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Finger Lakes National Forest

Final Environmental Impact Statement

To Accompany the Land and Resource Management Plan

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Final Environmental Impact Statement for the Land and Resource Management Plan

Finger Lakes National Forest

Eastern Region
Milwaukee, Wisconsin
April 2006

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Abstract

In May 2005, the Forest Service released for public review and comment a Draft Environmental Impact Statement (DEIS) that described three possible ways to manage the Finger Lakes National Forest (FLNF). Alternative 3 was the Preferred Alternative in the DEIS and was the foundation for the Proposed Revised Forest Plan. Alternative 3 was modified in the Final Environmental Impact Statement (FEIS) to address public comments and new information received since the release of the DEIS. Alternative 3 is referred to as the "Selected Alternative" or "Alternative 3 Modified" in the Record of Decision, some parts of the FEIS, and FEIS Appendix G – Responses to Public Comments.

This FEIS documents the analysis of the three alternatives developed for programmatic management of the FLNF. The Selected Alternative, outlined as the Finger Lakes National Forest 2006 Land and Resource Management Plan (2006 Forest Plan), guides all natural resource management activities on the Forest, addresses new information and concerns raised since the 1987 Forest Plan was published, and meets objectives of federal laws, regulation, and policies.

The rationale for choosing Alternative 3 Modified as the Selected Alternative is described in the Record of Decision for this FEIS.

Preface

The Finger Lakes National Forest (FLNF) was established in 1983 from federally owned lands in response to a threat of being sold under the Reagan-era "Assets Management" program. Local New York communities mobilized to petition the Congress to establish the area as a National Forest, which today consists of more than 16,000 acres, located in central New York. The United States Department of Agriculture's Forest Service administers the FLNF, aided by partners, other agencies, and individual volunteers. Forest Service personnel practice multiple-use natural resource management, thus providing the State of New York and the region with wood products; grazing for livestock; a wide range of recreation opportunities; vibrant watersheds; diversified habitat for wildlife; and protection of unique ecological areas.

Under the Multiple-Use Sustained-Yield Act of 1960 and the Forest and Rangeland Renewable Resources Planning Act of 1974, as amended by the National Forest Management Act of 1976 (NFMA), National Forest System lands are managed for a variety of uses on a sustained yield basis to ensure a continued supply of goods and services. The NFMA specifies that Forest Plans shall be developed for all National Forests and should be revised at least every 15 years. The *Land and Resource Management Plan for the Finger Lakes National Forest* (Forest Plan) was approved in 1987 and since that time, there have been changes in Forest conditions, shifts in public demands, technological advances, and a better understanding of forest ecosystems from 1987 Plan implementation monitoring. These factors combined together form the basis for the revision of the FLNF Forest Plan.

Following the direction of the National Environmental Policy Act (NEPA), the Forest Service has prepared this Final Environmental Impact Statement (FEIS) for the revision of the 1987 Forest Plan. The FEIS provides the purpose and need for Plan revision, discloses a description of the issues addressed, the three alternatives considered to respond to the issues, and an analysis of the potential environmental effects of the alternatives. Each alternative offers a different management approach for the FLNF.

The 2006 Land and Resource Management Plan (2006 Forest Plan) accompanies this FEIS and is based on the Selected Alternative that is described in Chapter 2 of the FEIS. The 2006 Forest Plan describes desired conditions, assigns goals and objectives, provides standards and guidelines as to how to achieve the desired conditions within specific parameters, and then outlines a program for monitoring and evaluating results of implementation.

This FEIS is organized into the following chapters and appendices:

Chapter 1: Purpose and Need – Describes the need for change, decisions to be made in the Forest Plan, the proposed action, public involvement efforts, and a discussion of the issues associated with Plan revision.

Chapter 2: Alternatives – Describes the process used to develop alternatives, lists important elements common to all alternatives, gives a general description of each alternative, explains why some alternatives were not considered in detail, and provides a summarized comparison of environmental consequences of alternatives, including the Selected Alternative.

Chapter 3: Affected Environment and Environmental Consequences – Describes the existing condition of the physical, biological, social, and economic resources and discloses possible environmental consequences (effects) of the three alternatives on those resources in a comparative format. The effects are tied closely to the issues discussed in Chapter 1.

Chapter 4: Preparers – Lists those who participated in preparation of the DEIS or FEIS.

Chapter 5: Groups and Individuals Contacted – Lists the federal, State, and local agencies, tribal governments, organizations, businesses, and individuals to whom copies of the FEIS or the FEIS Executive Summary were distributed.

Chapter 6: Literature Cited – Lists the literature cited in the preparation of the FEIS.

Chapter 7: Glossary – Provides terms and definitions used in the FEIS.

Chapter 8: Index – Provides an index of terms used in the FEIS.

Appendix A: Public Involvement – Provides a detailed description of the public involvement process associated with preparing the FEIS.

Appendix B: Analysis Processes – Discusses the primary analysis processes used in determining the outputs and effects associated with the timber and socioeconomic resources.

Appendix C: Wilderness – Reviews the current situation of designated wilderness on the FLNF, the need for additional wilderness, and the process used to consider recommendations for additional wilderness.

Appendix D: Wild and Scenic Rivers – Summarizes the process by which the Forest Service analyzed rivers for eligibility for protection under the Wild and Scenic Rivers Act.

Appendix E: Biological Evaluation – Provides a detailed evaluation of effects to federally listed threatened and endangered species (TES), and Regional Foresters sensitive species (RFSS).

Appendix F: Transportation Analysis – Describes the Roads Analysis Process (RAP) and the Trails Analysis Process (TAP).

Appendix G: Responses to Public Comments – Summarizes the public comments received on the DEIS and Proposed Revised Forest Plan, and provides the Forest Service responses.

Seneca Lake

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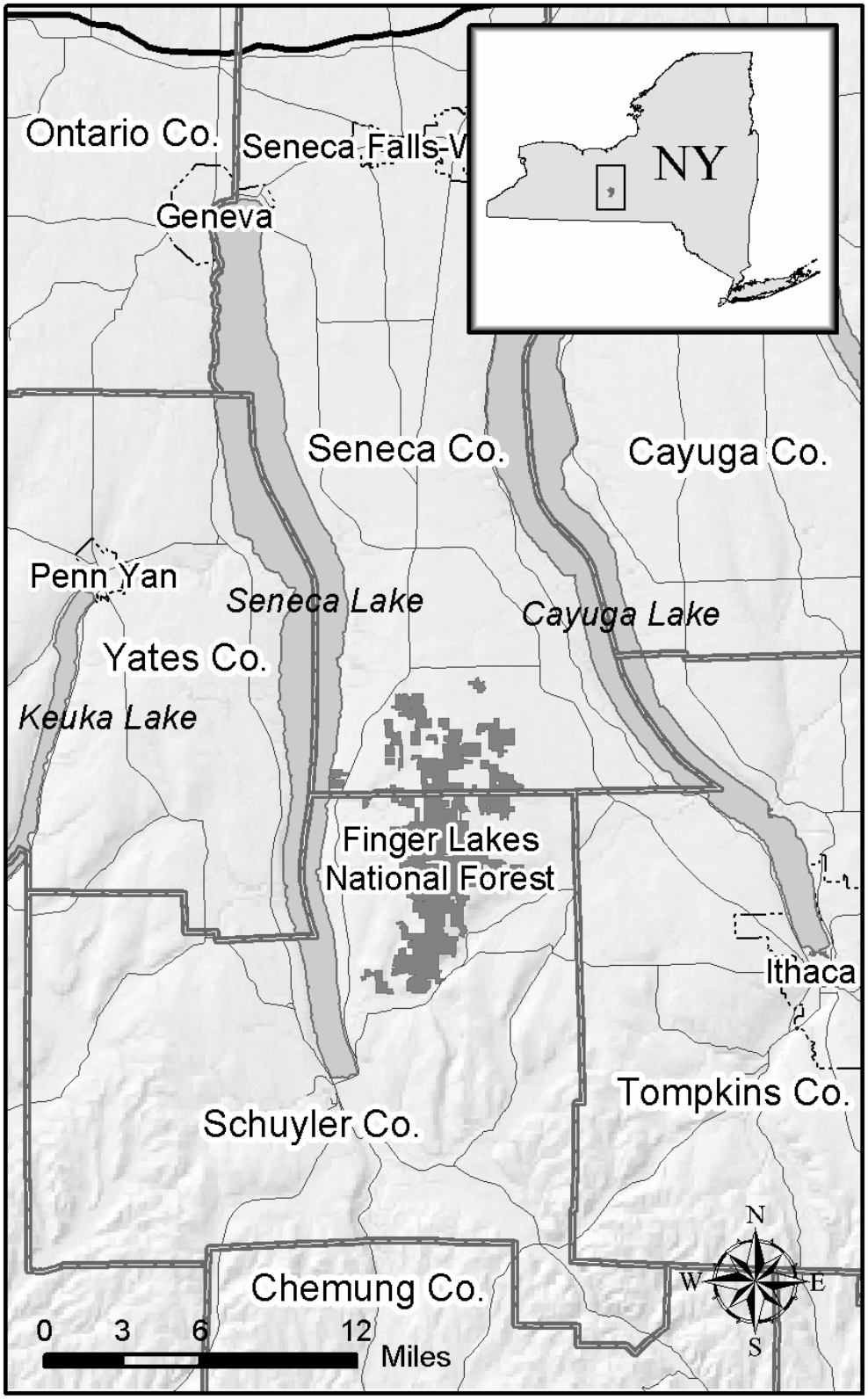

Finger Lakes National Forest Vicinity Map

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Potomac Pond

1.1 PURPOSE AND NEED

1.1.1 Introduction

The Finger Lakes National Forest (FLNF) consists of more than 16,000 acres of National Forest System lands located in central New York (see Vicinity Map). The FLNF provides a diverse mix of public land use opportunities including various recreation activities, grazing, wildlife habitat, clean water, and wood products. Eight towns ranging in population from 1,476 to 4,854 within two counties, Schuyler and Seneca, having a combined population of more than 52,000, are located in close proximity to the FLNF.

The USDA Forest Service administers the FLNF, aided by partners, other agencies, and individual volunteers. The FLNF has a local office in Hector, with the administrative headquarters for the Forest located in Rutland, Vermont.

The Forest Service proposes to revise the FLNF Land and Resource Management Plan (Forest Plan or Plan) that was approved by the Eastern Regional Forester in January 1987. There have been four amendments to the Forest Plan since its approval. Revision of the Plan is now needed to meet Federal law and regulations as well as to address new information about the Forest and its uses. The Revised Forest Plan will be used to guide all natural resource management activities, establish management goals and objectives, guide allocation of lands to different management emphases, and provide standards and guidelines for Plan implementation on the FLNF over the next 10 to 15 years.

Many Forest management issues cross administrative boundaries and are addressed on a scale larger than the FLNF. The FLNF planning team worked with the public, other federal, State, and local agencies, and scientists to ensure broad participation when proposing and analyzing potential changes to resource management on the FLNF.

This Final Environmental Impact Statement (FEIS) discloses, in a comparative format, the potential effects of applying three different alternatives for revising the Forest Plan. Included in the analysis are the potential physical, biological, social, and economic effects from implementing each alternative. The selected alternative will become the 2006 Finger Lakes National Forest Land and Resource Management Plan (2006 Forest Plan), and will supercede the 1987 Plan. The FEIS follows the implementing regulations of the National Environmental Policy Act (NEPA) found in 40 CFR, Parts 1500-1508.

The FEIS discloses:

- *The Purpose and Need for Change*: why the 1987 Plan is being revised and what issues need to be considered in the revision process.
- *The Alternatives*: a range of reasonable approaches for meeting the purpose and need and addressing the issues.
- *The Affected Environment*: the physical, biological and socioeconomic settings within the FLNF and its surrounding area.
- *Environmental Consequences*: the effects of each alternative on the Forest's resources, as well as the surrounding social and economic environments, in the long- and short-term, and cumulatively.

1.1.2 Forest Plan Decisions

The revised Forest Plan will be a programmatic framework that guides site-specific actions but does not authorize, fund, or carryout any project decisions. The revised Plan functions as a gateway for compliance with environmental laws during subsequent site specific decision-making. Similar to a zoning ordinance, the revised Plan would allow for activities that may occur through future decision-making, but would not authorize or mandate any ground-disturbing actions. The Plan may be amended

at any time through a site specific Plan amendment (operating similar to a zoning variance) to alter the direction applicable to a particular site. The Plan provides a broader-scale decision that does not compel or contain any site-specific decisions resulting in an irretrievable or irreversible commitment of resources, but simply would represent one level in a multi-stage decision-making process. The environmental disclosure information in this FEIS is commensurate with the programmatic nature of the proposal.

The focus of this revised Plan is on the condition of the land as a basis for providing multiple-use goods and services to the public. The Plan embodies a multiple use concept of natural resource management. The Forest Service has strived to balance competing uses across the Forest landscape. Not each use can, or should occur on every acre of the Forest. The vision of this revised Plan is to blend multiple-use resource management in such a way that sustains and protects the overall health and condition of the land and best meets the needs of the American people.

The FLNF Forest Plan revision process follows the 1982 planning regulations (36 CFR Part 219) for developing Forest Plans pursuant to the National Forest Management Act (NFMA). Planning actions required by the NFMA and used in this planning process are:

- Identification of issues, concerns, and opportunities
- Development of planning criteria
- Inventory of resources and data collection
- Analysis of the Management Situation
- Formulation of alternatives
- Estimation of effects of alternatives
- Evaluation of alternatives
- Recommendation of a preferred alternative
- Approval and implementation
- Monitoring and evaluation

The following key decisions are made in a Forest Plan:

1. Forest-wide multiple-use goals and objectives (36 CFR 219.11(b))
2. Forest-wide management requirements (such as standards and guidelines) (36 CFR 219.13-27)
3. Management area direction (36 CFR 219.11 (c))
4. Lands suited and not suited for timber production (36 CFR 219.14), and establishment of an allowable sale quantity (36 CFR 219.16)
5. Monitoring and evaluation requirements (36 CFR 219.11 (d))
6. Recommendations to Congress (such as wilderness designations) (36 CFR 219.17)
7. Lands suited and not suited for grazing and browsing (36 CFR 219.20)

The Regional Forester is the Responsible Official for the analysis and decisions for Forest Plan revision. Alternative development, conducting the analysis, as well as DEIS and FEIS preparation were done at the local Forest level under the direction of the Forest Supervisor of the Green Mountain and Finger Lakes National Forests. The Regional Forester selected Alternative 3 Modified to become the 2006 Forest Plan based on public comments received on t he DEIS, and analysis in the FEIS. The Regional Forester has provided the rationale for alternative selection in the Record of Decision (ROD) accompanying the FEIS. The alternative selected includes the seven key Forest Plan decisions.

1.1.3 Purpose and Need for Change

The purpose of Forest Plan revision rests in the NFMA and its implementing regulations contained in 36 CFR 219 (1982), which require National Forests to revise Forest Plans:

- Every 10 to 15 years
- When conditions or demands in the area covered by the plan have changed significantly
- When changes in agency policies, goals, or objectives would have a significant effect on forest level programs
- When monitoring and evaluation indicate that a revision is necessary

There are three primary reasons to revise the FLNF 1987 Forest Plan:

1. It has been more than 15 years since the Regional Forester approved the 1987 Plan.
2. Agency goals and objectives, along with other national guidance for strategic plans and programs, have changed.
3. New issues and trends have been identified that could change the management goals, management areas, standards and guidelines, and monitoring and evaluation direction in the 1987 Plan.

Public dialogue and Forest Service staff monitoring and evaluation of 1987 Plan implementation were used to complete the Analysis of the Management Situation (AMS) published in a report entitled, *Implementing the Finger Lakes National Forest Land and Resource Management Plan – A 15 Year Retrospective* (USDA, Forest Service 2002b). This report is based on 15 years of Forest Service monitoring, the experience of Forest Service resource managers' implementing the Forest Plan, and public input. A total of 18 separate resource issues were identified to help focus what management direction in the 1987 Plan is in need of change. These issues were grouped into 12 issues that are now the basis of the revision process and are discussed in more detail in subsection 1.1.6 of this chapter.

Public involvement and staff analysis also identified some concerns with the goals and objectives of the 1987 Forest Plan. The 1987 Plan included eight broad goals with detailed components. These goals were established more than 15 years ago by examining the issues identified by the public, the capabilities of the Forest, and the role that the FLNF can, or should play in addressing issues or resource problems. Review of these goals by Forest Service staff has led to the conclusion that many of these goals are overall broad "umbrella" statements, a procedure, a legal requirement, or a mixture of policies, directives, and objectives rather than goals. It was determined that there was a need to adjust the goals for the revised Plan.

Annual monitoring and evaluation reports have examined how well the Forest Service has met established objectives to achieve the 1987 Plan goals over the past 15 years. Forest Service staff concluded that many of the 1987 Plan objectives contain outdated methods for units of measurement or that they need to be updated to conform to national standards. In addition, some objectives in the 1987 Plan selected units of measure that were not accurate, some either under or over estimated a need, and some contained unrealistic end goals.

In addition to changing public views about how the FLNF should be managed, change has occurred regarding information and scientific understanding of forest ecosystems. Some of this new information is a product of research, while other information has resulted from changes in technology. Incorporating the "best science" is new, and is not addressed directly in the 1987 Plan. Utilizing scientific research, inventory, and monitoring has always been an objective. The need to use appropriate methodologies in monitoring and evaluation, as well as to provide clear understandable scientific information for the public, are among several science-related areas of concern that have been identified.

1.1.4 Proposed Action

The Forest Service proposes to revise the 1987 Forest Plan to guide management of the FLNF for the next 10 to 15 years. Specific proposals were identified through public input and Forest Service staff analysis of the implementation of the 1987 Plan. The proposed changes to the Forest Plan include a restructuring of the management area descriptions that guide the management direction across the Forest; changes in management area allocations to provide a range of management opportunities and to achieve desired future conditions; changes to goals, objectives, standards, and guidelines for desired direction, relevance, consistency, and accuracy; and addressing minor overall inconsistencies in the 1987 Plan. More far-reaching proposed changes are associated with the primary issues used to develop the need for change of the 1987 Plan. The proposals specific to these issues include the following:

Biodiversity and Ecosystem Management

- Consider biodiversity and natural communities at a variety of landscape scales and landscape patterns
- Provide for mixes of desired and viable plant and animal species populations, natural communities, and landscape patterns
- Revise the Forest's management indicators including management indicator species (MIS)

Recreation Management

- Provide for the appropriate mix of primitive, dispersed-use opportunities and more developed, higher density opportunities
- Provide guidance for the use of bicycles and the use of motorized vehicles such as snowmobiles and summer off-highway vehicles
- Provide guidance for the number, general location, and acceptable uses of trails, including separation of conflicting uses and accessibility

Timber Management

- Determine an appropriate level for timber harvesting
- Establish methods and uses for vegetation management
- More clearly define the desired mix and location of various vegetative forest types and age class distributions

1.1.5 Public Involvement and Collaborative Planning

Forest planning occurs within the overall framework provided by the implementing regulations of the NFMA and NEPA. Public involvement is a key component in the Forest Plan revision process under these regulations.

Public involvement and input have been essential elements of the Plan revision process since it began in 1996 (see Appendix A for a complete discussion of the public involvement process). This process was designed to identify changes needed in the 1987 Plan. One of the goals of this process was to emphasize public involvement and community partnerships. Forest Plan revision is a process that relies heavily on the collaboration of many stakeholders and the resolution of many issues. The FLNF planning team focused on creating an atmosphere of openness in which all members of the public would have an opportunity to share information.

To this end, the Forest Service has sought information, comments, and assistance from individuals, organizations, tribal governments, and federal, State, and local agencies that are interested in, or may be affected by the proposed action (36 CFR 219.6). The Forest Service has also pursued collaborative approaches with members of the public who are interested in management of the Forest.

From 1996 to 1998, and prior to initiating formal scoping, several public meetings were held to

identify issues and concerns related to management of the FLNF. These issues and concerns were studied and discussed by both the public and Forest Service staff, and issue papers were developed. The Plan revision process was halted in 1998 when funding was cut by the Congress due to the development of new NFMA planning regulations.

Funding for Plan revision was restored in 2001. At that time the FLNF received a grant from the United States Institute for Environmental Conflict Resolution (US Institute) to develop and implement a public involvement process for Plan revision. The US Institute contracted with Interface, part of the Community Dispute Resolution Center based in Ithaca, N.Y. to work directly with the Forest Service and the public. The goal was to help the public and Forest Service collaboratively develop alternatives to resolve contentious issues.

Public planning meetings were resumed in 2001. These meetings were designed primarily to validate issues identified in the 1996 to 1998 planning process and identify any new issues that had since emerged. The information provided by this public dialogue and by Forest Service staff evaluation and monitoring of the 1987 Plan implementation was used to complete the Analysis of the Management Situation (AMS) (USDA, Forest Service 2002b).

The AMS was used to evaluate how well the management strategies found in the 1987 Plan worked, and provided a documented discussion of the issues and concerns that were encountered over the 15 years of Plan implementation. The AMS helped focus the need for change to the 1987 Forest Plan and served as a starting point for the Plan revision process.

In May 2002, the Forest Service initiated the formal scoping process by publishing a Notice of Intent (NOI) to prepare an Environmental Impact Statement and a revised Land and Resource Management Plan (Vol. 67, No. 85, 22039-22043). The NOI described the focus of change needed for the 1987 Forest Plan and invited the public to comment on the proposal to revise the Forest Plan. NOI comments were analyzed to determine public issues and concerns. Review of the public comments confirmed that the Plan revision process as proposed in the NOI would be covering the concerns of the public.

Twelve separate but interrelated issues were identified from the AMS, NOI, and public comments. These issues were evaluated, developed, and grouped into categories based on: 1) the degree to which they would affect Forest Plan direction, management area designations, goals, objectives, standards and/or guidelines; and 2) the level of concern they received from the public and Forest Service staff. There were two categories of issues carried forward into the preparation of the DEIS and used to define the scope of the analysis: 1) *major issues that have been used to develop alternatives*; and, 2) *issues that do not require an alternative but are addressed in the context of the analysis across all alternatives.* The two categories of issues are discussed in more detail in the remaining subsections of this chapter.

Beginning in April 2003, a series of local public planning meetings were regularly held at the Hector Town Fire Hall. These meetings were designed to further explore the issues and provide a working group environment with the public to help focus the Plan revision process. These meetings culminated in March of 2004 with the presentation of preliminary draft alternatives that Forest Service staff developed to address the major issues.

Since the initiation of the Plan revision process in 1996, the public has been encouraged to call, visit the office, and/or submit letters and/or emails to have their comments and questions addressed. The involvement of the public has enabled the Forest Service to accomplish the following:

- Keep the public informed during the entire process
- Gather public input on issues

- Define the scope and nature of the decisions to be made
- Formulate alternatives
- Address various management conflicts

In May 2005 the Forest Service released the DEIS and Proposed Revised Forest Plan for public review and initiated a three-month public comment period. Specifically, the Forest Service asked the public the following questions:

- Are your issues accurately represented?
- Are all key issues included?
- Do the alternatives outlined in this DEIS address the Plan revision issues, and purpose and need?
- How could the alternatives be adjusted to better meet the purpose and need or issues?
- Is there at least one alternative, or part of an alternative, that addresses your issues?
- How well does the environmental effects analysis consider anticipated effects?
- How well are the management areas defined in the proposed Plan?
- Do the forest-wide and management area standards and guidelines address the stated goals, objectives, and desired future conditions?

After the release of the Proposed Revised Forest Plan and DEIS documents, the Forest Service held an open house meeting. This meeting was an important public forum to ask questions about the Proposed Revised Forest Plan in order to provide more informed and meaningful comments.

The Forest Service received more than 550 responses, including letters and emails, on the Proposed Revised Forest Plan and DEIS. Those responses contained more than 100 substantive comments. Substantive comments are addressed in the FEIS Appendix G – Responses to Public Comments.

Continuous public involvement throughout the Plan revision process will facilitate the eventual implementation of the revised Plan. To this end, the Forest Service intends to maintain consistent public involvement as the 2006 Forest Plan is implemented by site-specific project planning.

1.1.6 Issues

Forest Plan revision issues are those areas of Forest management that require a change as a result of new scientific information, changed resource conditions, a better understanding of previous management based on monitoring and evaluation information, and/or changing public needs. The issues identified through the planning and public participation process were categorized into two groups that helped define the scope of the analysis documented in the FEIS. These two categories of issues, those that were deemed major enough to necessitate varied approaches in alternatives to revising the Plan, and those that could be addressed through other means are summarized in this subsection. A more detailed discussion of the issues as they relate to the resources can be found at the beginning of each respective resource section in Chapter 3.

Major Issues

Major issues are those that were identified as having the greatest potential impact on the management of the Forest and direction of the Plan. These issues reflect the subject areas that have been proposed for the most change in management direction from the 1987 Plan and thus were the main factors used to develop alternatives. The three major issues that were identified are addressed in this FEIS through alternatives:

1. Biodiversity and Ecosystem Management
2. Recreation Management
3. Timber Management

Each of the major issues has one or more indicators that measure the potential effects of alternative implementation. Indicators highlight differences among alternatives, and help track the issues throughout the environmental effects analysis. Generally, indicators are quantitative, but some are qualitative. These indicators will also be used in Chapter 2 to highlight the differences among alternatives, and help

summarize the impacts of the alternatives. The analysis for some resources in Chapter 3 may use additional indicators to show the differences among alternatives in more detail.

1) Biodiversity and Ecosystem Management

This issue concerns the restoration, protection, maintenance and enhancement of biological and ecological diversity by conservation of species, plant and animal communities, and ecosystems at a variety of landscape scales and landscape patterns. It also includes topics such as wildlife management, range and grazing, and fire management.

Issue Indicators:

- Amount of each major forest community type (composition and abundance)
- Proportion of each major forest community type in various age categories (Age Class Distribution)
- Acres allocated to grassland habitat
- Acres allocated to shrubland habitat
- Acres allocated to contiguous, mature forest habitat
- Acres of habitat available for Management Indicator Species and their population trends
- Viability outcomes for species of potential viability concerns

2) Recreation Management

This issue concerns the appropriate mix of recreation opportunities including the number, location, and acceptable uses of trails, developed campsites, dispersed campsites, facilities, and accessibility. There has also been concern about the maintenance of existing trails and facilities, and sharing recreation information. It has been suggested that the revised Forest Plan outline a trail system that provides for the best mix of trail types in order to meet the needs of various users.

It is believed that there have been increases in many recreational uses during the life of the 1987 Forest Plan. People want to ensure that the Forest Service continues to place high emphasis on providing recreation opportunities.

Issue Indicators:

- Desired Recreation Opportunity Spectrum (ROS) classes by Management Area
- Number of acres available for development by trail activity
- Acres of land available for future developed recreation facilities
- Acres of land available for recreation special use activities

3) Timber Management

This issue concerns the role of timber harvesting on the Forest. The 1987 Forest Plan states that timber management can be used to maintain and enhance vegetative diversity, wildlife habitats, vistas, and the health and condition of the forest ecosystem, as well as produce high quality sawtimber. Timber harvesting can also be used as a tool to achieve recreation, visual, wildlife, timber, forest health, and other objectives assigned to specific management areas (MAs).

Monitoring of the 1987 Plan indicates that the amount of timber harvested on the FLNF has been well below that necessary to create the desired future conditions outlined in the Plan. In addition, the accomplishment of Forest Plan objectives that rely on timber management (such as the creation of habitat diversity for wildlife species) has also been well below desired levels.

There are differing views regarding the role of timber harvesting on the Forest, the amount of timber that should be cut, harvest methods that should be used, and management intensity.

Issue Indicators:

- Acres of land Identified as suitable for timber production
- Timber sale volume Average Annual Allowable Sale Quantity (ASQ)
- Acres of harvest treatment methods

Other Issues

There were nine other issues identified that were important enough to address in the context of the analysis in the FEIS, although they did not trigger a need for alternative development, These issues could have a considerable impact on the management of the Forest and direction contained in the Plan, but to a lesser degree than the major issues. These issues are addressed across all alternatives either through goals, objectives, standards, guidelines, or management direction, and include:

1. Role of the Finger Lakes National Forest
2. Socio-economic Concerns
3. Mineral Management – Oil and Gas Availability
4. Land Acquisition
5. Special Use Management
6. Areas of Significance – Special Designation Areas
7. Heritage Resources
8. Information and Education
9. Monitoring and Evaluation

1) Role of the Finger Lakes National Forest

The Finger Lakes National Forest is integral to the sense of place for communities across Central New York. The role of the Forest is viewed differently depending on a community's, or individual's use of, or reliance upon it.

Some people believe that the role of the FLNF is to provide unique opportunities for continuous blocks of habitat, old growth, and biodiversity. Others believe that the role of the Forest is to provide high quality sawtimber, grazing forage, and wildlife habitat. Some people believe that the Forest should focus on demonstration forestry and education. Many also believe that the role of the FLNF should be a mixture of all of the above. Discussion of the role of the Forest is found in Chapter 2 of the 2006 Forest Plan.

2) Socio-Economic Concerns

This issue is focused on the costs and benefits of National Forest System (NFS) lands to the region. Concern is also focused on the role the Forest Service has in addressing community concerns and opportunities. Some people believe that the Forest Service should recognize and address community concerns and opportunities, especially in the areas of tax loss from land acquisition, potential revenues, and employment that could be generated from the Forest through resource management and regional tourism.

The 1987 Forest Plan was drafted, in part, to maximize net public benefits (both qualitative and quantitative in nature). Some of these benefits include semi-primitive opportunities for recreation, lands for grazing, and an annual amount of harvested timber for wood products.

3) Mineral Management – Oil and Gas Availability

This issue involves a decision made in the 1987 Forest Plan that oil and gas minerals are available for possible lease on FLNF lands. Some people feel that this is not an appropriate use of these lands, and there are differing views concerning whether this 1987 Plan direction should be changed.

Oil and gas leasing is an intended use of the National Forests, as stated in a number of public land laws. In 1987, the Congress passed the Federal Onshore Oil and Gas Leasing Reform Act (FOOGLRA), setting forth the procedures by which the Forest Service and the Bureau of Land Management (BLM) will carry out their statutory responsibilities in the issuance of oil and gas leases. The Forest Service developed implementing regulations for FOOGLRA, which defined the procedures and a three-staged process to be used for the analysis and issuance of leases. The stages include:

1. The determination of lands available for leasing;
2. The decision whether to lease specific lands;

3. An Application for Permit to Drill for exploratory wells.

The decision for stage 1, availability, was made in the 1987 FLNF Forest Plan. The decision for stage 2 was made in December 2001 when the FLNF did not consent to lease the Forest for oil and gas development.

Subsequent to the issuance of the DEIS, however, oil and gas leasing on the FLNF was prohibited by the Energy Policy Act of 2005, thus rendering this issue a moot point.

4) Land Acquisition

There has been concern about continued acquisition of land for inclusion in the FLNF. Some people would like to see more land acquired for conservation purposes, while others do not want any additional land purchased.

5) Special Use Management

Concerns were raised regarding the need to clearly identify where certain special uses may occur on the FLNF. These uses include communication towers, wind turbines, large group gatherings, and special non-timber forest products.

6) Areas of Significance – Special Designation Areas

This issue is focused on the desire for designation of special areas, resolution of existing candidate Research Natural Areas, and determining the most appropriate mix, size, and configuration of future old growth and other special areas.

7) Heritage Resources

Heritage resources include the archaeological sites, historic structures, and cultural landscapes that educate us about past people, environments, and their interactions. Heritage resources have intrinsic cultural value to native peoples. There are concerns over how heritage resources are managed on the FLNF, such as consistency with new federal laws.

8) Information and Education

There is concern that the Forest Service needs to provide more information, increase public involvement, conduct better education programs, increase partnerships and volunteers, and improve law enforcement.

9) Monitoring and Evaluation

Monitoring and evaluation are very important parts of a Forest Plan. Through monitoring and evaluation, the Forest Service is able to verify if desired goals are accomplished and if resource protection is occurring as predicted. Concerns were raised regarding the need for clearer monitoring and evaluation direction, with an emphasis on recreation and ecology, and adequate funding for management activities. People are concerned that there may be a need for more collaborative partnerships to assist the FLNF in developing and implementing a monitoring and evaluation program.

Chapter 2 Alternatives

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Beach Front at Caywood Point

2.1 ALTERNATIVES

2.1.1 Introduction

This chapter describes and compares the three management alternatives considered for the Proposed Revised Forest Plan for the FLNF. The main focus of this chapter is to sharply define the differences between alternatives. Alternatives provide a framework for analyzing different ways of meeting the purpose and need and for addressing the issues discussed in Chapter 1. These alternatives show a range of options for guiding natural resource management activities on the FLNF over the next 10 to 15 years.

Alternatives express different desired future conditions through different Management Area (MA) allocation. The alternative that is selected in the Record of Decision (ROD) is a management strategy that will guide all natural resource management activities and establish management direction for the FLNF.

2.1.2 Alternative Development

The alternatives include different options to resolve issues and to fulfill the purpose and need discussed in Chapter 1. The public, other federal, State and local agencies, as well as Forest Service employees, contributed to the identification of three “major” issues, described in Chapter 1, that are addressed with alternatives in the FEIS. Following an interdisciplinary approach, the Forest Service used the three major issues (Biodiversity and Ecosystem Management; Recreation Management; and Timber Management) as the primary basis on which to focus development of three alternatives that have been carried forward for detailed analysis in the FEIS. While all three alternatives provide a wide range of multiple uses, goods, and services, each addresses the issues in different ways.

Public participation through local planning group meetings held from 2003 into the spring of 2004 helped focus the issues and scope of needed alternative development. Following these meetings, Forest Service staff developed preliminary alternatives in response to the issues and need for change. The following parameters were used in this process:

- Habitats required for species viability can’t be eliminated but amounts and locations could shift
- All newly acquired lands (existing MA 9.2) will be assigned a MA designation
- Follow all federal, State and local laws and legal requirements
- Maintain timber harvesting in all alternatives
- Maintain a multiple use and balanced approach
- There will be no extremes that overly emphasize one resource use over another
- Strive to have MA boundaries be more consistent with existing vegetation features
- Locate MAs based on desired management emphasis, vegetation type, and to the extent possible where compatible uses can be maximized
- Will not designate new Research Natural Areas (RNAs) but may designate new special areas and candidate RNAs
- Maintain existing grasslands for grazing
- Generally maintain grassland and shrubland habitat in all alternatives

The preliminary alternatives were presented at a public meeting in March 2004. Many of the comments received during and after the meeting were incorporated into alternative design, and led to the final three alternatives that have been brought forward for analysis in the FEIS.

The alternatives vary by how they:

- Display different combinations of recreation opportunities
- Address the public's concerns about the amount of timber harvest, and the failure to meet currently planned harvest levels
- Address ecosystem approaches to management, focusing on ecological processes and landscape patterns.
- Display different future combinations of plant and animal habitat across the Forest (this will vary by the amount of land allocated to each MA in the particular alternative).

Each alternative would maintain the habitat necessary to maintain viable populations of plant and animal species.

2.1.3 Changes between the Draft and Final Environmental Impact Statements

The Forest Service received more than 550 well-prepared and constructive comments on the Proposed Revised Forest Plan and DEIS during the three-month public comment period. Both public and internal comments were considered in preparing the FEIS and 2006 Forest Plan.

Changes made to the Proposed Revised Forest Plan have been incorporated into the alternatives. No additional alternatives were included for detailed analysis in the FEIS. Changes made ranged from minor editing for improved clarity to changes in the Forest Plan goals, objectives, standards, guidelines, and MA direction and allocation. Some changes resulted from data corrections, new survey information, and field verification. The following summary describes the most substantial changes made in the 2006 Forest Plan. A complete list of changes can be found in the FEIS planning record.

Public comments also identified the need for several improvements to the analysis and presentation of materials in the FEIS. As a result, editorial discrepancies, minor inconsistencies, or gaps in the presentation of information in the DEIS have been corrected in the FEIS. These changes are noted in the respective Forest Service responses in the FEIS Appendix G – Responses to Public Comments.

CHANGES TO MANAGEMENT AREA ALLOCATIONS

Future Old Forest, Oak Hickory, and Northern Hardwood Management Areas

Alternative 3 now includes 280 additional acres in the Future Old Forest Management Area. The 280 acres are comprised of 174 acres removed from the Oak Hickory Management Area and 106 acres removed from the Northern Hardwood Management Area.

Public comments received on the DEIS and Proposed Revised Plan expressed concern for the vegetation age classes contained in the areas allocated as Future Old Forest in Alternative 3. Specific concern was that there were other areas on the FLNF that had older trees and were better suited for inclusion in the Future Old Forest Management Area designation than those areas presented in the DEIS. Interpretation of aerial photographs taken in 1938 and recently made available through Geographic Information Systems (GIS) indicates areas that may have been continuously forested since the 1930s. At the time the Forest Service allocated lands to management areas for the DEIS, this information was not available. Forest Service staff developed the allocations for Future Old Forest based on the desire to have large areas of relatively unfragmented forest and continuous canopy, and areas that would provide a semi-primitive recreational setting.

In response to the public concerns and new information on the location of older FLNF forests, Forest Service staff reviewed the allocations for Future Old Forest in relationship to forested stands identified in agency

inventories as being at least 80 years old. The older forest areas were predominantly small areas scattered throughout the FLNF. Many of these stands had been incorporated into the Future Old Forest in Alternative 3, but there were opportunities to include more of these stands in this alternative by connecting areas allocated to management areas that would develop old growth characteristics over time. There was also an opportunity to remove some lands allocated to Future Old Forest that were less suitable for this designation, either due to isolation of small parcels or existence of early successional forest composition. Most of these areas were located on the edge of the Future Old Forest MA. The configuration of the Future Old Forest MA in Alternative 3 captures more older forest, provides linkages between future old growth areas, and places some lands in management areas other than Future Old Forest that are better aligned with existing and desired conditions.

CHANGES TO GOALS AND OBJECTIVES

Objectives under Goal 2

Forest Plan Goal 2 emphasizes the maintenance and restoration of habitats to produce viable and sustaining populations of native and desirable non-native plants and animals. The age class objectives have been clarified to be more consistent with desired conditions. The age class objective table has been revised to more clearly state that the age class objectives only apply to those lands classified as suitable for timber production that will be managed under even-aged treatments in the two management areas that include regularly scheduled timber harvest. The percentage of suitable land to be managed using uneven-aged treatment has been increased to a minimum of 20 percent in response to public comments that the timber program on the FLNF should have a greater focus on uneven-aged management, and the re-examination of the type of treatments needed to reach desired vegetation objectives.

Objective under Goal 4

Forest Plan Goal 4 emphasizes the maintenance and restoration of fisheries, riparian, vernal pool, and wetland habitats. A new objective has been added to Goal 4 which states, “Take needed measures to control cattle access on all water resources (including stock ponds, streams, wetlands, seasonal pools, and riparian areas) within the next ten to fifteen years.”

Goal 4 states: “Maintain or restore aquatic, fisheries, riparian, vernal pool, and wetland habitats.” The new objective was added to make a commitment to meet New York Natural Resource Conservation Service Best Management Practices (BMPs) that apply to the constructed ponds in grazing allotments. Currently, cattle are allowed to be around and in the ponds which causes erosion and degrades water quality and does not comply with BMPs.

CHANGES TO STANDARDS AND GUIDELINES

Minerals

Standards and guidelines for minerals management include a new standard: “Lands are withdrawn from oil and gas leasing under the Energy Policy Act of 2005.” Due to the withdrawal of FLNF lands through this act, a standard was removed that was in the Proposed Revised Forest Plan referencing the oil and gas no action decision and the need for new information to become available before this decision is reconsidered.

The 2005 Energy Bill withdrew the FLNF from oil and gas development. A previous EIS had made the decision not to lease areas of the FLNF for natural gas development but the FLNF was still available for consideration. A number of management areas in the Proposed Revised Forest Plan were open to consideration should there be a change in circumstances, such as an unforeseen energy crisis resulting in reconsideration of leasing the FLNF for natural gas development. The new standard is added to clarify that under federal

law, the FLNF is no longer available for oil and gas development.

Soil, Water, and Riparian Area Protection and Restoration

The Forest Service received comments that the wetland guidelines may not provide sufficient protection for wetlands and riparian areas. Specific concerns were related to the need to protect wetland habitats for odonate species such as dragonflies and damselflies, preserve perched white oak swamps, and protect wetland areas from grazing activities. The Soil, Water, and Riparian Standards and Guidelines now clearly display the intended protection of wetlands and riparian areas. For example, a guideline for wetlands now states that within 100 feet of a wetland, activities should be limited to those that protect, maintain, and improve the condition of the riparian resource.

Rare and Unique Biological Features

The 1987 Forest Plan as amended included considerable detail about requirements for management of plants listed by the US Fish and Wildlife Service as threatened or endangered, or by the Eastern Region of the Forest Service as sensitive The Proposed Revised Forest Plan eliminated some of that detailed direction for two reasons: 1) to avoid repeating direction provided in Forest Service Manual (FSM) 2760, and 2) to move detailed operational directions technical guides or Forest Suplements to the Forest Service directives.

Forest Service staff examined standards and guidelines related to protection for species of concern that were not listed as threatened, endangered, or sensitive and found that some of the S&Gs in the 1987 Forest Plan were not yet in the FSM Supplement direction. Without these S&Gs, there would be a need to produce analyses on how each site-specific project could affect plants that are species of concern, and then develop mitigation to protect them. By changing the S&Gs to be more detailed, Forest Service staff will be able to refer to the protection afforded these plants in the S&Gs.

Forest Service Staff raised the concern that the standards for Great Blue Heron and Northern Goshawk would require surveys for these species before any activity. Identifying “active” nests can be problematic for goshawks, as they may have multiple nests that they are working on in any given year. Forest Service staff reviewed potential situations in the field while considering the most effective procedures to protect nests when and where necessary. Based on this review, the standards for these species have been modified and converted into guidelines. This change provides greater flexibility for Forest Service staff in project planning while still protecting any nest found during management activities.

CHANGES TO PLAN APPENDICES

Management Indicator Species

Grassland Management Indicator Species (MIS) have been revised from woodcock to an assemblage of grassland songbirds comprised of eastern meadowlark, bobolink, and savannah sparrow. This change resulted from public comments, discussion among Forest Service staff, and consultation with a Cornell University ornithologist. The eastern meadowlark, bobolink, and savannah sparrow inhabit and nest in grasslands almost exclusively. Ongoing bird studies on the FLNF and breeding bird surveys in New York State provide background population trend information for each species. All three species can easily be monitored together.

Allowable Sale Quantity and Suitable Acres

The Allowable Sale Quantity (ASQ) in Alternative 3 as presented in the Draft EIS and Proposed Revised Plan was an average of 245 thousand board feet (MBF) per year. This increased to an average of to 258 MBF per year for the 2006 Forest Plan (Alternative 3 Modified).

Changes in management area allocations in Alternative 3 Modified have shifted some areas with non-native pine plantations that contribute minimally to the ASQ from MAs that are suitable for timber harvesting to Future Old

Forest, an MA that is not suitable for timber harvesting. Areas with saw timber were shifted from the Future Old Forest to management areas that are suitable for timber harvesting. Although the acres in the Future Old Forest have increased, the ASQ has also increased. The suitable timber base has decreased to 5,700 acres in Alternative 3.

CHANGES TO THE ENVIRONMENTAL IMPACT STATEMENT

Fire Management Analysis

Information has been revised in the Fire History, Ecological Role of Fire, and Existing Condition sections of the Fire Management section (3.16) in Chapter 3. This information has been corrected to better reflect fire conditions applicable to the Finger Lakes National Forest.

2.1.4 Elements Common to all Alternatives

The three alternatives included for detailed analysis in the FEIS have a number of common elements.

Laws, Regulation, and Policies

All alternatives were designed to comply with applicable laws, regulations, and policies. For a complete list of laws, regulations, and policies see Appendix E of the 2006 Forest Plan. All of the alternatives:

- Meet federal laws including, but not limited to:
  - National Forest Management Act
  - National Environmental Policy Act
  - Clean Water Act
  - Clean Air Act
  - Endangered Species Act
- Meet the minimum management requirements of 36 CFR 219.27. These requirements guide the development, analysis, approval, implementation, monitoring, and evaluation of forest plans, including:
  - Resource protection
  - Vegetative manipulations
  - Silvicultural practices
  - Even-aged management
  - Riparian areas
  - Soil and water protection
  - Diversity
- Meet relevant and applicable New York State and local laws.

Forest Plan Management Direction

All alternatives include the same goals, objectives, and forest-wide standards and guidelines. Allocation of land to the different Management Areas (MAs) varies by alternative as explained below. A detailed description of the goals, objectives, and forest-wide standards and guidelines can be found in Chapter 2 of the 2006 Forest Plan.

Monitoring and Evaluation Plan

All alternatives would include the same Monitoring and Evaluation Plan as described in Chapter 4 of the 2006 Forest Plan.

Management Areas

The alternatives allocate land among different MAs. Each alternative includes a different combination of MA acres applied in varied spatial patterns. Each MA has a unique emphasis, desired condition of the land, and standards and guidelines. A detailed description for each MA can be found in Chapter 3 of the 2006 Forest Plan. The following list provides a brief summary of the purpose for each MA.

MA 1.1 – Grassland for Grazing
The emphasis of this MA is to provide grasslands for domestic livestock grazing. Management actions provide a mix of grasses and forbs suitable for both livestock and a variety of wildlife species.

MA 1.2 – Grassland for Wildlife
The emphasis of this MA is to maintain grasslands for wildlife habitat. Management maintains or promotes grass and forbs production without livestock grazing.

MA 1.3 – Shrubland
The emphasis of this MA is to maintain parcels dominated by brushy conditions for wildlife habitat and fruit production.

MA 2.1 – Northern Hardwood
This MA emphasizes shade-tolerant northern hardwood tree species, primarily using uneven-aged management. Vegetation management focuses on the production of high quality sawtimber and other timber products on a sustained basis.

MA 3.1 – Oak-Hickory
This MA emphasizes oak-hickory forests, primarily using even-aged management. Vegetation management emphasis is placed on production of high quality sawtimber and other timber products on a sustained basis. Management actions provide a mix of habitats for wildlife species, emphasizing hard mast production.

MA 6.1 – Future Old Forest
This MA emphasizes natural succession of plant communities to old forest conditions, with little or no timber harvest. Management actions are limited to those that help restore or maintain natural processes, natural communities, and associated species within their natural ranges of variability in the landscape.

MA 8.1 – North Country National Scenic Trail Special Area
This MA emphasizes the nationally significant North Country Trail (NCT) for the education and recreation of present and future generations. The North Country Trail links outstanding scenic, natural, recreational, historic, and cultural areas in seven northern tier states: New York, Pennsylvania, Ohio, Michigan, Wisconsin, Minnesota, and North Dakota.

MA 8.2 – Recreation and Education Special Area
This MA emphasizes uncommon or outstanding recreational, educational, scenic, cultural, or historically significant features. It is intended to preserve the values of these features for the education and recreation of present and future generations.

MA 8.3 – Existing and Candidate Research Natural Areas
This MA emphasizes preservation and protection of ecologically significant natural features, representative ecosystems, and/or unique areas. In combination with other Research Natural Areas (RNAs) in the nation, these form a national network of ecological areas for research, monitoring, education, and maintenance of biological diversity.

MA 8.4 – Ecological Special Areas
This MA emphasizes physical or biological features of Forest-wide or regional significance. Management emphasizes the protection of geological, botanical, zoological, and ecological values and opportunities for public use and interpretation.

2.1.5 Alternatives Considered in Detail

Three alternatives are analyzed in detail in the FEIS including the “no-action” (current management) alternative. The discussion of each alternative:

- Provides a general overview of each alternative
- Discusses how each alternative addresses the major Plan revision issues stated in Chapter 1
- Lists the acres and percentages of land in each Management Area

Alternative 1 (Current Management)

General Overview of Alternative 1

Alternative 1 is the "no-action" alternative for this FEIS. This alternative serves as the baseline for comparison of the other alternatives. "No-action" for purposes of this analysis is considered "no change" from current management direction provided in the 1987 Forest Plan. It reflects the current level of goods and services provided by the Forest and the most likely amount of goods and services that can be expected to be provided in the future if current management direction continues. Most of the same changes identified for the other alternatives specific to the goals, objectives, standards and guidelines, and management area direction have been incorporated into Alternative 1 in order to reflect necessary improvements to the Forest Plan identified through monitoring since 1987.

Alternative 1 Highlights

- Alternative 1 would be consistent with the level of management intensity envisioned under the 1987 Forest Plan
- Greatest amount of grasslands and shrublands
- Lowest number of Ecological Special Areas
- Greatest number of oak-hickory acres.
- Offers greatest opportunity for future snowmobile development
- Least amount of semi-primitive desired Recreation Opportunity Spectrum (ROS) class

Table 2.1-1 shows the distribution of MAs in Alternative 1.

Table 2.1-1: FLNF Alternative 1 Management Area Acres

Management Area	Alt. 1 Current Management
	Acres (%)
Grassland for Grazing	5,912 (36%)
Grassland for Wildlife	436 (3%)
Shrubland	2,107 (13%)
Northern Hardwood	390 (2%)
Oak Hickory	6,779 (41%)
Future Old Forest	n/a
Ecological Special Areas	36 (<1%)
Recreation and Education Special Areas	218 (1%)
North Country National Scenic Trail Special Area	n/a
Existing and Candidate Research Natural Areas	561 (3%)
Total	16,439 (100%)

Source: FLNF GIS Alternative 1 MA Layer
‡ Notes:
1. The Interloken Trail and the North Country Trail are considered Special Areas in Alternative 1, however those trails were not given an area in the 1987 Forest Plan. Therefore, these cannot be reported in this chart.

How Alternative 1 Addresses the Issues

Biodiversity and Ecosystem Management

Under Alternative 1, biodiversity and ecosystem management would be enhanced due to the designation of the newly acquired lands into management areas. Under the 1987 Forest Plan, the newly acquired lands have no vegetation or wildlife habitat management. Designation of the newly acquired lands would enable land managers to provide the appropriate management to improve biodiversity and ecosystem management.

Grassland and shrubland habitat contribute to the biodiversity of the FLNF. Alternative 1 would have the greatest amount of acres in grasslands and shrublands (52%) compared to Alternative 2 (44%) and Alternative 3 (45%). Alternative 1 would also have the least amount of Ecological Special Areas (36 acres, <1%).

Recreation Management

Under Alternative 1, recreational opportunities and management would remain very much as they presently are in the 1987 Plan. There would be some improvements due to the assignment of the newly acquired lands to management areas. This would provide opportunities for future trails and other recreational opportunities appropriate to the MAs. Current MA descriptions for the Finger Lakes National Forest do not explicitly prohibit trail development. Snowmobile use would continue to be prohibited within several specific Special Areas, and summer off-road vehicles would not be allowed on the FLNF.

Timber Management

Under Alternative1, timber management opportunities would be increased slightly from the 1987 Plan. This would be due to the assignment of the newly acquired lands to management areas that allow timber harvesting. Timber management in this alternative would primarily focus on management for oak (even-aged management). Northern hardwood management (uneven-aged management) would occur only in visually sensitive areas.

Alternative 2

General Overview of Alternative 2

Alternative 2 was developed to address a public desire for larger undisturbed areas with less human intervention and semi-primitive recreation opportunities. This desire was expressed by some members of the public during public meetings and during review of FLNF resource maps.

Alternative 2 Highlights

- Lowest amount of grassland and shrubland MAs.
- A small amount of existing shrubland would revert to forest to provide continuity in the forested areas
- Lowest amount of combined acreage in northern hardwoods and oak-hickory
- Large areas of forest would be designated for little or no timber harvest
- Greatest amount of Future Old Forest acreage
- Greatest amount of closed canopy forest
- Offers lowest opportunity for snowmobile trail development
- Greatest amount of semi-primitive desired Recreation Opportunity Spectrum (ROS) class

Table 2.1-2 shows the distribution of management areas in Alternative 2.

Table 2.1-2: FLNF Alternative 2 Management Area Acres

Management Areas	Alt. 2
	Acres (%)
Grassland for Grazing	5,250 (32%)
Grassland for Wildlife	688 (4%)
Shrubland	1,268 (8%)
Northern Hardwood	3,047 (19%)
Oak Hickory	1,127 (7%)
Future Old Forest	3,821 (23%)
Ecological Special Areas	312 (2%)
Recreation and Education Special Areas	218 (1%)
North Country National Scenic Trail Special Area	164 (1%)
Existing and Candidate Research Natural Areas	544 (3%)
Total	16,439 (100%)

Source: FLNF GIS Alternative 2 MA Layer

How Alternative 2 Addresses the Issues

Biodiversity and Ecosystem Management

Alternative 2 would have less overall grasslands and shrublands (44%) than Alternative 1 (52%) and slightly less than Alternative 3 (45%). Alternative 2 would maintain less shrubland and more grassland for wildlife than Alternative 1. Some acres of grassland areas allocated to management areas for cattle grazing in Alternative 1 would be reallocated as grassland for wildlife. There would be fewer shrubland MA acres than in Alternative 1 because some shrub areas grew into forested areas due to lack of maintenance during the life of the 1987 Plan, or were not previously mapped correctly.

Areas that are currently forested and were in the shrubland MA in the 1987 Forest Plan would be placed into forested MAs. Although Alternative 2 would have MAs where timber harvesting can occur, this alternative would have the largest amount of closed canopy forest because it has the greatest number of acres in Future Old Forest MA. Alternative 1 does not allocate any lands to Future Old Forest.

Alternative 2 would have about half as much acreage available for Ecological Special Areas as Alternative 3, but considerably more than Alternative 1. This is primarily because these areas are located in the Future Old Forest MA in Alternative 2.

Recreation Management

Recreational trail opportunities have been outlined through the Trails Analysis Process (TAP). Three trails were identified for future site specific study. In general there would be less opportunity for future snowmobile trail development for Alternative 2 than in Alternative 1 and Alternative 3 due to the large amount of the Future Old Forest MA, which would not allow new snowmobile trails. Bicycling would be allowed on all multiple-use trails.

Timber Management

Alternative 2 would permit the least amount of timber harvesting of all the alternatives because it would contain the most land in the Future Old Forest MA. Without timber harvests, most of the forested lands would grow into mature even-aged oak and hardwoods, and eventually start to form an uneven-aged forest structure over the long-term. Although Alternative 2 would have the least amount of acres available for timber harvesting, there would be more acres in the shade tolerant northern hardwood MA than in the other alternatives. This MA would be designated not only in visually sensitive areas but also in areas that would promote larger blocks of managed northern hardwoods. Alternative 2 would allow the least amount of oak management.

Alternative 3 – Selected Alternative

General Overview of Alternative 3

Alternative 3 was developed to address a public desire for interior forest and semi-primitive recreation opportunities as well as oak and northern hardwood management for wildlife and timber. This desire was expressed by some members of the public during public meetings and during review of FLNF resource maps. This alternative is based more on current ecosystem and vegetative conditions than the other alternatives.

Alternative 3 Highlights

- Second greatest combined amount of northern hardwoods and oak-hickory, only slightly less than Alternative 1.
- Second greatest amount of grasslands and shrublands but only slightly more than Alternative 2.
- There would be more Future Old Forest acres than in Alternative 1 but considerably less than in Alternative 2.
- Greatest amount of acreage in Ecological Special Areas.
- Offers an intermediate opportunity for snowmobile trail development
- Intermediate amount of semi-primitive desired Recreation Opportunity Spectrum (ROS) class

Table 2.1-3 shows the distribution of management areas in Alternative 3.

Table 2.1-3: FLNF Alternative 3 Management Area Acres

Management Areas	Alt. 3
	Acres (%)
Grassland for Grazing	5,250 (32%)
Grassland for Wildlife	688 (4%)
Shrubland	1,421 (9%)
Northern Hardwood	2,189 (13%)
Oak Hickory	4,036 (25%)
Future Old Forest	1,398 (9%)
Ecological Special Areas	531 (3%)
Recreation and Education Special Areas	218 (1%)
North Country National Scenic Trail Special Area	164 (1%)
Existing and Candidate Research Natural Areas	544 (3%)
Total	16,439 (100%)

Source: FLNF GIS Alternative 3 MA Layer

How Alternative 3 Addresses the Issues

Biodiversity and Ecosystem Management

Alternative 3 would maintain about the same amount of grassland and shrubland as Alternative 2. Management in the forested areas would focus on a mix of oak-hickory and northern hardwoods. There would be considerably less Future Old Forest MA acreage (9%) than in Alternative 2 (23%) and considerably more Ecological Special Areas than in Alternatives 1 and 2. This alternative would have more closed canopy forest than Alternative 1 but less than Alternative 2.

Recreation Management

For Alternative 3, recreational trail opportunities have been outlined through the TAP (Appendix F). As in Alternative 2, three trails were identified for future site specific study. There would be less opportunity for future snowmobile trails than in Alternative 1, but more opportunities than in Alternative 2 due to the reduced amount of Future Old Forest MA acreage in Alternative 3. The Future Old Forest MA does not allow new snowmobile trails. Alternative 3 provides an intermediate number of acres (2357, or 17%) in the desired ROS class of semi-primitive motorized and non-motorized combined, and an intermediate number of acres (7926, or 47%) in a desired ROS class of roaded natural.

Timber Management

Alternative 3 would have slightly less overall area available for timber harvesting than Alternative 1, and substantially more than Alternative 2. Alternative 3 would allocate about 38 percent of FLNF acreage to hardwood and oak-hickory acreage compared to 43 percent for Alternative 1 and 26 percent for Alternative 2. Alternative 3 would allow more management for shade tolerant northern hardwoods than Alternative 1 and less than Alternative 2. Alternative 3 would also have substantially more forested land available for oak management than Alternative 2, but less than Alternative 1.

2.1.6 Alternatives Eliminated from Detailed Study

Several alternatives were considered by the Forest Service in response to public comments and related issues. This section identifies those alternatives, and briefly discusses why they were not analyzed in detail in this FEIS.

Alternatives with No Timber Harvesting or Large Increases in Timber Harvesting

These alternatives were considered to address public issues regarding whether timber harvesting should be allowed on the FLNF, and if so, at what level.

An alternative that would eliminate timber harvesting on the FLNF was considered but not analyzed in detail because it would not adequately address the issues and meet the purpose and need criteria set for revising the Forest Plan. The provision of sustainable supplies of timber products is one of several of the original purposes for establishing national forests, as described in the Organic Act and Weeks Act. The Forest Service has been practicing sustainable silvicultural practices on the FLNF since it began managing the area in the 1950s. The Forest is now at a point where long-term investments, such as thinning, stand improvement harvesting, and activities that enhance biological diversity, would be more fully realized with continued management.

Achieving the goals, objectives and the desired future condition of the Forest described in the 2006 Forest Plan are dependent on the relatively small but important level of timber management. Timber harvesting is a necessary management tool for the production of commercial wood products, the creation and maintenance of varied wildlife habitat conditions, the maintenance and enhancement of natural communities, and maintenance, enhancement, and protection of other resources. Without the use of timber harvesting to achieve these key objectives, this alternative would not meet aspects of the purpose and need dealing with providing a diversity of vegetative communities and wildlife habitats.

An alternative that called for large increases in timber harvest was also considered but not analyzed in detail because maximizing timber production would not need aspects of the purpose and need dealing with the need to manage and protect other resources.

The issue associated with the role of timber harvesting, the amount of timber that should be cut, harvest methods that should be used, and timber management intensity is addressed at various levels in the three alternatives included for detailed analysis in the FEIS.

Alternatives with No Livestock Grazing

These alternatives were considered in response to public comments that there should be no grazing on the Finger Lakes National Forest. One alternative without livestock grazing would allow grassland habitat to revert to forest. Another alternative would be to maintain the grassland habitat with methods other than livestock grazing.

Foraging cattle are an important tool in maintaining open, grass-forb habitat that benefits many wildlife species, adds to the scenic desirability and character of the region,

provides recreation opportunities, and increases the vegetative diversity of the Forest. Without livestock grazing aspects of the purpose and need for plan revision related to providing wildlife habitat, vegetative diversity, a mix of recreation opportunities and economic benefits could not be achieved.

The alternative that would maintain the grassland habitat with methods other than livestock grazing was not analyzed in detail because maintenance of that amount of grassland habitat using other methods such as mowing or fire would be technically and economically infeasible. Revenues collected from the grazing permits help offset the costs of maintaining these grassy openings.

Alternatives Adding New Trails

These alternatives were considered in response to public desire for more trails on the Finger Lakes National Forest. Alternatives that added new trails were not analyzed in detail because the Revised Forest Plan does not make site specific decisions such as specific trail locations. The Forest Service has completed a detailed Trails Analysis Process for the FLNF (TAP, see Appendix F) and has recommended three trails for future site specific study. All three alternatives analyzed in detail allow future trail development on the majority of the Forest.

Alternative Making Oil and Gas Resources Unavailable for Leasing

An alternative making oil and gas resources unavailable for leasing on the FLNF was considered in response to public opposition. An alternative that makes the oil and gas resource unavailable for leasing would not meet proposed Forest Plan revision management direction for available mineral leasing. Withdrawing the FLNF lands from availability for leasing would also be inconsistent with Presidential and Congressional intent for mineral leasing on public lands, and Forest Service mineral policy.

Furthermore, subsequent to the issuance of the DEIS, oil and gas leasing on the FLNF was prohibited by the Energy Policy Act of 2005. Therefore, a single alternative making leasing unavailable became unnecessary, as all alternatives are subject to this law. For these reasons, this alternative was eliminated from detailed analysis.

Alternative with All Ravines and Water Courses as Special Areas

This alternative was considered in response to public comments collected during the public mapping sessions. During these sessions, some maps were developed that included every ravine and water course as a Special Area. Individual Special Areas are designated within the Ecological Special Areas MA to protect specific resources that are of forest-wide or regional significance.

All ravines and water courses are not of forest-wide or regional significance. Management standards and guidelines contained in the revised Forest Plan provide protection for ravines and water courses, and it is not necessary to protect all of these resources by Special Area designation. Therefore, an alternative designating all ravines and water courses as Special Areas was not analyzed in detail because the need to protect these areas was already incorporated in all other alternatives.

