 26 (Widow's Clearing Trail) opened up views toward the east. Additional harvest of the overstory in Compartment 69 would allow for better viewing of Bread Loaf Mountain and the main ridge of the Green Mountains. During project layout, the Landscape Architect will determine which trees to reserve along the Widow's Clearing Trail, and Forest Road 101.

In consideration of the private land with camp adjacent to comp 46, stand 11, wildlife reserve trees would be located far enough back from the property line so they would not fall into private property. Although this stand is located along the North Branch Road, it is screened by topography and vegetation along the road. All action alternatives would retain the existing vegetative screening along the North Branch Road.

Visual Quality Objectives would continue to be met under the Proposed Action.

### **Cumulative Effects**

Stand 11, in Compartment 98, located north of Bingo road (FR 41) is northeast about one mile from the area currently being analyzed for the proposed Old Joe Timber Sale Project. Although the Old Joe project is near one unit of this proposal, (compartment 44, stand 11,) the nearest harvest unit from the Old Joe project, a selection cut, is about a mile away from stand 11 and therefore, there would be no cumulative effects with these proposed treatments on the visual resource. We can expect future harvesting to occur on both public and private lands. As with this project, the design and location of future projects would be consistent with Forest Plan direction and meet visual quality objectives. There are no projects on private lands we are aware of that would add to the visual impact of the harvests proposed in this project.

Based on this analysis, there would be no cumulative adverse impacts from the Proposed Action.

## **Issue # 5 – Water Quality, Soil erosion, Hydrology**

One person is concerned about how the timber sale would impact the hydrology of the area, particularly the washing out of roads, given the amount of flooding that has occurred over the last ten years. Will this timber sale cause additional erosion problems?

Some people are concerned about whether the project will have any impact on water quality, and the analysis should include whether such an impact could affect compliance with relevant provisions of the Clean Water Act.

Some people are concerned about nutrient loss in soils as a result of this sale, and that the primary impacts on stream ecology, and the secondary impacts on species dependant on those waters needs to be addressed.

### **Affected Environment**

The affected environment for analysis of the Proposed Action is the same for all alternatives. It consists of the harvest units of the Proposed Action, and all associated skid trails, landings and low standards haul roads. The soil types are shown in a table in the Project file entitled, "Soil Types by Compartment and Stand". The Soil Scientist identified soil types during field visits to most stands. Most soils formed from acid glacial till, are well drained, and deep (have over 40 inches of soil). Some soils have a hardpan (a layer which restricts downward movement of water), and soils are less than 40 inches deep on some ridge tops and steep slopes. Slope steepness generally ranges from 20-40%, and the soil erodibility hazard ranges from moderate to high.

There are several perennial streams (Gulf, Huntley, Blue Bank, Clark and Perkins brooks and South Branch Middlebury and Mad Rivers) and four intermittent tributaries in or adjacent to the projects area (see maps in project file), along with numerous smaller, ephemeral streams and small wetlands. Streams in the project area have good water quality and the riparian areas are also in good condition. The streams are characterized by having narrow, moderate to steep gradient channels containing boulders, rubble, gravel and fine sands. During high flow events, many of these materials are transported downstream to lower gradient or valley bottom stream sections. Riffles and cascades are the pre-dominant habitat types but are interspersed with pools and swift flowing runs as the streams descent in elevation. Streams in the project area are generally stable and not experiencing excessive bank erosion.

### **Direct and Indirect Effects**

The direct and indirect impacts of the Proposed Action on the soil and aquatic resources would be minor. Over the long term we expect these minor adverse effects to be offset by the positive effects of our past, present and future watershed restoration projects

Cutting trees in the harvest units would have negligible effects on the risk of flooding. The scientific literature repeatedly shows that increased peak stream flows from clearcutting do not cause floods downstream (Edwards, 2001). There is little overland flow in forested watershed. Water movement to streams occurs primarily as subsurface flow. Although stream flows do increase for 5-15 years to varying degrees for years following clearcuts, peak flows have little effects on flooding due to the lag time (the time it takes for water to move through the soil to streams). Clearcuts rarely increase peak flows more than 10%. If clearcuts do not cause floods, then a lesser harvest scheme such as the overstory removal harvests, would not cause floods or more road washouts.

The amount of erosion and sedimentation in the affected area would increase, to a small extent, due to harvesting trees. We know the extent would be small for three reasons. First, the mitigation measures (see section on Mitigation Measures Common to All Alternatives, items 1-9) would work to minimize erosion and associated sedimentation. Similar mitigation measures have successfully been used in the past.

Second, all S&Gs in the Forest Plan for protection of the soil and water resources would be implemented. The most important S&Gs for this sale are: stream filter strip guidelines to keep harvest activities away from streams and prevent sedimentation; no logging on shallow soil areas (less than 20 inches deep to bedrock); proper placement and spacing of skid road water bars to control erosion and sedimentation; protecting riparian vegetation near and along stream banks to maintain water quality and aquatic habitat; retaining large diameter trees in the riparian area for

future recruitment of organic material to the stream as sources of nutrients and for creating habitat diversity in stream ecosystems. A Sale Administrator would visit the sale (when ongoing) every 1-2 weeks to assure that S&Gs and mitigation measures are implemented and effective. This person would promptly initiate corrective measures to protect the resources, should unexpected problems arise.

Third, the Forest Service monitored the effects of timber harvest on the Soil, Water and Fisheries Resources on the GMNF, and presented the results in a report entitled, "Soil, Water and Fish Monitoring on Timber Sales on the Green Mountain National Forest, 1992-1999". This report is available in the project file, and can be obtained by calling the Forest Supervisor's Office in Rutland. The monitoring consisted of visual observations to determine if S&Gs and special mitigation measures implemented and effective in minimizing erosion and sedimentation; stream turbidity monitoring before, during and after logging; and surveys to detect changes in macro invertebrate and fish populations, and stream habitat quality due to harvest. Macro invertebrate and some water chemistry monitoring were completed by the State of VT Water Quality Division. The conclusion of the report states:

"Our monitoring showed most S&Gs (for soil, water and fisheries protection) were implemented most of the time; when implemented S&Gs were effective in protecting the soil and water resources; and harvest activities had little or no effect on stream turbidity, macroinvertebrate and fish populations. In general, soil, water and fish resources are being protected during timber harvest."

GMNF S&Gs are similar to Acceptable Management Practices (Amps). Our monitoring results are similar to past tests of Amps (a.k.a Best Management Practices), the results published by the State of Vermont and Forest Service Research (Martin and Hornbeck, 1994; Brynn et al., 1990). Based on this information, the effects of the harvesting associated with this Proposed Action on the soil and aquatic resources (including water quality, aquatic habitats, aquatic ecology) would be minor.

In addition, all streams in the project area are designated Class B water by the State of Vermont. This means they are managed to be suitable for bathing and recreational uses, and acceptable as a public water supply with filtration. Our monitoring of timber sales showed that GMNF S&Gs and Vermont's Amps (described above) are effective in meeting State water quality standards as well as provisions under the Clean Water Act.

Uncertainty exists in the research community about whether harvesting hardwoods, in combination with acid deposition, results in long term declines in the soil nutrients and forest productivity. Calcium is recognized as the nutrient most vulnerable to loss from the soil. Landmark research by Federer, et al. at Hubbard Brook in 1989 showed that calcium losses due to harvest, in combination with losses attributed to acid precipitation, may (with certain soils, tree species, harvest schemes, and acid deposition rates) result in significant calcium depletion over the long term. The research community (FS Research and local universities) recommends no harvesting on soils with low natural fertility (shallow, very wet, or very sandy/gravelly soils). The Proposed Action meets this direction. However, no one in the research community has recommended that we stop harvesting trees on soils of medium to high fertility. Such a recommendation would be premature because many questions remain about calcium levels in the soil, it's cycling in the ecosystem, how other aspects of acid deposition affect forest health, and

how the Hubbard Brook studies relate to other parts of New England (Yanai, 2001). Hardwood forests in Vermont do not show signs of overall decline due to nutrient losses or any other reason. On the GMNF, we have not observed overall decline in forest hardwood health, and harvested stands have regenerated vigorously.

Based on information presented in this section, the direct and indirect effects of the Proposed Action on the Soil and Aquatic resources would be minor.

### **Cumulative Effects**

The analysis area for the cumulative effects includes all the sub watersheds (known as HUC-6 watersheds) with proposed harvest units. This covers much of the north half of the GMNF. Flooding, soil erosion and nutrient losses, and degradation of aquatic ecosystems are the parameters of concern for the analysis. Soil and aquatic resources have been degraded by anthropogenic activities in the analysis area. Road construction and maintenance, home construction, land clearing, agriculture, and loss of riparian areas are the largest factors causing degradation. These activities occur on private lands in the sub watersheds; only road maintenance occurs on National Forest lands.

On National Forest lands, it has been a priority to restore the soil and aquatic resources over the last decade. Many watershed improvement/restoration projects (erosion and sediment control, aquatic ecosystem restoration) have been implemented in the analysis area. These projects will, cumulatively and over the long term, improve ecosystem integrity. Some examples are: stream bank stabilization and removal of old bridges and culverts in the Bingo Brook sub watershed; landslide revegetation and erosion control on recently purchased lands in a sub watershed of the Middlebury River; addition of large woody debris in Middlebury River sub watersheds to improve habitat quality and add organic nutrients to the stream ecosystem and riparian (stream bank) revegetation in sub watersheds of the Middlebury and White Rivers.

Past (since 1980), present, and future cumulative impacts to the soil and aquatic resources have been adverse in portions of the sub watersheds, specifically on private lands (i.e. see VT-ANR White River Basin Assessment Report, GMNF Upper White River Watershed Analysis). These adverse impacts only occur on National Forest Lands to a minor extent, and would be offset by the watershed improvement and restoration projects. The Proposed Action for the North ½ OSR Project would add little or nothing to the overall cumulative impacts.

## **B. Alternative 1 – No Action**

This section summarizes the physical, biological, social and economic environments of the affected project area and the potential changes to those environments due to implementation of the No Action alternative. This section is organized by issue, affected environment, direct effects, indirect effects and cumulative effects. It also presents the scientific and analytical basis for the comparison of alternatives presented in the chart above.

## Issue #1 – Silviculture-Oak management

Some people are concerned about the harvesting of oak because it is uncommon on the forest. They believe that because oak regeneration can be difficult to establish and the acorn crop from oaks is important to wildlife, no oak trees should be harvested.

### Affected Environment

The affected environment is already described in the section titled Environmental Consequences of the Proposed Action.

### Direct and Indirect Effects

The No Action alternative does not propose timber harvest or road construction and has no potential negative impacts on resources due to logging on National Forest. It avoids the issue of potentially causing adverse impacts to natural resources. The opportunity to create beneficial effects for deer wintering habitat that result from implementation of timber management systems using proven harvest methods wouldn't occur, nor would the opportunity to provide social and economic benefits associated with forest management. A mix of even aged, young stands would not be sustained; the culture and production of high quality saw timber and browse for wintering deer would not be achieved. This alternative would not meet the three major components of the Purpose and Need described on page five.

Taking no action would forfeit the opportunity for GMNF to complete the process directed by the Forest Plan to assess timber stand conditions, and implement silvicultural prescriptions resulting in sustainable, multiple use, forest management. Under this alternative the actions of harvesting, and harvest related road use would not take place at this time. Dynamic ecosystem processes that influence stand development, forest succession and animal-habitat interactions would proceed without human intervention. Stand replacement disturbances would take place only through natural events such as windstorms or fires at unpredictable intervals and intensities. Development of desired wildlife habitat such as winter and summer browse for deer, and accelerated development of high quality timber products such as saw timber, would occur at slower rates.

Specifically, No Action would result in abandonment of the Shelterwood system of regeneration for these stands half way through the process. This system is identified in the Forest Plan on pages 4.62, A.04 and N.06 as the process to follow for regeneration of the trees species involved. Young, developing stands of oak and hardwoods would remain shaded and growing conditions would not be improved. Competition between the understory and the over wood for growing space, nutrients and sunlight would continue and be the greatest under this Alternative.

Oak seedlings don't survive or don't thrive for long in shade, and consistent with our observations, would continue to decline in number and vigor until the understory is completely dominated by the more competitive shade tolerant species mentioned earlier (William Leak, personal conversation and memo dated 2/8/02). Unless released from shade and competition most of the seedlings present would not survive.

The health and value of some saw timber and pulpwood trees in the overstory would continue to decline. The opportunity to produce high quality saw timber, pulpwood, and fuel wood for sale at this site would be forgone for this management period.

Oak and other hardwood saw timber; pulpwood or firewood would not be produced and offered for sale to the highest bidder. There would be no revenues generated to help pay into the 25% fund payment to towns for use in roads and schools. There would be no revenues to help defray the cost of this analysis. No timber sale would occur and the efforts and expenditures spent on planning this proposal would end up as a cost to the program.

Where present, oak trees would remain as part of the overstory in these stands and depending on various biotic and abiotic factors, many could develop into large trees and survive for hundreds of years. Whether these trees would continue to grow and remain as high quality saw timber is unknown. These trees would provide mast and habitat for wildlife and viewing opportunities for forest visitors during that time.

### **Cumulative Effects**

Long term sustainability of oak forests in the Middlebury “oak belt” would be hampered. This is because to sustain oak forests over time, we need to provide a mix of young, middle aged and mature oaks stands to sustain the total population of oaks over the long term. Stands with young oak trees would not develop or be maintained as well as with the Proposed Action or Alternative 3. Past timber harvest actions have helped growing and sustaining of new oak stands and oak forests. With No Action old oak stands grow older but would not regenerate new stands of young oak and jeopardize our ability to sustain oak forests over the long term. There is no large scale harvesting being done on public or private lands to regenerate oak.

## **Issue #2 – Archeology**

One person is concerned about impacts of the project on archeological resources, including Native American burial and other sites.

### **Affected Environment:**

The affected environment is already described in the Environmental Consequences to the Proposed Action section.

### **Direct and Indirect Effects:**

The No Action Alternative would have no effect on heritage resources.

### **Cumulative Effects**

Since there would be no direct effects by taking no action, there would also be no overall cumulative effects on Heritage Resources sites if the recommended Mitigation Measures are implemented. Activities in adjacent private lands would continue outside of the control of the FS and would not affect the sites in this project. Forest Service undertakings will be subject to the same restrictions.

## **Issue #3 –Fish, Botany, Wildlife**

Some people are concerned that site-specific analysis within the project areas will not be conducted, and that in order to better assess impacts, site-specific fieldwork needs to be

conducted by agency specialists in the areas of aquatic biology, mammal biology, ornithology, and botany.

One person is concerned that not protecting the project areas will result in the continuing decline of woodthrush.

Some people are concerned about the proposals impact on reclusive wildlife species such as black bear, bobcat and fisher.

Some people are concerned about the impacts of the proposal on the Indiana bat's summer, fall, winter and spring habitat requirements. More specifically, there is concern that removal of the remaining, mature trees will decrease suitable roosting and maternity sites for the Indiana bat because the bat does not use those trees traditionally retained for cavity dwelling wildlife, and are known to frequent the same trees and areas repeatedly.

## **Fish**

### **Affected Environment**

The affected environment is already described in the Proposed Action section.

### **Direct and Indirect Effects**

The No Action Alternative would result in no change to stream and fish habitat conditions in the affected environment, and would result in no adverse effects to aquatic biota.

The No Action Alternative would result in no short-term change to stream habitat and aquatic biota (fish and macro invertebrate populations). Riparian areas would also remain in their current condition and would be a future source of large woody debris to the stream ecosystem. Large woody debris is widely recognized for its role in influencing channel morphology and creating diverse aquatic habitat.

### **Cumulative Effects**

The cumulative effects analysis area would be the same as that described for the affected area. The direct and indirect impacts of the No Action on the Fisheries and Aquatic Resources would be minor as the riparian areas age and stream courses respond to natural changes. Over the long term, barring catastrophic natural changes, we expect these minor impacts to be offset by the positive effects of other present, and future watershed restoration and stream habitat enhancement projects. Therefore, implementation of this alternative would not result in cumulative adverse effects to fisheries and aquatic resources that may occur in other portions of the watershed.

## **Botany**

### **Affected Environment**

This has already been described in the Environmental Consequences to the Proposed Action section.

### **Direct, Indirect and Cumulative Effects**

Based on determinations made in the Biological Evaluation (BE), the No Action alternative is expected to have no direct, indirect, or cumulative effects on any of the 19 plant species on the RFSS list that are known from, or have potential habitat within, the project area. The one possible exception is that any young butternut trees, if they exist at the sites (only old ones were found) would not be released from the shade that can stunt their growth. (See appendix B.)

## **Wildlife**

### **TES Species**

#### **Affected Environment**

The affected environment is already described in the Environmental Consequences to the Proposed Action section.

#### **Direct, Indirect Effects**

No improvements to travelways will result in Alternative 1. The stand composition will remain in their current condition. Suitability for TES animals would stay the same. Slightly more potential roost trees would be available within the project area, in that all potential roost trees in their current condition and would be available to bats until they become unsuitable (bark falls off), or the trees fall down. Although older trees in greater numbers would remain as potentially suitable roosting habitat in the No Action Alternative, other factors would continue to reduce the overall habitat suitable. Particularly the reduced canopy closure of shelterwood stands may limit suitability except within the oak shelterwood stands where residual basal area is higher.

As such, this alternative would not provide some of the conditions that have been observed at known Indiana bat roost sites, and the N1/2 OSR project area may never fully attain the suitable habitat conditions for Indiana bats. Therefore, it is highly unlikely that Indiana bats would settle into the project area. The habitat needed to ensure the continued existence of the species would have to be found elsewhere.

#### **Cumulative Effects**

The No Action alternative holds no affect (either direct or indirect) to T & E species on the GMNF-nor will the No Action alternative lead to the listing of Regional Foresters' Sensitive species under ESA. Cumulatively, assuming that human use patterns (e.g., winter and summer recreational activities) of the GMNF do not change, the No Action alternative holds no long-term affect to T & E species on the GMNF, nor will the No Action alternative lead to the listing of Regional Foresters' Sensitive species under ESA.

### **MIS Species**

#### **Affected Environment**

The affected environment is already described in the Environmental Consequences to the Proposed Action section.

#### **Direct, Indirect Effects**

MIS populations and MIS habitat communities are not changed or effected by the Proposed Action or Alternatives because none the treatments associated with the alternatives greatly changes the structure and stocking of the seedling/sapling stands, rather change is in the amounts of larger overstory trees retained per acre.

### **Cumulative Effects**

Barred owls, blackpoll warblers, yellow-bellied sapsuckers, and associated species will continue to benefit from the continued aging of the forest. The small size and infrequency of vegetation management projects on the GMNF will allow the mature habitat communities to continue to increase while young stands convert to intermediate aged stands. Disturbance dependent species like Chestnut-sided warbler will be adversely affected by the continued loss of suitable habitat on the forest. The current trend of regenerating no more than one-third of the annual Plan Objective is a contributing factor to the decline of young habitat communities on the GMNF. When added to the natural aging process of our forested communities, some species, especially those associated with regenerating hardwood stands, will continue to lose habitat and over the long term may no longer have enough suitable habitat to maintain viable populations on the GMNF. When you also consider that there is no way to insure that this habitat community will continue to be provided on private land, the public lands may become extremely important regionally to the survival of early sucessional habitat dependent species in the future.

The cumulative effect of this No Action relates to the retention of overstory in future shelterwood regeneration as a long-term “pattern” for continued management of the GMNF. For MIS this long-term retention will benefit those species relying upon mature trees for nesting – specifically, Barred Owl and Yellow-bellied Sapsuckers. Retention of these mature trees is not expected to be significant in total numbers, nor in areas in which the retention occurs. These levels are deemed insignificant due to the limited amount of shelterwood harvesting being utilized on the Forest, and due to the limited number of trees/acre actually being retained by eliminating overstory removal - as LRMP Standards and Guidelines for retention of “wildlife” trees already directs that many of these trees be retained. Continued retention of overstory trees, in shelterwood regeneration areas, is not expected to result in detectable changes in populations of any MIS.

### **Reclusive Species**

#### **Affected Environment**

The affected environment is already described in the Environmental Consequences to the Proposed Action section.

#### **Direct and Indirect Effects**

Since there would be no harvesting under the Alternative 1, there would no human disturbance of the project area as a result of harvesting. There would be no disturbance to animals that may be in the project area. In stands that are known to be used by bear and fisher, there are indications that the current condition is acceptable to these species, and that they would continue to utilize the project area. The current level of human intrusion for travel and recreation would continue. As discussed above, black bears, pine marten, Canada lynx and fisher generally benefit from efforts that diversify habitat and increase feeding opportunities.

### **Cumulative Effects**

From a vegetative perspective, No Action will leave the project area in its current condition for the short term. By not removing the older overstory trees, acorn production or availability for wildlife forage would not be affected by the timber harvesting. There would be no changes in light levels or ground disturbance that could help or hinder establishment of early successional plants or plants of concern.

There would most likely be a reduction in optimum growing conditions for young oak as the oak seedlings and saplings die off due to competition for sunlight. This could jeopardize acorn production in future years as over time, oak is lost from the stands and replaced by other more shade tolerant species

From a disturbance perspective, No Action will allow the least amount of disturbance associated with human presence and activity. By not entering these stands, those individual animals seeking avoidance with humans will be least disturbed. The degree to which this alternative differs from other alternatives is very small, due in large part to the very limited amount of acreage involved, that scattered nature of the harvest units, the limited duration that harvest will take place, and the existing pattern of human activity in areas surrounding these harvest units.

Over the long term, assuming that human use patterns of the GMNF do not change, these units are likely to become less attractive to reclusive species seeking habitat diversity. The degree to which use, by species like fisher and black bear, diminishes is unlikely to effect population trends of these wide-ranging species on the GMNF, so therefore there would not be any long term, cumulative effects.

### **Neotropical Migratory Songbird's**

The No Action Alternative would allow for the continued use of these stands by birds finding the current conditions of shelterwood stands desirable (e.g., black-throated blue warblers, ovenbirds). The area would remain unattractive to species such as hermit thrush, blackburnian warbler, and other NTMB's preferring closed canopy conditions. Some of the forest interior species that have been found to also use the edges or interior of the shelterwood cuts would continue to use the OSR stands.

### **Direct and Indirect Effects**

As with the Proposed Action, since the habitat communities would not be altered, this alternative would not result in impacts, either positive or negative, that would affect the population of any songbird species using these project areas.

### **Cumulative Effects**

Since there would be no direct or indirect effects to NTMB, there would also be no cumulative effects from Alternative 1, the No Action Alternative.

### **Actions in MA 4.1**

#### **Affected Environment**

The affected environment is already described in the Environmental Consequences to the Proposed Action section.

**Direct and Indirect Effects**

Wildlife habitat for deer wintering areas would not be improved. No winter browse would be produced; plants fed on by deer in non-winter months would still be shaded and would not grow as well because competition for growing space, nutrients and sunlight would be higher. With no timber harvesting there would be little human disturbance to wintering deer or other wildlife in the area. Winter recreation activities are expected to remain at the current level.

**Cumulative Effects**

Currently white-tailed deer are found throughout the 385,000 acres of GMNF lands although the numbers per square mile are low. VT State data shows that Wildlife Management Units (WMU's) containing GMNF lands have buck harvests below both: (1) the individual WMU State objectives and, (2) the Statewide average expressed as a percent of the total State harvest objective.

Cumulatively, there would be less browse per acre available for deer under the No-Action alternative. As discussed above in MIS section, long-term management of the GMNF following North-half Overstory Removal's No Action alternative (i.e., universal retention of all overstory trees), is not likely to lead to detectable population changes of white-tailed deer throughout the Forest.

**Snags, Dead Trees and Down Woody Debris****Affected Environment**

The affected environment is already described in the Environmental Consequences to the Proposed Action section.

**Direct and Indirect Effects**

No Action would leave the stands in their current condition and as trees mature, and drop branches, die or blow over it would make available more replacement snags and more down woody material. There would be more material left that may be slightly more beneficial to species using snags or down woody material but no measurable change in effects can be drawn between Alternative 1 and the Proposed Action and there is no indication that snags or down woody material is lacking in the project area.

Snags and down woody debris is available across the forest. The size of individual down material is expected to be larger where no recent vegetation management activities have occurred. Larger diameter wood on the ground will be available longer before decomposition than smaller diameter debris. At the same time, logging debris left on the ground following harvesting can provide a short-term increase of down woody debris. Counts comparing the size and distribution of woody debris within the OSR stands and unmanaged stands shows a similar distribution of snags between managed and unmanaged stands and similar amounts of large debris in all areas surveyed. The only noticeable differences occurred in the small to medium size class (< 10 " dbh). The OSR stands had more small material on the ground when compared with non-managed stands.