Alternative Changing the Finger Lakes National Forest into the Finger Lakes National Park

This alternative was considered in response to comments that the Finger Lakes National Forest should become a National Park. An alternative that gives administrative responsibility of the Finger Lakes National Forest to the National Park Service of the Department of the Interior was not analyzed in detail because it is outside of the scope of the revised FLNF Forest Plan analysis. It is also outside the authority of the Responsible Official for this FEIS since a decision of this magnitude would be made at the congressional level.

Alternatives Increasing the Ecological Reference Area Network

There were several suggested alternatives in response to the DEIS preferred alternative that included a change in and an increase of land allocation to Management Areas (MAs) within the ecological reference area network (Future Old Forest, Research Natural Areas, and Ecological Special Areas MAs). The main theme of these alternatives is to include as many existing older stands as possible within the network into large contiguous blocks across the Forest landscape. Specific configurations were presented that focused on protecting additional stands that are currently 70 to 80 years old or older by allocating them to the Future Old Forest (FOF) MA, eliminating proposed allocations of land to this MA that are considered low quality examples of potential future old forest stands, and significantly enlarging the ecological reference area network at the south end of the Forest by including all or most of the federal ownership south of Mathews Road within the FOF MA.

The specific configurations of FOF MA allocation suggested were considered but dismissed from detailed analysis because they do not adequately address the issues and meet the purpose and need criteria set for revising the Forest Plan. Large portions of the area suggested are dominated by plantations and other stands younger than 70 years old. Although there would be an increase in the proportion of stands 80 years or older within the ecological reference area network, these configurations would include less desirable stands. It was also suggested to eliminate the northernmost patch of FOF MA included in the preferred alternative. This patch contains the largest concentration of older forest on the FLNF, and it provides for much needed interior forest habitat in an area that is dominated by open lands. In addition, the northernmost patch of FOF MA is the only one to represent the Ecological Landtypes that dominate the northern portions of the Forest. The specific configurations of FOF MA allocation suggested were considered but dismissed from detailed analysis, because they do not adequately address aspects of the purpose and need for revising the Forest Plan related to old-growth characteristics objectives.

The allocation of large amounts of forested stands within the network simply because they are currently 70 to 80 years old or older would not help achieve the purpose and need for revising the Forest Plan. If all of these stands are placed within the FOF MA, then production of forest products, particularly sawtimber, would be limited to only that provided through thinning of young stands. Some of these stands are oak and oak-pine natural communities. Oak and oak-pine natural communities are likely to succeed to mesic hardwood forests without the opportunity for silvicultural and/or fire treatments. In addition, if all stands 70 to 80 years or older were placed within the FOF MA, there would be no regeneration harvesting on the Forest and the purpose and need of providing a diversity of wildlife habitats, including early successional habitat, would not be achieved. Without the ability to provide quality sawtimber, maintain or enhance oak dominated forest communities, and maintain the regenerating age class to desired levels, these suggested alternatives fail to meet several aspects of the purpose and need of revising the Forest Plan.

2.1.7 Comparison of Alternatives

Table 2.1-4 compares the Management Area allocations by alternative.

Table 2.1-5 briefly summarizes the environmental effects associated with the major issues and compares them by alternative. The detailed disclosure of the effects for all resources is found in Chapter 3.

Table 2.1-4: FLNF Management Area Comparison by Alternative

Management Areas	Alt. 1 Current Management	Alt. 2	Alt. 3
	Acres (%)	Acres (%)	Acres (%)
Grassland for Grazing	5,912 (36%)	5,250 (32%)	5,250 (32%)
Grassland for Wildlife	436 (3%)	688 (4%)	688 (4%)
Shrubland	2,107 (13%)	1,268 (8%)	1,421 (9%)
Northern Hardwood	390 (2%)	3,047 (19%)	2,189 (13%)
Oak Hickory	6,779 (41%)	1,127 (7%)	4,036 (25%)
Future Old Forest	n/a	3,821 (23%)	1,398 (9%)
Ecological Special Areas	36 (<1%)	312 (2%)	531 (3%)
Recreation and Education Special Areas	218 (1%)	218 (1%)	218 (1%)
North Country National Scenic Trail Special Area	n/a	164 (1%)	164 (1%)
Existing and Candidate Research Natural Areas	561 (3%)	544 (3%)	544 (3%)
Total	16,439 (100%)	16,439 (100%)	16,439 (100%)

Source: FLNF GIS Alternative 1, 2, and 3 Management Area Layers

‡ Notes:

1. The Interloken Trail and the North Country Trail are considered Special Areas in Alternative 1, however these trails were not given an area in the 1987 Forest Plan. Therefore, these can not be reported in this chart.
2. Shrubland MA acreage is less in Alt. 2 and Alt. 3 than in Alt. 1 because some of the shrubland areas have grown up into forest
3. Ecological Special Area MA acreage is less in Alt. 2 than Alt. 3 because the areas are in the Future Old Forest MA.

Table 2.1-5: Comparison of Environmental Effects by Alternative			
Issue/Indicator	**Alternative 1**	**Alternative 2**	**Alternative 3**
Biodiversity and Ecosystem Management			
Amount of each major forest community type (composition and abundance)			
Mesic Hardwood Forest Communities	Would provide the least amount of mesic hardwood forest over the long-term (15%). Mesic hardwoods would have a lower abundance than oaks across the FLNF landscape, which would generally be outside the ecological tendencies for this forest community.	Would provide the largest amount of mesic hardwood forest over the long-term (36%). Would increase mesic hardwoods to four times the area represented by oak, which is higher than the ecological tendency for the relative proportion of mesic hardwoods to oak.	Would provide an intermediate amount of mesic hardwood forest over the long-term (26%). Would move the forest closest to maintaining the proportional relationship of mesic hardwoods to oak predicted by ecological tendencies, with mesic hardwoods about 1.7 times as abundant as oaks.
Oak-Hickory and Oak-Pine Forest Communities	Would provide the greatest amount of oak-dominated forest over the long-term (20%). Oak-dominated forests are close to or within the expected ecological tendencies for this forest community.	Would provide the least amount of oak-dominated forest over the long-term (9%) by reducing the amount of oak-dominated forest to half of what currently exists. Would maintain oak-dominated forests well below what would be expected for ecological tendencies.	Would provide intermediate abundance of oak-dominated forest over the long-term (15%). Would move the forest closest to maintaining the expected proportional relationship between oaks and mesic hardwoods predicted by ecological tendencies.
Softwood Forest Communities	The long-term composition of softwoods would be toward the high end of the composition objectives (9%), but reduces the current abundance of softwoods by almost 50 percent compared to current abundance on the Forest.	The long-term composition of softwoods would be toward the low end of the composition objectives (6%), and reduces the current abundance of softwoods by two-thirds. This alternative most reflects the expected ecological tendency of the FLNF.	The long-term composition of softwoods would be toward the middle end of the composition objectives (8%), but reduces the current abundance of softwoods by more than 50 percent compared to the current abundance on the Forest.
Aspen Communities	Would increase the proportion of aspen toward the upper end of the desired range of objectives (3%) over the long-term. Opportunities to manage existing aspen stands and create new stands would be much greater than under Alternative 2.	Would provide fewer opportunities for managing the aspen forest community compared to the other alternatives, but still would maintain aspen at levels greater than expected by ecological tendencies (2%).	Same as Alternative 1.

Table 2.1-5: Comparison of Environmental Effects by Alternative

Issue/Indicator	Alternative 1	Alternative 2	Alternative 3
Open Land	Would provide the greatest opportunity to increase open land (54%) over the long-term.	Would provide an opportunity to increase open land to 48% over the long-term.	
Proportion of each major forest community type in various age categories within the lands projected for even-aged silvicultural management (Age Class Distribution)			
Mesic Hardwood Forest Communities	About half of the mesic hardwood stands within lands projected for even-aged silvicultural management on the Forest (51%) would have a balanced age class distribution in the vicinity of the desired age class objectives over the long-term.	Only a very small proportion of mesic hardwood stands within lands projected for even-aged silvicultural management on the Forest (6%) would have an age class distribution balanced to the desired objectives over the long-term.	About a third of the mesic hardwood forest stands within lands projected for even-aged silvicultural management on the Forest (35%) would have an age class distribution balanced to the desired objectives over the long-term.
Oak-Hickory and Oak-Pine Forest Communities	More than half of the oak stands within lands projected for even-aged silvicultural management on the Forest (58%) would have a balanced age class distribution in the vicinity of the desired age class objectives over the long-term.	Only a very small proportion of oak stands within lands projected for even-aged silvicultural management on the Forest (5%) would have an age class distribution balanced to the desired objectives over the long-term.	About a tenth of the oak stands within lands projected for even-aged silvicultural management on the Forest (10%) would have an age class distribution balanced to the desired objectives over the long-term.
Softwood Communities	As the majority of Forest softwood communities are plantations that will naturally convert to northern hardwood, no alternative has a clear advantage in age class distribution for softwood stands within lands projected for even-aged silvicultural management. All achieve the objectives eventually, with Alternative 3 stabilizing a little more quickly.		

Table 2.1-5: Comparison of Environmental Effects by Alternative

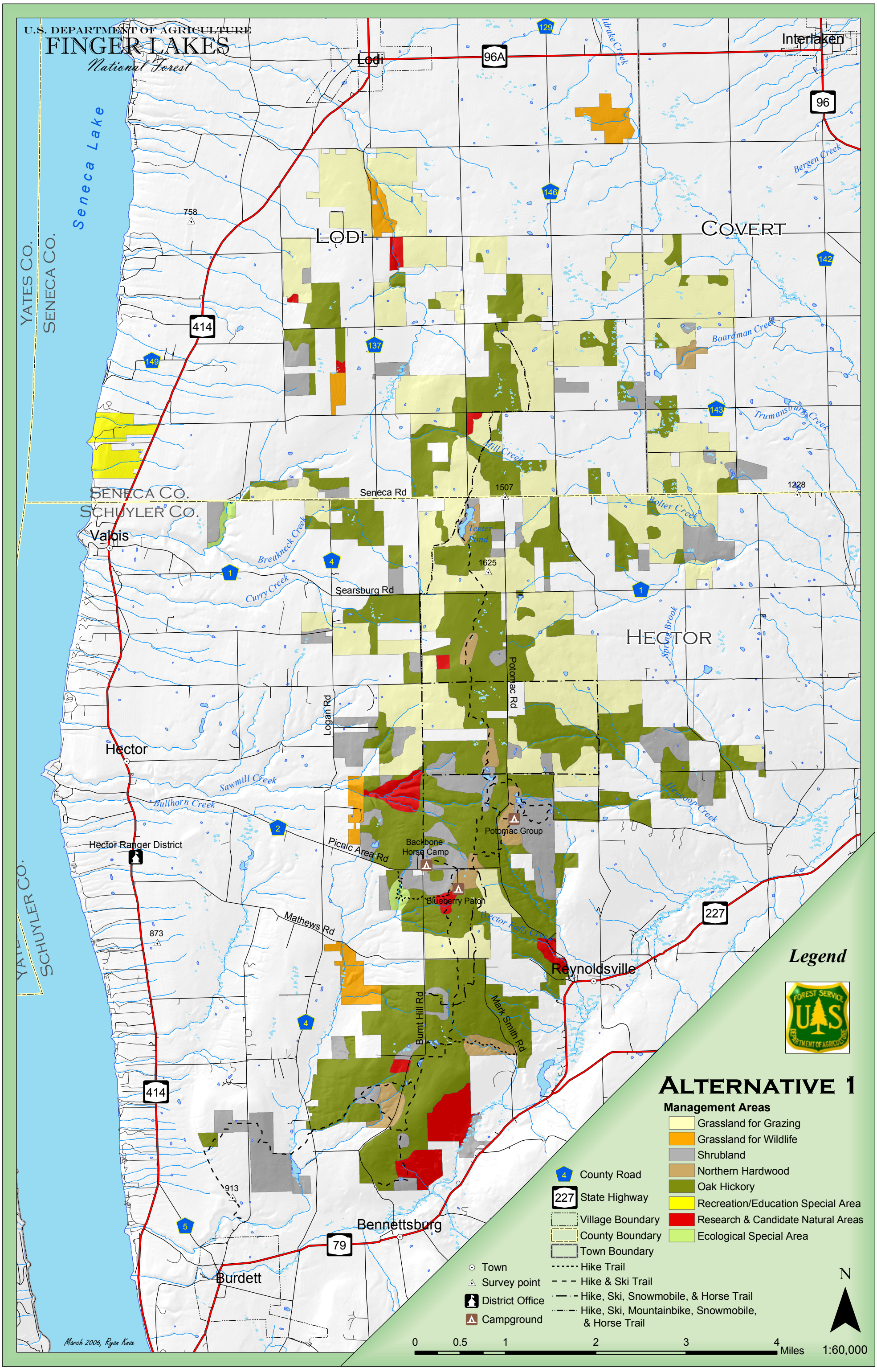
Issue/Indicator	Alternative 1	Alternative 2	Alternative 3
Aspen Communities	Would provide the most opportunities to manage age class distribution for aspen stands within lands projected for even-aged silvicultural management, since two-thirds of existing aspen stands (65%) are within the Oak Hickory MA that emphasize even-aged management. Would also allocate the lowest proportion of aspen stands (less than 1%) to MAs that emphasize natural processes or limited management.	Would provide the fewest opportunities to manage age class distribution for aspen stands within lands projected for even-aged silvicultural management, compared to the other two alternatives since only 1% of existing aspen stands occur within the Oak Hickory MA. Would also allocate the highest proportion of aspen stands (63%) to MAs that emphasize natural processes or limited management.	Would provide fewer opportunities to manage age class distribution for aspen stands within lands projected for even-aged silvicultural management than Alternative 1, since less than half of existing aspen stands (45%) occur within the Oak Hickory MA. Would also allocate an intermediate proportion of aspen stands (23%) to MAs that emphasize natural processes or limited management.
Acres providing grassland habitat	Alternative 1 proposes the greatest acreage (5,400 acres) of grazed grasslands, and the smallest (310 acres) of un-grazed grasslands.	Alternatives 2 and 3 provide an identical combination and distribution of grasslands: 5,100 acres of grazed grasslands and 680 acres of un-grazed grasslands.	
Acres providing shrubland habitat	Would provide the most acreage of shrubland habitat (1,400 acres), on 9% of the Forest.	Would provide the least acreage of shrubland habitat (1,100 acres), on 7% of the Forest.	Would provide an intermediate amount of acreage of shrubland habitat (1,200 acres), on 8% of the Forest.
Acres providing contiguous, mature habitat	Would provide a slightly lower emphasis on mature and older forest communities, but in the short- term these differences are negligible. The greater difference is that the areas that will develop into older forest are more scattered and provide less contiguity.	Would allocate the greatest amount of land to MAs that will develop into old forest, the greatest acreage managed under uneven-aged silvicultural methods, and the greatest connectivity and contiguity of the combined old and mature forest communities.	Lands that develop into old forest would be centrally located, with limited occurrence at the northern extremities of the Forest. Connectivity of old forest development similar to Alternative 2, but less connectivity than Alternative 2 between areas where uneven-aged silvicultural methods are used and those managed for older forest.

Table 2.1-5: Comparison of Environmental Effects by Alternative

Issue/Indicator	Alternative 1	Alternative 2	Alternative 3
Acres within the ecological reference area network (cRNAs, RNAs, eSAs, Future Old Forest MA, and some unsuitable lands for timber production)	Would allocate the lowest amount of land (783 acres or 5% of the Forest) to areas where natural processes dominate and where old growth characteristics will develop in the long-term.	Would allocate the most amount of land (4,854 acres or 30% of the Forest) to areas where natural processes dominate and where old growth characteristics will develop in the long-term.	Would allocate an intermediate amount of land (2,655 acres or 16% of the Forest) to areas where natural processes dominate and where old growth characteristics will develop in the long-term.
Percentage of ecological units represented within the ecological reference area network	All 14 ELTs are represented in the ecological network, but at percentages ranging from less than one percent to 30 percent. Most ELTs have less than ten percent of their acreage in the network. Nine out of 14 ELTs have less than five percent within the network. Three of the six LTAs are represented at five percent or more, while the other three LTAs are less than the five percent objective.	All 14 ELTs and six LTAs are represented at above five percent. Alternative 2 has the highest representation of ELTs represented in the ecological network, ranging from 14 to 72 percent of ELTs represented. LTAs are similarly well represented, ranging from 10 to 50 percent.	All 14 ELTs and six LTAs are represented at above five percent. Alternative 3 is intermediate in providing representation of ELTs in the ecological network, ranging from six to 43 percent. LTAs representation ranges from seven to 44 percent.
Acres of habitat available for Management Indicator Species (MIS) and their population trends	All three alternatives provide availability of each of the important habitat types and conditions for MIS on the FLNF. MIS would find suitable conditions under each alternative, both in the short and long-term. The availability of oak-hickory habitat should increase slightly over the current condition due to natural succession of some softwood stands, but does not vary among alternatives over the short-term.		
	Would provide abundance of aspen at the upper limit (500 acres or 3% of the Forest) of the desired composition range for this habitat type over the short-term. Provides the most emphasis on average acreage of young deciduous tree habitat (about 330 acres) over the short-term.	Would provide abundance of aspen below the desired composition range for this habitat type over the short-term (150 acres or 1% of the Forest). Provides the least emphasis on average acreage of young deciduous tree habitat (about 40 acres) over the short-term.	Would provide abundance of aspen approaching the upper limit (380 acres or 2% of the Forest) of the desired composition range for this habitat type over the short-term. Provides an intermediate emphasis on average acreage of young deciduous tree habitat (about 110 acres) over the short-term.

Table 2.1-5: Comparison of Environmental Effects by Alternative			
Issue/Indicator	**Alternative 1**	**Alternative 2**	**Alternative 3**
Viability outcomes for species of potential viability concerns	All alternatives promote the protection, enhancement, or maintenance of species of potential viability concern, and the habitats on which these species depend. Although there may be impacts on some species, implementation of any of the revised Plan alternatives is not likely to result in a trend toward federal listing, or loss of viability, for species listed as Sensitive by the Regional Forester on the FLNF.		
Recreation Management			
Desired Recreation Opportunity Spectrum (ROS) classes	Would provide for most of the Forest to be managed toward the Rural (40%) and Roaded Natural (56%) Desired ROS classes. There would be no Semi-primitive Motorized class emphasized and Semi-primitive Non-motorized would be 4% of the Forest.	Would provide for the majority of the Forest to be managed toward the Rural (37%) and Roaded Natural (33%) Desired ROS classes, but provides for the greatest amount of Semi-primitive Motorized class (23%), and would provide for an intermediate amount of Semi-primitive Non-motorized Desired ROS class (6%).	Would provide for most of the Forest to be managed toward the Rural (37%) and Roaded Natural (47%) Desired ROS classes. Places more emphasis on Semi-primitive Motorized ROS than Alternative 1 (9%), but less than Alternative 2. Semi-primitive Non-motorized ROS class would be emphasized greatest in this Alternative (8%).
Number of acres available for development by trail activity	All alternatives would provide for 97% of the FLNF to remain open for future hiking and cross country skiing trail development. All alternatives would provide for 96% to 97% of the FLNF to remain open for future horseback riding trail development and future mountain biking trail development.		
	Would provide for the greatest amount (95%) of the Forest to remain open for future snowmobile trail development.	Would provide for the least amount (69%) of the Forest to remain open for future snowmobile trail development.	Would provide for an intermediate amount (83%) of the Forest to remain open for future snowmobile trail development.
Acres of land available for future developed recreation facilities	Would provide for the greatest amount (96%) of the Forest to remain open to future developed recreation opportunities.	Would provide for the least amount (71%) of the Forest to remain open to future developed recreation opportunities.	Would provide for an intermediate amount (84%) of the Forest to remain open to future developed recreation opportunities.
Acres of land available for recreation special use activities	Would provide for the greatest amount (95%) of the Forest to remain open to future recreation special use activities.	Would provide for the least amount (69%) of the Forest to remain open to future recreation special use activities.	Would provide for an intermediate amount (83%) of the Forest to remain open to future recreation special use activities.

Table 2.1-5: Comparison of Environmental Effects by Alternative			
Issue/Indicator	**Alternative 1**	**Alternative 2**	**Alternative 3**
Timber Management			
Acres of land Identified as suitable for timber production	Would have the greatest amount of suitable forest land. A total of 6,677 acres (41% of the Forest) would be considered suitable for timber production.	Would have the least amount of suitable forest land. A total of 3,846 acres (23%) of the Forest) would be considered suitable for timber production.	Would be intermediate in the amount of suitable forest land. A total of 5,700 acres (35% of the Forest) would be considered suitable for timber production.
Timber sale volume Average Annual Allowable Sale Quantity (ASQ)	Would have the highest timber volume that could be sold of all the alternatives. Would average 425 MBF annually that could be sold for the first two decades and increases to 439 MBF annually over the long-term.	Would have the lowest timber volume that could be sold of all the alternatives. Would average 94 MBF annually that could be sold over the short and long-term.	Would have an intermediate timber volume that could be sold compared to the other two alternatives. Would average 258 MBF annually that could be sold over the short and long-term.
Acres of harvest treatment methods	Would have the highest potential for even-aged management (97 average annual acres) <u>Even-aged Management</u> • Thinning Harvest: 55 acres • Shelterwood Regeneration: 25 acres • Shelterwood Removal: 9 acres • Clearcut: 8 acres <u>Uneven-aged Management</u> • Selection: 35 acres **Total Harvesting: 132 acres**	Would have the lowest potential for even-aged management (20 average annual acres) <u>Even-aged Management</u> • Thinning Harvest: 10 acres • Shelterwood Regeneration: 5 acres • Shelterwood Removal: 3 acres • Clearcut: 2 acres <u>Uneven-aged Management</u> • Selection: 15 acres **Total Harvesting: 35 acres**	Would have intermediate potential for even-aged management (51 average annual acres) <u>Even-aged Management</u> • Thinning Harvest: 29 acres • Shelterwood Regeneration: 12 acres • Shelterwood Removal: 6 acres • Clearcut: 4 acres <u>Uneven-aged Management</u> • Selection: 36 acres **Total Harvesting: 87 acres**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FINGER LAKES
National Forest
Seneca Lake
Yates Co.
Seneca Co.
Lodi
Interlaken
Covert
Hector
Seneca Co.
Schuyler Co.
Valois
Hector
Hector Ranger District
Reynoldsville
Bennettsburg
Burdett
Seneca Rd
Searsburg Rd
Logan Rd
Potomac Rd
Picnic Area Rd
Mathews Rd
Burnt Hill Rd
Mark Smith Rd
Potomac Group
Backbone Horse Camp
Blueberry Patch
Tekter Pond
Bergen Creek
Boardman Creek
Trumansburg Creek
Mill Creek
Bolter Creek
Breakneck Creek
Curry Creek
Spring Brook
Hemlock Creek
Sawmill Creek
Bullhorn Creek
Hector Falls Creek
Drake Creek
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143
137
149
March 2006, Ryan Knox
Legend
County Road
State Highway
Village Boundary
County Boundary
Town Boundary
Town
Survey point
District Office
Campground
Hike Trail
Hike & Ski Trail
Hike, Ski, Snowmobile, & Horse Trail
Hike, Ski, Mountainbike, Snowmobile, & Horse Trail
Alternative 1
Management Areas
Grassland for Grazing
Grassland for Wildlife
Shrubland
Northern Hardwood
Oak Hickory
Recreation/Education Special Area
Research & Candidate Natural Areas
Ecological Special Area
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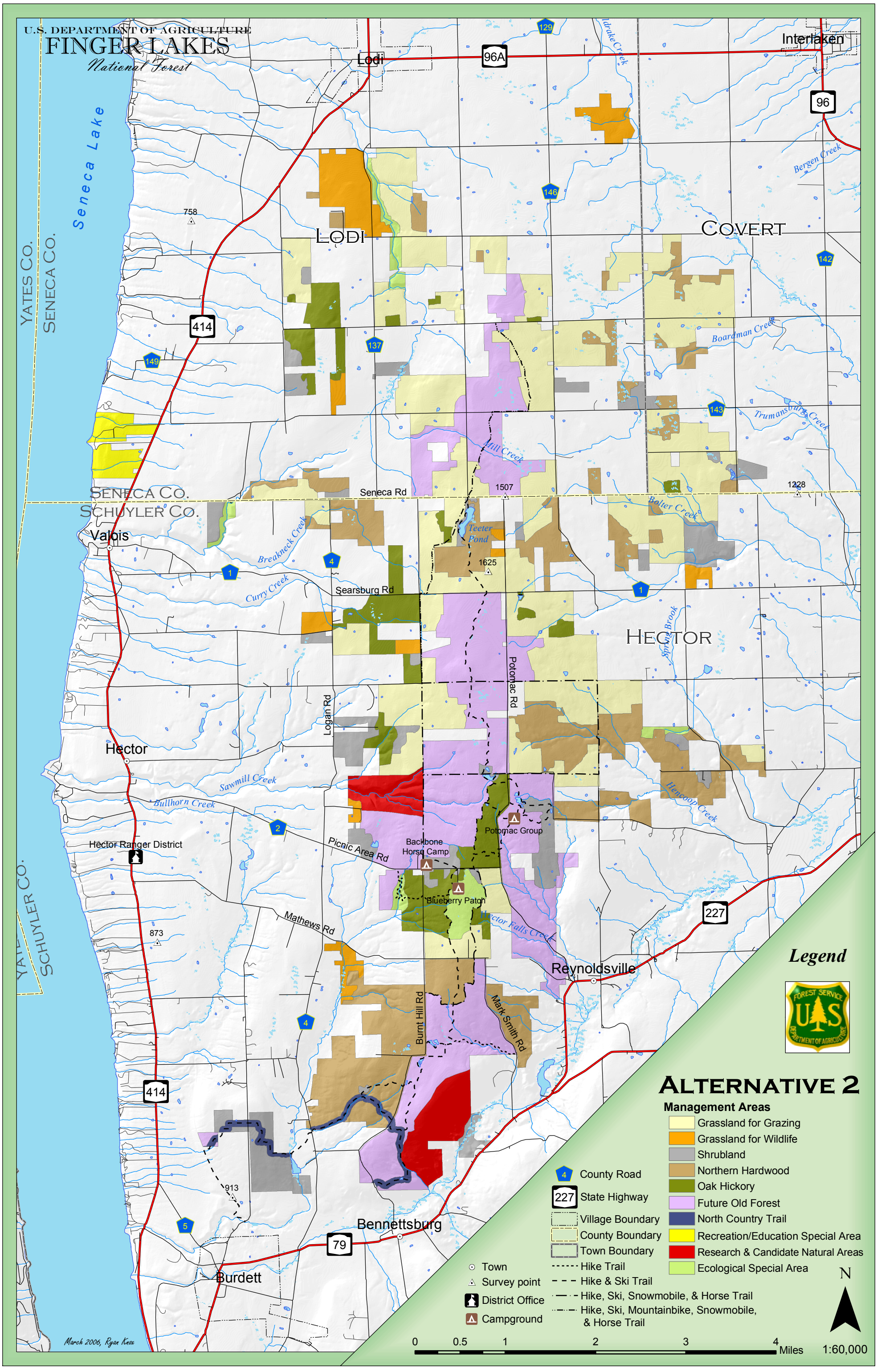
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Trumansburg Creek
Mill Creek
Bolter Creek
Bergen Creek
Spring Brook
Hemcoop Creek
Hector Falls Creek
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Alternative 2
Management Areas
Grassland for Grazing
Grassland for Wildlife
Shrubland
Northern Hardwood
Oak Hickory
Future Old Forest
North Country Trail
Recreation/Education Special Area
Research & Candidate Natural Areas
Ecological Special Area
County Road
State Highway
Village Boundary
County Boundary
Town Boundary
Hike Trail
Hike & Ski Trail
Hike, Ski, Snowmobile, & Horse Trail
Hike, Ski, Mountainbike, Snowmobile, & Horse Trail
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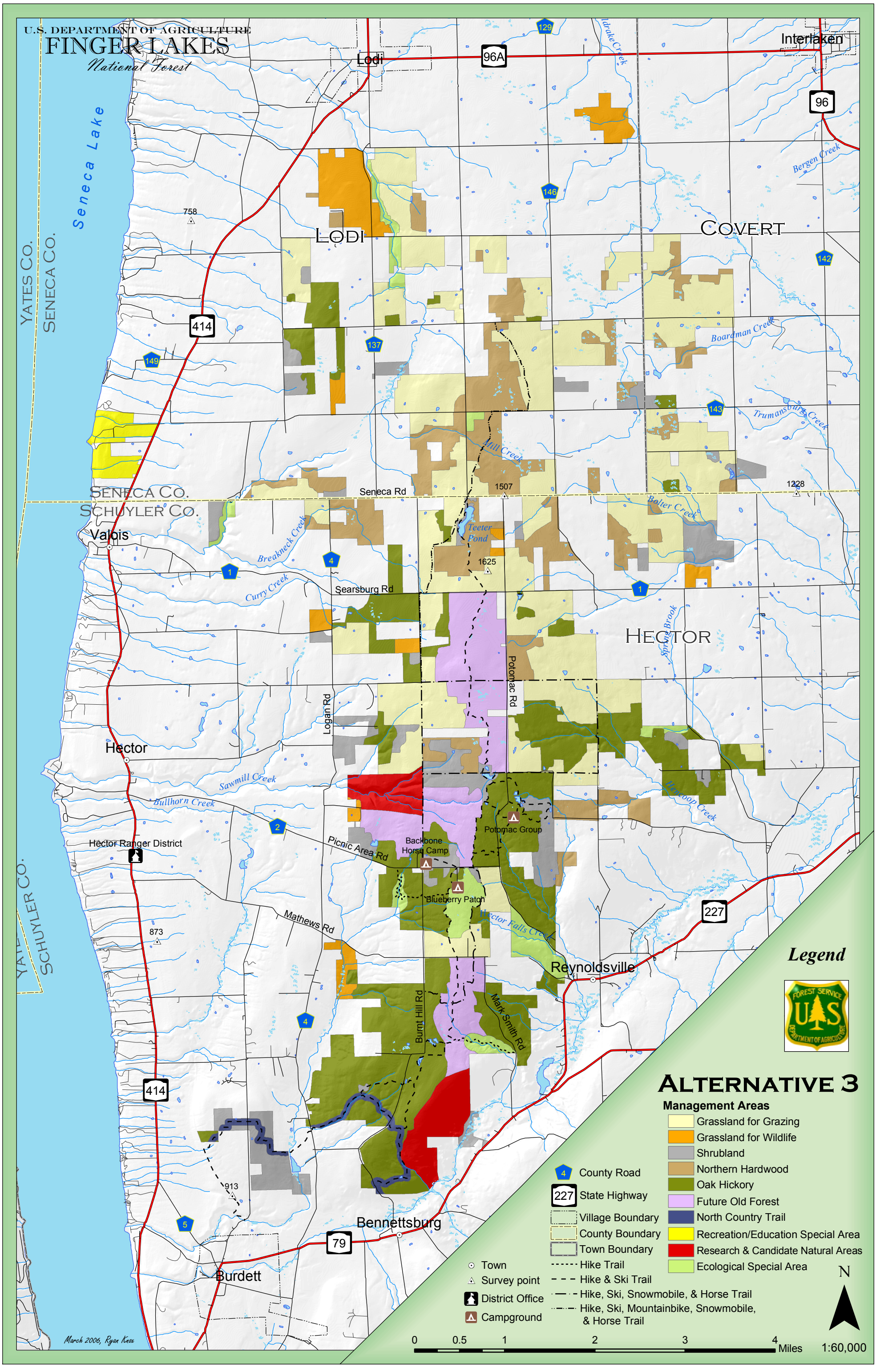
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Legend
Alternative 3
Management Areas
Grassland for Grazing
Grassland for Wildlife
Shrubland
Northern Hardwood
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Future Old Forest
North Country Trail
Recreation/Education Special Area
Research & Candidate Natural Areas
Ecological Special Area
County Road
State Highway
Village Boundary
County Boundary
Town Boundary
Hike Trail
Hike & Ski Trail
Hike, Ski, Snowmobile, & Horse Trail
Hike, Ski, Mountainbike, Snowmobile, & Horse Trail
Town
Survey point
District Office
Campground
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March 2006, Ryan Knox

Chapter 3 Affected Environment and Environmental Consequences

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3.1 INTRODUCTION

3.1.1 Chapter Purpose and Organization

Chapter 3 describes the existing physical, biological, social, and economic resources of the environment that may be affected by the alternatives presented in Chapter 2. It also presents the effects that the alternatives may have on those resources. The discussion of affected environment and environmental effects was combined into one chapter to provide a clear picture of what the resources are and what could happen to them under the different alternatives. The analysis of environmental effects provides the basis for the comparison of alternatives that appears at the end of Chapter 2. This Introduction, Section 3.1, prefaces the context in which the alternatives are analyzed and has seven parts:

Social and Economic Setting – Gives a brief overview of the key social and economic components of the area.

Physical and Biological Setting – Gives a brief overview of the key physical and biological components of the area.

Ecosystem Management – Presents the ecosystem management framework that was used in the development of alternatives and the analysis of resources and issues in Chapter 3. This subsection also introduces the reader to key components and concepts of the ecosystem management framework.

Laws, Regulations, and Policies – Describes the primary applicable laws, regulations, and policies that provide the legal framework for the various resource areas covered in this Chapter.

Analysis – Outlines the different scales and units used in the analysis. Some methods used in the analysis are also summarized.

Relationship between Programmatic and Site-specific Analysis – Describes the difference between the analysis for the revised Forest Plan alternatives and site-specific projects.

Affected Environment and Environmental Consequences Section Organization – The remainder of Chapter 3 is organized by resource, focusing on those resources related to issues described in Chapter 1.

3.1.2 Social and Economic Setting

The Finger Lakes National Forest (FLNF) is located in the central portion of Upstate New York in a region known as the Finger Lakes region (Figure 3.1-1). The FLNF is between Seneca Lake and Cayuga Lake and is located in the counties of Seneca and Schuyler. The area is a rural part of New York State having numerous farms, vineyards, and forested lands intermixed with low-density, rural residential development, and small historical villages and towns. The area also offers the scenic natural resources of the Finger Lakes, numerous ravines and gorges, and rolling hills. Area town populations range from approximately 1,500 to 5,000 (US Department of Commerce, Census Bureau 2000). The City of Ithaca, with a population of more than 29,000, is located in neighboring Tompkins County and is 20 miles from the FLNF.

The FLNF provides outdoor recreation opportunities, natural resource education and enjoyment, wildlife habitats, grazing, forest products, and relatively large expanses of forested landscapes. These benefits are enjoyed by residents and visitors. The 16,439-acre FLNF is a significant component for the rural communities in which it is located. Communities recognize the benefits but also feel the impacts of forest use and loss of local tax revenues. These benefits and impacts make community relationships and desires an important aspect of management.

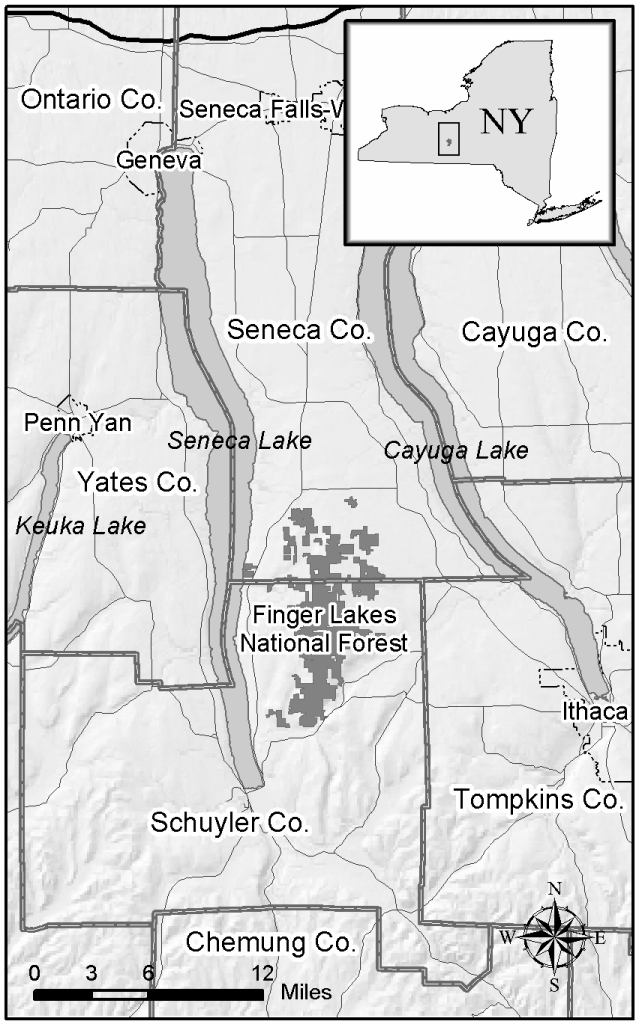

Figure 3.1-1: Finger Lakes National Forest Vicinity Map

Historical Setting

Prior to occupation by settlers of European ancestry, the Finger Lakes region was home to Native American peoples starting from roughly 12,500 years ago. Their land use began with hunting and gathering of a wide range of small animal and plant food resources, as well as resource extraction activities such as quarrying stone for tool-making. Later in time, Native people adopted horticultural subsistence practices, eventually depending on intensive corn agriculture and settling into permanent villages.

The FLNF is located in what was a boundary area between the Seneca and Cayuga Nations of the Iroquois Confederacy. Cayuga villages due east of the FLNF date from about 1450 to 1600 AD, with other villages north of these well into the 18th century. Seneca villages near the FLNF date to 1700 AD or later, and include Catherine (at the southern end of Seneca Lake), and a series of at least three small villages along the eastern shore of the Lake, including one at Peach Orchard (in the town of Hector). A known Iroquois road extends along the east side of Seneca Lake, heading toward settlements and agricultural fields to the north, but no Iroquois settlements or encampments are known to occur on FLNF lands.

Iroquois culture was the dominant culture and political force in New York up through the late 18th century. A military action, known as the Sullivan campaign of 1779, led to the devastation of the Iroquois in this area. This campaign was launched against the Iroquois in retaliation for their alliance with the British in the Revolution. Soldiers of the campaign raided Iroquois settlements throughout the Finger Lakes region, burning villages, cornfields, and orchards along both Seneca and Cayuga Lakes. During land surveys of the 1790s, evidence of settlements and the campaign were present, but few native peoples were noted.

The area around the FLNF was promised to New York veterans of the Revolutionary War as payment for their services, and so the State created a Military Tract in 1782. The land was surveyed during the 1790s, and settlement started in earnest during the first three decades of the 1800s. The distribution of the lots within the Military Tract included terms and conditions requiring “improvement” within five years of acquisition, which led to the clearing of forests and establishment of agricultural fields of hay and small grains (DeGloria 1998).

Agricultural production peaked in the area just before the Civil War. By the mid-1800s, agriculture and lumber production were important industries in the area. More than 145 mills were operating in the central Finger Lakes area. By the 1880s, land cleared for timber and agriculture peaked statewide (DeGloria 1998).

With the opening of the Midwest in the late 19th century, the region entered a sharp economic and population decline as farmers relocated to more fertile agricultural lands.

Between 1890 and the Great Depression, more than a million acres of farmland were abandoned in south central New York State. In the 1930s it was recognized that farmers in many parts of the country could no longer make a living from their exhausted land. Environmental damage was occurring as they cultivated the land more and more intensively to make ends meet. Several pieces of legislation were passed, including the Emergency Relief Act of 1933 and the Bankhead-Jones Farm Tenant Act of 1937 to address these problems. One result was the formation of a government agency, the Resettlement Administration, to carry out the new laws. This agency directed the relocation of farmers to more fertile land or other jobs, and purchased marginal farmland by the federal government. Between 1938 and 1941, more than 100 farms were purchased for what is now the FLNF (DeGloria 1998).

The Soil Conservation Service initially managed the newly acquired federal land, named the Hector Land Use Area (LUA). The emphasis was on stabilization of the soil by planting conifers, and development of a cooperative grazing program. Previously cultivated fields were converted to improved pastures to demonstrate how less intensive agriculture could still make productive use of the land (DeGloria 1998).

By the 1950s, many of the original objectives of the Hector Land Use Area had been met. Farmers had been resettled, the eroding soil stabilized, and alternative agricultural uses demonstrated. At the same time, the public was becoming interested in the concept of multiple uses of public lands. Management and appropriate ownership of the Hector LUA was reevaluated. The decision was made in 1954 to transfer administration responsibilities to the US Forest Service, which already had a fairly long history of multiple use management.

In 1982, the federal land management agencies were directed to identify isolated parcels of federal land that could be sold without significantly affecting the resource base or public service. The Hector Land Use Area was one parcel studied for possible disposal under the “Assets Management” program. When public meetings were held to evaluate this idea, there was strong local support for continued federal ownership. Local and regional citizens had come to depend on the Hector LUA for wood products, forage, recreation, and other benefits. Because of this public support, the Congress enacted legislation to make it a permanent part of the National Forest System. In October of 1985, the Hector District of the FLNF was established.

Social Setting

The social setting of an area can be described through demographics such as population, education, and housing; community stability; lifestyles; values; and social organization. Seneca and Schuyler Counties are both rural counties containing a number of small towns. Schuyler County is located on the southern portion of Seneca Lake (both east and west sides) and contains the towns of Hector, Catherine, Cayuga, Montour, Dix, Tyrone, and Orange, and the villages of Watkins Glen, Burdett, Montour Falls, and Odessa. Seneca County is located on the eastern side of Seneca Lake directly north of Schuyler County. It contains the towns of Lodi, Covert, Ovid, Romulus, Fayette, Junius, Seneca Falls, Tyre, Varick, and Waterloo, and the villages of Lodi, Interlaken, Ovid, and Seneca Falls. The combined population of Seneca and Schuyler Counties is 52,566 (Table 3.20-5). The population has increased only slightly in the past ten years (less than one percent growth), is predominantly white (greater than 95%), more than 80 percent are native New Yorkers, and more than 60 percent live in the same house as they did in 1990 (US Department of Commerce, Census Bureau 1990). Approximately 10 percent of the dwelling units are seasonal homes.

There is only one post high school educational institution in Seneca and Schuyler Counties. Several institutions of higher learning are within an hour of the two counties including Cornell

University. Approximately 17 percent of those over the age of 25 living in the two counties have a bachelor's degree or higher (US Department of Commerce, Census Bureau 2000).

In New York, local government is responsible for creating and regulating land use planning and zoning. Schuyler County has recently developed a county plan but Seneca County does not have a county plan. Goals and objectives in regional plans are a good indication of community values and attitudes. The Schuyler County Plan contains goals and objectives relating to a number of topics including agriculture, economic development, natural resources, recreation, historic and cultural resources, government, housing, infrastructure, and transportation.

Economic Setting

The economic setting of an area can be described through income, employment, types of businesses, property values, and tax burden. The two-county area is generally described as economically depressed. In 2001, the per capita personal income for Seneca County was $22,423, and $20,660 for Schuyler County, ranking them 47th and 55th out of 62 counties in New York State. The average per capita income for the State in 2001 was over $35,000 per year (New York State Data Center 2003).

In 2000, the dominant occupation in New York State, comprising 37 percent of all employed, was management and professional related jobs (Stokowski et al. 2004). Technical, sales and office jobs were the second dominant category with 27 percent. The occupation of farming, fishing, and forestry was the lowest with less than 1 percent. Schuyler and Seneca Counties were similar to the State with management, professional, and related occupations being the dominant occupations with 30 percent of those employed (Table 3.20-16). Construction, production laborers, and transportation were the second dominant category with 27 percent. Technical, sales and office was third with 25 percent, service was fourth (17.5%) and farming, forestry and fishing were last with 1.5 percent of all employed. Employment by industry shows the service industry to be the leading employer in New York and the mining industry to employ the least (Table 3.20-17). The highest employment by industry in both Seneca and Schuyler Counties was also the service industry and the mining industry employed the least. The 2002 unemployment rate for the Seneca and Schuyler Counties, respectively, was 5.6 percent and 8.3 percent (Table 3.20-7). The New York State unemployment rate for 2002 was 6.1 percent.

The 2000 median house value for Schuyler and Seneca Counties was $70,400 (Table 3.20-13). This is less than half the median house value of $148,700 for New York State. As of 2001, the average residential tax in the two counties was $1,430 in Schuyler County and $1,558 in Seneca County. This compares to an average residential tax of $2,412 in neighboring Tompkins County.

3.1.3 Physical and Biological Setting

In a global context, the central Finger Lakes region sits within the temperate deciduous forest biome (global ecological communities), which covers much of eastern North America, western Europe, and eastern Asia. The National Hierarchical Framework of Ecosystem Units (Cleland et al. 1997) classifies and maps ecological units based on associations of different factors. These factors include climate, topography, soils, water, and potential natural communities.

Keys et al. (1995) applied the national ecological framework to the Eastern United States down to the subsection level. The Finger Lakes region sits within a transition zone between two primary divisions of the Humid Temperate Domain, the Warm Continental Division, and the Hot Continental Division. These divisions are represented more locally by broad recognizable ecoregions, with the Erie and Ontario Lake Plain Section of the Eastern Broadleaf Forest Province to the north towards Lake Ontario, and the Northern Glaciated Allegheny Plateau Section of the Laurentian Mixed Forest Province to the south toward the

Allegheny Mountains (Figure 3.1-2). More than 98 percent of the FLNF occurs within one subsection of the Erie and Ontario Lake Plain Section known as the Cattaraugus Finger Lakes Moraine and Hills Subsection. This subsection is transitional in nature, capturing the increasing mountainous terrain as one moves from the Ontario Lake Plain into the Allegheny Plateau. The FLNF resides between Seneca and Cayuga Lakes within this ecoregion.

Landscape Characterization

Within the Cattaraugus Finger Lakes Moraine and Hills Subsection, the terrain is dominated by rolling hills resulting from glacial ground moraine and kame deposits (Keys et al. 1995, DeGloria et al. 1999). Landscapes, as defined by the FLNF Landtype Association (LTA) map developed by DeGloria et al. (1999), include morainal and hilly areas with lowlands, shale ravines, and small sideslopes characteristic of the transition zone the subsection represents; high plateaus and sideslopes along the "Backbone" more characteristic of the Allegheny plateau; and till and lake plains more characteristic of the Ontario Lake Plain. Elevations range from 400 to 2,000 feet. Soils tend to be derived from late Wisconsin loamy till, with minor alluvium and kame deposits. Soil taxa include both mesic and udic Hapludalfs and Ochraqualfs. Mean annual precipitation is 33 inches per year and evenly distributed, and the growing season lasts about 151 days (Keys et al. 1995, DeGloria 1998).

Closer to Cayuga and Seneca lakes, and the northern end of the FLNF within the Ontario Lake Plain, the terrain is characterized by lowland lake and till plain landscapes formed through deposition of lake silts and glacial outwash (Keys et al. 1995). Soils are formed from late Wisconsinan till, and include Hapludalfs, Ochraqualfs, Dystrochrepts, and Medisaprists. Deep, post-glacial lakes tend to be a dominant feature of this ecoregion, and in the FLNF area include Seneca and Cayuga Lakes, as well as Lake Ontario.

Air Resources

Air resources can be described in terms of the level of air pollutants that an area receives. Levels of particulates, ozone, nitrogen and sulfur dioxide, and mercury are all of concern in the northeastern United States, including the Finger Lakes region of New York. Local sources of air pollution include highway vehicles, fuel combustion, off-highway vehicles, dry cleaners, industry, and waste disposal (US EPA 2004a). More distant sources include industry in the Ohio River Valley and other parts of the midwestern United States. This is important since the FLNF is northeast and upwind of this industrialized area which produces approximately half of the nation's nitrogen oxide and sulfur dioxide point source pollution (Driscoll et al. 2001, Sams 2002). Further, mercury deposition is an issue in the northeast states. New York has issued advisories alerting the public to the risks of consuming too much fish taken from local waters (Sams 2002).

Despite these concerns, the two counties in which the FLNF sits have particulate emissions that are relatively low compared to other counties across the State, and they meet the ambient air quality standards for fine particulates. Although Seneca and Schuyler Counties also meet national ozone standards (US EPA 2004d), data indicates moderate ozone exposure for most of New York based on information collected from 1996 to 2002 (US EPA 2004e). No site specific information on effects of acid deposition (sulfur and nitrogen dioxide) to soils or surface water on the FLNF exists. These resources appear to have enough natural buffering capacity that acid deposition effects are small (Tetra Tech 2003).

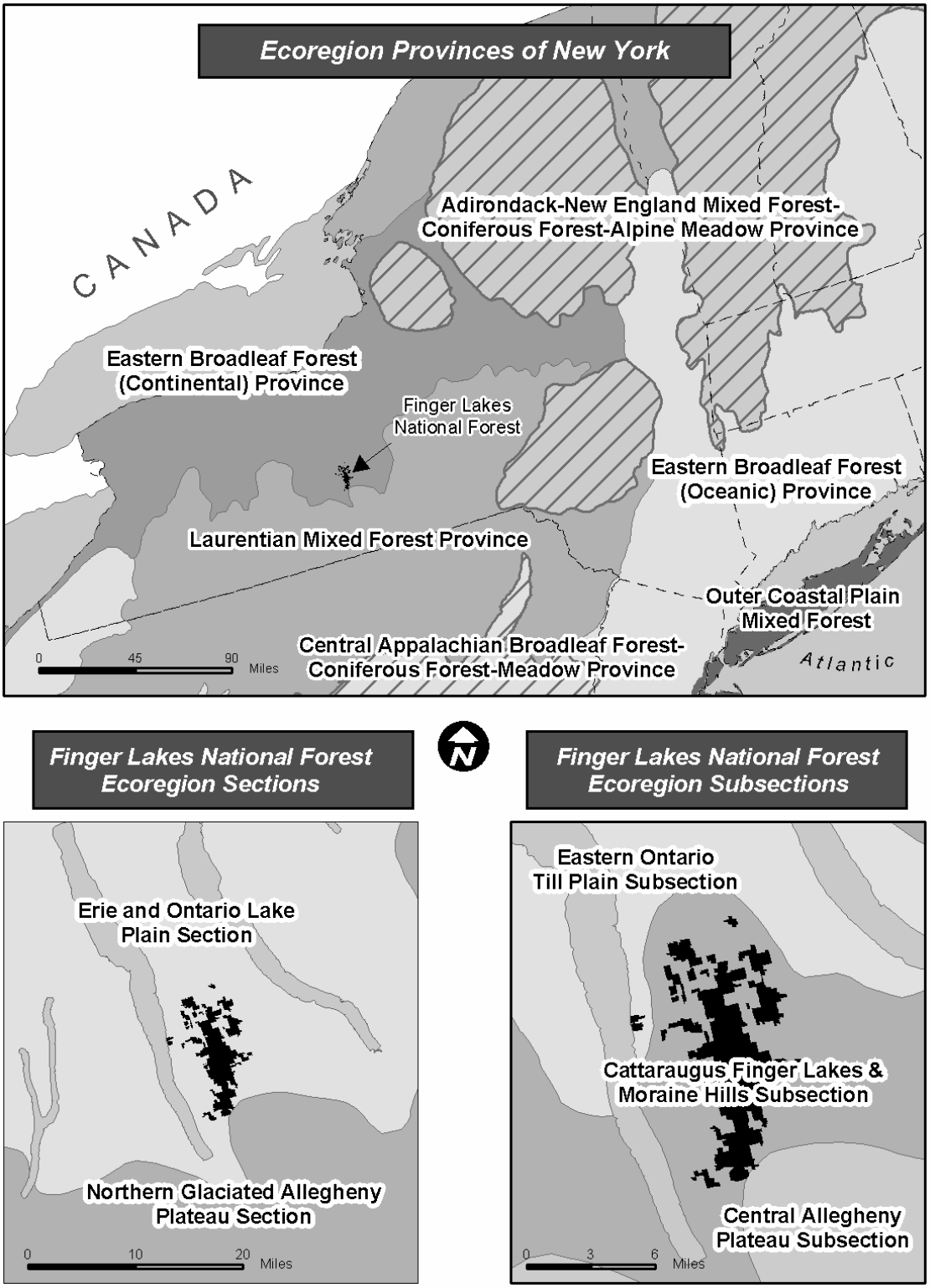

Figure 3.1-2: Ecological Units in the Northeastern United States and the Finger Lakes National Forest

Aquatic Resources

The FLNF lies astride a plateau known as the "Hector Backbone." About half of the land drains to the east toward Cayuga Lake and half to the west toward Seneca Lake. These are the two largest Finger Lakes, each being about 40 miles long and 2 to 3 miles wide.

The Forest includes seven sub-watersheds with headwaters located on the FLNF that drain into Seneca Lake, and five sub-watersheds that drain into Cayuga Lake. This area contains eight perennial streams and many intermittent and/or ephemeral streams, as well as a large number of small, mapped wetlands. There are no natural bodies of water, but 46 livestock ponds have been constructed on grazing pastures and 27 wildlife ponds have been built throughout the remainder of the Forest. These ponds average one-half to one acre in size (USDA Forest Service 1989-2004b).

The only public water supplies on the FLNF are drilled wells with hand pumps at Blueberry Patch Campground and Potomac Group Campground. Each well is about 100 feet deep. One spring, located off Picnic Area Road, is under special use permit to supply a residence (USDA Forest Service 2000a).

The primary fish habitats on the FLNF are found in the small human-made wildlife ponds and the few perennial streams scattered across the Forest. The ponds support limited natural reproduction of warm water fish species and a recreational fishery (FLNF pond surveys 1989 to 2004). Ponds are stocked with warm-water species (for example, largemouth bass, bluegill, golden shiner), as well as rainbow trout and brook trout in Ballard, Foster, and Potomac ponds. Ponds that have become shallow and choked with excessive vegetation have been dredged to restore fish habitat, and grass carp has been introduced in a few ponds to reduce aquatic vegetation growth. Stream fisheries are maintained solely through natural reproduction, and populations of native fish there appear healthy and stable.

Terrestrial Resources

The FLNF is underlain by geologic formations that represent important reservoirs of natural gas in the Northeast, which have been in production since the 1880s. The Forest sits astride an important fracture zone of this formation, and a significant amount of natural gas production and leasing is occurring in the areas surrounding the Forest (Romito 2004).

The FLNF is dominated by soils formed from upland glacial till plains, generally with slopes of less than 25 percent (Tetra Tech 2003). Tills vary from acidic in the southern portion of the Forest to more basic and fertile in the northern portion of the Forest. Along the Hector Backbone, soils are relatively shallow to bedrock (DeGloria 1998). There are small areas in ravines and along the few perennial streams on the Forest where areas of sediment have been deposited by water movement (DeGloria et al. 1999). During the agricultural period of European settlement, soils were severely depleted by land use practices, and are currently recovering (DeGloria 1998).

Vegetation on the FLNF can be grouped into five major types: mesic hardwood forests of maple, beech, ash, and basswood, as well as aspen and locust; Appalachian oak-hickory forests of oaks, hickories, and pines; softwood forests of native hemlock and pine as well as plantations; shrublands of trees, shrubs, and forbs; and grasslands. Grasslands are maintained for grazing and for wildlife use and shrublands are maintained for wildlife use. Forested conditions are found on 55 percent of the FLNF, split more or less evenly among the forest types. Under the 1987 Forest Plan, most forested land is available for management using timber harvesting, and most is less than 100 years old due to land use history in the area. There are no known areas of old growth.

Prior to European settlement, the FLNF was about one-third oak-hickory forest and two-thirds mesic hardwood forest, with small percentages of native softwoods and swampland. During the 1790s, the Hector Backbone was particularly noted for brushy, scrubby conditions of oaks and beech, and

evidence of fire disturbance (Marks and Gardescu 1992).

About 200 wildlife species and more than 300 vascular plant species inhabit the FLNF (USDA Forest Service 2000a). No federally listed Threatened or Endangered species, species proposed for federal listing, or critical habitat for such species, have been found on the FLNF (USFWS 2004). Species of viability concern that may be rare or declining on the FLNF or in the region include 25 animals and 16 plants. The FLNF provides a diversity of habitats for animal and plant species. Habitats that are of particular importance to species in this area include grasslands, shrublands, young deciduous trees, upland forest, old forest conditions, shale cliffs and ravines, wetlands, riparian areas, and aquatic habitats (USDA Forest Service 2004h). All of these habitats, except old-forest conditions, can be found currently on the FLNF.

3.1.4 Ecosystem Management

Framework

In 1992, the Forest Service adopted ecosystem management as an operating philosophy (Overbay 1992). Ecosystem management is scientifically based land and resource management that integrates ecological capabilities with social values and economic relations to produce, restore, or sustain ecosystem integrity and desired conditions, uses, products, values, and services over the long-term (Overbay 1992). This means an ecological approach is used to achieve multiple-use management of the national forests and grasslands.

Such an approach helps to accomplish the Forest Service's mission to sustain the health, diversity, and productivity of the nation's national forests and grasslands to meet the needs of present and future generations. Through ecological sustainability, National Forest Management Act (NFMA) goals for maintaining species diversity, viability, and ecological productivity can be addressed.

According to the Committee of Scientists in the publication *Sustaining the People's Lands* (1999), "ecological sustainability means maintaining the composition, structure, and processes of an ecological system." They go on to state that, "sustaining ecological processes so that they operate within their expected bounds of variation is the only way to sustain ecological diversity and productivity for future generations."

Ecological systems are dynamic in nature – their composition, structure, and processes fluctuate over time. In order to address ecosystem sustainability, these fluctuations need to be understood in the context of natural and historical variation in the landscape. When these fluctuations occur under a relatively stable set of physical and climatic conditions, disturbance regimes, and natural succession processes, such variation can be predictable. In these situations, species associated with these ecosystems can evolve adaptations that allow them to remain resilient and/or resistant to fluctuations. Such fluctuations help to define the range of variation that might be expected in a landscape or for an ecosystem. When fluctuations change suddenly, for example through the introduction of a new or dramatically expanded land use, or become unpredictable, attributes of an ecosystem's composition, structure, and/or processes can change dramatically. This dramatic change can lead to both losses and gains for species associated with these ecosystems. At its worst, fluctuations can become so dramatic and unpredictable as to lead to ecosystem collapse and simplification, with a loss of biological diversity.

In the Finger Lakes region, fluctuations considered part of the expected range of variation include the compositional "tension zone" that resides on the FLNF between mesic hardwood forests to the north and east, and oak-hickory forests to the south and west. It includes the historical disturbance regimes of the Iroquois, from maintaining wheat fields and orchards along the shore of Seneca Lake and the Ontario lakeplain, to using fire along roads and clearings and driving game in the uplands along the Hector Backbone. It includes the

natural disturbance regimes of wind and ice damage, which are rare in the region but can be catastrophic on occasion, and long-term forest succession in mesic hardwoods that was likely common north and east of the Hector Backbone.

Fluctuation in ecological systems that are considered to be outside the expected range of variation include developments and land use practices that are relatively new to the Finger Lakes region, including land ownership patterns, the high density of roads, historical large-scale land clearing over a short period of time, agricultural practices like cultivation and grazing in the uplands away from the lakes, introduction of non-native invasive species, and urban and suburban development.

Due to the current condition of the landscape in terms of these and other human-induced factors that are relatively permanent based on social and economic needs and desires, the ability of the central Finger Lakes region to again operate totally within the range of variation that might be expected is extremely difficult. In particular, grasslands and shrublands on the FLNF are maintained well outside the expected range of variation, due both to social and economic considerations of the local community, and the need to protect rare species and provide uncommon habitat structure for wildlife. A guiding principle used in the Final Environmental Impact Statement (FEIS) and revised Forest Plan for addressing ecological sustainability is recognition that the closer ecological processes operate towards what is perceived to be their expected bounds of variation, the greater the confidence that diversity and productivity will be sustained for future generations.

An Introduction to Biodiversity

Ecological sustainability is the key to maintaining species diversity, viability, and ecological productivity, which is a requirement of the Forest Service and part of its mission. This requirement is derived from the National Forest Management Act (NFMA), which directs the Forest Service to “provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives and within the multiple-use objectives of a land management plan” (16 USC 1604 (g)(3)(B)). Implementing regulations for the NFMA require that each Forest Plan “provide for diversity of plant and animal communities and tree species consistent with the overall multiple-use objectives of the planning area” (36 CFR 219.26). In addition, these regulations require that the Forest Service manage fish and wildlife habitat “to maintain viable populations of existing native and desired non-native vertebrate species in the planning area” (36 CFR 219.19). USDA departmental regulation 9500-4 extends the requirement to manage for viable populations of “all existing native and desired non-native plants, fish, and wildlife species.”

All of these requirements relate to managing habitat because State agencies have primary authority over management of wildlife *population*s. The Forest Service is responsible for managing wildlife *habitats* at levels that will protect rare species and maintain viable populations of all species. State agencies and the Forest Service work together to determine desired population levels of key species and survey for species of interest or concern.

To assist the reader in understanding how the FLNF is meeting this direction, this introduction discusses the various aspects of maintaining biological diversity and species viability on the Forest. The purpose of this section is to:

- Define the concept of biodiversity and the context in which it is used in the planning process.
- Present the overall approach used by the Forest Service to contribute to species viability and maintain and enhance biodiversity.
- Identify where in the FEIS the different components of biodiversity are located.

What is Biodiversity?

Biological diversity (or biodiversity) has been defined many ways (Baydack et al. 1999). For this document, it is defined as the sum of all natural communities, ecological processes, and species. In the central Finger Lakes region, it includes broad communities, such as mesic hardwood forest, and isolated communities like swamp white oak swamps. It encompasses processes such as nutrient cycling, the decay that creates snags, and natural disturbance. Species of plants and animals, in all their genetic variations, are also part of biodiversity.

The challenge in maintaining biodiversity on a national forest involves two aspects. First, the Forest Service must determine how best to conserve biological diversity that includes forest, open, and aquatic communities; common and rare species; and innumerable ecological processes. Second, the Forest Service must determine how to best integrate biodiversity needs with the social and economic aspects of sustainable ecosystem management.

Conservation Approaches

In order to meet the diversity and viability requirements of the NFMA and its regulations, the Forest Service has turned to the literature on biodiversity conservation. In recent decades, the ecological scientific community has proposed and discussed several methods for maintaining biological diversity (Baydack et al. 1999). Most of these methods are described as coarse filter or fine filter approaches. A coarse filter approach proposes management that would maintain or restore the natural variety of ecosystems in an area (Kaufmann et al. 1994). It assumes that retaining the variety of ecosystems and their natural processes will also maintain the viability of the species that use those ecosystems.

Some species are rare and have very specific habitat needs or face threats unrelated to habitat. For these species, a coarse filter approach may not maintain viability. Most often, a fine filter approach is used to address species of concern whose needs are not likely to be addressed by a coarse filter approach. A fine filter approach proposes management for individual species or groups of species. A concern with this approach is that developing separate management approaches for every species occurring in an area individually is often confusing and usually unfeasible. Grouping species based on habitat use or some other parameter, and designing management to meet the needs of each group, is more feasible but often has limitations similar to those for a coarse filter (Hunter 1990). For those species with very particular habitat needs that cannot be adequately addressed by a species group approach, individualized management strategies are often required.

The FLNF uses a combined coarse filter-fine filter approach to evaluate and manage for species viability. Vegetative composition and age class objectives maintain a representation of common communities, such as grasslands, areas of shrublands and young deciduous trees, aging forests, and forests dominated by oak, mesic hardwoods, softwoods, and aspen, ensuring they are reasonably well-distributed across the Forest. Communities that are naturally restricted but not uncommon, such as hemlock ravines and wetlands, as well as ecological processes such as fire disturbance and forest succession are conserved through resource goals, standards, guidelines, and management area direction. Maintaining the diversity of communities and processes on the landscape also maintains the diversity and viability of most wildlife and plant species, providing a practical and efficient approach to addressing the thousands of species that are found on a national forest. All of this is the coarse filter.

Goals, standards, guidelines, and management area direction provide management guidance to protect the rarer elements of biodiversity on the Forest, and so constitute the fine filter. A Species Viability Evaluation was conducted during Forest Plan revision to determine which species, subspecies, and variations of plants and animals may not be covered by the Forest's coarse filter (USDA Forest Service 2004b). These taxa are addressed as species of viability concern in this chapter. Uncommon

communities were evaluated separately to determine which ones might not be sufficiently protected by the coarse filter. These are addressed as rare and unique biological features, or as special management areas.

Biological Diversity as Addressed Within the Final Environmental Impact Statement

As stated previously, maintaining biological diversity is a primary goal of the Forest Service and the FLNF. As a result, the coarse filter-fine filter approach described is an integral part of all alternatives. Goals, standards, guidelines, and management area direction designed to protect communities, processes, and species are largely the same among the alternatives. The three main issues (recreation, timber, and ecosystems and biodiversity) however, cause management activities to vary among alternatives to meet social, economic, or ecological objectives. These differences are seen primarily in the allocation of land to different management areas, each of which varies in emphasis and desired condition of the land. The variation across alternatives in how much of each management area is allocated to what areas of the FLNF results in different mixes of ecological communities and species on the landscape. Each alternative is then evaluated to determine how it would affect biological diversity and viability on the Forest (direct and indirect effects) as well as within the surrounding area.

Biodiversity is a broad topic with many pieces, even on a land base as small as the FLNF. Biodiversity is covered in many places in Chapter 3 and the Final Environmental Impact Statement (FEIS) by broad resource topics. The Vegetation section (3.5) discusses three components of biodiversity: major forest communities, rare and exemplary natural communities, and non-native invasive species. The Major Forest Communities subsection (3.5.1) of this chapter addresses the basic terrestrial ecology of the FLNF, including historical types of vegetation, natural disturbance, past management, and identification of broad forest communities. It describes the current condition for those habitats, and evaluates effects of the alternatives on forest composition, age class distribution, and structure. The non-native invasive species subsection (3.5.2) focuses on plants that have been purposefully or accidentally introduced outside their original geographic range and have become invasive to the extent that they may be altering local terrestrial and aquatic ecosystems.

The Wildlife and Wildlife Habitat section (3.6) in Chapter 3 takes the habitat information presented in the Vegetation section a step further and describes effects on individual species or groups of species related to grassland/shrubland habitat, old forest habitat, aspen/birch habitat, oak forest habitat, northern hardwood habitat, and young deciduous tree habitat.

The Areas of Special Significance section (3.10) specifically addresses the management approach of the revised Forest Plan for rare or exemplary natural communities, as well as the representation of ecological landtypes and landscapes within management areas that minimize extractive or disruptive uses. While the types of rare and exemplary natural communities are introduced in the Vegetation section (3.5), the analysis of environmental consequences takes place in the Areas of Special Significance section, since these areas are addressed through either goals, standards and guidelines, or by management area allocation as special management areas.

The Water and Fisheries section (3.3) describes the current condition and potential for alternatives to impact lakes, ponds, wetlands, riparian habitat, and overall hydrology. Habitat for fish is also discussed. Soil, bedrock, and other surficial materials are described in the Soils section (3.2) of this chapter.

The Vegetation, Areas of Special Significance, Wildlife and Wildlife Habitat, Water and Fisheries, and Soils sections are part of the coarse filter analysis for maintaining biological diversity. They generally deal with the more common aspects of biodiversity.

The effects of alternatives on species considered rare or declining on the FLNF are

not likely to be addressed adequately in the coarse filter analysis. Consequently, these species, their associated habitat needs, and alternative effects are discussed in the Species of Potential Viability Concern section (3.8) of this chapter, which includes Threatened, Endangered, and Sensitive (TES) species. TES species are also addressed in the Biological Evaluation (Appendix E), and the effects discussed in this chapter are summarized for federally listed Threatened and Endangered species in the Threatened and Endangered Species section (3.7). Together, these sections and Appendix E address the fine filter component of the Forest Service's biodiversity approach.

3.1.5 Laws, Regulations, and Policies

The following laws, regulations, and policies provide the primary legal framework necessary for Forest planning and management of National Forest System lands. All alternatives have been designed to comply with these laws, regulations, and policies. For additional statutes, regulations, policies, and agreements see the revised Forest Plan Appendix E.

Organic Administration Act (1897)

The Organic Administration Act authorized the creation of what is now the National Forest System. The law established forest reserves "to improve and protect the forests within the boundaries, or for the purpose of securing favorable water flows, and to furnish a continuous supply of timber for the use and necessities of citizens of the United States…"

This Act is the legal authority authorizing designation of Research Natural Areas and classification of lands as special areas.

Twenty-Five Percent Fund Act (1908)

The Twenty-Five Percent Fund Act (1908) requires the Secretary of the Treasury to allocate 25 percent of all fiscal year national forest receipts to the State (or Territory) where the national forest is situated. The distributed funds are to be expended as the State or Territory legislature may prescribe for the public schools or public roads of the county or counties where the national forest is located.

Granger-Thye Act (1950)

The Granger-Thye Act authorizes the use of government-owned facilities and authorizes the Forest Service to issue grazing permits and use grazing receipts for range improvements. In addition, the Act provides direction on establishment of local grazing advisory boards and other purposes.

Multiple-Use Sustained-Yield Act (1960)

In the Multiple-Use Sustained-Yield Act, the Congress affirmed the application of sustainability to the broad range of resources over which the Forest Service has responsibility. This Act confirms the authority to manage the national forests "for outdoor recreation, range, timber, watershed, and wildlife and fish purposes."

National Historic Preservation Act (1966)

Sections 106 and 110 of the National Historic Preservation Act (NHPA, P.L. 89-655) provide the framework for federal review and protection of cultural resources, and to ensure that they are considered during federal project planning and execution. The Secretary of the Interior maintains a National Register of Historic Places (NRHP) and sets forth significance criteria for inclusion in the register. Cultural resources may be considered "historic properties" for the purpose of consideration by a federal undertaking if they meet NRHP criteria. Historic properties may be those that are formally placed on the National Register (NR) by the Secretary of the Interior, those that meet the criteria and are determined eligible for inclusion, and those that are yet undiscovered but may meet eligibility criteria.

National Trails System Act (1968)

The National Trails System was created in 1968 by the National Trails System Act (NTSA). The Act established the Appalachian and Pacific Crest National Scenic Trails and authorized a national system of trails to provide additional outdoor recreation opportunities and to promote the preservation of access to the outdoor areas and historic resources of the nation. The North

Country National Scenic Trail was created under the National Trails System Act.

Wild and Scenic Rivers Act (1968)

For the segments of rivers that have been determined to be eligible for consideration as National Wild, Scenic, or Recreational Rivers under the Wild and Scenic Rivers Act, the Forest Service is required to provide for the protection of the river values. The Act requires a Forest planning process to conduct an eligibility determination process for potential Wild, Scenic, and Recreational Rivers. The Forest Plan addresses resource protection, development of land and facilities, public use, and other management practices necessary or desirable to maintain the eligibility of the river segments.

National Environmental Policy Act (1970)

The National Environmental Policy Act (NEPA) ensures that environmental information is made available to public officials and citizens before decisions are made and before action is taken. This disclosure helps public officials make decisions based on an understanding of environmental consequences and take actions to protect, restore, and enhance the environment. Essential to this process are accurate scientific analyses, expert agency input, and public involvement, all of which have been part of this Plan revision process. The revised Forest Plan alternatives have been analyzed and the potential effects have been disclosed in this FEIS. The Act also requires environmental analysis and disclosure for site-specific actions and the consequences to the human environment as implemented under this Plan.

Clean Water Act (1972)

The Clean Water Act (CWA) provides surface water quality protection in the United States. The statute employs a variety of regulatory and non-regulatory tools to sharply reduce direct pollutant discharges into waterways and non-point source pollution, finance municipal wastewater treatment facilities, and manage polluted runoff. These tools are employed to achieve the broader goal of restoring and maintaining the chemical, physical, and biological integrity of the nation's waters so that they can support "the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water."

Endangered Species Act (1973)

The Endangered Species Act (ESA) directs all federal agencies to participate in the protection and conservation of Threatened and Endangered species of plants and animals. Under the ESA, protection extends to the ecosystems and critical habitats upon which Threatened and Endangered species depend. The act requires federal agencies to carry out programs for the conservation of Threatened and Endangered species in consultation with the US Fish and Wildlife Service.

The ESA also provides for designation of critical habitat for listed species. Critical habitat is comprised of those areas that include physical or biological features essential to the conservation of the species and which may require special management considerations or protection. Critical habitat may include areas not occupied by the species at the time of listing, but essential to the conservation of the species.

Forest and Rangelands Renewable Resources Planning Act (1974)

The Forest and Rangeland Renewable Resources Planning Act (RPA) of 1974 as amended by the National Forest Management Act (NFMA) of 1976 requires that renewable resource programs be based on a comprehensive assessment of present and anticipated uses. The demand for and supply of renewable resources must be determined through an analysis of environmental and economic impacts. Local community impacts as well as economic cost-efficiency considerations must be considered when revising a forest plan.

Federal Noxious Weed Act (1975)

The Federal Noxious Weed Act of 1975 provides for the control and management of plant species that are classified as undesirable, noxious, harmful, exotic, injurious, or poisonous, pursuant to State or federal law. The Act provides specific agency direction for management of undesirable plants on federal

lands. This Act does not invalidate any State or local laws regulating noxious weeds. States are encouraged to have parallel legislation and to add species that may only be noxious within their areas.

Federal Land Policy and Management Act (1976)

The Federal Land Policy and Management Act of 1976 (FLPMA) requires that public lands be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values; that, where appropriate, will preserve and protect certain public lands in their natural condition; that will provide food and habitat for fish and wildlife and domestic animals; and that will provide for outdoor recreation and human occupancy and use. The Act also states that the United States shall receive fair market value for the use of the public lands and their resources unless otherwise provided for by law. Most linear rights-of-way such as roads and utility lines are authorized under the FLPMA.

National Forest Management Act (1976)

The National Forest Management Act (NFMA) requires that National Forest System land be managed for a variety of uses on a sustained basis to ensure in perpetuity a continued supply of goods and services to the American people. The Act's regulations also establish analytical and procedural requirements for developing, revising, and amending forest plans (36 CFR 219). The FLNF Forest Plan includes provisions of the NFMA and regulations that apply to forest plan implementation.

Among other important direction, the NFMA requires that:

- The Forest Service manage fish and wildlife habitat to maintain viable populations of plant and animal species in the planning area. The NFMA also stipulates that Forest Plans must provide for the diversity of plant and animal communities based on the suitability and capability of the specific land area.
- The Forest Plan contains monitoring and evaluation requirements that will provide a basis for periodic assessment of the effects on management practices. The monitoring requirements include selection of Management Indicator Species that will help evaluate whether Forest-wide goals and objectives are being realized.
- The planning process identifies areas for establishment as Research Natural Areas (RNAs).
- The planning process evaluates and considers roadless areas within the National Forest System for recommendation as potential wilderness.
- The planning process estimates and compares the physical, biological, and social effects of implementing each alternative, according to NEPA procedures.
- The Forest Plan contain an estimation of the effects of the expected outputs of marketable and non-marketable goods and services, the impacts on Present Net Value, the receipts to the federal government, the direct benefits to users, the receipt shares to State and local governments, and income and employment.

Payments in Lieu of Taxes Act of 1976

The Payments in Lieu of Taxes Act of 1976 (PILT) authorizes compensation to counties in lieu of property taxes that cannot be levied against federal lands within the counties' jurisdiction.

Clean Air Act (1977 and 1990)

The Clean Air Act (CAA) is the comprehensive federal law that regulates air emissions from area, stationary, and mobile sources. The CAA requires the Forest Service to protect the air from pollution emitted inside and outside the borders of National Forest System lands.

The American Indian Religious Freedom Act (1978)

The American Indian Religious Freedom Act (AIRFA) applies the First Amendment guarantee of religious freedom to Native Americans whose religious practices may involve requirements to access sacred sites on federal property. Under AIRFA, Native Americans must be provided with access and ceremonial use of Native American sacred sites on federal property, and federal agencies must avoid adversely impacting those sites and maintain the confidentiality of sacred site locations.

Public Rangelands Improvement Act (1978)

The Public Rangelands Improvement Act of 1978 establishes and reaffirms the national policy and commitment to inventory and identify current public rangeland conditions and trends; manage, maintain and improve the condition of public rangelands so that they become as productive as feasible for all rangeland values in accordance with management objectives and the land use planning process; and charge a equitable fee for public grazing use.

The Archaeological Resources Protection Act (1979) and the Antiquities Act (1906)

The Archaeological Resources Protection Act of 1979 (ARPA) and the Antiquities Act of 1906 prohibit the unauthorized excavation, removal, damage, alteration, defacement, or the attempt of such acts, on federal lands. ARPA provides legal penalties and establishes a permitting system to authorize excavation or removal of archaeological resources by qualified applicants.

The Alaska National Interest Lands Conservation Act (1980)

The Alaska National Interest Lands Conservation Act requires the grant of access to non-federally owned land within the boundaries of a Forest such that its owner may have the reasonable use and enjoyment of that land. These inholdings can occur in any management area across the Forest.

Federal Onshore Oil and Gas Leasing Reform Act (1987)

In 1987, the Congress passed the Federal Onshore Oil and Gas Leasing Reform Act (FOOGLRA), setting forth the procedures by which the Forest Service will carry out their statutory responsibilities in the issuance of oil and gas leases. The Forest Service developed implementing regulations for FOOGLRA, which defined the procedures and a three-stage process to be used for the analysis and issuance of leases. The stages include:

(1) The determination of lands available for leasing
(2) The decision whether to lease specific lands
(3) An Application for Permit to Drill for exploratory wells

The decision for Stage 1, availability, was made in the 1987 Finger Lakes Forest Plan. The decision for Stage 2 was made in December 2001 when the FLNF did not consent to lease the Forest for oil and gas development. The Forest can be ‘available to lease’ as determined in the Forest Plan and the Forest Service can still make the subsequent decision ‘not to consent to lease’ based upon the situation at the time.

Native American Graves Protection and Repatriation Act (1990)

The Native American Graves Protection and Repatriation Act (NAGPRA) was intended to ensure the protection and the rightful disposition of Native American cultural items (which, under NAGPRA, include human remains, associated funerary objects, unassociated funerary objects, sacred objects, and objects of cultural patrimony) located on federal or Native American lands and in the federal Government’s possession or control. NAGPRA requires agencies to determine what Native American cultural items are within its possession or located at its facilities and then notify potentially effected tribes concerning possible repatriation. Upon inadvertent discovery and intentional excavation of potential cultural items, it is necessary for the federal agency to identify proper ownership and to ensure the rightful disposition of cultural items.

While the FLNF has yet to uncover/discover any Native American human remains on NFS lands, they potentially exist. The Seneca and Cayuga Nations would both be consulting parties with the FLNF regarding the disposition of such remains.

The Telecommunications Act (1996)

The Telecommunications Act of 1996 requires federal agencies to facilitate the development and placement of telecommunications equipment on buildings and land they manage when placement does not conflict with the agency's mission or current or planned use of the property. An Executive Order issued May 18, 2001, establishes essentially the same requirements regarding alternative energy sources.

Secure Rural Schools and Community Self-Determination Act of 2000

The Secure Rural Schools and Community Self-Determination Act of 2000 (SRSCS) specifies how states and counties will be compensated for impacts associated with National Forest System lands.

The Healthy Forests Restoration Act (2003)

The Healthy Forests Restoration Act of 2003 provides management tools and authorities to restore forests to healthy conditions. The Act strengthens the public participation in developing high-priority forest health projects and reduces complexity of related environmental analyses.

The Energy Policy Act (2005)

Section 370 of the Energy Policy Act of 2005 withdraws all federal land within the boundary of the Finger Lakes National Forest in the State of New York from oil and gas leasing. This includes:
(1) All forms of entry, appropriation, or disposal under the public land laws
(2) Disposition under all laws relating to oil and gas leasing.

Executive Order 12898

Executive Order 12898 requires that planning alternatives be assessed for environmental justice concerns to determine whether or not any of the alternatives disproportionately affect minority and/or low-income populations.

Forest Service Directives

Management direction for the FLNF can be found in the Forest Service Directive System, including the Forest Service Manual (FSM) and the Forest Service Handbook (FSH). These directives include applicable laws, regulations, and policies that guide the management of National Forest System lands.

3.1.6 Analysis

Analysis Units – Spatial and Time Scales

Ecological regions, watersheds, and political boundaries may be used to provide information at appropriate scales for ecosystem mapping, environmental analysis, developing desired future conditions, and monitoring.

Scale is important to understand in terms of both space and time, but scale is often difficult and challenging for resource managers to analyze and communicate. Relationships viewed on a small scale or over a short time period can be very different when viewed over large scales or for a longer time period. For example, the immediate aftermath of a large fire may appear to be highly destructive to a specific site, but the same fire viewed in terms of long-term landscape dynamics may provide many ecological benefits.

Different time scales are used in the effects analysis to provide a temporal context and comparison for the way conditions may change through time as a result of management activities or natural events. Three time frames are used: 1) temporary; 2) short-term; and 3) long-term. Unless otherwise stated, temporary effects are generally expected to last anywhere from 0 to 3 years. Short-term effects can include temporary effects but can last up to 10 to 15 years, or the period of time between Forest Plan revisions. Long-term effects generally last longer than 10 to 15 years, or until desired future conditions are achieved for the respective resource.

Available Information and Use of Models

The data and level of analysis in the FEIS are commensurate with the importance of the potential effects (40 CFR 1502.15). In the modeling and analysis for Forest Plan revision, the numbers for things such as management areas, road miles, and acres of timber harvest are all best estimates based on the latest available information.

During the development of assessments for Forest Plan revision, gaps in information were identified, and an interdisciplinary team determined those gaps that were a high priority to fill. Some gaps were filled simply by gathering all relevant literature on the subject for use during various Plan revision stages, while other gaps required more intensive analysis involving such activities as convening expert panels (for example, the Species Viability Evaluation process), or developing models (for example, SPECTRUM).

For the gaps in information that remained, the interdisciplinary team concluded that the missing information may have added precision to estimates or better specified a relationship; however, the basic data and central relationships are already sufficiently well established in science so that additional information was considered unlikely to reverse or nullify understood relationships. Thus, new information would add precision but is not essential to providing adequate information for the decision maker to make a reasoned choice among the alternatives.

The purpose of modeling is to provide comparative insight into complex questions, not to provide an answer. Decision makers and managers use modeling results along with an understanding of the assumptions used in building the model as a factor in their decisions, but there are many other factors that are considered, many of which are not in the model. The modeling and analysis conducted for the FEIS were intended and designed to indicate relative differences among the alternatives, rather than to predict absolute amounts of activities, outputs, or effects.

Analysis Processes

Appendix B of the FEIS provides a discussion of the more complicated analysis processes used in the environmental analysis. These include the timber harvest schedule analysis, and the economic analysis. Other analysis processes used in the FEIS are discussed or referenced in the appropriate sections, and are documented in the project file.

3.1.7 Relationship Between Programmatic and Site-Specific Analysis

The revised Forest Plan and FEIS are programmatic documents. The FEIS discusses environmental consequences on a broad scale. Over the life of the revised Forest Plan, the selected alternative, and accompanying Forest-wide standards and guidelines, will set management direction by establishing and affirming rules and policies for the use of natural resources.

Because this document contains a Forest-wide level of analysis, it does not predict what will happen when standards and guidelines are implemented on individual site-specific projects. Nor does it convey the long-term environmental consequences of any site-specific project. These actual effects will depend on the extent of each project, environmental conditions at the site (which vary across the Forest), and site-specific mitigation measures and their effectiveness.

In preparing the FEIS, focus was on consequences most likely to occur and why. By combining this broad assessment with site-specific information, a reader can make a reasonable prediction about the kind of environmental consequences that would result from a specific project. Actual site-specific effects will be disclosed under separate NEPA analysis for projects proposed to implement direction in the Forest Plan.

The FEIS does not describe every environmental process or condition on the FLNF because this would be impractical given the complexity of natural systems. The purpose of the FEIS is to provide a survey of the broader environmental and social factors that are relevant to programmatic planning.

3.1.8 Affected Environment and Environmental Consequences Section Organization

Each resource section is presented in the following format:

Issue Statement – Describes the Forest planning concerns identified by both the public and Forest Service staff. These statements are summarized in Chapter 1.

Issue Indicators – Describes the indicators used to compare the effects of the alternatives associated with the issue.

Analysis Area – Briefly describes the geographic area used for analysis. Analysis areas may vary depending on the resource, issue, or anticipated activities. Within a specific resource or issue, analysis areas may also differ for direct, indirect, and cumulative effects.

Affected Environment – Describes the 1987 Forest Plan direction, proposed changes to that direction common to all alternatives, and the existing (current) conditions of the resources relative to the issues and issue indicators. This section may also include history, development, trends, past disturbances, naturally occurring events, and interactions that have helped shape the existing conditions.

Environmental Consequences – Includes discussion of the direct, indirect, and cumulative effects by alternative for each resource.

Direct and Indirect Effects – Describes the direct and indirect effects that each alternative could have on resources or issues. Direct effects occur at the same time and place as the action. Indirect effects occur later in time or are spatially removed from the action. Although a Forest Plan would guide management for 10 to 15 years, effects may be discussed for both the short-term (throughout the planning period, 10 to15 years) and long-term (greater than 15 years). Direct and indirect effects often overlap and are discussed together.

Cumulative Effects – Describes the cumulative effects by alternative for each resource or issue. Cumulative effects are the incremental impacts of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes the other actions. Cumulative impacts can result from individually minor but collectively significant actions that take place over time.

Environmental effects are disclosed assuming full compliance with Forest-wide and management area standards and guidelines described in the revised Forest Plan.

3.2 SOIL

Issue Statement

Concern is focused on the extent to which soil quality will be maintained under the revised Forest Plan. The issue of erosion in riparian areas is addressed in the Water and Fisheries section (3.3) of Chapter 3.

Indicator 1 – Acres in Management Area Allocations Most Subject to Ground Disturbing Activities That Decrease Soil Quality

The first indicator to be used in this effects analysis is the acres in management areas (MAs) most subject to ground-disturbing activities that can decrease soil quality. The number of acres is compared among alternatives. The MAs with the most potential for ground disturbance are Grassland for Grazing, Grassland for Wildlife, Shrubland, Northern Hardwood, and Oak Hickory. This indicator is important because the higher the number of acres potentially subject to ground-disturbing activities, the greater the potential for soil disturbance and reductions in soil quality. Soil disturbance, consisting primarily of erosion, rutting, and compaction, is the most important risk to soil quality. Ground disturbance is caused by activities such as grazing, tree harvesting, trail construction, road construction and maintenance, prescribed fire, recreation development, and mineral exploration.

Indicator 2 – Acres in Management Area Allocations Most Subject to Ground Disturbing Activities, With a High Erosion Hazard

This indicator is similar to the first, except that is also takes the soil erosion hazard into consideration. Again, acreages are compared among alternatives. Soil erosion is often a concern with land management activities. The erosion hazard for a soil is the probability that erosion damage and reductions in soil quality may occur as a result of ground-disturbing land management activities, such as tree harvest, prescribed fire, road maintenance, and trail construction. For this analysis, the soils with a high erosion hazard consist of all soils on slopes of greater than 25 percent

Soils with a high erosion hazard, however, will not necessarily become highly eroded when disturbed. When implemented properly, erosion control measures are usually effective in minimizing erosion. Soils with a high erosion hazard do require more erosion control measures than soils with a lower erosion hazard. Also, the risk of a measure failing due to human error or an unusually high rainfall event is greater for soils with a high erosion hazard than for soils with a low erosion hazard.

Analysis Area

The analysis area for direct and indirect effects includes all federal land managed by the Finger Lakes National Forest (FLNF). This is the area potentially subject to soil disturbance as a result of land management activities implemented under the revised Forest Plan.

The analysis area for cumulative effects is the same area used for direct and indirect effects. The cumulative effects analysis area does not include privately owned lands adjacent to the Forest because the effects of soil disturbing land management practices on the FLNF generally do not extend (in the form of erosion or a landslide) onto privately owned lands. The reverse is also true, in that the effects of soil disturbing activities on privately owned lands generally do not affect soils on the FLNF.

3.2.1 Affected Environment

Introduction

Soil quality, the key issue in this analysis, is defined as the capacity of the soil to function within ecosystem boundaries to sustain biological productivity, maintain or enhance water and air quality, and support human health and habitation (Tetra Tech 2003). For this analysis, it is assumed that to maintain soil quality, the most important and understood soil properties must be protected. Those properties are soil organic matter, aeration (porosity), moisture, and productivity (nutrient levels).

A few additional concepts are important to recognize for this analysis, as described in this and the following paragraphs. The first concept involves wetlands. For this analysis, wetlands are considered a type of soil resource, since they have poorly drained soils. Wetland effects are considered as part of the discussion of soil effects. Wetlands are also discussed to some extent in the Water and Fisheries section (3.3)

Ground-disturbing activities, such as tree harvest, prescribed fire, recreation development, trail construction, road construction and maintenance, and mineral exploration, can reduce soil quality. For example, soil erosion results in loss of organic matter and associated nutrients, in turn reducing soil quality. Other examples are soil compaction and rutting, which can result in decreased soil aeration, moisture availability, productivity, and soil quality. When soil quality is reduced, the soil is less capable of restoring and maintaining the above and below-ground biological and ecological diversity.

Soils of the FLNF, and much of central New York, were severely depleted by land use practices during the 1800s and early 1900s. The depletion included erosion of much of the topsoil; reduction of beneficial plant nutrients and nutrient storage capacity; compaction of remaining surface layers and a corresponding reduction in infiltration capacity; and increased surface runoff of precipitation. Soils on the FLNF, more so than on the surrounding lands, are currently in a recovery period. Lands formerly used for intensive agriculture are now in a forest, shrubland, or grassland condition (Tetra Tech 2003). Reforestation, grassland, and shrubland management has resulted in decreased soil disturbance and general improvement in soil quality. Future changes in soil quality under the revised Forest Plan are discussed in this analysis, utilizing the two indicators.

Despite this overall improvement in soil quality on the FLNF, concern has grown over the potential effects of acid deposition. Acid deposition (the result of air pollution) has resulted in increased levels of nitrogen, sulfur, and some toxic elements such as mercury, in the soil. Atmospheric deposition of acidic compounds from the air can make the soil more acidic; leach nutrients, such as calcium and magnesium, from the soil; and increase the availability of aluminum. This may be altering the soil nutrient content and thus, soil quality.

Soil quality can be maintained or improved in several ways. The most important way is to implement State Best Management Practices (BMPs), and Forest Plan Standards and Guidelines (S&Gs). These practices, standards, and guidelines are actions implemented on the ground to prevent or minimize erosion, compaction, and other types of soil disturbance. The effects of these measures on soil quality in the current and next planning periods are discussed in this analysis.

Existing Forest Plan Management Direction

The 1987 Forest Plan goal for the soil resource directs the Forest Service to “protect the quality of the soil resource so it can continue its life supporting functions in perpetuity.” Standards and guidelines in the 1987 Plan were designed to achieve this goal by protecting the soils from erosion, compaction, and other detrimental soil disturbances.

Proposed Changes in Management Direction Common to All Alternatives

The goal for the soil resource in the revised Forest Plan is similar to the 1987 Plan. In the revised Plan, however, there is an added emphasis on soil restoration. Goal 3 of the revised Forest Plan is to "maintain or restore the natural, ecological functions of the soil." Maintaining soil ecological functions means sustaining biological diversity, cycling nutrients, providing physical support for vegetation, and filtering pollutants. Standards and guidelines in the revised Plan provide for improved soil resource protection. Examples of such S&Gs are: harvesting activities would be required to comply with State of New York Forestry BMPs; no harvesting would be done within 25 feet of perennial streams; and Forest sites that show signs of advanced deterioration (for example, soil erosion) would be rehabilitated, closed, or relocated.

Under the revised Forest Plan (all alternatives) increased emphasis will be placed on protection and management of wetlands and seasonal pools, and their adjacent riparian areas. Important new protection measures for wetlands and seasonal pools are provided by new standards and guidelines in the revised Forest Plan.

In the revised Forest Plan greater importance is placed on implementation of State of New York BMPs for grazing areas. This emphasis is articulated in Goal 4, in a new objective that reads: Take needed measures to control cattle access on all water resources (including stock ponds, streams, wetlands, seasonal pools, and riparian areas) within the next ten to fifteen years.

Existing Condition

The FLNF is dominated by soils formed from upland glacial till plains, generally on slopes of less than 25 percent. Glacial tills on the southern part of the Forest were derived from acid sandstones and shales with low lime content. Tills over the northern part of the Forest, however, were derived partially from limestone, producing the most fertile soils on the Forest. At the highest elevations of the FLNF, along the north-to-south-trending Hector Backbone, soils are relatively shallow to bedrock (Tetra Tech 2003).

Most lands on the FLNF with a slope greater than 25 percent have a high erosion hazard rating. This generally correlates to erosion hazard ratings developed by the Natural Resource Conservation Service (USDA Forest Service 1972, USDA Forest Service 1979). Soils on slopes greater than 25 percent are scattered throughout the Forest, but occur most commonly near ravines and higher elevations. These slopes are more erosive because individual soil particles detach from each other more readily than soils on slopes less than 25 percent. Soil organic matter is usually the first part of the soil to erode. As organic matter and associated plant nutrients are lost, soil quality decreases.

Many wetlands occur on the Forest, of varying sizes and vegetative type. Some wetlands are located on the National Wetlands Inventory maps (USDI – Fish and Wildlife Service 1977). Unmapped wetlands greater than about three acres in size can be seen on aerial photos. Smaller wetlands can be identified on the ground during field reconnaissance. Some wetlands are located in FLNF grazing areas, most being less than one acre in size. Some wetlands located on the FLNF in the early to mid-1900s no longer exist due to draining of fields to facilitate crop production. Most of these lost wetlands have not been restored.

The current condition of the soil resource on the FLNF is described in the FLNF Soil Assessment (Tetra Tech 2003). As stated in this report, general soil health is good including soil quality, with only occasional exceptions to this as discussed later. This means soils are stable (not eroding), have a protective and nutrient-rich cover of organic matter, and support productive forests and grazing lands. Soil health has been good over the past 15 years because BMPs and S&Gs from the 1987 Plan have been followed (Tetra Tech 2003). Best Management Practices and S&Gs have

been shown to be effective in keeping the soil impacts at low levels on the FLNF (USDA Forest Service 1999d, USDA Forest Service 2001d, USDA Forest Service 2003q). Best Management Practices implemented in the State of New York and the northeast have repeatedly been shown to be effective in keeping adverse effects to the soil and water resources at low levels (New York State Dept. of Environmental Conservation 2004, Irland and Connors 1994, Martin and Hornbeck 1994*).* For this analysis, "low levels" means the following features can rarely be observed: gullies, sheet erosion, sedimentation, rutting, the absence of the soil organic (humus) layer, and large bare and/or compacted soil areas. In addition, overall effects on soil quality and productivity are minor on a landscape scale.

Low levels of adverse effects to soil and water resources were observed, for example, on a field visit to the Teeter Timber Sale in the spring of 2002. All Forest Plan standards and guidelines for soil and water protection were adhered to. Erosion was minor, and no sedimentation was entering streams (USDA Forest Service 2002a). This and subsequent visits to the sale by the Forest Soil Scientist revealed that filterstrip standards from the 1987 Plan were implemented. Filterstrip widths generally ranged from 50 to110 feet on each side of streams in the Teeter sale area, with steeper slopes having the wider filterstrips. Soil disturbance and erosion were rare in the filterstrip, and stream sedimentation was observed to be minor (low volume, localized, and short-term). Skid road crossings of streams were minimized, skidder operators were not allowed to skid logs up stream channels, and logging was done only during winter, or the driest two to three months of the summer. Log landings were located outside of filterstrips. In compliance with 1987 Plan standards and guidelines, at least 50 to 70 percent of stream-side shading was maintained on a stream reach basis, for the purpose of minimizing changes to water temperatures. All these actions were effective in minimizing erosion and maintaining water quality the Teeter Sale.

Monitoring of several other projects in 2002 showed that the adverse impacts to the soil and water resources were minor or non-existent. Projects monitored included the 2001 Rainbow Gathering site, vegetation clearing at the Townsendville Cemetery, a road ditch stabilization project, pond fencing in Aman pasture, and improvements to the Interloken Trail (Burt 2003). All projects were found to have either minor impacts to soils, or to have actually improved the soil condition (for example, the pond fencing to exclude livestock improved the soil condition around the pond).

As noted earlier, areas exist on the FLNF where soil health and quality are poor (Tetra Tech 2003). These areas most commonly include: short segments of roads or trails with gullies or eroding ditch lines due to heavy use, poor road/trail design, or lack of maintenance; bare, eroding soils in pastures due to congregation of livestock; soil compaction and displacement in wetlands due to the presence of livestock; and temporary gully erosion or rutting on skid roads associated with timber harvest and/or heavy rainfall. These exceptions to good soil health are uncommon and limited in extent, generally less than 100 feet in length along roads and trails, and less than 0.1 acre in size on pasture lands. The Forest Service strives to eliminate these exceptions, but as long as people are utilizing the National Forest, and funding is finite, some exceptions are unavoidable.

Acid deposition may be affecting soil quality on the FLNF and throughout the northeast, however the existence and extent of nutrient leaching, and its effects on soil quality, have not been measured. It is known that soils on the northern half of the FLNF have a greater buffering capacity and therefore a higher ability to assimilate incoming pollutants without changes in soil nutrients. Research on the effects of acid deposition on soils is a topic of long-term, on-going Forest Service research.

The potential effects of acid deposition are not considered further in this analysis because the Forest Service has no direct control over acid deposition or the effects of acid deposition on the FLNF and the current and future effects are not quantified (see Air section 3.4 of this

Chapter). Based on the most current science, none of the FLNF management practices (including timber harvest) decrease long-term soil productivity on the Forest (Tetra Tech 2003).

3.2.2 Environmental Consequences

Direct and Indirect Effects by Alternative

Under all alternatives it is anticipated that soil resources will be protected. For example, the past effects of harvesting on the soil and water resources as described in section 3.2.1 would continue to be minor in the future under the revised Plan. The effects of implementing one alternative over another would be minimal because revised Forest Plan soil resource S&Gs, and other measures for protecting soil quality identified during project-level analysis, effectively minimize soil quality impacts. The opportunity for human error exists however, so the discussion of direct and indirect effects considers the potential adverse effects management actions could have, as a function of the amount of ground-disturbing activities.

The direct and indirect effects of a variety of land management practices were considered in this analysis. The most common effects on soils, and those considered in this analysis, are displayed in Table 3.2-1.

Although there is opportunity for soil disturbance within the MAs discussed, only a relatively small portion of the MAs would actually be subject to ground disturbing activities in any given alternative. The estimated acreage for various ground-disturbing activities is provided in the Forest Plan Proposed and Probable Practices (revised Forest Plan, Appendix D). Although these acres are specific to Alternative 3, they are not expected to vary by alternative except those associated with timber harvest activities. The Timber Management section of Chapter 3 (Table 3.11-5) provides the potential acres harvested under each alternative.

Table 3.2-1: Soil Effects of Common FS Activities on the FLNF

Activity	Potential Effects
Timber harvest	Landing and skid road construction and use, and over-land travel by skidder can all result in erosion, rutting and compaction; removal of trees can also reduce on-site nutrient levels in the short-term; crossing of wet soils by the skidder can cause compaction and rutting.
Road construction and maintenance	Construction (rare on the FLNF) can result in erosion, compaction, removal of topsoil and loss in soil productivity. Maintenance can result in erosion and soil displacement.
Recreation development	Construction of new recreation developments can result in erosion, compaction, removal of topsoil and loss in soil productivity due to construction activities or recreational use.
Grazing	Erosion, compaction, soil displacement, and non-vegetated soils can occur near streams and heavily grazed areas, or where livestock congregate. Degradation of wetlands and riparian areas where livestock are allowed to graze in or cross these areas.
Trail construction and maintenance	Erosion on trails where the flow of water is uncontrolled.
Prescribed fire	Erosion, loss of organic matter and some nutrients.

Indicator 1 – Acres in Management Area Allocations Most Subject to Ground Disturbing Activities That Decrease Soil Quality

Effects Common to All Alternatives

The first indicator to be used in this effects analysis is acres in MAs that have the potential for the most ground-disturbing activities that decrease soil quality. As displayed in Table 3.2-2, Alternative 1 would have the highest acreage of lands most subject to soil disturbance (15,624 acres, or 95% of the FLNF), Alternative 2 would have the lowest acreage (11,380 acres, or 70% of the FLNF), and Alternative 3 would be intermediate in acreage (13,584 acres, or 83% of the FLNF). This indicates that the risk of soil disturbance, the need for erosion control measures, the risk of an erosion control measure failing, and the risk of soil quality reductions would be highest for Alternative 1, lowest for Alternative 2, and intermediate for Alternative 3.

Table 3.2-2: Acres in Management Area Allocations Most Subject to Ground Disturbing Activities

Alternative	Acres (percent)
1	15,624 (95%)
2	11,380 (70%)
3	13,584 (83%)

Source: FLNF GIS Alternative 1, 2, and 3 MA Layers
Notes:
[1] Percents in parentheses indicate the percent of the FLNF acres in Management Area Allocations allowing ground disturbing activities
[2] The Management Area Allocations most subject to ground disturbing activities are: Grassland for Grazing, Grassland for Wildlife, Shrubland, Northern Hardwood, and Oak Hickory.
[3] Although there is opportunity for ground disturbance within these MAs, only a portion of the MAs would actually be subject to ground disturbing activities in any given alternative.

While this indicator reveals differences in acreages among the alternatives, the actual overall risk, and therefore effects, of reduced soil quality would be low for all alternatives. This would be true in both the short and long-term. This is because soil protection measures (BMPs, S&Gs, other site-specific measures) would minimize detrimental impacts to soil quality. For example, wetlands would be protected due to implementation of revised Forest Plan S&Gs and Forest Service Manual direction for wetlands protection, and State and/or federal wetlands regulations (see previous section 3.2.1 – Proposed Changes in Management Direction Common to All Alternatives). Over the long-term, beyond the life of the revised Forest Plan, implementation of any alternative would move the Forest closer to meeting the revised Plan goal to maintain or restore the natural, ecological functions of the soil.

Indicator 2 – Acres in Management Area Allocations Most Subject to Ground Disturbing Activities, With a High Erosion Hazard

Effects Common to All Alternatives

The second indicator to be used in this effects analysis is acres in MAs that have the potential for the most ground-disturbing activities, having a high erosion hazard.

Table 3.2-3 displays the acreage of soils with a high erosion rating in MA allocations most subject to ground disturbance, by alternative. Alternative 1 has the highest acreage of lands with a high erosion hazard rating (332 acres), Alternative 2 has the lowest acreage (152 acres), and Alternative 3 is intermediate in acreage (226 acres). This indicates the risk of soil erosion is highest for Alternative 1, lowest for Alternative 2, and intermediate for Alternative 3. Acreage differences, however, are extremely small, rendering them negligible on a landscape scale such as the FLNF.

Table 3.2-3: Acres in Management Area Allocations Most Subject to Ground Disturbing Activities, With a High Erosion Hazard

Alternative	acres (percent)
1	332 (2%)
2	152 (1%)
3	226 (1%)

Source: FLNF GIS maps relating slope class to MA allocations.
[1] Percents in parentheses indicate the percent of the FLNF acres in MAs most subject to ground disturbing activities, with a high erosion hazard.
[2] The MAs most subject to ground disturbing activities are: Grassland for Grazing, Grassland for Wildlife, Shrubland, Northern Hardwood, and Oak Hickory.

It is important to consider that erosion control measures (BMPs, S&Gs, and other site-specific measures) would be implemented with every project, under all revised Forest Plan alternatives. These measures have been shown to be effective in minimizing impacts to soil quality.

Since the acreage differences among alternatives are minor for this indicator, and erosion control measures would be implemented with all alternatives, both short and long-term differences in effects to soil quality would be negligible. Implementation of any alternative would move the Forest closer to meeting goals to maintain or restore the natural, ecological functions of the soil.

Cumulative Effects

Effects Common to All Alternatives

The cumulative effects of all alternatives on soil quality consist of all potential effects of soil disturbing activities on FLNF lands in the current planning period (1987 to 2005), the next planning period (extending 10 to 15 years into the future), and beyond the next planning period (the long-term).

The primary land management activities with potential to affect soil quality on the FLNF throughout the time period of this analysis are the same as those considered in the analysis of direct and indirect effects: grazing, tree harvesting, trail, road, and recreation site construction and maintenance, prescribed fire, and mineral exploration. Similar magnitudes of effects on the soil resources (including wetlands) would occur for the long-term. For this reason, effects would continue at low levels, having only minor impacts to soil quality. Soil quality on acres not subject to soil disturbing activities would have no negative impacts, actually improving the soil due to ongoing natural processes.

For all alternatives, it is reasonable to expect that over the long-term the potential detrimental effects to soil quality on the FLNF would be minimal due to mitigation and protection measures. In addition, the acres unaffected by management practices would far exceed the acreage affected by management practices. Thus, soil quality on a Forest-wide basis would be maintained for all alternatives, and over much of the Forest, move toward a more natural condition (restoration).

3.3 WATER AND FISHERIES

3.3.1 Water

The indicators and affected environment for water and fisheries resources are displayed separately for each resource. They are closely related, however, so the environmental consequences for water and fisheries resources will be analyzed together.

Issue Statement

Concern is focused on the extent to which water quality will be maintained and/or improved, and riparian area conditions (soil erosion and vegetation) will be improved under the revised Forest Plan.

Indicator 1 – Acres in Management Area Allocations Most Subject to Ground-Disturbing Activities That Could Impact Water Quality and Riparian Areas

The indicator to be used in this effects analysis is the number of acres in management area (MA) allocations most subject to ground disturbance. This is a good indicator because the higher the number of acres subject to ground-disturbing activities, the greater the potential for reductions in water quality and damage to riparian areas. Ground disturbance is the result of activities such as grazing, tree harvests, prescribed fire, trail construction, recreation development and use, road construction and maintenance, and minerals exploration and extraction (ground-disturbing activities are listed in Table 3.2-1 in the Soils section). Water quality and riparian area impacts include soil erosion and surface runoff; turbidity; nutrient enrichment or pollution of streams and ponds; or loss or reduction of riparian vegetation. The MAs most subject to ground disturbance are Grassland for Grazing, Grassland for Wildlife, Shrubland, Oak Hickory and Northern Hardwood. This indicator is important because the higher number of acres potentially subject to ground disturbance, the greater the potential for soil erosion and water quality reductions and degradation of aquatic and riparian habitat.

Risks to water quality, such as soil erosion, surface runoff, and water turbidity, can be caused by ground-disturbing activities. Nutrient enrichment is caused primarily by run-off from grazing and agricultural lands. Pastures with livestock use and limited or no riparian vegetation buffers are more likely to contribute to water quality degradation than those with buffers.

Analysis Area

The analysis area for direct and indirect effects includes all federal land managed by the Finger Lakes National Forest (FLNF). This is the area potentially subject to ground disturbances as a result of land management activities on the FLNF.

The analysis area for cumulative effects includes all FLNF lands and the lands administered by other public and private landowners in Seneca and Schuyler counties.

3.3.1.1 Affected Environment

Introduction

The FLNF lies astride a plateau known as the “Hector Backbone.” About half of the FLNF land drains east toward Cayuga Lake and half west toward Seneca Lake. The FLNF land lies within three watersheds (Taughannock Creek, Trumansburg Creek, Cayuga Lake) that drain into Cayuga Lake and one watershed (Seneca Lake) that drains into Seneca Lake. The FLNF contains 6 perennial and many intermittent and/or ephemeral streams, as well as a large number of small mapped wetlands.

In the late 1700s, settlers from the east colonized the Finger Lakes area, and rapidly converted

forests into agricultural land. Approximately 90 percent of the forested land had been converted into pastureland by the second half of the 1800s. Wetlands were drained and lost. Water quality in streams was degraded and forested riparian areas were dramatically reduced (USDA Forest Service 2004h).

A trend of agricultural abandonment followed this period and continues today. Resulting reforestation has led to a recovery of water quality throughout the region (USDA Forest Service 2004h). For example, Seneca and Cayuga Lakes are valued public water supplies for thousands of people, and area streams, ponds, and wetlands are focal points for recreation. With about one-third of the land base in the Finger Lakes Region still under agricultural production, sedimentation of aquatic habitats, and water pollution from fertilizers and pesticides, will continue to be water quality issues.

Under the 1987 Plan, about 34 percent of the FLNF is grazing land. Over the years, approximately 46 small ponds were constructed for livestock use. Other surface water features on the FLNF include streams, riparian areas, and wetlands. There are a total of 27 constructed wildlife ponds on the Forest. Most of them range from approximately one-half acre to one acre in size and are found in the Grassland for Grazing and Grassland for Wildlife MAs. At about fourteen acres, Teeter Pond is the largest pond and wetland area on the Forest. The Forest also contains six perennial streams and many small intermittent and/or ephemeral streams (USDA Forest Service 2004h).

Soil and water improvement projects have been implemented in recent years to address water quality and riparian area problems. Over-use of certain riparian areas by livestock has resulted in bank erosion, sedimentation, and water quality degradation. Fencing of these areas water quality and bank stability are beginning to recover, improve, and provide the desired protective vegetative buffer along streams. In addition, water monitoring is being performed to determine whether water quality and riparian areas are maintained and enhanced.

Existing Forest Plan Management Direction

The 1987 Forest Plan provides comprehensive water resource management direction and conservation measures. In particular, specific goals and objectives in the Plan direct the FLNF to protect the integrity of water resources by preventing contamination of water sources and maintaining clean water in forest ponds, streams, and wetlands, to continue life-supporting functions.

The 1987 Forest Plan also directs the FLNF to meet federal and State water quality laws governing management of the National Forest, including the Clean Water Act and National Forest Management Act. Specific laws and regulations are also discussed in detail in the Water Resource Assessment for the FLNF (USDA Forest Service 2004h).

Current management of water resources on the FLNF is directed at reducing soil erosion, maintaining and improving water quality and riparian areas near streams, wetlands, and ponds.

Proposed Changes in Management Direction Common to All Alternatives

The revised Forest Plan will continue to improve upon existing direction in the 1987 Forest Plan. The revised Plan contains a goal to maintain or restore aquatic, fisheries, riparian, vernal pool, and wetland habitats (Goal 4). The revised Forest Plan also includes a goal to maintain or restore ecological processes and systems on the FLNF within desired ranges of variability, including a variety of native vegetation and stream channel types and their patterns and structural components (Goal 5). This ecosystem approach will protect the integrity of water resources and life support functions.

Objectives to achieve these goals include:

- Minimize adverse impacts on aquatics, riparian, vernal pool, and wetland resources
- Meet or exceed State water quality standards
- Restore and enhance stream ecosystem processes using knowledge of riparian floodplain functions

The Forest Service would accomplish many of these goals and objectives for the water resource by maintaining and expanding cooperative agreements and partnerships.

Forest-wide standards and guidelines for the water resource follow direction provided in Forest Service Manual 2526.03.2 and 2526.03.5 and align closely with the State of New York's BMP. Compliance with standards and guidelines will assist the Forest Service in maintaining State water quality standards in FLNF streams and ponds. The revised Forest Plan's Forest-wide standards and guidelines provide more detailed direction on permanent stream crossings to prevent sedimentation and avoid riparian wetlands.

Existing Condition

Much of the cleared, open land that existed during the 18th and 19th centuries has reforested to a variety of succession stages. Today, approximately 55 percent of the FLNF is forested and provides healthy riparian habitat along streams, ponds and wetlands. In general, riparian forests are about 70 years old and functioning to filter sediments from entering water bodies, as well as to provide a canopy to maintain desirable water temperatures for native aquatic species. These stands, however, are not yet providing much woody material to benefit habitat conditions in streams, ponds and wetlands.

Additional information on water and riparian resources on the FLNF is described in the FLNF Water Resource Assessment (USDA Forest Service 2004h). This document states that water quality on the FLNF generally meets State Class D water quality standards, except in some grazing allotments. Over the past several years, water quality, macroinvertebrate, and riparian area monitoring in the allotments has shown that some streams, wetlands, and riparian areas have been degraded, to varying extents, due to grazing. Specifically, stream sedimentation, unstable stream banks, high levels of nitrogen and phosphorous in the water, and altered macroinvertebrate communities are concerns in some allotments.

When this degradation was first characterized in the late 1990s, measures were initiated to correct resource problems. These measures consisted of fencing riparian areas and wetlands to exclude livestock, limiting the number of livestock crossings of streams, increasing stream-side shading and vegetation, and fencing stock ponds. These measures reflect guidance in the State of New York Best Management Practices (BMPs) for grazing areas (USDA Forest Service 2004h). Over the past seven years, the Forest Service has observed improving riparian and wetland conditions, and has measured improved water quality as a result of these protection measures. The Forest Service continues to work toward full implementation of all these protection measures in all grazing allotments. The long-term management intent is to demonstrate the benefits of implementing BMPs in grazing areas, and encouraging private land owners to implement the same measures to improve water quality in the Finger Lakes region.

See section 3.2.1 of this Chapter (a description of the Existing Condition of the soil resources) for further information on the effects of Forest Service land management practices on water resources from 1987 to the present.

3.3.2 Fisheries

Issue Statement

Concern is focused on the extent to which fish habitat will be maintained and enhanced under the revised Forest Plan.

Indicator 1 – Acres in Management Area Allocations Most Subject to Ground-Disturbing Activities that Could Impact Fisheries Habitat

The indicator to be used in this effects analysis is the number of acres in MA allocations most subject to ground-disturbing activities, specifically those that could result in sedimentation of fish spawning and rearing habitat and reduction or loss of riparian vegetation. These acreages are compared among alternatives. The MAs most subject to ground disturbance are Grassland for Grazing, Grassland for Wildlife, Shrubland, Northern Hardwood and Oak Hickory. This indicator is important because the higher the number of acres potentially subject to ground-disturbing activities, the greater the potential for sedimentation and habitat degradation or loss.

Analysis Area

The analysis area for direct and indirect effects includes all federal land managed by the FLNF. This is the area potentially subject to ground disturbances as a result of land management activities.

The analysis area for cumulative effects includes all FLNF lands and the lands administered by other public and private landowners in Seneca and Schuyler counties.

3.3.2.1 Affected Environment

Introduction

On the FLNF, fisheries habitat is found primarily in small wildlife ponds that provide suitable habitat for a variety of fish species like largemouth bass, trout, and Bluegill. Several streams on the Forest also provide fisheries habitat. Some of the perennial streams contain a wild brown trout fishery. In addition, the streams support populations of several non-game fish species and macro-invertebrates. Ponds are locally important because they provide a recreational fishery to those anglers and their families seeking an accessible small pond or stream setting as an alternative to big lake environments. Management of the ponds is conducted through a combination of fish stocking and habitat improvement. Fisheries monitoring is performed to ensure that these resources are maintained and enhanced, and available for public use and enjoyment.

The region surrounding the FLNF provides a wide variety of angling opportunities. Seneca and Cayuga Lakes are considered some of New York's top angling waters. These lakes, in addition to several streams in the area, support healthy populations of many fish species, including landlocked salmon, smallmouth bass, yellow perch, northern pike, and three trout species. Fishing continues to be a popular sport and pastime in the area.

Ground-disturbing activities pose a threat to fish and fish habitat (ground-disturbing activities are listed in Table 3.2-1 in the Soils section). The hazard to fish and fish habitat occurs when soils erode and run off the land, and deposit as sediment in the substrate (bottom) of a stream or pond. Fish require clean, sediment-free substrate to successfully carry out life cycle requirements such as spawning and egg incubation. Also, the loss or lack of vegetative canopy over streams and ponds can result in decreased protective cover and increased water temperatures that can be fatal to fish.

There is a close relationship between the quality of fish habitat, the health of fish populations, and water quality conditions on the FLNF. Many of the factors that affect water quality also have positive and negative impacts on fisheries resources. For example, erosion from upland areas that flows into a stream as sediment results in negative impacts to water quality in the form of turbidity and suspended solids and pollutants. That same sediment settles to the stream bottom and fills in open spaces that fish use as rearing area, cover area, or spawning substrate. Conversely, a well-vegetated riparian area will have positive effects on fisheries and water quality by filtering sediments before it reaches the stream and providing shade and cover for fish.

Existing Forest Plan Management Direction

The 1987 Forest Plan provides comprehensive fisheries management direction and conservation measures. Goal 5 of the 1987 Plan directs the Forest Service to provide types of recreation that require a large, relatively undeveloped land area, which includes fisheries-related recreation.

Objectives to achieve this goal include fish stocking of three ponds per year and fish habitat and population surveys. The FLNF has implemented an array of projects such as trout, Largemouth bass, and non-game fish stocking; riparian and pond habitat improvements; and fish population and habitat monitoring to meet the goals and objectives for fisheries resources.

In the 1987 Plan Forest-wide standards and guidelines for the fisheries resource were included within standards and guidelines for the wildlife resource. These S&Gs state that fisheries management activities will be coordinated with the New York State Department of Environmental Conservation (NYSDEC). Standards and guidelines also state that management will emphasize warm-water fish that can establish self-perpetuating populations, except where trout has traditionally been stocked.

Proposed Changes in Management Direction Common to All Alternatives

The revised Forest Plan would improve upon existing direction in the 1987 Forest Plan. The revised Plan contains a goal to maintain or restore aquatic, fisheries, riparian, vernal pool, and wetland habitats (Goal 4). The revised Plan also includes a goal to maintain or restore ecological processes and systems on the FLNF within desired ranges variability, including a variety of native vegetation and stream channel types and their patterns and structural components (Goal 5). This ecosystem approach will protect the integrity of water resources and life support functions.

Revised Forest Plan objectives to achieve these goals include:

- Minimize adverse impacts on fisheries
- Maintain existing pond impoundment structures
- Meet or exceed State water quality standards
- Restore and enhance stream ecosystem processes using knowledge of large, woody debris dynamics for the purposes of improving and connecting aquatic habitats such as wild trout habitat
- Provide a specific amount of large, woody debris quantities for stream habitat management

Revised Forest Plan objectives, standards, and guidelines for water quality directly pertain to the fisheries resource by affecting fish habitat. The goals and objectives will continue to emphasize protection and enhancement of quality fish habitat for warm and cold-water fisheries.

The FLNF would accomplish many of these goals and objectives for the water resource by maintaining and expanding cooperative agreements and partnerships. The FLNF and their partners will implement fishery management activities such as stream, pond, and riparian habitat improvements, fish stocking, and monitoring.

In the revised Plan, Forest-wide standards and guidelines for the fisheries resource have been separated from the wildlife resource standards and guidelines and listed in greater detail. An added standard states that non-native fish shall only be introduced after alternative measures for native fish management prove unsatisfactory.

Management area standards and guidelines for Special Areas, Future Old Forest, and Existing and Candidate Research Natural Areas allow for restoration and habitat improvement activities when they do not diminish the character or purpose of the management area.

Existing Condition

The primary fish habitats on the FLNF are found in the small human-made wildlife ponds and the few perennial streams scattered across the Forest. Pond surveys and monitoring conducted over the past 15 years indicate habitat quality supports limited natural reproduction of warm water fish species and a recreational fishery (USDA Forest Service 1989-2004b). Based on these conditions, the ponds have been managed through a combination of habitat protection and enhancement as well as supplemental stocking of warm-water species (for example, largemouth bass, bluegill, golden shiner). Stream fisheries are maintained solely through natural reproduction.

Rainbow trout and brook trout are stocked annually into Ballard, Foster, and Potomac ponds in cooperation with the NYSDEC. Each pond receives about 300 brook trout and 400 rainbow trout in either April or May. The trout range in size, generally from eight to ten inches long, and provide good angling opportunities throughout the spring months. By summer, most trout have been caught and the water temperatures in the ponds have become too warm for them to survive. As a result, the ponds are managed strictly as “put and take” recreational fisheries.

Management of fisheries in FLNF ponds is to maintain a healthy fish community and sport fisheries through natural reproduction in selected ponds throughout the Forest. This means that fish populations, particularly largemouth bass, reproduce on a regular basis and maintain several age and size classes in each pond. Supplemental stocking is performed when this natural process has been interrupted by environmental factors such as drought and winterkill. Some of the ponds that have received supplemental fish stocking due to winterkill include Teeter, Burdick, Sassafras, and South Burnt Hill ponds. Frequent monitoring provides the information necessary to determine if additional management steps are needed.

The fisheries habitat in ponds has been negatively impacted through the input of sediment and excessive nutrients from agricultural practices in adjacent pastures and grasslands (USDA Forest Service 1989 to 2004b). As a result, many of the ponds became shallow and choked with excessive aquatic vegetation. To mitigate these effects, dredging of sediment and aquatic vegetation was performed to restore water depth and provide fish habitat to lessen the effects of winterkill. Also, a few ponds were stocked with grass carp that feed on aquatic plants as another means to reduce aquatic vegetation.

In the 1990s habitat enhancements were implemented in several ponds to address habitat limitations. This work involved submerging trees and root systems in ponds at various depths to provide protective cover/shelter for fish. Follow-up monitoring indicated the structures were being utilized by a number of fish, and by aquatic invertebrates such as insects and crayfish (USDA Forest Service 1989-2004a).

Most streams on the Forest are intermittent and provide only seasonal angling opportunities for trout. There are eight perennial streams that flow through the FLNF. Several of these streams have been inventoried for fish population composition and abundance. Their populations appear healthy and stable. To date, there has been no habitat enhancement work done in the streams.

3.3.3 Environmental Consequences: Water and Fisheries

Direct and Indirect Effects by Alternative

Effects Common to all Alternatives

Under all alternatives it is anticipated that water, riparian, and fisheries resources would be protected and the effects of implementing one alternative over another would be minimal because protection measures would minimize the impacts to these natural resources (also see section 3.2.2 for additional information). This would be the case over the short-term, defined as the length of the Forest Plan (10 to15 years), and the long-term, until desired future conditions are met. It is worth noting that improved compliance with State of New York BMPs for grazing areas, and better riparian and wetland protection standards and guidelines in the revised Plan, will reduce the impacts to these resources under all alternatives of the revised Plan.

Regardless of which alternative is selected under the revised Plan, the opportunity for human error in implementing management direction exists, so the discussion of direct and indirect effects considers the potential adverse effects management actions could have as a function of the amount of ground-disturbing activities permitted.

Although there is opportunity for soil disturbance within the management areas (MAs) discussed for Indicator 1, only a relatively small portion of the MAs would actually be subject to ground-disturbing activities in any given alternative. The estimated acreage for various ground-disturbing activities is provided in the Forest Plan Proposed and Probable Practices (revised Forest Plan, Appendix D). Although these acres are specific to Alternative 3, they are not expected to vary by alternative except those associated with timber harvest activities. The Timber Management section of Chapter 3 (Table 3.11-5) provides the potential acres harvested under each alternative.

Indicator 1 (Water and Fisheries) – Acres in Management Area Allocations Most Subject to Ground-Disturbing Activities that could Impact Water Quality, Riparian Areas, and Fisheries Habitat

Indicator 1 for both the water and fisheries resources reveals differences among alternatives in the acreage of MA allocations most subject to ground disturbance. Alternative 1 would have the highest acreage of lands most subject to ground disturbance at approximately 15,624 acres (Table 3.2-2) in the Soils section). Alternative 2 would have the lowest acreage affected at 11,380, and Alternative 3 would be between those two figures at 13,584. This indicates that the risk of ground disturbance, including soil erosion and surface runoff, loss of riparian vegetation, and the risk of water quality and fish habitat reductions from turbidity, sedimentation of fish habitat, and nutrient enrichment would be highest for Alternative 1 and lowest for Alternative2.

While this indicator reveals differences in acreages between the alternatives, the actual overall risk, and therefore effects, on reduced water quality and fish habitat would be low for all alternatives. This would be true in both the short and long-term. This is largely due to fish, water, and riparian resource protection measures proposed by the Forest Plan to keep soil erosion and runoff, turbidity, sedimentation, nutrient enrichment and riparian vegetation loss at low levels.