**Cumulative Effects**

Long-term management as prescribed by North-half Overstory Removal's No Action alternative will result in a small increase in the amount of down woody debris across the Forest.

Additionally, the number of dead trees and snags are likely to increase, slightly. Because of the existing situation (regenerating hardwood stands with residual mature shelter trees), the differences between “action” alternative(s) and No Action for cumulative amounts of standing dead and down material is limited. Over the long-term, the number of standing dead, their average size, and the “loading” of dead material on the Forest floor will be determined by today’s prominent condition (regenerating hardwoods) and the future management of these regenerating stands. These slight differences, between overstory removal and overstory retention, are insignificant and completely overshadowed by future forest growth and management; and hold no detectable significance to species utilizing the dead material.

## **Issue # 4: Recreation & Visuals**

Some people are concerned about the impacts to cross country skiers from the plowing along FR 54, which also serves as a portion of the Catamount Trail and a VAST Trail, as well as skidding along the Widows Clearing Trail, which also serves as a portion of the Catamount Trail. They request that the harvesting be done in a short as time as possible, and wonder if alternate routes will be provided. There is also a concern about how logging operations would impact use of the log landing on FR 65 which is also known as the Chatfield parking lot.

Some people are concerned about the impacts of the project on the Emily Proctor Trail.

One person is concerned the proposal will cause an increase in illegal all-terrain vehicle use in the project area, which in turn would cause negative impacts to wildlife, air quality and other environmental amenities.

## **Recreation**

### **Affected Environment**

The affected environment is already described in the Environmental Consequences of the Proposed Action Section.

### **Direct, Indirect and Cumulative Effects**

There would be no impacts to winter trail recreation opportunities as a result of the No Action alternative. Winter plowing and logging sights and sounds would not occur nor affect winter recreation opportunities. Opportunities for cross country skiing and snowmobiling would not be impacted. Logging or logging vehicles would not affect trails or trailhead parking areas. There would be no increased possibility of unauthorized or undesirable recreational use of landings or skid trails. There would be no sharing of the transportation system by loggers and users of the Catamount, Oak Ridge or Emily Proctor Trails. Logging or logging vehicles would not affect snowmobile trails and shared parking areas. Since there would be no direct or indirect effects to recreation there would be no overall cumulative effects produced by the No Action alternative.

## **Visual Resources**

**Affected Environment**

The affected environment is already described in the Environmental Consequences of the Proposed Action section.

**Direct and Indirect Effects**

No Action would allow natural processes to take place in those stands where the first stage of the shelterwood harvest has already taken place. The current conditions, which show a two-age stand (seedlings growing between the mature trees), would continue. Over time, the visual distinction between the two ages of the stand would diminish as the young seedlings grow to mature trees and the current assortment of overstory trees blend in with those immature trees or eventually decline and fall over from old age.

Visual Quality Objectives would continue to be met with this alternative. There would be no impacts to visual resources.

**Cumulative Effects**

Since there would be no direct or indirect effects to visual resources, there would be no cumulative impacts from the No Action Alternative.

**Issue # 5 – Water Quality, Soil Erosion, Hydrology**

One person is concerned about how the timber sale would impact the hydrology of the area, particularly the washing out of roads, given the amount of flooding that has occurred over the last ten years. Will this timber sale cause additional erosion problems?

Some people are concerned about whether the project will have any impact on water quality, and the analysis should include whether such an impact could affect compliance with relevant provisions of the Clean Water Act.

Some people are concerned about nutrient loss in soils as a result of this sale, and that the primary impacts on stream ecology, and the secondary impacts on species dependant on those waters needs to be addressed.

**Affected Environment**

The affected environment is already described in the Environmental Consequences of the Proposed Action section.

**Direct & Indirect Effects**

The No Action Alternative would result in no change to the hydrology and water quality of the affected environment, would not change the risk of future flooding, and would result in no change to the amount of soil erosion and stream sedimentation.

The No Action Alternative would result in no short-term change to the productivity and stability of the soil resource. However in the long term, not harvesting would enhance the soil productivity. This is because more organic matter, the source of most soil nutrients, would be added to the soil though increased availability of dying and dead wood. This would also enhance soil porosity, moisture holding capacity, and biodiversity of soil organisms. There would also be

no change in the amount of nutrients leaving the harvest areas in stream water or the form of tree biomass. Riparian areas would also remain in their current conditions and would be future sources of organic material and woody debris to the stream ecosystem for nutrient enrichment and habitat quality, particularly for aquatic biota dependent on depositional habitats.

### **Cumulative Effects**

Implementation of No Action would not result in cumulative adverse effects to the soil and aquatic ecosystem resources

## **C. Alternative 2 – No Harvesting In Oak Stands**

### **Issue #1 – Silviculture-Oak management**

Some people are concerned about the harvesting of oak because it is uncommon on the forest. They believe that because oak regeneration can be difficult to establish and the acorn crop from oaks is important to wildlife, no oak trees should be harvested.

### **Affected Environment**

The affected environment is already described in the Environmental Consequences of the Proposed Action section.

### **Direct Effect**

The effects of this alternative would be the same as in the Proposed Action except that no harvesting would occur in oak stands. Effects of not treating the oak stands would be similar to the effects listed in the No Action Alternative because existing shading and competition to young oak trees would be maintained, and growth would not be improved as much as in the Proposed Action and Alternative 3.

### **Indirect Effects.**

Large oak trees present would continue to grow on site for some time but most of the oak seedlings and saplings would die off and would shift to a composition of more shade tolerant species such as beech and sugar maple and sweet birch.

The decline of the amount of oak trees and oak forests that were established following the history of disturbance, logging, grazing and agriculture in the Champlain Valley on both public and private land, would continue. This is because new oak seedlings have not and cannot establish themselves adequately in the existing shade of larger oak, and hardwoods, in sufficient numbers to perpetuate the oak forest type without disturbance such as forest management. The status quo regarding the current condition of these oak stands would be maintained for the short term, while over the long term, these stands left undisturbed, would eventually be made up more Northern hardwoods tree species as mature oak trees die and existing oak seedlings are shaded out by more numerous and competitive Northern hardwoods.

### **Cumulative Effects**

Since there are no adverse cumulative effects that would occur with the implementation of the Proposed Action, and since Alternative 2 involves even less timber harvesting, there would be no adverse cumulative effects from implementing Alternative 2.

## **Issue #2 – Archeology**

One person is concerned about impacts of the project on archeological resources, including Native American burial and other sites.

### **Affected Environment**

The affected environment is already described in the Environmental Consequences of the Proposed Action section.

### **Direct Effects and Indirect effects**

From a Heritage Resources perspective, the effects of Alternative 2 would be the same as those in the Proposed Action. Although fewer stands would receive treatment in Alternative 2, four of the five dropped “oak” stands (C46, s11 & s21; C65, s19 & s20) contain no identified sites, and in the case of the fifth “dropped” stand (C50, s12) the concern is to protect sites along access routes which will likely still be used to get to/from other stands. Therefore, recommended Mitigation Measures would be the same as the Proposed Action.

### **Cumulative Effects**

There will be no cumulative effects to Heritage Resources sites if the recommended Mitigation Measures are implemented. Activities in adjacent lands will not affect these sites, and any future Forest Service undertakings will be subject to the same restrictions.

## **Issue #3 –Fish, Botany & Wildlife**

Some people are concerned that site-specific analysis within the project areas will not be conducted, and that in order to better assess impacts, site-specific fieldwork needs to be conducted by agency specialists in the areas of aquatic biology, mammal biology, ornithology, and botany.

One person is concerned that not protecting the project areas will result in the continuing decline of woodthrush.

Some people are concerned about the proposals impact on reclusive wildlife species such as black bear, bobcat and fisher.

Some people are concerned about the impacts of the proposal on the Indiana bat's summer, fall, winter and spring habitat requirements. More specifically, there is concern that removal of the remaining, mature trees will decrease suitable roosting and maternity sites for the Indiana bat because the bat does not use those trees traditionally retained for cavity dwelling wildlife, and are known to frequent the same trees and areas repeatedly.

## **Fish**

### **Affected environment**

The affected environment is already described in the Environmental Consequences of the Proposed Action section.

### **Direct and Indirect Effects**

Alternative 2 would affect fisheries and aquatic resources less than the Proposed Action because fewer trees and acres would be harvested. This would result in a lower risk of erosion and degradation of aquatic resources from sedimentation.

### **Cumulative Effects**

The cumulative effects on fish and aquatic habitat would be similar to those of the Proposed Action but to a slightly lesser degree.

## **Botany**

### **Affected Environment**

The affected environment is already described in the Environmental Consequences of the Proposed Action section.

### **Direct, Indirect and Cumulative Effects**

Based upon the analysis of effects in the BE, determinations were made that although the Proposed Action may impact individuals or habitat for nineteen Sensitive plant species, they are not likely to contribute to a trend towards Federal listing or to a loss of viability to the population or species. Four mitigation measures for plants have been suggested, which are discussed in detail in the BE (see Appendix B). If mitigation measures are followed, no direct, indirect, or cumulative effects to any plants on the RFSS list should occur from Alternative 2.

## **Wildlife**

### **TES Species**

#### **Affected Environment**

The affected environment is already described in the Environmental Consequences to the Proposed Action section.

#### **Direct, Indirect and Cumulative Effects**

Alternative 2 (204 acres) would result in greater beneficial effects than the Proposed Action. These benefits would be derived from maintaining the overstory within the oak stands. It would provide more potential roost trees in a semi-open habitat condition. Since the oak stands generally are on the western edge of the Forest there is a slightly higher possibility that these areas would be used by Indiana bats. It should be noted that surveys conducted in Compartment 46 near stands 11 and 21 were unsuccessful in catching Indiana bats. Despite the greater beneficial effects produced by this alternative the overall impacts would not be substantial

enough to create ideally suitable Indiana bat habitat, and therefore, would only be slightly more attractive to roaming bats.

The same mitigation measures and new and revised standards and guidelines for Indiana bats described in the Proposed Action, including measures to ensure that adequate numbers of potential roost trees would be reserved, would be applied for Alternative 2.

The cumulative effects to TES would be similar to those of the Proposed Action.

## **MIS Species**

### **Affected Environment**

The affected environment is already described in the Environmental Consequences to the Proposed Action section.

### **Direct and Indirect Effects**

As discussed in the Proposed Action, the project will not change MIS Habitat Communities from their current condition. Alternative 2 would have no adverse or beneficial effects to MIS species and MIS Habitat Communities

### **Cumulative Effects**

Since Alternative 2 would likewise, produce no habitat community changes, there would be no cumulative adverse effects.

## **Reclusive Species**

### **Affected Environment**

The affected environment is already described in the Environmental Consequences to the Proposed Action section.

### **Direct and Indirect Effects**

Compared to the Proposed Action, harvesting is reduced by 60 acres and is eliminated from two separate areas, Compartment 46 and 65. This alternative drops one unit in Compartment 50 area. By reducing the amount of harvesting and the amount of areas with harvesting, potential impacts to reclusive species caused by implementing Alternative 2 would be less than those expected by the Proposed Action.

The effects of the reduction in harvesting as described above would only be slightly different from those of the Proposed Action. There is no measurable change in effects because only five stands would be dropped with this alternative and there would still be fourteen other hardwood stands treated by removal harvest.

In regards to disturbance from harvesting operations, the effects of Alternative 2 would be very similar to those described above for the Proposed Action, with a possible decrease in time needed to harvest the five oak stands. Human disturbance would still occur, but to a slightly lesser degree.

The effects of the reduction in harvesting as described above would only be slightly different from those of the Proposed Action. Effectively there is no measurable change in effects because only five stands would be dropped with this alternative and there would still be fourteen other hardwood stands treated by removal harvest.

### **Cumulative Effect**

Since there are no cumulative adverse impacts from the Proposed Action and there would be even less disturbance from timber harvesting, human disturbance and intrusion on reclusive species, likewise there would be no cumulative adverse effects from Alternative 2.

### **Neotropical Migrating Songbirds**

#### **Affected Environment**

The affected environment is already described in the Environmental Consequences to the Proposed Action section.

#### **Direct and Indirect Effects**

Compared to the Proposed Action, harvesting is reduced by 60 acres and is eliminated from two separate areas, Compartment 46 and 65. This alternative drops one unit in Compartment 50 area. As was stated for the Proposed Action, the overstory removal cut harvest would not alter the habitat community and therefore have no impacts to NTMB's.

#### **Cumulative Effects**

As stated for the Proposed Action, there would be no overall cumulative effects to NTMB's produced by Alternative 2.

### **Management in MA 4.1**

#### **Affected Environment**

The affected environment is already described in the Environmental Consequences to the Proposed Action section.

#### **Direct and Indirect Effects**

Reduced harvesting within the oak stands will produce less stump sprouting and isolated revegetation resulting from the harvesting activities (increases in light and ground disturbance) would not occur.

#### **Cumulative Effects**

As stated for the Proposed Action, there would be no overall cumulative effects to deer wintering habitat produced by Alternative 2.

### **Snags, Dead Trees, and Down Woody Material**

#### **Direct and Indirect Effects**

Alternative 2 is similar to Alternative 1 and the Proposed Action. Slightly more available material for future snags or down woody material than the Proposed Action but less than Alternative 1.

**Cumulative Effect**

Expected to be the same as the Proposed Action

**Issue # 4 – Recreation and Visual Resources**

Some people are concerned about the impacts to cross country skiers from the plowing along FR 54, which also serves as a portion of the Catamount Trail and a VAST Trail, as well as skidding along the Widows Clearing Trail, which also serves as a portion of the Catamount Trail. They request that the harvesting be done in a short as time as possible, and wonder if alternate routes will be provided. There is also a concern about how logging operations would impact use of the log landing on FR 65 which is also known as the Chatfield parking lot.

Some people are concerned about the impacts of the project on the Emily Proctor Trail.

**Recreation****Affected Environment**

The affected environment is already described in the Environmental Consequences of the Proposed Action section.

**Direct and Indirect Effects**

The effects on recreation would not change significantly from the Proposed Action. There are no system trails near the oak stands in Compartments 46 and 65. The impacts on the road portion of the Oak Ridge Trail would be shortened slightly if the oak stand in Compartment 50 (stand 12) was to be dropped from the sale.

**Cumulative Effects**

Cumulative effects are expected to be the same as in the Proposed Action.

**Visual Quality Objectives****Affected Environment**

The affected environment is already described in the Environmental Consequences of the Proposed Action section.

**Direct and Indirect Effects**

The effects of this alternative on visual quality objectives would be similar to the effects described for the Proposed Action alternative except, that the oak stands would not be harvested. Since these oak stands are not located along recreation trails or roads or within known vistas for offsite viewing, the effect of not harvesting them has little effect on the visual resource.

Visual Quality Objectives would continue to be met with this alternative.

### **Cumulative Effects**

Even though this alternative would have similar effects to the Proposed Action, overall, less acres of harvest mean fewer acres of visible treetops on the ground (slash) and fewer tree stumps visible to people traversing the general forest area. Therefore, the general forest area would have less acres of land and scenery affected by timber harvest with this alternative.

As stated in the cumulative effects for the Proposed Action and based on past, present and future conditions there would be no cumulative adverse impacts with this alternative.

## **Issue # 5 – Water Quality, Soil Erosion, Hydrology**

### **Affected Environment**

The affected environment is already described in the Environmental Consequences of the Proposed Action section.

### **Direct & Indirect effects**

The effects of this alternative would be less than the Proposed Action, because 62 fewer acres and approximately 350 less CCF would be harvested. Less harvesting would result in less risk of soil erosion and aquatic resource degradation. Not harvesting the oak stands would enhance the soil productivity in the long term, as explained in the No Action Alternative.

### **Cumulative Effects**

The cumulative effects would be the same as for the Proposed Action; likewise there would be no cumulative effects from Alternative 2.

## **D. Alternative 3 – Modified Cutting in Oak Stands**

### **Issue #1 – Silviculture-Oak management**

Some people are concerned about the harvesting of oak because it is uncommon on the forest. They believe that because oak regeneration can be difficult to establish and the acorn crop from oaks is important to wildlife, no oak trees should be harvested.

### **Affected Environment**

The affected environment is already described in the Environmental Consequences of the Proposed Action section.

### **Direct and Indirect Effects**

The effects of this alternative would be the same as in the Proposed Action, except that only half of the residual basal area would be harvested in oak stands. Residual basal area would be reduced from approximately 70-90 square feet per acre to about 30 – 40 square feet per acre.

This would provide about half of the sunlight and improved growing conditions to oak and other hardwood seedlings than the Proposed Action would. While more large oak trees would be retained with this alternative when compared with the Proposed Action, the competition for growing space would be greater than with the Proposed Action and contribute to the decline of oak seedlings competing with other shade tolerant hardwood species, but not as much as with No Action or in Alternative 2. About half the saw timber and pulpwood would be produced from the oak stands with this alternative than in the Proposed Action.

With less harvesting, less browse and early successional forage for deer would be produced. This alternative would respond to concerns regarding removal of older oak trees, by retaining more acorn producing size trees for wildlife food and for future oak seed sources. This would involve less overall timber harvesting than the Proposed Action but more than Alternative 2, where no oak stands are harvested at all.

### **Cumulative Effects**

Cumulative effects would be similar to those in the Proposed Action.

## **Issue #2 – Archeology**

One person is concerned about impacts of the project on archeological resources, including Native American burial and other sites.

### **Affected Environment**

The affected environment is already described in the Environmental Consequences of the Proposed Action section.

### **Direct and Indirect Effects**

From a Heritage Resources perspective, the effects of Alternative 3 would be the same as those in Alternative 2 and the Proposed Action because the actions do not change the spatial nature of the impact, but will simply occur over a different span of time. Therefore, the recommended Mitigation Measures would also be the same as the Proposed Action and Alternative 2.

### **Cumulative Effects**

There will be no cumulative effects to heritage Resources sites if the recommended Mitigation Measures are implemented. Activities in adjacent lands will not affect these sites, and any future Forest Service undertakings will be subject to the same restrictions.

## **Issue #3 – Fish, Botany, Wildlife**

Some people are concerned that site-specific analysis within the project areas will not be conducted, and that in order to better assess impacts, site-specific fieldwork needs to be conducted by agency specialists in the areas of aquatic biology, mammal biology, ornithology, and botany.

One person is concerned that not protecting the project areas will result in the continuing decline of woodthrush.

Some people are concerned about the proposals impact on reclusive wildlife species such as black bear, bobcat and fisher.

Some people are concerned about the impacts of the proposal on the Indiana bat's summer, fall, winter and spring habitat requirements. More specifically, there is concern that removal of the remaining, mature trees will decrease suitable roosting and maternity sites for the Indiana bat because the bat does not use those trees traditionally retained for cavity dwelling wildlife, and are known to frequent the same trees and areas repeatedly.

## **Fish**

### **Affected Environment**

The affected environment is already described in the Environmental Consequences of the Proposed Action section.

### **Direct and Indirect Effects**

Alternative 3 would affect fisheries and aquatic resources very similarly to the Proposed Action. It would result in more soil disturbance and risk of erosion and sedimentation from the three cut shelterwood system planned in 4 stands. However, this alternative also reduces the amount of harvesting by six acres. As a result, the direct and indirect effects would be about the same for the Proposed Action and this alternative.

### **Cumulative Effects**

The cumulative effects would be the same as that described for the Proposed Action.

## **Botany**

### **Affected Environment**

The affected environment is already described in the Environmental Consequences of the Proposed Action section.

### **Direct, Indirect and Cumulative Effects**

(Although the known sites for yellow lady's slipper, ginseng, and sweet joe-pye weed are in or adjacent to the two oak stands that would be removed under this alternative, they would still have potential habitat in other rich Northern hardwoods stands that are part of this project. Therefore, the list of 19 Sensitive plant species potentially impacted, if no mitigation were to occur, remains the same.) If mitigation measures are followed, no direct, indirect, or cumulative effects to any plants on the RFSS list should occur.

## **Wildlife**

### **TES Species**

**Affected Environment**

The affected environment is already described in the Environmental Consequences to the Proposed Action section.

**Direct and Indirect Effects**

Alternative 3 (237 acres) would result in greater beneficial effects than either the Proposed Action or Alternative 2 since it would partially open the canopy of the oak stands. These benefits would be derived from maintaining some of the overstory within the oak stands and choosing which overstory trees would be left. It would provide more potential roost trees in a semi-open habitat condition and would likely maintain a canopy closure similar to the Romme model. Since the oak stands generally are on the western edge of the Forest there is a slightly higher possibility that these areas would be used by Indiana bats. It should be noted that surveys conducted in Compartment 46 near stands 11 and 21 were unsuccessful in catching Indiana bats. There may be some beneficial effects produced by Alternative 3, but the location, aspect, and elevation of the oak stands would not be substantial enough to create ideally suitable Indiana bat habitat, and therefore, would only be slightly more attractive to roaming bats.

**Cumulative Effects**

The cumulative effects would be similar to effects described in the Proposed Action.

**MIS Species****Affected Environment**

The affected environment is already described in the Environmental Consequences to the Proposed Action section.

**Direct and Indirect Effects**

As discussed in the Proposed Action, the project will not change MIS Habitat Communities from their current condition. Alternative 3 would have no adverse or beneficial effects to MIS species and MIS Habitat Communities

**Cumulative Effects**

There would be no cumulative adverse effects from Alternative 3.

**Reclusive Species****Affected Environment**

The affected environment is already described in the Environmental Consequences to the Proposed Action section.

**Direct and Indirect Effects**

In regards to disturbance from harvesting operations, the effects of Alternative 3 would be very similar to those described above for the Proposed Action. With a possible decrease in time needed to harvest the five oak stands. Human disturbance would still occur but at lesser amounts.

The effects of the reduction in harvesting as described above would only be slightly different from those of the Proposed Action. There would be no measurable change in effects.

**Cumulative Effects**

Since there are no cumulative effects with the Proposed Action, there would be no cumulative adverse effects from Alternative 3.

**Neotropical Migrating Songbirds****Affected Environment**

The affected environment is already described in the Environmental Consequences to the Proposed Action section.

**Direct and Indirect Effects**

The effects would be similar to the Proposed Action.

**Cumulative Effects**

As with the Proposed Action, there would be no cumulative effects.

**Management in MA 4.1****Affected Environment**

The affected environment is already described in the Environmental Consequences to the Proposed Action section.

**Direct and Indirect Effects**

The direct and indirect effects of Alternative 3 would be similar to the effects of the Proposed Action.

**Cumulative Effects**

The cumulative effects would be the same as the Proposed Action.

**Snags, Dead Trees, and Down Woody Material****Direct and Indirect Effects**

Alternative 3 is similar to Alternative 2 and the Proposed Action. Slightly more available material for future snags or down woody material than the Proposed Action but less than Alternative 2.

**Cumulative Effects**

The cumulative effects would be the same as the Proposed Action.

**Issue #4 – Recreation and Visual Resources**

Some people are concerned about the impacts to cross country skiers from the plowing along FR 54, which also serves as a portion of the Catamount Trail and a VAST Trail, as well as skidding along the Widows Clearing Trail, which also serves as a portion of the Catamount Trail. They request that the harvesting be done in a short as time as possible, and wonder if alternate routes

will be provided. There is also a concern about how logging operations would impact use of the log landing on FR 65 which is also known as the Chatfield parking lot.

Some people are concerned about the impacts of the project on the Emily Proctor Trail.

One person is concerned the proposal will cause an increase in illegal all-terrain vehicle use in the project area, which in turn would cause negative impacts to wildlife, air quality and other environmental amenities.

## **Recreation**

### **Affected Environment**

The affected environment is already described in the Environmental Consequences of the Proposed Action section.

### **Direct, Indirect and Cumulative Effects**

The direct and indirect effects on recreation would not change significantly from those effects disclosed in the Proposed Action. This is because there are no trails near the oak stands in Compartments 46 and 65. For these reasons, there would be no cumulative effects from Alternative 3.

## **Visual Resources**

### **Affected Environment**

The effected environment for visual resources has been previously described in the Proposed Action section.

### **Direct and Indirect Effects**

This alternative is similar to the effects in the Proposed Action except for the oak treatments. Three-stage shelterwood harvest would offer screening benefits when viewed from offsite. The more mature trees left in the stand, the more crown closure is left to screen the ground surface when viewed from a distance. However offsite views are not a factor in this project. The oak stands in Compartment 46 and 65 currently have a greater amount of overstory seed trees left in them than in the Northern hardwood stands. In this alternative, the effects of removing about half of the basal area in the overstory of these four oak stands would create stands that look similar to what the hardwood stands and oak stand in Compartment 50, look like now.