Cumulative Effects

Timber harvest, road construction, agriculture, and livestock grazing have occurred on the Forest and adjacent private lands for many decades. Historically, there was more land in agriculture and pasture than exists today. These lands undoubtedly contributed substantially to water quality and riparian area degradation since this occurred prior to the application of BMPs for water resource protection. It is reasonable to believe that substantial soil erosion and nutrients washed into ponds, wetlands, and streams,

resulting in degraded water quality and aquatic habitat.

Today, more of the land is in forest cover following decades of farmland conversion back to forest. Since the 1970s, water quality and clarity has improved in the larger Finger Lakes and has remained static in the smaller lakes (USDA Forest Service 2004h). Recent logging and recreational uses have had only minor effects on water quality. This is because streams in forested areas are relatively stable, support continuous riparian vegetation, and are less likely to experience excessive sedimentation and nutrients, which degrade water quality.

Although a lot of land in the area has reforested, there is a considerable amount of grassland and pastures under active management. Grazing and livestock use of these areas are also expected to continue. Riparian areas and water quality in stream and ponds on these lands should improve over the coming years because the Forest Service and its partnerships will implement projects to re-establish and restore vegetated buffers along streams and ponds.

The short and long-term effects on water quality and riparian areas from implementing any of the proposed alternatives would be minor because S&Gs and site-specific mitigation measures would be implemented. There would continue to be minor amounts of soil erosion, sedimentation, and nutrient run-off into streams from pastures as long as grazing continues.

Therefore, based on the past, present, and reasonably foreseeable future actions on nearby lands, there would be minimal overall adverse cumulative impacts to water quality, fisheries, and riparian resources in the analysis area, including Cayuga and Seneca Lakes. There would also be positive effects from implementing fisheries and water improvement projects that will result in additional vegetative buffers in riparian areas on FLNF lands and possibly on neighboring lands if demonstration activities are replicated.

Stocking Potomac Pond

3.4 AIR

Issue Statement

Concern is focused on the extent to which management activities on the Finger Lakes National Forest (FLNF) would affect local and regional air quality. Maintenance of air quality is an important part of the issue of restoring, protecting, maintaining, and enhancing biological and ecological diversity. Additionally, there is concern about the impacts to forest resources and air quality from air pollution transported to the FLNF from near and distant sources.

Additional discussion on the impacts of air pollution on other resources may be found in respective Chapter 3 sections, such as Soil (3.2) and Water (3.3) and Vegetation (3.5).

Indicator 1 – Potential Amount of Particulate Emissions Generated from Prescribed Fire

The indicator to be used in this effects analysis is the potential amount of particulate emissions (tons per year) generated from prescribed fire. Prescribed fire is the management practice conducted by the Forest Service that most directly impacts air quality. Prescribed fire is used primarily to maintain shrublands, grasslands, wildlife openings, and oak forests as well as to reduce hazardous fuels. This indicator will be used to compare the effects of alternatives on air quality because the potential amount of particulate emissions would depend on the level of opportunity for the use of prescribed fire.

Other activities within the FLNF, such as road construction/maintenance, mineral development, recreational use (including snowmobiles), and timber harvesting, all have potential impacts on local air quality. These activities, however, are not expected to increase significantly in the future on the Forest.

Analysis Area

The analysis area for direct, indirect, and cumulative effects includes all land managed by the FLNF and the lands administered by other owners, both public and private, within approximately 62 miles (100 km) of the Forest. This distance was chosen to correspond to other air quality permitting criteria and is the area where smoke from prescribed fire could potentially affect air quality.

3.4.1 Affected Environment

Introduction

Federal statutes and regulations, including the Clean Air Act (1990), the Organic Act (1897), and the Wilderness Act (1964), require federal land managers to protect air, land, and water from the effects of air pollutants originating from federal lands. In addition, Clean Air Act Amendments (1977 and 1990) direct federal land managers to protect the air, land, and water resources under their jurisdiction from the impacts of air pollution originating outside of federal lands.

The Forest Service is directed to minimize the impact of management activities on general air pollution. To fulfill this responsibility, the Forest Service must understand the impacts of pollution originating on National Forest System land as well as the impacts of pollution from sources outside the Forest.

New York sources of air pollution include highway vehicles, fuel combustion, off-highway vehicles, dry cleaners, industry, storage and transport, waste disposal, and other miscellaneous sources (US EPA 2004a). More distant sources include industry in the Ohio River Valley and other parts of the midwestern United States. This is important since the FLNF is northeast and upwind of this industrialized area which produces approximately half of the nation's nitrogen oxide and sulfur dioxide point source pollution (Driscoll et al. 2001, Sams 2002). Once emitted into the atmosphere, nitrogen oxides are ultimately

converted to nitrates, and sulfur dioxides are converted to sulfates, which can then impact soil, water, vegetation, and visibility.

Regional Haze

The Regional Haze Regulations require states and tribes to make reasonable progress over a period of decades toward restoring natural visibility conditions in major national parks and wilderness areas designated by the Congress in the Clean Air Act as "Class I" areas. Class I areas are afforded the greatest protection from air pollution impacts. National wilderness areas greater than 5,000 acres in size and national parks greater than 6,000 acres in size were designated Class I if they existed when the 1977 Clean Air Act amendments were passed. All other national parks and wilderness areas, as well as the remainder of the United States, were designated Class II areas.

There are no Class I areas within 62 miles (100 kilometers) of the FLNF. The nearest Class I area is the Lye Brook Wilderness (15,814 acres) located on the south half of the Green Mountain National Forest in Vermont. As a Class I area, air quality related values (AQRVs), including visibility, are to be protected from air pollution impacts. As the federal land manager for the Lye Brook Wilderness, the Forest Service has the direct responsibility to protect the AQRVs by considering the impacts of proposed major emitting facilities on these AQRVs (Clean Air Act, 42 U.S.C 7475(d)(2)(B)).

Additionally, because pollutants that cause haze are emitted over wide areas and are transported by winds over long distances, the United States Environmental Protection Agency (EPA) promulgated the Regional Haze Regulations (US EPA 1999). These regulations promote States, tribes, and federal land managers working together in regional programs (Regional Planning Organizations (RPO)) to improve visibility in parks and wilderness areas. The Forest Service and the State of New York are members of the Mid-Atlantic/Northeast Visibility Union (MANE-VU), the RPO considering all sources and their emissions which impact visibility at Lye Brook Wilderness.

The State of New York will need to develop a State Implementation Plan (SIP) for Regional Haze by 2008. In developing the SIP, the State will need to consider all sources of air pollution (major, minor, local, and distant) within New York which affect regional haze in Class I areas. The SIP will need to consider the source's contribution to visibility impairment and the potential reduction in emissions which could occur from that source. Reductions are meant to move visibility towards more natural conditions by 2064. State of the science emissions inventories and modeling is currently being conducted by the MANE-VU RPO in order to provide information and data to the states as they develop their SIPs.

Ozone

Regional air pollutants are inextricably related, and there is an interrelationship between ozone, fine particles, and regional haze. Ozone levels can occasionally reach high levels anywhere in the northeastern United States. Only southern California and some areas near the southern Appalachians experience greater and/or more frequent concentrations of rural ground-level ozone than the northeast United States. This can be attributed to higher temperatures and longer, more severe, periods of stagnant weather conditions (Sams 2002).

Atmospheric Deposition

Atmospheric deposition refers to chemicals that are carried in the air and deposited on the land or water via precipitation ("wet" deposition) or gases and particles ("dry" deposition). Sulfur dioxide (SO2) and nitrogen oxides (NOx) are the primary causes of atmospheric deposition producing acidic water, gases, and particles that can affect water quality, soil productivity, and other Forest resources.

Sulfur dioxide and nitrogen oxides primarily come from fossil fuel combustion. Electric utilities account for the greatest proportion of sulfur dioxide emissions, while nitrogen oxide is mainly from vehicle emissions. Analysis of air currents

shows that many states in the Ohio River Valley are dominant sources for sulfur and nitrogen oxide emissions, traveling downwind to the northeastern US (Driscoll et al. 2001). Ammonia emissions related to manure handling, especially from the Midwest, also contribute to nitrogen deposition. Where sulfur and nitrogen have been deposited, chemical reactions occur that degrade water and soil quality by lowering pH levels (increasing acidity), decreasing buffering capacity, and increasing aluminum concentrations.

Another example of atmospheric deposition is mercury. Mercury in the air is primarily from coal-fired power plant emissions. Its deposition leads to the formation of methyl mercury, a potent neurotoxin that is accumulated through the aquatic food chain. In New York, fish consumption advisories due to mercury are in effect for all surface waters (Sams 2002).

Existing Forest Plan Management Direction

The 1987 Forest Plan contains a goal to protect the basic integrity of the air resource.

This goal is being accomplished through Forest-wide standards and guidelines that include: coordinating with regulatory agencies; obtaining appropriate State permits prior to conducting prescribed fires; and minimizing smoke impacts on adjacent residences.

Management direction for the air resource is also found in the Fire Management section of the Forest-wide standards and guidelines. The Forest Service must also follow all State and federal regulations governing air quality, and must coordinate with regulatory agencies to seek emissions reductions as needed to protect National Forest resources. All prescribed fire activities must receive prior approval from the State of NY Department of Environmental Conservation (NYSDEC).

Proposed Changes in Management Direction Common to All Alternatives

Unlike the 1987 Plan, the revised Forest Plan does not have specific goals or Forest-wide standards and guidelines related to the air resource. Forest-wide standards and guidelines for the air resource have been incorporated in the revised Plan's Fire Management section. These direct the Forest Service to plan for, and implement, best available smoke management techniques for all prescribed fires in order to minimize emissions and reduce smoke impacts. There is also a Forest-wide standard for the air resource in the Forest Health and Disturbance section that directs the Forest Service to coordinate forest health condition monitoring, including air quality, with New York State.

Existing Condition

Local Air Quality – Emissions and Concentrations

Emissions of particulate matter smaller than 2.5 microns in diameter (PM-2.5) impact visibility and human health. The amount of particulate matter a source emits is typically measured in tons per year. Sources which produce PM-2.5 include diesel cars, trucks and buses, power plants, industry, and many other sources including prescribed fire. Approximately 80 percent of the pollutants emitted from wildland fire and prescribed fire are PM-2.5.

The FLNF lies within Seneca and Schuyler Counties. Particulate emissions in these counties are relatively low compared to other counties across the State. Schuyler County produces approximately 500 to 800 tons per year and Seneca County produces 800 to 1,400 tons per year. Surrounding counties produce anywhere from 1,400 to 4,500 tons per year. Some counties in the state produce in excess of 4,500 tons per year (US EPA 2004b).

The amount of particulate in the air which could impact human health is measured as a concentration, for example, the amount of mass of particulate per unit volume of air. This concentration is typically expressed in

micrograms per cubic meter (μg/m^3). The US Environmental Protection Agency has established National Ambient Air Quality Standards (NAAQS) for fine particles (PM-2.5). The PM-2.5 annual average standard is 15 μg/m^3 and the 24-hour average standard is 65 μg/m^3. These standards are meant to protect the groups at greatest risk to air pollution impacts. This includes the elderly, individuals with cardiopulmonary diseases such as asthma, and children.

Currently all of New York, except some of the counties in the southeast part of the State, meets the ambient air quality standards for PM-2.5 (Federal Register 2005). Monitoring results from the three closest monitoring stations to the FLNF, located in Onandaga, Steuben, and Monroe Counties, indicate that in 2003 24-hour average concentrations were between 30 and 50 μg/m^3 and annual averages were between 8 and 12 μg/m^3. These stations are located approximately 75 to 125 miles from the FLNF (US EPA 2004c).

Ozone

Prescribed fires emit small quantities of nitrogen oxides, which are precursors to ozone formation. The NAAQSs for ozone is 0.08 parts per million averaged over eight hours and 0.12 parts per million averaged over one hour. Although Seneca and Schuyler counties meet the ozone standards, several counties on the western and eastern edges of the State do not meet the one-hour or eight-hour standards (US EPA 2004d).

Ozone can impact plant species at concentrations or exposures less than that established by EPA to protect individuals. Sensitive species include blackberry, black cherry, milkweed, yellow poplar, and white ash. Data from the USDA Forest Service Ozone BioMonitoring Project indicates moderate ozone exposure for most of New York based on information collected from 1996 to 2002 (US EPA 2004e).

Acid Deposition

According to maps developed by the National Acid Deposition Program (NADP), sulfate deposition is 15 to18 kilograms per hectare per year and nitrate deposition is 12 to 14 kilograms per hectare per year for New York's Finger Lakes region. Unlike ambient air quality, there are no national "deposition" standards to compare these numbers against. When compared against other parts of the country, these amounts are considered moderate.

No site specific information on effects of acid deposition to soils or surface water on the FLNF exists. These resources appear to have enough natural buffering capacity that acid deposition effects are small (Tetra Tech 2003). See the Soil (3.2) and Water and Fisheries (3.3) sections for more information on atmospheric deposition effects.

Prescribed Fire Use

The use of prescribed fire on the FLNF is the primary Forest-generated source of particulate matter emissions that could impact air quality and would be the pollutant of most concern to public health and visibility. While fire also produces ozone, potential ozone exposures are infrequent (Sandberg and Dost 1990). Fire also produces carbon monoxide, but because fires are generally spatially and temporally dispersed and carbon monoxide is rapidly diluted at short distances from a burning area, this carbon monoxide poses little or no risk to public health (Sandberg and Dost 1990).

The FLNF typically burns about 250 acres a year. Figure 3.4-1 compares emissions generated in the two Counties covering the FLNF (Schuyler and Seneca Counties) and the typical amount of particulate matter emissions generated from historical levels of prescribed fire conducted on the Forest. At these levels, prescribed fire emissions are about 20 tons per year, compared to approximately 650 to 850 tons per year of emissions generated in the two counties.

3.4.2 Environmental Consequences

Direct and Indirect Effects by Alternative

Indicator 1 – Potential Amount of Particulate Emissions Generated from Prescribed Fire

Effects Common to All Alternatives

The direct and indirect effects for all alternatives would be minor, with only slight variations among alternatives. Natural resource management activities such as timber harvest, road construction and maintenance, motorized recreational use, and minerals development can generate ozone, carbon monoxide, and particulate matter. The amounts, however, would be negligible in terms of impacts to the air quality and would not meaningfully vary by alternative.

The potential impacts from prescribed fires are not expected to vary by alternative due to the small acreage differences in management area allocations allowing prescribed fire. Under all alternatives, prescribed fire is expected to have minimal impacts to local and regional air quality. For the purpose of this analysis, it is estimated that the maximum amount of prescribed fire that could occur annually would not exceed three times the maximum historic annual level of 250 acres (less than 2% of the FLNF). This scenario represents the most acres (750 acres, or 5% of the Forest) that likely could be burned if all conditions conducive to burning occurred at the same time; timing that rarely happens. Figure 3.4-1 compares emission amounts from this level of prescribed fire to overall amounts in surrounding counties. These estimates indicate that tripling the historic maximum number of acres burned would increase emissions to 60 tons per year. This amount is minimal compared to amounts from outside sources, which are substantially greater.

Although prescribed fire could occur on 250 acres, weather and fuel conditions vary from year to year, as do budgets and staffing. Therefore, it is difficult to estimate the exact amount of prescribed fire that will be conducted, and emissions potentially produced, for any one year in the planning period.

The amount of emissions produced does not necessarily correlate to increased particulate concentrations. Prescribed fire is a temporary source and would only be conducted with prior approval from the NYSDEC; best smoke management practices, which consider existing and forecasted air quality, would also be implemented. Currently, the NYSDEC issues the Forest Service burning permits contingent on several conditions: prevailing winds must carry the smoke away from populated areas; burning must not be conducted during any stage of an air pollution episode; and burning must not adversely impact ambient air quality standards. The direct and indirect effects from prescribed fire, under all Alternatives, would have minimal short and long-term impacts to air quality and visibility.

Cumulative Effects

Effects Common to All Alternatives

Cumulative effects consist of the effects of prescribed fire on FLNF air quality, on any given day over the life of the revised Forest Plan (short-term), in combination with the effects of all other air pollutants (from a variety of sources including those in the Ohio River Valley) during the same time period.

The potential amount of emissions produced from the FLNF, even if prescribed fires were increased to 750 acres a year, would be small compared to other existing pollution sources outside the control of the Forest Service. In order to minimize local air quality impacts to human health and visibility, the Forest Service will work with adjacent landowners to coordinate prescribed fires and use best available smoke management techniques, such as staying aware of local and forecasted air quality and weather in order to minimize smoke impacts. All prescribed burn plans will address potential smoke impacts and

have contingency measures in place in case of unexpected impacts to human health or safety.

Ozone, Regional Haze, and Atmospheric Deposition

High ozone concentrations are most typical in summer due to high temperatures and stagnant weather. Because of the seasonality of prescribed fire management on the Forest (primarily done in the spring), and the small amount of emissions produced, prescribed fire is unlikely to contribute to ozone problems.

The quality of the air that passes over the Forest is largely determined by the origin of the air. Outside influences have the greatest effect on FLNF resources, and are cumulative in nature. The emissions produced from FLNF management actions will be negligible compared to emissions generated outside of the FLNF. Future levels of these pollutants depend on regulations and national policy. None of the proposed alternatives changes this situation.

It is likely that with current and proposed rules and regulations, air quality across the country will continue to improve over the next 15 years (US EPA 2004f). In fact, a recent settlement agreement between operators of six coal burning power plants and the State of New York will reduce by more than half the amount of sulfur dioxide produced by all the power plants and factories in New York and reduce by more than a fifth the amount of nitrogen oxide produced in New York (Cooper 2005). The Forest Service will remain involved with regional, local, and national air quality groups engaged in research, monitoring, education and policy making. The Forest Service will continue to diligently work within the context of current and proposed air quality rules to in order to protect and restore forest ecosystems impacted by air pollution.

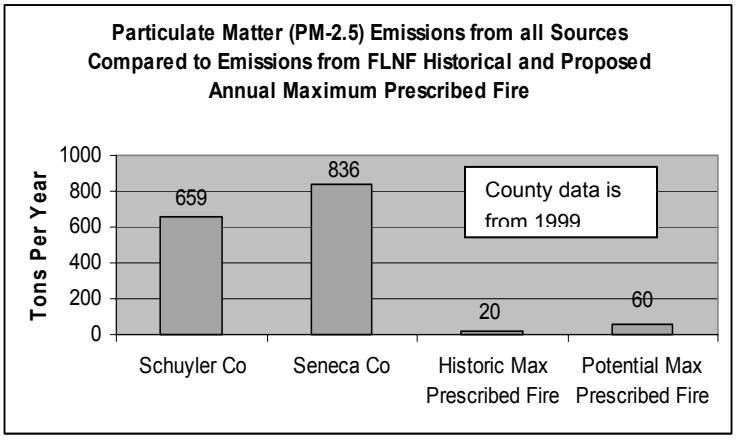

Figure 3.4-1: Particulate matter emissions from all sources in Schuyler and Seneca Counties compared to emissions from historical annual maximum (250 acres) and projected annual maximum (750 acres) prescribed fire on the FLNF. Chart was generated using EPA's AirData Website (US EPA 2004b) and the Prescribed Fire Emissions calculator (USFWS 2000).

3.5 VEGETATION

Introduction

Concern is focused on the composition and structure of forest vegetation provided on the Finger Lakes National Forest (FLNF) as a result of historical management strategies and proposed future management under the revised Forest Plan and its alternatives. This section provides a broad overview of the types of vegetation that historically occurred, and presently occur, on the FLNF, and the effects on this vegetation that are predicted to occur as a result of the implementation of the revised Forest Plan. It also provides part of the coarse filter analysis for biodiversity, which is discussed in the first section of Chapter 3.

This section covers two components of the vegetation topic:

- Major Forest Communities (Subsection 3.5.1)
- Non-Native Invasive Species (Subsection 3.5.2)

The Major Forest Communities subsection discusses the ecological context for vegetation on the FLNF, including ecological tendencies for vegetation, natural disturbance patterns, and a history of land uses that have affected the current vegetation. It then provides descriptions of the four major forest communities discussed in this analysis: 1) forests dominated by mesic hardwoods, 2) forests dominated by oak, 3) forests dominated by softwoods, and 4) forests dominated by aspen. These major forest communities are analyzed using indicators related to their abundance, age class distribution, and structure to evaluate alternatives.

The Major Forest Communities subsection also provides an overview of the types of communities considered rare and exemplary on the FLNF. Rare or exemplary natural communities are by definition not well distributed or common, and organisms associated with these communities may be at more risk if the composition, structure, or functioning of these communities are disrupted. The Areas of Special Significance section (3.10) specifically addresses the revised Forest Plan's management approach for rare and exemplary natural communities, as well as the representation of ecological landtypes and landscapes within management areas that minimize extractive or disruptive uses. While the analysis of environmental consequences in the Areas of Special Significance section (3.10) will not be repeated here, these natural communities will be introduced in the affected environment portion of this subsection.

The Non-Native Invasive Species subsection discusses the threats to the natural vegetation of the FLNF that come from a variety of non-native plants that can invade and alter local terrestrial and aquatic ecosystems.

Threats to forest health from insects and disease were not considered to be a major issue in Forest Plan revision and are not discussed in this Chapter. All alternatives provide for protection of forest health through management of insect and disease outbreaks. Old growth conditions are discussed further in the subsection associated with Major Forest Communities (3.5.1) and are analyzed in the Areas of Special Significance section (3.10). Fire risks are discussed further in the Fire Management section (3.16) of this Chapter.

Additional analysis of terrestrial vegetation can be found in other sections of this chapter. The Wildlife and Wildlife Habitat section (3.6) discusses vegetation composition in terms of wildlife habitat needs, specifically focusing on oak, northern hardwoods, young deciduous trees, grasslands, shrublands, aspen/birch, and old forest. Because the Wildlife and Wildlife Habitat section addresses grasslands and shrublands, these habitats will not be included in this section, except as a comparison with the distribution, abundance, age, and structure of major forest communities.

The Timber Management section (3.11) of this Chapter analyzes some of the same subjects as the Major Forest Communities subsection, such as composition and forest age, but with a focus on how these affect the quality or production of wood products and special forest products. The Timber Management section also describes products supplied by the FLNF, demand for these products, and timber management techniques used on the Forest. Aquatic and riparian habitats, and their associated vegetation, are analyzed in the Water and Fisheries section (3.3). Finally, specific habitat requirements for species of viability concern, including vegetation characteristics, are analyzed in the Species of Viability Concern (3.8) and Threatened and Endangered Species (3.7) sections of this chapter, as well as in the Biological Evaluation in Appendix E.

3.5.1 Major Forest Communities

Issue Statement

Public concern with major forest communities is focused on what tree species and forest ages will provide adequate forest structure and biodiversity while providing the social and economic needs of people. Social and economic effects are discussed in the Socio-economics section (3.20) of this chapter.

Indicator 1 – Amount of Each Major Forest Community (Composition and Abundance)

The first indicator to be used in this effects analysis is the abundance of each major forest community expected to occur under each alternative. The major forest communities are broadly defined groupings of the forest types used to classify lands on the FLNF during field inventories. These communities indicate the dominant tree species present, but may not always reflect all of the species present in a forested stand. The acres and proportion of each forest type projected under each alternative will be compared to existing conditions and composition objectives over the short and long-term, and will be discussed in the context of historical conditions.

This indicator does a good job of highlighting the differences among alternatives because each proposed alternative will produce varying amounts and distributions of major forest communities over time. The abundance and distribution of forest communities may have direct implications on available wildlife habitat, scenic quality, forest products, and recreational opportunities.

Indicator 2 – Proportion of each Major Forest Community in Various Age Categories (Age Class Distribution)

The second indicator to be used in this effects analysis is the proportion of each major forest community expected to occur in various age categories, or age class distribution, under each alternative. The age class distribution projected under each alternative for each forest community will be compared to existing conditions and 1987 Plan and revised Forest Plan age class objectives, over the short and long-term, and will be discussed in the context of historical conditions. This indicator does a good job of highlighting the differences among alternatives because each alternative produces varying amounts and distributions of major forest community ages over time. The amount and distribution of forest communities in different growth stages may also have direct implications on biological diversity, old forest, scenic quality, forest products, and recreational opportunities.

Indicator 3 – Acres of Timber Harvest Treatments (Forest Structure)

The third indicator to be used in this effects analysis is the acres of timber harvest treatments utilizing varied cutting methods, which influence the within-stand structure and complexity of the understory, midstory, and overstory layers. Forest management treatments, such as non-commercial

methods, planting, and prescribed fire, will be discussed in more general terms. The maximum acres of annual timber harvest treatments will be projected under each alternative. Additionally, the amounts of untreated stands will also be projected. These amounts will be compared among alternatives and to what has been implemented over the past fifteen years.

This indicator does a good job of highlighting the differences among alternatives because the mix and amounts of treatments proposed within each alternative will result in varying degrees of within-stand complexity of forest structure over time. Forest structure may also have implications for native plant community and wildlife habitat quality.

Analysis Area

The analysis area for direct and indirect effects includes all federal land managed by the FLNF.

The analysis area for cumulative effects includes all FLNF and the lands administered by other owners, both public and private, within the ecological subsections in which the FLNF sits, primarily the Cattaraugus Finger Lakes Moraine and Hills Subsection. Ecological subsections are separated by differences in broad patterns of vegetation, soils, and climate, and offer a reasonable framework for analyzing cumulative effects on major forest communities.

3.5.1.1 Affected Environment

Introduction

The composition, age, and structure of the major forest communities present today on the FLNF are the result of a long history of land use. The condition of the vegetation in the central Finger Lakes region in the 1790s was documented recently by Marks and Gardescu (1992), based on survey records for the Military Tract. The Military Tract is an area of land that extends across the Finger Lakes from Seneca Lake to Oneida Lake, and from Lake Ontario south onto the Allegheny Plateau at the south end of Seneca Lake in Hector township east to Cincinnatus township. This information contributes to understanding of the origins of the vegetation seen in the region today. Also summarized is the history of land use from the late 1700s to today, based on a summary prepared by DeGloria (1998).

Vegetation of the FLNF Region, 1790s

More than 97 percent of the Finger Lakes region's landscape was forested in the 1790s. Mesic deciduous forests of beech, maple, and basswood were predominant. Wetlands were more common in the region's northern lowlands, south of Lake Ontario, and oak forest was common in the southwest. A number of areas described as swampy or low land, as well as two large swamps, were noted in the general area of the FLNF. Oaks, walnut, and hickory were concentrated between Seneca and Cayuga Lakes, where the FLNF sits today. About two-thirds of the trees noted by surveyors on the west/southwest-facing lake slopes of these two Finger Lakes were white or black oak, pine, and hickory. The east/northeast-facing lake slopes were dominated by more mesic species and hemlock. Chestnut and pitch pine, as well as places described as "scrubby oak," were also noted on the eastern side of Seneca Lake in the vicinity of the FLNF.

Table 3.5-1 shows composition and abundance of potential natural vegetation that would have occurred on the FLNF under natural disturbance regimes during the late 18th century. Potential natural vegetation, or the ecological tendencies of the land, is estimated using two sources of information: ecological land types (ELTs) and data from Marks and Gardescu (1992) on the Military Tract surveys of the 1790s. The ELTs, described in Table 3.5-7, predict potential natural vegetation based on soils, landform, and other physical data about the land (DeGloria 1998). The 1790s data predict potential natural vegetation based on vegetation noted by land surveyors of the time and the associated disturbance regimes that affect vegetation.

Table 3.5-1: Potential composition and abundance of natural vegetation on the FLNF.

Natural Vegetation	Potential Abundance[1]
	percent
Mesic hardwoods	63-73%
Oaks	25-34%
Softwoods	1-2%
Aspen	<1%
Swamp/Open	1%

Source: Marks and Gardescu (1992), DeGloria (1998)
Notes:
[1] Abundance, or ecological tendencies, of potential natural vegetation represents an approximate range based data from Marks and Gardescu (1992) and DeGloria (1998).

An analysis of this data suggests that about two-thirds of the FLNF landscape was composed of mesic hardwoods such as basswood, maples, and ash, while one-third of the landscape was composed of oaks and hickory; only about one percent was represented in softwood forest, primarily pine and hemlock, another one percent was represented in swampy vegetation, and less than one percent was represented in aspen (Table 3.5-1). Oaks, hickory, and pine often mixed with mesic hardwoods, and where they were dominant they were sometimes described as brushy or scrubby.

A classification of forest types based on the 1790s survey records indicates that Oak-Hickory and Oak-Pine types occurred frequently in Hector Township at the south end of the Backbone ridge; in the vicinity of Burnt Hill and Satterly Hill; and along Seneca Lake in Hector and Ovid Townships. Across the uplands between the two lakes, these types mixed with Basswood-Maple-Oak-Ash and Beech-Maple-Basswood types. Other research suggests that oaks, chestnut, and pine were primarily a phenomenon of southern New York along the Allegheny and Susquehanna River drainages, extending north and east into the area west of Seneca Lake, and then continuing east into the western Military Tract until gradually disappearing eastward across the other Finger Lakes (Marks and Gardescu 1992).

Disturbances caused by wind, fire, beavers, and people were noted on about one percent of the entire Military Tract landscape. In contrast, open woods, scrubby/brushy conditions, and to a lesser extent records of fire, were frequent in the area between Seneca and Cayuga Lakes, particularly in the western half of that area in the vicinity of the FLNF. These conditions were virtually absent east of Cayuga Lake. Areas described as “scrubby timber,” “thick underbrush,” or “scrubby bushes” were recorded north of Seneca Lake and on the slopes and uplands east of Seneca Lake near an Iroquois road that follows the lakeshore. What is described as “a large area with ‘scrubby beech,’ ‘black and white oak,’ and ‘thick underbrush’ [that] ran along the top of the upland between the two large lakes” is likely the landform known as “The Backbone” that runs through the center of the FLNF (Marks and Gardescu 1992). The authors also note that most of the open woods were in this area as well, and were often within a few kilometers of the Iroquois road.

It is likely that most of the scrubby brushy vegetative conditions between Seneca and Cayuga Lakes were caused by fire, and these fires were likely related to burning by people. Open oak woods often occurred in areas of gentle slopes and silt-loam soils that would not have typically supported dry open scrubby oak woods. The proximity of dry scrubby conditions and the Iroquois road along the east shore of Seneca Lake suggests that fires may have been used to drive deer or to clear brush along the road. Some brushy oak and chestnut areas were in places with thin soils, on ridges and steep southern and western slopes, which could have supported this vegetation without a reliance on fire.

Vegetation of the FLNF, 1790s-1940s

Lands within the Military Tract were distributed to Revolutionary War veterans in the late 1790s. From that time until 1890, native vegetation was either cleared and converted to agricultural production, or harvested for timber. Between 1890 and the Great Depression, farmland within the FLNF was abandoned due to soil depletion and other factors. Legislation during the 1930s authorized the reforestation of abandoned farmland, and over the next 15 years parts of

the FLNF were planted with non-native softwoods such as red pine, scots pine, jack pine, larch, Norway spruce, and white spruce.

There is no information about the landscape's vegetation at the peak of agriculture and lumbering in the area. FLNF land cover in 1938, another time of transition from one major land use pattern to another, has been mapped (DeGloria 1998). In 1938 approximately 2,800 acres of the Forest was in natural forest vegetation, with most (83%) in deciduous forest, and the remainder in coniferous (pines or hemlocks) or mixed forests. The rest of the Forest was dominated by cropland, pasture, and shrubland, with smaller acreages in wetlands or plantations.

Vegetation of the FLNF, 1940s-1980s

During the 1940s and 1950s, land use in the FLNF area was focused primarily on restoration. More than 1,500 acres of the Forest, most in open land, were planted to conifers, and more than 4,300 acres were removed from cropland and converted either to pasture or allowed to develop into forest, shrubland, or wetland habitat (DeGloria 1998). By 1988, just after the 1987 Forest Plan was adopted, land cover mapping showed the significant shift in the Forest's vegetation since 1938. Forested acres, including plantations, had grown from around 2,800 acres (21% of the Forest) to more than 6,500 acres (49% of the Forest). While most of the forested land in 1938 was in deciduous vegetation, by 1988 only 42 percent was of this type, with 34 percent in coniferous or mixed vegetation, and 24 percent in plantations. Open lands consisted predominantly of pastureland, with smaller amounts of wetland and shrubland types.

Existing Forest Plan Management Direction

The 1987 Forest Plan contains goals to protect the environment to promote a diversity of life forms and unique habitats; provide a variety of goods and services, particularly wildlife habitat uncommon on other lands in the region; and manage timber for high-quality sawtimber.

Objectives to achieve these goals include: allowing natural succession to old-growth forest on 350 acres of the FLNF, converting some acres of even-aged to uneven-aged forest age classes, maintaining shrub openings and forest age class diversity, maintaining uncommon tree species like aspen and locust, promoting native softwoods, and providing forage and Forest products such as high quality sawtimber.

Forest-wide standards and guidelines for management of vegetation for wildlife are located in the 1987 Forest Plan. Forest composition objectives are identified for wildlife diversity and mixes of vegetation types are to be attained recognizing the inherent capabilities of the land. The 1987 Forest Plan also identifies the desire to maintain or increase uncommon vegetation types, including hemlock, white pine, aspen, black walnut, locust, black cherry, gray birch, orchards, and hedgerows. Forest structure is to be attained through management of age classes and protection or recruitment of appropriate numbers of snag and den trees.

The desired composition objectives are shown in Table 3.5-2. The desire at the time that the 1987 Forest Plan was adopted was to essentially maintain the existing major forest communities, with a slight increase in forested land and a slight decrease in open lands.

Overall direction for timber management is located in the 1987 Forest Plan within the various management areas. Enhancing vegetative diversity, wildlife habitats, and vistas, along with improving the health and condition of the forest ecosystem, were general goals for timber management.

Table 3.5-2: 1987 Forest Plan composition objectives.

Forest Type	Percent of FLNF
Mixed Hardwoods	44-47%
Aspen	1-2 %
Locust	1%
Softwoods	6-10%
Shrub Openings	11%
Pastures	34%

Source: USDA Forest Service 1987a

Management area standards and guidelines in the 1987 Plan dictate the types of harvest methods used on the Forest. Management Area 2.1 for continuous forest cover emphasizes uneven-aged silvicultural systems, and Management Areas 3.1 for even-aged timber emphasizes even-aged systems to maintain those characteristics. Management areas for open land (1.2 and 1.3) do not directly address management of forest communities, but on occasion small patches of forest are found in these management areas, and they are often maintained as forest. Special management areas (8.1), such as those for trails or old growth conditions, generally do not allow harvesting of timber except to enhance the values associated with those areas.

Management area standards and guidelines in the 1987 Plan provide age-class objectives for even-aged silvicultural systems (3.1) and are displayed in Table 3.5-3. These objectives are applicable only to stands managed using even-aged silvicultural systems. Age class distribution is intended for both regulation of the stands for timber management, and to provide wildlife habitat diversity.

Management Area 3.1 uses even-aged silvicultural systems to achieve a diversity of stand types and age classes; regenerate species which are shade intolerant or intermediately shade intolerant; regenerate high risk and sparse stands; prevent the spread of insects and disease; and produce high-quality sawtimber and other wood products. Approximately 6,200 acres of the FLNF are currently managed for these purposes.

Management Area 2.1 uses uneven-aged silvicultural systems primarily in areas where there is a desire to maintain continuous forest cover, such as in areas with highly sensitive views, and in riparian areas. Uneven-aged silvicultural systems produces a diversity of species and age classes within a stand, regenerates tree species that are tolerant of shade, and produces high quality sawtimber and other wood products. Approximately 670 acres of the FLNF are managed for these purposes.

Table 3.5-3: 1987 Forest Plan age class objectives for Management Area Prescription 3.1.

Forest Type	Age Class	Desired Range
		percent
Mixed hardwoods	Regenerating	10%
	Young	50%
	Mature	40%
	Old	0%
Native softwoods	Regenerating	10-12%
	Young	30-36%
	Mature	52-55%
	Old	0-5%
Aspen	Regenerating	16%
	Young	48%
	Mature	31%
	Old	5%
Locust	Regenerating	25%
	Young	75%
Oaks	Regenerating	10%
	Young	50%
	Mature	35%
	Old	5%

Source: USDA Forest Service 1987a

Proposed Changes in Management Direction Common to All Alternatives

The revised Forest Plan would continue much of the 1987 Plan direction for management of vegetation, but clarifies goals and objectives. The revised Plan would direct the Forest Service to maintain or restore habitats to produce sustainable populations of plants and animals (Goal 2). Direction to protect rare and outstanding biological, ecological, and geological areas is clarified in Goal 6. Goal 5 specifies direction to maintain or restore ecological processes and systems.

Composition objectives would be very similar to those in the 1987 Plan (Table 3.5-4); regenerating forest and open habitats would be provided at levels higher than might be expected under natural disturbance regimes in order to support species associated with those habitats, some of which are at risk of losing viability.

Table 3.5-4: Proposed composition objectives for the revised Forest Plan.

Forest Type	Percent of FLNF
Mixed Hardwoods (Oak and Northern Hardwood)	35-50%
Softwoods	6-10%
Aspen	1-2%
Shrubland	10-12%
Grassland	33-35%

Source: FLNF revised Forest Plan, Chapter 2.2, Goal 2.

As in the 1987 Plan, the revised Forest Plan identifies age class objectives for various forest types. In the revised Plan, however, these objectives only apply to the Oak Hickory and Northern Hardwood MAs, and then, only to lands suitable for timber production that are managed using even-aged silvicultural systems within these MAs (Table 3.5-5). In these areas, each stand of trees will have trees that are all approximately the same age, however different stands will vary in age by the distribution pattern indicated in Table 3.5-5. The revised Plan treats age classes differently than the 1987 Plan by combining oaks with northern hardwoods, and removing objectives for locust, which is primarily managed for fence posts. Locust is discussed further in the Special Forest Products section (3.17). This approach to age class objectives was used to simplify the objectives because the differences among them for these forest communities were minimal. The revised Plan also differs from the 1987 Plan by expressing age classes as ranges instead of targeted percentages. This was done in order to provide managers the flexibility to adapt to conditions found in the field.

Because age class objectives apply to suitable lands managed using even-aged silviculture, they are primarily applicable to the Oak Hickory MA, and would be infrequently applied to the Northern Hardwood MA. Consequently, these age class objectives are not applicable to the bulk of the Forest that is either not suitable for timber production or not managed using even-aged silviculture. The overall Forest-wide age class distribution is not expected to look like the objectives identified for the subset of lands to which these objectives apply. The remaining forested landbase, including lands where vegetation is managed using uneven-aged silviculture and lands where vegetation is managed specifically for particular ecological values, will develop a multi-aged structure. Ages may therefore vary within stands as well as between stands in these areas.

The revised Forest Plan also contains additional objectives, standards, and guidelines for vegetation. In the revised Plan, vegetative composition is managed toward ecological tendencies, which are primarily determined in the field by ecological land types or other site-specific analyses. During implementation of the revised Plan, improved understanding of the relationship between ecological land types and vegetation on the FLNF will be emphasized, which will enhance the Forest Service's abilities to work with the ecological tendencies of the land. Working with these natural tendencies will enhance the recovery of ecosystems on the FLNF and will help conserve and restore the biological diversity of these ecosystems. Oak-dominated natural communities are identified specifically under Goal 5 for maintenance due to their prevalence in the pre-European settlement landscape.

Table 3.5-5: Proposed age class objectives for suitable lands managed using even-aged silvicultural systems in the revised Forest Plan.[1]

Forest Type	Age Class	Desired Range
		percent
Mixed Hardwoods (Hardwoods and Oaks)	Regenerating	5-10%
	Young	30-50%
	Mature	25-35%
	Old	5-10%
Softwoods	Regenerating	10-20%
	Young	15-35%
	Mature	25-55%
	Old	5-40%
Aspen	Regenerating	10-20%
	Young/Mature	70-80%
	Old	5-15%

Source: Revised Plan, Chapter 2.2, Goal 2.
[1] Age class objectives apply ONLY to lands suitable for timber production, and then only to those lands managed using even-aged silvicultural systems, primarily within the Oak Hickory Management Area.

Other objectives in the revised Forest Plan specify that management for old growth characteristics be achieved on at least five percent of each ecological type on the Forest, and uneven-aged conditions will be maintained on a minimum of 20 percent of the lands managed for timber. Rare or outstanding biological or ecological features, which include rare, unique, or exemplary natural communities, are to be conserved.

In the revised Forest Plan most of the management areas are similar to those in the 1987 Plan. Ecological Special Areas and Research Natural Areas are emphasized specifically in the updated set of management areas, with each area identified for one of these designations having a particular set of values to be conserved.

Another change in management areas in the revised Forest Plan is the creation of the Future Old Forest Management Area. This MA is a conceptual expansion of the current Old Growth Stands Management Area. This designation emphasizes representation of a variety of ecological types and natural communities in areas where natural succession to old forest conditions is promoted, and management of vegetation is limited to meeting ecological restoration needs. The Future Old Forest Management Area is designed to encompass larger blocks of land than the original Old Growth Stands Management Area, emphasizing interior forest conditions wherever possible.

Existing Condition

Indicators 1 & 2 – Amount of Each Major Forest Community (Composition and Abundance) and Age Class Distribution.

All Forest Types

Management strategies strongly influence the abundance and age class distribution of major forest communities. These strategies are directed by management area allocation, as well as Forest-wide objectives, standards, and guidelines. Table 3.5-6 displays how each of the forest types are distributed among management areas in the 1987 Forest Plan. This table includes the Newly Acquired Land Management Area, which only allows management for maintenance of existing conditions or for health and safety, until these areas can be allocated to one of the other management areas.

As can be seen from the table, more than half of each major forest community falls within management areas where even-aged silvicultural systems are emphasized (MA 3.1). Consequently, there are many opportunities available to manage these forest types toward the composition and age class objectives identified in the 1987 Plan. While oaks, softwoods, aspen, and locust are most effectively maintained using even-aged systems, mesic hardwoods can also be maintained effectively using uneven-aged systems (MA 2.1), as well as through the natural process of forest succession (MA 8.1 & 9.2). About 22 percent of the mesic hardwood stands are in management areas where uneven-aged silvicultural systems or natural succession are emphasized.

Table 3.5-6: Proportion of each forest type across the FLNF management area (MA) prescriptions under the 1987 Forest Plan.

MA[1]	Mesic Hardwoods	Oaks	Softwoods	Aspen/ Locust
	(%)	(%)	(%)	(%)
1.2	13%	5%	4%	3%
1.3	9%	5%	10%	17%
2.1	4%	7%	2%	1%
3.1	57%	69%	72%	72%
8.1	3%	4%	5%	1%
9.2	15%	10%	7%	5%

Source: Forest GIS data, 2004 stand coverage, management area coverage
Notes:
[1] Management area prescription definitions:
MA 1.2a and 1.2b: Grassland for Grazing and Wildlife
MA 1.3: Shrublands
MA 2.1: Uneven-aged continuous forest cover.
MA 3.1: Even-aged mosaic of forest ages.
MA 8.1: Special Areas
MA 9.2: Newly Acquired Lands

Ten to 22 percent of each forest type is located in the Grassland or Shrubland MAs. Forest management is not emphasized in these areas, within which woodlands may be cut to improve open conditions, or may be

maintained for shade or habitat diversity. Stands within the Grassland and Shrubland MAs tend to be small, although they also represent some shrublands that have succeeded to forest.

Mesic Hardwood Forest

The mesic hardwood forests covered in this section include forest types classified during silvicultural inventories as red maple, black walnut, sugar maple/beech/yellow birch, sugar maple/basswood, cherry/ash/poplar, and mixed northern hardwood forest types. Together these forest types on the FLNF are often referred to as northern hardwoods, although they include some elements of central hardwoods as well. These types are generally equivalent to Mohler's (1991) forest types of mesic slopes excluding types dominated by hemlock. These types are also equivalent to Reschke's (1990) rich mesophytic, beech-maple mesic, and maple-basswood rich mesic forest types. In general, the successional types of black walnut and cherry/ash/poplar will eventually develop into the other later-successional types noted.

Mesic hardwood forests are generally dominated by maples, beech, and various other hardwood trees. Softwood trees can be part of these communities, but do not dominate. Soils tend to be moist, and can become wet in the spring or during wet weather. Generally these forest communities are slightly more nutrient-rich than other types. These forests tend to have a moderate to high level of plant species diversity, although intensive land use can reduce diversity levels, as well as reduce nutrient levels.

Ecological tendencies for this community based on ELTs and 1790s data suggest an expected range in abundance of 63 to 73 percent (Table 3.5-1). Across the FLNF, the ELTs that would be expected to support the mesic hardwood forest community in the absence of disturbance include ELTs 801, 804, 806, 807, 808, and 809 (Table 3.5-7). These ELTs account for about 74 percent of the FLNF and predominantly occur in the northern half of the Forest, although less enriched, acidic versions of these landtypes are also found in the southern half of the Forest.

Abundance

Mesic hardwood forests currently cover approximately 2,700 acres, representing about 17 percent of the overall FLNF landbase (Table 3.5-8). Stands of this forest community are widely distributed across the Forest and across ecological landtypes, and account for 31 percent of the forested landscape on the FLNF. They tend to be more concentrated in the southern half of the FLNF, mainly because much of the northern half is open land. More nutrient-enriched and diverse examples of this forest community would be expected in ecological types that have gentle to flat slopes with deeper, fine soils that are generally not acidic. These types of conditions tend to occur more at the northern end of the Forest and toward Seneca Lake off the Backbone ridge. It is interesting to note that these landtypes are almost entirely located in areas currently in pasture, grassland, and shrubland in the northern portion of the Forest. This is mainly because historically agricultural land use occurred on the more fertile northern lands, while other lands were reforested.

Age Class Distribution

The current age class distribution of mesic hardwoods on the FLNF for lands that are managed for timber using even-aged silvicultural systems is skewed toward the mature age classes (Table 3.5-9). The proportions are very similar to those for mesic hardwoods across the Forest, regardless of management. About a third of the stands of this type are young, indicating some harvesting in the past 60 years. Since most of the forest on the FLNF became established in the early 1900s, very few stands have been established long enough to reach the old age class.

All age classes of mesic hardwoods also develop in stands managed using uneven-aged silvicultural systems. In these stands, there are several age classes represented by individual trees and small groups, usually in patches less than an acre, scattered throughout the stands.

Table 3.5-7: Distribution, characteristics, and major forest communities of the ecological landtypes (ELTs) on the Finger Lakes National Forest

ELT	Acres of the FLNF	Percent of the FLNF	Characteristics	Major Forest Community
801	810	6	Fine acidic soils formed in acid tills, north and east aspects, maple and beech	Mesic hardwoods
802	1,240	9	Fine acidic soils formed in acid tills, south and west aspects, oak, hickory, beech, and white pine	Oak
803	190	1	Fine acidic soils formed in acid tills, little to no slope, oak, hickory, beech, and white pine	Oak
804	1,006	8	Coarse acidic soils formed in acid tills, north and east aspects, maple and beech	Mesic hardwoods
805	1,890	14	Coarse acidic soils formed in acid tills, south and west aspects, oak, hickory, beech, and white pine	Oak
806	84	1	Coarse acidic soils formed in acid tills, little to no slope, maple and beech	Mesic hardwoods
807	4,589	34	Fine non-acidic soils formed in non-acid tills, north and east aspects, rich mesophytic forest of oak, sugar maple, hickory, white ash	Mesic hardwoods
808	2,223	17	Fine non-acidic soils formed in non-acid tills, south and west aspects, sugar maple, basswood, and white ash	Mesic hardwoods
809	1,079	8	Fine non-acidic soils formed in non-acid tills, little to no slope, sugar maple, basswood, and white ash	Mesic hardwoods
810	83	1	Fine acidic soils formed in glacial outwash, lacustrine, or alluvial deposits, north and east aspects, hemlock, sugar maple, basswood	Softwood
811	42	<1	Fine acidic soils formed in glacial outwash, lacustrine, or alluvial deposits, south and west aspects, hemlock, sugar maple, basswood	Softwood
812	23	<1	Coarse, non-acidic soils formed in glacial outwash, lacustrine, or alluvial deposits, north and east aspects, hemlock, beech, black birch	Softwood
813	56	<1	Coarse non-acidic soils formed in glacial outwash, lacustrine, or alluvial deposits, south and west aspects, hemlock, beech, black birch	Softwood
814	35	<1	Fine non-acidic soils formed in glacial outwash, lacustrine, or alluvial deposits, little to no slope, hemlock, beech, black birch	Softwood

Source: DeGloria (1998)

Table 3.5-8: Current composition of the FLNF by major forest community.

Forest Community	Amount	1987 Plan Objectives	Current Status
	acres	percent	percent
Mesic hardwood forest	2,745	44-47%[1]	17%
Oak-hickory & oak-pine forest	2,697	44-47%[1]	17%
Softwood forest	3,029	6-10%	19%
Aspen	239	2%[2]	1%
Open land	7,367	43-47%	45%

Source: Forest GIS data, 2004 stand coverage
Notes:
[1] 1987 Plan objectives were for a combination of hardwoods and oaks.
[2] 1987 Plan objectives included aspen and locust.

Table 3.5-9: Existing age class structure for mesic hardwood forests on the FLNF based on 1987 Plan objectives for even-aged lands, current condition for even-aged lands, and current condition for all lands.

Age Class[1]	1987 Objectives[2]	Even-aged MA[3]	All MAs [4]
	percent	percent	percent
Regenerating	10%	0%	0%
Young	50%	31%	33%
Mature	40%	63%	60%
Old	0%	6%	7%

Source: Forest GIS Data, 2004 stand coverage
Notes:
[1] Age classes are based on the revised Plan
[2] The objectives are applied only to stands managed for timber using even-aged silvicultural systems
[3] Existing age class distribution of mesic hardwood stands suited for even-aged timber management.
[4] Existing age class distribution of all stands of mesic hardwoods on the Forest, regardless of management.

Oak-Hickory and Oak-Pine Forest

The oak-dominated forests covered in this section include forest types classified during silvicultural inventories as black oak/scarlet oak/hickory, white oak, red oak, yellow poplar/white oak/red oak, and mixed oak types. These types are generally equivalent to Mohler's (1991) dry upland forest types, which tend to be dominated by oaks. These types are also generally equivalent to Reschke's (1990) Appalachian oak-hickory forest type, with some affiliation to her Appalachian oak-pine forest type.

Oak-hickory and oak-pine forests are generally dominated by a combination of oaks, including red, white, black, and chestnut oaks. Softwood trees can be part of these communities, especially white pine and occasionally red and pitch pines, but do not dominate. Soils tend to be dry to dry-mesic, acidic, coarse, and often rocky, although there are examples of this type on the Forest in areas that have a perched water table and so can be wet in the spring. This community in general is not likely to persist on mesic sites in the FLNF without some form of disturbance. In the past, human use of fire has been the dominant disturbance agent perpetuating this community (Marks and Gardescu 1992). On the drier sites on the Forest along the Hector Backbone and south and west facing slopes, this community may be able to persist indefinitely without fire (DeGloria 1998).

Ecological tendencies for this community based on ELTs and 1790s data suggest an expected range in abundance of 25 to 34 percent (Table 3.5-1). Across the FLNF, the ELTs that would be expected to support this forest community in the absence of disturbance include 802, 803, and 805, which account for about 24 percent of the Forest (Table 3.5-7). These ELTs predominantly occur in the southern half of the Forest (DeGloria 1998).

<u>Abundance</u>
Oak-dominated forests currently cover approximately 2,700 acres (17%) of the FLNF (Table 3.5-8). Stands of this forest community are widely distributed across the Forest, primarily along the Backbone ridge and west toward Seneca Lake, and account for more than 30 percent of the forested landscape on the FLNF. Like mesic hardwood stands, however, oak-hickory and oak-pine forests tend to be concentrated more toward the southern half of the Forest where the land is more forested. This forest community is widely distributed across most ecological land types, with no strong

relationships to soil and topographic characteristics that one might expect to find. This is likely due to intensive land use history, including pre-European conditions, which have altered the composition of present-day forests.

Age Class Distribution

The current age class distribution of oak-hickory and oak-pine forests for FLNF lands that are managed for timber using even-aged silvicultural systems is heavily skewed toward the mature age classes (Table 3.5-10). Proportions are very similar to those for oak-dominated forests across the Forest, regardless of management. A few oak-dominated stands are found in parts of the Forest managed using uneven-aged silvicultural systems (Table 3.5-6). Because these methods are applied in areas where continuous forest cover is desired, they are not likely to create adequate light for regenerating oak. Consequently, additional areas of the regenerating age class are not likely to be found on the Forest outside of stands managed using even-aged systems.

Table 3.5-10: Existing age class structure for oak-dominated forests on the FLNF based on 1987 Plan objectives for even-aged lands, current condition for even-aged lands, and current condition for all lands.

Age Class[1]	1987 Objectives[2]	Even-aged MAs[3]	All MAs[4]
	percent	percent	percent
Regenerating	10%	2%	2%
Young	50%	10%	9%
Mature	35%	82%	84%
Old	5%	6%	5%

Source: Forest GIS Data, 2004 stand coverage
Notes:
[1] Age classes are based on the revised Plan.
[2] The objectives are applied only to stands managed for timber using even-aged silvicultural systems
[3] Existing age class distribution of oak-dominated stands suited for even-aged timber management.
[4] Existing age class distribution of all oak-dominated FLNF stands, regardless of management.

Softwood Forest

The softwood-dominated forests covered in this section include forest types classified during silvicultural inventories as jack pine, red pine, white pine, white pine/hemlock, hemlock, scots pine, tamarack, white spruce/Norway spruce, pitch pine, and white pine/red oak/white ash types. Of these, only the white pine, white pine/hemlock, and white pine/red oak/white ash types are native or natural types to the Finger Lakes area; the rest are plantations of these species planted to reclaim abandoned agricultural land. The native types are generally equivalent to Mohler's (1991) white pine-red maple-white ash-poplar type on abandoned agricultural land; and his ravine associated types of pine-hemlock, hemlock-sugar maple-tulip tree, and hemlock-beech-birch. The native types are also equivalent to Reschke's (1990) hemlock-northern hardwood type, and possibly related to her Appalachian oak-pine forest type. Of the FLNF softwood stands, approximately 1,900 acres (64%) are native forest types.

Native softwood forests in this region are generally dominated by hemlock and associated with ravines and gorges. Occasionally white pine will mix with hemlock in areas near a seed source and where there has been disturbance, and white pine will often mix with hardwoods in old fields. White pine is not a late successional species, and so it will eventually decline to small numbers relative to hemlock or hardwoods. Of the stands of native softwoods on the Forest, 82 percent are dominated by white pine mixes with hardwood, suggesting that most of the Forest's native softwoods are successional in old fields. Native softwood forests generally occur in areas of coarse gravelly or sandy soils often produced through alluvial or glacial fluvial processes. In the steeper gorges and ravines, hemlock forests help provide long-lived and extensive root systems that stabilize these erosive soils. Softwood forests can also develop in enriched conditions at the bottoms of ravines and gorges, but usually mix there with other hardwoods. Soil conditions can vary from moist to dry, and from acidic to more neutral, although drier

conditions would foster more pine and less hemlock, and more neutral conditions will foster an association of hemlock with other hardwoods.

Most of the plantation softwood forests were established from the late 1930s into the 1960s. Although site conditions were a factor in determining what species were planted where, many of the plantations are of species not native to the region, and they do not appear to be regenerating. There also do not appear to be plantation forests within ravines. Consequently, it is likely that most of these plantation forests will succeed into mesic hardwood or oak forests, based in part on ecological tendencies modified by land use history, and any development of more acidic conditions from the coniferous leaf litter and slow decomposition typical under softwood stands.

Ecological tendencies for this community based on ELTs and 1790s data suggest an expected range in abundance of one to two percent (Table 3.5-1). Across the FLNF, the ELTs that would be expected to support this forest community in the absence of disturbance include 810-814, which account for two percent of the Forest (Table 3.5-7). In the southern half of the Forest these ELTs are associated with the edges of the Backbone at the perimeter of the Forest, while in the northern half they are more widely distributed across the Forest, although generally off the Backbone ridge (DeGloria 1998).

Abundance

Softwood forests currently cover approximately 3,000 acres (19%) of the FLNF (Table 3.5-8). Stands of this forest community have an irregular distribution across the Forest, with plantations concentrated in the south along Burnt Hill, and larger areas of native softwoods concentrated toward the middle of the Forest near Sawmill Creek. Outside of these concentrations, stands are generally small and scattered. While this forest community makes up more than 34 percent of the forested landscape of the Forest, a little more than one-third are plantation forests, and most of the rest are natural communities that will succeed to hardwoods or oak over time. Only about three percent of the currently forested landscape of the FLNF is composed of softwoods that are expected to remain that type for the long-term. This is consistent with the ecological land type mapping of the Forest, suggesting that there are limited opportunities for additional areas in native late-successional softwoods like hemlock.

Age Class Distribution

As noted with the previous major forest communities, the current age class distribution of native softwood communities, for lands that are managed for timber using even-aged silvicultural systems, are also heavily skewed toward the mature age class (Table 3.5-11). The proportions are very similar to those for native softwood-dominated forests across the Forest, regardless of management. Plantation forests are similarly skewed toward the mature age class, suggesting that little harvesting using even-aged silvicultural systems of regeneration has occurred in these forest types. Uneven-aged systems are generally not applied to softwood stands, where many softwood species require light and soil disturbance to germinate.

Aspen

Forest communities dominated by various species of aspen on the Forest are early successional communities. These types are transitional in nature, succeeding to either mesic hardwood or oak forest communities unless they are managed on short rotations. These types are equivalent to successional forest types described by Mohler (1991) and Reschke (1990). These forest communities are dominated by shade-intolerant species that need light to reproduce, and are well adapted to a variety of disturbances. Typically, as these stands age, the species dominant in the canopy will not be found as seedlings in the understory, where more shade tolerant species have germinated and developed. On the Forest, these communities have developed almost entirely on abandoned agricultural lands, and the shrubs and herbs common in the agricultural landscape can still be found in these stands.

Table 3.5-11: Existing age class structure for native softwood forests on the FLNF based on 1987 Plan objectives for even-aged lands, current condition for even-aged lands, and current condition for all lands.

Age Class[1]	1987 Objectives[2]	Even-aged MA[3]	All MAs[4]
	percent	percent	percent
Regen.	10-12%	0%	0%
Young	30-36%	9%	8%
Mature	52-55%	90%	91%
Old	0-5%	1%	1%

Source: Forest GIS Data, 2004 stand coverage
Notes:
[1] Age classes are based on the revised Plan.
[2] The objectives are applied only to stands managed for timber using even-aged silvicultural systems.
[3] Existing age class distribution of native softwood stands suited for even-aged timber management.
[4] Existing age class distribution of all stands dominated by native softwoods on the Forest, regardless of management.

While these communities are not major forest communities in terms of area, they are important to the Forest Service in terms of the wildlife habitat that they provide. Aspen communities are managed to meet composition and age class objectives in order to provide wildlife habitat, and so will be discussed in general terms regarding the abundance and age class distribution indicators.

Abundance
Aspen forests currently cover approximately 239 acres (1%) of the FLNF, and make up about three percent of the current forested landscape. There are only a few stands of aspen on the Forest, and they are widely scattered. The relationship between these stands and ecological landtypes is not well known.

Age Class Distribution
Aspen communities, in management areas that are managed for timber using even-aged silvicultural systems, are skewed toward the older age classes (Table 3.5-12). Age class distributions for forest communities dominated by aspen are similar across the Forest regardless of management area and are indicative of little to no harvesting in this community type over the last ten years. On occasion during timber harvests, small groups of aspen are harvested to create a new stand. Sometimes these stands are not re-typed as aspen stands in the database because they are less than an acre in size. In this case, the data may slightly underestimate the number of acres of regenerating aspen stands.

Table 3.5-12: Existing age class structure for aspen forests on the FLNF based on 1987 Plan objectives for even-aged lands, current condition for even-aged lands, and current condition for all lands.

Age Class[1]	1987 Objectives[2]	Even-aged MA[3]	All MAs[4]
	percent	percent	percent
Regenerating	16-25%	0%	0%
Young/Mature	48-75%	61%	66%
Old	0-31%	39%	34%

Source: Forest GIS Data, 2004 stand coverage
Notes:
[1] Age classes are based on the revised Plan.
[2] The objectives are applied only to stands managed for timber using even-aged silvicultural systems.
[3] Existing age class distribution of aspen stands suited for even-aged timber management.
[4] Existing age class distribution of all stands dominated by aspen on the Forest, regardless of management.

Rare and Exemplary Natural Communities

Several rare or exemplary natural communities have been identified on the FLNF, and evaluated by federal, State, and local botanists and ecologists over the past several decades. Those identified prior to 1987 were designated as Special Areas in the 1987 Plan. Rare natural communities, and natural communities of statewide significance, are catalogued and tracked by the New York Natural Heritage Program (NYNHP), and are recognized by the Forest Service as rare or exemplary when they occur on the FLNF. The Forest Service also recognizes high quality examples of major forest communities that may have more local significance or significance for Region 9 of the Forest Service as exemplary natural communities. The revised Forest Plan has identified all known rare or exemplary natural communities for conservation through management area designations that prohibit extractive uses, such as Research Natural Areas, Ecological

Special Areas, or Future Old Forest. A more detailed analysis of the existing conditions related to these designations, and the areas on the Forest that currently have or would receive these designations, can be found in the Areas of Special Significance section (3.10) of this chapter.

Exemplary natural communities on the FLNF include examples of Appalachian oak-hickory forest, hemlock-northern hardwood forest, and mesic hardwood forests, all of which are presently mature forest (between 67 to100 years of age). The forest stands considered exemplary have been evaluated by botanists and ecologists and have been determined to be the best, most intact and least disturbed examples of these forest communities on the FLNF. Of the two Appalachian oak-hickory forests considered exemplary, one is quite dry with thin rocky soils on a steep southeast-facing slope. It includes chestnut oak, white pine, and ericaceous shrubs such as blueberry. The other example is a more mesic example, dominated by large red oaks, with the site grading between well-drained and somewhat poorly drained soils, as it sits upon a perched water table.

There are six examples of hemlock-northern hardwood ravines that are considered exemplary, primarily because they represent areas where harvesting and agriculture were difficult, and so land use was less intensive. These areas are also considered sensitive due to steep slopes and erosive soils. These ravines vary in size and age, but represent the best examples of ravines present on the Forest. There is an additional ravine that is considered exemplary and is dominated by maple-basswood rich mesic forest, which is uncommon on the Forest given the prevalence of pasture and grassland in enriched land types. Most other examples of mature mesic hardwoods are either very small, or have had some sort of harvesting in them over the last 20 to 30 years.

There is one known occurrence on the FLNF of a rare forested wetland known as a perched swamp white oak swamp, which is only known from the FLNF and one other site in New York. This type of swamp is dominated by swamp white oaks, white ash, and maples, with a shrubby understory that includes highbush blueberry. The water table is perched, which leads to ponding of water during the spring and during rain events. These swamps can, however, dry out substantially during dry periods of the summer. The swamp white oak swamp occurrence on the Forest is ecologically and geographically connected to the mesic Appalachian oak-hickory exemplary site.

For more details on the effects of the revised Forest Plan on these rare and exemplary natural communities, please refer to the Areas of Special Significance section (3.10) of this chapter. To the extent that the exemplary natural communities represent the major forest communities discussed here, this section's effects analysis will be applicable to these exemplary sites.

Indicator 3 – Forest Structure (All Forest Types)

This indicator evaluates active management treatments that may affect within-stand complexity. For this analysis, within-stand complexity refers to the vertical structure and associated species diversity at the stand scale, as well as within-stand components such as snags, cavity trees, and coarse woody debris. Vertical structure is the bottom to top configuration of above ground vegetation within a forested stand and varies with forest types and stand ages.

Stand complexity changes markedly during forest succession, from a relatively simple structure in early successional stands to a more complex structure as stands age. This increase in complexity generally occurs as the overstory matures, some trees die and leave canopy gaps, new patches of young trees (called "cohorts") grow into the gaps, and individual canopy trees grow to different heights. The staggered timing and variety in gap size and shape produces variation in the vertical structure of the stand, which also leads to variation in overall plant and animal species diversity (DeGraaf et al. 1992). As stands age and self-thin, there are also increased amounts of standing snags and woody debris on the forest floor. This

maturation process takes tens to hundreds of years depending on forest type. The natural succession of forested stands to a mature and eventually old growth condition generally provides the greatest vertical diversity and overall stand complexity of any of the earlier successional (seral) stages.

Forest structure is also influenced by manipulations of vegetation by humans, including timber harvesting, stand improvement and reforestation, fire use, and conservation of structural components like snags and cavity trees during harvesting operations. Harvest methods and other manipulations of vegetation also vary in the extent to which they affect forest structure.

In general, methods of harvesting that produce one large patch of trees of the same age (or single-cohort methods), such as clearcutting or the traditional shelterwood method, initially simplify vertical stand structure, and depending on the rotation length, may not provide an opportunity to develop more complexity prior to the next harvest. Partial harvesting methods, such as shelterwood with reserves or thinning, as well as many other activities that do not involve timber harvesting, can be used to specifically increase structural complexity by managing for mixtures of tree species that grow at different rates and to different sizes. As trees are retained in subsequent thinnings and harvests, stand complexity can approach what one might find in a multi-aged stand. Multi-age stands created through selection harvests, which create several small cohorts of new trees at different times in the same stand, may provide the highest amount of vertical structure of the methods discussed in this analysis.

A recent paper by Seymour et al. (2002) compared harvesting methods to the range of natural variation expected in forests of the Northeast. In this context, the paper intended to determine the extent to which different harvesting methods created the age class distribution and forest structure one might have expected for these forests under natural disturbance regimes. The researchers found that multi-cohort methods, such as selection harvesting, two-cohort methods such as variable retention (retention of at least 44 ft^2 of basal area per acre), and long rotation management (rotations of around 190 years or more) all compare favorably with the expected range of natural variation for northeastern forests.

The application of prescribed fire in fire dependent ecosystems can aid in the restoration of the compositional and structural components of the associated native plant and animal communities. Prior to European settlement, recurring fire shaped some of the native plant communities on portions of the FLNF landscape. The nature of these fires is unknown, but they were most likely predominantly low intensity ground fires, which would generally maintain the composition and structure of the plant communities that evolved with their associated landforms. In some cases it seems clear that fires in the Finger Lakes region facilitated the conversion of mesic types to oak and pine-dominated types.

The following figures are based on the FLNF 15-year Retrospective (USDA Forest Service 2002b). Between 1987 through 2001, the Forest Service harvested timber on approximately 525 acres of the FLNF, averaging approximately 35 acres of harvest per year.

Of these 525 acres, harvesting using single-cohort methods like clearcutting and shelterwood harvests accounted for approximately 265 acres, or 51 percent, of the total harvested acres. Approximately 60 acres (less than one percent of the FLNF's forested communities) were harvested using the clearcut method. Clearcuts primarily occurred on upland landforms to maintain aspen stands and convert non-native softwood plantations to native hardwoods. Delayed shelterwood method, a two-cohort harvesting method, has been used in a very limited way on the FLNF. A very small percentage of the almost 210 acres of FLNF managed using the shelterwood method was harvested using delayed shelterwood methods.

Approximately 37 percent (195 acres) of the 525 acres harvested on the FLNF between

1987 and 1991 was thinned. Thinning is a method used primarily to increase forest health by removing poor quality trees, release oak mast trees, and accelerate growth of individual trees within the stand. Uneven-aged silviculture, which leads to all-age or multi-cohort stands, was used on 12 percent (66 acres) of the total acres harvested on the Forest. This method was used primarily in highly sensitive visual areas such as roadsides and trail and recreation sites, and in riparian areas to maintain shade along streams.

Prescribed fire and hand tool methods have been used on the FLNF for site preparation. Site preparation and stand improvement techniques have been as prevalent as timber harvesting on the Forest, accounting for 561 acres (6%) of the forested landscape. Within forested areas prescribed fire has been used primarily in regenerating young oak stands to reduce competition from other hardwood species, especially beech and maple.

Over the past 15 years, management activities that manipulate forest structure have been limited on the Forest. Natural succession has played a much larger role than timber harvesting in the development of structural complexity over the last 15 years on the Forest. Consequently, vertical and structural complexity continues to recover on the FLNF. Most stands are young to mature, with the vast majority less than 100 years old. It will take many more decades of management and natural forest succession to begin to see the kind of structural diversity once present in this area.

3.5.1.2 Environmental Consequences

Direct and Indirect Effects by Alternative

Indicator 1 – Amount of Each Major Forest Community (Composition and Abundance)

Ecological tendencies based on analysis of pre-European settlement tree data (Marks and Gardescu 1992), along with ecological characteristics of the land based on ELT data, estimate the direction and magnitude by which forest community composition and abundance is expected to change over time on National Forest System lands (Table 3.5-1). These tendencies also indicate the expected relative proportion of each type, where some communities like mesic hardwood forests are expected to occur in larger proportion compared to other communities like oak forests. The open land will not attain a composition that will be equivalent to these tendencies. The Forest Service has identified composition objectives (Table 3.5-4) that move the Forest closer to these ecological tendencies than it is now, given the constraints of existing and historical land uses. In addition, the Forest Service has the opportunity under each alternative to work toward relative proportions of the major forest types that are closer to those expected under ecological tendencies.

Within most MAs, except the Existing and Candidate Research Natural Areas and Future Old Forest MAs, vegetation management could alter forest community composition, particularly for the oak, aspen, and opening communities. Land allocation to these MAs varies by alternative, and so alternatives would have varying effects on the composition and abundance of some of these forest communities over the short-term or long-term.

Modeling provides predictions of actual changes in abundance over time for the major forest communities in the Finger Lakes region. The SPECTRUM model used for harvest level analysis did not analyze conversions from one type to another, particularly conversions between oak and mesic hardwood forests (Appendix B). The previous discussion on ecological tendencies suggests that both natural conversions through forest succession, as well as conversions to halt succession and maintain important habitats, are key in understanding trends in abundance. Because the management areas developed for the revised Forest Plan place a strong emphasis on certain forest communities or management activities to support those communities, abundance can be estimated based on the

allocation of existing forest communities to particular management areas within each alternative.

Consequently, the focus of the analysis for this indicator will be on the estimated amounts and trends in abundance for the major communities, based on the emphases and vegetation management activities that are allowed to occur within the various management areas. First, management areas are grouped and described in terms of their potential effects on composition and abundance. Then, the alternatives are compared in terms of the allocation of existing stands to the different management area groups. Finally, based on these allocations, composition is predicted for each community under each alternative, and compared to the existing condition, ecological tendencies, and revised Forest Plan objectives. This comparison helps to explain how well each alternative would move the Forest toward desired composition objectives, as well as the extent to which the alternatives would help to reestablish the relative proportions of each forest community that would be expected based on ecological tendencies.

Effects of Management Area Emphasis and Desired Future Condition Common to All Alternatives

This section discusses the short and long-term effects of management area emphasis and desired future condition on the major forest communities that fall within those areas. For this discussion, short-term effects are considered for this discussion to be over the life of the revised Plan; long-term effects are considered to take place at the point where the desired future condition has been attained, generally between 100 and 200 years. Across all alternatives, vegetation in each management area will be managed in a particular way, based on the emphasis and desired future condition of the area. Consequently, when a major forest community falls within a particular management area, the effects on its abundance, age class distribution, and forest structure will be the same across all alternatives. Management area allocations, and the distribution of major forest communities within those allocations, vary by alternative. The effects of the different management area allocations presented in the alternatives on major forest communities are discussed under each alternative.

<u>Shrublands and Grasslands</u>
Within the Grassland for Grazing, Grassland for Wildlife, and Shrubland MAs, wooded stands will generally be removed to maintain desired open conditions. Hedgerows, small patches of trees, and small woodlots may be maintained for species diversity and shade for livestock and wildlife. Such wooded areas are generally quite small and may be open to grazers, so they are unlikely to have a natural composition or structure. Consequently, these areas are considered to offer a low likelihood of maintaining recognizable stands of the major forest communities over both the short and long-term. Shrublands, which are generally in a stalled process of succeeding to forest, offer a substantial amount of regenerating age class for the northern hardwood, oak, and aspen forest communities. Further discussion of the benefits these areas and their age class structure provide for wildlife can be found in the Wildlife and Wildlife Habitat section (3.6) of this Chapter. Ecologically, maintaining shrublands over the long-term tends to favor development of shade-intolerant forest communities on those sites if they are abandoned, since the areas are kept moderately open for 20 years at a time. On shrublands with enriched, mesic conditions that have not been badly degraded through agricultural use, the shade-tolerant species (mesic hardwoods) are effective colonizers and competitors and so may develop after abandonment.

<u>North Country National Scenic Trail, Recreation and Education, and Ecological Special Areas</u>
In the North Country National Scenic Trail Special Area, Recreation and Education Special Areas, and Ecological Special Area MAs shifts in composition are likely to be minor to nonexistent over the short-term, and age class distribution is likely to stay similar to what currently exists, with a slight increase in the mature to old age proportion over the short-term. As these areas continue to age,

there will likely be a long-term overall shift toward the old age class, with small, scattered patches of younger age trees. In these MAs, trees are not managed for timber production, but may be cut to meet an ecological, recreational, or educational need, or to maintain the landscape's open character. The revised Forest Plan directs the Forest Service to maintain existing hedgerows, particular species of trees, and the various forest types that make these areas valuable.

Over the long-term, native forests in these areas have a high likelihood of becoming dominated by mesic hardwoods or hemlock forest, depending on ecological tendencies, as these forests develop over long periods of time with little disturbance. Oak and pine forests have a moderate likelihood of being maintained in these areas over the long-term if either the land is more suited to these types, or if these types are part of the desired values for the particular area. Conifer plantations that may occur within these MAs are not likely to be maintained over the long-term. They may be cut to support the native vegetation of the area. Even if not cut, however, conifer plantations are aging and will be falling apart over the next 50 to 100 years, to be naturally replaced by native vegetation compatible with ecological tendencies. This natural conversion process will then decrease the representation of softwoods.

Future Old Forest and Existing and Candidate Research Natural Areas Management Areas

Within the Future Old Forest and Existing and Candidate Research Natural Areas MAs, composition and age class distribution is not likely to shift much in the short-term. These MAs prohibit vegetation manipulation and fire management except for very specific activities that support the values of these areas. Consequently, native forest types in these areas will continue to develop under natural disturbances and are likely to remain similar over the next 15 years. Plantations can be removed under these MAs, but removals are likely to be limited over the life of the revised Plan. Over the long-term, these areas are likely to favor late successional forest types like mesic hardwoods and softwood forests of hemlock, as well as minor amounts of aspen in areas of natural disturbance that happen to coincide with an aspen clone that can still reproduce. Oak forest will have a low likelihood of being maintained in these areas over the long-term, and may continue only in areas where site conditions favor it, such as on dry southern or western exposures with thin, rocky soils.

The predicted long-term compositional shift in these management areas is partly a result of their management approach, which focuses on maintenance and creation of old forest conditions with little modification. Some ecological restoration may occur within Future Old Forest to enhance structural diversity or remove non-native plantation forests. Little to no tree cutting would occur in Existing and Candidate Research Natural Areas. This type of management tends to favor mesic hardwoods and long-lived conifers like hemlock, mainly because the tree species of these types can regenerate in shade. Oak, white pine and aspen forests need to regenerate in the sun, and so may be excluded eventually from these areas. Prescribed fire is allowed in these management areas, and can be used to reduce understory competition and perpetuate oak forests. Prescribed fire is likely to occur only on a limited or experimental basis in these management areas, since minimal human intervention in natural processes is desired.

Over the long-term, forests of mesic hardwoods, oaks, and native softwoods in these management areas will continue to mature, with age classes shifting toward the old end of the spectrum. As the trees age and start to succumb to damage from disturbances and diseases, a multi-age class structure will start to develop, with new cohorts of trees becoming established in gaps created by disturbance and tree death. This is likely to take at least another 100 years or more, as most stands are not in the old age class yet.

Northern Hardwood and Oak Hickory Management Areas

The Northern Hardwood and Oak Hickory Management Areas (MAs) are where most of the manipulation of forest types is likely to occur, and so where most of the change in

composition and age class distribution is likely to be seen over both short and long-terms. These MAs provide the most opportunities for timber management. The emphasis in the Northern Hardwood MA is to perpetuate shade-tolerant tree species like those in mesic hardwood and hemlock forests, while the emphasis in the Oak Hickory MA is to perpetuate shade intolerant tree species, like those in oak or pine dominated forests. Both MAs allow for management of aspen. Consequently, major forest communities that are emphasized in these MAs have a high likelihood of being perpetuated.

The revised Forest Plan also includes an objective that management will move composition toward ecological tendencies. This means, for instance, that sites within the Northern Hardwood MA that ecologically support oak-dominated forests would be managed for tree species associated with oak-dominated forests. Sites in the Northern Hardwood MA that have an ecological tendency toward growing mesic hardwoods, and are currently growing oak, would be managed for trees associated with mesic hardwood forests. Conversely, sites within the Oak Hickory MA that ecologically support mesic hardwoods would be managed for trees associated with mesic hardwood forests. Sites in the Oak Hickory MA that have an ecological tendency toward growing oak, and are currently growing mesic hardwoods, would be managed for trees associated with oak-dominated forests.

Consequently, major forest communities that are not emphasized within either the Northern Hardwood or Oak Hickory MAs have a more moderate likelihood of being perpetuated there. While there may be decreases in the proportions of one or the other of these major forest communities within these MAs, depending upon ecological tendencies, there would be associated increases as well. The relative proportion of gains and losses vary by alternative because alternatives differ in the number of acres allocated to each MA. Across the action alternatives, allocations of these MAs were made considering the ecological tendencies of the land for the dominant forest communities, as well as inventory of where these forest communities currently exist and how they are interspersed with each other. It is expected that the majority of stands within these MAs have ecological tendencies that are consistent with the emphases of the MAs.

While the Northern Hardwood and Oak Hickory MAs will both have a diversity of trees of different ages, the age class distribution and structure will vary between them. These differences are unlikely to be apparent in the short-term, but may develop eventually over the long-term. In the Northern Hardwood MA individual trees, and small patches of trees within stands, will be harvested periodically. Individual forest stands and the entire Northern Hardwood MA will develop a multi-aged structure over time. While this MA will have a continuous forest canopy, there will tend to be a diversity of size and age classes. Some trees may grow to be large and old.

In the Oak Hickory MA, age class distribution will in places look similar to the Northern Hardwood MA because uneven-aged systems may also be used. In other parts of the Oak Hickory MA whole stands or portions of stands will be harvested periodically using even-aged systems. Regeneration harvesting will occur at rotation ages defined in the revised Forest Plan for the various forest types, generally 100 years for hardwoods. Some stands may be managed at extended rotation ages, generally between 150 to 250 years for hardwoods. Consequently, forested stands will generally be all the same age or composed of trees of two different ages. Over the entire management area, age-class distribution will tend to be proportionally larger in the young and mature age classes than in the regenerating or old age classes.

Mesic Hardwoods

Effects Common to All Alternatives

Forest composition, and therefore abundance of mesic hardwoods, is not likely to change very much over the short-term, and so will remain at the low end of the desired composition objective range. Shifts in composition from one forest type to another, whether by management through harvesting or through natural forest succession, can take at least 50 to 100 years. Vegetation

management activities have historically been limited in the past, and there is little evidence to suggest this is likely to change over the next 15 years (see also Timber Management section 3.11 of this Chapter).

Over the long-term, however, all alternatives appear likely to shift the composition of mesic hardwoods and oak combined to within the desired composition objective range. Table 3.5-14 shows the potential future composition of the FLNF over the long-term under each alternative, compared to the current condition, ecological tendencies of the land, and the desired objectives in the revised Forest Plan. The ecological tendencies of the land displayed in the table are carried forward from Table 3.5-1, and are estimated as discussed earlier, based on ELTs and Military Tract survey data from the 1790s.

Based on Table 3.5-14, the relative proportion of mesic hardwoods to oak varies by alternative due to the variation in how the alternatives allocate management areas. Under any of the alternatives the proportions do not come very close to approximating ecological tendencies indicated by either 1790s conditions or ecological land types. Ecological tendencies do not, however, account for open land maintained for pasture, grassland, or shrubland. Because about half of the Forest is in open land and expected to stay that way, all of the data was also analyzed by removing the open land, both to determine if ecological tendencies toward forest communities changed as a result, and to provide a means of comparing all measures of composition on the same basis. Table 3.5-15 shows the results of the analysis on just the forested lands of the FLNF.

Table 3.5-15 indicates that on just the forested portion of the FLNF, objectives for mesic hardwoods and oaks combined can be met by any of the alternatives. Based on this analysis, all alternatives come a little closer to the proportion of mesic hardwoods expected based on ecological tendencies of the forested land on the FLNF. The variation in the abundance of mesic hardwoods across the alternatives, and its relation to ecological tendencies, is discussed below for each alternative.

Alternative 1

Over the long-term, Alternative 1 provides the least amount of mesic hardwood forest of all the alternatives, whether looking at the Forest as a whole or just at the forested landbase. This is in large part due to the allocation of almost a quarter of the stands currently typed as mesic hardwood forest types to the Grassland for Wildlife, Grassland for Grazing, and Shrubland Management Areas (Table 3.5-13). These stands generally represent either small, forested inclusions within large open areas, or are areas that have not been maintained as grasslands or shrublands and so have succeeded to mesic hardwoods. This alternative's high proportion of mesic hardwood stands within the Oak Hickory MA suggests that there may be some mesic hardwood stands that are on sites with a tendency to oaks, and so will be managed for oaks instead of mesic hardwoods.

As indicated in Tables 3.5-14 and 3.5-15, based on ecological tendencies, mesic hardwoods range from representing a slightly greater proportion of the landscape than oak to three times as much of the landscape. Alternative 1 over the long-term will generally maintain mesic hardwoods at levels similar to what currently exists on the Forest. This level is well below ecological tendencies, whether looking at the overall Forest or just the forested land.

This alternative is also likely to lead to mesic hardwoods having a lower abundance than oaks across the FLNF landscape, which would generally be outside the ecological tendencies for this forest community. By managing this community outside ecological tendencies, this alternative is less likely to sustain the diversity and productivity of mesic hardwood forests (see also range of variation discussion under the Ecosystem Management subsection (3.1.4) of the Introduction to this Chapter).

Alternative 2

Alternative 2 provides the largest amount of mesic hardwood forest of all the alternatives over the long-term, whether looking at the Forest as a whole or just the forested

landbase. This is partly due to the shifting of many of the mesic hardwood stands in the Grassland for Wildlife, Grassland for Grazing, and Shrubland MAs under Alternative 1 into MAs that will maintain the mesic hardwood community (Table 3.5-13). It is also partly due to the fact that a number of stands of other forest communities, including oak, white pine, plantation conifers, and aspen, will be allocated to MAs affected predominantly by natural processes, especially Ecological Special Area, Future Old Forest, and Existing and Candidate Research Natural Areas MAs (Table 3.5-13). Over the long-term, the forest types in these areas are likely to succeed to mesic hardwoods, unless there is a strong ecological tendency toward oaks.

In comparing Alternative 2 with the ecological tendencies indicated in Tables 3.5-14 and 3.5-15, this alternative increases mesic hardwoods to four times the area represented by oak, which is higher than the ecological tendency for the relative proportion of mesic hardwoods to oak. The absolute proportion is close to the ecological tendencies expected for this landscape as a whole, with mesic hardwoods more prevalent than oak-dominated forests. Consequently, the effects of managing beyond the expected tendencies noted for Alternative 1 are of less concern for mesic hardwoods under this alternative than for oak, which is discussed further under the effects analysis for oaks.

Table 3.5-13: Proportion of mesic hardwood forest in each management area group by alternative.

Management Area Group[1]	Alt. 1	Alt. 2	Alt. 3
	acres (percent)	acres (percent)	acres (percent)
Grassland for Grazing, Grassland for Wildlife and Shrubland	641 (24%)	223 (8%)	223 (8%)
North Country National Scenic Trail Special Area, Recreation and Education Special Areas, and Ecological Special Area	95 (3%)	223 (8%)	307 (11%)
Future Old Forest and Existing and Candidate Research Natural Areas	167 (6%)	941 (35%)	381 (14%)
Northern Hardwood	105 (4%)	1,038 (38%)	608 (22%)
Oak Hickory	1,737 (63%)	321 (12%)	1,226 (45%)

Source: Forest GIS data: 2004 stand coverage, alternative coverages
Notes:
[1] Groupings are as discussed in the "Effects Common to All Alternatives" subsection of this Section.

Alternative 3

Over the long-term, Alternative 3 provides an intermediate amount of mesic hardwood forest when compared to the other alternatives, whether looking at the Forest as a whole or just over the forested landbase (Tables 3.5-14 and 3.5-15). This is due to the same grassland and shrubland allocation adjustments discussed for Alternative 2, except that fewer stands of the shade intolerant species, such as oak and aspen, are allocated to MAs that emphasize natural processes, primarily Future Old Forest (Tables 3.5-16 and 3.5-18). As noted for Alternative 2, the forest types in these areas are likely to eventually succeed to mesic hardwoods unless there is a strong ecological tendency toward oaks.

Compared to Alternatives 1 and 2, Alternative 3 is closest to maintaining the proportional relationship of mesic hardwoods to oak predicted by ecological tendencies. Mesic hardwoods under this alternative are about 1.7 times as abundant as oaks, compared to the ecological tendency of being 1.5 to 2.5 times as abundant as oaks (Tables 3.5-14 and 3.5-15). The actual abundance of mesic hardwoods is slightly less than would be expected under ecological tendencies, and so similar concerns still exist for this alternative as were noted for Alternative 1 regarding diversity and productivity of mesic hardwood forests, although to a lesser degree.

Oak-Hickory and Oak-Pine Forest

Indianpipe

Effects Common to All Alternatives

Forest composition, and therefore abundance of oak-dominated forests, is not likely to change very much over the short-term for the same reasons indicated for mesic hardwoods: mainly because of the age of existing stands, limited vegetation management on the Forest, and the general length of time it takes long-lived tree species to grow and die. Consequently, it is likely that the abundance of oak stands will remain at the low end of the desired composition objective range. Over the long-term, however, as noted for mesic hardwoods, all alternatives appear likely to shift the composition of oak and mesic hardwoods combined to within the desired composition objective range (Tables 3.5-14 and 3.5-15).

Table 3.5-14: Long-term composition[1] of the FLNF by forest community across alternatives compared to current composition, ecological tendencies, and desired objectives.

Forest Type	Current	Tendency	Objectives	Alt. 1	Alt. 2	Alt. 3
	percent	percent	percent	percent	percent	percent
Mesic hardwoods	17%	63-73%	35-50%[2]	15%	36%	26%
Oaks	17%	25-34%	35-50%[2]	20%	9%	15%
Softwoods	19%	1-2%	6-10%[3]	9%	6%	8%
White pine[4]	(11)%	(0)%	(6-10)%[3]	(8)%	(5)%	(7)%
Hemlock[4]	(1)%	(2)%	(6-10)%[3]	(1)%	(1)%	(1)%
Plantations[4]	(7)%	(0)%	(0) %	(0)%	(0)%	(0)%
Aspen	1%	<1%	1-3%	3%	2%	3%
Open land	45%	1%	43-47%	54%	48%	48%

Source: Forest GIS data: 2004 stand coverage, alternative coverages; Marks and Gardescu (1992); DeGloria (1998).
Notes:
[1] Long-term composition for each alternative is predicted based on the likelihood that each stand of a given type will remain recognizable and intact in a given management area, as discussed in the "Effects of Management Area Emphasis and Desired Future Condition Common to All Alternatives" subsection.
[2] Objectives in the revised Plan combine mesic hardwoods with oaks.
[3] Objectives in the revised Plan combine all native softwoods.
[4] White pine, hemlock, and plantation proportions are included within the softwoods proportions.

Table 3.5-15: Long-term composition[1] of currently forested land on the FLNF by forest community across alternatives compared to current composition, ecological tendencies, and desired objectives, with open land removed.

Forest Type	Current	Tendency	Objectives	Alt. 1	Alt. 2	Alt. 3
	percent	percent	percent	percent	percent	percent
Mesic hardwoods	31%	54-64%	75-86%[2]	33%	69%	50%
Oaks	31%	34-45%	75-86%[2]	44%	17%	29%
Softwoods	35%	<1-2%	14-16%[3]	19%	12%	15%
White pine[4]	(20)%	(0)%	(14-16)%[3]	(17)%	(10)%	(14)%
Hemlock[4]	(2)%	(2)%	(14-16)%[3]	(2)%	(2)%	(2)%
Plantations[4]	(13)%	(90)%	(0)%	(0)%	(0)%	(0)%
Aspen	3%	<1%	2-6%	5%	4%	5%

Source: Forest GIS data: 2004 stand coverage, alternative coverages; Marks and Gardescu (1992); DeGloria (1998).
Notes:
[1]Long-term composition for each alternative is predicted based on the likelihood that each stand of a given type will remain recognizable and intact in a given management area, as discussed in the "Effects of Management Area Emphasis and Desired Future Condition Common to All Alternatives" subsection.
[2] Objectives in the revised Plan combine mesic hardwoods with oaks.
[3] Objectives in the revised Plan combine all native softwoods.
[4] White pine, hemlock, and plantation proportions are included within the softwoods proportions.

Alternative 1

Over the long-term, Alternative 1 provides the greatest amount of oak-dominated forest of all the alternatives, whether looking at the Forest as a whole or just over the forested landbase (Tables 3.5-14 and 3.5-15). This is in large part due to the allocation of a substantial majority of stands dominated by oak to the Oak Hickory Management Area (Table 3.5-16). Under this MA, oak-hickory and oak-pine forests are emphasized and will be maintained, primarily using even-aged silvicultural systems.

Looking at ecological tendencies, as shown in the long-term composition tables (3.5-14 and 3.5-15), in Alternative 1 oak-dominated forests are close to or within the expected range for this forest community. Consequently, this alternative will help to ensure that much of the diversity in composition, structure, and processes associated with this forest community can be maintained or restored. As noted for mesic hardwoods, Alternative 1 maintains a higher proportion of oak-dominated forest than mesic hardwoods, which is a different proportional relationship than would be expected under more natural conditions. This difference will not have repercussions for this forest community, which itself remains within or near the expected range based on ecological tendencies.

Alternative 2

Over the long-term, Alternative 2 is expected to provide the least amount of oak-dominated forest of all the alternatives, whether looking over the entire Forest or just the forested landscape (Tables 3.5-14 and 3.5-15). Alternative 2 reduces the amount of oak-dominated forest over the long-term to half of what currently exists. This shift in abundance is caused primarily by the allocation of around half of the existing oak stands on the Forest to MAs that have a low likelihood of perpetuating this forest type due to management emphasis on natural processes, particularly the Future Old Forest, Existing and Candidate Research Natural Areas, and Ecological Special Area MAs (Table 3.5-16). Oak-dominated forests in these MAs may be perpetuated indefinitely if site conditions are favorable. The use of prescribed fire in these MAs to maintain oak communities may occur, but is likely to be limited based on the emphasis of these areas on natural processes, particularly in Existing and Candidate Research Natural Areas.

Looking at ecological tendencies, Alternative 2 maintains oak-dominated forests well below what would be expected, whether looking at the entire Forest or just forested lands, and its proportional relationship with mesic hardwoods is less than would be expected. The under-representation of oaks in this alternative leads to concerns that it will be difficult to maintain biodiversity and ecosystem processes associated with these types (see also the Ecosystem Management subsection of the Introduction [3.1.4] to this Chapter).

Table 3.5-16: Proportion of oak-dominated forest in each management area group by alternative.

Management Area Group[1]	Alt. 1	Alt. 2	Alt. 3
	acres (percent)	acres (percent)	acres (percent)
Grassland for Grazing, Grassland for Wildlife, and Shrubland	277 (10%)	80 (3%)	80 (3%)
North Country National Scenic Trail Special Area, Recreation and Education Special Areas, and Ecological Special Area	50 (2%)	181 (7%)	235 (9%)
Future Old Forest and Existing and Candidate Research Natural Areas	196 (7%)	1,280 (48%)	773 (29%)
Northern Hardwood	200 (7%)	822 (30%)	725 (27%)
Oak Hickory	1,973 (73%)	334 (12%)	884 (33%)

Source: Forest GIS data: 2004 stand coverage, alternative coverages

Notes:

[1] Groupings are as discussed in the "Effects Common to All Alternatives" subsection of this section.

Alternative 3
Under Alternative 3 the long-term abundance of oak-dominated forests is expected to be intermediate between the other two alternatives (Tables 3.5-14 and 3.5-15). Compared to Alternative 2, Alternative 3 has fewer oak stands in management area allocations where management is not likely to perpetuate these types, although more than in Alternative 1 (Table 3.5-16).

Looking at ecological tendencies, Alternative 3 in the long-term is likely to provide oak-dominated forest in amounts slightly less than the low end of what is expected from ecological tendencies (Table 3.5-15). Given that two-thirds of plantation forests are likely to shift toward oaks in this alternative, since they are allocated to MAs that support this type, this additional new oak forest may help to boost amounts toward the low end of ecological tendencies. Alternative 3 comes the closest to maintaining the expected proportional relationship between oaks and mesic hardwoods predicted by ecological tendencies, as noted for mesic hardwoods. While not as effective as Alternative 1, Alternative 3 will, over time, have effects similar to Alternative 1 in providing for the diversity and productivity of oak-dominated forest communities.

Softwood Forest

Effects Common to All Alternatives
The abundance of softwood forests on the FLNF may change over the short-term, primarily in conifer plantations. About half of the plantations, or one-quarter of all softwood stands, are in the process of falling apart and naturally succeeding to oaks and mesic hardwoods. Silviculturists expect this natural conversion process to be more or less complete over the next 15 years. The remaining plantations, mostly red pine and Norway spruce, are likely to persist for several more decades as they are longer-lived species. The remaining stands of white pine and hemlock are not likely to change over the life of the revised Forest Plan because of the age of existing stands, limited vegetation management on the Forest, and the general length of time it takes long-lived tree species to grow and die. Consequently, over the short-term, the abundance of softwood forest is expected to decline and approach the desired composition objective range.

Over the long-term, all alternatives appear likely to shift the abundance of softwoods to within the desired composition objective range when considering all of the lands on the Forest (Table 3.5-14). This amounts to a reduction in the current amount of softwood forests on the FLNF. This reduction would mainly be achieved through allowing plantations to succeed to native forest types and using management area direction and ecological tendencies to dictate the future composition of these areas.

Beyond plantations, the higher proportion of softwoods in the revised Forest Plan objectives and across the alternatives, when compared to the ecological tendencies of the landscape, is the result of a large number of stands of white pine mixed with oaks (Tables 3.5-14 and 3.5-15). Eleven percent of the FLNF is currently composed of stands dominated by white pine mixed with oaks. In the FLNF region, white pine is often a pioneer tree of old agricultural fields and can dominate with oaks in those situations (Mohler 1991). White pine was also a common tree noted along the survey lines in the 1790s, although it did not appear to dominate (Marks and Gardescu 1992). Most of these sites eventually develop into oak stands of some type. It is likely that stands either dominated by, or mixed with, white pine will continue to exist on the Forest under any alternative, given that each alternative does maintain a proportion of the landscape with pine and oak in MAs that emphasize their management.

The proportion of hemlock stands on the Forest remains constant and low across all alternatives, primarily because hemlock is restricted to growing in ravines and gorges. Most ravines and gorges are either protected from timber harvest through various special designations and/or soil and water standards and guidelines. Hemlock abundance approaches ecological tendencies (Table 3.5-15) when considering only the forested lands on the FLNF. As hemlock is a long-

lived, late successional species, over the long-term it is unlikely that management activities under any alternative will affect its abundance on the Forest. There are some existing ravines on the Forest that are composed of a mix of hemlock with other hardwood stands and some plantations; these may eventually shift to hemlock over the long-term.

Alternative 1

The long-term composition of softwoods in Alternative 1 tends toward the high end of the composition objectives, but is reduced by almost 50 percent compared to current abundance on the Forest (Table 3.5-14). This is due, in large part, to the conversion of all plantations to other forest types, which is a constant across all alternatives. Under Alternative 1, most of the plantations will shift to forests dominated by oak. Since the abundance of hemlock is also relatively constant across the alternatives, most of the differences in alternatives are due to variation in the abundance of white pine stands. Alternative 1 maintains the largest amount of white pine forest of all the alternatives. This is due primarily to the high proportion of these stands within the Oak Hickory MA, which is best suited to perpetuating this forest type (Table 3.5-17). There are also a number of white pine stands that are allocated to grassland and shrubland management areas, which probably represent succession of some of these areas that have not been maintained. Consequently, about 18 percent of the white pine stands will either be converted to open lands or will be perpetuated as small patches within open lands.

When looking only at the forested land of the FLNF, Alternative 1 maintains a slightly higher proportion of softwoods than the other alternatives, and this proportion is slightly higher than the desired objectives (Table 3.5-15). As noted earlier, the objectives and alternatives all maintain a higher proportion of softwoods on the landscape than ecological tendencies. If there is a desire to move the Forest more toward the expected ecological tendencies, Alternative 1 provides the least opportunity to do so. With more white pine stands on the landscape, this habitat will be more available to species that depend on or benefit from the composition or structure associated with these forests.

Table 3.5-17: Proportion of native white pine forest in each management area group by alternative.

Management Area Group[1]	Alt. 1	Alt. 2	Alt. 3
	acres (percent)	acres (percent)	acres (percent)
Grassland for Grazing, Grassland for Wildlife and Shrubland	327 (18%)	45 (2%)	46 (3%)
North Country National Scenic Trail Special Area, Recreation and Education Special Areas, and Ecological Special Area	29 (1%)	47 (2%)	127 (2%)
Future Old Forest and Existing and Candidate Research Natural Areas	118 (6%)	943 (51%)	517 (28%)
Northern Hardwood	48 (3%)	508 (28%)	440 (24%)
Oak Hickory	1,319 (72%)	298 (16%)	711 (39%)

Source: Forest GIS data: 2004 stand coverage, alternative coverages
Notes:
[1] Groupings are as discussed in the "Effects Common to All Alternatives" subsection of this section.

Alternative 2

In Alternative 2, the long-term composition of softwoods tends toward the low end of the composition objectives, and reduces the current abundance of softwoods by two-thirds (Table 3.5-14). Most plantations in this alternative will shift to forests dominated by mesic hardwoods, mainly because they are allocated to lands where mesic hardwoods are emphasized, either through natural processes like succession, or through management within the Northern Hardwood Management Area.

Alternative 2 also maintains the smallest amount of white pine forest of all the alternatives, primarily due to the allocation of about half of the stands to MAs that are not likely to perpetuate these stands, such as Future Old Forest and Existing and Candidate

Research Natural Areas (Table 3.5-17). As the white pine type in the Finger Lakes is successional by nature, eventually these forests will develop into mesic hardwood forest in these MAs, unless the sites are particularly suited to oaks.

This alternative, compared to the others, most reflects the expected ecological tendency of the FLNF landscape for softwoods by providing the lowest amount of softwood forest (Tables 3.5-14 and 3.5-15). In so doing, however, Alternative 2 is unable to achieve the minimum objectives identified for this forest community in the revised Forest Plan when looking just at the forested land within the FLNF (Table 3.5-15). These objectives, as noted earlier, are set higher than ecological tendencies because of the value of this forest community as habitat for wildlife. This alternative, while reducing the proportion of white pine stands more than other alternatives, still maintains a level of habitat availability greater than what would be expected through natural processes, providing benefits to species associated with this habitat.

Alternative 3

In Alternative 3, the long-term composition of softwoods tends toward the middle of the composition objectives, and reduces the current abundance of softwoods by more than half (Table 3.5-14). About two-thirds of the plantations in this alternative will shift to forests dominated by oaks, mainly because they are allocated to the Oak Hickory Management Area. About one-third of the plantations are likely to shift to mesic hardwoods due to allocation to MAs where mesic hardwoods are emphasized.

When looking across the entire Forest, this alternative maintains about the same amount of white pine forest as Alternative 1 (Tables 3.5-14 and 3.5-15). Compared to the other alternatives, about twice as much of this forest type is allocated to the Oak Hickory MA, where this type is likely to be perpetuated, as compared to Alternative 2, while half as much is so allocated when compared to Alternative 1 (Table 3.2-17). Similarly, twice as much of this type is allocated to Future Old Forest and Existing and Candidate Research Natural Areas, where this type is more likely to shift to mesic hardwoods, than under Alternative 2, compared to Alternative 1 where substantially fewer acres are allocated to these MAs (Table 3.5-17). When compared to Alternative 1, more white pine type is allocated to the Northern Hardwood MA, where it has a moderate likelihood of being perpetuated, primarily on sites that have an ecological tendency toward oak.

When composition, ecological tendencies, and objectives are adjusted to exclude open land that will not change to forested land, Alternative 3 is the only alternative that maintains softwoods within the objectives, although the amount of this forest type is still well above ecological tendencies for the Finger Lakes landscape.

Aspen

Effects Common to All Alternatives

All alternatives will maintain aspen at levels greater than would be expected by ecological tendencies. Perpetuation of aspen is an important objective noted in the revised Forest Plan, and so the objective and potential future composition across the alternatives reflect the desire to keep this forest community at higher levels than would be expected naturally. While aspen was not a large part of the 1790s landscape on the FLNF, and did not dominate any survey line or corner's vegetation, it was noted as present in four of the survey lots, which represent about four percent of the lots surveyed (Marks and Gardescu 1992). Consequently, it makes sense to maintain some aspen on the FLNF. Maintaining higher levels of this forest community, which is proportionally quite small at one percent of the Forest, will provide valuable wildlife habitat, without detracting from the ability of the Forest Service to meet objectives for other forest communities or ecological tendencies.

Alternatives 1 and 3

Alternatives 1 and 3 would increase the proportion of aspen toward the upper end of the desired range of objectives at three percent (Table 3.5-14). This is in large part due to harvesting proposed as a noncommercial activity to maintain wildlife habitat (see also Proposed and Probable

Practices, Appendix D, revised Forest Plan). The SPECTRUM model for harvest acres did not identify any aspen stands that were cost effective to harvest commercially.

In Alternatives 1 and 3, opportunities to manage existing aspen stands and create new stands are much greater than under Alternative 2 (Table 3.5-18). A large majority (at least 65%) of the existing aspen stands are allocated to areas that emphasize or allow management to perpetuate them, mainly the Northern Hardwood and Oak Hickory Management Areas (Table 3.5-18). These alternatives also allocate around 40 percent of the FLNF to these management areas, where new stands of aspen can be created. These opportunities will enable both alternatives to increase the abundance of aspen over the long-term. In Alternative 1, 32 percent of existing aspen stands are within the grassland and shrubland management areas. Even if these stands are harvested in order to maintain open lands, they will sprout vigorously from stumps and roots, and are likely to maintain potential for re-establishment. Alternative 3 shifts most of these stands to forested management areas where management for this community is part of the MA emphasis.

Alternative 2

Alternative 2, in contrast to the other alternatives, provides fewer opportunities for managing the aspen forest community in two ways. First, it allocates only 27 percent of existing stands to the Oak Hickory and Northern Hardwood MAs, as compared to over 65 percent for the other alternatives (Table 3.5-18). The remaining aspen stands are most likely to shift to mesic hardwoods. Second, only 26 percent of the Forest is allocated to these two management areas in which new aspen stands are most likely to be created. While noncommercial activities will help to mitigate some of the loss of existing stands, the smaller proportion of the Forest available for new stands is expected to enable only a slight increase in abundance (around 1%; Table 3.5-14)

Alternative 2 represents a loss in opportunities to maintain certain aspen clones and substantially increase aspen abundance, which is an objective of the revised Plan. Overall that loss is not significant in terms of maintaining the presence of the type on the Forest. Aspen is an opportunistic species that will colonize disturbed sites within range of its wind blown seeds or near existing live clones. As long as some aspen is maintained, it can colonize new sites opened up by fire or other disturbances.

Table 3.5-18: Proportion of aspen in each management area group by alternative.

Management Area Group[1]	Alt. 1	Alt. 2	Alt. 3
	acres (percent)	acres (percent)	acres (percent)
Grassland for Grazing, Grassland for Wildlife and Shrubland	77 (32%)	11 (4%)	11 (4%)
North Country National Scenic Trail Special Area, Recreation and Education Special Areas, and Ecological Special Area	5 (2%)	14 (6%)	14 (6%)
Future Old Forest and Existing and Candidate Research Natural Areas	<1 (<1%)	150 (63%)	42 (17%)
Northern Hardwood	<1 (<1%)	62 (26%)	66 (28%)
Oak Hickory	156 (65%)	3 (1%)	108 (45%)

Source: Forest GIS data: 2004 stand coverage, alternative coverages
Notes:
[1] Groupings are as discussed in the "Effects Common to All Alternatives" subsection of this section.

Indicator 2 – Proportion of each Major Forest Community in Various Age Categories (Age Class Distribution)

For the discussion of direct and indirect effects in this subsection, short-term effects are considered those occurring over the next 20 years. Long-term effects for age class distribution extend to 150 years, which is based on modeling done by SPECTRUM for suitable stands managed using even-aged silvlculture. SPECTRUM is a computer modeling program used to estimate probable

harvest treatments and volumes based on Forest stand data. Because the development of a desired age class distribution involves long-lived tree species and regulation over many decades, the effects of alternatives in achieving these objectives over the short-term tend to be less indicative of program success than long-term effects. It simply takes longer than 20 years to achieve a regulated forest condition. Consequently, long-term effects will be emphasized in this discussion.

In analyzing age class distribution for each forest community, two approaches were taken. First, for each alternative, SPECTRUM identified the stands of each forest community within the Oak Hickory MA that would be managed toward the age class objectives defined in the revised Forest Plan using even-aged silvicultural methods. Only stands within the Oak Hickory MA were evaluated this way, and then only those that were considered suitable for timber management (see the Timber Management section 3.11 of this Chapter for an explanation of how suitability is defined). Information generated by the SPECTRUM model can also be used to estimate the proportion of major forest communities managed via even-aged silviculture in the Oak Hickory MA within each age class for the next 15 decades. Age class categories used by the model were those defined in the revised Plan for each forest type. For more information on the SPECTRUM model and the assumptions and constraints used, see Appendix B of the FEIS.

The SPECTRUM model also calculated maximum sustainable harvest volumes, and only suitable stands within the Oak Hickory MA that were considered cost-effective at meeting desired future conditions were identified for harvesting under each alternative. Table 3.5-19 displays the proportion of current acres of each major forest community that was selected by SPECTRUM from the Oak Hickory MA for even-aged silvicultural treatment.

The analysis of age class for all other management areas, as well as for unsuitable lands within the Oak Hickory MA, used a different approach. In this second approach, age class distribution was analyzed qualitatively to identify other management areas where stands of different ages may develop. There is currently no published model of age class development under natural disturbance regimes that is available for the Finger Lakes region. SPECTRUM did not choose any aspen stands for even-aged management under any alternative, because it was not cost effective to do so. Therefore, this qualitative analysis is how effects on aspen age class distribution will be analyzed.

Table 3.5-19: Acres and proportion of major forest communities currently on the FLNF that fall within the Oak Hickory MA and are projected by SPECTRUM to be managed using even-aged silvicultural systems under each alternative.

Forest Community	Total	Alt. 1	Alt. 2	Alt. 3
	acres	acres (%)	acres (%)	acres (%)
Mesic hardwood forest	2,745	1,395 (51%)	160 (6%)	962 (35%)
Oak-dominated forest	2,697	1,569 (58%)	128 (5%)	257 (10%)
Softwood forest	3,029	671 (22%)	342 (11%)	743 (24%)
Aspen	239	0 (0%)	0 (0%)	0 (0%)

Source: Forest GIS data, timber model feature class; SPECTRUM analysis.

Mesic Hardwoods

Effects Common to All Alternatives

Based on SPECTRUM modeling projections for mesic hardwoods in the Oak Hickory MA that are managed for timber using even-aged silvicultural systems (Table 3.5-20), it is clear that none of the alternatives will fall within the desired age class distribution within the first two decades. While the proportion within the regeneration age class is fairly close to the desired range, the remaining age classes tend to be quite far off, with the young and old age class generally below the desired range and the mature age class well above. This is likely due to the fact that the Forest is starting from an age class distribution that is far different than the desired objectives.

The SPECTRUM model looked at four age classes and estimated the proportion of mesic

hardwood forest community in each of those age classes for each of 15 decades. Consequently, across these 15 decades, one can evaluate both the average age class distribution as well as the degree of variation from decade to decade. For mesic hardwood forests in the Oak Hickory MA identified for even-aged management, while all alternatives varied in the frequency with which they were able to maintain the desired age class distribution over the 150-year modeling period, on average all alternatives generally fell within the desired range except for the mature age class (Table 3.5-20).

From decade to decade, all alternatives were able to meet the objectives for regenerating and young age classes more often than the older age classes, primarily due to the abundance of aging mesic hardwood stands that can be harvested and moved into those younger classes over time. Because harvesting too many of the mature and old stands in a short period of time can be unsustainable, and unrealistic given markets, all alternatives tend to have less success meeting the older age class objectives. In particular, the modeling for all alternatives projected a greater proportion of mesic hardwoods in the mature age class across most decades than desired, averaging at a higher level over the 15 decades as well (Table 3.5-20).

The proportion of mesic hardwoods represented in the regenerating age class from decade to decade varies by alternative. Even with this variation, the averages for each alternative over 150 years are within the desired range, and very close to each other (8-9%; Table 3.5-20). The regenerating age class will also be emphasized in shrublands, which are generally combinations of forbs, shrubs, and trees that are prevented from moving into the young forest age class by periodic mowing, hand cutting, or prescribed fire. The proportion of the Forest in the Shrubland MA ranges from eight percent in Alternative 2 to 13 percent in Alternative 1, with Alternative 3 providing an intermediate amount (9%). Consequently, regardless of alternative chosen or relative success at meeting objectives for the regenerating age class, a substantial amount of the habitat structure that characterizes this age class will be represented in shrublands.

The proportion of mesic hardwoods represented in the old age class also varies from decade to decade. Even with this variation, however, the averages for each alternative over 150 years are within or very close to the desired range (4-10%; Table 3.5-20). The old age class will also be emphasized in lands unsuitable for timber management, which include some lands within the Oak Hickory and Northern Hardwoods MAs, as well as all other forested MAs on the FLNF. In mesic hardwood forest within these areas, the old age class will come to dominate the age class structure over the long-term, representing between about 80 and 90 percent of the lands of this type in these areas (Lorimer and White 2003).

It is important to note that the SPECTRUM model used for Forest Plan revision calculates the maximum harvest volumes that could be harvested and still be considered sustainable. The model is used to estimate harvesting treatments and volumes, which are requirements of preparing a Forest Plan. One of the products of this model includes an estimate of age class distribution, constrained by the age class objectives and MA allocations defined for each forest type in the revised Forest Plan. It should not be assumed, however, that management of any of the forest communities, under any of the alternatives, would always look like what is estimated by the model. In many cases, management objectives or circumstances on the ground will dictate the need for different harvest treatments, at different frequencies, which will alter the estimated age class distributions. In addition, with such a small land area over which to apply or change treatments, and with existing low harvest levels, it is very difficult to achieve the type of balanced age class distribution envisioned in the revised Forest Plan objectives (Goal 2) for any of the forest communities. The age class distributions noted in the Forest Plan continue to serve as goals toward which the Forest Service can strive, as they also provide diversity in forest structure that benefits a wide variety of plants and animals.

Table 3.5-20: Projected trends in age class distribution for mesic hardwoods on the FLNF within the Oak Hickory MA that are projected by SPECTRUM to be managed using even-aged methods at 10 years, 20 years, and averaged over 150 years, compared to current distribution and revised Plan objectives.

Age Class[1]	Current distribution		Plan Obj.[1]	Alternative 1[2]			Alternative 2[2]			Alternative 3[2]		
	Even-aged MA[2]	All MAs[3]		10 yr	20 yr	150-year average	10 yr	20 yr	150-year average	10 yr	20 yr	150-year average
	%	%	%	%	%	%	%	%	%	%	%	%
Regen.	0	0	5-10	2	12	9	6	10	9	5	10	8
Young	31	33	30-50	26	22	39	14	20	40	20	21	35
Mature	63	60	25-35	72	61	45	80	70	46	70	64	47
Old	6	7	5-10	0	5	7	0	0	4	5	5	10

Source: Forest GIS data: 2004 stand coverage, alternatives coverages; SPECTRUM analysis
[1]Age classes and Plan objectives based on the revised Plan
[2]Age class distribution for lands suitable for even-aged timber management
[3]Age class distribution currently across the Forest, regardless of management

Table 3.5-21: Projected trends in age class distribution for oak-dominated forests on the FLNF within the Oak Hickory MA that are projected by SPECTRUM to be managed using even-aged methods at 10 years, 20 years, and averaged over 150 years, compared to current distribution and revised Plan objectives.

Age Class[1]	Current distribution		Plan Obj.[1]	Alternative 1[2]			Alternative 2[2]			Alternative 3[2]		
	Even-aged MA[2]	All MAs[3]		10 yr	20 yr	150-year average	10 yr	20 yr	150-year average	10 yr	20 yr	150-year average
	%	%	%	%	%	%	%	%	%	%	%	%
Regen.	2	2	5-10	13	10	9	16	5	10	13	13	9
Young	10	9	30-50	9	20	41	14	21	38	24	33	42
Mature	82	84	25-35	75	56	37	65	65	44	58	44	41
Old	6	5	5-10	2	14	12	5	9	8	5	10	8

Source: Forest GIS data: 2004 stand coverage, alternatives coverages; SPECTRUM analysis
[1]Age classes and Plan objectives based on the revised Plan
[2]Age class distribution for lands suitable for even-aged timber management
[3]Age class distribution currently across the Forest, regardless of management

Table 3.5-22: Projected trends in age class distribution for all softwood forests on the FLNF within the Oak Hickory MA that are projected by SPECTRUM to be managed using even-aged methods at 10 years, 20 years, and averaged over 150 years, compared to current distribution and revised Plan objectives.

Age Class[1]	Current distribution		Plan Obj.[1]	Alternative 1[2]			Alternative 2[2]			Alternative 3[2]		
	Even-aged MA[2]	All MAs[3]		10 yr	20 yr	150-year average	10 yr	20 yr	150-year average	10 yr	20 yr	150-year average
	%	%	%	%	%	%	%	%	%	%	%	%
Regen.	0	0	10-20	11	18	11	10	14	10	10	16	11
Young	9	8	15-35	14	14	29	3	10	28	9	10	28
Mature	90	91	25-55	70	63	51	86	71	52	81	74	54
Old	1	1	5-40	5	5	9	2	5	10	0	0	7

Source: Forest GIS data: 2004 stand coverage, alternatives coverages; SPECTRUM analysis
[1]Age classes and Plan objectives based on the revised Plan
[2]Age class distribution for lands suitable for even-aged timber management
[3]Age class distribution currently across the Forest, regardless of management

Alternative 1

Alternative 1 is different from the other alternatives because it has the highest proportion of mesic hardwood stands (51%) that are projected for even-aged management (Table 3.5-19). Consequently, about half of the mesic hardwood stands on the Forest will, over the long-term, be managed toward a balanced age class distribution in the vicinity of the desired age class objectives.

On average across the 15 decades, the regenerating, young, and old age classes are predicted to be within the desired objectives, and the mature age class averages about 10 percent higher than the desired objectives (Table 3.5-20). Alternative 1 met the objectives for the young and old age classes over most of the 15 decades, and met objectives for every decade starting with the ninth decade. This is largely due to the natural aging of stands into and out of the young age class and the increased harvesting of mature and old stands to create regenerating stands. Because more stands of mesic hardwoods are available for even-aged management in Alternative 1, more choices are available for regenerating stands in a sustainable manner.

Compared to other alternatives, Alternative 1 has a lower degree of variation from decade to decade for the older age classes, although it has a higher degree of variation from decade to decade for the regenerating age class. This alternative fell within the desired age class range for the regenerating age class only 20 percent of the time, although on average it worked toward the upper end of the desired range (Table 3.5-20). It fell above the desired age class range about 47 percent of the time, ranging from 12 to17 percent.

Looking at age classes across all the MAs, a little over a quarter (about 710 acres) of mesic hardwood forest falls within designations that either emphasize older age classes or do not regulate age class distribution according to age class objectives, a proportion lower than in the other two alternatives (see Section 3.10 of this Chapter). Outside of the stands within the Oak Hickory Management Area that are managed using even-aged silvicultural systems, 262 acres (9%) of mesic hardwood stands are allocated to MAs where natural processes dictate age class distribution (Table 3.5-13). In addition, 342 acres of mesic hardwood stands within the Oak Hickory MA were not chosen by SPECTRUM for any timber harvesting. In these areas, mature and old age classes will tend to dominate over the long-term. Another 105 acres (4%) of mesic hardwood forests are allocated to the Northern Hardwood MA, where mainly uneven-aged silvicultural systems are used. In these areas, trees of many sizes and ages will be emphasized, in patches less than an acre in size. About 13 percent of the Forest is allocated to shrublands under Alternative 1, representing the largest proportion of any of the alternatives. Consequently, the regenerating age class will be well represented over the long-term in the Shrubland Management Area.

In summary, age class distribution for suitable stands of mesic hardwoods within the Oak Hickory MA is likely to be close to the desired objectives over the long-term under Alternative 1. This alternative has a little less than two-thirds of the mesic hardwood forest in the Oak Hickory MA, and about 80 percent of these stands are projected to be managed using even-aged silviculture. About three quarters of this community will be regulated for age class distribution according to the objectives in the revised Forest Plan, with the remainder managed through uneven-aged silviculture or natural processes. This, in combination with the higher proportion of the Shrubland MA than in the other two alternatives, suggests that Alternative 1 will overall favor the younger mesic hardwood age classes when compared to the older age classes over the long-term, and more so than the other alternatives.

Alternative 2

Alternative 2 has the smallest proportion of mesic hardwood forest managed for age class objectives at 160 acres, or six percent of the acres of this type (Table 3.5-19). This proportion is substantially lower than other alternatives. Consequently, only a very small proportion of mesic hardwood stands on the Forest will be managed toward an age class distribution balanced to the desired objectives, with the age class distribution of the remainder

of this forest community governed by natural processes.

On average across the 15 decades, the regenerating and young age classes are predicted to be within the desired objectives, and the mature age class averages about 10 percent higher than the desired objectives, for reasons similar to those explained under Alternative 1 (Table 3.5-20). The average for the old age class is slightly less than the desired objective, and reflects substantial variation within this age class from decade to decade. Alternative 2 met the age class objectives in only two decades out of 15, and otherwise was at zero percent for 73 percent of the decades. In two decades it fell between 20 to 30 percent. Consequently, over most of the 15 decades, mesic hardwood stands managed using even-aged silvicultural systems under Alternative 2 will not be represented in the old age class.

Alternative 2 has less variability from decade to decade within the regenerating age class than Alternative 1. Not only does the regenerating age class on average fall within the desired range, but it also falls within the range each decade. Consequently, although only a small proportion of mesic hardwood stands are managed under Alternative 2, they will be more consistently represented in the regenerating age class at the desired level under this alternative than under Alternative 1.

Looking at age classes across all the MAs, 86 percent (about 2,360 acres) of mesic hardwood forest falls within designations that either emphasize older age classes or do not regulate age class distribution according to age class objectives, a proportion higher than in the other two alternatives (see Section 3.10 of this Chapter). Outside of the Oak Hickory Management Area, 1,164 acres (43%) of mesic hardwood stands are allocated to MAs where natural processes dictate age class distribution (Table 3.5-13). In addition, about half of the mesic hardwood stand acreage within the Oak-Hickory MA was not chosen by SPECTRUM for any timber harvesting because it was not cost-effective to harvest these stands. In all of these areas, mature and old age classes will tend to dominate over the long-term. Another 1,038 acres (38%) of mesic hardwood forests are allocated to the Northern Hardwood MA, where mainly uneven-aged silvicultural systems are used. In these areas, trees of many sizes and ages will be emphasized, in patches less than an acre in size. About eight percent of the Forest is allocated to shrublands, representing a smaller proportion than Alternative 1 but the same as in Alternative 3.

In summary, Alternative 2 places a strong emphasis on older age classes and areas where age classes are not regulated, and provides fewer opportunities to manage for the younger age classes. Even with the high level of success at meeting the regenerating age class in areas where even-aged silviculture is used, these opportunities are limited by the small proportion of acres managed this way (160 acres). The Shrubland MA, however, even with reduced acreage from Alternative 1, will still provide a substantial amount of regenerating habitat (more than 1,200 acres) for the Forest, in amounts greater than what was identified in the age class objectives for just the Northern Hardwood and Oak Hickory MAs.

Alternative 3

Alternative 3 has an intermediate proportion of mesic hardwood forest managed for age class objectives, when compared to the other alternatives, at 35 percent of all stands of this type (Table 3.5-19). This proportion is about two-thirds of that in Alternative 1, and almost six times as much as Alternative 2. Consequently, about a third of the mesic hardwood forest stands on the Forest will be managed for an age class distribution balanced to the desired objectives, with the age class distribution of the remainder of this forest community governed by natural processes.

As with Alternative 1, in Alternative 3 on average across the 15 decades, the regenerating, young, and old age classes are predicted to be within the desired objectives, and the mature age class averages about 12 percent higher than the desired objectives, for reasons similar to those explained under Alternative 1 (Table 3.5-20). Although the old

age class on average stays within the desired objectives, there is still a lot of variation among decades as in Alternative 2. All decades but two, however, are within or above the objectives. During about half of the decades, the desired objectives for this age class are met under Alternative 3, and the age class proportion tends to be greater than objectives between the 6th and 15th decades. Overall, this age class will be generally well-represented in the age class distribution, except during two decades in the first 50 years.

Alternative 3, like Alternative 2, has a low level of variation in the regenerating age class, and moderate levels in the young and mature age classes. The regenerating age class averages over the 15 decades slightly less than under Alternative 2 at eight percent (Table 3.5-20), although this difference appears negligible given the abundance of shrubland habitat to meet the habitat needs of species that prefer this age class.

Looking at age classes across all the MAs, 57 percent (about 1,560 acres) of mesic hardwood forest falls within designations that either emphasize older age classes or do not regulate age class distribution according to age class objectives, a proportion intermediate between that of the other two alternatives (see Section 3.10 of this Chapter). Outside of the Oak Hickory Management Area, 688 acres (25%) of mesic hardwood stands are allocated to MAs where natural processes dictate age class distribution (Table 3.5-13). This proportion is more than half that in Alternative 2, but almost three times that in Alternative 1. In addition, 264 acres of mesic hardwood stands within the Oak-Hickory MA were not chosen by SPECTRUM for any timber harvesting because it was not cost-effective to harvest these stands. In all of these areas, mature and old age classes will tend to dominate over the long-term. Another 608 acres (22%) of mesic hardwood forests are allocated to the Northern Hardwood MA, where mainly uneven-aged silvicultural systems are used. In these areas, trees of many sizes and ages will be emphasized, in patches less than an acre in size. As noted for Alternative 2, regenerating age classes will occur over the long-term in much smaller patches in the Northern Hardwood MA, scattered throughout mesic hardwood stands. About nine percent of the Forest is allocated to shrublands in Alternative 3, one percent more than in Alternative 2.

Overall, Alternative 3 appears to strike more of a balance in terms of age class distribution of mesic hardwoods across the Forest, when compared to the other alternatives. It maintains approximately equal proportions of this forest community within management areas that regulate age class distribution through even-aged silvicultural systems, and within those that generally favor either older age classes or where age classes are not regulated. Alternative 3 provides the regenerating age class at levels similar to the other alternatives, with less variation than under Alternative 1, while maintaining shrublands at a lower percentage than under Alternative 1. It also provides a more consistent representation of the old age class than under Alternative 2 for managed stands, while maintaining a higher proportion of the Forest in management areas where natural processes will drive age class distribution than under Alternative 1.