Visual Quality Objectives would continue to be met with the actions of this alternative.

### **Cumulative effects**

Although several harvest units of the proposed Old Joe project near the Bingo Road in Rochester are near this project area, they are far enough away, are small in size and not noticeable that there would be no cumulative effects with the visual resource. We can expect future harvesting to occur on both public and private lands. As with this project, the design and location of future projects would be consistent with Forest Plan direction and meet visual quality objectives.

Based on this analysis, there would be no cumulative adverse impacts of Alternative 3.

## **Issue # 5 – Water Quality, Soil Erosion, Hydrology**

One person is concerned about how the timber sale would impact the hydrology of the area, particularly the washing out of roads, given the amount of flooding that has occurred over the last ten years. Will this timber sale cause additional erosion problems?

Some people are concerned about whether the project will have any impact on water quality, and the analysis should include whether such an impact could affect compliance with relevant provisions of the Clean Water Act.

Some people are concerned about nutrient loss in soils as a result of this sale, and that the primary impacts on stream ecology, and the secondary impacts on species dependant on those waters needs to be addressed.

### **Affected Environment**

The affected environment is already described in the Environmental Consequences of the Proposed Action section.

### **Direct & Indirect effects**

The effects of this alternative on the soil and aquatic resources would be very similar to the Proposed Action, over the long term. Alternative 3 would result in more soil disturbance in the 4 stands planned for the three cut shelterwood system. These increases in soil disturbance with Alternative 3 are largely offset by the fact that six acres less would be harvested in Compartment 65, stand 19.

### **Cumulative Effects**

The cumulative effects would be the same as for the Proposed Action.

## **E. Economic Conditions**

The following economic analysis has been prepared to display a comparison of key costs and benefits. It does not include all costs but only considers those commonly established cost factors that the Deciding Officer has deemed as useful criteria to compare alternatives and aid in the decision making process. At the request of the Deciding Officer, cost calculations are estimated and displayed from the NEPA decision point forward (i.e., when the decision to implement some alternatives of the North Half Overstory Removal Project is made), rather than also including those costs incurred prior to actually making the decision. As an example, the rather substantial cost of preparing the analysis documentation (the EA and associated documents) is not included in this economic analysis. The Quick-Silver Investment Analysis software and procedure was used with a discount rate of 4 percent. Further explanation of key factors is found in the footnotes following the table below.

**Table 10. Economic Benefits and Costs**

BENEFITS /1	Proposed Action	Alternative 1 No Action	Alternative B	Alternative C
Total Est. Volume (MBF)	739	0	514	625
Jobs Provided (person years)	27	0	18	23
25% Fund to Towns (est.) /2	\$ 56,000	0	\$ 38,900	\$ 47,300
Total Stumpage Revenues (est.)	\$266,600	0	\$185,600	\$225,800
<b>COSTS /2</b>				
Sale Administration	\$16,000	0	\$11,200	\$13,700
Sale Preparation	\$26,700	0	\$18,800	\$22,900
<b>TOTAL BENEFITS, COSTS, AND PRESENT NET VALUE AFTER DISCOUNTING</b>				
TOTAL Benefits	\$266,600	0	\$185,600	\$225,800
TOTAL Costs	\$42,700	0	\$30,000	\$36,600
PRESENT NET VALUE	\$223,900	0	\$155,600	\$189,200

/1 Benefits listed are not a complete list of priced and non-priced benefits that may result of implementation of the alternatives. An estimate of revenues that could occur from the sale of wood products to the highest bidder was made. Estimates of the hardwood and softwood saw timber and pulpwood volumes for the Proposed Action was estimated from existing documents. The estimated volume for each species and product group was then multiplied by the average prices paid for GMNF saw timber and pulpwood on the stump in 2000. The amount calculated for the 25 Percent Fund estimate was made simply by determining 25 percent of the estimated stumpage revenues for each alternative after costs are subtracted. Job calculation is based on estimates provided by the State of Vermont that a 1 million board feet timber sale will yield 36 Vermont jobs. Such jobs consist only of “tree to board” processing of products, and do not include the jobs created from the actual application of lumber into finished wood products such as furniture, flooring or other items commonly used in homes or in home building.

/2 The 25 Percent Fund is created from all revenues raised from activities on the National Forest. Activities such as special use permit fees paid by ski areas, revenues from selling timber, Christmas trees and fuel wood, and campground fees go into this fund. Towns receive payments from the 25 Percent Fund along with payments in lieu of taxes (PILT) depending on the acres of National Forest land occurring in the town. Under the Secure Schools Act of 1999, towns could choose to receive an annual 25 Percent Fund payment based on an average of the highest three years paid or stay with a payment that could fluctuate depending on the amount of annual revenues raised by the Forest Service in the areas listed above.

/3 Costs were estimated from the most recent fiscal year 1998 Timber Sale Program Data for the Green Mountain National Forest and were prorated on a MBF (thousand board foot) basis for analysis

## ECONOMIC ANALYSIS

The Forest Service Manual (FSM 1970.6) provides non-binding guidance as to the scope of economic analysis required in project decision making: “the responsible line officer determines the scope, appropriate level, and complexity of economic and social analysis needed.” If a unit prepares an economic analysis, then one must be prepared and displayed for all alternatives (40 CFR 1502.23). NEPA regulations do not require a quantitative, monetary benefit-cost analysis. The disclosure of economic effects under NEPA is limited (40 CFR 1508.14).

### Affected Environment

The analysis area is located primarily in Addison County, Vermont with the exception of stand 3, Compartment 150 which, is in Washington County and stand 11, Compartment 98 which is located in Windsor County. From an economic and social standpoint, the analysis area is closely connected to the Champlain Valley and the upper White River Valley, including, the towns of Lincoln, Ripton, Middlebury, Salisbury, Rochester, Hancock, Granville, Warren, Pittsfield and Stockbridge. Other towns outside these, like Brandon and Bristol are affected as well, especially regarding wood products because of sawmills and wood manufacturing businesses located there. Local tourism is based around destination resorts, motels, hotels, restaurants, stores and access to National Forest.

National Forest lands are an integral part of the economic life of local communities, as a destination point for outdoor recreation, as a scenic backdrop for commercial and recreation activities on private lands, and as employment opportunities in forest management and the wood product industries. Local employment is largely centered on retail and service sectors, though there is lesser but substantial employment in light manufacturing, construction and forest products industries.

Forest Plan direction is to identify opportunities for local communities to enhance self-sufficiency and stability. Timber harvesting has been an established economic activity in the Green Mountains. Under Forest Service administration, modern timber sale programs and timber stand management began in the 1950’s with the emergence of second growth forests that were extensively cutover around the turn of the century. Timber harvesting remains today as an important contributor to local economies in communities of the Green Mountain National Forest

## F. Environmental Justice

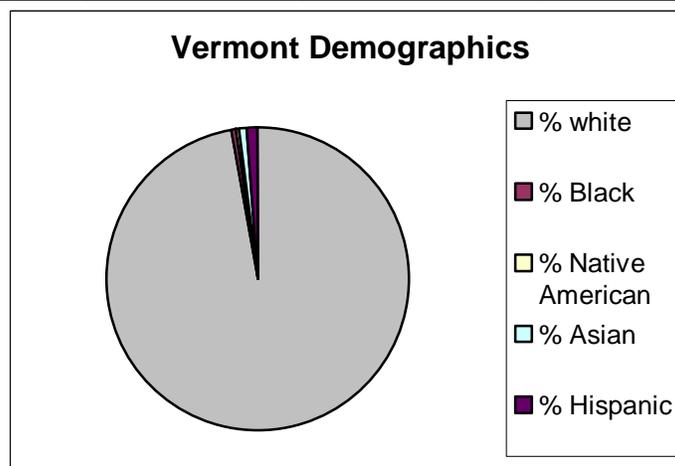
Executive Order 12898, “Federal Actions to Address Environmental Justice in Minority population and Low-income Populations,” mandates that “each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, policies, and activities on minority populations and low-income populations,” (Federal Order 12898, 2/11/94). Evidence shows that areas of low income or minority populations suffer a disproportionate risk of succumbing to adverse environmental conditions in their community. Some examples of this problem include toxic waste facilities, garbage disposal areas, or unmonitored factory dumping in impoverished, ethnic areas. In order to protect the rights and health of these populations, this Executive Order establishes, within the NEPA framework, a system to analyze the demographics of a proposed location. Before a policy is instated, the proposed area must be checked to see whether the new policy will disproportionately affect

minority or low-income populations. The standards used to analyze a given location are as follows: if the demographics of a location show a minority or low-income population greater than two times that of the state average, then that area is considered one of potential environmental injustice. This does not require the agency to disregard the proposal altogether, but does discourage it and suggests that other alternatives be examined more closely. If the location in question shows minority or low-income populations that are equal to that of the state average, then the proposal is a possible environmental justice case and should be monitored carefully. If the demographics of a proposed location demonstrate minority or low-income populations is less than that of the state average, then the area is not considered a potential for environmental injustice and there is no reason to disregard the proposal due to ethnic or financial discrimination.

The following tables and figures illustrate the different ethnic groups and income levels represented by Addison, Washington and Windsor Counties, and the average for the State of Vermont. The values represent 1996 Census information, organized by <http://govinfo.library.orst.edu>.

**Table 11. Ethnicity by County**

County	Percent Ethnicity				
	% White	% Black	% Native American	% Asian	% Hispanic
Addison	98.1	0.7	0.2	1	1
Washington	98.7	0.5	0.2	0.7	1.6
Windsor	98.6	0.4	0.2	0.8	0.7
State of Vermont	98.2	0.6	0.3	0.9	1



**Figure. 7 Vermont Demographics**

The above table and figure show that the vast majority of the populations (98%) in all three counties: Addison, Washington, and Windsor and for the entire state of Vermont are white. The demographic evidence suggests that the counties, with less than two percent ethnic diversity, do not represent concentrated ethnic locations. Furthermore, they mimic, almost exactly, the demographic trend for the state. For this reason, it is unlikely that the proposed timber sale will have any disproportional effect on any minority groups.

**Table 12. Poverty Level by County.**

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<b>County</b>	<b>% Below Poverty Level</b>
Addison	12.2
Washington	11.2
Windsor	11.3
Vermont	12.2

The income table shows that the percent of the population below the poverty level for Addison County is equal to that of the State of Vermont and the other two counties show percentages lower than the state average. Therefore, none of the three counties represent disproportionately poor areas. Hence, the likelihood that the timber sale will disproportionately affect an impoverished location is low.

In conclusion, the counties within the Green Mountain National Forest do not demonstrate ethnic nor income demographics two times greater than that of the state average. Most importantly, the Proposed Action and alternatives do not pose a disproportionately high and adverse environmental, human, health, or social effect on these counties, and there are no known community identified environmental justice related issues

## CONSULTATION AND COORDINATION

The Forest Service consulted the following individuals, Federal, state and local agencies, tribes and non-Forest Service persons during the development of this environmental assessment:

### **ID TEAM MEMBERS:**

Bob Bayer, NEPA Coordinator  
Mike Burbank, Biological Technician  
Diane Burbank, Ecologist  
Nancy Burt, Soil Scientist  
Chris Casey, ID Team Leader, Silviculturist  
Pat D'Andrea, NEPA Coordinator  
Mary Beth Deller, Botanist  
Dick Gaiotti, Forest Technician  
Ed Griffith, Realty Specialist  
Clay Grove, Wildlife Biologist  
Steve Kimball, District Ranger  
Dave Lacy, Archeologist  
Donna Marks, Landscape Architect  
Tom Paquette, Recreation Technician  
Steve Roy, Fisheries Biologist

### **FEDERAL, STATE, AND LOCAL AGENCIES:**

Susi von Oettingen, US Fish and Wildlife Service, Concord NH  
Steve Parren, Non-Game Heritage program, VT Dept. of Fish and Wildlife  
VT Dept. of Commerce & Community Development – Division for Historic Preservation/State Historic Preservation Office  
William Leak, Silviculturist, USDA Forest Service, State and Private Forestry, Durham, NH  
James Linnane, Entomologist, USDA Forest Service, State and Private Forestry, Durham, NH  
Town Select boards: Salisbury, Granville, Rochester, Ripton and Hancock.

### **TRIBES:**

Abenaki Nation, Mississquoi Band

### **OTHERS:**

Dave Hardy, Green Mountain Club  
Mark Lapin, Ecologist  
Rosemary Shea, Catamount Trail Association  
Jim Wacker, Keewayden Camps  
Dr. Jason Wiesfeld, Adjacent landowner  
Klinton Wiregren, Forester

## APPENDIX A: PUBLIC COMMENTS

### LIST OF PUBLIC COMMENTS AND RESPONSE FROM MAY, 1999 INITIAL SCOPING

Each response received during the environmental analysis scoping process was reviewed to identify specific comments, issues and concerns. This appendix contains a listing of those comments. Following each comment **in bold type** is a response as to how a comment was addressed. Comments are grouped by subject matter.

#### *Ecology*

1. There is a concern that by removing mature trees for sawtimber, the project areas will be depleted of dead and/or dying trees, thereby decreasing habitat and food for wildlife, fish, amphibians, insects and reptiles. The analysis needs to disclose how many standing and fallen dead trees there would be in a healthy natural forest of this size and the current status of this habitat component.

**The proposal will only remove merchantable forest products from the project area. The area will not be depleted of dead and dying trees and as the remaining dead snags fall down, they become large woody debris on the ground. The FWS recommendations for retaining potential Indiana bat roost trees states that at least five snags, cavity trees, or replacement snags should be reserved per acre harvested. In addition, the project will leave all the existing standing dead and fallen dead trees. Currently there is 65% of the GMNF landbase within the mature and overmature classification. This age class distribution allows for ample amounts of dead and down material to be reserved with no decline anticipated.**

Depending on site condition, species composition, age class, insect and disease patterns and natural disturbance events, the number of standing and fallen dead trees varies dramatically in a forested landscape. It can be very few per acre to large concentrated amounts within actively managed stands or passively managed stands alike.

Recent surveys of snags and down material within some of the North Half OSR stands as well as control sites, (places with no known management activities) shows similar distribution of snags between managed and unmanaged stands. Some of the managed OSR stands had approximately 40 to 50 hard snags per acre compared to the reserve stands where 20 to 40 hard snags per acre is estimated. As would be expected some of the N<sup>1/2</sup> OSR project stands have less medium to large sized down woody material but other N<sup>1/2</sup> OSR stands have more large woody debris than the control sites. Within the shelterwood stands the lowest amount of large sized LWD is approximately 40 pieces per acre and the greatest amount is approximately 160 pieces per acre. Ranges of large woody debris in the unmanaged areas surveyed is approximately 100 to 160 pieces.

However the short term availability of down woody debris, those trees less than 9” diameter is greater within the shelterwood stands where site preparation for

regeneration occurred. The range of small LWD within the N ½ OSR stands was double the number of down woody stems within the unmanaged stands. Refer to the Biological Evaluation and Section III of the Environmental Consequences Section for disclosure of effects to wildlife.

### *Wildlife*

2. Determine and list the species of songbirds present in the project areas and estimate how many song birds of each species will be eliminated (either by outright killing or nest destruction) by the project.

The list of bird species that would be present in the project area and would occur with the treatments are listed in Appendix B of the Assessment of Green Mountain National Forest Management for Neotropical Migratory Birds, C. Grove, 1992. (See Project File). Effects to song birds that would be mitigated due to winter only logging operations and other effects on songbirds are discussed in the Environmental Consequences section.

3. A request was made to discuss the results of the agency's wildlife monitoring program and the application of those results to this particular project.

### **Bats:**

Recent wildlife monitoring has concentrated on Threatened and Endangered Species. Three seasons on woodland bat monitoring has occurred on the GMNF. In 2001, bat surveys, radio telemetry, and anabat recording was completed near the Compartment 46 part of the project area. One solitary male Indiana bat was found in Compartment 46 but was more than ½ mile west of the stands 11 and 21. Female Indiana bats or maternity colonies were not found. *A Survey for Eastern Woodland Bats on the Green Mountain and Finger Lakes National Forests, with Emphasis on the Federally Endangered Indiana bat (Myotis sodalis), October, 2001* discusses survey results.

Indiana bat telemetry work used to follow migrating Indiana bats from their hibernaculum to summer roost sites found that in 2002 roost sites were at least six miles west of the GMNF. Twenty female Indiana bats had radio transmitters attached to them and then they were tracked to follow migration patterns and locate roost sites. These bats migrated to Ferrisburg, Monkton, New Haven, Orwell, Shoreham, Weybridge, and Whiting, Vermont and Crown Point and Ticonderoga, New York. All of these towns are west of the National Forest lands with the closest site being six miles to the west of the Forest Boundary.

Fall swarming surveys have been completed at known Hibernacula with two male Indiana bats being discovered at the Silver Mine, Brandon, Vermont. Other recent fall surveys such as those conducted at Dorset Cave, Plymouth Cave, and Greeley Talc Mine have not found Indiana bats. Winter surveys to follow up on the discovery of Indiana bats at the Silver Mine found 153 Indiana bats hibernating in the mine. One of these bats had been captured in 2001 at the Salisbury, VT monitoring site. The project area is at least 13 miles away from the Silver Mine and is well beyond the five mile area

of influence around the hibernaculum. Winter surveys have also been completed at Dorset Cave, Greeley Talc Mine, Plymouth Cave, and Nickwacket Cave with no Indiana bats found. Northern long-eared bats or little brown bats were the most common species found during monitoring. Site specific data is currently being collected at the roost sites.

Indications are that habitat conditions similar to those found in the central part of the Indiana bat's range exist within the Champlain Valley. Shagbark hickory, which is an important roost tree species, is present in the valley. The percent of canopy closure outlined in Romme's work is also represented within Champlain Valley woodlots. Canopy closures on GMNF land generally exceed the 50% to 70% or as is the case in the project area, do not meet the minimum canopy closure.

For a more complete update on bat monitoring, including July 2002 findings, refer to page 133 of the BE (see Appendix B).

#### **Canada lynx:**

Detection plots to locate Canada lynx have been completed over the past three years within areas of the GMNF. Hair snare and scent stations set up between 1999 and 2001 detected no Canada lynx and also found no other cat species attracted to the stations. Hair samples were analyzed using DNA technology to differentiate species. All sample collected and tested on the GMNF found that black bears were attracted to the sample sites.

#### **Salamanders:**

A study completed on the Middlebury District found that red-backed salamanders are less abundant in stands between 0 and 30 years old when compared to abundance in older stands. Since red spotted salamanders prefer to live in older forested stands these are not unusual results. Ninety percent of the GMNF is at least 40 years old so this species is not at risk of losing habitat on the forest.

#### **Goshawks:**

A study of the use of forest openings and regeneration cuts by raptors was completed for a UVM thesis project. The findings indicate the importance of temporary and permanent forest openings as foraging sites particularly for northern goshawk, a forest interior nesting species. Goshawks would travel some distance from their nest sites to feed in regeneration cuts or permanent upland openings. The habitat communities used in this study are similar to the project area stands.

#### **Other Birds:**

In 1999 Steve Germaine, with assistance from Steve Vessey and Dave Capen, published a paper entitled "Effects of Small Forest Openings on the Breeding Bird Community in a Vermont Hardwood Forest" - this paper assessed the bird species, their abundance and their diversity in and around small regeneration patches, up to 0.4 ha (~ 1 ac.) on

the GMNF. This study found that "As a group, neotropical forest-interior migrants were significantly less abundant in openings than at any distance from them, and less abundant 50 meters from openings than 200 meters from them. Neotropical interior-edge migrants were significantly more abundant 50 meters from openings than at any other distance. Overall, bird species diversity increased in forested areas containing small openings due to the addition of edge and open-area nesters, but several forest-interior species were adversely affected by the presence of openings." (iv) we need to search for similar study on larger regeneration units (this study is underway).

#### **Other Wildlife:**

**For information on other MIS species and wildlife in general, refer to the Environmental Consequences Section and Biological Evaluation.**

4. Address the impacts to mammals, invertebrates, plants, insects, microorganisms, reptiles and amphibians. Consider area requirements of all species and the degree to which this area provides a wildlife corridor.

**Impacts for plants and animals are addressed within the Environmental Consequences section of the EA and also within the N ½ OSR Biological Evaluation for Threatened, Endangered, and Sensitive Species. These 19 stands are described as dispersed with very large forested areas around each diminutive site. This area is no more or no less a wildlife corridor than other parts of the National Forest.**

5. There is a concern that interior dependant species will become extinct if the project area is not protected.

**Effects to interior dependent species is discussed within the Environmental Consequences Section of the EA under Reclusive Species.**

6. There is concern about the impacts of logging and road building and/or road use on interior-dependent species such as the black bear, pine marten, and interior-seeking neotropical migratory songbirds.

**Effects to interior dependent species is discussed within the Wildlife Effects Section of the EA under the heading of "Reclusive Species."**

7. There is a concern based on an study in Indiana, that clearcuts, forest openings, and possibly regeneration openings, may cause a reduction in the reproductive success of birds nesting in adjacent forest, and therefore management for viable populations of neotropical migratory songbirds should involve minimizing the amount of internal opening and edge.

**(i) this concern really doesn't "apply" to our North Half Overstory removal proposal - our proposal will have no noticeable effect, or alteration, to the current vegetative communities (the featured stands are the understories).. the regeneration openings have already been created. (ii) the concern is inaccurately stated - this issue "applies" to**

some species of neotropical migratory (NTMB) songbirds, generally speaking those species that rely upon large patches of mature woodland habitats (e.g., unfragmented habitats). There are numerous other NTMBs that rely on the continuum of habitats "leading" to mature woodland conditions (grasslands, shrublands, early successional woodlands, etc.). (iii) in 1999 Steve Germaine, with assistance from Steve Vessey and Dave Capen, published a paper entitled "Effects of Small Forest Openings on the Breeding Bird Community in a Vermont Hardwood Forest" - this paper assessed the bird species, their abundance and their diversity in and around small regeneration patches, up to 0.4 ha (~ 1 ac.) on the GMNF. This study found that "As a group, neotropical forest-interior migrants were significantly less abundant in openings than at any distance from them, and less abundant 50 meters from openings than 200 meters from them. Neotropical interior-edge migrants were significantly more abundant 50 meters from openings than at any other distance. Overall, bird species diversity increased in forested areas containing small openings due to the addition of edge and open-area nesters, but several forest-interior species were adversely affected by the presence of openings." (iv) we need to search for similar study on larger regeneration units (this search is underway).

8. One commenter felt the analysis should address the impact of group selection on the reproductive success of those bird populations that are in sharp decline.

Group selection is not proposed for this project nor is it a viable prescription for the stands given their history, current condition, age and the stated purpose and need for the project. This proposal, and all alternative actions to this proposal, will create little or no change in the predominant characteristics of these stands (i.e., Northern hardwood or oak regeneration).

Bird populations exhibiting sharpest decline in the northeast, are generally those species that require early successional habitats like shrub lands, grasslands, or regenerating woodlands (e.g., eastern towhee, field sparrow, eastern meadowlark, chestnut sided warbler, indigo bunting). If we look at the locale of the North Half of the GMNF, habitat conditions that are conducive to the species relying on regenerating woodlands (e.g., chestnut-sided warbler, indigo bunting) have already been created by the entail shelterwood harvests. These regenerating woodland habitats will not be significantly changed through implementation of any alternative discussed in this EA – including the no action alternative.

### ***Management Indicator Species (MIS)***

9. One commenter requested that we consider the adequacy of the GMNF's selected MIS and their monitoring, and whether decisions and actions which could affect MIS habitats and their conditions should be postponed until appropriate MIS can be chosen and the necessary baseline data regarding their presence can be established.

In 2002, the GMNF and Finger Lakes National Forest (FLNF) prepared a draft report entitled "A Systematic Review of The Selection, Use, and Monitoring of Management Indicator Species on the Green Mountain and Finger Lakes National Forests". This draft report has reached the preliminary conclusion that the GMNF and FLNF used a

systematic approach in selecting MIS, including the input of scientific experts from universities, federal agencies and state agencies. It also concluded that this information was properly incorporated into the GMNF and FLNF Land & Resource Management Plans and included a systematic monitoring program consistent with NFMA planning direction.

The draft report did caution that the MIS lists and MIS monitoring programs for both National Forests are likely outdated and need updating as part of the Forest Plan revision. This need for revision is particularly important given that;(1) the steady state, decade long, decline in early successional habitat may pose the greatest risk to the population viability of the GMNF vertebrate community and (2) current habitat trends on the FLNF may increase risks to FLNF forest and shrubland vertebrate communities, particularly songbirds.