Oak-Hickory and Oak-Pine Forest

Effects Common to All Alternatives

Based on SPECTRUM modeling projections for forest dominated by oaks in the Oak Hickory MA that are managed using even-aged silvicultural systems (Table 3.5-21), none of the alternatives will fall within the desired age class distribution within the first two decades. Most projections are different from the desired range by at least five percent. Generally, the regenerating and mature age classes are represented in the distributions at greater levels than desired, and the young age class is represented at lower levels than desired. Difficulties in meeting desired objectives during the short-term are likely due to the fact that the Forest is starting from an age class distribution that is far different than the desired objectives. When the results for each decade are averaged over the 150-year modeling period, all alternatives were able to meet or come very close to the desired age class distribution, except for the mature age class which is

consistently higher than objectives (Table 3.5-21).

From decade to decade, however, most age classes exhibited a high degree of variability in meeting the desired range for age class distribution. Under each alternative, at least one of the four age classes fell within the desired range less than 25 percent of the time. There are no decades, under any alternative, in which all age classes fell within the desired range, with the exception of the last decade under Alternative 3. Consequently, while some age classes under some alternatives are within desired ranges more often, in general from one decade to the next, the age class distributions will appear slightly different than the desired ranges.

As noted for mesic hardwoods, the Shrubland Management Area, over the short and long-term, will also be providing a substantial proportion of the habitat structure associated with the regenerating age class for hardwood types, including oak-dominated forests. Likewise, lands unsuitable for timber management, which include some lands within the Oak Hickory and Northern Hardwoods MAs, as well as all other forested MAs on the FLNF, will provide older age classes of this type. In oak-dominated forest within these areas, the old age class will come to dominate the age class structure over the long-term, representing between about 80 and 90 percent of the lands of this type in these areas (Lorimer and White 2003).

Alternative 1

Alternative 1 has the largest proportion of oak-hickory and oak-pine forest managed for age class objectives within the Oak Hickory MA at 58 percent of all stands of this type (Table 3.5-19). Consequently, more than half of the oak stands on the Forest will, over the long-term, be managed toward a balanced age class distribution in the vicinity of the desired age class objectives.

On average across the 15 decades, the regenerating and young age classes are predicted to be within the desired objectives, while the mature and old age classes come within one to three percent of desired objectives (Table 3.5-21). In particular, Alternative 1 met the objectives for the regenerating and young age classes over a majority of the 15 decades. In addition, the proportion of oak stands within the regenerating age class never fell below the desired objectives, unlike other alternatives. This is largely due to the increased harvesting of mature and old stands in Alternative 1 to create regenerating stands. Because more oak stands are available for harvest in Alternative 1, more choices are available for regenerating stands in a sustainable manner while maximizing value.

Compared to other alternatives, Alternative 1 has a moderate degree of variation from decade to decade for the age class distribution overall, particularly for the old and mature age classes. The old age class objectives are achieved only twice, and from decades two to seven the proportions of stands in the old age class are substantially higher than objectives. In subsequent decades the proportions tend to fall below objectives, generally at two to three percent. Consequently, during the first 70 years of the modeled period, about a quarter of oak stands will be represented in this age class, while after 70 years, generally less than five percent of oak stands will be represented in this age class.

The proportion of oak stands in the old age class is related to the proportion in the mature age class as well. The proportion of stands in the mature age class was at or below objectives in the early decades when the old age class was at higher levels than objectives. Then during the later decades when the old age class was underrepresented, the proportion of stands in the mature age class was higher than the objectives. If one combines the mature and old age classes, oak stands will be well represented in this combined class, and will generally be slightly over-represented.

Looking at age classes across all the MAs, a third (about 900 acres) of oak-dominated forest falls within designations that either emphasize older age classes or do not regulate age class distribution according to age class objectives, a proportion lower than under the other two

alternatives. Outside of the Oak Hickory Management Area, 246 acres (9%) of oak stands are allocated to management areas where natural processes dictate age class distribution (Table 3.5-16). In addition, about 400 acres of the oak stands within the Oak-Hickory MA were not chosen by SPECTRUM for any timber harvesting. In all of these areas, mature and old age classes will tend to dominate over the long-term. About 200 acres (7%) of these forests are allocated to the Northern Hardwood MA, where mainly uneven-aged silvicultural systems are used and a variety of tree ages and sizes will be represented. About 13 percent of the FLNF is allocated to shrublands, representing the largest proportion of the alternatives. Consequently, the regenerating age class will be well represented over the long-term in the Shrubland Management Area.

In summary, Alternative 1 appears to offer the greatest opportunity over the long-term to maintain a balance of age classes that is closest to the revised Plan objectives for oak-dominated forests in the Oak Hickory MA. The primary benefit that this alternative provides to perpetuation of oak-dominated forests is the high proportion of the forest community allocated to a management area that emphasizes its perpetuation. The relatively low representation of this community to areas where natural processes dominate, compared to other alternatives, reduces the risk of losing this forest type from natural succession to mesic hardwoods. The age class distribution will improve and move closer to objectives in the Oak Hickory MA, because oak management is one of the principle drivers for this MA. In addition, there is an equal balance between stands in the younger age classes and stands in the older age classes on average, with more consistency in the younger age classes over the long-term. When combined with the larger proportion of the land within the Shrubland MA in this alternative, it is likely that the regenerating age class will be more consistently available to meet habitat needs in Alternative 1 compared to the others.

Alternative 2

Among all alternatives, Alternative 2 has the smallest proportion of oak-dominated forests allocated to the Oak Hickory Management Area, and an even smaller proportion where even-aged management may be applied at five percent (Table 3.5-19). This proportion is substantially lower than other alternatives. Consequently, only a very small proportion of oak stands on the Forest will be managed toward an age class distribution balanced to the desired objectives, with the age class distribution of the remainder of this forest community governed by natural processes or managed using uneven-aged silviculture.

On average across the 15 decades, the regenerating, young and old age classes for these lands managed using even-aged silviculture are predicted to be within the desired objectives, and the mature age class averages about 10 percent higher than the desired objectives (Table 3.5-21). Alternative 2 met the objectives in all 15 decades for the old age class, and had the lowest variability for this age class from decade to decade. This is due to the small number of stands considered available and cost-effective for harvesting in this alternative, and so the need to allow stands to age into this age class to accrue value. This also leads to much less consistency across the other age classes in terms of meeting the desired objectives for age class distribution.

Under Alternative 2, the proportion of stands in the regenerating age class across decades ranges from zero to 26 percent, with very little consistency between decades. Although stands are represented in this age class at a slightly higher level than under Alternative 1, there are three decades when there will be no stands represented in this age class.

Similarly, while the old age class is represented as desired in each decade, the mature age class is highly variable, ranging from six to 72 percent of stands represented in that age class. If one combines the older two age classes, there are two consecutive decades where these older age classes will be represented at lower proportions than desired. Even with this variability, however, Alternative 2 generally

represents the older age classes for these even-aged stands at higher proportions than Alternatives 1 and 3 (Table 3.5-21). This also means that the younger age classes (regenerating and young age class combined) will be represented at slightly lower proportions under Alternative 2 than under Alternatives 1 and 3.

Looking at age classes across all the MAs, more than 90 percent (about 2,490 acres) of oak-dominated forest falls within designations that either emphasize older age classes or do not regulate age class distribution according to age class objectives, a proportion higher than under the other two alternatives. Outside of the Oak Hickory Management Area, 1,461 acres (about 55%) of oak stands are allocated to MAs where natural processes dictate age class distribution (Table 3.5-16). In addition, more than 200 acres of oak stands within the Oak-Hickory MA were not chosen by SPECTRUM for any timber harvesting because it was not cost-effective to harvest these stands. In all of these areas, mature and old age classes will tend to dominate over the long-term. Ecological tendencies in these areas will tend to favor mesic hardwoods over oak stands over the long-term. Consequently, as the older age classes of oak age and die, they will eventually be replaced by younger age classes of mesic hardwoods. Another 822 acres (30%) of oak-dominated forests are allocated to the Northern Hardwood MA, where mainly uneven-aged silvicultural systems are used. In these areas, trees of many sizes and ages will be emphasized, in patches less than an acre in size. It is currently unclear if oaks on the FLNF can be managed effectively using uneven-aged silvicultural systems. About eight percent of the Forest is allocated to shrublands under this alternative, representing a smaller proportion than Alternative 1. Within these shrublands a substantial proportion of the regenerating age class will be found for deciduous forests including oak.

When looking overall at the results of the age class modeling and the allocation of management areas with their emphases, Alternative 2 allocates the highest proportion of oak-dominated forests to management areas that may not sustain oak, and where the older age classes are emphasized. In addition, in stands managed using even-aged silviculture in the Oak Hickory MA, the older age classes have a slightly higher representation than the younger age classes. Consequently, it appears likely that Alternative 2 will emphasize the older age classes in the oak forest community across the Forest substantially more than in Alternative 1, and somewhat more than under in Alternative 3. An additional concern with this emphasis is that there is currently only historical or theoretical evidence that oak-dominated forests can be perpetuated indefinitely without even-aged silvicultural system techniques. While the FLNF is ideally suited to experiment with partial cutting or selection methods that might perpetuate oak without creating definable stands of young trees, as even-aged silvicultural systems do, it may be risky to place such a high proportion of the Forest's oak stands in MAs where there is uncertainty regarding their persistence.

Alternative 3

Alternative 3 has an intermediate proportion of oak-dominated forest managed for age class objectives, when compared to the other alternatives, at 10 percent of all stands of this type (Table 3.5-19). This proportion is double that under Alternative 2, but still substantially less than under Alternative 1. Consequently, only ten percent of the oak stands on the Forest will be managed toward an age class distribution balanced to the desired objectives, with the age class distribution of the remainder of this forest community governed by natural processes or uneven-aged silviculture.

On average across the 15 decades, the regenerating, young and old age classes for stands managed using even-aged management under Alternative 3 fall within the desired objectives for their age classes, while the mature age class was more than five percent higher than desired (Table 3.5-21). Alternative 3, however, was the most consistent of the three alternatives, with the regenerating, young, and old age classes meeting objectives over a majority of the 15 decades, and with the old age class meeting objectives every decade. In addition, from decade to decade, variability was

relatively low for all age classes, particularly for the old and regenerating age classes, as well as for the young and mature age classes when compared to other alternatives.

Similar to Alternative 2, Alternative 3 is of concern relative to the desired objectives when looking at the regenerating age class from decade to decade. The regenerating age class ranges from one to 13 percent in Alternative 3, a smaller range than under Alternative 2, but still includes decades higher and lower than desired. The high proportions of stands in this age class occur within the first three decades, while the lowest proportions occur in decades eight and nine. From then on the proportions stabilize to within the desired range. Overall, however, this alternative is more similar to Alternative 1 in providing a relatively stable amount of this age class with only a third of the decades out of range.

The representation of even-aged oak stands within the older age classes is also variable across decades under Alternative 3, although less so than in either of the other two alternatives. While the old age class is represented within the desired range across all decades, similar to Alternative 2, the mature age class is only represented within the desired range in three of the 15 decades, similar to the two decades within range for Alternatives 1 and 2. The mature age class is at the high end or higher than objectives in all but two decades. This is balanced by the young age class being at the low end of the desired range whenever the mature age class is higher than desired. These difference are based on SPECTRUM's attempt to balance age classes and supply a sustainable yield of timber. Even with the old age class within objectives and the mature age class generally higher than objectives, however, this alternative is more similar to Alternative 1 in providing a slightly higher average proportion of even-aged stands in the younger age classes (51%) than in the older age classes (49%) (Table 3.5-21)

Looking at age classes across all the MAs, about three-quarters (almost 2,000 acres) of oak-dominated forest falls within designations that either emphasize older age classes or do not regulate age class distribution according to age class objectives, an amount intermediate between the other two alternatives. Outside of the Oak Hickory MA, this alternative allocates about 1,000 acres (38%) of the oak stands to management areas where natural processes dictate age class distribution. This is a smaller percentage than under Alternative 2, but still substantially higher than under Alternative 1. An additional 270 acres of oak stands within the Oak-Hickory MA were not chosen by SPECTRUM for any timber harvesting because it was not cost-effective to harvest these stands. In all of these areas, mature and old age classes will tend to dominate over the long-term. The long-term ecological tendencies in many of these areas, however, are likely to favor mesic hardwoods over oak stands. Another 725 acres (27%) of these oak stands are allocated to the Northern Hardwood Management Area, where mainly uneven-aged silvicultural systems are used. In these areas trees of many sizes and ages are maintained, but there is uncertainty if oak forests will be perpetuated over the long-term using uneven-aged management. About nine percent of the Forest is allocated to shrublands in Alternative 3, representing a smaller proportion than Alternative 1, where a substantial proportion of the regenerating age class will be found for deciduous forests including oak.

Overall, Alternative 3 is similar to Alternative 2 in providing a higher proportion of oak-dominated forests in areas where natural processes dominate, or that are maintained using uneven-aged silviculture. While this alternative therefore elicits the same concern as Alternative 2 regarding potential loss of oak forests over the long-term, Alternative 3 does a better job than Alternative 2 at contributing acres of even-aged oak stands to the regenerating age class. Alternative 3 is also more successful at meeting age class objectives than the other two alternatives on the acres where those age class objectives are applied.

Softwoods

Effects Common to All Alternatives

This discussion focuses on native softwoods, as most of the plantations are identified for conversion to native forest types. The SPECTRUM age class modeling, however, analyzed all softwoods combined. A comparison of the current age class distribution for native softwoods and plantation softwoods suggests almost identical proportions in each age class. Consequently, this discussion will use the age class distributions projected by SPECTRUM for all softwoods stands that fall within the Oak Hickory MA across alternatives, because there is little difference in the model parameters between native and plantation conifers, and because the starting proportions in each age class are essentially the same.

As noted for other forest communities, there is variation across alternatives in the proportion of softwood stands allocated to the Oak Hickory Management Area where age class objectives set in the revised Forest Plan are applied. This variation does not end up having much influence on the end result of achieving age class distribution for the alternatives. Alternatives 1 and 3 allocate similar proportions of softwood stands managed for age class objectives to the Oak Hickory MA at 22 and 24 percent, respectively, while Alternative 2 allocates 11 percent of these stands to the Oak Hickory MA (Table 3.5-19).

Based on modeling projections for softwood forests in the Oak Hickory MA that are managed using even-aged systems (Table 3.5-22), it is clear that the alternatives are projected to do a better job of achieving the age class distribution objectives over the short-term for softwoods than for the other forest communities discussed thus far. This may be due in part to the different ranges in age for each desired age class used in softwood stands compared with hardwood or oak stands. Each alternative is able to get at least one age class, the regenerating class, within the desired range of the objectives within the first and second decades.

Over the long-term, when averaging the age class distribution across the 15 decades, all alternatives met the objectives for age class distribution (Table 3.5-22). By the sixth decade, all age classes under all alternatives had attained the desired objectives and remained within the desired ranges throughout the rest of the modeling period. Alternative 3 stabilized at the fifth decade with all age classes within desired ranges from then on. The proportions in each age class were also very similar across alternatives, with Alternative 1 providing slightly higher proportions in the younger age classes and Alternatives 2 and 3 providing slightly higher proportions in the older age classes (a two percent difference). The small difference is likely inconsequential given the low variability in age class distribution from decade to decade and with the regenerating age class consistently within the desired range across all decades. Consequently, all of the alternatives provide managers with flexibility and are projected to be successful.

Outside of the Oak Hickory MA, the Shrubland Management Area is not relevant to the regenerating age class for softwood stands, as the maintenance intensity and methods for these areas favor deciduous tree species over coniferous species. Consequently, the regenerating age class can primarily only be satisfied through even-aged silvicultural systems. As noted earlier and in Table 3.5-19, across alternatives less than a quarter of the softwoods stands are identified by SPECTRUM for even-aged management. Alternatives 1 and 3 do offer greater opportunities than Alternative 2 in providing this habitat on the Forest. Overall, however, these “opportunity acres” across alternatives represent only two to four percent of the entire Forest, and so each alternative provides only small opportunities for this habitat over a landscape scale.

In addition, softwood stands outside of the Oak Hickory MA that are allocated to MAs where natural processes or uneven-aged silvicultural systems dictate age class distribution vary by alternative. Since all MAs would allow for removal of plantations for at least restoration purposes, however, and this removal is a desired objective of the revised Forest Plan, the

effect of management by natural processes or uneven-aged silviculture on softwood stands really only applies to the native softwood stands of white pine and hemlock. Over the long-term, age class distribution of softwoods stands will be associated predominantly with these native stands. Therefore, effects of alternatives on the older age classes of native softwoods are discussed below by alternative.

Alternative 1
Under Alternative 1, native softwood stands allocated to management areas that focus on older age classes, or on continuous forest canopy where age class is not managed, amount to 248 acres or 13 percent. This amount is substantially lower than the other two alternatives, and represents two percent of the Forest. Based on ecological tendencies (Table 3.5-1), however, native softwoods are expected on only 1 to 2 percent of the Forest, and these stands would likely be dominated by the old age class. The white pine stands in this group will eventually succeed to other forest types, and the extent to which they succeed to a mix with hemlock will dictate the long-term expectations for this age class for native softwoods across the Forest. Therefore, it is likely that the amount of old age class for native softwoods is a little lower than but close to what one might expect based on natural tendencies.

Alternative 2
Under Alternative 2, native softwood stands allocated to management areas that focus on older age classes or continuous forest canopy amount to 1,563 acres or 82 percent. This amount is substantially higher than the other two alternatives, and represents ten percent of the Forest. As noted for Alternative 1, however, the bulk of these acres are white pine, which will succeed to other forest types eventually. Even with natural succession, it is likely under this alternative that the older age classes of native softwood stands will fall within the expected range of natural variation. Three quarters of hemlock stands on the Forest are within these MAs, and some of the white pine stands are likely to succeed to a mix with hemlock. Consequently, it is expected that out of 1,500 acres, between 160 and 300 (1-2% of the FLNF) will remain in native softwoods over the long-term and be dominated by the older age classes.

Alternative 3
Under Alternative 3, native softwood stands allocated to management areas that focus on older age classes or continuous forest canopy amount to 1,149 acres, or 60 percent. This amount is intermediate between the other two alternatives, and represents seven percent of the Forest. As noted for Alternative 2, the bulk of these acres are white pine, which will succeed to other forest types, and three quarters of the Forest's hemlock stands are included within these MAs. Although the total acres are less than in Alternative 3, they are still substantially more than under Alternative 1. Consequently, as for Alternative 2, it is likely that some of the white pine stands will remain softwood over the long-term, and that 1 to 2 percent of the FLNF will remain in native softwoods dominated by the older age classes.

Aspen

Effects Common to All Alternatives
SPECTRUM was not able to cost-effectively harvest any aspen stands across alternatives. Consequently, commercial harvesting of aspen was not modeled, and projections of future age class distributions could not be made through SPECTRUM. Proposed non-commercial activities in Appendix D include clearcutting for aspen in order to maintain wildlife habitat, at a maximum of 80 acres per decade regardless of alternative. It is unlikely that all 80 acres will be harvested under Alternative 2 due to limited availability of lands that support this activity.

Based on a constant level of harvesting across all alternatives, and age class and rotation age objectives in the revised Plan, all alternatives are expected to fall within the desired age class distribution for aspen by the fifth decade, when all stands will have rotated through one rotation age for this community. Acres in each age class will tend to vary between Alternative 2 and the other alternatives, as will the age class distribution during the 50 years it takes to reach a balanced distribution at desired objectives. These differences are discussed below.

Comparison of the alternatives focuses on lands allocated to the Oak Hickory and Northern Hardwood MAs where regenerating aspen is permitted or emphasized, and lands allocated to other management designations where management of aspen would be more limited.

Alternatives 1 and 3

Alternative 1 and 3 have the largest proportions of aspen forest in management areas where even-aged silvicultural systems are emphasized, ranging from 65 percent in Alternative 1 to 45 percent in Alternative 3 (Table 3.5-18). Alternative 1 provides the most opportunities to manage age class distribution for this forest community since two-thirds of existing stands are within the Oak Hickory MA, and because the management area allocation to the Oak Hickory MA in general is substantially greater in this alternative. Alternative 3 may not offer as many opportunities, with less than half of existing aspen stands continuing to be managed through even-aged silvicultural systems. Since the Northern Hardwood MA allows for aspen management, however, the combination of allocations of land to both this and the Oak Hickory MA under Alternative 3 means that there are opportunities to create new aspen stands that can be managed for age class distribution.

Under both alternatives, projections are that aspen will have 80 acres in the regenerating age class, 40 acres in the old age class, and about 320 acres in the young/mature age class after 50 years. During the 50-year transition period, the amount of regeneration age class will increase substantially through the regeneration of existing stands and the creation of new stands. As the acres of this habitat increase over time, there will be an increase in middle-aged stands along with a slow decline in old stands as they are regenerated. All age classes are represented during this 50-year transition period except for the old age class during the last year of the transition under Alternative 3.

Looking outside the Oak Hickory Management Area, the proportion of aspen stands where older age classes will be emphasized through natural processes or limited management ranges from less than 1 percent in Alternative 1 to 23 percent in Alternative 3 (Table 3.5-18). In the Northern Hardwood Management Area, there is an exception to allow management of aspen using even-aged silvicultural systems. This accounts for less than 1 percent of the aspen stands in Alternative 1, and 28 percent in Alternative 3. If one combines the two MAs where aspen can be managed using even-aged silvicultural systems (Oak Hickory and Northern Hardwood), Alternative 3 provides the greatest opportunity at 73 percent, with Alternative 1 somewhat less at 65 percent. Consequently, at least in Alternatives 1 and 3 a substantial amount of aspen forest can be managed using even-aged silvicultural systems, which will provide increased opportunity to develop an age class distribution closer to what is desired.

Shrublands, where the regenerating age class will be emphasized, range from 13 percent in Alternative 1 to 9 percent in Alternative 3. As mentioned earlier, the shrubland component will account for a large portion of the regenerating age class for all the deciduous forest types, including aspen. In fact, because aspen species are encouraged to sprout when cut back through mowing or burning, shrubland management can be particularly effective at maintaining this age class for aspen.

Alternative 2

Alternative 2 provides the fewest opportunities for management of aspen compared to the other alternatives; only 1 percent of existing stands of this community occur within the Oak Hickory MA (Table 3.5-18). Alternative 2 allocates 26 percent of aspen stands to the Northern Hardwood MA, where even-aged management of this forest community is also allowed by exception. Under this alternative, projections are for fewer acres to be regenerated or created, and so acres within each age class are generally smaller than under the other alternatives. Aspen is projected to be represented by around 40 acres each in the regenerating and old age classes, and around 180 acres in the young/mature age class, after 50 years. The regenerating age

class will have half the acres expected under the other two alternatives.

In addition, due to the smaller number of existing stands to start with (nine stands, 79 acres), and the fact that they are in either the young/mature or old age class, managing toward the age class distribution will require that all older stands be harvested over the 50-year transition period in order to regenerate stands. Consequently, during the second through fifth decade, there will be few to no aspen stands represented within the old age class under this alternative.

Outside of the Oak Hickory MA, Alternative 2 allocates the highest proportion of aspen stands to management designations that emphasize natural processes or limited management, at 63 percent. When looking at a combination of both MAs where aspen can be maintained through management, Alternative 2 allocates 27 percent of this forest community to these management areas, the lowest proportion of the alternatives. With only about a quarter of the existing stands of aspen likely to continue into the future, this small proportion will limit the ability of managers to achieve the desired age class distribution over the short and long-term through creation of new stands. Because the proportion of the Forest in shrubland in this alternative is similar to Alternative 3, there will continue to be representation of aspen in the regenerating age class in this MA as well.

Indicator 3 – Acres of Timber Harvest Treatments (Forest Structure)

The following analysis looks at the general long-term effects to within-stand complexity of major forest communities due to the varying MA allocations and associated harvesting and natural development trends. The effects discussed here generally do not pertain to the short-term, as forest structure takes decades or centuries to develop, and appreciable or measurable differences are not likely to be found over the short-term. This analysis uses the SPECTRUM modeling that estimates acreages of different treatments by forest community for each alternative. In addition, the acres that are not harvested are compared in order to take into account the effects that forest succession has on increasing within-stand complexity. Table 3.5-23 displays the relative amounts of harvest treatment methods to be used on an average annual basis over the 150-year projection period to maximize present net value.

Effects Common to All Alternatives

Generally across alternatives, harvesting levels are expected to be at or above those of the previous 15 years. Levels of commercial clearcutting will generally decrease, and levels of selection harvests are expected to increase (Table 3.5-23). Clearcutting using noncommercial methods for aspen is expected to increase across all alternatives, although these treatments tend to occur in small patches and leave some down woody debris that contributes to habitat structure.

The long-term harvest projections indicate that all of the alternatives will harvest less than two percent of the forested management areas on the FLNF annually, which amounts to less than one percent of the Forest per year over the long-term (Table 3.5-23). At least half of the acres in forested management areas will develop old conditions over the long-term (Table 3.5-23) as they were not selected for harvesting by SPECTRUM. These areas will continue to succeed through natural processes and develop increasing within-stand complexity over the long-term.

Clearcutting harvest methods are used minimally on the Forest across the alternatives, and are unlikely to have substantial effects on within-stand complexity of the regenerating stands over the long-term. Clearcutting will occur on much less than one percent of the forested portion of the FLNF each year (Table 3.5-23), and over the next 20 years would amount to at most 60 acres for commercial methods and 160 acres for noncommercial methods for aspen. When compared to other regeneration harvest methods, clearcutting simplifies within-stand species and structural diversity. This effect is mitigated by the predominance of the various other harvesting methods across alternatives, which add

structural diversity by maintaining mature trees in the canopy for a period of time after the initial regeneration harvest.

All alternatives tend to improve forest structure over the long-term because they make limited use of the more intense single cohort methods (clearcutting) and provide more opportunities to manipulate forest structure through management. The ability to manipulate forest structure is important on the FLNF because it can accelerate forest recovery from land use history by adding structure that is currently missing, and thereby benefit plant and animal species and their habitats. In addition, prescribed fire is allowed in all of the alternatives and across most of the management areas to help restore and maintain native plant communities, which will also contribute to improved structural diversity.

Alternative 1

Based on the average annual harvesting projections over the next 150 years for Alternative 1 (Table 3.5-23), even-aged silvicultural systems will be the dominant method of regenerating forested stands, as it is currently. Even-aged regeneration harvests and removal cuts will be applied to about half of the acres harvested, while selection harvesting is applied to about 16 percent of the harvested acres. The shelterwood method, both delayed and standard, is the dominant even-aged silvicultural systems; clearcutting makes up about three percent of the average annual cut. Partial cutting through thinning accounts for over a third of the cutting likely to occur on the Forest over this timeframe.

Overall, this alternative will provide moderate opportunities to increase within-stand complexity over the long-term. About half of the acreage within forested management areas will experience harvesting over the long-term, which is more than under other alternatives. This provides abundant opportunities to manipulate structure through active timber management, which can help to improve the structural characteristics that have been reduced through land use history. The harvesting methods are weighted heavily toward even-aged silvicultural systems, and so within-stand complexity is likely to be less in the harvested areas than it might be in other alternatives.

Alternative 2

This alternative proposes timber harvesting on a relatively small proportion of the Forest (871 acres or 10 percent of the forested lands), which amounts to about 28 acres annually. Even-aged silvicultural systems are slightly more prevalent than uneven-aged silvicultural systems, but actual regeneration harvests and removal cuts using each method amount to similar acreages annually (Table 3.5-23). This is a substantial increase in the proportion of uneven-aged silvicultural systems when compared to Alternative 1, although actual acres harvested annually are still less than in Alternative 1.

The proportions of the remaining harvest treatments are reduced from Alternative 1, including shelterwood, clearcutting, and thinning activities (Table 3.5-23). Shelterwood harvesting dominates the even-aged regeneration methods, with clearcutting amounting to about one acre harvested annually via commercial methods. Thinnings account for about a fifth of the annual cutting. The use of prescribed fire may become more important in Alternative 2 than in the other alternatives as a tool to restore ecosystems and maintain opportunities for regeneration of shade intolerant species like oaks.

Overall, this alternative in particular provides the Forest with minimal ability to increase within-stand complexity over the long-term through active timber management. The availability and proposed amounts of regeneration harvest cutting methods provide a mix of management practices to improve stand level structural diversity, but over a much smaller number of acres than other alternatives. With the low harvest levels under this alternative, it will likely take a much longer time for structural diversity to increase substantially.

This alternative proposes a substantial number of acres within the Future Old Forest designation, where ecological restoration of native ecosystems is encouraged, although not through commercial timber sales. A variety of vegetative manipulations can be implemented in the Future Old Forest designation to improve structural diversity in these recovering forests, including prescribed fire and removal of non-native softwood plantations.

Alternative 3

Alternative 3 proposes timber harvesting on an intermediate proportion of the Forest landscape when compared to the other two alternatives. More than 2,800 acres of the Forest, or 31 percent of forested lands, are proposed for harvesting over the long-term (Table 3.5-23). Harvesting would amount to about 95 acres per year, which is more than three times that in Alternative 2 and somewhat less than under Alternative 1. Under this alternative, uneven-aged regeneration harvests occur on almost twice the acres as even-aged regeneration harvests and removal cuts, and occur on more than double the acres of either of the other alternatives. With thinnings added, however, the two silvicultural systems are almost balanced, with even-aged silvicultural systems slightly more prevalent. Clearcutting, shelterwood, and thinning activities will also happen on more acres than under Alternative 2, but less than under Alternative 1.

Overall, this alternative will provide moderate to high levels of opportunities to increase within-stand complexity over the long-term. While about 30 percent of the forested lands will be managed using active timber harvesting, a diversity of methods and balance among even-aged and uneven-aged silvicultural systems will occur under this alternative, more so than under Alternatives 1 and 2. This suggests that Alternative 3 will be more successful than Alternative 1 in improving within-stand complexity across the harvested proportion of the Forest. The remainder of the forested acreage will be managed primarily through natural processes and will increase in structural complexity over the long-term. Overall, this alternative appears to provide many of the benefits of Alternatives 1 and 2 with fewer drawbacks related to low harvest levels or predominance of even-aged silvicultural systems. Consequently, this alternative will be more effective at improving structural diversity over a shorter timeframe than the other alternatives.

Table 3.5-23: Average annual acres of commercial harvest projected by SPECTRUM for various harvest methods over the 150-year modeling period, by alternative.

Harvest Methods	Alt. 1	Alt. 2	Alt. 3
	acres (percent)	acres (percent)	acres (percent)
Even-aged Regeneration Methods			
Clearcut	3	1	3
% of harvests	3%	5%	3%
Shelterwood Regeneration Cut	30	5	15
% of harvests	25%	17%	16%
Overstory Removal Cut	24	4	12
% of harvests	21%	15%	13%
Partial Cut – Thinning	43	6	22
% of harvests	36%	20%	23%
Uneven-aged Regeneration Methods			
Individual Tree/Group Selection Cut	19	12	43
% of harvests	16%	43%	46%
Total Average Annual Regeneration[1]	75	22	73
Total Average Annual Harvest	118	28	95
Total Acres Not Harvested (percent of forested acres)[2]	5,045 (56%)	8,201 (90%)	6,237 (69%)

Source: Amounts are derived from SPECTRUM outputs by decade on all suitable forested acres. See glossary for definitions of harvest methods.
[1] Total regeneration includes all methods except thinning
[2] Total not harvested = total forested acres (excluding acres of open land) minus the acres that were assigned a harvesting prescription by the SPECTRUM model. Total forested acres are 9,072 acres.

Cumulative Effects

The proposed alternatives rely on differing forest management strategies for shaping future forest composition and structure on the FLNF. The cumulative effects to forest composition and structure associated with the implementation of a proposed alternative are analyzed within the context of the lands managed by the FLNF. As noted in the introduction to the analysis area for this section, quantitative data on the current forest composition and structure of the ecological region in which the FLNF sits is not available. Historical data from the 1790s (Marks and Gardescu 1992) and data on ecological tendencies from ecological mapping (DeGloria 1998) provide context for this analysis.

The FLNF region represents a transition zone between the agriculturally dominated Ontario Lake Plain to the north and the mountainous, forested Allegheny Plateau to the south. The Forest essentially straddles the break between these two broad ecoregions, with more mesic, calcareous, finer soils in the northern half and along the lakeshores, and more acidic forest soils in the southern half. Data from 18th century land survey records indicate that the FLNF sits at the transition between oak-dominated forests that extend into the region from the south and west, and mesic hardwood forests that dominate the Finger Lakes region from Cayuga Lake north and eastward. As a transition zone between two dominant types of current land use (forest and agriculture) and two major forest communities (oak-dominated and mesic hardwoods), an expected mix of agricultural uses and forest communities can be found on the FLNF. Transition zones are also known as places where species at the edges of their range encounter constant stresses that force adaptation in order to avoid local extinction. One responsibility of land managers within transition zones is to ensure that conditions are maintained that allow the species in these areas to adapt.

Mesic hardwoods in the 1790s generally dominated the composition of the FLNF and Finger Lakes region. In the towns of Hector and Ovid, however, a substantial area of oak-dominated forest was also present,

representing about one-third of the area in the vicinity of the FLNF. This forest type was also associated with a much higher level of disturbance associated with fire. Consequently, maintaining oak-dominated forest and associated fire disturbance are likely to be important contributions the FLNF can make to biodiversity conservation in the area.

Within the mesic hardwood forest community of the Finger Lakes area large disturbances were rare historically, aside from forest clearing by Native Americans associated with Lake Ontario. There is little evidence of Iroquois settlements or other developments on the FLNF. The primary disturbance in this forest community has been conversion to agriculture. Maintaining mesic hardwood forest communities on productive sites, including a proportion that are not disturbed by harvesting, is another action the Forest Service can take to conserve this major forest community on the Forest. Given the existing agricultural use of these areas of the Forest, the proportion of mesic hardwoods may not reach two-thirds as it was historically. Alternatives can be evaluated regarding the extent to which they approach the historical proportions.

Native forests of conifers and aspen were minor components of the landscape historically. Hemlocks occur in ravines; pine often occurs as a long-lived pioneer with hemlock, mesic hardwoods, or oak forests; and aspen occurs as a short-lived pioneer in association with oaks and mesic hardwoods. Although conifers were widely planted in the Finger Lakes region to aid recovery of depleted agricultural soils, many of these plantations are declining and reverting to native forest communities. Consequently, conifer proportions are declining on the FLNF. By maintaining the presence of conifers and aspen on the Forest on sites capable of supporting their long-term presence, and with disturbances required to ensure their continuation, the Forest can make another important contribution to regional biodiversity.

Alternative 1

Alternative 1 generally maintains or improves conditions for supporting oaks, aspen, and native conifers, but of the alternatives provides the fewest opportunities to improve mesic hardwood composition to increase its proportion on the Forest. This alternative, when considering only the forested land on the FLNF, maintains a higher proportion of oaks to mesic hardwoods, which is the opposite of the historical proportions. While native softwoods and aspen are maintained at levels higher than the historical proportions, they are only slightly higher and so do not appear way out of balance. This alternative tends to favor younger age classes and forests regulated using even-aged silvicultural systems, with a small proportion of the Forest reserved for low disturbance levels, the lowest of the alternatives. This approach to management also tends to favor oaks, native pines, and aspen, while limiting the development of stand structure in mesic hardwoods. Native hemlock forests in ravines are generally protected in this alternative, either in special designations or through standards and guidelines. Prescribed fire is allowed in this alternative in most of the management areas and can contribute to development of structure and historical disturbance regimes in the area

Overall, this alternative tends to move the current forest condition, which is balanced between mesic hardwoods and oaks, toward a more oak-dominated landscape with increasing levels of disturbance. While it is desirable to maintain conditions suitable for oak forests in the region, this alternative does so at the expense of improving conditions for mesic hardwoods on the Forest, which are under-represented when compared to the historical context. In addition, mesic hardwood forests are the most likely to be lost to agriculture, industry, or housing development in this region over the long-term, as the lands they occupy tend to be productive and suitable for those uses. There is no reason to expect development pressures to decline in the Ontario Lake Plain, and so it is likely that fewer and fewer

areas of mesic hardwood forest of any substantial size will persist over the long-term in this ecoregion. This alternative does less than the others to contribute to the conservation of this forest type over the long-term in this region.

Alternative 2

Alternative 2 generally increases the amount of mesic hardwood forest on the FLNF, which is currently under-represented proportionally, but provides the fewest opportunities of the alternatives to maintain conditions that would support oak, aspen, and native pines. When considering only the forested land on the FLNF, Alternative 2 proposes to increase the amount of mesic hardwood forest to levels even greater proportionally than in the 1790s, and reduces the amount of oak forest to levels half of what might be expected historically. Native softwoods and aspen are maintained at slightly higher than historical levels. Because Alternative 2 allocates more than three-quarters of the Forest's forested landscape to MAs where timber harvesting is limited, stand structure and forest structure will become more diverse over the long-term, particularly in areas of mesic hardwoods. This alternative generally favors the older age classes of all types. This approach, however, minimizes the flexibility the Forest has to maintain oak, aspen, and native pine stands. As these stands age, there is an increased risk that they will shift in composition to mesic hardwoods, placing composition further outside the ecological tendencies indicated by 1790s data. Hemlock forests in ravines are generally protected in Alternative 2, primarily through special designations. While prescribed fire is allowed in this alternative, its effectiveness in maintaining oak ecosystems with which fire is associated, without the creation of canopy gaps through active management, remains to be seen.

Overall, Alternative 2 tends to move the current forest condition, which is balanced between mesic hardwoods and oaks, toward a more mesic hardwood forest landscape with minimal levels of disturbance. While it is desirable to improve conditions for mesic hardwoods, which are under-represented on the Forest when compared to the historical context, this alternative does so at the expense of maintaining conditions that tend to support oak, aspen, and native pines. Based on historical data, forests dominated by oak tend to reach their northern extent in the FLNF. While these forests tend to be more common to the south, in the Allegheny Plateau, foresters have been finding it more and more difficult to regenerate oak in the northern parts of its range (Rentch et al. 2003). There is strong evidence that routine prescribed fire along with frequent canopy gaps are needed to perpetuate these areas of oak forest. Compared to other small conserved parcels of forest land in this region of New York, the FLNF has an important role to play in providing for research and demonstration of effective tools for oak management over a substantially larger land base, where there is historical data for comparison. By removing a substantial proportion of existing oak forests from managed lands where these management strategies can be tested, the risk of losing most of the oak forest to mesic hardwoods over the long-term is increased.

Alternative 3

More than the other alternatives, Alternative 3 increases the conditions that support mesic hardwoods on the Forest, while maintaining or improving conditions that support oaks, aspen, and native conifers. Alternative 3, when considering only the forested land on the FLNF, increases the amount of mesic hardwood forest when compared to oaks to a proportion similar to, but a little lower than, the historical context and ecological tendencies. This is the only alternative that comes close to approximating the historical or ecological proportions expected. While native softwoods and aspen are maintained at levels similar to Alternative 1, they are only slightly higher than levels expected based on ecological tendencies.

Alternative 3, when compared to the others, comes closest to balancing the younger and older age classes, particularly with mesic hardwoods. While Alternative 1 emphasizes even-aged management and younger age classes, and Alternative 2 emphasizes low levels of harvesting in general, Alternative 3

provides for more stable representation of the age classes for even-aged stands within desired objectives, while also providing about a third of the Forest and over half of the forested lands in MAs that emphasize natural disturbance or uneven-aged management. This alternative also provides more opportunities for uneven-aged management than the other two. This overall approach to management is likely to provide for more of a range in structural diversity in stands of all types. In Alternative 3 hemlock forests in ravines are protected primarily through special designations. Prescribed fire is allowed in this alternative in most of the MAs and can contribute to development of structure and historical disturbance regimes in the area.

Overall, Alternative 3 tends to manage FLNF lands in a way that contributes considerably to maintaining and supporting the composition and structure of major forest communities in the region and moving them toward the proportions that might be expected based on historical data and ecological tendencies, as well as toward desired objectives in the revised Forest Plan. Alternative 3 provides the most opportunity to conserve lands that will eventually develop into mesic hardwood forests managed through natural processes, as well as to maintain oak forests using a variety of management strategies.

3.5.2 Non-Native Invasive Species

A non-native invasive species (NNIS) is an organism that has been purposefully or accidentally introduced outside its original geographic range, and that is able to proliferate and aggressively alter its new environment, causing harm to the economy, environment, or human health (Executive Order 13112 1999). An infestation is defined as an area where a population of invasive species exists (USDA Forest Service 2004g).

Issue Statement

Public concern is focused on the need to evaluate current management direction for non-native invasive species (NNIS). At this time, the list of NNIS the FLNF tracks includes only plants; it could potentially include animals, as well, if any non-native invasive animals became of concern. Concern is focused on the need to address maintenance and viability of native plant and animal populations, and prevention and control of non-native invasive species, including the effects NNIS management will have on Threatened, Endangered, and Sensitive (TES) Species. NNIS, wildlife, and TES are part of overall biodiversity and ecosystem management concern; wildlife and TES are discussed in Chapter 3 sections 3.6 and 3.7.

Indicator 1 – Acres in Management Area Allocations Allowing Ground-Disturbing Activities that have Potential to Increase NNIS

The first indicator to be used in this effects analysis is acres in management area allocations allowing ground-disturbing activities that have the potential to increase NNIS. NNIS establish more readily in places where the ground is disturbed (for example, bare soil has been exposed and/or the soil has been loosened). As NNIS increase, native and desirable non-native species face greater competition for resources, and management for biological and ecological diversity and conservation of species, communities, and ecosystems becomes more challenging.

While a myriad of management activities and Forest uses can cause ground-disturbance, ground-disturbing management activities that are most conducive to spreading NNIS include:

- Timber harvest
- Trail and recreation facility development, use, and maintenance
- Designating trails for new uses, such as bicycles, which would change the extent to which use of a travel corridor is ground-disturbing

- Utility corridor development and maintenance, including wind power and communication sites
- Surface development for mineral exploration and extraction
- Aquatic habitat restoration (for example, dredging ponds or repairing earthen dams or dikes)
- Grazing domestic animals (the hooves of domestic animals can tear up vegetation and expose bare ground)
- Prescribed fire
- Road development (temporary and permanent), maintenance, and closures (road closing involves soil disturbance, but once closed, the roadbed receives less disturbance)

Management areas that would be most subject to all, or most, of these ground-disturbing activities are Grassland for Grazing, Grassland for Wildlife, Shrubland, Northern Hardwood, and Oak Hickory. Other management areas either allow very few of these activities, or allow them only under very limited circumstances. While the actual acres of ground-disturbing activities in a given year would be substantially less than the total acres in which those activities would be allowed, the extent to which an alternative allows ground-disturbing management activities is an indicator of the relative potential of that alternative to increase NNIS on the Forest. A list of estimated acreage of ground-disturbing activities can be found in the revised Forest Plan Proposed and Probable Practices (Appendix D). The Timber Management section (3.11) of Chapter 3 also lists the potential acres harvested under each alternative.

This indicator highlights the differences between management area allocations under each alternative allowing ground-disturbing activities that have potential to increase NNIS.

Indicator 2 – Acres in Management Area Allocations Allowing an Increase in Pathways along which NNIS can Disperse

The second indicator to be used in this effects analysis is acres in management area allocations allowing management activities that increase pathways − mostly linear openings − along which NNIS can disperse. NNIS disperse to new sites via a variety of means, including wind, water, the fur, feathers, and digestive tracts of wild and domestic animals, and vegetative reproduction. Patterns of infestation indicate that dispersal also follows human travel corridors (seeds are easily transported on people's vehicles, footwear, clothing, and gear) and other linear openings. These pathways can provide the combination of disturbed ground, increased light, and avenues for seed movement that can enable NNIS to become established in new areas. The more pathways there are for dispersing NNIS, the more the composition of the interiors of natural communities shifts away from native species, making it harder to maintain biological and ecological diversity and conserve species, communities, and ecosystems.

Management activities that could increase pathways for dispersing NNIS include:

- Timber harvest
- Trail and recreation facility development
- Designating trails for new uses, such as bicycles, which would change the extent to which a travel corridor is a pathway for NNIS dispersal
- Utility corridor development, including wind power and communication sites
- Surface development for mineral exploration and extraction
- Road development (temporary and permanent)

Likewise, a decrease in pathways for dispersal could occur if existing trails or roads were closed, or existing uses of trails were prohibited. The acres in management area allocations most likely to have an increase in pathways for dispersal are one indicator of the relative potential of the alternative to increase NNIS on the Forest. Management areas that would be most subject to all, or most, of the activities that increase pathways of dispersal are Grassland for Grazing, Grassland for Wildlife, Shrubland, Northern Hardwood, and Oak Hickory. Other

management areas either allow very few of these activities, or allow them only under very limited circumstances. While the actual acres on which new pathways would be developed would be substantially less than the total acres on which those activities would be allowed, the extent to which an alternative allows these activities is an indicator of the relative potential of that alternative to increase NNIS on the Forest. A list of estimated acreage of forest management activities can be found in the revised Forest Plan Proposed and Probable Practices (Appendix D). The Timber Management section (3.11) of Chapter 3 also lists the potential acres harvested under each alternative. This indicator highlights the differences between management area allocations under each alternative allowing potential increases in pathways for dispersing NNIS.

Indicator 3 – Acres in Management Area Allocations Allowing Activities that Increase the Amount of Light Reaching the Ground

The third indicator to be used in this effects analysis is the acres in management area allocations allowing management activities that increase the amount of light reaching the ground. Many NNIS establish most readily in areas exposed to sunlight. While there is overlap between activities that disturb the ground and activities that increase light, there are also instances in which one happens without the other (for example, hand-cutting small amounts of woody vegetation can increase light without disturbing the ground); for this reason, they are analyzed separately. The more light reaches the ground, the more NNIS can become established, making it harder to maintain biological and ecological diversity and conserve species, communities, and ecosystems.

Management activities that could increase the amount of light reaching the ground include:

- Timber harvest
- Trail and recreation facility development and maintenance
- Utility corridor development and maintenance, including wind power and communication sites
- Surface development for mineral exploration and extraction
- Openings maintenance
- Grazing domestic animals
- Prescribed fire
- Road development (temporary and permanent)

The acres in management area allocations that would be most subject to activities that increase the amount of light reaching the ground is an indicator of the relative potential of an alternative to increase NNIS on the Forest. Management areas that would be most subject to all, or most, of the activities that increase light reaching the ground are Grassland for Grazing, Grassland for Wildlife, Shrubland, Northern Hardwood, and Oak Hickory. Other management areas either allow very few of these activities, or allow them only under very limited circumstances. While the actual acres on which activities that increase light reaching the ground would be substantially less than the total acres on which those activities would be allowed, the extent to which an alternative allows these activities is an indicator of the relative potential of that alternative to increase NNIS on the Forest. A list of estimated acreage of forest management activities can be found in the revised Forest Plan Proposed and Probable Practices (Appendix D). The Timber Management section (3.11) of Chapter 3 also lists the potential acres harvested under each alternative.

This indicator highlights the differences between management area allocations under each alternative that allows activities that potentially increase the amount of light reaching the ground.

Analysis Area

The analysis area for direct and indirect effects includes all federal land managed by the FLNF. This area represents National Forest System lands where NNIS occur or could become established, and the land where other National Forest resources could receive impacts from the spread of NNIS.

The analysis area for cumulative effects includes all FLNF lands and the adjoining lands administered by other owners, both public and private, because activities on National Forest System lands have the potential to spread NNIS to adjacent lands, and conversely, adjacent land activities may spread NNIS to National Forest System lands.

3.5.2.1 Affected Environment

Introduction

Non-native invasive species and their impact on other resources have become a nation-wide concern. As a threat to biodiversity, invasive plants are second only to habitat destruction (The Nature Conservancy, NYSO 2004). For centuries, humans have moved plant, animal, and other species around the world, both intentionally and unintentionally (National Agricultural Library 2004). In New York State, more than 30 percent of the flora is non-native; however, only a few are considered invasive and problematic (The Nature Conservancy, NYSO 2004).

There is a federal noxious weed list that includes species that could be problematic anywhere in the country. Some states have developed their own lists, and each national forest has its own list of priority species. Currently, the FLNF has 37 species on its NNIS plant list (Table 3.5-25). This list currently consists of 18 of the 22 species on the 2004 Primary List of Invasive Plants in New York State, which includes some species not believed to be problematic on the FLNF, and has since been reduced to a few target species (The Nature Conservancy, NYSO 2004); 1 species on the federal list; and 13 species suggested by a local botanical consultant, including five that may be problematic mainly in grazed areas. Over time, species may be added to or subtracted from the FLNF list, as knowledge about this topic evolves. Currently the FLNF list includes species that could occur in three broad classes of environments − aquatic, riparian, and terrestrial. Each of these broad classes occurs on the Forest, and is therefore susceptible to NNIS infestation.

Introduction of plant NNIS can occur in a variety of ways. Seeds may be dispersed by wind, water, wildlife, and human activity. NNIS may also spread by vegetative means, such as underground stems and buds, or plant fragmentation. Some aquatic species produce bud-like over-wintering structures. Most NNIS spread into natural communities by first becoming established along their edges (the margin where two or more vegetation patches meet, such as a meadow opening next to a mature forest stand), where there is more likely to be soil disturbance and more light. NNIS occur less frequently in forest interiors. While the Forest Service has no control over dispersal by wind, water, wildlife, or vegetative growth, they can control management activities and influence human activity on the Forest.

Existing Forest Plan Management Direction

The 1987 Forest Plan direction is component of Integrated Pest Management, but does not focus on plant NNIS. Additional 1987 Forest Plan direction pertains to the protection of wildlife habitat, but does not specifically address NNIS. Even though the 1987 Forest Plan does not directly address NNIS, the FLNF has begun to address this issue through utilization of national and regional direction that emphasizes NNIS inventory, mapping, and monitoring; prevention and education; control; research; and administration and planning (USDA Forest Service 1998b).

Proposed Changes in Management Direction Common to All Alternatives

The revised Forest Plan includes a goal to maintain and restore quality, amount, and distribution of habitats to produce viable and sustainable populations of native and desirable non-native plants and animals (Goal 2). The revised Plan also includes a goal to demonstrate innovative, ecologically sound management practices that can be applied to other lands (Goal 9).

Objectives to achieve these goals emphasize control of NNIS. In addition, the revised Forest Plan incorporates NNIS into goals and objectives for ecosystem management, education, and relationships with partners and community organizations.

The revised Forest Plan includes Forest-wide standards and guidelines that direct the Forest Service to incorporate information on the status and threat of NNIS infestation as part of project development, to use standardized methods for determining risk, and to identify measures that can be undertaken to prevent and control the spread of NNIS during project implementation. Standards and guidelines also provide guidance regarding infestation treatment; require inclusion of NNIS prevention methods in contracts and permits; provide direction regarding seed mixes and mulch; and outline an integrated pest management approach that includes methods of prioritizing prevention and control activities.

Existing Condition

Varied recreational and management activities occur on the FLNF that have the potential to disperse NNIS or increase the likelihood that they will become established at a given site. This increase in dispersal and establishment is more than what would happen naturally as a result of seed transport by wind, water movement, and in the fur, feathers, feet, and digestive tracts of wild animals. Given that the Forest Service has no control over dispersal and establishment that happens naturally, the amount of NNIS infestation that would occur naturally becomes, to a certain extent, an acceptable threshold of infestation.

Despite prevention and control efforts, NNIS will continue to disperse and become established to at least some degree, since no methods for prevention and control are one hundred percent effective. Left unchecked, however, NNIS have the potential to impact other resources, including contributing to the decline of TES species and biodiversity. At this point, there is no indication that competition with NNIS is pushing any Regional Forester Sensitive Species (RFSS) toward federal listing or loss of viability on the Forest. Although not quantified, there is anecdotal evidence that NNIS have contributed to loss of biodiversity on the Forest. An unacceptable threshold would be for NNIS to increase to the level at which they could contribute to decline in TES species on the Forest. In addition, it would be unacceptable to continue to lose biodiversity, if methods of avoiding this level of infestation were available.

Problematic species that do or could occur on the FLNF include Eurasian watermilfoil in aquatic habitats, purple loosestrife in riparian habitats, and garlic mustard in terrestrial habitats. For a complete list of NNIS tracked on the FLNF, see Table 3.5-24.

Statewide distribution information for all NNIS is not currently available. Forest distribution is available to a limited extent.

Aquatic habitats on the Forest consist of human-made livestock ponds, wildlife ponds, and streams that are mostly dry in mid-summer; these have not been surveyed for NNIS.

Riparian areas on the Forest that have been surveyed are those within or adjacent to sites designated as potential future Research Natural Areas, or other potential ecological study areas. Of eight such sites on the Forest, all have had at least partial surveys, and all but one have infestations of NNIS; at these sites, multiflora rose and buckthorn are most widespread (FLNF, unpublished data).

Terrestrial habitats that have been surveyed on the Forest include approximately one-third of all roads that form a grid on the Forest, skid roads from four timber sale areas, three stands slated for timber stand improvement work, and most of the Forest's pasture lands. All of the roads surveyed had infestations, most with several different species, with multiflora rose, buckthorn, honeysuckle, garlic mustard, brown knapweed, and autumn olive being the most common (FLNF, unpublished data). All of the timber sale areas had infestations in or near at least some skid roads or log landings; these infestations were small and multiflora rose was most common (FLNF, unpublished data). Of the three sites

slated for timber stand improvement, two are infested with multiflora rose (FLNF, unpublished data). Of the 50 pastures surveyed, 35 had infestations of brown knapweed, although a few of these infestations were less than 0.01 acres in size (FLNF, unpublished data). Many areas on the Forest have not been surveyed for NNIS. Given the extensive network of roads and trails on the Forest, very little of it is remote enough to likely be completely free of NNIS infestations.

Public education and control projects have begun; prevention is beginning to be incorporated into projects during the planning stage; and Forest Service staff and volunteers are learning and implementing national data collection protocols.

Table 3.5-24: FLNF non-native invasive species (NNIS) list and associated major habitat types in 2004.

	Terrestrial	Riparian	Aquatic
Giant Hogweed	X	X	
Norway maple	X		
Tree of heaven	X		
Garlic mustard	X		
Barberry – Japanese & common	X		
Oriental bittersweet	X		
Crown vetch	X		
White swallow-wort	X		
Autumn olive	X		
Leafy spurge	X		
Privet	X		
Honeysuckle – Japanese, Amur, Tartarian, Morrow, European fly,& their hybrids	X		
Purple loosestrife	X	X	
Japanese stilt grass	X		
European water-milfoil			X
Reed canary grass	X	X	
Common reed	X	X	
Japanese knotweed	X	X	
Curly pondweed			X
Buckthorn – common & smooth	X		
Multiflora rose	X		
Water chestnut			X
Periwinkle	X		
Knapweeds – black, brown, & spotted	X		
Short-fringe starthistle	X		
Thistles – Canada & bull	X		
Tall meadow buttercup	X		

3.5.2.2 Environmental Consequences

Direct and Indirect Effects by Alternative

Direct and indirect effects of alternatives would include increased dispersal of NNIS into areas not yet infested, creation of additional suitable sites for the infestation of NNIS, and facilitation of their establishment and growth. NNIS associated standards and guidelines and other measures for minimizing the spread of NNIS are effective when implemented. Under all alternatives, it is anticipated that the spread of NNIS will be minimized and the effects of implementing one alternative over another would be minimal. The opportunity for human error exists, however, and NNIS will still disperse by means other than human activity, and will still be able to take advantage of the increased soil disturbance, pathways for dispersal, and light that result from management activities and recreational use of the Forest.

For the direct and indirect effects analysis, the three indicators with the potential to facilitate the establishment, growth, and dispersal of NNIS are combined because of their interconnected relationships. These potential effects are compared for each alternative by the allocation of management areas (MAs) that allow activities related to each indicator (Table 3.5-25). Although there is opportunity for these management activities within the MAs discussed, only a relatively small portion of the MAs would actually be subject to them in any given alternative. The estimated acreage for various activities is provided in the Forest Plan Proposed and Probable Practices (revised Forest Plan, Appendix D). Although these acres are specific to Alternative 3, they are not expected to vary by alternative except those associated with timber harvest activities. The Timber Management section of Chapter 3 (Table 3.11-5) provides the potential acres harvested under each alternative.

The short and long-term impacts from recreational use and management activities that could cause ground disturbance, increase pathways of dispersal, and allow more light to reach the ground are lowest in Alternative 2, highest in Alternative 1, and intermediate in Alternative 3 (Table 3.5-25). This suggests that the protection and maintenance of biodiversity and conservation of ecosystems would be most supported by Alternative 2 and least supported by Alternative 1.

Alternative 1 has the greatest potential for direct and indirect effects, since it offers the most opportunities for ground-disturbing activities that can facilitate establishment of NNIS, for developing new pathways that can facilitate the spread of NNIS into new areas, for increasing the amount of light that reaches the ground, facilitating the establishment of NNIS, and for creating new edge habitats that facilitate access of NNIS into less disturbed areas.

Alternative 2 has the lowest potential for direct and indirect effects, since it offers the fewest opportunities for ground-disturbing activities that can facilitate establishment of NNIS, for developing new pathways that can facilitate the spread of NNIS into new areas, for increasing the amount of light that reaches the ground, facilitating the establishment of NNIS, and for creating new edge habitats that facilitate access of NNIS into less disturbed areas.

Alternative 3 has a potential for direct and indirect effects that is intermediate between Alternatives 1 and 2, since it offers fewer opportunities for ground-disturbing activities that can facilitate establishment of NNIS, for developing new pathways that can facilitate the spread of NNIS into new areas, for increasing the amount of light that reaches the ground, facilitating the establishment of NNIS, and for creating new edge habitats that facilitate access of NNIS into less disturbed areas than Alternative 1, but more than Alternative 2.

Indicators 1, 2, and 3 – Potential to Facilitate the Establishment, Growth, and Dispersal of NNIS

Effects Common to All Alternatives

Alternatives 1, 2, and 3 do not differ in their potential to spread NNIS as a result of ground-disturbing activities associated with maintenance of existing utility corridors, maintenance of existing roads, or road closures. Maintenance of existing utility corridors is allowed in all management areas (MAs) in all three alternatives. Road maintenance is allowed in all management areas except the Existing and Candidate Research Natural Areas MA, in all alternatives; the difference in acres of Research Natural Areas among alternatives is so small that the percentage of acres in which maintenance is allowed is the same (97%) for each of them. In all MAs, in all alternatives, roads may be closed when necessary to protect resources or accomplish management objectives.

Alternatives 1, 2, and 3 do not differ in their potential to increase the amount of light reaching the ground as a result of maintenance of existing utility corridors. In all management areas in all alternatives, maintenance of existing utility corridors is allowed.

Alternatives 1, 2, and 3 also do not differ in their potential for designating existing trails for a new trail use, such as bicycles, which can change the extent to which existing pathways have the potential to facilitate dispersal of NNIS.

Alternative 1

In Alternative 1, 15,624 acres (95%) are in management area allocations that are most subject to ground-disturbing activities, an increase in pathways, and activities that increase light reaching the ground. These activities have the potential to increase, disperse, or facilitate the establishment of NNIS (Table 3.5-25). This acreage is higher than the other two alternatives and least supports the protection and maintenance of biodiversity and conservation of ecosystems.

Table 3.5-25: Acres in management areas that are most likely to allow activities associated with the indicators for increased spread, establishment, and growth of non-native invasive species (NNIS), by alternative.

Indicator	Alt. 1 Current Mgt.	Alt. 2	Alt. 3
	acres (percent)	acres (percent)	acres (percent)
Indicator 1: Acres in MA allocations most subject to ground-disturbing activities[1] that have potential to increase NNIS	15,624 (95%)	11,380 (70%)	13,584 (83%)
Indicator 2: Acres in MA allocations most likely to have an increase in pathways for dispersing NNIS[1]	15,624 (95%)	11,380 (70%)	13,584 (83%)
Indicator 3: Acres in MA allocations most subject to activities that increase light reaching the ground or edge habitat[1]	15,624 (95%)	11,380 (70%)	13,584 (83%)

[1] Management areas that are most subject to activities that disturb ground, increase pathways for NNIS dispersal, and increase the amount of light which can reach the ground are Grassland for Grazing, Grassland for Wildlife, Shrubland, Northern Hardwood, and Oak Hickory.

Alternative 2

In Alternative 2, 11,380 acres (70%) are in management area allocations that are most subject to ground-disturbing activities, an increase in pathways, and activities that increase light reaching the ground. These activities have the potential to increase, disperse, or facilitate the establishment of NNIS (Table 3.5-25). This acreage is lower than in the other two alternatives and most supports the protection and maintenance of biodiversity and conservation of ecosystems.

Alternative 3

In Alternative 3, 13,584 acres (83%) are in management area allocations that are most subject to ground-disturbing activities, an increase in pathways, and activities that increase light reaching the ground. These activities have the potential to increase, disperse, or facilitate the establishment of NNIS (Table 3.5-25). This acreage is intermediate between the other two alternatives and is intermediate in supporting the protection and maintenance of biodiversity and conservation of ecosystems.

Cumulative Effects

Given that NNIS can spread to or from adjacent lands or water bodies, the area of analysis for cumulative effects includes all FLNF lands, including water bodies, plus all adjacent lands. Adjacent lands are any lands that are close enough for any established population of NNIS to spread to or from National Forest System lands; dispersal distance varies not only between species, but as a result of different dispersal opportunities. Cumulative effects would be the result of all previous and foreseeable future management activities, natural events, and recreational use of the Forest that have either resulted in infestations of NNIS or made habitat suitable for them on the National Forest and adjacent lands.

Revised Forest Plan standards and guidelines, which are the same across alternatives, are designed to minimize the spread of NNIS and aid in the control of existing occurrences and restoration of habitats on National Forest System lands; they also encourage cooperation with willing adjacent landowners. These measures will minimize the spread of NNIS within the FLNF, from the FLNF to adjacent lands under other ownership, and vice versa.

It is not possible, however, to be 100 percent effective in prevention and control during management activities, nor is it possible to prevent the dispersal of NNIS from National Forest System land onto private land, and vice versa, that would occur naturally, in the absence of Forest management activities and recreational use. In addition, the Forest Service has no control over activities on adjacent lands that could facilitate NNIS establishment, growth, and dispersal, although educating the public about NNIS is an objective under Goal 9.