Just as importantly, the draft report concluded that the scientific value and limitations of the MIS concept needs serious evaluation. Even with seven years of systematic field surveys it has not been possible to state with any degree of certainty, what the population trends are for the majority of the MIS studied or for their community associates. Nor can a cause and effect relationship be established between weather, physical or biological factors (including forest management practices). It will take several “generations” of Forest Plans, if at all to determine either the actual population trends or the causes for these trends. This conclusion agrees with Niemi et al. (1997): “Most species responded to habitat attributes that satisfy their needs for survival and these autecological responses likely led to inconsistent patterns of species associations for most of the MIS.” The lack of consistent patterns among most MIS casts doubt on the ability to use a few species, as indicators for the well being of many other species, especially for those that are uncommon and difficult to monitor. Developing more comprehensive techniques that improve habitat classifications and combine monitoring trends in habitat and birds within those habitat likely will prove more fruitful than focusing on a few “representative species”.

In spite of those needs, the draft report concluded that the GMNF and FLNF continue to successfully respond to emerging population viability issues by implementing new monitoring programs and new management direction on a species by species basis. However, this new direction needs to be formalized through amendments to the Forest Plan. The determination has been made for the N ½ OSR project that the current condition of any of the habitat communities is not changing as a result of the Proposed Action or any alternatives. The N ½ OSR stands are sapling hardwood or sapling oak-hardwood communities. Therefore trends in MIS populations and habitats will remain the same.

### *Silviculture*

10. One person is concerned that the net primary productivity (growth) remains the same regardless of harvest, and multi age stands are more resilient to health threats. Based on this, they believe the effects of the overstory removal on the biological growth rate and resilience of the stand needs to be assessed.

**That is correct, biological growth rate would not be changed by the Proposed Action. With the Proposed Action the growth rate would remain the same but growth would be mostly focused on the younger trees when the amount of older, larger trees in the overstory is reduced.**

**Multi-age stands may be more resilient to certain kinds of health problems, but the fact remains that vigorous, fast growing trees are better able to survive all kinds of stresses. There are many other things to consider regarding stand resilience to stress. In Using Silviculture to Improve Health in Northeastern Conifer and Eastern Hardwood Forests, Kurt W. Gottschaulk, 1995, Gottschaulk states one commonality between the three philosophies for altering susceptibility and vulnerability of trees to insects and disease is maximizing tree growth and vigor. The action alternatives work to maximize tree vigor. Following that, young trees that are free to grow would be more resilient to stress than young trees growing under the shade of larger trees. Oak stands that are mixed with Northern hardwoods are more able to withstand stress from defoliators like gypsy moths that prefer to feed on oaks.**

**Also consider that selecting superior phenotypes for residual trees has the potential to maintain vigor and resistance to pathogens and insects in present and future generations. Natural regeneration includes a variety of species, shade tolerant and shade-intolerant species. This enhanced diversity of woody species provides a resilience to host-specific insects and reduces the impacts of insects and pathogens that thrive in monocultures (Gottschaulk, 1993).**

11. One person believes that the impacts of not removing the oak and Northern hardwood overstory on the survival of the seedlings, and on the viability and longevity of the overstory needs to be assessed.

**This is addressed under the no action alternative. Regarding the survival, viability and longevity of oak and hardwood seedlings, we believe only a small amount of oak seedlings would survive in these stands if no action were taken. The hardwoods would dominate and the more shade tolerant species would compete best. What is not known is for how long would the oaks survive. Observations of similar shelterwood areas on the Oxbow, Partridge and Chandler Ridge timber sales indicate that young oak trees do not compete well with faster growing Northern hardwoods. Without overstory release and at least one thinning during the first 10 years of development, many oak regeneration efforts would favor development of more Northern hardwoods. The viability and longevity of the overstory has been discussed in the purpose and need section.**

12. One person believes that the environmental impacts of shelterwood logging are the same as clearcutting, in that the goal is to create early successional or edge habitat. They request that the analysis of the project described shelterwood logging as a variant of clearcutting, so as not to mislead the public into thinking that this method of logging is relatively benign when compared to clearcutting.

**First, the term is shelterwood cutting, not logging. Shelterwood is a specific, technical term commonly used in forestry, (Terminology of Forest Science, 1971,**

**1977, and The Dictionary of Forestry./John A. Helms, 1998). The request for analysis and comparison to clearcutting is moot because the shelterwood or regeneration cut is already completed. What we are proposing is the Removal Cut. It is an intermediate cut, a thinning, except it is done for improving growing conditions of the new stand instead of larger trees. While shelterwood harvests may have some similarities to clearcutting in providing specific kinds of early successional wildlife habitat or tree species, it is different, overall, and the effects are disclosed in the Environmental Consequences Section. In addition, the GM Forest Plan makes a clear distinction between these different types of harvests in the glossary and discussions of harvest systems and their use in achieving specific Forest Plan Goals and Objectives on Plan pages 4.59 – 4.73 and A.01 –A.09.**

13. There is concern about the capability of the project areas to regenerate and for young trees to reach maturity in light of a recent study at the Hubbard Brook Experimental Forest, which strongly suggests that the total biomass of the White Mountain National Forest is not increasing, and that this failure of the forest to grow is probably due to the effects of acid rain.

**The areas proposed for logging have already been regenerated, which is why a Removal Cut harvest is in order. While acid rain has effects on higher elevation forests, especially spruce-fir, its negative effects on oak and hardwood forests and Vermont soils, is less measurable. Observations of our timber staff indicate that hardwood stands continue to develop and grow to maturity normally. Oak stands continue to age especially since harm from gypsy moth has been reduced. Concern over oaks inability to regenerate in its own shade is discussed in this EA. The state of Vermont, along with the Forest Service has recently published an informative pamphlet ( Forests in the Green Mountain State: A half Century of Change, NE-INF-142-01). This pamphlet provides the results of long term monitoring of the condition of Vermont forests. It indicates forests are growing well in Vermont. The amount of forest in Vermont has increased 2% since 1983 and 24% since 1948. Trees have increased in size and in number. This increase in the number of trees has occurred in trees greater than 8 inches. As trees have increased in size and in numbers, volume per acre has increased too. Volume per acre has steadily increased since 1966 from 14.4 cords/acre to 26.1 cords/acre. We grow more trees than we cut each year.**

**In Vermont, the net growth of trees has exceeded removal since 1948. About twice as much wood has been grown than was cut or otherwise removed. Our trees are healthy. About 90% of the trees measured for dieback (a sign the tree has health problems) had little or no dieback. Acid rain and its effects continue to concern land managers but there is no clear indication that the forest management in our project proposal needs to be curtailed because of it.**

14. Non-winter harvesting - will this occur in any of the alternatives? If so, effects on soil compaction, erosion, herbaceous plants, stream siltation, bird populations, needs to be considered..

**Only winter harvesting is proposed.**

15. Some people believe that a greater diversity of tree ages and sizes within the stands would be achieved if the overstory were left uncut.

**This comment is noted.**

16. What are the current health problems in the stands where crown dieback is occurring - if that is to be a justification for their removal, what would be the social, economic and ecological implications of not cutting these trees now.

**The justification for tree removal and discussion of stand condition is disclosed in the purpose and need section of the EA. The implications of not cutting these trees now is covered under the No Action Alternative.**

17. There is concern about the ecological, economic and social implications of removing the rare and ecologically important oak trees on a forest where regenerating oak trees is acknowledged as risky and difficult, especially when it seems oak regenerates well in partial shade, unevenaged conditions and on "natural" sites where no cutting has occurred for several decades.

**We do acknowledge that oak regeneration has some risks and have explained the background of the proposal, the purpose and need for this project and our strategies in the description of alternatives and effects of alternatives and the Proposed Action. Our experience and that of other experts in silviculture in New England indicate that oak is generally considered an early to mid-successional, shade intolerant species and needs disturbance and plenty of sunlight to regenerate and to become well established.**

18. There is a concern that the proposal calls for logging a considerable amount of red oak, and that this not feasible due to findings that it is difficult to regenerate red oak on the GMNF and that the red maple is rapidly displacing red oaks in the forests of the northeast.

**We have developed a range of alternatives to address this concern, as well as described the associated effects - please see the Issues, Alternatives Considered and Environmental Consequences sections. In addition, we have not noted that red maple is rapidly displacing red oaks on this forest.**

19. I am strongly opposed to continuing present management in stands 19 & 20 and would like to see a reconsideration of the management goals for the entire area, which is heavily used for forms of recreations also.

**Alternative 2, No Harvesting in Oak Stands was created to address this concern, and see also "Alternatives Not Considered in Detail," Section, which discusses why changes to management prescriptions and goals would not occur.**

### ***Recreation and Visuals***

20. Consider the impacts of removing the overstory on freedom from noise, scenic beauty and recreation opportunities.

**This is addressed in the Environmental Consequences Section of this EA.**

### ***Economics***

21. One person asked us to address the following questions: What are the costs involved in developing this sale that are paid with tax money? What funds, if any, will be returned to the Treasury as a result of this sale? What are the irreplaceable ecosystem values that are lost when logging occurs? All work done on this project uses federal funds.

**The question regarding what irreplaceable ecosystem values are lost when logging occurs is not within the purpose and need of this analysis. The actions in this proposal address changes and working towards desired future conditions described in the DEIS, ROD and Forest Plan for the various management areas (MA's) which reflects the benefits, goals, objectives and outputs of forest management on the GMNF.**

**See the Economics effects section for information regarding costs and revenues.**

22. One person asks if this sale will generate receipts in excess of preparation costs, and what portions of those receipts will be returned to the Treasury?

**The costs and revenues generated by the proposal and Alternatives are disclosed in the Economics section. Many factors affect the bottom line. The price of sawtimber fluctuates and will effect it. If project implementation can take place as scheduled it will increase the likelihood that receipts will exceed costs. If the project is appealed and litigated, than costs go up.**

23. One person is concerned that the Forest Service's commercial timber sales force private timber producers to compete with logs harvested at tremendous taxpayer cost, and that this reduces the value of private timber land, and increases the harvest of below-value timber. It is felt the analysis should reveal the effects of the timber sale program on timber values and cutting levels on private land.

**A recent study by USDA Forest Service about timber availability in the nine county area surrounding the New England National Forests can provide some additional information. The study indicates that timber purchasers seek out and pay more for NF timber as it is generally bigger and of high quality. This is because GMNF timber management addresses multiple uses and benefits to the public that are not easily given a cash value. The GMNF is not bound simply by the rate of return on the investment. Indeed, the deciding official should not decide on which alternative to select based on the most receipts generated.**

**National Forest timber sale offerings have not been offered for the last three years and past purchasers of GMNF timber have had to get all of their wood from private lands. We have received feedback that some of these lands are being overcut and timber and other resources may not be managed in a sustainable fashion.**

24. One person asks that we analyze and compare the economics of overstory removal as proposed and if delayed 40 to 50 years. They ask that we use both present net value analysis and a benefit cost analysis that does discount financial costs and values.

**This is not within the purpose and need for this analysis. Delayed shelterwood prescription does not fit the stand condition for stands in this proposal. The Forest Plan specifically directs when to apply standard shelterwood harvest versus delayed shelterwood harvest and given the history and current conditions, a delayed shelterwood prescription is inappropriate.**

25. One person asks that we provide a full and fair accounting of the financial costs of removing the overstory versus leaving it uncut.

**This is noted. Please see the Economic section.**

26. One person asks that we disclose and compare the economic-priced and unpriced, market and nonmarket-values of removing the overstory with the values of leaving it uncut.

**This is noted. Please see the Economic section.**

### **General**

27. The forest should support a complete range of plant and animal species. Northern hardwoods should contain canopy dominants in the 300-400 year age class, as well as a range of replacement trees. Consider the best way to move the proposed stands to unevenaged stands with large canopy-dominants.

**This comment is noted. Sixty two percent of the GMNF is already determined to be unsuitable for timber management as outlined in the Forest Plan and older trees will be a component there. MA's 2.1A, 2.1B, 2.2A, 2.2B, 5.1, 6.1, 6.2B, 8.1A, 8.1D, 8.1F, 8.1G, 8.1J, 8.1K, and 8.1M will move the Forest toward conditions where those older trees will be a component of the Forest. The goals, objectives, silvicultural systems, rotation ages to use on suitable lands for timber management in the Management Areas involved in this proposal are already set in the Forest Plan and guide us in managing these areas now.**

28. Please analyze and discuss whether the no-action or restoration alternatives would maximize public benefits by enhancing the Green Mountain National Forest's recreational, biological and ecosystem services values.

**Refer to the Environmental Consequences section for discussion of the effects of the No-action alternative. Refer to the Alternatives Not Considered in Detail section for discussion of a restoration alternative.**

29. If you feel you must manage our Forests, then please manage them for old growth...When I go to the GMNF, I want to see a big old forest, not a logging operation.

**Refer to Affected Environment Section for Silviculture under the Proposed Action. Note that only one-third of the GMNF is available for commercial harvesting, about 140,000 acres within the entire 385,000 acres. Thus, commercial harvesting does not occur on the remaining acreage, and these trees will eventually become old growth (note the high percent of existing mature trees in Figure 2 of this EA). See also responses to comment numbers 27 and 35.**

30. On the Toll Road section of the proposed project area, we request that the trucks go west on FR 296 to Route 125 rather than east.

**This would occur if the Proposed Action or Alternatives 2 or 3 were selected (and not under the No Action Alternative).**

31. Since NEPA environmental documents were produced on the original timber sales which resulted in the first cuts of this shelterwood, we urge you to use that previous analysis to the extent possible to in order to lessen the costs of the project and eliminate the need to re-do a lot of work.

**All previous analyses have been incorporated into the current analysis. Moreover, an up to date analysis is needed and required under NEPA in order to base decisions on the most recent and best available science.**

32. This is basically a small project. We hope to see more in the way of forest management in Granville since 25% of the proceed benefits our schools and roads.

**This comment is noted. Moreover, note the *Secure Rural Schools and Community Self-Determination Act of 2001* (Secure Schools Act) is an attempt by Congress to stabilize the payments that used to be based upon income generated by the National Forest (the 25-Percent Fund) to National Forest communities. This act will be revisited in 2006 to see if communities are more satisfied with the new, more stabilized “full payment” or whether they want to stay with the 25-Percent formula, or whether there is some other better way to administer this funding. In Fiscal Year 2001, each school district affected by the Green Mountain National Forest made a choice about whether they wanted to try the “full payment” or stay with the 25-Percent Fund. Those school districts that chose the 25-Percent Fund will be able to rethink their choice every two years until 2006.**

**The U.S. Forest Service prepares reports based on the “historical percentage” received by a county. For this reason, the FY 01 payment varied from \$0.12 per acre in Granby to \$1.02 per acre in Granville.**

**Note: The Green Mountain National Forest is proposing distribution of the money between towns based on current acreage and not historical percentage. However, this has not been approved as yet by the Vermont Treasurer’s Office.**

### ***Public Opinion***

33. The Forest Service must take into account public opinion as the National Forests belong to all U.S. Citizens, not to the logging corporations. The present process of soliciting public input on timber sales is inadequate.

**This proposal is to implement the current Forest Plan, which was created with extensive public involvement. Refer also to the public involvement section of this EA, which describes the public involvement process to date for this particular proposal. Moreover, this EA is being made available for a 30 day public comment period, where feedback from the public will again be taken into consideration.**

34. We recommend another 30 day comment scoping period with an effort made to reach additional members of the public.

**See response to the comment above.**

### ***Biodiversity and Forest Fragmentation***

35. Some people are concerned that our analysis only reflects local conditions, while the problem of forest fragmentation is in the entire bioregion, and increasing edge-habitat and forest fragmentation elsewhere makes incumbent the preservation of the remaining stands of continuous forest cover. The true need for large tracts of forest must be addressed.

**The project does not increase edge habitat, and the current mosaic of forest stands around the N ½ OSR stands will remain the same. In the Northeast, increases in forest and decreases in shrubland and grassland habitat is a trend that is putting some species at risk. Ninety eight percent of the GMNF is forested and a large percentage of the private land within the Proclamation Boundary is forested. Sixty five percent of the GMNF is a mature and over-mature forest.**

36. Conversely, some people believe our analysis should quantify the degree of fragmentation within the project area that has already taken place, and will occur as a result of the various alternatives. These patterns should be compared with historical patterns that existed prior to human disturbance. Considered amount and distribution of late successional and mature forest habitats, edge effects, and population viability for those species most prone to fragmentation effects.

**Please see the above comment and response, and response to comment number 27.**

37. Analysis must consider cumulative as well as site specific impacts of logging on biodiversity. What is the potential role of this site in relation of the overall region? Consider the effects of disturbance on a diversity of species, including TES species, parasitism, predation, population size and distribution, structure and reproductive success.

**Direct, indirect, and cumulative effects are discussed in the Environmental Consequences Section of the EA. Effects to TES species is described in detail in N ½ OSR BE and**

summarized in the Environmental Consequences Section of the EA. The 266 acres within the Project Area are currently available to species utilizing early successional habitat. The benefits and impacts of the current habitat communities to TES species, MIS species, reclusive species, songbirds, white-tailed deer, and reptiles and amphibians is discussed in the Environmental Consequences Section of the EA. The project has been determined to have no effect locally on TES species, MIS species, Reclusive species, songbirds, white-tailed deer, or reptiles and amphibians and the project would likewise be insignificant to wildlife species regionally.

The fact that 83% of the GMNF is Northern hardwood forests and that 90% of the forested communities are more than 39 years old is limiting opportunities to improve forest biodiversity. The continued aging of the forest will limit habitat for species that are dependent of disturbance. The management of 5% of the land base in Vermont (the total extent of the GMNF), in and of itself, is unlikely to significantly impact populations of any of the songbirds utilizing the Green Mountain National Forest. It is, arguably, of greater importance for the GMNF to be positioned so as to provide habitats that are regionally lacking, or in decline, (in particular, early successional habitat), to insure the continued opportunity for birds needing these habitats in the future, as well as for improved biodiversity of the forest.

38. "What will be the impact on herbaceous understory? Will they ever recover from the effects of previous logging? Have comparative inventories of understory plants been conducted before and after timber sales on the Green Mountain National Forest? Has the Forest Service conducted a complete inventory of all understory plants on the proposed site? "

Prior to this proposed harvest, just as with any other ground-disturbing project, a botanist surveys all potential rare plant habitat for plants that are on the RFSS (Regional Forester's Sensitive Species) list. Any plants on the RFSS list that are found are protected through mitigation measures and/or their entire habitat is removed from the project area, and monitoring is scheduled to occur post-harvest, to ensure the mitigation measures were properly implemented and effective. While all-encompassing studies of the herbaceous layer of the Forest pre- and post-harvest have not been conducted, there is evidence to suggest that this layer survives relatively intact: 1) The sites which are part of this proposed project had a shelterwood cut several years ago, but the ground flora (herbaceous layer) is comparable to the ground flora observed in more mature stands that have not been harvested in many decades; 2) Previous monitoring for a rare plant population in the same general vicinity occurred pre- and post-harvest, with results indicating no harm to the rare species.

In addition, at the present time, the stands in which overstory removal is proposed already have a substantial layer of saplings generated as a result of the initial shelterwood cut; thus, the removal of some remaining overstory trees is not likely to result in a change in light regime for these species. Finally, because most of Vermont was open land in the early 1900's, there is little opportunity to compare the herbaceous understory of these and other stands to "old growth" stands. The one "old growth" stand on the north half of the Forest (The Cape, MA 8.1D) is very rich due to a combination of factors that do not exist elsewhere on the Forest, so it is not a good site to use to compare the ground flora of stands of a variety of ages.



## **APPENDIX B: BIOLOGICAL EVALUATION**

### **EXECUTIVE SUMMARY - BIOLOGICAL EVALUATION**

#### **THREATENED, ENDANGERED, SENSITIVE SPECIES**

A Biological Evaluation (BE) was prepared for Threatened, Endangered, and Sensitive (TES) Plant and Animal Species for the proposed North Half Overstory Removal project activities scattered throughout the North Half of the Green Mountain National Forest (GMNF). The Proposed Action would complete the second step of a two-step shelterwood cutting system that is used to regenerate even-aged stands of Northern hardwood tree species. Timber stands proposed for this work are located in the towns of Salisbury, Ripton, Granville, Hancock, and Rochester, within Addison, Washington, and Windsor Counties, in the State of Vermont. The BE included a prefield analysis of available information, and identified 1 Federally listed animal species and 1 Regionally Sensitive animal species as having potential or suitable habitat in the project area. Recent surveys have discovered that the Federally listed animal and the Regionally Sensitive animal are known to occur along the western edge of the GMNF in Addison County. Both species were discovered on private land near one of the project area stands in the town of Salisbury, Addison County, Vermont. The BE also identified five Regionally Sensitive plant species as occurring in the project area, and fourteen others as having potential habitat there. (There are no federally listed plant species on the GMNF.)

The affected environment for the BE's effects analysis includes the stands being treated along with those areas directly adjacent to the treated stands. These stands include a variety of Northern hardwoods, Northern hardwoods mixed with spruce, sugar maple stands, and red oak stands. Based upon the BE's analysis of effects, determinations were made that none of the Federally listed species tracked for the GMNF would be affected by the Proposed Action or its alternatives, due to lack of occurrences or use of proposed sites, the absence of critical habitat in the project areas, and the timing of project implementation which coincides with hibernation of the two listed species. The project area is at least six miles from known hibernacula. The BE also determined that although the projects may impact individuals or habitat for one of the Sensitive animal species and nineteen Sensitive plant species, they are not likely to contribute to a trend towards Federal listing or to a loss of viability to the population or species. Also, four mitigation measures for plants have been suggested, which are discussed in detail in the BE.

**Biological Evaluation  
for  
Threatened, Endangered, and Sensitive Species**

**North Half Overstory Removal Project**

Green Mountain National Forest  
Towns of Salisbury, Ripton, Granville, Hancock, and Rochester  
Addison, Washington, and Windsor Counties, VT

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## **Biological Evaluation for Threatened, Endangered, and Sensitive Species North Half Overstory Removal Project**

### **Introduction**

The purpose of this document is to determine the effects of the proposed North Half Overstory Removal Project on threatened, endangered, and sensitive plant and animal species within the Green Mountain National Forest in the towns of Salisbury, Ripton, Granville, Hancock, and Rochester, within Addison, Washington, and Windsor Counties, in the State of Vermont. The overstory removal work is prescribed for 19 stands, throughout the GMNF, totaling 266 acres. These stands consist of a variety of Northern hardwoods, sugar maple stands, red oak stands, and Northern hardwoods mixed with spruce. Specifically, the work in these stands consists of timber harvesting that would complete the second step of a two-step shelterwood cutting system. In stands designated for overstory removal, timber harvest of more of the remaining mature trees will occur. The harvest will occur in winter only. A number of small wetlands and rare plant populations will be flagged as exclusions from the sale area.

To determine which TES species could be affected by these harvest activities, the following "Likelihood of Occurrence" (LOO) tables (Appendix Tables 1A & 1B) were completed. In these tables, all TES species tracked by the Green Mountain National Forest (GMNF) are listed along with their status and a brief description of habitat requirements. These requirements are compared to existing habitat within the project area and existing data on species from Forest files, records of the Vermont Nongame and Natural Heritage Program, available research literature, various field surveys, and personal communication with TES specialists. This comparison is then used to determine the likelihood of occurrence for each TES species in the project area.

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Appendix Table 1A. – Likelihood of Occurrence Table for Biological Evaluation of Threatened, Endangered, and Sensitive Animals; Project, Town, County, Vermont

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## LIKELIHOOD OF OCCURRENCE (LOO)

### THREATENED/ENDANGERED SPECIES

Format: Name/Status/Habitat/Green Mountain NF Distribution LOO

#### BIRDS

Bald Eagle (*Haliaeetus leucocephalus*) - T/G4/N4B/E

Nests in tall trees or on cliffs near large rivers or lakes. Not known to nest in Vermont or the GMNF. Known to migrate through the Forest.

**LOO: Unlikely;** no nesting habitat adjacent to large water bodies within the project area.

#### MAMMALS

Gray Wolf (*Canus lupus*) - E/G4/N4/SH

Requires large tracts of wild lands in coniferous and mixed Northern hardwoods/coniferous forest that have suitable numbers of available wild prey and low human densities. Not known to be present on the GMNF or in Vermont.

**LOO: Unlikely;** extirpated in the Northeast.

Eastern Cougar (*Felis concolor cougar*) - E/G5TH/NH/E

Requires large, remote hardwood or mixed forests with an availability of wild prey.

Recently documented in northern Vermont in Orleans County and other non-confirmed sightings in other parts of the State. Not known to be present on the GMNF.