Activities that could facilitate NNIS establishment, growth, and dispersal on adjacent land under other ownership are similar to those that could do so on National Forest System lands, plus development, agriculture, and any other management, business, or recreation activities that could disturb ground, increase light, or provide opportunities for dispersal of NNIS.

In 2003, the New York State legislature passed a bill creating an Invasive Species Task Force, charged with recommending how to use existing laws, regulations, programs, policies, practices, and resources to prevent and respond to introduction of aquatic nuisance species (Great Lakes Panel on Aquatic Nuisance Species 2004). In addition, New York State now has an Invasive Plant Council that maintains a list of what are believed to be the most invasive species in the State (The Nature Conservancy, NYSO 2004). This list has no legal status, however, and many people are either unaware of the list, or unaware of the NNIS problem, in general. In addition, those who are aware of the problem may not be skilled in identifying NNIS, and may not know how to avoid inadvertently facilitating the spread and establishment of NNIS on their land. In this regard, goals, objectives, standards, and guidelines aimed at prevention and control of NNIS in the revised Forest Plan are likely to have a beneficial effect, not only on National Forest System lands, but on adjacent lands, as well.

Despite the potential beneficial effects of the revised Forest Plan, infestation of new sites, both on the National Forest and on adjacent lands, is likely to continue to occur to at least some degree. Infestation of new sites can ultimately lead to loss of biodiversity and alteration of habitat for TES and other more common native and desirable non-native species, including forage for wildlife and tree seedlings that could grow into harvestable

timber. In addition, the recreational value of the National Forest or adjacent land can decrease if species targeted for hunting or fishing have diminishing amounts of suitable habitat, or trail and other recreational facilities become entangled in shrubby NNIS, such as non-native honeysuckles or buckthorn. Increased infestation of National Forest System land could lead to increased infestation on adjoining private land, causing similar problems there, and vice versa. While there may be more opportunities for NNIS establishment, growth, and dispersal in Alternative 1 than in Alternatives 2 and 3 (Table 3.5-25), revised Forest Plan standards and guidelines will prevent this to the extent possible. In this regard, the revised Plan standard and guidelines, regardless of the alternative chosen, represent a substantial step forward in minimizing the problems caused by NNIS. Under all alternatives, it is anticipated that the spread of NNIS would be minimized, and the effects of implementing one alternative over another would be minimal.

3.6 WILDLIFE AND WILDLIFE HABITAT

Issue Statement

Public concern is focused on the types and mixtures of habitats on the Finger Lakes National Forest (FLNF) that will provide diversity of terrestrial wildlife species, while meeting other resource objectives. Public concern includes debate about the appropriate distribution and amount of three vegetation conditions: grassland, shrubland, and forest habitats. These vegetation conditions provide a majority of the options and diversity of wildlife habitat that are available on the FLNF

Chapter 3 of the FEIS also addresses environmental and vegetation conditions on the FLNF relative to Soils (section 3.2), Water and Fisheries (section 3.3), Air (section 3.4), Vegetation, including Non-native Invasive Species (section 3.5), Areas of Special Significance (section 3.10), Timber Management (section 3.11), and Range Management (section 3.12).

Indicators

The Forest Service's efforts to provide for viability of wildlife species is based on conservation and enhancement of habitats. Ensuring viability on a species-by-species basis is difficult or impossible, but management efforts can affect the availability of suitable habitat, which in turn, supports individual wildlife species.

The Forest Service approaches indicators for the FLNF wildlife and habitat on two different scales. Coarse-scale indicators track general changes in the three vegetation conditions (grassland, shrubland, and forest) and trends of selected animals (management indicator species: MIS). Individual MIS relate directly to the three, coarse-scale, vegetation conditions and to other important habitat types. Changes in relative abundance of these MIS under different alternatives considered during Forest Plan revision provide a basis for evaluating anticipated changes in Forest use.

Fine-scale indicators track rare or specialized species that may not be addressed through the coarse-filter analysis. These include threatened or endangered (TE) species of plants and animals (FEIS section 3.7) and Regional Forester sensitive species (RFSS) and other species of potential viability concern (FEIS section 3.8). The Biological Evaluation (BE: Appendix E) also addresses potential effects of the revised Forest Plan alternatives on TE species and RFSS.

Indicator 1 – Acres of Grassland Habitat

The first indicator is acres allocated to grassland habitat, as well as the relative allocation to grasslands that would be maintained with or without grazing. Grasslands provide a spectrum of habitat options for a number of wildlife species, particularly migratory birds. Grassland habitat maintained specifically for wildlife (not grazed or mowed for hay) is uncommon in the Finger Lakes region. This indicator highlights the differences among alternatives because acreage, parcel connectivity, and options for management combine to predict the distribution, relative abundance, and viability of wildlife species relying on grasslands.

Indicator 2 – Acres of Shrubland Habitat

The second indicator is acres allocated to shrubland habitat. Shrublands provide a variety of habitats for a number of wildlife species, particularly migratory birds. Lands managed and retained as shrubland are relatively uncommon in the region. This indicator highlights the differences among alternatives because under each alternative acreage and parcel connectivity combine to predict the distribution, relative abundance, and viability of wildlife species relying on shrublands.

Indicator 3 – Acres of Contiguous, Mature Forest Habitat

The third indicator is acres allocated to contiguous, mature forest habitat. Many forests in the Finger Lakes region are mature, but still relatively young, because of historical land use practices. In addition, forest parcels in the region generally are small. The FLNF has a unique opportunity to provide large, continuous acres of mature and older forest. This indicator highlights the differences among alternatives because acreage and contiguity of forest stands, tree species, tree age, and options for management combine to predict the distribution, relative abundance, and viability of wildlife species relying on large, contiguous areas of predominantly mature forests.

Indicator 4 – Acres of Habitat Available for Management Indicator Species and Their Population Trends

The fourth indicator is abundance and quality of habitat for management indicator species (MIS). MIS are vertebrate or invertebrate species selected for monitoring habitat conditions on the Forest because their population changes are believed to indicate the effects of management activities (36 CFR 219.19(a)(1)). Changes in the abundance of MIS or the quality of MIS habitat serve as indicators for the status of particular wildlife habitats and conditions, as well as for the other species that depend on these habitats and conditions. This indicator highlights differences among alternatives because the management emphases of each alternative and the relative allocation of land to different MAs affect the amount, condition, and connectedness of the habitats and conditions represented by MIS.

Analysis Area

Unless otherwise noted, the analysis area for direct and indirect effects includes all federal land managed by the FLNF. This includes a wide variety of vegetation conditions spread over diverse physiographic or environmental settings, such as slope, aspect, and soil conditions.

The analysis area for cumulative effects includes all FLNF lands and the lands administered by other owners, both public and private. Boundaries for the cumulative effects study area vary, depending on the particular issue or indicator. Few species of wildlife are confined to FLNF lands; many species move freely on and off the Forest and others migrate seasonally beyond the boundaries of the United States. Consequently, some wildlife and wildlife habitat issues may extend to New York State, to the Allegheny Plateau and Ontario Lake Plain ecological sections (Keys et al. 1995), or beyond.

3.6.1 Affected Environment

Introduction

The abundance and distribution of wildlife on the FLNF is primarily determined by the quantity and quality of major habitats. Major habitats are a product of the type, age, amount, and distribution of vegetation communities. The current vegetation composition on the FLNF is the result of forest succession and past land uses. These historical lands uses, and resulting vegetation conditions, are discussed in the FEIS in the Introduction to Chapter 3, in section 3.5 (Vegetation), and in section 3.15 (Heritage Resources and Tribal Relations). Vegetation conditions determine habitat conditions, which in turn affect the animal species that occupy a site. Thus, the widely variable historical use of lands now managed by the FLNF has led to a variable diversity and abundance of wildlife on the Forest.

Prior to European settlement, the Finger Lakes region of New York (including lands currently owned by the FLNF) was predominately forested. With European settlement, lands were progressively cleared to support agricultural pursuits. At the height of agricultural land clearing (circa 1880), very little woodland habitat was present on what is now the FLNF or in the surrounding region. Wildlife that rely on open habitats (for example, smooth

green snake, leopard frog, several species of grassland sparrows, meadow vole, and meadow jumping mouse) benefited from those conditions, whereas species that rely on forested habitats (for example, spotted salamander, wood frog, scarlet tanager, wood thrush, and flying squirrel) did not.

By the early 1900s, land clearing reached its peak and virtually all forests had disappeared. The next phase saw abandonment of farms, and woodlands and forests have slowly returned to the region and to the FLNF. In response, diversity and populations of wildlife have changed. Today, the FLNF is home to species of grassland, shrubland, and forest habitats. Grassland and shrubland species continue to occur in the remaining open lands, while forest-dwelling species have moved into the region's returning woodlands.

Without continual maintenance, grassland and shrubland habitats in the FLNF's central New York environment succeed to forest. Over a period of several years, grasslands turn into shrublands, and shrublands turn into woodlands. During the past 120 years, woodlands have slowly returned to the FLNF and the surrounding region. This slow change of vegetation conditions and wildlife habitat brought with it increased diversity and abundance of woodland-dependent animal species, concurrent with a slow decline in diversity and abundance of those species dependent on open lands.

Grassland Habitats

Grasslands provide a spectrum of habitat options for a number of wildlife species, particularly migratory birds. Grassland habitats generally are declining in abundance and quality across much of the Northeast. Consequently, there are regional conservation and viability concerns over many grassland dependent species, such as the short-eared owl, upland sandpiper, bobolink, and Henslow's, field, and grasshopper sparrows (Mitchell et al. 2000, DeGraaf and Yamasaki 2001, Dettmers and Rosenberg 2003, Robertson and Rosenberg 2003). Grasses and forbs are the dominant grassland vegetation types, although some shrub and wooded areas may exist within grasslands.
The revised Forest Plan allocates two grassland management areas (MAs): Grassland for Grazing and Grassland for Wildlife. The Grassland for Grazing MA emphasizes livestock grazing, recognizing and continuing this historical and important land use in the region. The Grassland for Wildlife MA maintains grassland for wildlife, prohibiting grazing by domestic livestock. Grassland habitat maintained for wildlife is relatively uncommon in the Finger Lakes region.

Shrubland Habitat

Shrublands (along with regenerating forest stands and other temporary and permanent forest openings) are a component of early successional habitat. These early successional habitats are important to a wide variety of species, particularly mammals and migratory birds (DeGraaf et al. 1992, DeGraaf and Yamasaki 2001, Thompson et al. 2001, Litvaitis 2003a). Shrubland habitat may persist indefinitely on "poor-quality" sites, such as those that are extremely wet or dry, at high elevation, on poor or rocky soils, or underlain by ledge, but generally it is a successional or seral habitat that reverts rapidly to mature forest (DeGraaf et al. 1992; Brooks 2003; DeGraaf and Yamasaki 2001; Litvaitis 2003a, b). Mowing and brush-hogging, prescribed fire, and timber management are the most effective tools for shrubland maintenance (Degraaf et al. 1992). The availability and quality of early successional habitats generally has declined across the northeastern United States during the last several decades (Thompson 2001, Litvaitis 2003a, Dettmers and Rosenberg 2003, Robertson and Rosenberg 2003).

Brushy conditions predominate in shrublands, although grasses and forbs or inclusions of more mature trees may be important vegetation components, as well. Fruit-producing trees and shrubs may be important sources of food for wildlife. Lands managed and maintained as shrubland specifically for wildlife are uncommon in the region.

Contiguous, Mature Forest Habitat

The Finger Lakes region generally is covered by a mosaic of small woodlots, open agricultural land, and various levels of residential and commercial development (USDA Forest Service 2001a, GFLRPC 2004). The older forest stands in the region are mature, but still relatively young. Additionally, woodland parcels generally are small. The FLNF has a unique opportunity in the Finger Lakes region to provide large areas of contiguous forest, as well as forest lands that will, in time, approach the characteristics of true old-growth forest. Old forest includes a variety of ecological land types and natural communities where terrestrial and aquatic ecosystems develop under natural disturbance regimes. Development of old-growth forest on the FLNF will take place over the long-term; however, large acreages of contiguous, mature forest land can become influential in the short-term, as well (during the next 20 years).

Many wildlife species benefit from mature and older forest conditions and from large, contiguous tracts of forest (Hagan and Grove 1999, Rosenberg et al. 1999, DeGraaf and Yamasaki 2001, Rosenberg et al. 2003), although there do not appear to be any species that require old-growth forest (Hagan 2004, Hartley and Burger 2004, Yamasaki 2004). Examples of mature-forest species are spotted salamander, wood frog, eastern wood-pewee, scarlet tanager, black-throated blue warbler, ovenbird, and gray fox (Degraaf et al. 1992, DeGraaf and Yamasaki 2001, Litvaitis 2003a).

Other Important Habitat Types and Conditions

In addition to the habitat conditions represented by separate indicators, several other forest types and conditions are important to wildlife species inhabiting the FLNF. These include aspen, oak-hickory, northern hardwoods, young regenerating deciduous trees, and mature forest.

Aspen is one of the first tree species to grow in a disturbed or abandoned area. These fast-growing and short-lived trees provide preferred habitat for several animal species as a food source (for example, beaver and ruffed grouse), places to excavate nesting cavities (for example, yellow-bellied sapsucker), and resting areas (for example, American woodcock). Other species that benefit from aspen habitats of various ages include Nashville and mourning warblers, eastern cottontail, red fox, and white-tailed deer (DeGraaf et al. 1992, DeGraaf and Yamasaki 2001, Dettmers and Rosenberg 2003). Aspen is extremely shade-intolerant; in the Northeast it generally requires specific management to encourage regeneration (DeGraaf et al. 1992). Without management, aspen and its contribution to regional wildlife may diminish from large portions of the FLNF.

The oak-hickory forest type of the FLNF includes several species each of oak and hickory, as well as American chestnut, butternut, and black walnut. The structure of these forests provides habitat for nesting and foraging, but another important feature for wildlife is the production of hard mast: acorns and nuts. Several wildlife species, such as wood duck, wild turkey, woodland jumping mouse, gray squirrel, and white-tailed deer seek out and rely on this hard mast (Godin 1977, DeGraaf and Yamasaki 2001).

The structural condition presented by recently regenerated (0 to 9 year age class) hardwood stands provides hiding and nesting cover preferred by a number of wildlife species. The thick flush of small hardwood trees occurring before natural thinning (brought on by shading and competition for nutrients) provides nesting and foraging habitat for a number of songbirds, such as morning warbler, chestnut-sided warbler, indigo bunting, rose-breasted grosbeak, and American redstart, as well as hiding cover for other species, such as ruffed grouse, white-footed mouse, and red fox (DeGraaf and Yamasaki 2001).

Existing Forest Plan Management Direction

Goals contained in the 1987 Forest Plan direct the Forest Service to provide adequate habitat to maintain diverse, self-sustaining populations of wildlife. The 1987 Plan recognizes that the

basic components of habitat (food, water, and cover) can all be manipulated to promote or discourage different species of wildlife. Another goal of the 1987 Plan is to provide habitats, such as shrubland, not common on other lands. Objectives to achieve these goals focus on the number of acres on the FLNF that provide for a diversity of habitat conditions.

Forest-wide objectives, standards, and guidelines in the 1987 Forest Plan provide management direction for forest-type and habitat-type composition on the FLNF; retention of wildlife reserve trees (snags and trees used by wildlife for nesting, denning, or roosting); management of wetlands and ponds; and management, conservation, and protection of threatened and endangered species, Regional Forester sensitive species, and other species of concern. Direction under the 1987 Forest Plan also points out that both direct manipulations (for example, pond construction or nest-box placement) and indirect manipulations (for example, timber harvest or grazing) significantly affect the mixture of available habitats.

The Forest Service developed the 1987 Forest Plan with the knowledge available during the mid-1980s, as well as with public interest and involvement. The 1987 Plan addresses biodiversity primarily at small scales: tree and stand diversity, and individual species (endangered, threatened, Regional Forester sensitive species, and management indicator species). Since that time, wildlife researchers have learned more about wildlife use of landscapes. This knowledge, in conjunction with the heightened interest and involvement of the citizenry, helps guide management that addresses both local and regional wildlife concerns and issues at a variety of landscape scales and landscape patterns.

The Forest Service manages the FLNF under the 1987 Forest Plan to provide five different vegetation conditions. The 1987 Plan initially identified four major vegetation conditions: grass-forb openings (pasture), shrub openings, continuous forestlands, and even-aged forests. In 1999, the Forest Service created a fifth vegetation condition by dividing grass-forb openings into two separate management prescriptions: grazed and un-grazed grassland (USDA Forest Service 1999c). The 1987 Plan also directs the Forest Service to maintain other important vegetation types, such as aspen clones, black locust stands, fruit orchards, blueberry patches, and other important wildlife habitat components. Management of this combination of vegetation conditions, several lesser vegetation types, and important wildlife habitat components provides needed habitat diversity for wildlife species on the FLNF.

Management Area Direction

Management area (MA) prescriptions included in the 1987 Forest Plan focus on habitat management and reserve trees. These prescriptions include the following:

MA Prescription 1.2A – Grazing Lands
The Grazing Lands management area prescription contains grasslands maintained through the grazing of livestock and mowing. Wildlife supported by pastureland areas includes hawks, owls, American woodcock, eastern bluebird, horned lark, several species of rodents, eastern cottontail, and red fox. Grazed grasslands require some mowing or clipping to control vegetation succession; however, these actions are needed less frequently than in other grasslands.

MA Prescription 1.2B – Grasslands
The Grasslands management area prescription contains grasslands maintained through the use of mowing and prescribed fire but not grazing. The habitat provided by these un-grazed grasslands is rare within the region and supports numerous wildlife species, including eastern smooth green snake, turkey vulture, wild turkey, horned lark, several sparrow species (vesper, savannah, grasshopper, and Henslow's), bobolink, eastern meadowlark, eastern cottontail, woodchuck, meadow vole, meadow jumping mouse, and ermine. Grasses and forbs provide forage and nesting habitat for many of these species.

MA Prescription 1.3 – Shrublands
This management prescription contains shrubby or brushy openings on the FLNF that are maintained through a combination of

mowing and prescribed fire. Many game and non-game wildlife species such as American woodcock, ring-necked pheasant, ruffed grouse, wild turkey, white-tailed deer, and many species of songbirds and small mammals are dependent on shrubland during all or part of their life cycle. The Record of Decision (USDA Forest Service 1987b) for the 1987 Forest Plan guides management toward maintenance of 1,400 acres of shrubland. The Forest currently has nearly 2,000 acres identified under management area prescription 1.3. Of these, 1,250 acres are currently in shrubland condition and the remaining 750 acres are more wooded.

MA Prescription 2.1 – Continuous Forest Lands
These are wooded areas predominately managed through uneven-aged silviculture. Forest-dependent species include wild turkey, pileated woodpecker, great blue heron, gray squirrel, an occasional black bear, as well as many other species.

MA Prescription 3.1 – Even-aged Forest
These are wooded areas predominately managed through even-aged silviculture. Forest-dependent species include wild turkey, pileated woodpecker, great blue heron, gray squirrel, an occasional black bear, as well as many other species.

MA Prescription 8.1D – Old Growth Stands
MA prescription 8.1 emphasizes various special areas that have uncommon biological, geological, recreational, cultural, or historical significance on the FLNF. Some of these special areas (8.1D) emphasize succession of forest land to old growth conditions in the absence of human-caused disturbances. Old growth communities are rare in the Finger Lakes region because of the land use history.

Management Indicator Species (MIS)

The Forest Service began monitoring management indicator species (MIS) on the FLNF in 1987, in cooperation with the New York Cooperative Fish and Wildlife Research Unit, Cornell University, Ithaca College, the New York Department of Environmental Conservation, and numerous partners and volunteers (USDA Forest Service 1988, 2004d; Toth 2000). The 1987 Forest Plan includes 11 MIS, which are listed in Table 3.6-1 with their associated habitat types and conditions.

Monitoring for MIS on the FLNF has included such activities as breeding bird surveys, monitoring fledging success of eastern bluebirds at nest boxes, courtship flight counts for American woodcock, drumming surveys for ruffed grouse, nest surveys for gray squirrels, and examination of population and harvest data for white-tailed deer collected by the New York Department of Environmental Conservation (Toth 2000, USDA Forest Service 2004d). Results from these monitoring efforts are summarized in the Existing Condition subsection of this section and in annual monitoring and evaluation reports (for example, USDA Forest Service 2004d).

Table 3.6-1: MIS for the FLNF included in the 1987 Forest Plan, and their associated habitat types and conditions.

MIS	Habitat type and condition
American woodcock (*Scolopax minor*)	Permanent grass-forb openings (pasture)
Ruffed grouse (*Bonasa umbellus*)	Regenerating and young aspen, permanent shrub openings
Chestnut-sided warbler (*Dendroica pennsylvanica*)	Regenerating (Appala-chian) hardwood forest
Gray squirrel (*Sciurus carolinensis*)	Mature and over-mature Appalachian hardwoods; mature and old oak
White-tailed deer (*Odocoileus virginianus*)	Mature and old growth softwood forest
Eastern bluebird (*Sialia sialis*)	Cavities, snags; open areas; orchards
Northern goshawk (*Accipiter gentilis*)	Mature hardwood forest
Barred owl (*Strix varia*)	Mature and over-mature northern hardwood forest
Blackpoll warbler (*Dendroica striata*)	Mature softwood forest
Yellow-bellied sapsucker (*Sphyrapicus varius*)	Mature and old growth aspen and birch
Tree swallow (*Tachycineta bicolor*)	Beaver flowage and wetland

Source: USDA Forest Service (1987a).

Proposed Changes in Management Direction Common to All Alternatives

The revised Forest Plan builds on the 1987 Forest Plan, with a goal to maintain and restore quality, amount, and distribution of habitats to produce viable and sustainable populations of native and desirable non-native plants and animals (Goal 2). The 1987 Forest Plan addresses biodiversity primarily at small scales, such as individual species biodiversity. The revised Plan considers biodiversity and natural communities at a variety of landscape scales and patterns.

Most changes to standards and guidelines (S&Gs) in the revised Forest Plan reflect simplification, clarification, and definition. The Forest Service did modify S&Gs for wildlife reserve trees by incorporating features used by the White Mountain and Green Mountain National Forests. The primary feature of these modifications is retention of uncut patches of trees totaling five percent of the harvested area during even-aged management.

Management Area (MA) Direction

Management direction provided by MA prescriptions, emphases, and desired future conditions exerts a major influence on the structure and condition of wildlife habitat. For the most part, MAs included in the revised Forest Plan do not represent a significant departure from the MA prescriptions in the 1987 Forest Plan; rather, MA names have changed to emphasize the desired future condition of each area.

Management area prescription 2.1 in the 1987 Forest Plan emphasizes uneven-aged silviculture that maintains continuous forest cover. In the revised Forest Plan, this prescription is renamed Northern Hardwood MA, which emphasizes shade-tolerant tree species such as sugar maple.

Management area prescription 3.1 in the 1987 Forest Plan emphasizes even-aged timber management to support a diversity of wildlife habitat and production of high quality sawtimber in a roaded natural recreational setting. In the revised Plan the Oak Hickory MA allows for the application of both even-aged and uneven-aged silviculture techniques, but this MA particularly promotes shade-intolerant tree species such as oak, hickory, white pine, aspen, and locust.

A new MA, the Future Old Forest MA, is similar to the Special Areas prescription 8.1D designated in the 1987 Forest Plan for old growth development. The emphasis of this MA in the revised Plan is to have larger, more contiguous blocks of land in which to allow aging forests to develop old-growth characteristics.

Management area standards and guidelines for the Grassland for Grazing, Grassland for Wildlife, and Shrubland MAs change very little from prescriptions presented in the 1999 Amendment to the 1987 Forest Plan (USDA Forest Service 1999c).

It is important to emphasize that differences between MAs in the revised Forest Plan and their counterparts in the 1987 Plan reflect changes in MA names, not substantive changes to management direction. Consequently, the management direction contained in the revised Plan provides emphasis for vegetation conditions and structure, and the resulting wildlife habitats, which is similar to 1987 Plan direction.

Management Indicator Species

Monitoring of management indicator species (MIS) assesses the effectiveness of management actions to produce and maintain the amount and quality of important habitat types and conditions. As such, MIS are a major component of the Forest's monitoring and evaluation program. Chapter 4 in the revised Forest Plan describes the monitoring and evaluation program.

The revised Forest Plan includes several changes for MIS on the FLNF. These changes generally reflect the following:

- Select MIS linked to issues or conditions directly associated with active habitat manipulation
- Select MIS linked to habitats and conditions expected to change substantially over time
- Do not select MIS that are uncommon or linked to limited habitat conditions, as changes in abundance or distribution may be difficult to observe

Changes to MIS made during Plan revision are presented below, as well as in Appendix C of the revised Forest Plan.

The Forest Service selected eight MIS for the revised Forest Plan to represent six major issues or habitat conditions (Table 3.6-2). Five of the MIS are linked to indicators for wildlife and wildlife habitat on the FLNF: grassland, shrubland, and contiguous, mature forest. Three other MIS are linked to important wildlife habitat types: young deciduous trees, aspen, and oak-hickory.

Table 3.6-2: MIS for the revised Forest Plan linked to resource issues or habitat types.

MIS	Major issue or habitat
Savannah sparrow (*Passerculus sandwichensis*) Bobolink (*Dolichonyx oryzivorus*) Eastern meadowlark (*Sturnella magna*)	Grassland
Common yellowthroat (*Geothlypis trichas*)	Shrubland
Black-throated blue warbler (*Dendroica caerulescens*)	Contiguous forest habitat
Chestnut-sided warbler	Young deciduous trees (age 0-9 yrs)
Ruffed grouse	Aspen
Gray squirrel	Oak-hickory

Grassland and shrubland habitats are important to large suites of wildlife species; they also are habitats that are declining in abundance and quality in much of the Northeast (Mitchell et al. 2000, DeGraaf and Yamasaki 2001, Dettmers and Rosenberg 2003, Litvaitis 2003a, Robertson and Rosenberg 2003). Without vegetation management, particularly mowing, prescribed fire, and timber management, these habitats quickly revert through succession to forested conditions (DeGraaf et al. 1992, Mitchell et al. 2000, Litvaitis 2003a, MAS 2003-2005). The FLNF has the unique opportunity in the region to provide large areas of contiguous, mature forest, as the region generally is covered by a mosaic of small woodlots, open agricultural land, and various levels of residential and commercial development (USDA Forest Service 2001a, GFLRPC 2004). Young deciduous trees, aspen, and oak-hickory each represent forest or stand types that are important to many species of wildlife (DeGraaf et al. 1992, DeGraaf and Yamasaki 2001). Together, the selected MIS can help track the influences that these habitat conditions and management activities exert on regional wildlife.

Three of the MIS selected for the revised Forest Plan are carried forward from the 1987 Plan, with minor changes to simplify and clarify their associated habitat types and conditions. The chestnut-sided warbler will be MIS for “young deciduous trees (age zero to nine years)” instead of “regenerating (Appalachian) hardwood forest.” This warbler is strongly associated with early successional, deciduous woods (Richardson and Brauning 1995, DeGraaf and Yamasaki 2001, CLO 2004) and has proven to be an effective indicator species for this habitat type (Toth 2000).

The habitat associated with the gray squirrel is simplified to “oak-hickory” instead of “mature and over-mature Appalachian hardwoods or mature and old oak.” This selection reflects the connection of the gray squirrel to oak and hickory trees, which are important sources of hard mast such as acorns and nuts (Godin 1977, DeGraaf and Yamasaki 2001, NatureServe 2004).

The revised Forest Plan retains ruffed grouse as an MIS for the FLNF, but in its associated habitat is simplified to “aspen,” rather than “regenerating and young aspen, permanent shrub openings.” Ruffed grouse rely on many habitat types and conditions, but aspen is a

particularly important habitat species (Gullion 1984, DeGraaf et al. 1992, Rusch et al. 2000, DeGraaf and Yamasaki 2001, DeStefano et al. 2001, RGS 2003).

The Forest Service selected a new MIS, common yellowthroat, as a more effective indicator for shrubland on the FLNF. This is a common breeding species in diverse types of dense, brushy habitat (DeGraaf et al. 1992, Guzy and Ritchison 1999, DeGraaf and Yamasaki 2001).

The Forest Service selected a second new MIS, the black-throated blue warbler, as MIS for contiguous, mature forest habitat. This species is most commonly found in large, more or less continuous tracts of northern hardwood forest with thick, deciduous or mixed coniferous-deciduous understory (Holmes 1994, DeGraaf and Yamasaki 2001). Continuing maturation of forest stands on the FLNF enhances habitat conditions for this species. The Future Old Forest MA is incorporated into Alternatives 2 and 3 of the revised Forest Plan. This MA emphasizes large areas of contiguous forest with natural succession of plant communities that will, in time, lead to old forest conditions. The black-throated blue warbler is an appropriate MIS for monitoring the future influence of increasing maturity and continuity of forest conditions in the region.

The revised Forest Plan includes an assemblage of three grassland songbirds (savannah sparrow, bobolink, and eastern meadowlark) as MIS for grassland habitats on the FLNF. This is a departure from the selection of American woodcock as MIS for permanent grass-forb openings (pasture) in the 1987 Forest Plan. The American woodcock was dropped as an MIS in the revised Forest Plan due to the range of habitats required by this species, confounding the MIS-habitat link of woodcock with grasslands. Woodcock use forest openings, abandoned fields, and grasslands for courtship display and roosting; grassy fields are particularly important as night-time roosting sites during summer. Other habitats, particularly alder thickets and moist shrub areas with young hardwoods, such as aspen or birch, are important for nesting and brood rearing (Sepik et al. 1981, Keppie and Whiting 1994, DeGraaf and Yamasaki 2001). Savannah sparrow, bobolink, and eastern meadowlark each are associated with grasslands without potentially confounding associations with other breeding-season habitats (Wheelwright and Rising 1993, Lanyon 1995, Martin and Gavin 1995, USFS 2003t). The bobolink and eastern meadowlark typically occupy intermediate successional stages of grassland, whereas the savannah sparrow is more of a generalist, inhabiting a wider range of grassland habitat types (Mitchell et al. 2000).

In addition to American woodcock, seven other MIS from the 1987 Forest Plan are not carried over to the revised Forest Plan. Occurrence and suitable habitat are limited to such an extent on the FLNF and in the region for the barred owl (MIS for mature and over-mature northern hardwood forest) and blackpoll warbler (MIS for mature softwood forest, especially high-elevation, spruce-fir), that changes in abundance of these species would be difficult to document and likely not linked to management activities on the FLNF (USDA Forest Service 1989; Toth 2000; C. Grove, personal communication, September 2004). The yellow-bellied sapsucker (MIS for mature and old-growth aspen and birch) and tree swallow (MIS for beaver flowage-wetland) are ineffective indicators for their respective habitats because these species adapt readily to a variety of habitat conditions and population changes could be confounded by responses to factors other than the identified MIS relationship (USDA Forest Service 1989; Toth 2000; C. Grove, personal communication, September 2004).

In the revised Forest Plan, the Forest Service does not retain white-tailed deer as MIS for the FLNF because habitat conditions important to this species are not expected to change substantially by any alternative or over time. The revised Plan will maintain a mix of grassland, shrubland, and mature forest that will provide ample habitat for winter cover and year-round feeding, both grazing and browsing. The combined product of FLNF and private land in the region is an interspersion of grasslands, agricultural lands, forest openings, and forest

cover that is ideal habitat for white-tailed deer (DeGraaf and Yamasaki 2001).

The Forest Service does not retain the northern goshawk as MIS for two reasons. First, this species is not linked directly to issues or conditions directly associated with active habitat manipulation. Goshawks are susceptible to disturbance, particularly at nest sites, and levels and distribution of potential sources of disturbance may be influenced by management decisions. Forest-wide guidelines that apply under all alternatives protect goshawk nest sites from disturbance and from management activities that could degrade habitat conditions. Second, the abundance of goshawks on the Forest is low and their mobility is high. One pair has nested on the FLNF in recent years and other pairs may occur in the area (SVE Bird Panel 2003; J. and S. Gregoire, personal communication, July 2003, April 2005). But goshawks can have multiple alternate nests that may be as much as a mile apart, and home ranges during nesting can vary from 500 acres to more than 5,000 acres (Squires and Reynolds 1997, DeGraaf and Yamasaki 2001). Given the low abundance of goshawks near the FLNF and that a goshawk's home range would be only partially contained on the FLNF, presence or absence of the species on the Forest at a given time could not be unambiguously indicative of changes in habitat conditions on the Forest. The northern goshawk continues to be a Regional Forester sensitive species for the FLNF. Accordingly, the Forest Service will continue to monitor its presence on the Forest and provide protection to nesting birds as necessary. The Biological Evaluation (BE: Appendix E) includes a detailed discussion of the northern goshawk. The BE and FEIS section 3.8 (Species of Potential Viability Concern) address potential management effects that the revised Forest Plan may have on the northern goshawk.

The Forest Service does not retain the eastern bluebird as MIS for the FLNF. Under the 1987 Forest Plan, the eastern bluebird is both MIS and a Species of Concern. The eastern bluebird population declined dramatically during much of the 20th century, due to competition for nest sites from introduced house sparrows and European starlings, introduction of metal fence posts, general decline in agricultural land uses, increased use of insecticides, and cold spring weather (Gowaty and Plissner 1998, DeGraaf and Yamasaki 2001). Since 1980, the eastern bluebird has increased dramatically in central New York and generally across the Northeast, due in large part to conservation efforts and nest box programs. Concern over the species' status has abated considerably (DeGraaf and Yamasaki 2001, Dettmers and Rosenberg 2003, Robertson and Rosenberg 2003, Sauer et al. 2003). The preferred habitat for eastern bluebirds includes open areas, grasslands, pastures, orchards, and forest edges, but nest boxes are a key habitat component supporting local populations (Gowaty and Plissner 1998, DeGraaf and Yamasaki 2001, Dettmers and Rosenberg 2003). Monitoring eastern bluebirds on the FLNF likely would indicate more about the success of the nest-box program than about the abundance and quality of other habitat features. For these reasons, the eastern bluebird is not retained as MIS or as a Species of Potential Viability Concern in the revised Forest Plan. Construction, maintenance, and monitoring of bluebird nest boxes on the FLNF will continue.

Existing Condition

The FLNF and Wildlife

The FLNF provides habitat for about 200 species of wildlife, 10 species of fish, and more than 300 species of vascular plants. The New York Audubon Society has identified the FLNF as an Important Bird Area (NASNYS, undated).

Wildlife species that occur on the FLNF, and their respective populations, are greatly influenced by the populations of these species beyond the boundaries of the Forest in central New York State, in the Allegheny Plateau and Ontario Lake Plain ecological sections (Keys et al. 1995), and in northeastern North America.

Birds may occur on the Forest throughout the year, may undergo seasonal movements within the region, or may migrate annually as far as Central or South America. Other bird species winter in the FLNF region after breeding farther

north, or merely pass through the FLNF during migration. Various mammal species move freely on and off Forest lands. Because of this mobility, these species can easily disperse onto or off the Forest to reinforce depleted populations.

Amphibians and reptiles, which may live their entire lives on the Forest, are still dependent on region-wide populations for their long-term viability. Because these species do not disperse very far, extirpation of local genetic populations breaks the connectivity within the regional population and reduces the species' overall viability (SVE Herpetology Panel 2003).

Vegetation Conditions and Wildlife Habitat

The mixture and diversity of vegetation conditions and habitats found on the FLNF contribute to the continued presence of animal species found there. The small number of species that cannot have their continued presence and viability assured through management of these important vegetation conditions, lesser vegetation types, and important wildlife habitat components, are those species that are threatened or endangered (TE), Regional Forester sensitive species (RFSS), or other species of potential viability concern. Discussions of these species are provided in FEIS section 3.7 (Threatened and Endangered Species), section 3.8 (Species of Potential Viability Concern), and in the Biological Evaluation (FEIS Appendix E).

The current acreages of FLNF's major or important vegetation conditions are displayed in Table 3.6-3. It is important to understand that although management area (MA) direction influences the composition and structure of vegetation in an area, acreages of these vegetation conditions do not correspond directly to acreages allocated to MAs with similar names. For example, lands allocated to the Grassland for Grazing and Grassland for Wildlife MAs encompass small woodlands of northern hardwoods, softwoods, oaks, and other species, as well as forested riparian areas and shrubland habitats along fence rows. Thus, the actual acreage of grassland habitat is less than the acreage allocated to the two grassland MAs. Lands allocated to the Shrubland MA include some areas that have changed through succession into northern hardwood, oak-hickory, or conifer stands. Although management direction for the Northern Hardwood MA emphasizes species of the northern hardwood forest types, lands allocated to this MA will include stands of softwoods, oaks, hickories, and other species. Similarly, MA direction for the Oak Hickory MA emphasizes shade-intolerant species, but these lands also will include stands of northern hardwoods and softwoods. Aspen clones occur as inclusions in northern hardwood and oak-hickory forest types, as well as in larger, aspen stands. Aspen clones generally are not reflected in stand inventory data, such as those presented in Table 3.6-3. Acreages presented in Table 3.6-3 reflect amount of vegetation and habitat types, not acres allocated to MAs.

Table 3.6-3: Current acreage of important vegetation conditions on the Finger Lakes National Forest.

Vegetation Condition	Acres (%)[1]
Grazed grassland	5,400 (34%)
Un-grazed grassland	310 (2%)
Shrubland	1,250 (8%)
Aspen	240 (2%)
Young deciduous trees (age 0-9 years)	350 (2%)
Northern hardwood forest (including locust)	2,700 (17%)
Oak-hickory stands	2,700 (17%)
Conifer stands	3,000 (19%)

Source: Forest GIS and stand coverage data
Notes:
[1] Acres presented as rounded estimates of existing habitat conditions, not management area allocations. Does not include wetlands or small openings in forested stands.

"Northern hardwood forest" in Table 3.6-3 includes a mix of forest types that generally are dominated by maples, beech, and other shade-tolerant hardwood trees. "Oak-hickory" refers to oak-hickory and oak-pine forests that generally are dominated by a combination of oak species, including red, white, black, and chestnut oaks. For detailed discussion of these forest types, see FEIS section 3.5 (Vegetation).

The age structure of the major forest types on the FLNF is dominated by the mature age classes. Historical land use, as described above and in FEIS sections 3.5 (Vegetation)

and 3.15 (Heritage Resources and Tribal Relations), included removal of most of the forest cover at several points in time. About 60 percent of the northern hardwood forests (FEIS Table 3.5-9), 84 percent of the oak-dominated forests (FEIS Table 3.5-10), and 91 percent of the softwood forests (FEIS Table 3.5-11) on the FLNF are in mature age classes. Only seven percent of northern hardwoods, five percent of oak-dominated, and one percent of softwood forests are in the old age classes.

Management Indicator Species

The Forest Service has collected population data for current MIS since 1987 (Toth 2000, USDA Forest Service 2004d). Although these data give some indication about population trends on the FLNF, they are not sufficient to support statistically significant analysis. The Forest Service continues to collect MIS data for the FLNF, determine population and habitat availability trends to the extent possible, and assess this program's effectiveness.

Table 3.6-4 provides a summary of population and habitat trends for MIS selected for the revised Forest Plan. Information about current MIS that are not carried forward into the revised Forest Plan is contained in Toth (2000) and annual monitoring and evaluation reports (for example, USDA Forest Service 2004d).

Savannah Sparrow

The savannah sparrow belongs to an assemblage of grassland birds that occur in eastern North America, many of which are undergoing general population declines in the Northeast (Mitchell et al. 2000). North American Breeding Bird Survey data show a one to two percent decline for savannah sparrows in the Northeast and in New York State from 1966 or 1980 to 2002 (Sauer et al. 2003). These declines are less than those currently experienced by other grassland species (Mitchell et al. 2000). Maps produced by the New York Breeding Bird Atlas (NYDEC 2005) suggest no clear trend from 1985 to 2000. Savannah sparrows are relatively abundant on the FLNF with no apparent population trend (Smith and Brown 1994; USDA Forest Service, unpublished data).

Table 3.6-4: Trends for populations (Pop) of FLNF Management Indicator Species (MIS) and the habitats (Hab) they represent, for the northeastern region, New York State, and the FLNF.

MIS Species	Northeast region		New York		FLNF[4]	
	Pop	Hab	Pop	Hab	Pop	Hab
Savannah sparrow	↓*[1]	↓[2]	↓*[1] ↔[3]	↓[2]	?	↔
Bobolink	↔[1]	↓[2]	↔[1,3]	↓[2]	?	↔
Eastern meadowlark	↓*[1]	↓[2]	↓*[1,3]	↓[2]	↓?	↔
Common yellowthroat	↔[1]	↓[2]	↔[1,3]	↓[2]	?	↓
Black-throated blue warbler	↔[1]	↑?	↔[1,3]	↑?	?	↑
Chestnut-sided warbler	↔[1]	↓[2]	↔[1,3]	?	↔	↓
Ruffed grouse	↓*[1]	↓[2]	↓*[1,3]	?	↓?	↓
Gray squirrel	?	?	?	?	↔	↔

Sources:
[1] BBS (North American Breeding Bird Survey: Sauer et al. 2003)
[2] PIF (Partners in Flight physiographic area 15- Lower Great Lakes Plain: Dettmers and Rosenberg 2003), PIF (Partners in Flight physiographic area 24 – Allegheny Plateau: Robertson and Rosenberg 2003)
[3] NYDEC (2005)
[4] Smith and Brown (1994), Toth (2000), USDA (2004d), USDA (unpublished data)

Trend codes:
? = uncertain
↑ = increase in abundance/quality
↔ = stable
↓ = moderate decrease in abundance/quality
↓* = significant decrease in abundance/quality

Savannah sparrows breed in a variety of grassland habitats, ranging from tidal marshes to wet meadows, dry hayfields, overgrown or lightly grazed pasture, and reclaimed surface mines (Wheelwright and Rising 1993, Mitchell et al. 2000). This is a generalist species that inhabits either earlier or later stages of grassland succession. On the FLNF, savannah sparrows show less specificity in nesting habitat than other grassland birds and they tolerate moderate levels of grazing (Smith 1997, Mitchell et al. 2000). Approximately 5,700 acres (36%) of the FLNF is in grazed or un-grazed grassland habitat (Table 3.6-3). Continuing maintenance of lands allocated to

grassland MAs would provide adequate habitat for this species on the Forest in the future.

Bobolink
The bobolink belongs to an assemblage of grassland birds that occur in eastern North America. Many of these species, including the bobolink, currently are experiencing general population declines (Lanyon 1995, Mitchell et al. 2000). Partners in Flight (Dettmers and Rosenberg 2003, Robertson and Rosenberg 2003) recognize widespread and persistent population declines for bird species associated with agricultural grasslands, and identify bobolink as an abundant but declining priority species for the habitat type. Data from the North American Breeding Bird Survey, however, suggest that numbers appear to be stable in the Northeastern US and show no significant trend for New York State from 1966 or 1980 to 2002 (Sauer et al. 2003). Maps produced by the New York Breeding Bird Atlas (NYDEC 2005) show no clear trend from 1985 to 2000. Bobolinks are relatively abundant on the FLNF with no apparent population trend (Smith and Brown 1994; USDA Forest Service, unpublished data).

In the Northeast, bobolinks tend to select grasslands with sparse vegetation dominated by tall grasses, such as older hayfields that have not been replanted in eight years or more. Nest densities appear greater in fields with low density of alfalfa and legumes, high litter cover, and a high ration of grass to legumes (Martin and Gavin 1994, Mitchell et al. 2000). About 5,700 acres (36%) of the FLNF is in grazed or un-grazed grassland habitat (Table 3.6-3). Continuing maintenance of lands allocated to grassland MAs would provide adequate habitat for this species on the Forest in the future.

Eastern meadowlark
Eastern meadowlark is part of an assemblage of grassland birds that are undergoing general population declines in the Northeast (Martin and Gavin 1995, Mitchell et al. 2000). North American Breeding Bird Survey data show a seven to eight percent decline in the Northeast and in New York State from 1966 to 1979 and a three to four percent decline in the same areas from 1980 to 2002 (Sauer et al. 2003). Maps produced by the New York Breeding Bird Atlas (NYDEC 2005) suggest a slight increase in distribution of confirmed nesting of eastern meadowlarks in Central New York from 1985 to 2000. The eastern meadowlark is known to breed on the FLNF. Population trend on the FLNF is uncertain, but may be declining (Smith and Brown 1994, SVE Bird Panel 2003, USDA Forest Service 2003t; USDA Forest Service, unpublished data).

Eastern meadowlarks nest in diverse grasslands, pastures, hayfields and alfalfa, weedy cropland borders, overgrown agricultural fields, airports, and reclaimed surface mines (Lanyon 1995, Mitchell et al. 2000). Bollinger (1995) observed that abundance of eastern meadowlarks in central New York increased with age of hayfields. Eastern meadowlarks also prefer fields with medium to tall grasses and ample litter, and larger grasslands than those preferred by many other species (Lanyon 1995, Smith 1997, Mitchell et al. 2000). About 5,700 acres (36%) of the FLNF is in grazed or un-grazed grassland habitat (Table 3.6-3). Continuing maintenance of lands allocated to grassland MAs would provide adequate habitat for this species on the Forest in the future.

Common yellowthroat
Estimated population trends for the common yellowthroat vary by region. Partners in Flight identify the common yellowthroat as a species that is increasing in the Lower Great Lakes Plain (PIF physiographic region 15: Dettmers and Rosenberg 2003), although North American Breeding Bird Survey data suggest a slight decline in the Northeast and in New York State from 1980 to 2002 (Sauer et al. 2003). The New York Breeding Bird Atlas (NYDEC 2005) shows no apparent trend from 1985 to 2000. No population data are available for this species on the FLNF (USDA Forest Service, unpublished data).

The common yellowthroat is a warbler that breeds in diverse types of dense, brushy habitat (DeGraaf et al. 1992, Guzy and Ritchison 1999, DeGraaf and Yamasaki 2001). As noted above, Partners in Flight describe “scrub-shrub” habitats as diminishing in availability and quality in the Allegheny Plateau and Lower Great

Lakes Plain and in the Northeast in general (Dettmers and Rosenberg 2003, Robertson and Rosenberg 2003). Shrubland habitat currently is declining on the FLNF, as some areas are succeeding to more mature forest conditions, but shrubland habitat remains available on the FLNF and adjacent private lands. About 1,250 acres (8%) of the FLNF is in shrubland habitat (Table 3.6-3). Continuing maintenance of lands allocated to Shrubland MA would provide adequate habitat for this species on the Forest in the future.

Black-throated blue warbler
Partners in Flight identify the black-throated blue warbler as a species that is increasing in the Allegheny Plateau (physiographic region 24: Robertson and Rosenberg 2003). Breeding bird surveys suggest that populations appear to be stable for the Northeast and for New York State over the last three or four decades (Sauer et al. 2003, NYDEC 2005). No population data are available for this species on the FLNF.

Preferred breeding habitat for the black-throated blue warbler is continuous, mature, and relatively undisturbed deciduous or mixed deciduous-coniferous forest with dense understory (Holmes 1994, DeGraaf and Yamasaki 2001). Abandonment of farmland across the northeast during the 20th Century led to a “wave of reforestation” across the region, largely at the expense of grassland habitats (Robertson and Rosenberg 2003: p. 9). Much of this new and existing forestland occurs in small tracts (Dettmers and Robertson 2003, GFLRPC 2004), which may detract from its suitability for the black-throated blue warbler. About 5,400 acres (34%) of the FLNF are covered in northern hardwood or oak-hickory forest. About two thirds of the northern hardwood and almost 90 percent of the oak-hickory forest is mature or older (FEIS Tables 3.5-9 and 3.5-10). The amount and continuity of mature forest on the FLNF is unique for the central New York region. Habitat conditions on the FLNF for the black-throated blue warbler are improving, as forest stands mature.

Chestnut-sided warbler
Although breeding bird surveys suggest a slight population decline in the Northeast and in New York State for the chestnut-sided warbler during the last three or four decades, these declines are not statistically significant and populations probably are stable (Sauer et al. 2003, NYDEC 2005). Periodic surveys on the FLNF give no clear indication of population trends on the Forest, although habitat management on the Forest is credited with increasing breeding survey point counts for this species by as much as six times over point counts for New York State as a whole (Toth 2000, USDA Forest Service 2004d).

The chestnut sided-warbler is a species of regenerating, deciduous forest (Richardson and Brauning 1995, DeGraaf and Yamasaki 2001). Therefore, the increase in the acreage and maturity of forestland that benefits the black-throated blue warbler represents diminishing quantity and quality of habitat for the chestnut-sided warbler. Regenerating hardwood forest on the FLNF currently covers about 350 acres (2%) of the Forest (Table 3.6-3).

Ruffed grouse
The ruffed grouse is an important game bird throughout North America. The North American Breeding Bird Survey (Sauer et al. 2003) shows a significant decline in ruffed grouse populations for New York State and for the Northeast as a whole for 1966 to 2002. The New York Breeding Bird Atlas (NYDEC 2005) also shows a decline from 1985 to 2000 in central New York. Results from drumming surveys on the FLNF suggest a decline in numbers of ruffed grouse from 1995 through 1999 (Toth 2000), but there is no clear indication of any population trend since that time (USDA, unpublished data).

Ruffed grouse take advantage of many habitat types and conditions, but aspen is a particularly important habitat species (Gullion 1984, DeGraaf et al. 1992, Rusch et al. 2000, DeGraaf and Yamasaki 2001). Aspen is generally considered a component of early successional habitat. Early successional habitat is declining in abundance over much of the northeastern United States as abandoned fields, forest openings, and other shrubland habitats revert to older forest conditions (Litvaitis 2003a). Given the observed

population declines for this species in the Northeast and in central New York (Sauer et al. 2003, NYDEC 2005), it can be inferred that suitable habitat likely is declining across the area. The FLNF includes only about 240 acres (2%) of inventoried aspen (Table 3.6-3), although more, non-inventoried aspen also occurs as inclusions in other forest types. Virtually none of the inventoried aspen on the FLNF is in regeneration (FEIS Table 3.5-12). Aspen is a short-lived and shade-intolerant species; regeneration efforts will be necessary to provide adequate aspen habitat on the Forest in the future.

Gray squirrel
The gray squirrel is a small game species with an annual hunting season in New York, although population and trend data are not available. FLNF has conducted nest surveys along designated routes to determine relative changes in gray squirrel abundance based on leaf nest counts. Results from these surveys do not indicate any clear population trends, but gray squirrels continue to be common on the Forest (Toth 2000, FLNF unpublished data).

The gray squirrel generally is found in mature deciduous and mixed forests, particularly those that provide hard mast, such as acorns and other nuts (Godin 1977, DeGraaf and Yamasaki 2001, NatureServe 2004). Oak-hickory forest covers about 2,700 acres (17%) of the Forest (Table 3.6-3). About 90 percent of the oak on the FLNF is mature or older (FEIS Table 3.5-10). For the short-term (20 years) there should be no lack of abundance of oak on the Forest. Abundance of oak could diminish in the long-term (100 years or more) if oak regeneration is not encouraged in areas that allow even-aged silvicultural systems.

3.6.2 Environmental Consequences

Direct and Indirect Effects by Alternative

For the purpose of this analysis, short-term effects are defined as those that occur within the next 20 years and long-term effects are those that occur within the next 150 years.

Tables 3.6-5 and 3.6-6 provide the estimated availability of key habitat types by alternative over the short and long-term, assuming full implementation of the revised Forest Plan. Alternative-specific differences displayed in Tables 3.6-5 and 3.6-6 form the basis of the following effects analysis. It is important to emphasize that these tables provide rounded estimates of existing and future habitat conditions, not acres of land allocated to MAs with similar names. Allocation of land to MAs under the three alternatives is provided in FEIS Table 2.1-4.

Indicator 1 – Acres of Grassland Habitat

The three alternatives provide two choices in the amount, quality, and distribution of grassland habitats. As indicated in Table 3.6-5, the overall availability of grassland is almost the same for the three alternatives, ranging from 5,713 to 5,777 acres (approximately 35% of the FLNF). The principal difference is the relative acreage where grazing is or is not permitted.

Methods employed for maintenance of grasslands, specifically, grazed versus un-grazed maintenance, directly affect the quality of that grassland habitat. Grazed grasslands tend toward a higher percentage of unpalatable grasses and forbs that create a less-dense and less-uniform vegetation cover than in the un-grazed grasslands. Species seeking less dense habitats (for example, vesper sparrow) may prefer grazed areas over un-grazed areas. Conversely, species seeking higher vegetation densities (for example, northern harrier, red-winged blackbird) are more likely to use

un-grazed grasslands. In addition, some of the ground-nesting birds prefer the relative lack of disturbance in un-grazed grasslands.

Effects Common to All Alternatives

All alternatives provide approximately 35 percent of the Forest as grassland habitats, predominately located in the northern portions of the FLNF. Wildlife species, like grasshopper sparrow, eastern meadowlark, meadow vole, meadow jumping mouse, garter snake, and leopard frog will be provided with a substantial acreage of preferred habitat that is well distributed across the FLNF, especially the northern portions.

None of the alternatives allows for natural succession of grassland habitats to forest habitats. The long-term effect of continued grassland maintenance is the persistence of these habitats on approximately 35 percent of the Forest. Thus, all alternatives provide positive contributions to viability and persistence of grassland-dependent species that occur on the Forest. Common species that rely on grassland habitat likely will continue to occur on the Forest as long as grassland habitats persist. Over the long-term, some of the rarer grassland-dependent species (for example, Henslow's sparrow, upland sandpiper, or short-eared owl) that are separated from core range and core populations may no longer occur on the FLNF if the Forest's grasslands become increasingly isolated from that core range.

All alternatives require active maintenance of grassland through grazing, mowing, clipping, and/or prescribed burning. The revised Forest Plan includes standards and guidelines designed to minimize adverse impacts to wildlife occurring on the Forest's grasslands. These standards and guidelines apply identically under each alternative; therefore, effects do not change among alternatives. Recreational activities (including hiking, camping, and snowmobiling) and use of the town road network can indirectly affect the availability of grassland habitats for wildlife use by disturbing or trampling nests, introducing predators (particularly dogs), creating barriers to movements, or causing direct mortality on roadways. Forest-wide direction on the management of these activities (primarily through standards and guidelines) is consistent across alternatives and designed to minimize the potential adverse affects of these uses. Consequently, there are no alternative-specific differences in management effects relative to grasslands.

Grasslands contain small inclusions of shrubs, hedgerows, and small patches of larger trees and forested habitats. The following analyses assume that these inclusions will be retained. Conversion of these areas to grassland may not be cost effective, and many are desirable for providing shade for livestock, cover for wildlife, and added structural habitat diversity.

Alternative 1

Alternative 1 provides the most acres as grazed grasslands (5,400 acres: 34%) and the least acres as un-grazed grasslands (310 acres: 2%), over both the short-term (Table 3.6-5) and the long-term (Table 3.6-6). This alternative more closely reflects the Finger Lakes region as a whole, with a higher percentage of grasslands actively grazed. Wildlife species preferring the less dense, grassy conditions that result from moderate levels of grazing will find greater opportunities under Alternative 1 than under Alternatives 2 and 3. These species include garter snake, savannah sparrow (a grassland MIS), grasshopper sparrow, and meadow vole. Conversely, grassland-dependent species preferring taller and denser vegetation that occurs in un-grazed grassland or less disturbed conditions [upland sandpiper, Henslow's sparrow, eastern meadowlark (a grassland MIS), meadow jumping mouse] will have less suitable habitat under Alternative 1 than under Alternatives 2 and 3.

Alternatives 2 and 3

Alternatives 2 and 3 provide an identical combination and distribution of grasslands: 5,100 acres (32%) of grazed grassland and 680 acres (4%) of un-grazed grassland, over both the short-term and the long-term (Tables 3.6-5 and 3.6-6). These alternatives differ from

Alternative 1 by proposing greater amounts of un-grazed grasslands. Under Alternatives 2 and 3, the increased acres of un-grazed grasslands result directly from a reduction in acres of grazed grasslands. Additionally, 410 acres proposed as grazed grasslands in Alternative 1 are proposed for management as woodlands in Alternatives 2 and 3.

Spatially, Alternatives 2 and 3 reduce the number of isolated, grassland habitat parcels in comparison to Alternative 1, while shifting focus of grassland management toward the northern portions of the FLNF. Similarly, Alternatives 2 and 3 propose woodland management for some isolated, grazed grasslands in Alternative 1.

Un-grazed grasslands are less common than grazed grasslands in the vicinity of the FLNF. Because grasses and forbs are allowed to grow without livestock grazing pressure, vegetation densities in un-grazed areas exceed (are denser than) those of grazed areas. In addition to species likely found in grazed areas, these un-grazed and less-disturbed areas also attract some of the region's rarer species, like northern harrier and Henslow's sparrow. Particularly considering the availability of un-grazed grasslands, MIS (savannah sparrow, bobolink, and eastern meadowlark) and other species that rely on or use grassland habitats receive greater benefit overall from Alternatives 2 and 3 than from Alternative 1.

Indicator 2 – Acres of Shrubland Habitat

Effects Common to All Alternatives

The alternatives provide limited differences in the amount and distribution of shrubland habitat. Each alternative provides for shrubland habitats between 1,100 acres (7%) and 1,400 acres (9%) of the FLNF (Table 3.6-5). Wildlife species, like eastern American toad, eastern towhee, common yellowthroat, white-tailed deer, and red fox will be provided with a substantial acreage of preferred habitat that is well distributed across the FLNF, especially along the edges and in the Forest's northern portions. As all alternatives provide sufficient acreage and distribution of shrubland habitats, all alternatives adequately address the Forest Service's responsibility for viability of wildlife using the FLNF.

None of the shrubland management alternatives allow for natural succession of shrubland to older forest stands. Continued maintenance of these areas on the FLNF would result in the persistence of between about seven to nine percent of the FLNF remaining in shrublands (Table 3.6-5). Thus, all alternatives provide positive contributions to viability and persistence of shrubland-dependent species using the FLNF. Common species that rely on shrubland habitat likely will continue to occur on the FLNF as long as shrubland habitats persist. Over the long-term, some of the rarer, shrubland-dependent species (for example, blue-winged warbler, field sparrow) that are currently experiencing regional population declines due to range-wide loss of habitat, may no longer occur on the FLNF if the Forest's shrublands become increasingly isolated.

All alternatives require active maintenance of shrubland through mowing, clipping, and/or prescribed fire to perpetuate shrubland conditions. The revised Forest Plan provides Forest-wide guidance (primarily through standards and guidelines) that is designed to minimize adverse impacts to wildlife occurring on the Forest's shrublands. These standards and guidelines apply identically under each alternative; therefore, effects do not change among alternatives. Recreational activities (including hiking, camping, and snowmobiling) and use of the town road network can indirectly affect the availability of shrubland habitat for wildlife use by disturbing or trampling nests, introducing predators (particularly dogs), creating barriers to movements, or causing direct mortality on the roadways. Consequently, there are no alternative-specific differences in management effects relative to shrublands; the differences occur in the amount of acres allocated to each MA by each alternative.

Shrublands contain inclusions of hedgerows, small patches of larger trees, and other forested habitats. The following analyses assume that these inclusions are retained for additional habitat structure and diversity.

Alternative 1

Alternative 1 allocates the most acres to the Shrubland MA (FEIS Table 2.1-4: 2,107 acres, 13%), compared to Alternative 2 (1,268 acres, 8%) and Alternative 3 (1,421 acres, 9%). Differences in the actual availability of shrubland habitat are much smaller, ranging from 1,400 acres (9%) in Alternative 1 to 1,100 acres (7%) in Alternative 2. Availability of shrubland habitat is the same over the short- and long-term (Tables 3.6-5 and 3.6-6). Except for a couple small shrubland parcels proposed for grassland management, the shrubland acres subtracted from Alternative 1 are those that have reverted through natural succession to wooded conditions and no longer appear as shrubland in the vegetation inventories. Alternatives 2 and 3 propose changing management direction for these parcels to woodland prescriptions.

Alternative 1 provides slightly greater benefit to shrubland MIS (common yellowthroat) and other wildlife species preferring shrubland conditions than the other alternatives. Alternative 1 proposes to maintain in the Shrubland MA approximately 700 acres that are currently woodland habitat.

Alternative 2

Alternative 2 offers the least short- and long-term availability of shrubland habitat (Tables 3.6-5 and 3.6-6: 1,100 acres, 7%) and reallocates the most acres from the Shrubland MA prescription to woodland management. Shrubland parcels proposed for reallocation to woodland management in Alternative 2 occur primarily along the Hector backbone. This change to woodland management is proposed for some of the larger shrubland parcels, which would drop the average shrubland parcel size from more than 45 acres to less than 42 acres (a decline of nearly 7%). Alternative 2 proposes 30 shrubland parcels, primarily toward the edges and northern portions of the FLNF. The average shrubland parcel sizes in Alternative 2 are slightly smaller than those in Alternative 3. Shrubland MIS (common yellowthroat) and other wildlife populations relying on shrubland habitat would receive less benefit from Alternative 2 than from Alternative 1.

Spatially, Alternatives 2 and 3 reduce the number of shrublands that are surrounded by woodland management, shifting shrubland focus to the edges and towards the northern portions of the FLNF.

Alternative 3

Alternative 3 offers 100 acres more shrubland habitat, over both the short-term and the long-term (Tables 3.6-5 and 3.6-6: 1,200 acres, 8%) than Alternative 2, but 200 acres less than Alternative 1. Shrubland parcels proposed for reallocation to woodland management in Alternative 3 occur primarily in the southern portion of the FLNF. Under Alternative 3, the change to woodland management for some of the larger shrubland parcels results in an increase in the average shrubland parcel size from about 45 acres to 47 acres. Alternative 3 proposes 30 shrubland parcels, primarily toward the edges and northern portions of the FLNF. The average shrubland parcel sizes in Alternative 3 are larger than in the other alternatives. Shrubland MIS (common yellowthroat) and other wildlife species that rely on shrubland habitat would benefit less from Alternative 3 than from Alternative 1, but more than from Alternative 2.

Spatially, Alternatives 2 and 3 reduce the number of shrublands that are surrounded by woodland management, shifting shrubland focus to the edges, and towards the northern portions, of the FLNF.