**LOO: Unlikely;** endangered in Vermont with recent isolated reports of occurrence outside the Forest.

Indiana bat (*Myotis sodalis*) - E/G5/N2/E

For winter habitat, this bat hibernates in limestone caves or mines. For summer habitat, it roosts in trees with cavities or exfoliating bark. Riparian areas provide important foraging habitat and travel corridors. Surveys conducted in the spring and summer of 2001 found Indiana bats in the Champlain Valley and on the western edge of the GMNF. Previous surveys on the Forest between 660 feet and 2200 feet elevation did not find any Indiana bats. Radio telemetry work conducted in New York in 2001 revealed that some Indiana bats migrated to the Champlain Valley, Addison County, Vermont. Radio telemetry and surveys in 2002 further validate the findings that some woodlots with shagbark hickories and other suitable roost trees that are at least 3 miles from the Proclamation Boundary are roost sites for Indiana bats. One female Indiana bat was discovered adjacent to GMNF land in Compartment 65. Radio telemetry shows that this individual is roosting away from the GMNF at a known maternity colony 3.7 miles northwest of Compartment 65. It is not known whether the Indiana bat was foraging in the Compartment 65 area or just traveling through the area. For the purpose of this BE it will be assumed that a foraging Indiana bat was discovered. Winter hibernacula surveys in 2002 found a number of Indiana bats in the Brandon Silver mine, approximately eight or more miles from the project area. Further

details on habitat needs and recent survey findings may be found under the Analysis of Effects section of this document.

**LOO: Possible.** This project is scheduled to be implemented during winter months (the hibernation period for Indiana bats); no winter habitat for Indiana bat is known within the project area. Possibility exists that Indiana bats could use Compartments 46, 50, and 65 of the project area during the non-hibernation period (summer); however, this possibility is limited by location of the project area, higher elevations, and tree species composition and habitat conditions on the GMNF not similar to those found at known roost sites in Vermont.

Lynx (*Lynx canadensis*) - T/G4G5/N4?/E

Requires boreal (coniferous) forest and good snowshoe hare habitat. There are no known occurrences currently in Vermont or on the Forest, although known historically to have occurred on the Forest. Records indicate that historic occurrence was uncommon.

**LOO: Unlikely;** extensive boreal communities not present in the project area; abundant snowshoe hare population not known from project area.

## PLANTS

No federally listed Threatened and Endangered plants are found on the GMNF.

## **SENSITIVE SPECIES**

### BIRDS

Peregrine Falcon (*Falco peregrinus*) - \_\_/G4/N3/E

Requires high cliffs with clear views of surrounding areas for nesting. Can also be found nesting on buildings, bridges, or the ground. Known from cliff sites on the Forest in Addison and Rutland Counties. Historic occurrence on other cliff sites within the Forest are known.

**LOO: Unlikely;** no suitable nesting habitat within the project area.

Common Loon (*Gavia immer*) - \_\_/G5/N4N5/

Large and small freshwater lakes both in open and densely forested areas for breeding. Wintering: coastal bays and inlets from Maritime Provinces south. Known in Rutland County on the Forest in 2001.

**LOO: Unlikely;** no suitable habitat within the project area.

Bicknell's Thrush (*Catharus bicknellii*) - \_\_/G3G4/N3N4/S3B,SZN

Coniferous forests above 3000 feet; spruce-fir krummholtz. Known from Forest in Addison, Bennington, and Windham counties at high elevations.

**LOO: Unlikely;** project area not within high elevation/krummholtz zone.

### MAMMALS

Eastern small-footed bat (*Myotis leibii*) - \_\_/G3/N3/T

Requires caves, old buildings, mines, rock crevices, and hollow trees for roost sites. Will use aspen, conifers, upland openings, and wetlands, usually up to 2,000 feet elevation.

Known from the only hibernaculum on the Forest in Windsor County in the town of Stockbridge. Summer habitat is poorly understood. Recent summer surveys on the Forest

and also adjacent to the Forest have found Eastern small-footed bats in Compartment 65 and at other locations at least 4 miles west of the GMNF.

**LOO: Possible;** This project is scheduled to be implemented during winter months (the hibernation period for eastern small-footed bats); no winter habitat for eastern small-footed bat is known within the project area. Possibility exists that eastern small-footed bats could use rock crevices and hollow trees in the project area during the non-hibernation period (summer).

### AMPHIBIANS

Jefferson Salamander (*Ambystoma jeffersonianum*) - \_\_\_/G5/N5/S2

Requires undisturbed damp, shady deciduous or mixed woods, bottomlands, swamps, ravines, moist pastures, or lakeshores. Requires temporary pond for breeding period. Known in the Champlain Valley, western edge of the Forest in Bristol, VT.

**LOO: Unlikely;** not known to occur near the project area.

### REPTILES

Wood Turtle (*Clemmys insculpta*) - \_\_\_/G4/N4/S3

Requires slow moving meandering streams with sandy bottoms and overhanging alders. Moves from water sources during summer months to fields, woods, and roadsides. Not known in the project area.

**LOO: Unlikely;** not known to occur near the project area.

### MOLLUSKS

Brook floater (*Alasmidonta varicosa*) - \_\_\_/G3/N3/S1

Requires firmly-packed sand and gravel stream bottoms of small rivers and streams. Known from the West River in Windham County along the proclamation boundary of the Forest.

**LOO: Unlikely;** no streams with required substrates in the project area. Only occurrence far from project area.

Creek Heelsplitter (*Lasmigona compressa*) - \_\_\_/G5/N5/

Known on Otter Creek headwaters in Mt. Tabor.

**LOO: Unlikely;** no sandy river banks in project area; only occurrence far from project area.

### INVERTEBRATES

Black-tipped Darner (*Aeshna tuberculifera*) - \_\_\_/G4/N4/S2/

Requires undisturbed damp, shady deciduous or mixed woods, bottomlands, swamps, ravines, moist pastures, or lakeshores. Requires temporary ponds for breeding period.

**LOO: Unlikely;** not known to occur near the project area.

Green-striped darner (*Aeshna verticalis*) - \_\_\_/G5/N5/

Requires undisturbed damp, shady deciduous or mixed woods, bottomlands, swamps, ravines, moist pastures, or lakeshores. Requires temporary ponds for breeding period.

**LOO: Unlikely;** not known to occur near the project area.

Lilypad Clubtail (*Arigomphus furcifer*) - \_\_\_/G5/N5/

Requires lily ponds for breeding.

**LOO: Unlikely;** no suitable habitat within the project area.

Superb Jewelwing (*Calopteryx amata*) - \_\_/G5G4/N4

Requires cold clear streams.

**LOO: Unlikely;** not known to occur within or near the project area.

Cobblestone Tiger Beetle (*Cicindela marginipennis*) - \_\_/G2/G3/N2/N3

Restricted to cobblestone islands and deltas in large rivers. In Vermont, known only from the Connecticut, Winooski and White rivers.

**LOO: Unlikely;** no suitable habitat within the project area.

Harpoon Clubtail (*Gomphus descriptus*) - \_\_/G4/N4

Requires streams and small rivers.

**LOO: Unlikely;** not known to occur within or near the project area.

Mustached Clubtail (*Gomphus adelphus*) \_\_/G4/N4

Requires rocky streams.

**LOO: Unlikely;** known in the Deerfield River. Not known within the project area.

Southern Pygmy Clubtail (*Lanthus vernalis*) - \_\_/G4/N4

Requires small cold brooks. Is also associated with brook trout streams.

**LOO: Unlikely;** known in Bourne Brook. Not known within the project area.

Amber-winged Spreadwing (*Lestes eurinus*) - \_\_/G4/N4

Requires shrubby borders of bog ponds.

**LOO: Unlikely;** no suitable habitat within the project area.

Maine Snaketail (*Ophiogomphus mainensis*) - \_\_/G5G4/N4

Needs small streams and sometimes will inhabit rivers.

**LOO: Unlikely;** Not known within the project area.

Ski-tailed Emerald Dragonfly (*Somatochlora elongata*) - \_\_/G5/N5/S2

Requires marshy ponds.

**LOO: Unlikely;** not known within the project area.

Forcinate Emerald (*Somatochlora forcipata*) - \_\_/G5/N4/S2

Requires small bog streams.

**LOO: Unlikely;** not known within the project area.

Ocellated Emerald (*Somatochlora minor*) - \_\_/G5/N4/S2

Requires small slow flowing streams. Known from two locations of the Manchester District of the GMNF – two small streams south of Griffith Lake.

**LOO: Unlikely;** no suitable habitat within the project area.

**Appendix Table 1B. - Likelihood of Occurrence Table for Regional Forester's Sensitive Plants**

[NORTH HALF OVERSTORY REMOVAL, TOWNS OF SALISBURY, RIPTON, GRANVILLE, HANCOCK, AND ROCH WASHINGTON, AND WINDSOR COUNTIES, VERMONT]

Date: 08/10/2001

SPECIES	HABITAT REQUIREMENTS	EXTANT OR HISTORIC OCCURRENCES IN ANALYSIS AREA	HABITAT SUITABILITY OF ANALYSIS AREA	SURV CONDUCT ANALYSIS
<b>Agrostis mertensii</b> Arctic bentgrass	Alpine meadows on mountaintops in northern Green Mountains; known on Forest only from Lincoln.	None	Not suitable; the project area is not this high in elevation	Not for this
<b>Aureolaria pedicularia</b> Fernleaf yellow false-foxtail	Dry hills, woodland character – oaks in southern VT; known on Forest only from Salisbury.	None	Marginally suitable; although the geographic area is right, the oak stands within the project area are more mesic	Yes
<b>Blephilia hirsuta</b> Hairy wood mint	Rich woodland seeps; the only two extant populations are associated with trailside seepy areas; often hidden under <i>Laportea</i> (nettles); associated with limy soils up to 2500' elevation; known in VT only from Forest, in Leicester and Chittenden.	None	Suitable habitat in some places	Yes
<b>Calamagrostis stricta ssp. Inexpansa</b> New England northern reed grass	Wet, seepy, limy cliffs, low elevation to subalpine in Green Mountains; possibly limy wetlands at base of limy cliff; known on Forest only from Salisbury.	None	Marginally suitable; although the geographic area is right, the only rock outcrops seen in field surveys were not extensive, and the vegetation suggested nutrient accumulation in the soil at the base of the rocks, rather than on the rocks, themselves	Yes

SPECIES	HABITAT REQUIREMENTS	EXTANT OR HISTORIC OCCURRENCES IN ANALYSIS AREA	HABITAT SUITABILITY OF ANALYSIS AREA	SURV CONDUCT ANALYSIS
<b>Cardamine parviflora</b> Small-flower bitter-cress	Dry, rocky, sometimes calcareous places at low-mid altitudes; known on Forest only from Rochester/Goshen.	None	Not suitable; we did not find these habitat types in the project area	Not for this
<b>Carex aestivalis</b> Summer sedge	Rich-mesic rocky woods, mid-elevations in southern VT; previously known on Forest only from Woodford and Danby, but found in Lincoln in 2001.	None	Suitable	Yes
<b>Carex aquatilis</b> Water sedge	Bogs, fens, wet meadows, pond margins throughout VT; known on Forest from Wallingford, Woodford, and Stamford.	None	Not suitable; the small wetlands we encountered during field surveys were not of these types and are geographically distant from the known populations	Not for this
<b>Carex argyrantha</b> Hay sedge	Limy cliffs and ledges in western VT; known on Forest only from Salisbury.	None	Marginally suitable; although the geographic area is right, the only rock outcrops seen in field surveys were not extensive, and the vegetation suggested nutrient accumulation in the soil at the base of the rocks, rather than on the rocks, themselves	Yes
<b>Carex atlantica</b> Prickly bog sedge	Scattered bogs, wet meadows, pond margins of VT; known on Forest only from Sunderland.	None	Not suitable; the small wetlands we encountered during field surveys were not of these types, and are geographically distant from the known population on the Forest	Not for this

SPECIES	HABITAT REQUIREMENTS	EXTANT OR HISTORIC OCCURRENCES IN ANALYSIS AREA	HABITAT SUITABILITY OF ANALYSIS AREA	SURV CONDUCT ANALYSIS
<b>Carex bigelowii</b> Bigelow sedge	Alpine meadows of Green Mountains; known on Forest only from Lincoln.	None	Not suitable; the project area is not this high in elevation	Not for this
<b>Carex foenea (=aenea)</b> Bronze sedge	Clearings, dry rocks of southern VT ( <i>aenea</i> ); open sands of western VT ( <i>foenea</i> ); known on Forest only from Salisbury.	None	Not suitable; we did not find these habitat types in the project area	Not for this
<b>Carex lenticularis</b> Shore sedge	Wetlands, shallow marshes, pond margins; known on Forest from Danby, Wilmington, Stamford.	None	Marginally suitable; although there are small wetlands in the project area, the project is 50 to 75 miles N of the species' distribution in VT	Not for this wetland loc have been and mitigal all wetland requested
<b>Carex michauxiana</b> Michaux sedge	Shallow and deep marshes associated with high elevation softwater ponds in southern Green Mountains; only known occurrences in VT on Forest, in Mount Tabor, Wallingford, Ripton.	None	Not suitable; although there are small wetlands in the project area, they are not associated w/ high elevation softwater ponds	Not for this
<b>Carex schweinitzii</b> Schweinitz's sedge	Calcareous swamps, wet meadows, low woods, wet ditches; Vermont Valley and Taconics – not known from Forest	None	Possibly suitable; there are small wetlands in the project area	Not for this wetland loc have been and mitigal all wetland requested

SPECIES	HABITAT REQUIREMENTS	EXTANT OR HISTORIC OCCURRENCES IN ANALYSIS AREA	HABITAT SUITABILITY OF ANALYSIS AREA	SURV CONDUCT ANALYSIS
<b>Carex scirpoidea</b> Bulrush sedge	High elevation calcareous cliffs scattered throughout VT; known on Forest only from Rochester/Goshen	None	Marginally suitable; although the geographic area is right, the only rock outcrops seen in field surveys were not extensive, and the vegetation suggested nutrient accumulation in the soil at the base of the rocks, rather than on the rocks, themselves	Yes
<b>Clematis occidentalis var. occidentalis (=verticillaris)</b> Purple clematis	Dry limy woodlands with thin soil or exposed limestone ledges, generally in moderate or full sun, usually in oak woods, generally in western VT; known on Forest only from Hancock, historically from Salisbury/Ripton.	None	Marginally suitable; the project is in the right geographic area, and some of the woods w/in the project area shows signs of enrichment, but are more mesic than dry	Yes
<b>Collinsonia canadensis</b> Canadian horsebalm	Rich mesic woods, generally low elevation and southern VT; known on Forest only from Bristol.	None	Suitable	Yes
<b>Conopholis americana</b> Squaw-root	Dry open woods (dry oak-pine, and dry oak-red maple) in southern and western VT; known on Forest only from Salisbury and Leicester.	None	Marginally suitable; the project is in the right geographic area, but the oak stands w/in the project area are more mesic	Yes

SPECIES	HABITAT REQUIREMENTS	EXTANT OR HISTORIC OCCURRENCES IN ANALYSIS AREA	HABITAT SUITABILITY OF ANALYSIS AREA	SURV CONDUCT ANALYSIS
<b>Cryptogramma stelleri</b> Steller's cliffbrake	Shaded cold damp crevices of calcareous cliffs and rocks (limestone or limy schist), scattered throughout VT; known on Forest only from Hancock and Mt. Tabor; historic from Dover, Salisbury, Chittenden, and Granville.	None	Marginally suitable; although the geographic area is right, the only rock outcrops seen in field surveys were not extensive, and the vegetation suggested nutrient accumulation in the soil at the base of the rocks, rather than on the rocks, themselves	Yes
<b>Cypripedium parviflorum var. parviflorum</b> Small yellow ladyslipper	Limy swamps with conifers, mostly Champlain Valley and southwestern VT; known on Forest only from Goshen.	None	Not suitable; we did not find these habitat types in the project area	Not for this
<b>Cypripedium parviflorum var. pubescens</b> Large yellow ladyslipper	Fertile, limy woods with rich, moist soil, under maples, mostly Champlain Valley and southwestern VT; known on Forest only from Salisbury	Yes	Yes	Yes
<b>Cypripedium reginae</b> Showy ladyslipper	Limy wetlands with conifers, including limy sphagnum bogs and fens, limy wooded conifer swamps, and limy shrub thickets adjacent to wooded swamps; low elevations, generally the big valleys (Champlain, Vermont, Connecticut) in VT; known on Forest only from Goshen, historic from Hancock.	None	Not suitable; we did not find these habitat types in the project area	Not for this

SPECIES	HABITAT REQUIREMENTS	EXTANT OR HISTORIC OCCURRENCES IN ANALYSIS AREA	HABITAT SUITABILITY OF ANALYSIS AREA	SURV CONDUCT ANALYSIS
<b>Desmodium paniculatum</b> Paniculate tick-trefoil	In VT, associated with dry, low altitude, open woods and woodlands, sometimes oak woods, in VT on limestone or limy schists; generally Champlain Valley in VT; known on Forest only from Salisbury, historic also from Salisbury.	None	Marginally suitable; the project is in the right geographic area, but the oak stands w/in the project area are more mesic	Yes
<b>Draba arabisans</b> Rock whitlow-grass	Cold limestone cliffs, often moist, in full sun or partial shade, in Vermont associated with Champlain Valley and other limestone areas; known on Forest only from Salisbury, also historic there.	None	Marginally suitable; although the geographic area is right, the only rock outcrops seen in field surveys were not extensive, and the vegetation suggested nutrient accumulation in the soil at the base of the rocks, rather than on the rocks, themselves	Yes
<b>Dryopteris filix-mas</b> Male fern	Rich, cool woodlands over calcareous bedrock or other limy substrate, mostly between 1300-2300' elevation; in VT seemingly restricted to an area from Brandon to Woodstock; known on Forest only from Pomfret and Bridgewater.	None	Marginally suitable; habitat is available, but geographic location is not within the expected range of its distribution	Yes
<b>Eleocharis intermedia</b> Matted spikerush	Muddy shores of ponds, scattered throughout VT, although only in circumneutral substrates on Forest; known on Forest only from Ripton and Wallingford.	None	Not suitable; we did not find these habitat types in the project area	Not for this
<b>Eupatorium purpureum</b> Sweet joe-pye weed	Limy, moist woods in central and western VT; known on Forest only from Salisbury.	Yes	Suitable	Yes

SPECIES	HABITAT REQUIREMENTS	EXTANT OR HISTORIC OCCURRENCES IN ANALYSIS AREA	HABITAT SUITABILITY OF ANALYSIS AREA	SURV CONDUCT ANALYSIS
<b>Geum laciniatum</b> Rough avens	Rivershores, damp places, in western VT and tends to be in limy areas; known on Forest only from Ripton, associated with <i>Polemonium vanbruntiae</i> .	None	Suitable	Yes
<b>Isoetes tuckermanii</b> Tuckerman's quillwort	Shallow waters on sandy shores of softwater ponds, mostly southern Green Mountains; known on Forest only from Wallingford, historic from Stratton and Wilmington.	None	Not suitable; we did not find these habitat types in the project area	Not for this
<b>Isotria verticillata</b> Large whorled pogonia	Acidic, open woods at low elevation in western VT, generally in oak-hardwood forests on escarpment; known on Forest only from Salisbury and Leicester.	None	Suitable	Yes
<b>Juglans cinerea</b> Butternut	Well-drained, circumneutral, gravelly soils in coves, stream benches, terraces, and talus of rock ledges; sometimes dry soil of limestone origin; generally riparian and below 1500'; several sites on Forest.	None	Yes	Yes
<b>Juncus trifidus</b> Highland rush	Alpine tundra and subalpine cliffs, limited to isolated sites in Green Mountains in VT; known on Forest only from Goshen/Rochester.	None	Not suitable; the project is not this high in elevation	Not for this
<b>Lespedeza hirta</b> Hairy bush-clover	Dry open woodlands and openings, in southern and western VT; known on Forest only from Salisbury.	None	Marginally suitable; the project is in the right geographic area, but the oak woods w/in these stands are more mesic	Yes

SPECIES	HABITAT REQUIREMENTS	EXTANT OR HISTORIC OCCURRENCES IN ANALYSIS AREA	HABITAT SUITABILITY OF ANALYSIS AREA	SURV CONDUCT ANALYSIS
<b>Listera auriculata</b> Auricled twayblade	Moist, sandy soils along streams with alder, or circumneutral mucky seeps; extant only from Warren off-Forest; historic from Hancock and Sunderland	None	Not suitable; the streams w/in the project area did not offer these specific microhabitats	Not for this
<b>Littorella uniflora</b> American shore-grass	Shores or shallow water of ponds, both soft and moderately hard water, scattered in VT; known on Forest only from Wallingford and Mt. Tabor/Peru.	None	Not suitable; we did not find these habitat types in the project area	Not for this
<b>Muhlenbergia uniflora</b> Fall dropseed muhly	Wet meadows and shores; assumed to be more common, but undocumented, in VT; known on Forest only from Stratton, historic from Ripton.	None	Not suitable; we did not find these habitat types in the project area	Not for this
<b>Myriophyllum farwellii</b> Farwell's water-milfoil	Softwater ponds, bog ponds, and slow streams, often at high elevations, southern and northern Green Mtns (not central); unconfirmed from Wallingford on Forest, and historic from Wallingford.	None	Not suitable; we did not find these habitat types in the project area	Not for this
<b>Myriophyllum humile</b> Low water-milfoil	Mudflats of softwater ponds, bog ponds, southern Green Mountains; known on Forest only from Stratton, unconfirmed from Wallingford, on private within Forest in Woodford.	None	Not suitable; we did not find these habitat types in the project area	Not for this
<b>Panax quinquefolius</b> Ginseng	Rich maple woods and coves, sheltered limestone soils with much humous, moist and in deep shade, scattered in VT; known on Forest from 9 stations.	Yes	Suitable	Yes

SPECIES	HABITAT REQUIREMENTS	EXTANT OR HISTORIC OCCURRENCES IN ANALYSIS AREA	HABITAT SUITABILITY OF ANALYSIS AREA	SURV CONDUCT ANALYSIS
<p><b>Pellaea atropurpurea</b> Purple-stemmed cliffbrake</p>	<p>Limestone outcrops (often sunny but occasionally in woodlands), generally west of Greens in VT; known on Forest only from Salisbury.</p>	<p>None</p>	<p>Marginally suitable; although the geographic area is right, the only rock outcrops seen in field surveys were not extensive, and the vegetation suggested nutrient accumulation in the soil at the base of the rocks, rather than on the rocks, themselves</p>	<p>Yes</p>
<p><b>Peltandra virginica</b> Green arrow-arum</p>	<p>Shallow water, mud in bogs or lakeshores, in southern and western VT; known from Forest only from Woodford/Stamford.</p>	<p>None</p>	<p>Not suitable; we did not find these habitat types in the project area</p>	<p>Not for this</p>
<p><b>Phegopteris hexagonoptera</b> Broad beech fern</p>	<p>Warm, rich maple or maple-oak woods, generally light, moist soils, on limestone, western VT and lower CT River Valley; known on Forest only from Leicester; historic from Salisbury.</p>	<p>None</p>	<p>Suitable</p>	<p>Yes</p>
<p><b>Platanthera orbiculata</b> Round-leaved orchis</p>	<p>Either fertile oak woods, usually limy, dry, and low elevation, OR boreal conifer woods, generally moist and mossy, up into subalpine, scattered in VT; known on Forest only in Granville and Leicester, with several Forest historic sites.</p>	<p>None</p>	<p>Suitable</p>	<p>Yes</p>
<p><b>Polemonium vanbruntiae</b> Eastern jacob's ladder</p>	<p>Wetlands and seeps, between 350'-1800' elevation; natural seeps circumneutral muck over sandy sediments; extant and extensive on Forest only in Ripton, Lincoln.</p>	<p>Yes</p>	<p>Suitable</p>	<p>Yes</p>

SPECIES	HABITAT REQUIREMENTS	EXTANT OR HISTORIC OCCURRENCES IN ANALYSIS AREA	HABITAT SUITABILITY OF ANALYSIS AREA	SURV CONDUCT ANALYSIS
<b>Potamogeton bicultatus</b> Snail-seed pondweed	Acid waters, southern VT; known on Forest only from Stratton, also on private in proc. bdry in Jamaica.	None	Not suitable; we did not find these habitat types in the project area	Not for this
<b>Potamogeton confervoides</b> Tuckerman's pondweed	Shallow water of isolated soft-water lakes, ponds, or shallow depressions; known from 7 ponds in Manchester District	None	Not suitable; we did not find these habitat types in the project area	Not for this
<b>Potamogeton hillii</b> Hill's pondweed	Small, cold, slow, highly alkaline streams and occasionally ponds; in association with limy bedrock, primarily Vermont Valley and Taconics; not known from Forest.	None	Not suitable; we did not find these habitat types in the project area	Not for this
<b>Prenanthes trifoliolata</b> Three-leaved rattlesnake-root	Cliffs, open woods, only known on Forest and in VT from one site in Salisbury	None	Suitable	Yes
<b>Pyrola chlorantha (=virens)</b> Green pyrola	Limy woods, moderate elevations, and limy swamps at lower elevations, scattered in VT; known on Forest only from Leicester.	None	Suitable	Yes
<b>Ribes triste</b> Wild red currant	Limy softwood swamps, and subalpine woods and ravines, especially on lime, scattered in VT; known on Forest only from Goshen, historic from Wilmington, Mt. Tabor, and Stratton.	None	Not suitable; we did not find these habitat types in the project area	Not for this
<b>Saxifraga paniculata (=aizoon)</b> White mountain saxifrage	Cold, high elevation limestone cliffs, only 5 isolated sites in VT; known on Forest only from Rochester/Goshen.	None	Not suitable; the project is not high in elevation	Not for this

SPECIES	HABITAT REQUIREMENTS	EXTANT OR HISTORIC OCCURRENCES IN ANALYSIS AREA	HABITAT SUITABILITY OF ANALYSIS AREA	SURV CONDUCT ANALYSIS
<b><i>Scheuchzeria palustris ssp. americana</i></b> Pod-grass	Sphagnum bogs and boggy margins of ponds, often limy, primarily southern and western VT; known on Forest only from Winhall, several historic from Wallingford and Sunderland.	None	Not suitable; we did not find these habitat types in the project area	Not for this
<b><i>Scirpus subterminalis</i></b> Incomplete bulrush	Softwater ponds and sphagnum bogs, to moderate elevations, scattered in VT; known on Forest only from Mt. Tabor/Peru, Jamaica on private within proc. bdry., and historic from Stratton.	None	Not suitable; we did not find these habitat types in the project area	Not for this
<b><i>Sedum rosea</i></b> Roseroot stonecrop	Subalpine limestone cliffs and rocks, exposed or shaded, often wet, only known from two sites in VT, one on Forest in Rochester/Goshen.	None	Not suitable; the project is not high in elevation	Not for this
<b><i>Selaginella rupestris</i></b> Rock spikemoss	Dry, warm rocks, usually schist or quartzite, occasionally lime, in full sun or partial shade, generally low elevations in oak zone; mostly Champlain and lower CT River Valleys; known on Forest only from Wallingford, unconfirmed from Bristol, and historic from Salisbury.	None	Not suitable; the rock outcrops we found in the project area were wet, not dry	Not for this
<b><i>Sisyrinchium angustifolium</i></b> Narrow blue-eyed grass	Wet meadows, low woods and thickets, damp shores, scattered in VT; known on Forest only from Lincoln.	None	Suitable; the understory of many of these sites could be described as a thicket, with so much tree regeneration	Yes
<b><i>Sisyrinchium atlanticum</i></b> Eastern blue-eyed grass	Meadows (damp or dry), swales, marshes, low woods, historic in southern VT; only extant station in VT is on Forest in Hancock, historic in Stratton.	None	Suitable; small wetlands occurred within the project area	Not for this wetlands w excluded fr project are through mi

SPECIES	HABITAT REQUIREMENTS	EXTANT OR HISTORIC OCCURRENCES IN ANALYSIS AREA	HABITAT SUITABILITY OF ANALYSIS AREA	SURV CONDUCT ANALYSIS
<b>Solidago squarrosa</b> Stout goldenrod	Open to partial shade (e.g. woodlands), dry soil, convex landforms, or outcrops of weathered, disintegrating rocks (e.g. slates, sandstones, granites), scattered in VT; known on Forest only from Rochester/Goshen.	None	Marginally suitable; the soil in most of the stands we visited would be described as wet, not dry, and rock outcrops were minimal	Yes
<b>Sorbus decora</b> Northern mountain-ash	Subalpine woods, often with lime, generally in Green Mtns in VT; known on Forest from Rochester/Goshen, Lincoln, Sherburne, and Mendon.	None	Not suitable; we did not find these habitat types in the project area	Not for this
<b>Sparganium fluctuans</b> Floating bur-reed	Tannic water ponds scattered in VT; known on Forest from sites in Wallingford, Mt. Tabor, Weston, Peru, Sunderland, unconfirmed at Stamford and Woodford.	None	Not suitable; we did not find these habitat types in the project area	Not for this
<b>Torreyochloa pallida</b> (= <i>Glyceria fernaldii</i> ) Fernald alkali grass	Pools, marshes bordering streams, floating bog mats on softwater ponds, scattered in VT; known on Forest only from Ripton and Sunderland.	None	Not suitable; we did not find these habitat types in the project area	Not for this
<b>Utricularia geminiscapa</b> Hidden-fruited bladderwort	Softwater ponds, in Green Mountains; known on Forest from Sunderland, Winhall, on private within Proc. Bdry. in Woodford, Searsburg.	None	Not suitable; we did not find these habitat types in the project area	Not for this
<b>Utricularia resupinata</b> Northeastern bladderwort	Sandy, muddy, or peaty shores of mountain softwater ponds, scattered in VT; known on Forest only from Stratton, historic from Jamaica.	None	Not suitable; we did not find these habitat types in the project area	Not for this

SPECIES	HABITAT REQUIREMENTS	EXTANT OR HISTORIC OCCURRENCES IN ANALYSIS AREA	HABITAT SUITABILITY OF ANALYSIS AREA	SURV CONDUCT ANALYSIS
<p><b>Uvularia perfoliata</b> Perfoliate bellwort</p>	<p>Rich, dry, calcareous woodlands, generally in western VT; known on Forest only from Salisbury.</p>	<p>None</p>	<p>Marginal; while the project is in the right geographic location, and the woods in some places show signs of enrichment, they are mostly more mesic</p>	<p>Yes</p>
<p><b>Vaccinium uliginosum</b> Alpine bilberry</p>	<p>Alpine and subalpine ledges, scattered on isolated mountaintops in northern VT; known on Forest only from Lincoln.</p>	<p>None</p>	<p>Unsuitable; the project area is not that high in elevation</p>	<p>Not for this</p>
<p><b>Woodsia glabella</b> Smooth woodsia</p>	<p>Cold, limestone cliffs, partial sun or shade, often wet and sheltered; also in limy talus at top of ledges, scattered, isolated cliffs in VT; known on Forest only from Rochester/Goshen.</p>	<p>None</p>	<p>Marginally suitable; although the geographic area is right, the only rock outcrops seen in field surveys were not extensive, and the vegetation suggested nutrient accumulation in the soil at the base of the rocks, rather than on the rocks, themselves</p>	<p>Yes</p>

\*NOTE: Any species determined **unlikely** to occur in the analysis area is not carried forward into the effects analysis of the Biological Determination for these species is that the Proposed Action and alternatives **will not impact** these species, and will not therefore threaten the GMNF, nor result in a trend towards Federal listing of these species.

## **Analysis of Effects**

### **Animals**

Determinations made in the LOO table dictate the level of analysis for each of the animal TES species. Any species determined unlikely to occur in the project area was not carried forward into effects analysis. Indiana bat and the Eastern small-footed bat may occur within the Compartment 46, 50, and 65 part of the project area during the summer. The federally listed Indiana bat and the Regionally Sensitive species, the Eastern small-footed bat, have been identified as having potential or suitable habitat in the project area. The effects analysis will therefore focus on these species. To implement U.S. Fish and Wildlife Service recommendations for mitigation regarding protection of potential summer roost trees, at least 5 suitable or potentially suitable trees will be reserved per acre. All shagbark hickory trees will be reserved and protected from damage caused by project implementation. An evaluation of direct, indirect, and cumulative effects for these species is documented below, with particular attention paid to the indirect impacts of proposed activities on habitat conditions, primarily foraging habitat and summer roost trees.

None of the TES species are known to have documented occurrences within the project area, either currently or historically.

#### **Affected Environment**

The affected environment for the analysis of effects, occurring in the N1/2 OSR project area, includes oak and hardwood stands and large trees that are either hollow or have exfoliating bark.

#### **Threatened and Endangered Species**

Indiana bat (*Myotis sodalis*)

#### **Background, Habitat Needs**

The Indiana bat is federally listed as endangered. Indiana bats are migratory and use considerably different winter and summer habitats. A detailed life history can be found in the U.S. Fish and Wildlife Recovery Plan (1999), Kiser et al. (2001), and LaVal and LaVal (1980). It is a winter hibernating mammal. Winter habitat includes limestone caves and mines, with preferably, forest habitat and riparian foraging habitat near cave entrances. In the summer, Indiana bats prefer woodlots, low woodlands, swamps, and field edges. In the central parts of summer range, Indiana and Ohio, a mix of woodlands and agricultural lands provides preferred foraging habitat. Central hardwoods, particularly shagbark hickory are preferred summer roost trees. Summer habitat includes trees with cavities or exfoliating bark used by the maternity colony, with riparian foraging areas nearby (Evans, 1988). Recent work in Vermont has found Indiana bats in habitats similar to those found in other parts of its range (Kiser et al., 2001). Solitary females or small maternity colonies bear young in hollow trees or under loose bark. Indiana bats tend to forage in the foliage of crowns of trees, along the shores of rivers and lakes, along streams and other travel corridors, and over floodplains. Recent evidence indicates that reproductive females may also forage or roost outside the riparian areas (Tyrell and Brack, 1990).

There is one known bat hibernaculum occurring on the Green Mountain National Forest, the abandoned Greeley talc mine in the Town of Stockbridge, Vermont, at least nine miles southeast of the project location. Wintering populations of Indiana bats are not known to inhabit this mine.

Information about bat use of the Green Mountain National Forest during non-hibernation periods has shown that Indiana bats occupy small woodlots in the Champlain Valley (Kiser et al., 2001). One male Indiana bat occupied GMNF land on the western edge of the forest at 1,000 feet elevation in the summer of 2001. Mist-netting was completed in the Compartment 46 part of the project area in 2001. The male Indiana bat had a radio transmitter attached and was followed to a 10" dbh, 24 foot tall dead red maple snag that had been girdled by GMNF crew during a precommercial thinning completed about ten years ago. The current condition of the tree, the network of open skid trails near the roost tree, and semi-open character of the stand contributed to the stand being chosen for roosting by that individual. Exit counts completed at the site found that one solitary male Indiana bat used the roost tree. That bat also used a lightning damaged white oak 100 feet away from the red maple. Radio telemetry work conducted in the spring of 2002 found female Indiana bats roosts no closer than 6 miles west of the Forest Proclamation Boundary. Mist-netting was completed within the Compartment 50 and 65 part of the project area occurred in July, 2002. One female Indiana bat was caught at the Lake Dunmore 2 net site (Compartment 65), at 0100, July 16, 2002. This site was on private land south of Compartment 65, Stand 20. A radio transmitter (Freq. 151.8386), was attached to this bat to obtain summer roosting and foraging information. The net sites, the area around stands 19 and 20, and other areas within a 2 ½ mile radius of the LD2 net site were checked on July 16, 2002 and the bat was not located. The first signal of this Indiana bat was discovered at 2200, July 16, 2002 at the intersection of Blake Roy Road and Columbus Smith Road in West Salisbury. Follow-up on July 17, 2002 found that 151.8683 was roosting in a large dead shagbark hickory tree at the Salisbury roost site. Indiana bats were known to roost in this tree in 2001. Follow-up work is continuing to look for other roost trees used by 151.8386. At least one other roost tree, (dead 12" dbh American elm) was found approximately ¼ mile to the east of the known shagbark hickory tree. One other Indiana bat (Freq. 150.0635), caught on the Middlebury River near Blake Roy Road also was tracked to the same shagbark hickory tree. Emergence counts at that roost site have found that over 200 bats are using that shagbark hickory tree. Bat 151.8683 was netted approximately 3.70 miles from its roost site. It is assumed that bat 151.8386 was caught foraging in Compartment 65. Other surveys conducted on the GMNF between 1998-2000 have not caught any Indiana bats. Tests of the survey protocol in 2001 proved that the methods work and if Indiana bats are present they can be caught using the protocol. One habitat feature found close to roost sites in Vermont that is obviously lacking within the project area as well as throughout most of the GMNF is agricultural fields or meadows. Roost sites tracked during 2001 and 2002 in Vermont and New York were frequently found next to open lands. It should not be overlooked that Indiana bats are choosing roost sites in woodlots in agricultural areas.

As expected, increased woodland bat surveying and tracking during the past four years has started to uncover additional winter and summer areas and also important migratory information. The Silver Mine in the town of Brandon, Vermont (nine miles west/southwest of the project location), was surveyed during fall swarming in September, 2001 and two male Indiana bats were caught during this survey. Winter hibernacula surveys in 2002 found 159 Indiana bats hibernating within this mine. Extensive wetlands, open agricultural lands, and some areas of oak-hickory-pine forests lie to the southwest, west, and northwest of this mine. Surveys completed in 2002 did not catch any Indiana bats but did find one Eastern small-footed bat. The

N1/2 OSR project area, northeast of the mine, is outside the area of influence (five mile radius) of the Silver Mine. It is likely that Indiana bats migrating from the Silver Mine can find summer habitat west, southwest, or northwest of the hibernacula within the Champlain Valley. As evidence of this, it was confirmed that one of the hibernating Indiana bats from the Silver Mine was caught and tagged in Salisbury, Vermont during the summer of 2001. This is the same location where bat 151.8386 was found roosting in 2002.

### **Environmental Effects**

The N1/2 OSR project area has no known mines or caves suitable for bat hibernation. The Proposed Action or any of the alternatives will therefore have no direct impact to hibernating Indiana bats. All timber harvesting activities will occur only in the winter, and therefore, would not directly impact Indiana bats in the summer months.

Indirect impacts to the species may result from timber harvesting activities affecting a portion of the summer habitat. The amount of available foraging habitat and the availability of roost trees can be limiting factors in offering suitable summer habitat conditions for attracting Indiana bats. None of the Alternatives will affect foraging habitat and the OSR stands will be available for foraging.

One measurable habitat variable that can be used as an indicator of preferable foraging habitat is stand density as measured by the amount of crown closure. Romme et al. (1995) indicated that overstory canopy closure of 50% to 70% is optimum for Indiana bat foraging. Lower stand densities generally translate into greater open or semi-open conditions, which in turn mean more ideal foraging conditions. Besides forested areas with these ideal canopy conditions, other areas that offer good foraging opportunities include early successional habitat, open and semi-open areas, travel corridors such as skid trails, riparian zones, and wetlands. The Proposed Action or alternatives do not meet recommended canopy closure and would likely not be preferred roost sites for Indiana bats. These stands could be used for foraging. The existing condition of the Compartments 46 and 65 stands do provide open and semi-open conditions for foraging bats. Following project implementation, these areas will still provide open foraging conditions.

### **Proposed Action**

There is considerable difference in the density of stands (canopy closure) that the Romme studies indicate as preferred foraging habitat, and the density of the stands within the N1/2 OSR project area. With the exception of the oak stands, the vast majority of the forested habitat in the project area is estimated to be between 20% and 35% crown closure.

Of the 282 stand acres proposed for timber harvest treatments, 266 acres would be directly affected. The Proposed Action would complete the second phase of the shelterwood harvest system for nineteen timber stands. The removal of the remaining overstory trees would not change the current habitat communities within these 19 stands. Currently these stands have been regenerated during the first phase of the shelterwood system and they are in a two-aged even aged condition. Open areas are important as travel corridors to facilitate movement and as sources of nocturnal insects that Indiana bats forage on. This is evidenced by the character of habitat where bats seemed to be found in the Champlain Valley region: wetlands and stream corridors, field edges, low woodlands, agricultural areas, and small woodlots bordered by fields and other open travelways.

The timber harvesting of the Proposed Action would open previously used, existing skid trails and landings, and may create new ones as needed. This would offer more opportunities for movement between roost sites, and for foraging. The infrequency of timber harvest entry on GMNF lands, including the N1/2 OSR project area, has allowed skid trails to become overgrown over time, and thus not provide these opportunities. Some of the sites where known roosting has been observed frequently tend to be old roads and skid trails that are re-opened from the ground to the bottom of the surrounding canopy, or are opened from ground to sky.

To mitigate the possible loss of potentially suitable roost trees, the Reasonable and Prudent Measures and Terms and Conditions found in the *Biological Opinion of the Effect of the Land and Resource Forest Management Plan and Other Activities on Threatened and Endangered Species in the Green Mountain National Forest and Incidental Take Statement* issued by the U.S. Fish and Wildlife Service on February 16, 2000 would be followed. This is in accordance with direction found in the recently approved Decision Notice and Finding of No Significant Impact for the Environmental Assessment for the Proposed Amendment of the Green Mountain National Forest Land and Resource Management Plan for Threatened, Endangered, and Sensitive Species, September 11, 2001 (TES Forest Plan Amendment). New and revised Forest Plan standards and guidelines resulting from this amendment would be applied to ensure that adequate numbers of roost trees will be retained in the project area. This, in turn, would ensure that the availability of roost trees would not be a limiting factor in offering suitable habitat.

At least five trees per acre, applied on a stand basis, would be retained within the project area. The “leave” trees may be found among the harvest sites and among the remainder of the unharvested stand areas. They may be scattered over the entire area of the stands, or clumped where desirable, to provide the greatest potential benefit for roosting. Areas of the stands not affected by harvest provide an existing source of potentially suitable roost trees, and would also continue to age, thereby providing future potential roost trees. Tallies of reserved trees within OSR stands in the Old Joe project showed that at least 7 trees per acre have been retained. It can be expected that similar numbers of reserved trees will be left in the N1/2 OSR project. These estimates exceed the minimum number of reserve trees per acre (five) recommended by direction in the TES Forest Plan Amendment and the Biological Opinion (2/00) of the Fish and Wildlife Service. Visual observations made in the areas adjacent to the harvest units also showed a substantial number of potential roost trees. Some potential roost trees may be removed but overall roosting habitat would remain in and around the N1/2 OSR project area.

The Proposed Action would affect 266 acres. This alternative would meet the purpose and need of the North ½ Overstory Removal timber sale. At least five trees per acre, applied on a stand basis, would be retained within the project area. Areas adjacent to the OSR stands would also retain all of their potential roost trees. The remaining potential roost trees in their current condition would be available to bats until they become unsuitable (bark falls off), or the trees fall down.

### **Alternative 1 – No Action**

This alternative would maintain the area in its present condition. This alternative would maintain all potential roost trees in their current condition and they would be available to bats until they become unsuitable (bark falls off), or the trees fall down. Although older trees in greater numbers would remain as potentially suitable roosting habitat in the No Action Alternative, other factors would continue to reduce the overall habitat suitable. Particularly the

reduced canopy closure of shelterwood stands may limit suitability except within the oak shelterwood stands where residual basal area is higher.

As such, this alternative would not provide some of the conditions that have been observed at known Indiana bat roost sites, and the N1/2 OSR project area may never fully attain the suitable habitat conditions for Indiana bats. Therefore, it is highly unlikely that Indiana bats would settle into the project area. The habitat needed to ensure the continued existence of the species would have to be found elsewhere.

### **Alternative 2 – No Harvesting in Oak Stands**

Alternative 2 (204 acres) would result in greater beneficial effects than the Proposed Action. These benefits would be derived from maintaining the overstory within the oak stands. It would provide more potential roost trees in a semi-open habitat condition. Since the oak stands generally are on the western edge of the Forest there is a slightly higher possibility that these areas would be used by Indiana bats. It should be noted that surveys conducted in Compartment 46 near stands 11 and 21 were unsuccessful in catching Indiana bats. Despite the greater beneficial effects produced by this alternative the overall impacts would not be substantial enough to create ideally suitable Indiana bat habitat, and therefore, would only be slightly more attractive to roaming bats.

The same mitigation measures and new and revised standards and guidelines for Indiana bats described in the Proposed Action, including measures to ensure that adequate numbers of potential roost trees would be reserved, would be applied for Alternative 2.

### **Alternative 3 – Modified Harvesting in Oak Stands**

Alternative 3 (237 acres) would result in greater beneficial effects than either the Proposed Action or Alternative 2 since it would partially open the canopy of the oak stands. These benefits would be derived from maintaining some of the overstory within the oak stands and choosing which overstory trees would be left. It would provide more potential roost trees in a semi-open habitat condition and would likely maintain a canopy closure similar to the Romme model. Since the oak stands generally are on the western edge of the Forest there is a slightly higher possibility that these areas would be used by Indiana bats. It should be noted that surveys conducted in Compartment 46 near stands 11 and 21 were unsuccessful in catching Indiana bats. There may be some beneficial effects produced by Alternative 3, but the location, aspect, and elevation of the oak stands would not be substantial enough to create ideally suitable Indiana bat habitat, and therefore, would only be slightly more attractive to roaming bats.

### **Cumulative Effects**

Past timber harvesting activities in or adjacent to the N1/2 OSR project area, including those areas in the vicinity of the Silver Mine, have been very small in scale and have done little to increase suitable habitat for Indiana bats. The forest has been growing, stand densities have been increasing, and little early successional habitat or open areas have been created.

As has been described above, the proposed harvesting for the N1/2 OSR Project would only slightly decrease the amounts of potentially suitable habitat (roost trees). Only the Compartment 65 stands are at elevations similar to where Indiana bats have been caught in Vermont. Although areas adjacent to the shelterwood stands in Compartment 65 are below 900 feet elevation, the stands conditions were not typical of other known roost sites in Vermont or elsewhere (Kiser,

pers.comm.). Understories were cluttered, having shrubs and saplings filling in the understory. There was some individual shagbark hickory trees found in the area however, those individuals were younger and appeared healthy. There was not a component of decadent large trees or large snags present where the Indiana bat was caught. These features are found at other roost sites in Vermont. All other removal stands are at or above 1000 feet elevation. None of the action alternatives would provide the habitat necessary to attract Indiana bats on a permanent basis.

The North Half Overstory Removal Sale (N1/2 OSR) is not a typical project area and is small shelterwood removals spread across the Northern Half of the Forest. Future harvests can be expected to be similar in size and scale to the Old Joe project. The implementation of the Old Joe project on national forest land, and the possible return entry to the Old Joe Sale in about seven years to remove the overstory from the proposed shelterwood harvest in stand 19 of compartment 158 are the only foreseeable actions within the area. The Old Joe project would impact 313 acres and the reentry into Old Joe for the overstory removal would impact only about eight acres, and since it would provide little or no additional open area, would have no impact. The N1/2 OSR sale is a proposed series of final harvests of past shelterwood sites and likewise, would result in no impact, positive or negative.

We can also expect some small-scale future harvesting to occur on private lands. There are no large industrial private timberlands in the project area. Any timber harvesting done on these small private lots would most likely be not greater in size and scale than the Old Joe or the N1/2 OSR proposals, and therefore result in little or no measurable impact.

In conclusion, the overall cumulative effects on habitat conditions would show a continued decline in foraging habitat as the project area and nearby areas grow more forested with higher stand densities. The continued lack of, and further decrease, in early successional habitat, open travel corridors and open areas would limit feeding and movement near the project area. The ability to provide an abundance of over-mature, declining, or dead trees through forest maturation in areas generally thought of as not likely to contain Indiana bats will not likely lead to expanded Indiana bat populations into those areas. Also of great consequence to Indiana bats is the current and expected condition of agricultural lands in and around the GMNF. As the GMNF habitat conditions continues to move further away from the known preferred Indiana bat habitat such as that found in the Champlain Valley region (open stand conditions where sunlight reaches roost trees; forest edges; early successional habitat and forest openings; mixture of forested areas and open or semi-open areas interspersed with past or present agricultural areas, and repeated entries within woodlot stands), it is highly unlikely that the population will expand into the project area. This could further elevate the importance of the known roost sites on private lands

### **Sensitive Species**

#### Eastern Small-footed Bat (*Myotis leibii*)

### **Background, Habitat Needs**

The Eastern small-footed bat is listed as a USFS Eastern Region sensitive species. Small-footed bats occur in or near woodlands in caves, mines, tunnels, buildings, and rock crevices up to 2,000 feet elevation (DeGraaf et. al., 1986 and Godin, 1977). They have been recently documented in the only known hibernaculum on the Green Mountain National Forest, the

abandoned Greeley talc mine in the Town of Stockbridge, Windsor County, Vermont. Summer habitat is poorly understood. Recent summer surveys on the Forest and also adjacent to the Forest have not found any Eastern small-footed bats until 2002. Surveys conducted during July, 2002 found Eastern small-footed bats at three sites in Addison County, Vermont.

### **Effects**

The effects of the N1/2 OSR proposed activities on Eastern small-footed bats and their habitat are the same or very similar to the effects described for Indiana bats. The project area has no known mines or caves, nor any documented history of subterranean "hollows" suitable for bat hibernation. This proposal would therefore have no impact to hibernating Eastern small-footed bats. All timber harvesting activities would occur only in the winter, and therefore, would not directly impact Eastern small-footed bats in the summer months. While summer habitat utilization is poorly understood, some potential exists that this species will utilize rock crevices or large hollow trees for roosting, in much the same manner as the Indiana bat.

### **Proposed Action, Alternative 2, Alternative 3**

As is the case for Indiana bats, a limiting factor in offering suitable habitat for Eastern small-footed bats can be the amount of foraging areas. The effects pertaining to foraging habitat produced by the activities of the action alternatives as described for the Indiana bat would be the same for the Eastern small-footed bat. See the discussion above.

The same mitigation as that described in the Proposed Action for Indiana bats would be applied to all action alternatives to ensure that adequate numbers of potential roost trees for use by Eastern small-footed bats would remain after harvest. Therefore, the availability of roost trees would not be a limiting factor in offering suitable habitat. As has been described above for Indiana bats, the proposed harvesting for the N1/2 OSR Project would only slightly increase or decrease the amount of suitable habitat.

### **No Action Alternative**

As described for the Indiana bat above, this alternative would provide the greatest amount of potential roost trees while also offering the same amount of improvement to foraging conditions. The effects to Eastern small-footed bats would be the same or very similar to those described above for the No Action Alternative's effects on Indiana bats.

### **Cumulative Effects**

See the discussion above under Cumulative Effects for the Indiana bat. The same conclusion might be drawn for Eastern small-footed bats but little specific information is available for summer habitat needs (roost sites). It is known that Greeley Talc Mine is an Eastern small-footed bat hibernacula however; surveys conducted over the past three years during the summer or fall have not caught any Eastern small-footed bats. Summer surveys in Vermont in 2002 found Eastern small-footed bats in three locations.

## Sensitive Species – Plants

### *Species that are present in the project area:*

Butternut (*Juglans cinera*)

Butternut is found in well drained, circum-neutral, gravelly soils in coves, stream benches, terraces, and talus of rock ledges; it is also sometimes in dry soil of limestone origin. It is generally riparian, tends to occur below 1500' in elevation (in Vermont), and is shade intolerant ([http://www.na.fs.fed.us/spfo/pubs/silvics\\_manual/volume\\_2](http://www.na.fs.fed.us/spfo/pubs/silvics_manual/volume_2)). Butternut occurs in several sites on the Forest, including the following compartments and stands that are part of this proposed project:

Compartment	Stand	Payment Unit
50	29	7
50	12	9
65	20	2

### Effects:

Without mitigation, there is the possibility that butternut trees would be cut down or damaged during overstory removal. These direct effects could occur in all actions except the “no action” alternative. However, concern over butternut’s population size is due mainly to loss of individuals through the butternut disease. Disease-resistant individuals have been located in the Midwest; twigs from resistant individuals can be grafted to walnut (*Juglans nigra*) rootstock, and these saplings can then be raised on seed farms, such as the one on the Rochester Ranger District (personal communication with Bob Burt, 1999). Thus, adverse effects to individuals present (e.g., death or injury) are not likely to jeopardize the viability of this species on the GMNF, nor lead to the species listing and protection under the Endangered Species Act. In addition, because butternut is shade-intolerant, any seedlings or saplings that are in the understory might benefit from the removal trees in the overstory, since they would then have less competition for light. Thus, any indirect effects on butternut as a result of this project may be positive, rather than negative. No cumulative effects to butternut are expected, since any potential loss of trees (if no mitigation occurs) would be balanced by enhanced habitat for butternut seedlings or saplings, if present.

### Mitigation:

To minimize the impact to butternut trees, we recommend that they not be harvested as part of this project. If mature butternut trees are not harvested, and immature seedlings and saplings, if they exist, respond to an increase of light that this project may cause, there will be no adverse impacts – direct, indirect, or cumulative – to this species; there may, instead be beneficial effects.

Large Yellow Lady’s Slipper (*Cypripedium parviflorum* var. *pubescens*)  
 Ginseng (*Panax quinquefolius*)  
 Sweet Joe-pye Weed (*Eupatorium purpureum*)

Large yellow lady's slippers grow in fertile, limy woods with rich, moist soil, under maples, mostly in the Champlain Valley and southwestern VT; they are known on the Forest only from Salisbury. Ginseng grows in rich maple woods and coves and sheltered limestone soils with much humus, where the soil is moist and in deep shade. It is scattered in Vermont, and known on the Forest from 9 stations. Sweet joe-pye weed grows in limy, moist woods in central and western Vermont; it is known on the Forest only from Salisbury. Northern hardwood communities showing signs of enrichment occur in several stands where overstory removal is proposed; both ginseng and large yellow lady's slippers were found in stand 19 in compartment 65, while neither was found during surveys of other stands. The sections of this stand where these species occur are more typical of enriched Northern hardwoods, although the overall stand is a red oak forest type. Sweet joe-pye weed is documented to occur along FR 106, the one-lane dirt road that provides access to this and other adjacent stands, including stand 20, which is also a proposed site for this project. Stand 20 is also a red oak stand.

#### Effects:

Because the proposed harvest would occur in winter, when these herbaceous plants would be under ground, individual plants are not likely to be damaged. However, it is possible that removal of adjacent overstory trees could change the light regime and hydrology such that their environment temporarily does not provide ideal habitat. Likewise, if the ground does not freeze and/or there is lack of snow cover, damage to their underground parts could occur during winter logging. This could potentially result in loss of these particular populations on the Forest. These direct effects could occur in all alternatives except the "no action" alternative and alternative 3, in which the oak stands would not be cut. Adverse effects to the one individual large yellow lady's slipper plant found within the proposed sale area might jeopardize the viability of this species on the GMNF, since it is known on the Forest only from small populations in this general geographic (Salisbury) area, but would not be likely to lead to the species listing and protection under the Endangered Species Act, since much more substantial populations of large yellow lady's slippers occur elsewhere in Vermont, off National Forest land. Adverse effects to these few individual ginseng and sweet joe-pye weed plants is not as likely to jeopardize the viability of these species on the GMNF, since they are known from other sites, and would also not be likely to lead to the species listing and protection under the Endangered Species Act. However, there is the potential for short-term indirect effects, since this project will temporarily change the nature of the habitat. No cumulative effects are expected, however, since these small isolated populations do not constitute a very large proportion of these species' populations within the state of Vermont.

#### Mitigation:

To minimize impacts to this plant species of rich Northern hardwoods, we recommend that the southern edge of stand 19, where ginseng and yellow lady's slippers were found, be excluded from the overstory removal project. A field visit to this site suggested that the portion of this stand where these plants are located may not have had any previous harvest and, therefore, may not be subject to overstory removal, so this should be easily accomplished. We also recommend careful flagging of the small population of sweet joe-pye weed that's along the dirt road, so that any trampling of that area can be avoided. If these mitigation measures are followed, there should be no adverse effects – direct, indirect, or cumulative – to these species.

### Eastern Jacob's Ladder (*Polemonium vanbruntiae*)

Eastern Jacob's ladder grows in wetlands and seeps, between 350'-1800' in elevation; natural seeps where it occurs have circum-neutral muck over sandy sediments. This species is extant and extensive on the Forest only in Ripton and Lincoln, including the western edge of stand 15 in compartment 42, which is one of the stands proposed for overstory removal as part of this project.

#### Effects:

Although no eastern Jacob's ladder plants will be removed as a part of this project, and the harvest will occur in winter when the plants are below ground, there is potential for direct effects to individual plants or indirect effects as a result of damage to the habitat if the ground is not fully frozen and snow-covered, or if the hydrology or light regime change as a result of tree removal. These impacts could occur in all actions except the "no action" alternative. Although these impacts could lead to cumulative effects to this particular population, the effects would not extend beyond the boundaries of this sale.

Past monitoring of this species in the Ripton/Lincoln area indicates the populations are doing well, including those that dwell along disturbed sites such as roadsides. In addition, the most recent Nature Conservancy Summary on this species suggests that this species "tolerates and may respond favorably to logging and some other disturbances". Because of this, adverse effects to the habitat, and therefore to individual plants at this site, are not likely to jeopardize the viability of this species on the GMNF, nor lead to the species listing and protection under the Endangered Species Act. However, because this particular population is so extensive, and response to logging is not absolutely certain, we will suggest mitigation to avoid this population.

#### Mitigation

To minimize the impact to eastern Jacob's ladder, we recommend that no trees be removed, and no equipment drive through, the site where these plants occur. If this mitigation measure is followed, there should be no adverse effects – direct, indirect, or cumulative – to this species.

#### ***Species not searched for that have potential habitat in the project area:***

- ?? Eastern Blue-eyed Grass (*Sisyrinchium atlanticum*)
- ?? Rough Avens (*Geum laciniatum*)
- ?? Schweinitz's Sedge (*Carex schweinitzii*)
- ?? Shore Sedge (*Carex lenticularis*)

There are five species (the above four, plus eastern Jacob's ladder, discussed separately) associated with wetlands that have the potential to inhabit the project area. Eastern blue-eyed grass is found in dry or damp meadows, swales, marshes, and low woods. Rough avens grows on river shores and in damp places, in western Vermont, and tends to be in limy areas; it is known on the Forest only from Ripton, and is associated with eastern Jacob's ladder. Schweinitz's sedge lives in calcareous swamps, wet meadows, low woods, and wet ditches. Shore sedge is associated with wetlands, shallow marshes, and pond margins. (Effects on

eastern Jacob's ladder will be assessed separately, since it is documented to occur within the project area, while the other four species are not.)

Seven small wetlands were found in the stands where work is proposed. Two small ones were searched - no rare plants were found in one, and eastern Jacob's ladder was found in the second. Surveys for eastern Jacob's ladder at this second wetland may not have been adequate for rough avens, so it is still considered potentially present at this site. Because we plan to mitigate to exclude wetlands and needed to use field survey time as efficiently as possible, the remaining five wetlands were not searched, and are considered potential habitat for all five species.

Location and search information for wetlands within sites that are part of the overstory removal project is listed below. (More specific location information is available in the field notebooks of Diane Burbank and MaryBeth Deller.)

Compartment	Stand	Payment Unit (P. U.)	Forest Type	Number of Wetlands Found/searched
50	12	9	Red Oak	2 / not searched
150	3	3	Northern Hardwood	2 / not searched
26	6	10	Northern Hardwood	1 / searched; no rare plants found
69	26	3	Northern Hardwood	1 / not searched
42	15	1	Northern Hardwood	1 / searched; found eastern Jacob's ladder; search not adequate for rough avens

### Effects:

There is the potential for each of these plant species to exist in or on the periphery of the small wetlands within stands that are part of the overstory removal project. Because the proposed harvest would occur in winter, when these herbaceous species would be under ground, individual plants are not likely to be damaged. However, if the ground is not truly frozen when work occurs, as the Forest Plan requires, it is possible that trees felled into the wetland could damage them, as could a skidder driving across them. These impacts could occur in all actions except the "no action" alternative, although impacts within compartment 50, stand 12, would also be eliminated under alternative 2, in which no oaks would be cut. Since none of the wetlands found during field surveys have documented populations of any plants on the RFSS list (with the exception of eastern Jacob's ladder), and there are no currently known threats to the known sites for this species, adverse effects to individuals potentially present (e.g., death or injury) are not likely to jeopardize the viability of this species on the GMNF, nor lead to the species listing and protection under the Endangered Species Act. Thus, no direct effects are expected. It is possible, though, that removal of adjacent overstory trees could change the light regime and hydrology such that their environment temporarily does not provide ideal habitat. Thus, there are potential indirect effects to these species due to impacts to suitable habitat. Indirect effects, if they occur, are expected to be minimal, since the removal of overstory trees only temporarily

changes the habitat. No cumulative effects are expected, since no direct effects are expected, and indirect effects are expected to be minimal and short-lived.

#### Mitigation:

To minimize the impact to these four plant species and their potential habitat, we request, as planned, that no logging occur within or immediately adjacent to any of these wetlands (their locations are available in the field notebooks of Diane Burbank and MaryBeth Deller). A buffer of 80 to 100 feet would ensure that trees harvested would not land in the wetland. Winter logging is already planned for all sites, as directed in the Forest Plan; however, it is important that the sale administrator ensures that the ground is truly frozen before allowing equipment to drive across wetlands – or that they are off-limits to all vehicle movement.

#### ***Species with potential habitat in the project area that were not found during field surveys:***

- ?? Hairy Wood Mint (*Blephilia hirsuta*)
- ?? Summer Sedge (*Carex aestivalis*)
- ?? Canadian Horse Balm (*Collinsonia canadensis*)
- ?? Male Fern (*Dryopteris filix-mas*)
- ?? Broad Beech Fern (*Phegopteris hexagonoptera*)
- ?? Green Pyrola (*Pyrola chlorantha*)
- ?? Round-leaved Orchis (*Platanthera orbiculata*)
- ?? Large Whorled Pogonia (*Isotria verticillata*)
- ?? Three-leaved Rattlesnake-root (*Prenanthes trifoliata*)
- ?? Narrow Blue-eyed Grass (*Sisyrinchium angustifolium*)

Each of the above species occurs in some variant of Northern hardwoods. The first seven are associated more specifically with enriched Northern hardwoods, of varied types. Hairy wood mint is associated with rich woodland seeps, often hidden under nettles. Summer sedge is found in rich, mesic, rocky woods at mid-elevation. Canadian horse balm grows in rich, mesic woods, but at lower elevations. Male fern is known from rich, cool woodlands, mostly over limy or calcareous substrates, at mid elevations. Broad beech fern grows in warm, rich maple or maple-oak woods. Green Pyrola is known from limy woods at moderate elevations (in addition to other habitat types not found in the project area). Round-leaved orchis grows in fertile oak woods – usually dry, limy, and low elevation. The next two are associated with more open woods - large whorled pogonia is known from acidic, open woods at low elevation, often oak-hardwoods, while three-leaved rattlesnake-root is known from cliffs and open woods. The last one, narrow blue-eyed grass, is found in low woods and thickets, along with other habitat types not found in the project area. To at least some degree, each of these variants of Northern hardwood habitats can be found within the project area.

#### Effects:

No direct effects are expected to any of these species, since there are no documented occurrences of any of them in the project area, nor were any of them found during site surveys. However, the project area does offer at least some relatively good potential habitat for each of them. Thus, there are potential indirect effects to these species due to impacts to suitable habitat. These

impacts could occur in all the alternatives except the “no action” alternative, although the large whorled Pogonia and three-leaved rattlesnake-root would also not be impacted under alternative 3, in which the oaks are not cut. Indirect effects, if they occur, are expected to be minimal, since the removal of overstory trees only temporarily changes the habitat. The soil at different microsites within the project area will continue to offer potentially suitable habitat for these species, and the saplings that are already well established will continue to offer some shade. The site will eventually return to mature hardwoods, of varying types, and will continue to be potential habitat for rare species associated with different woodland types. No cumulative effects are expected to these species, since there are no direct effects and indirect effects are expected to be minimal. Since there are no known extant occurrences of these species at this site, adverse effects to their potential habitat are not likely to jeopardize the viability of this species on the GMNF, nor lead to the species listing and protection under the Endangered Species Act.

Mitigation:

None recommended.

### **Determination for Threatened and Endangered Species**

After reviewing the Proposed Action and alternatives, the project area, the literature, and consulting individuals, it is my determination that the proposed North Half Overstory Removal activities or their alternatives will have **no adverse effect** on the following T&E species:

Bald Eagle or their critical habitat.  
Gray Wolf or their critical habitat.  
Eastern Cougar or their critical habitat.  
Indiana bat or their critical habitat.  
Canada Lynx or their critical habitat.

Rationale:

Bald eagle, gray wolf, eastern cougar, and Canada lynx are not known to occur or have critical habitat within the project area. Indiana bat winter hibernacula not known to occur in the project area. An Indiana bat summer roost habitat has been found west of the Compartment 46 OSR stands and Indiana bat foraging habitat was potentially found south of the Compartment 65, stand 20 area. This bat was found to roost 3 ½ miles west of the Compartment 65 portion of the project area. Winter activities will insure no adverse effects during the summer for Indiana bats.

Mitigation:

None recommended for bald eagle, gray wolf, eastern cougar, and Canada lynx. Winter logging and follow USFWS guidelines for reserving potential Indiana bat roost trees.

### **Determination for Sensitive Species**

## Determination for Species with Unsuitable Habitat:

### Animals and Plants

Based upon the prefield analysis documented in the LOO tables, it is our determination that the proposed North Half Overstory Removal activities or their alternatives will not adversely affect the viability, nor result in a trend toward Federal listing, for any of the species identified as "unlikely to occur" within the project area.

## Determination for Species with Suitable or Potentially Suitable Habitat:

### Animals

After reviewing the Proposed Action and alternatives, the project area, the literature and records, and consulting individuals, it is my determination that the proposed North Half Overstory Removal activities will have **no impact** to:

?? Eastern small-footed bats, or their habitat.

### Rationale:

This species may occur in the Compartment 65 portion of the proposed North Half Overstory Removal stands during the summer. Surveys completed in July 2002 found Eastern small-footed bats foraging in the Compartment 65 portion of the project area. Extensive exposed rock on Bryant Mountain as well as other parts of Compartment 65 and 87 may be used for summer roosting. Current guidance from the USFWS does not recommend attaching transmitters to Eastern small-footed bats unless the bats can be located within 48 hours and the transmitters detached.

### Mitigation:

Winter logging and follow USFWS guidelines for reserving potential Indiana bat roost trees.

### Plants

After reviewing the Proposed Action and alternatives, the project area, the literature and records, and consulting individuals, it is our determination that the proposed North Half Overstory Removal activities **may impact** individuals and/or habitat, but will not likely contribute to a trend towards Federal listing or a loss of viability to the population or species for:

- ?? Butternut
- ?? Eastern Jacob's Ladder (*Polemonium vanbruntiae*)
- ?? Ginseng (*Panax quinquefolius*)
- ?? Large Yellow Lady's Slipper (*Cypripedium parviflorum* var. *pubescens*)
- ?? Eastern Blue-eyed Grass (*Sisyrinchium atlanticum*)
- ?? Rough Avens (*Geum laciniatum*)

- ?? Schweinitz's Sedge (*Carex schweinitzii*)
- ?? Shore Sedge (*Carex lenticularis*)
- ?? Sweet Joe-pye Weed (*Eupatorium purpureum*)
- ?? Hairy Wood Mint (*Blephilia hirsuta*)
- ?? Summer Sedge (*Carex aestivalis*)
- ?? Canadian Horse Balm (*Collinsonia canadensis*)
- ?? Male Fern (*Dryopteris filix-mas*)
- ?? Broad Beech Fern (*Phegopteris hexagonoptera*)
- ?? Green Pyrola (*Pyrola chlorantha*)
- ?? Round-leaved Orchis (*Platanthera orbiculata*)
- ?? Large Whorled Pogonia (*Isotria verticillata*)
- ?? Three-leaved Rattlesnake-root (*Prenanthes trifoliata*)
- ?? Narrow Blue-eyed Grass (*Sisyrinchium angustifolium*)

#### Rationale:

Butternut, eastern Jacob's ladder, ginseng, large yellow lady's slipper, and sweet joe-pye weed are all documented to occur in or adjacent to the project area, and there is at least some potential for damage to individual plants, or temporary habitat change, due to this project. However, none of these small populations represents the only population either on the Forest, or in the state.

Eastern blue-eyed grass, rough avens, Schweinitz's sedge, and shore sedge all have potential habitat in the small wetlands that are within the stands proposed for overstory removal, and have not yet been searched for rare plants. If present, there is at least some potential for damage to individual plants, or temporary habitat change, due to this project. However, with the exception of the one wetland where eastern Jacob's ladder has been found, none of these wetlands are known sites for any of these species.

Hairy wood mint, summer sedge, Canadian horse balm, male fern, broad beech fern, green Pyrola, round-leaved orchis, large whorled Pogonia, three-leaved rattlesnake-root, and narrow blue-eyed grass all have potential habitat in woods that are part of this project area. However, none were found during field surveys, and none have previously documented occurrences in the project area.

#### Mitigation:

The following mitigation measures are recommended:

1. In stands where butternut trees occur, do not harvest them as part of this project.
2. Exclude all wetlands from any overstory removal activities. If access to the site can only be accomplished by moving equipment across a wetland, do so only on solidly frozen ground. Leave a buffer strip of 80 to 100 feet between the wetland edge and any logging activity.
3. Exclude from any overstory removal activities the small sites where ginseng, large yellow lady's slippers, and sweet joe-pye weed have been found.

4. Monitor the effectiveness of each of the above mitigation measures, after the project is complete.

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## APPENDIX D: MONITORING PLAN

### Archeology

In response to Issue #2 and to be consistent with Forest Resource Monitoring needs, we will collect the following three sets of monitoring data for each site during and after the project's implementation:

(1) Mitigation Measure Implementation:

- a) Were the 7 sites marked/buffered? **Y/N**
- b) Was the Forest Archaeologist involved in establishing the buffer zone? **Y/N**

(2) Mitigation Measure Effectiveness

- c) Based on site condition monitoring, were the sites protected from direct impact (e.g., skidders)? **Y/N** (specify #s)
- d) Based on site condition monitoring, were the sites protected from indirect impacts (e.g., vandalism, collecting)? **Y/N**

(3) Site Condition

- a) Were there unanticipated effects to the sites from the project?  
**Y/N**; if yes, describe

### Botany

Monitor the effectiveness of each of the above mitigation measures, after the project is complete. The Forest botanist will be responsible for this. Monitoring for large yellow lady's slippers, Jacobs ladder and ginseng should occur in the growing season following harvest to ensure that these plants were avoided, and should occur again in about five years to determine whether the established buffer was sufficient to allow the plants to persist. Monitoring for sweet joe-pye weed and wetlands is necessary only once, in the growing season following harvest, to ensure that they were avoided.

### Oak Management

As part of an oak ecosystem study, there may be a future project involving treatment with prescribed fire on a six-acre portion of Stand 19. This portion, reserved from timber harvest in this project would be studied to see how fire reduces competition to oak. Northern hardwood seedlings and saplings, which cannot withstand fire as well as oaks, can be reduced with fire. Areas around local landfills in the oak belt that have experienced repeated escaped fires that primarily burned leaf litter show good numbers of oak regeneration when compared to hardwood species. This observation helps us to theorize that application of similar fires to oak stands on the National Forest may help in regenerating and sustaining oak forests on the GMNF.

### Visual Quality Management

Monitoring of Visual Quality Objectives (VQO's)

What: Monitor Visual Quality Objectives referenced in the Visual Quality Affected Environment section and the Visual Quality Effects section.

Purpose: To verify if the lands meet the Visual Quality Objectives (VQO's) displayed in the Affected Environment section of the EA.

Frequency: Monitor during leaf on and / or leaf off seasons as needed.

Responsible Person: Forest Landscape Architect

Monitoring Techniques: Visual inspection from roads and trails referenced in the EA.

## **Soil and Water Resources**

All mitigation measures described in the Soil and Water Resources section of this EA (see Mitigation Measures Common to All Alternatives Section) will be monitored, either by the soil scientist, or by a person(s) designated by the soil scientist.

### **Recreation – Unauthorized Vehicle Use**

At the pre-work conference, the Timber Sale Purchaser will be briefed to be on the lookout for unauthorized vehicle use of the sale area. They will be encouraged to pass on pertinent information.

Once sale begins, the Timber Sale Administrator will monitor for and document such use or lack of such use on the daily Timber Sale inspection form and share the findings with the Timber Sale Contracting Officer, the sale purchaser, Law Enforcement, District Ranger and Recreation/Trails staff. This will be done at least weekly or as needed during winter periods when the sale is active.

Forest Law Enforcement will visit sale areas periodically during winter and summer months and document findings and pass them on to the people mentioned above. Appropriate action to stop use and/or investigation would occur according to the situation. The documentation of findings and any actions taken will be submitted to the Team Leader of this analysis project to place in the project files. Post sale monitoring for unauthorized vehicle use will be conducted and summarized along with other resource monitoring at the conclusion of this project.

## APPENDIX E: MANAGEMENT INDICATOR SPECIES (MIS) POPULATION AND HABITAT COMMUNITY TRENDS

### **Chestnut-sided Warbler (hardwood saplings)**

The chestnut-sided warbler was selected as a MIS for the regenerating Northern hardwood community. The chestnut-sided warbler's dependence on shrubby and dense sprout, vegetative structure makes it an ideal indicator for regenerating deciduous vegetation. This bird will be well distributed throughout regenerating woodland clearings and will often be associated with shrubby edges. Chestnut-sided warblers breed and feed in shrubby vegetation. They utilize brushy stream banks, roadside thickets, old fields, woodland clearings, and burns. The early second growth sprouts of regenerating hardwoods, from 0-9 years of age, duplicate this vegetative condition. Current Forest Plan direction provides for this habitat primarily through evenaged forest management prescriptions.

**Population Trends:** The global population of chestnut-sided warblers is declining (NatureServe 2001) with moderately declining populations in Physiographic Areas 27 & 28 (Partners In Flight Database). The Audubon Society Watch List lists the chestnut-sided warbler as high priority in Physiographic Area 27. The North American Breeding Bird Survey (BBS) for Vermont indicates a non-statistically significant population decline for the 1960-2000 and 1987-2000 trend periods but a statistically significant decline for the 1980-98 period. The population is considered secure (S5) in Vermont (NatureServe 2001) and has no specific status in the Vermont Nongame and Natural Heritage Program.

**Habitat Community Trends:** Habitat in Physiographic Areas 27 & 28, including Vermont, peaked following the widespread logging and agricultural abandonment that occurred in the last century. As New England and Vermont mature, suitable hardwood sapling habitat continues to decline. Currently, approximately 7 percent of Vermont's land area is in this habitat type (Trani et al. 2001). Partners In Flight (PIF) list early successional forest/edge habitat, represented by the chestnut-sided warbler, as a priority habitat-species suite with the objective being "management to reverse or stabilize populations."

On the GMNF, the acreage of even aged management has declined in recent years. As a result, less than 5 percent of the Forest is in early successional habitat (USDA 1996). Assuming even aged timber harvest and natural disturbance events continue to occur, it is unlikely that the chestnut-sided warbler or the habitat it represents will be lost from the suite of wildlife species or habitat communities present on the GMNF. However, numbers may continue to fall.

**Relative Importance Of The GMNF To This Species/Habitat Community:** Population viability will likely be maintained even though numbers may continue to fall. The GMNF is, however, in a position to contribute towards PIF's objective to "management to reverse or stabilize populations" of early successional forest/edge habitat through even aged forest management, including clearcuts. This is particularly important given the general absence of

even aged forest management on Vermont's private lands. Capen, Germaine, and Town (1991) found the Chestnut-sided warbler would also readily pioneer even small areas of early successional habitat.

### **Barred Owl (mature hardwood)**

The barred owl was selected as a MIS for the mature and old growth Northern hardwood communities on the GMNF. Due to their dependence upon suitable cavity trees for nesting, they are good indicators of the quality and availability of the communities that include these habitat components. They exhibit a limited tolerance to human activity – selecting the more interior hardwood habitats for their nesting territories.

Recent changes in Forest Plan direction for Indiana bat likely benefits the barred owl as additional trees that may also be suitable for barred owl nesting are retained. However, there is no indication that barred owl populations are being adversely effected due to a lack of suitable nesting sites.

**Population Trends:** The barred owl population is considered viable and well distributed. BBS data show increasing to significantly increasing populations in Physiographic Areas 27 & 28. The BBS for Vermont indicates a non-statistically significant population increase for the 1960-2000 and 1987-2000 trend periods. The barred owl is not considered vulnerable in the Northeast (Hunter et al. 2001), is considered secure (S5) in Vermont (NatureServe 2001), and has no specific status with the Vermont Nongame and Natural Heritage Program. GMNF surveys over a 6-year period did not indicate discernable population trends on the Forest.

**Habitat Community Trends:** Mature forests currently dominate the northeastern and Vermont forests (Trani et al. 2001). This trend is expected to continue into the foreseeable future. Therefore, the amount of suitable habitat for the barred owl can be expected to increase. Likewise, the amount of mature and old growth Northern hardwood communities on the GMNF has increased over the last decade (USDA 1996) now comprising approximately 75 percent of the Forest. This trend is expected to continue with the decreased emphasis on even aged management.

**Relative Importance Of The GMNF To This Species/Habitat Community:** All indications are that barred owl populations and its mature and old growth Northern hardwood habitat community will increase in Physiographic Areas 27 and 28 as well as on the GMNF. Therefore, although a contributor to this habitat community, the GMNF does not play a unique role in its long-term maintenance.

### **Snowshoe Hare (regenerating, young softwood)**

Snowshoe hare are similar to white-tailed deer, in that they are both relatively common, hunted species that rely on the Forest's softwood community. They differ a bit from deer, in that hare prefer the greater tree density and lower cover characteristic of regenerating and younger conifer.

**Population Trends:** The snowshoe hare population is considered viable and well distributed. Snowshoe hare populations are considered secure (S5) in all Northeast states except Connecticut and Rhode Island (NatureServe 2001). The local population is considered stable and viable, albeit with cyclic fluctuations. No discernable trends have been identified on the GMNF.

Litvaitis (2001) expressed concerns over long-term population declines throughout New England due to the loss and fragmentation of young forest and shrub dominated communities.

**Habitat Community Trends:** Early successional vertebrate populations reached unprecedented levels in the Northeast during the late 19<sup>th</sup> and early 20<sup>th</sup> centuries following the extensive land clearing for agriculture and subsequent farm abandonment (Litvaitis 1993). Since then, habitat has declined as young forests matured. Population declines likely followed. The 10-year decline in the amount of early-aged conifer forest on the GMNF (USDA 1996) may indicate a reduced amount of available high-quality hare habitat with a corresponding decrease in hare abundance and/or distribution.

**Relative Importance Of The GMNF To This Species/Habitat Community:** Though not a population viability issue, the GMNF is in the position to provide increased levels of early successional habitat, supporting higher snowshoe hare populations, through vegetation treatments. This is particularly important as recreational hunting is becoming more dependent on public lands due to the posting of private lands.

### **Blackpoll Warbler (high elevation, mature softwood)**

The blackpoll warbler was selected as a MIS for the high elevation red spruce and balsam fir community on the GMNF. Blackpoll warblers breed in the mountains of New York, Vermont, and New Hampshire and winter in Guiana and Venezuela to Brazil. Nests are usually built in conifers within 2 meters of the ground.

**Population Trends:** The blackpoll warbler population is considered viable and well distributed. The population is considered secure (S5) in Vermont (NatureServe 2001). Overall, the trend is considered to be somewhat in a decline in Physiographic Area 28, but not significantly different from a stable population (Sauer et al. 2000). Population trends in Physiographic Area 27 are uncertain. The BBS for Vermont indicates a statistically significant population decline for the 1960-2000 trend period but no data is available for the 1987-2000 period. It has no specific status in the Vermont Nongame and Natural Heritage Program. Populations fluctuate considerably as a result of spruce budworm outbreaks, hurricanes, forest fires, and extensive logging (Richards 1994).

Ortega and Capen (1998) provided a preliminary analysis of blackpoll warbler population trends on the GMNF. They concluded that the blackpoll warbler showed statistically significant increases in mean relative abundance.

**Habitat Community Trends:** Habitat has been reduced from historic times through ski area development; trail construction, and historic logging. However, in recent times these activities have not expanded significantly. Therefore, the habitat is considered stable. Partners In Flight lists the mountaintop/conifer woodland community represented by both the blackpoll warbler and Bicknell's Thrush, as a priority habitat-species suite with the objective being "immediate management or policy needed range wide."

**Relative Importance Of The GMNF To This Species/Habitat Community:** The GMNF provides a large portion of this high elevation community in Vermont. Therefore, it is in a unique position for both habitat management and wildlife community-level research.

**White-tailed Deer (low elevation, mature softwood)**

The white-tailed deer was selected as a MIS for the mature and old growth red spruce, balsam fir, and hemlock components of the GMNF. It is recognized that deer utilize other components of the Forest as well, however the spruce-fir and hemlock communities used by deer in winter were selected as the habitat upon which deer are most dependent.

**Population Trends:** The white-tailed deer population is considered viable and well distributed. Nationally and statewide the white-tailed deer population is widespread and secure (N5, S5) (NatureServe 2001) and is a game species in Vermont. Populations fluctuate considerably as a result of winter weather conditions. The state data indicates that Wildlife Management Units containing the GMNF have buck harvests below both: (1) the individual WMU state objectives and, (2) the statewide average expressed as a percent of the total state harvest objective. The cause for this shortfall can be any of several factors including a decline in the quantity or quality of winter deer habitat, reduced hunting pressure, poor weather conditions during the hunting season, the increase in housing as well as winter recreation in traditional deer wintering areas, or a combination of all these factors.

**Habitat Community Trends:** Softwood forest age class distribution statewide (USDA 2001) and for GMNF (USDA 1996) shows a general shift to a more mature forest. This indicates deer winter thermal cover is being maintained and its quality improved. It also indicates that mature conifer forest wildlife associates, such as the Blackburnian warbler, have also benefited. Conversely, there has been a decline in the amount of early-age forest in both the softwood and Northern hardwood forest types. This may indicate a general decline in the amount and quality of browse available for wintering deer.

**Relative Importance Of The GMNF To This Species/Habitat Community:** The GMNF is not in a unique position to influence population or habitat community trends statewide. On a local level, it is in the position to increase conifer composition and browse in deer wintering areas through the use of even aged and uneven aged management. This is particularly important as recreational hunting becomes more dependent on public lands due to the posting of private lands.

**Ruffed Grouse (regenerating, young aspen and birch)**

The ruffed grouse was selected as a MIS for regenerating and young aspen/birch community. The GMNF naturally does not contain large tracts of pure aspen; however, small pockets and inclusions are distributed throughout the lower elevations. A majority of the GMNF's birch community occurs at higher elevations. These stands tend to be of greater purity and size than the aspen occurrences. Current Forest Plan direction provides for this habitat primarily through evenaged forest management prescriptions.

**Population Trends:** The ruffed grouse population is considered viable, although it may fluctuate widely over a period of several years. Nationally and statewide the ruffed grouse population is widespread and secure (N5, S5) (NatureServe 2001). PIF indicates that populations of this species are significantly increasing in Physiographic Area 27 but significantly decreasing in Physiographic Area 28. The ruffed grouse is ranked in Pool II of the PIF Species ranking system, meaning it is a high priority species for Physiographic Area 28. Ranking criteria define this as a species of moderately high global vulnerability, and with relatively high abundance

and/or declining or uncertain population. The BBS for Vermont indicates a non-statistically significant population decline for the 1960-2000 trend period but a statistically significant increase for the 1987-2000 period. Ruffed grouse is a game species in Vermont. However, the state does not have systematic population or harvest data. The GMFL has periodically carried out drumming surveys along pre-designated routes for the last decade. The survey results do not indicate any clear population trends.

**Habitat Community Trends:** Habitat availability has also changed over time, but is currently also considered stable and distributed throughout Physiographic Area 28. The aspen stands on the GMNF (USDA 1996) are mature and becoming increasingly more susceptible to mortality. This, combined with the fact that the GMNF has only reached 25 percent of its Forest Plan habitat composition goals for regenerating even aged acres of aspen and paper birch (USDA 1996), means suitable grouse habitat on the Forest is, or will shortly be, in decline.

**Relative Importance Of The GMNF To This Species/Habitat Community:** The GMNF is not in a unique position to influence population or habitat community trends statewide. On a local level, the Forest can improve aspen and paper birch habitat through even aged management. This is particularly important as recreational hunting becomes more dependent on public lands due to the posting of private lands.

### **American Beaver (regenerating and young, birch and aspen)**

The beaver was selected as a MIS for the regenerating and young birch and aspen communities on the GMNF. They are generalized herbivores, specialized for aquatic life, and are therefore associated with these communities in association with drainages. Although they are generalists and can adapt their foraging habits to a variety of environments, beavers have been shown to prefer quaking aspen and the more tender parts of other woody plants such as leaves, twigs and bark.

**Population Trends:** Nationally and statewide the beaver population is widespread, expanding, and secure (N5, S5) (NatureServe 2001). The beaver population is considered viable in Vermont. It is classified as a fur-bearing animal. The GMNF surveys both beaver populations and the quantity of regenerating birch and aspen at 5-year intervals. A 1994 GMNF report entitled *Beaver: Management Indicator Species Monitoring Results, Discussion, and Assessment* compared 1983 and 1993 aerial surveys of active and inactive ponds as well as the total acres of occupied habitat. The report concluded that there had been a significant increase in beaver occupation, and presumably population, in this time interval.

**Habitat Community Trends:** It is possible that the natural cycle of wetland creation, abandonment, and re-colonization by beavers will maintain their distribution. The 10-year decline in the amount of early-aged forest both statewide and on the GMNF, combined with the maturing of aspen and paper birch stands could mean a decrease in beaver abundance and/or distribution.

**Relative Importance Of The GMNF To This Species:** The GMNF is not in a unique position to influence population or habitat community trends statewide. It is likely that the current distribution of both beaver and the wetland communities on the GMNF will be maintained. On a local level, the Forest could provide early successional food sources through even aged management.

### **Yellow-bellied Sapsucker (mature aspen and birch)**

The yellow-bellied sapsucker was selected as a MIS for the mature and old growth aspen and birch communities. Sapsuckers are primary cavity nesters, excavating their own cavities. Runde (1981) found that the majority of sapsucker nests he studied were in quaking aspen, although they utilized red maples, birch and beech. Regardless of tree species, the trees were associated with the following characteristics: wood decay conks *Fomes fomentarius* and *Phellinus tremulae*, branch stubs, broken tops, bark cover of at least 50 percent and previously excavated cavities.

The recent Forest Plan amendment for the Indiana bat may increase potentially suitable nesting sites in stands receiving timber treatments as additional trees that may be suitable for yellow-bellied sapsucker nesting are retained. However, there is no indication that yellow-bellied sapsucker populations are being adversely effected through lack of suitable nesting sites.

**Population Trends:** The population is considered secure nationally (N5) and in Vermont (S5) (NatureServe 2001). No population trend data is available at either the PIF or the Physiographic Area level. The BBS for Vermont indicates a non-statistically significant population increase for the 1960-2000-trend period but a statistically significant increase for the 1987-2000 period. DeGraaf and Yamasaki (2001) consider them to be common to Vermont.

**Habitat Community Trends:** With the general maturing of Vermont's forests (USDA 2001) and the relatively short-lived nature of aspen and birch, it is likely that the amount and distribution of suitable large diameter cavity trees will increase statewide. The aspen stands on the GMNF (USDA 1996) are also rapidly maturing and becoming increasingly more susceptible to mortality. Therefore, the amount of mature aspen and birch on the Forest is likely increasing as well.

**Relative Importance Of The GMNF To This Species/Habitat Community:** The GMNF is not in a unique position to influence population or habitat community trends statewide. Retention of suitable habitat on both managed and unmanaged lands will maintain or increase suitable habitat Forest-wide.

### **Gray Squirrel (mature oak)**

The gray squirrel was selected as a MIS for the mature and old growth oak communities on the GMNF. Due to the squirrel's preference for acorns, squirrel relationships to the oak communities of the Forest make it a good indicator of management effects. Gray squirrels occur in hardwood as well as mixed hardwood-coniferous forests, and concentrate in areas of mast producing trees such as red oak, beech, hickory and butternut. The LRMP standards and guidelines provide direction for the retention of hard mast trees (including hickories) during timber harvest treatments. The recent amendment regarding the Indiana bat increases focus on shagbark hickory retention. However, due to the small acreage of naturally occurring shagbark hickory and the limited acreage receiving timber treatment, it is unlikely that this amendment will result in a detectable change to the population of gray squirrel on the GMNF.

**Population Trends:** Nationally and statewide the gray squirrel population is secure (N5, S5) (NatureServe 2001). The gray squirrel population is viable and considered a game species in Vermont. There is no population trend data available at the state level. DeGraaf and Yamasaki

(2001) consider them to be common to uncommon in Vermont. GMNF monitoring efforts have not indicated any clear population trends.

**Habitat Community Trends:** Suitable gray squirrel habitat is distributed more extensively in the valleys, the Taconic range, and other lower elevation hickory forests. The USDA (2001) indicates that oak forests are maturing statewide. The GMNF has limited acreage of oak forests. These forests are maturing as well (USDA 1996). Therefore, available data indicates mature oak habitat is increasing both statewide and on the GMNF.

**Relative Importance Of The GMNF To This Species/Habitat Community:** Given the limited amount of oak forests on the GMNF, the Forest is not in a unique position to have a significant influence on either gray squirrel populations or the mature oak habitat community it represents. However, recent land purchases in the Taconic range have increased the Forest's ability to provide suitable habitat on a relatively local level.

### **American Woodcock (upland opening)**

The American woodcock was selected as a MIS for the permanent openings on the GMNF. Because woodcock have highly specific diurnal and nocturnal ecological requirements, including the necessity of upland openings for the males' courtship display, their population levels are susceptible to change resulting from habitat alteration. These display grounds are usually abandoned fields, forest cuttings or other openings, and range from less than one acre to greater than 100 acres.

**Population Trends:** Population viability will likely be maintained even though numbers may continue to fall. Nationally and statewide the woodcock population is widespread and secure (N5, S5). PIF considers the woodcock to be in Tier IA (High Continental Priority-High Regional Responsibility) of the priority species pool for Physiographic Area 27. The U.S. Fish and Wildlife Service Singing-ground Survey data for 2000 indicates the number of displaying woodcock in the Eastern Region, which includes Vermont, decreased 10.4 percent from 1999 levels with a long-term (1968-00) Eastern Region decline ( $P < 0.01$ ) of 2.3 percent. The BBS for Vermont indicates a non-statistically significant population increase for the 1960-2000 trend period. Roy (1996) analyzed seven years of North American woodcock data collected on the GMNF as part of the MIS monitoring program. He concluded that the index used showed no statistically significant change in woodcock populations within the study sites.

**Habitat Community Trends:** Habitat in Physiographic Areas 27 and 28, including Vermont, peaked following the widespread logging and agricultural abandonment that occurred in the last century. As New England and Vermont mature, suitable upland opening and hardwood sapling habitat continues to decline. Currently, approximately 7 percent of Vermont's land area is in this habitat type (Trani et al. 2001). In the northeastern U.S., habitat has declined with increasing urban/suburban/industrial development and concurrent decrease in field and shrubland habitat (Dwyer et al. 1983, Kelley 2001). Partners In Flight list early successional forest/edge habitat, represented by the American woodcock, as a priority habitat-species suite with the objective being "management to reverse or stabilize populations."

**Relative Importance Of The GMNF To This Species:** The GMNF is in the position to contribute towards PIF's objective of "management to reverse or stabilize populations" of early successional forest/edge inhabitants through active forest management. This is particularly

important given the general absence of even aged forest management on Vermont's private lands and the fact that recreational hunting is becoming increasingly more dependent on public lands due to the posting of private lands.

### **Brook Trout (stream)**

Brook trout was selected as a MIS for small headwater and other streams on the GMNF. Optimal habitat south of Canada has been characterized as "...clear, cold spring-fed water, a silt-free rocky/gravel substrate with riffle-run areas, and approximate 1:1 pool-riffle ratio with areas of slow deep water, well vegetated stream banks, abundant in-stream cover, and relatively stable water flow, temperature regimes and stream banks" (Raleigh 1982). McCormick et al. (1972) cited that the most important limiting factor for brook trout reproduction and distribution appears to be suitable water temperatures. In addition, stream cover is considered to be one of the critical components of brook trout habitat.

**Population Trends:** Population viability will likely be maintained. In the northeast and in Vermont, the brook trout population is widespread and secure (N5, S5) (NatureServe 2001). This is also true for the brook trout population in the GMNF. Kirn (2000) analyzed brook trout populations in 12 Vermont watersheds (62 sites representing 53 streams). Present-day brook trout were characterized by abundant natural reproduction and multiple age-classes, including the contribution of older, larger fish. He stated, "the long-term viability of Vermont's wild brook trout stream populations will depend on the protection and enhancement of suitable physical habitat and water quality."

**Habitat Community Trends:** As New England and Vermont's upland forests mature, suitable habitat will continue to persist and improve. Riparian habitat in these upland forests will increasingly provide necessary thermal protection to streams and a source of woody material to maintain habitat quality. Habitat in low elevation streams and rivers is often limited by water temperature and may decline further with increasing urban/suburban/industrial development and concurrent decreases in coldwater habitat.

**Relative Importance Of The GMNF To This Species/Habitat Community:** The GMNF is in a position to contribute towards the management of stable and improving populations and habitat through resource protection strategies and active habitat restoration or enhancement. This is particularly important as the Forest works with other federal and state agencies, and organizations to meet brook trout management objectives. Also, the Forest has begun to contribute to habitat protection through purchase of low elevation river parcels.

### **American Bittern (marsh)**

The American bittern was selected as a MIS for remote wetland areas on the GMNF that are dominated by marshy vegetation. American bitterns nest singly on both wet and dry ground, near or in freshwater swamps, marshes, bogs, or reedy lakes. Slow rivers or streams with dense vegetation along their borders provide appropriate habitat as well. Cover commonly consists of tall vegetation, such as reeds, cattails and bullrushes.

**Population Trends:** Globally, the American bittern population is widespread and apparently secure (G-4) but declining due to habitat destruction. Populations are considered vulnerable at the national (N3) and Vermont state levels (S3). BBS data for 1966-1987 indicate a decline in

the north-central U.S. (Hands et al. 1989, Brewer et al. 1991) due mainly to loss and degradation of wetlands. The BBS for Vermont indicates a non-statistically significant population increase for the 1960-2000 and 1987-2000 trend periods.

**Habitat Community Trends:** Continued loss and degradation of wetlands is the most serious threat in the northeast and Vermont.

**Relative Importance Of The GMNF To This Species/Habitat Community:** Bittern sightings on the GMNF are rare and the Forest has a very limited amount of suitable bittern habitat. It has begun to contribute to habitat protection through the purchase of larger, low elevation wetlands within its proclamation boundary.

### **Peregrine Falcon (cliff)**

The peregrine falcon was selected as MIS for mountain cliff sites on the GMNF. Typical peregrine eyries have been described as cliffs with sheer rock faces along mountain ridges overlooking open expanses of river valleys. Slopes below the cliffs are commonly wooded, while the areas above the cliffs are either semi-open or wooded. At this time, disturbance of nesting sites is considered the greatest threat to the continued recovery of this species.

**Population Trends:** Populations are considered apparently secure at the national (N4) but imperiled at the Vermont state level (S2) (NatureServe 2001). The Vermont Institute of Science (VINS), the Vermont Natural Heritage Program, and the GMFL have monitored falcons annually within Vermont since 1984, and on the GMNF since 1987. There has been a steady increase in the number of Peregrine falcon territorial pairs and successful nesting in both Vermont as a whole and on the GMNF.

**Habitat Community Trends:** With an increased demand for day hiking to cliff overlooks, there is more risk of nest failure or site abandonment. Closure orders and signing on public and private land has had mixed results for protecting sites.

**Relative Importance Of The GMNF To This Species/Habitat Community:** The GMNF has three active sites and several potential sites. Signing and closure at two sites has improved nesting success at those areas. The risk of disturbance of these sites by day hikers continues to be monitored and protective measures are working at this time. The risk is greater where new nests are established at previously unoccupied sites. As shown from one recent reoccupied site, it took several years of closure and postings along with public education before a successful nesting occurred.

### **Tree Swallow (beaver flowage)**

The tree swallow was selected as a MIS for the beaver flowage wetland community. This species utilizes tree cavities in wetland habitats for nesting, and the wetland habitats themselves, for feeding. Beaver-created wetlands provide habitat for a variety of avian and mammalian wildlife. In this environment, tree swallows are dependent upon the cavity trees within the beaver flowage and along the edge of the forest opening that may or may not be flooded as the pond ages.

**Population Trends:** Population viability will likely be maintained. Nationally and statewide the tree swallow population is widespread and secure (N5, S5) (NatureServe 2001). The BBS for Vermont indicates a non-statistically significant population increase for the 1960-2000-trend period but a statistically significant increase for the 1987-2000 period. DeGraaf and Yamasaki (2001) consider them to be a common breeder in Vermont.

**Habitat Community Trends:** Downward trends in early successional habitat (see chestnut-sided warbler) may be causing a decline in suitable tree swallow habitat. However, increase in beaver populations would indicate an increase in suitable habitat.

**Relative Importance Of The GMNF To This Species/Habitat Community:** The GMNF is not in a unique position to influence population or habitat community trends statewide. It is likely that the current increase in beaver activities, protection and purchase of wetlands, and maintenance of suitable nesting cavities on the GMNF will maintain or increase suitable tree swallow habitat.