Indicator 3 – Acres of Contiguous, Mature Forest Habitat

The alternatives provide varied choices in the type, amount, condition, and distribution of contiguous, mature forest habitats. Among alternatives, the acreages of land allocated to the Northern Hardwood MA, the Oak Hickory MA, and the Future Old Forest MA vary in amounts and distribution. These MA allocations affect the amount and distribution of lands where even-aged silviculture may be employed, where uneven-aged silvicultural

systems will be employed, or where no vegetation management will be allowed and changes to composition and structure of the forest will occur through forest succession, growth, and natural disturbance processes. The distribution of these management actions as determined by MA direction ultimately determines the amount, distribution, and age structure of forest communities.

Effects Common to All Alternatives

All alternatives provide for a persistence and mixture of all forest types currently present on the FLNF. Common wildlife species preferring these different forest types are likely to persist in viable numbers on the FLNF under each alternative. None of the alternatives proposes closing (or changing) roads through the Forest; consequently, discussion of habitat connectivity pertains to species for which Forest roadways are not barriers (for example, large mammals or forest birds). Effects to wildlife species for which Forest roadways may create hazards or barriers (for example, spotted salamanders, woodland jumping mouse) do not change among alternatives.

Relative abundance of northern (mesic) hardwood, oak-hickory, and other oak-dominated forest communities would change very little over the short-term (Table 3.6-5). Major components of these communities are long-lived species, and changes occur slowly over many decades or longer, whether these changes occur through timber management or through natural succession and disturbance processes (see FEIS subsection 3.5.1.2 Environmental Consequences, in Vegetation for greater detail). A short-term increase in acreage of northern hardwoods and oak hickory from the current condition is due to these forest types replacing about 25 percent of the existing softwood forest through natural succession (see next paragraph).

Conifer management, including removal of non-native plantations, is consistent across alternatives. The abundance of conifer forest likely will diminish by about 25 percent under each alternative, due primarily to natural succession of older stands to northern hardwood and oak-hickory forests (Table 3.6-5). Differences will be greater over the long-term (150 years), relative to the current condition, as well as among alternatives. Long-term differences are driven primarily by land capabilities; they will not be apparent during the short life span of this revised Plan. FEIS subsection 3.5.1.2 (Environmental Consequences in Vegetation) addresses the relative amounts of these forest types and their conditions resulting from long-term implementation of the three alternatives. Conifer forest communities will continue to be present and available on the FLNF, with little or no difference in the short-term, for those wildlife species that occupy them.

Old-forest habitat is one component of contiguous, mature-forest habitat. Over time old-forest habitat will develop on lands that would not be subjected to timber or vegetation management, such as those in the Future Old Forest MA, existing and candidate Research Natural Areas (RNAs), and Ecological Special Areas (eSAs). These lands eventually will provide old-forest habitat components and increase the region's biological diversity; however, this process is likely to take a hundred years to achieve. Management direction for each of these MAs is constant across alternatives. Some land that will develop over time into old forest habitat is proposed under each alternative, although the amounts and distributions do vary. Alternative 1 does not allocate land to the Future Old Forest MA.

Of the major vegetation conditions proposed for FLNF management, forested lands are least likely to be fragmented and isolated from similar conditions in the region because the rate of habitat loss is lower for forested lands. This is in contrast to the situation described above for grassland and shrubland, where the loss of grassland habitat region-wide will lead in time to greater isolation of those habitats on the FLNF, as well as the species that depend on those habitats.

Alternative 1

Timber harvest will occur primarily in the Northern Hardwood and Oak Hickory MAs. Alternative 1 includes the greatest allocation of FLNF land to these MAs (FEIS Table 2.1-4: 7,169 acres, 44%), and the largest suitable land base (FEIS Table 3.11-3: 6,680 acres, 41%). Alternative 1 also allocates the most acres of the FLNF to the Oak Hickory MA, which emphasizes even-aged silvicultural system methods; provides the greatest emphasis on young deciduous forest (see Indicator 4 below); and provides the greatest annual harvest acres. These factors will result in a lower relative representation of mature and older forest communities on the FLNF. The short-term (20 year) differences are not substantial, however, as the projected proportion of mature and older forest on lands subjected to even-aged management ranges from 66 to 70 percent for northern hardwood communities and 54 percent (Alternative 3) or 70 to 74 percent (Alternatives 1 and 2) for oak-dominated communities (FEIS Tables 3.5-20 and 3.5-21). The seemingly large (20%) range for mature and older oak-dominated forest represents only about 50 acres, as even-aged management is projected for only 257 acres of oak-dominated forest (FEIS Table 3.5-19).

Alternative 1 allocates the least land (FEIS Table 2.1-4: 390 acres, 2%) to the Northern Hardwood MA, compared to 3,047 acres (19%) in Alternative 2 and 2,189 acres (13%) in Alternative 3. Management designed to maintain hardwood forests, and in this MA specifically, is predominately uneven-aged silviculture, which perpetuates continuous forest canopy and mature forest conditions.

Alternative 1 also includes the least land (FEIS Table 3.10-6: 783 acres, 5%) allocated to MAs that do not allow timber or vegetation management (ecological Special Areas and Research Natural Areas) or are otherwise unsuitable for such management. Changes to the composition and structure of forest communities on these lands will occur through succession and natural disturbances. These are the lands that will provide old forest habitat over time. Under Alternative 1, these parcels would be scattered throughout the FLNF, not contributing to contiguity of old forest communities. In addition, Alternative 1 does not allocate lands to the Future Old Forest MA.

In summary, Alternative 1 offers a slightly lower emphasis on mature and older forest communities, but in the short-term, these differences are negligible. Alternative 1 also provides the least emphasis on lands that will develop old-growth characteristics, although old growth likely represents no advantage for wildlife in comparison to mature and older-forest communities. The greater difference is that the areas that will develop into older forest are more scattered and provide less contiguity. Thus, the MIS for contiguous, mature forest habitat (black-throated blue warbler) and other species that rely on or use this habitat (for example, spotted salamander, scarlet tanager, ovenbird, gray fox), receive the least benefit from Alternative 1.

Alternative 2

Alternative 2 allocates the least lands (FEIS Table 2.1-4: 4,174 acres, 25%) to the two MAs that focus on timber management and provides the smallest suitable land base (FEIS Table 3.11-3: 3,846 acres, 23%). Alternative 2 allocates the most land to the Northern Hardwood MA (3,047 acres, 19%), which emphasizes uneven-aged silvicultural system methods and provides continuous forest cover. Alternative 2 also includes the greatest allocation to the Future Old Forest MA (3,821 acres, 23%), and the greatest overall acreage that will produce old forest conditions (FEIS Table 3.10-6: including RNA, eSA, and other unsuitable acres, 4,854 acres, 30%) Habitat conditions resulting from northern hardwood and future old forest management are similar in that woodlands of either management tend toward high-canopied, shaded stands with varying amounts of understory.

Under Alternative 2, old forest parcels would extend the length of the Forest along the Hector backbone (the north-south height of land). Alternative 2 provides the greatest connectivity among old forest parcels. Northern hardwood stands actively managed under Alternative 2

are well distributed throughout the FLNF and generally connected to the Future Old Forest MA, thus providing a high degree of connectivity for continuous canopied woodlands.

In summary, Alternative 2 allocates the most lands to MAs that will develop into old forest, the most acreage managed under uneven-aged silvicultural methods, and the most connectivity and contiguity of the combined old and mature forest communities. Consequently, Alternative 2 provides the greatest benefit to the selected MIS (black-throated blue warbler) and other species that rely on or use contiguous, mature forest habitat.

Alternative 3

Alternative 3 is intermediate to Alternatives 1 and 2 in allocation of National Forest System lands to the two MAs that focus on timber management (FEIS Table 2.1-4: 6,225 acres, 38%) and in the size of the suitable land base for timber harvest (FEIS Table 3.11-3: 5,700 acres, 35%). Alternative 3 also allocates an intermediate amount of lands to the Northern Hardwood MA (2,189 acres, 13%), which emphasizes uneven-aged silvicultural system methods; to the Future Old Forest MA (1,398 acres, 9%); and MAs and other unsuitable land that will develop into old-forest conditions (FEIS Table 3.10-6: 2,655 acres, 16%).

Under Alternative 3, lands that develop into old forest would be centrally located, with limited occurrence at the northern extremity of the Forest. This alternative provides habitat connectivity among areas of old forest development similar to Alternative 2, but provides less connectivity than Alternative 2 between areas managed with uneven-aged silvicultural methods and those managed for older forest. The selected MIS (black-throated blue warbler) and other species that rely on or use contiguous, mature forest habitat receive greater benefit under Alternative 3 than under Alternative 1, but less than under Alternative 2.

Indicator 4 – Acres of Habitat Available for Management Indicator Species and their population trends

Five of the management indicator species (MIS) for the revised Forest Plan (Table 3.6-2) are linked to major wildlife habitats that the Forest Service identified as indicators for the FLNF: grassland; shrubland; and contiguous, mature forest. Analysis of the potential effects of the revised Plan on these habitats and their short- and long-term availability are discussed separately above for Indicators 1, 2, and 3. The associated MIS are savannah sparrow, bobolink, and eastern meadowlark (grassland); common yellowthroat (shrubland); and black-throated blue warbler (contiguous, mature forest). The revised Forest Plan provides suitable habitat for each of these MIS under any of the three alternatives.

Three other MIS for the revised Forest Plan are linked to other important habitat types on the FLNF: young deciduous trees (age 0-9 years), aspen, and oak-hickory. Analysis of the potential effects of the revised Plan on these MIS and their habitats are discussed below.

Effects Common to All Alternatives

All alternatives provide availability of each of the important habitat types and conditions on the FLNF. MIS will find suitable conditions under all alternatives, both in the short-term (Table 3.6-5) and the long-term (Table 3.6-6). Common wildlife species of the FLNF and the FLNF vicinity that rely upon or use these same habitat conditions are likely to persist in viable numbers, regardless of which alternative is selected.

Management of aspen does not vary among alternatives, and all alternatives maintain aspen at levels greater than would be expected by ecological tendencies, although the abundance of aspen, due to MA allocation and corresponding allowable management practices, would vary by alternatives. Oak-hickory and oak-dominated forest types will be available on the Forest during the short-term with little change in abundance and distribution from the current condition. Succession of these

forest types to northern hardwood and the development of old forest characteristics will likely require 150 years or more. See FEIS subsection 3.5.1.2 (Environmental Consequences in Vegetation) for a more detailed discussion of aspen, oak-hickory, and other forest types, and how they would respond to the alternatives.

Alternative 1

Alternative 1 provides the most available habitat for MIS that rely on aspen and young deciduous tree habitats over the short-term. Alternative 1 would provide for abundance of aspen at the upper limit (3% of the FLNF) of the desired composition range for this species (Table 3.6-5). The average acreage of young deciduous trees at any given time during the short term (20 years) would be about 330 acres (2%), three times that of Alternative 3 and about eight times more than under Alternative 2. Long-term availability of aspen and young deciduous tree habitat under Alternative 1 vary slightly from the short-term (Table 3.6-6). Thus the MIS for aspen (ruffed grouse) and young deciduous trees (chestnut-sided warbler), as well as the other wildlife species that rely on or use these habitat communities, would benefit most from Alternative 1. The availability of oak-hickory habitat should increase slightly over the current condition due to natural succession of some softwood stands, but does not vary among alternatives over the short term. Availability of oak-hickory increases only marginally to 3,300 acres (20%) over the long-term (Table 3.6-6), but this is greater than under the other alternatives. The associated MIS (gray squirrel) and other species that rely on this habitat receive equal benefit from each alternative in the short-term and greater benefit from Alternative 1 over the long-term.

Alternative 2

Alternative 2 would provide slightly less emphasis on aspen and substantially less young deciduous tree habitat than Alternatives 1 and 3 (Table 3.6-5). Projected short-term abundance of aspen is about 150 acres (1%) compared to 380 to 480 acres (2-3%) for the other alternatives. Average abundance of young deciduous trees would be only about 40 acres (< 0.5%) under Alternative 2, which is substantially less than that provided under Alternatives 1 and 3. Long-term availability of aspen doubles to 300 acres (2%) but long-term availability of young deciduous trees increases only marginally to 50 acres (< 0.5%: Table 3.6-6). The MIS for aspen (ruffed grouse) and young deciduous trees (chestnut-sided warbler), as well as the other wildlife species that rely on or use these habitat communities, would benefit least from Alternative 2. The availability of oak-hickory habitat should increase slightly over the current condition due to natural succession of some softwood stands, but does not vary among alternatives over the short term. Availability of oak-hickory declines to 1,500 acres (9%) over the long-term (Table 3.6-6), which is lower than under the other alternatives. The associated MIS (gray squirrel) and other species that rely on this habitat receive equal benefit from each alternative in the short-term and less benefit from Alternative 2 over the long-term.

Alternative 3

Alternative 3 would provide abundance of aspen at about 2 percent, approaching the upper limit (3%) of the desired composition range for this species. Short-term abundance of aspen under Alternative 3 would be less than under Alternative 1 because Alternative 3 allocates 56 acres of existing aspen to MAs that do not allow regeneration management (FEIS Table 3.5-18). Alternative 3 provides an intermediate amount of young deciduous tree habitat (110 acres, <1%) over the short-term. This is one third as much as under Alternative 1, but almost three times more than under Alternative 2. Ruffed grouse, and other wildlife species that rely on or use aspen, would receive the most and equal benefit from Alternatives 1 and 3. Those that depend on or use young deciduous tree habitat would receive intermediate benefit from Alternative 3 – less than under Alternative 1 but more than under Alternative 2. The availability of oak-hickory habitat should increase slightly over the current condition due to natural succession of some softwood stands, but does not vary among alternatives over the short term. Availability of

oak-hickory declines to 2,500 acres (15%) over the long-term (Table 3.6-6), which is intermediate to the other alternatives. The associated MIS (gray squirrel) and other species that rely on this habitat receive equal benefit from each alternative in the short-term and an intermediate level of benefit from Alternative 3 over the long-term.

Cumulative Effects

Effects Common to All Alternatives

The landscape, and associated habitats, adjacent to and near the FLNF reflect the patchwork of diverse habitat conditions proposed in revised Forest Plan alternatives. All alternatives provide sufficient availability of important habitats for the continued presence of the region's wildlife species that rely on these conditions. MIS populations on the Forest will reflect the abundance and availability of the habitats on which they rely.

Wildlife species that occur on the FLNF, and their respective populations, are greatly influenced by populations of these species in the Finger Lakes region of central New York. The regional landscape, land use characteristics, and associated habitats adjacent to the FLNF and in the central New York region provide a patchwork of diverse habitat conditions, including a variety of agricultural uses, forests and small woodlots, rural residential areas, and some commercial development. Recent regional trends have seen a decrease in the relative proportion of farmland in Schuyler and Seneca Counties, the counties in which the FLNF lies (USDA Forest Service 2001a). The same trend is evident in the Seneca Lake watershed, as agricultural land uses have been declining and more land is reverting to forest (GFLRPC 2004). General development also is increasing across the region, particularly for second homes and internet-based businesses. The Genesee/Finger Lakes Regional Planning Council anticipates that such development will increasingly conflict with agricultural land uses, wildlife habitat, water quality, and other resources (GFLRPC 2004).

If current land-use trends continue, the relative abundance of forested habitats across the central New York region would increase at the expense of grassland and shrubland habitats. With a greater and seemingly more stable availability of woodland habitats in the central New York region, it is unlikely that woodland species will experience decline of diversity or abundance in the long-term. Conversely, grassland and shrubland habitat on the FLNF likely will become increasingly isolated from similar habitats in the region. This habitat isolation will result in the FLNF becoming a temporary refuge for species dependent on grassland and shrubland habitats. As the isolation process deepens, grassland and shrubland species are apt to slowly disappear, as core habitat and range move farther and farther away.

Wildlife can also be affected by the introduction and spread of non-native invasive species (NNIS) of plants, which can compete with, and overcome, native species. For example, West Virginia white butterfly larvae develop primarily on two or more species of toothworts (*Dentaria* spp). Female butterflies, however, also lay eggs on the NNIS species garlic mustard (*Alliaria officinalis*) if it is present, but the larvae cannot successfully mature on this species (Porter 1994). FEIS Vegetation section 3.5.1.2 (Environmental Consequences) discusses NNIS in detail.

The total availability of grassland (grazed and non-grazed) is very similar across alternatives (Table 3.6-6: 5,690 to 5,710 acres, 36%). Long-term availability of grasslands depends on maintenance, as these habitats quickly succeed into shrubland and then into older forested habitats. The primary difference among alternatives is the relative allocation of grassland for grazing versus non-grazed grassland. Non-grazed grasslands that are retained primarily for wildlife are an uncommon habitat in the region.

The shrubland habitat community is one of the least available in the vicinity of the FLNF. The long-term availability of shrubland provided by the alternatives varies little, from 1,100 acres to 1,400 acres (Table 3.6-6). Shrubland condition,

which depends on maintenance, has a greater potential impact on shrubland species than acreage. Maintenance of allocated shrublands is covered by Forest-wide management direction that does not vary by alternative.

Alternative 1

Alternative 1 provides the greatest long-term availability of oak-hickory (Table 3.6-6: 3,300 acres, 20%) and young deciduous tree habitats (330 acres, 2%). The young deciduous tree habitat, which is associated with even-aged silvicultural systems, would be present in sufficient abundance that the FLNF may be a source habitat from which species relying on or using young hardwood habitat can disperse into the surrounding region. Continued emphasis on oak-hickory forest will also provide a hard mast source for animals on or near the Forest. Alternative 1 (along with Alternative 3) provides the greatest long-term emphasis on aspen. Alternative 1 offers the least availability of northern hardwood habitat (2,500 acres, 15%),

Alternative 1 provides the least support of future old forest conditions, with no acres allocated to the Future Old Forest MA and fewest acres in MAs or other unsuitable land that will develop old forest characteristics over time (FEIS Table 3.10-6: 783 acres, 5%) . Because future old forest areas have yet to become old forest, wildlife responses to FLNF management for old forest will likely be undetectable for the expected life of the revised plan (10 to 15 years), and are unlikely to manifest themselves before another hundred years. Old forest habitats are even rarer than shrubland habitats in the FLNF vicinity. As Forest stands managed for old forest age, they will begin to provide a new habitat component and increase the region's biological diversity.

Although the acreage allocated to grassland MAs is similar in all alternatives, Alternative 1 allocates less acreage to un-grazed grassland (Table 3.6-6: 310 acres, 2%) than Alternatives 2 and 3, which are identical in this respect (680 acres, 4%). The un-grazed grassland habitat community is extremely rare in the FLNF vicinity and it is unlikely that other landowners will be maintaining un-grazed grasslands. With time, the Forest's un-grazed grasslands may be unique in the vicinity. Species that prefer the vegetation density and lack of disturbance in these habitats receive the smallest long-term benefit from Alternative 1.

Alternative 2

Alternative 2 provides the greatest opportunity for development and maintenance of un-grazed grasslands and future old forest habitats. The total long-term acreage of grassland habitat is similar in all alternatives, but Alternative 2 (as does Alternative 3) provides slightly more acres for un-grazed grassland habitat (Table 3.6-6: 680 acres, 4%) than Alternative 1 (310 acres, 2%). The un-grazed grassland habitat community is extremely rare in the FLNF vicinity and it is unlikely that other landowners will be maintaining un-grazed grasslands. Over time, the Forest's un-grazed grasslands may be unique in the vicinity. Species that prefer the vegetation density and lack of disturbance in these habitats receive greater long-term benefit from Alternative 2 than from Alternative 1. Alternatives 2 and 3 provide identical opportunities for grassland management.

Long-term implementation of Alternative 2 would provide the greatest area that will develop old forest characteristics (Table 3.10-6: 4,854 acres, 30%), and the most central, contiguous distribution, of mature and future old forest habitats. Large areas of contiguous, mature forest are unlikely to be provided by neighbors of the FLNF or other landowners in central New York. The FLNF likely would be the only provider of the old forest component of this habitat type.
Alternative 2 offers the least long-term availability of oak-hickory habitat (Table 3.6-6: 1,500 acres, 9%), least relative contribution towards young deciduous trees (50 acres, less than 0.5%), and the least contribution towards aspen (300 acres, 2%).

Alternative 3

Alternative 3 provides a balance of availability for most habitat types that is intermediate between Alternatives 1 and 2. Alternative 3 provides abundant contiguous, mature forest

habitat; the total area and connectivity of those habitats is lower than under Alternative 2 but greater than under Alternative 1. Alternative 3 provides an intermediate acreage that will develop old forest characteristics (Table 3.10-6: 2,655 acres, 16%). Alternative 3 (along with Alternative 1) provides the greatest long-term emphasis on and availability of aspen (Table 3.6-6: 500 acres, 3%).

Alternative 3 would provide intermediate availability of young deciduous tree habitat (Table 3.6-6: 100 acres, <1%), oak-hickory forest habitat (2,500 acres, 15%), and shrubland (1,200 acres, 8%). Under Alternative 3, benefits derived from grazed and un-grazed grassland habitats are the same as under Alternative 2, and greater than under Alternative 1. Alternative 3, therefore, provides the greatest flexibility for future wildlife habitat management.

Table 3.6-5: Estimated short-term (20 years) availability of key habitat types in the revised Forest Plan, by alternative.

Habitat Type	Current Condition[1]	Alt. 1	Alt. 2	Alt. 3
	acres	acres	acres	acres
Grazed grassland	5,400 (34%)	5,400[2] (34%)	5,100[2] (32%)	5,100[2] (32%)
Un-grazed grassland	310 (2%)	310[2] (2%)	680[2] (4%)	680[2] (4%)
Shrubland	1,250 (8%)	1,400 (9%)	1,100 (7%)	1,200 (8%)
Aspen	240 (2%)	480[3] (3%)	150[3] (1%)	380[3] (2%)
Young deciduous trees (age 0-9 years)	350 (2%)	330[4] (2%)	40[4] (<0.5%)	110[4] (<1%)
Northern hardwood	2,700 (17%)	3,100[5] (19%)	3,100[5] (19%)	3,100[5] (19%)
Oak-hickory	2,700 (17%)	3,100[5] (19%)	3,100[5] (19%)	3,100[5] (19%)
Conifer	3,000 (19%)	2,200[6] (13%)	2,200[6] (13%)	2,200[6] (13%)

Notes:
[1] Table 3.6-3 for current condition.
[2] Acreage of grazing land and grassland for wildlife calculated by area allocated by MA less inclusions of forest land, assuming management will retain those inclusions.
[3] Aspen projected to increase to upper end of projected range, adjusted by the proportion of acres of aspen in manageable MAs (FEIS Table 3.5-18).
[4] Calculated from SPECTRUM modeling results: acres per age class by decade.].
[5] Abundance of northern hardwood and oak-hickory will increase in the short-term from current conditions as hardwoods replace about 25% of existing softwoods through natural succession[6] (see FEIS section 3.5.1.2 in Vegetation).
[6] Acreage of softwood based on about 25 percent of current softwood being replaced by deciduous forest types within the next 15 years through succession (see FEIS section 3.5, Vegetation).

Table 3.6-6: Estimated long-term (150 years) availability of key habitat types in the revised Forest Plan, by alternative.

Habitat Type	Current Condition[1]	Alt. 1	Alt. 2	Alt. 3
	acres	acres	acres	acres
Grazed grassland	5,400 (34%)	5,400[2] (34%)	5,100[2] (32%)	5,100[2] (32%)
Un-grazed grassland	310 (2%)	310[2] (2%)	680[2] (4%)	680[2] (4%)
Shrubland	1,250 (8%)	1,400 (9%)	1,100 (7%)	1,200 (8%)
Aspen	240 (2%)	500[3] (3%)	300[3] (2%)	500[3] (3%)
Young deciduous trees (age 0-9 years)	350 (2%)	330[4] (2%)	50[4] (<0.5%)	100[4] (<1%)
Northern hardwood	2,700 (17%)	2,500[3] (15%)	5,900[3] (36%)	4,300[3] (26%)
Oak-hickory	2,700 (17%)	3,300[3] (20%)	1,500[3] (9%)	2,500[3] (15%)
Conifer	3,000 (19%)	1,500[3] (9%)	1,000[3] (6%)	1,300[3] (8%)

Notes:
[1] Table 3.6-3 for current condition.
[2] Acres for grazed grassland and un-grazed grassland are the same as the short-term projections in Table 3.6-5 (see text).
[3] Derived from FEIS Table 3.5-14.
[4] Calculated from SPECTRUM modeling results: acres per age class by decade.

3.7 THREATENED AND ENDANGERED SPECIES

The Forest Service is required to comply with provisions of the Endangered Species Act of 1973 (ESA), as amended, which defines species that are "endangered" or "threatened." An endangered species is one in danger of extinction throughout all or a significant portion of its range. A threatened species is one that is likely to become endangered in the foreseeable future. The US Fish and Wildlife Service (USFWS) is responsible for administering the ESA.

This section addresses the current condition of federally listed, threatened and endangered species on the Finger Lakes National Forest (FLNF), and the potential effects that different Forest Plan alternatives may have on them. The Forest Service approaches issues related to biological diversity and species viability on two different scales. Coarse-scale indicators track general resource concerns and habitat conditions for wildlife and wildlife habitat (FEIS section 3.6 of this chapter). Fine-scale indicators catch species that "fall through the cracks" of the coarse filter. These fine-scale indicators include threatened or endangered (TE) plants and animals (this section), Regional Forester sensitive species (RFSS), and other species of plants and animals of potential viability concern (FEIS section 3.8). The Biological Evaluation (BE: Appendix E) also addresses potential effects of the revised Forest Plan on TE species and RFSS. Other sections of Chapter 3 include habitat-related discussions for water and fish (FEIS section 3.3) and for plants and vegetation (FEIS section 3.5).

The BE presents detailed analysis of potential effects of the revised Forest Plan on six federally listed TE animal species and one plant species for the FLNF: gray wolf (*Canis lupus*), eastern cougar [*Puma* (=*Felis*) *concolor cougar*], Canada lynx (*Lynx canadensis*), Indiana bat (*Myotis sodalis*), bald eagle (*Haliaeetus leucocephalus*), bog turtle (*Clemmys muhlenbergii*), and Leedy's roseroot (*Sedum integrifolium* ssp. *leedyi*). The USFWS (2004) identified two species, Indiana bat and Leedy's roseroot, as occurring in the FLNF area, although neither species is known to occur on the Forest. The BE concludes that only one species, the Indiana bat, may be present on the FLNF and may be affected by management actions authorized by the revised Forest Plan. The BE further concludes that implementation of the revised Forest Plan, under any of the proposed alternatives, may affect, but is not likely to adversely affect, the Indiana bat.

The BE also concludes that implementation of the revised Forest Plan, under any of the proposed alternatives, will have no effect on the other listed species. This conclusion is based on the fact that the gray wolf, eastern cougar, and Canada lynx are not known to occur on, or in the vicinity of, the FLNF (Appendix E). The bog turtle and Leedy's roseroot occur near but not on the FLNF, and the Forest currently does not include suitable habitat for either species (S. Young, personal communication, July 2002; A. Nelson, R. Niver, P. Rosenbaum, personal communication, August 2003). The bald eagle may occur on the FLNF, but only as an occasional transient; it does not nest on the Forest (Smith and Brown 1994, USDA Forest Service 2000a, Stilwell 2000). Should the status of any of these species change relative to the FLNF, the Forest Service will reinitiate consultation with the USFWS. In light of their current status, the gray wolf, eastern cougar, Canada lynx, bald eagle, bog turtle, and Leedy's roseroot are not analyzed further in this section.

The FLNF does not include designated critical habitat or proposed critical habitat for any TE species, including the Indiana bat (USFWS 2004).

Issue Statement

Public concern is focused on ensuring that federally listed, threatened and endangered (TE) species are considered during development of the revised Forest Plan and during project implementation. The Indiana bat is the one federally listed, endangered, or threatened species analyzed in this section.

Indicator 1 – Acres Allowing Management Activities That May Affect Habitat or Population Trends of Indiana Bats

Indiana bats are at the periphery of their range in the Finger Lakes region of New York. They are not known to occur on or near the FLNF, although at present, the relative proportions of forest cover and open land on the FLNF, and in surrounding region, are well within the range of suitable conditions for roosting and foraging habitat. The FLNF also includes oak-hickory forest, which is a forest type preferred by Indiana bats. Management actions most relevant to habitat conditions for Indiana bats are those that may affect the availability of suitable roost trees and the overall abundance of suitable forest types, in general. This indicator differentiates among alternatives by comparing opportunities for creating and maintaining forest composition and structure that provide suitable habitat for Indiana bats.

Analysis Area

The analysis area for direct and indirect effects includes all federal land managed by the FLNF. Because the Indiana bat is highly mobile and capable of covering great distances between hibernacula and summer roosting and foraging habitats, the analysis area for cumulative effects is the two ecological sections that encompass the FLNF: the Erie and Ontario Lake Plain and the Northern Glaciated Allegheny Plateau. Ecological sections are large enough to encompass whole populations of this species, while ecological subsections may not be.

3.7.1 Affected Environment

Introduction

This section summarizes the analysis of direct, indirect, and cumulative effects and determinations made in the Biological Evaluation (BE: Appendix E) for the Indiana bat. The BE concludes that implementation of the revised Forest Plan under any of the proposed alternatives may affect, but is unlikely to adversely affect, the Indiana bat. The BE also presents the analyses that resulted in determinations of no effect for the six other TE species: gray wolf, eastern cougar, Canada lynx, bald eagle, bog turtle, and Leedy's roseroot.

The USFWS listed the Indiana bat as endangered under the ESA in 1967 (USFWS 1983). Censuses suggest a range-wide decline of about 60 percent from 1960 to 2000. Since the early 1980s, however, numbers of Indiana bats in New York and New England are stable and may be increasing (Clawson 2002, SVE Mammal Panel 2003). The Indiana bat is not known to occur on the FLNF, but the BE concludes that occurrence of Indiana bats on the FLNF cannot be discounted. Additionally, given current, regional population trends, numbers of Indiana bats in the Northeast likely will increase during the life of the Plan, increasing the likelihood of finding this species on the FLNF.

The Forest Service prepared an earlier Biological Assessment (USDA Forest Service 2000a) for consultation with the USFWS on potential impacts that continued implementation of the 1987 Forest Plan might have on TE species, particularly the Indiana bat. In December of 2000, the USFWS concluded that continued implementation of the 1987 Plan was not likely to adversely affect Indiana bat, and would have no effect on gray wolf, eastern cougar, bald eagle, bog turtle, and Leedy's roseroot (Stilwell 2000). Canada lynx was not evaluated at that time. The USFWS did not recommend any additional conservation measures for the Indiana bat, as they concluded that existing legal, policy, and 1987 Forest Plan direction was sufficient to protect the extremely low numbers of bats that might occur on the Forest.

The Forest Service also analyzed the Indiana bat and all other TE species, Regional Forester sensitive species, and other species of potential viability concern as part of the Forest's Species Viability Evaluation process (FEIS section 3.9, Species of Potential Viability Concern). This process evaluated species' status, distribution,

trends, life history characteristics, habitat needs at various scales, threats, and important ecological processes to help identify limiting factors and management approaches that might contribute to species' viability. This analysis concluded that viability for the Indiana bat is of less concern on the FLNF than on a range-wide scale.

Existing Forest Plan Management Direction

The existing management direction for the Indiana bat and other TE species is based on the provisions of the Endangered Species Act (ESA). Section 7(a)(2) of the ESA states that no federal agency should authorize, carry out, or fund any action "likely to jeopardize the continued existence of a listed species…." Accordingly, the Forest Service evaluates the effects of ongoing management practices, including implementation or revision of the Forest Plan, on species of plants and animals that are threatened, endangered, or proposed for listing as threatened or endangered. Through formal consultation, the Forest Service and the USFWS determine whether any listed species is likely to be affected. If necessary, the USFWS can recommend reasonable and prudent alternatives or other measures to prevent, minimize, or mitigate potential impacts.

Section 7(a)(1) of the ESA states that all federal agencies "should participate in the conservation and recovery of listed threatened and endangered species." The Forest Service actively fosters constructive working relationships with other federal and State resource management agencies, academic researchers, and other partners to maintain active involvement in regional conservation efforts and to keep abreast of changes in the regional status, distribution, and population trends of Indiana bats and other TE species. Such regional involvement enhances the ability of the Forest Service to respond quickly with appropriate management actions.

Management direction in the 1987 Forest Plan that addresses conservation of TE species, both directly and indirectly, is provided in goals that protect the environment and promote a diversity of life forms and unique habitats. Standards and guidelines for forest composition recognize a diversity of communities (such as shrub openings and pastures) and individual species (aspen or mast-producing species) that are important for wildlife. The 1987 Plan also provides age-class objectives for areas of even-aged silvicultural systems.

Forest-wide standards and guidelines address retention of wildlife reserve trees, including the desired numbers and distribution of snags, den trees, and mast trees. Several species of bats, including Indiana bats, use snags and den trees for roosting.

Management area (MA) standards and guidelines for wildlife provide direction for habitat management in general, but not specifically for TE species. MA standards and guidelines dictate the types of harvest methods (even-aged versus uneven-aged) used on particular areas of the Forest. The importance of this management direction to TE species, and to wildlife in general, is in how they influence the species composition and structure of habitats on the FLNF.

Proposed Changes in Management Direction Common to All Alternatives

The revised Forest Plan includes few changes in management direction relative to TE species, as the USFWS (2000a) recently determined that the current direction was sufficient for conservation of TE species on the FLNF. Proposed changes primarily reflect modification of language for simplification and clarity.

Goal 2 in the revised Forest Plan directs the Forest Service to "Maintain and restore quality, amount, and distribution of habitats to produce viable and sustainable populations of native and desirable non-native plants and animals." This goal encompasses general objectives addressing maintenance and enhancement of habitats and retention of wildlife reserve trees. This goal also includes an objective that explicitly identifies implementing established recovery or

conservation strategies for TE species in accordance with USFWS guidelines. The Forest Service added a Forest-wide standard requiring that project sites be investigated for the presence of TE or Regional Forester sensitive species prior to implementing ground-disturbing activities.

Goals, objectives, standards, and guidelines in the revised Forest Plan specifically address retention of trees important for wildlife, including snags, den trees, nest trees, and mast trees. These trees and snags represent potential roost sites for Indiana bats.

Existing Condition

The Indiana bat occurs across most of the eastern half of the United States (Rommé et al. 1995). Despite a range-wide decline of about 60 percent from 1960 to 2000, numbers of Indiana bats in New York and New England apparently are stable or increasing (Clawson 2002, SVE Mammal Panel 2003). Recent studies and survey results indicate that mature upland forest may provide important maternity habitat for female Indiana bats (Gardner et al. 1991a, 1991b). The apparent wide dispersal of Indiana bats emerging from hibernation has led biologists to consider any mature forests within the bat's known range as potential foraging and maternity roosting habitat (Widlak 1997).

The Indiana bat is one of nine bat species found in New York, although to date it has not been found on the FLNF. Mist-net and echo-location surveys conducted during the summers of 2001 and 2005 failed to detect the presence of Indiana bats on the FLNF (Kiser et al. 2001, BCM 2006); additional surveys will take place in the future. The presence or absence of Indiana bats on the Forest also is governed by the abundance and overall status of the species in the region. Accordingly, the likelihood of Indiana bats occurring on the FLNF may increase in the future if regional population trends continue.

Analysis of potential habitat-related management effects relative to Indiana bats focuses on habitats essential to four major aspects of the species' natural history: summer roosts; summer foraging habitat; roosting and foraging habitat near hibernacula where bats swarm immediately prior to hibernation; and the hibernacula themselves. Summer roosting and foraging habitat are the habitats of concern on the FLNF, as there are no known hibernacula on or near the Forest. The closest hibernaculum to the FLNF known to overwinter Indiana bats is near Jamesville, New York, approximately 50 to 60 miles to the northeast.

Optimal summer habitat for Indiana bats includes a landscape-level patchwork of open and forested lands, ranging from 20 to 60 percent forest cover, that provides suitable roost trees, sources of flying insects for foraging, and access to open water (Rommé et al 1995, Farmer et al. 1997, Kurta et al. 2002). Gardner and Cook (2002) reported that oak-hickory is a preferred forest types for maternity colonies (15%), compared to maple-beech-birch (3.2%), oak-pine (2.7%), and elm-ash-cottonwood (2.1%). Crown closure around preferred maternal roost sites is variable, but rarely exceeds 80 percent (Rommé et al. 1995, SVE Mammal Panel 2003). Preferred maternal roost sites are standing trees or snags with loose bark; bats roost under the bark, or occasionally in cavities or hollow portions of tree boles and limbs (Gardner et al. 1991a, USFWS 1999). Preferred roost trees are often in the open, along the edge of a forest with an open canopy and open understory, or in or near sources of disturbance (such as residences, roads, livestock operations, timber harvest), as roost trees in these sites are exposed to the warming effects of direct sunshine during all or part of the day (USFWS 1999, Kurta et al. 2002).

Indiana bats are insectivorous and have the ability to feed opportunistically on whatever flying insects are prevalent in their foraging habitats (Kurta and Whitaker 1998, USFWS 1999). In some areas, they forage in or beneath the tree canopy, over clearings and farmland, over water, and along forest edges (USFWS 1999, Menzel et al. 2001); in other areas they appear to avoid these areas (Humphrey et al. 1977).

The FLNF current is approximately 55 percent forested and 45 percent open habitats: grazing land, grassland, or shrubland (FEIS Table 3.5-8).

This patchwork of open and forested habitats on the FLNF is a reflection of the Forest's location straddling different ecological regions and the recent land uses in the region. Northern portions of the FLNF are in the highly agricultural Erie and Ontario Lake Plain Section of the Eastern Broadleaf Forest Province. Southern portions of the FLNF are in the more mountainous and forested Northern Glaciated Allegheny Plateau Section of the Laurentian Mixed Forest Province (Keys et al. 1995).

Private lands in the region include a matrix of woodlots, pastures, hayfields, vineyards, orchards, other agricultural crops, and residential uses (USDA Forest Service 2001a). In 1994, land use in the Seneca Lake watershed, which includes the western portions of the FLNF and lands to the west, was almost equally in agriculture (39%) and forest (41%), with 11 percent "idle" and about 8 percent in various levels of development (GFLRPC 2004). Idle lands, in this case, refers primarily to pasture and other agricultural land that is no longer worked, is reverting to forest, but may be "prime for development" (GFLRPC 2004). The existing mix of agricultural and forested lands on the FLNF and in the surrounding region provide suitable summer roosting and foraging habitat for Indiana bats.

3.7.2 Environmental Consequences

Direct and Indirect Effects by Alternative

Indicator 1 – Acres Allowing Management Activities That May Affect Habitat or Population Trends of Indiana Bats

Because there are no hibernacula on or in the vicinity of the FLNF, analysis of potential habitat-related management effects focuses on roosting and foraging habitat. Although Indiana bats can exploit a variety of forest types, oak hickory is a preferred type (Gardner and Cook 2002). The three alternatives provide a range of acres allocated to the Oak Hickory MA that emphasizes this forest community.

Management activities on the FLNF most likely to affect Indiana bats stem from vegetation or timber management in areas where Indiana bats are likely to occur. Potential adverse effects include direct affects from killing or injuring bats during removal of or damage to an occupied roost tree or snag, or indirect effects from reducing quantity or quality of potential roosting habitat by removing existing or potential roosting trees or snags. Potential beneficial effects include creation of openings or patches in which canopy closure is reduced, thereby enhancing the mosaic of suitable roosting and foraging habitats in close proximity to each other, and identification and retention of trees likely to provide suitable roost trees now and in the future, thereby increasing the availability of such structures.

Specific activities most likely to affect Indiana bats, directly or indirectly, and adversely or beneficially, are timber and vegetation management, particularly timber harvest and firewood cutting for commercial or personal use. Other activities, such as management and maintenance of recreational sites, construction and maintenance of roads and trails, removal of hazard trees, wildlife habitat management, prescribed fires, special uses, visual quality management, and protection of cultural resources may alter habitat over smaller areas. Removal of some occupied or potential roost trees can be offset to some extent by the fact that roost trees are ephemeral, suitable for a limited time because they die, exfoliating bark falls off, and they fall over. New roost trees become available through tree growth and natural mortality (Humphrey et al. 1977, Gardner et al. 1991a, Callahan et al. 1997). Timber or vegetation management also creates openings or areas of reduced canopy cover that provide foraging habitat for bats.

The three alternatives provide a range of land allocated to the two management areas (Oak Hickory MA and Northern Hardwood MA) that focus on timber management and a range of suitable acres on which commercial timber management is allowed.

Effects Common to All Alternatives

The Forest Service's responsibilities pursuant to the ESA and compliance with ESA requirements are not affected by the alternatives. These responsibilities and requirements include:

- Taking proactive conservation efforts on behalf of TE species
- Consulting with the USFWS to determine whether proposed management activities are likely to affect any listed TE species
- Developing and maintaining partnerships and cooperation with appropriate federal, State, and other agencies, conservation organizations, concerned landowners, and individuals in all appropriate aspects of wildlife, fish, and TE, and sensitive species habitat management

Forest-wide management direction relative to the protection, conservation, and recovery of TE species is not affected by alternatives. This includes direction provided in the revised Forest Plan (goals, objectives, standards, and guidelines), as well as agency policy and operational direction contained in Forest Service Manuals and Handbooks.

The revised Forest Plan does not include management direction specific to Indian bat habitat. Forest-wide objectives, standards, and guidelines, however, ensure that wildlife reserve trees (snags, den trees, nest trees, and mast trees) will be retained whenever possible during management activities. Several species of bats, including Indiana bats, use these snags and trees for roosting. This management direction provides that suitable roost trees and snags will continue to be available on the Forest.

Optimal summer habitat for Indiana bats includes a landscape-level patchwork of open and forested lands that provides suitable roost trees and foraging habitat. Short-term objectives for forest-type composition include keeping approximately 45 to 55 percent of the FLNF in grassland or shrubland conditions under all alternatives (FEIS Table 3.5-4). The Forest Service will maintain Grassland for Grazing, Grassland for Wildlife, and Shrubland MAs in generally open conditions. Hedgerows, small patches of trees, and small woodlots may be maintained within these MAs for species diversity and shade for livestock and wildlife. Such wooded areas are generally quite small and may be open to grazers. Such small woody patches provide excellent habitat for bats, as roost trees are exposed to warming sunlight, and the open canopy and abundant edge habitat with adjacent grasslands and shrublands provide good foraging areas. Management direction for these areas is the same under all alternatives, although the acreage and distribution of the three MAs varies.

Alternative 1

Alternative 1 includes the greatest combined allocation of FLNF land (Table 3.7-1: 7,169 acres, 43%) to the Oak Hickory and Northern Hardwood MAs, which focus on timber management, as well as the largest suitable land base (6,677 acres, 41%). Alternative 1 includes the greatest allocation of FLNF land to the Oak Hickory MA (Table 3.7-1: 6,779 acres, 41%). Alternative 1 also includes the greatest projected annual acres of harvesting during the first 20 years (Table 3.7-2: 99 acres).

It is in the Oak Hickory and Northern Hardwood MAs and on suitable acres that the greatest likelihood exists for direct effects to Indiana bats through removal of occupied summer roost trees or through disturbance of roosting bats. It is on these same lands that application of timber management activities could enhance roosting and foraging habitat for Indiana bats. Alternative 1 also provides the greatest emphasis on the oak-hickory forest community, which is a preferred habitat type of Indiana bats (Gardner and Cook 2002).

Table 3.7-1: Acres of the FLNF allocated to MAs that allow timber management and suitable acres, by alternative.

	Alt. 1 Current Mgt.	Alt. 2	Alt. 3
	acres (% of FLNF)		
Acres allocated to Oak Hickory MA	6,779 (41%)	1,127 (7%)	4,036 (25%)
Acres allocated to Northern Hardwood MA	390 (2%)	3,047 (19%)	2,189 (13%)
Combined allocation to Oak Hickory and Northern Hardwood MAs	7,169 (43%)	4,174 (25%)	6,225 (38%)
Suitable land[1]	6,677 (41%)	3,846 (23%)	5,700 (35%)

Source: FLNF GIS Alternative 1, 2, and 3 MA Layers and Table 3.11-3 in Timber for suitable land acreage.
Notes:
[1] All suitable land is in the Oak Hickory MA or Northern Hardwood MA, but these MAs also include unsuitable land.

Table 3.7-2: Average annual acres of timber management activities[1] on the FLNF during short term (20 years), by alternative.

	Alt. 1 Current Mgt.	Alt. 2	Alt. 3
	average acres per year		
Clearcut	8	3	8
Shelterwood regeneration	30	3	12
Shelterwood overstory removal	13	4	6
Selection	18	12	44
Thinning	31	6	18
Average annual total over 20 years	99	28	88

Source: Average annual harvest estimates derived from SPECTRUM outputs by decade on all suitable forested acres. Other FEIS sections may present harvest average acres over different time intervals that are appropriate for different effects: e.g., over the first 10 years (FEIS section 3.11 Timber) or 150 years (FEIS section 3.5 Vegetation).
Notes:
1 These are activities that could affect Indiana bats or Indiana bat summer roosting and foraging habitat.

The likelihood for direct effects to Indiana bats on the FLNF under Alternative 1 (killing or injuring a bat by cutting or damaging an occupied roost tree) is extremely low. If Indiana bats occur on the FLNF, they do so in extremely low numbers, and the overall availability of suitable roosting or foraging habitat on the Forest and in the Central New York region (including public and private lands) is high (Stilwell 2000). Additionally, a small percent of National Forest System lands is affected by tree removal in a given year, many tree-removal activities occur during the winter months when Indiana bats are hibernating, and management direction provides for the protection and retention of potential roost trees. Some tree cutting activity takes place on non-suitable lands as well, but the likelihood of direct effects on these lands is even more remote.

The low abundance of Indiana bats on the FLNF and the apparent availability of roosting and foraging habitat on the Forest and across the region in general also imply that the increased level of opportunity for creating or enhancing these habitats inherent in Alternative 1 may provide little or no additional benefit to Indiana bats in the short-term (20 years).

Alternative 2

Alternative 2 includes the smallest combined allocation of FLNF land to the Oak Hickory and Northern Hardwood MAs (Table 3.7-1: 4,174 acres, 25%), the smallest allocation to the Oak Hickory MA (1,127 acres, 7%) and the least emphasis on oak-hickory forest type, the smallest suitable land base (3,846 acres, 23%), and the lowest projected annual acres of harvesting during the first 20 years (Table 3.7-2: 28 acres).

Although the possibility for direct effects to Indiana bats or loss of roosting structures exists whenever large trees are cut in suitable roosting habitat, the likelihood of such impact is lowest in Alternative 2, based on the relative acreage available to timber management and the projected harvest acres. Given the extremely low likelihood of direct effects or negative impacts under Alternative 1, however, the difference between Alternatives 1 and 2 is negligible.

Alternative 2 provides the least opportunity for enhancement of Indiana bat roosting and foraging habitat on the FLNF. Given the low likelihood of Indiana bats occurring on the Forest and the current availability of suitable roosting or foraging

habitat on the Forest and in the region, short-term consequences of this reduced opportunity for management are likely to be negligible.

Alternative 3

Alternative 3 is intermediate in the combined allocation of the FLNF land to the Oak Hickory and Northern Hardwood MAs (Table 3.7-1: 6,225 acres, 38%), in allocation to the Oak Hickory MA (4,036 acres, 25%) and emphasis on the oak-hickory forest type, in the size of the suitable land base (5,700 acres, 35%), and in the projected annual acres of harvesting during the first 20 years (Table 3.7-2: 88 acres).

Alternative 3, therefore, represents intermediate likelihood for direct effects to Indiana bats, for reducing the quality of habitat by reducing the availability of roosting trees, or for opportunity to create and enhance roosting and foraging habitat. As described above, however, differences between the three alternatives in the potential short-term benefits or negative impacts likely are negligible.

Cumulative Effects

Effects Common to All Alternatives

Through cooperative relationships with the USFWS, other federal and State wildlife agencies, other resource managers, and researchers, the Forest Service will remain involved in conservation and protection efforts and keep abreast of changes in the regional and range-wide status, distribution, and population trends of Indiana bats. The Forest Service will continue to coordinate all efforts related to Indiana bats on the FLNF, including protection, conservation, census, and research, with parallel efforts taking place across the species' range. This high level of communication and coordination increases Forest Service knowledge of the status, distribution, ecology, and behavior of Indiana bats, as well as other species of bats, on the FLNF, across the cumulative effects area (the two ecological sections that encompass the FLNF), and range-wide. In this way, the Forest Service will be able to respond in a timely manner to any changes in status of Indiana bats on the FLNF and reinitiate consultation with the USFWS if, and when, appropriate.

The most likely long-term changes relative to Indiana bats, assuming a continuation of current trends, is that the Indiana bat population in the northeastern United States will continue to increase. Such an increase may be accompanied by expansion of the species onto suitable habitat, including the FLNF, that has been previously unoccupied or occupied at low levels. All three alternatives would provide abundant suitable roosting and foraging habitats over the long-term (150 years).

The regional landscape, land use characteristics, and associated habitats adjacent to the FLNF and in the Central New York region provide a patchwork of diverse habitat conditions, including a variety of agricultural uses, forests and small woodlots, rural residential areas, and some commercial development. Recent regional trends have seen a decrease in the relative proportion of farmland in Schuyler and Seneca Counties, the counties in which the FLNF occurs (USDA Forest Service 2001a). The same trend is evident in the Seneca Lake watershed, as agricultural land uses have been declining and more land is reverting to forest (GFLRPC 2004). General development also is increasing across the region, particularly for second homes and internet-based businesses. The Genesee/Finger Lakes Regional Planning Council anticipates that such development will increasingly conflict with agricultural land uses, wildlife habitat, water quality, and other resources (GFLRPC 2004).

Land-use trends like those anticipated by the Genesee/Finger Lakes Regional Planning Council would continue to provide a patchwork landscape of forested and open areas that should provide suitable foraging and roosting habitat for Indiana bats. As described above, optimal summer habitat for Indiana bats includes a landscape-level patchwork of open and forested lands, ranging from 20 to 60 percent forest cover (Rommé et al 1995, Farmer et al. 1997, Kurta et al. 2002).

Alternatives 1, 2, and 3

The three alternatives provide a range of opportunity for timber management, which is greatest under Alternative 1, intermediate under Alternative 3, and least under Alternative 2. Components of this timber management opportunity that vary by alternative include the combined allocation of FLNF land to MAs that allow timber management (Oak Hickory MA and Northern Hardwood MA), the suitable land base, and the projected annual acres of harvesting over 150 years (FEIS Table 3.5-22).

Similarly, the three alternatives provide a range in allocation to the Oak Hickory MA and emphasis on the oak-hickory forest type, which is a preferred habitat of Indiana bats (Gardner and Cook 2002). Emphasis on oak-hickory in greatest under Alternative 1, intermediate under Alternative 3, and least under Alternative 2.

For these reasons, the long-term opportunity to create, enhance, and maintain suitable roosting and foraging habitat for Indiana bats on the FLNF, as well as the likelihood of direct effects by harming or disturbing roosting Indiana bats through tree-cutting activities, are greatest under Alternative 1, intermediate under Alternative 3, and lowest under Alternative 2.

Despite these differences in management options provided by the three alternatives, however, the cumulative, long-term effects on Indiana bats are inconsequential. This applies to effects on the quality and quantity of suitable roosting and foraging habitat, as well as to the likelihood of direct impacts. Assuming continued implementation of Forest-wide standards and guidelines for wildlife reserve trees, suitable roost trees for Indiana bats should become increasingly abundant on the FLNF as forest stands age over time. The potential for harming or disturbing roosting Indiana bats through tree-cutting activities, given the current likelihood of their occurrence on the Forest, is low to the point of being discountable under any alternative.

Habitat conditions or potential for direct effects to Indiana bats on the FLNF will begin to become important at a regional scale if and when the Indiana bat population increases and expands onto Forest lands. The slight differences among alternatives in the direct and indirect effects on the suitability of habitat for Indiana bats will become consequential over the long-term only if the bat population increases to such an extent that availability of suitable habitat becomes limiting. This is highly unlikely, as anticipated trends in land-use patterns suggest that a patchwork landscape of forested and open areas will persist across the region (see *Effects Common to All Alternatives*, above). This landscape should provide suitable roosting and foraging habitat for Indiana bats. The FLNF will contribute to suitable habitat in the region, but differences among alternatives would not be measurable on a regional scale.

3.8 SPECIES OF POTENTIAL VIABILITY CONCERN

This section, along with that on Threatened and Endangered Species (section 3.7 of this Chapter) and the Biological Evaluation (BE: Appendix E), addresses the "fine filter" component of the Forest Service's approach to maintaining biological diversity and viability, as discussed in the Ecosystem Management Introduction (section 3.1.4 of this Chapter). Species evaluated here include federally listed threatened and endangered (TE) species, Regional Forester sensitive species (RFSS), and other species identified as being of potential viability concern during the Species Viability Evaluation (SVE) process.

Other sections of the Final Environmental Impact Statement also present coarse-filter habitat analysis that is applicable to species of potential viability concern. Discussions of vegetation (section 3.5) and wildlife and wildlife habitat (section 3.6) include analyses for forest and upland opening habitats and species associated with them. The Water and Fisheries section (3.3) includes some analyses of aquatic, shoreline, and wetland habitat.

Issue Statement

Public concern is focused on ensuring the conservation of biological diversity at the species, community, and regional levels. There is public debate regarding the quantity and quality of habitat that the Finger Lakes National Forest (FLNF) will provide and maintain. There is also public concern that Forest Service management and FLNF habitat provide for viable well-distributed populations of plants and wildlife, particularly those that are TE or RFSS.

Indicator 1 – Viability Outcomes

The indicator to be used in this effects analysis is outcomes from viability evaluation for each plant and animal species of potential viability concern, for both present and future conditions. Viability evaluation uses professional judgment to assess risk to the current and continued viability of a species range-wide or within the analysis area. This indicator highlights the differences among alternatives because it systematically evaluates abundance, quality, and distribution of habitats, as well as threats to species.

Analysis Area

The analysis area for direct and indirect effects includes all federal land managed by the FLNF. For species that use large landscapes, the analysis area for cumulative effects is the two ecological sections that encompass the FLNF: the Erie and Ontario Lake Plain and the Northern Glaciated Allegheny Plateau. Ecological subsections may not be sufficiently large to encompass whole populations of these species. The cumulative effects analysis area for smaller habitat groups and species are addressed under the individual habitat group headings below, but are generally encompassed by the Finger Lakes Highlands sub-zone of the Appalachian Plateau ecozone (Reschke 1990). This area comprises a portion of the Cattaraugus Finger Lakes Moraine and Hills Subsection.

3.8.1 Affected Environment

Introduction

Context for Species Viability Evaluation

The National Forest Management Act of 1976 (NFMA), the Code of Federal Regulations (CFR), USDA Departmental Regulations, the Forest Service Manual (FSM), and the Forest Service Handbook (FSH) provide specific statutory, regulatory, and administrative guidance for management of RFSS and species of potential viability concern. Under the NFMA, the Forest Service is to provide for a diversity of plant and animal communities, based on the suitability and capability of the specific land area, in order to meet its multiple use objectives.

The 1982 planning rule (36 CFR 219.19) directs that habitat be managed to maintain viable

populations of existing native and desired non-native vertebrate species in the planning area, and to avoid trends that result in listing a species under the Endangered Species Act (ESA). USDA regulations (9500-004) expanded the rule to apply to all species of plants, fish, and wildlife. The 1982 planning rule defines viability as the estimated numbers and distribution of reproductive individuals to ensure the continued existence of a species throughout its existing range within the planning area. The planning area is all National Forest System lands within the proclamation boundary of a National Forest.

One of the tools the Forest Service uses to address species viability is designation of Regional Forester sensitive species (RFSS). The designation process for RFSS involves periodic screening of species found on the Forest in order to identify those that may need special conservation measures. RFSS are then given special consideration during project development and implementation.

The analysis of potential impacts to TE species and to RFSS is contained within the Biological Evaluation (BE: Appendix E), which is part of the record for every environmental assessment or environmental impact statement prepared by the Forest Service in accordance with FSM 2672.42. In particular, the BE evaluates specific habitat needs and potential impacts that management activities might have on individual organisms, populations, and habitats. This analysis of habitats and populations on the Forest provides the context for reaching a determination of effects for each TE species and RFSS.

The Forest Service conducted the most recent revision of RFSS for Region 9 (northeastern United States) in 2000. The revised Forest Plan, however, is a comprehensive document designed to set strategic direction for the next 10 to 15 years. Accordingly, the Forest Service deemed it appropriate to expand viability evaluation beyond TE and RFSS. Biologists from the FLNF, the Green Mountain National Forest (GMNF), and White Mountain National Forest (WMNF) worked together on developing a process for conducting a Species Viability Evaluation or SVE (USDA Forest Service 2004b). The SVE process led to an adjustment of the RFSS list for the FLNF in 2003, but it also identified other species that might be of potential viability concern, depending upon the alternative chosen for the revision of the Forest Plan.

Species Viability Evaluation Process

SVE is a qualitative process developed to identify and gather information about vertebrate, invertebrate, and plant species of potential viability concern and for existing RFSS.

The Forest Service conducted the SVE in cooperation with scientists qualified for each taxon (plants, insects, molluscs, amphibians and reptiles, birds, and mammals) and knowledgeable about local flora and fauna. Scientists included local wildlife and botanical experts from state agencies, faculty at local universities, Forest Service researchers, and other knowledgeable individuals. Forest Service staff and the consulted scientists reviewed available literature, provided unpublished information and insights, and discussed viability issues, factors, risks, and potential outcomes for each species. The Forest Service used this information to evaluate the short-term, long-term, and cumulative effects of alternatives on species viability.

The final result of the SVE process is an estimated outcome assigned to each species for current conditions and for the next 15 to 20 years, both range-wide and for the FLNF. Future outcomes for the FLNF include a separate outcome for each alternative. Each viability outcome is an index or relative measure of the environment's capability to support population abundance and distribution. It is not a prediction of population occurrence, size, density, or other demographic characteristics (Schenk et al. 2002).

Outcomes display a range of increasing risk to viable, well-distributed populations from "A" (lowest viability concern) through "E" (greatest viability concern). In assigning these outcomes, a taxon's historical range is equated to its range prior to European settlement of northeastern North America. Each outcome integrates many

features, including habitat quantity and quality, local demes, metapopulation interactions, and geographic extent. A ***deme*** is a locally interbreeding population. ***Intrademe*** interactions include breeding, dispersal, or other interactions occurring within a deme; ***metapopulation*** interactions involve those occurring between demes.

The outcomes are defined as follows:

Outcome A: Suitable ecological conditions are distributed broadly across the taxon's historical range, and they are of sufficient quantity and quality to support the type and degree of intrademe and metapopulation interactions that the taxon would characteristically engage in if it were not habitat limited.

Outcome B: Suitable ecological conditions across the taxon's historical range are either reduced in quality or quantity, or are naturally limited. Local demes may be extirpated. Metapopulation interactions may be adversely altered in some parts of the taxon's historical range due to lack of suitable habitat or local extirpations, but the taxon generally retains the geographic extent typical of the historical distribution.

Outcome C: Suitable ecological conditions across the taxon's historical range are either reduced in quality or quantity, or are naturally distributed as patches and/or exist at low abundance. Local demes have been extirpated. Metapopulation interactions are adversely altered throughout most or in significant portions of the taxon's range, due to habitat or population isolation, or local extirpations. The geographic extent of the taxon is reduced.

Outcome D: Suitable ecological conditions across the taxon's historical range are much reduced in quality or quantity, or are naturally isolated or rare. A majority of the historical populations have been extirpated. While some subpopulations associated with these ecological conditions may be self-sustaining, there are limited opportunities for metapopulation interactions among habitat patches. The geographic extent of the taxon is significantly reduced.

Outcome E: Suitable ecological conditions across the taxon's historical range are so reduced in quantity and quality that they are highly isolated or exist at very low abundance, with little or no possibility of metapopulation interactions among suitable patches of habitat, resulting in strong potential for extirpations within many of the patches, and little likelihood of recolonization of such patches. The geographic extent of the taxon is significantly reduced, except for some rare, local endemics that may have persisted in these conditions since the historical period.

In summary, outcome A indicates that habitats are similar, or only slightly degraded from, historical conditions and risks are relatively low, while for outcome B conditions are more degraded. For outcome C, suitable ecological conditions and/or populations are not well distributed, are uncommon, or have been lost, and risk to viability is moderate. Under outcomes D and E, conditions are such that habitats and/or populations are very poorly distributed, or are at great risk, and therefore the likelihood of loss of viability is high. A taxon may meet some conditions of one outcome and other conditions for a different outcome. In this situation, a range of outcomes (such as B/C) may be identified. In other instances, while a species or its habitat may have had a small downward or upward trend, it was not enough to switch the outcome, and so such cases were identified with a "+" or "-" added to the outcome.

Species carried forward during the SVE process for detailed analysis in this section of the FEIS include all federally listed TE species, all RFSS, and additional species identified through the SVE process as being of potential viability concern. Upon issuance of the Record of Decision for the revised Plan, the Forest Service will add to the RFSS list those species that continue to be of viability concern but not currently listed as RFSS.

As a result of the SVE process, 25 animals and 16 plants were identified as species of potential viability concern for the FLNF (Tables 3.8-1 and 3.8-2). Of these species, 12 animals and nine plants are not currently listed as RFSS or TE. The remaining species include six animals federally listed as TE, as well as seven plants and seven animals listed as RFSS.

Context for Effects Analysis

Species of potential viability concern occur on the FLNF in a wide variety of environmental conditions ranging from isolated sites and low abundance to broad distribution and relatively high abundance. For some species, these conditions result from effects of past or current management practices that have led to diminished habitat or reduced opportunities for population interactions across the landscape. For other species, suitable environmental conditions may not be greatly influenced by management; availability of suitable habitat and conditions has always been limited, or abundance has historically been low.

Species of viability concern also occur across a wide variety of habitats that may be influenced by the full array of potential management activities and multiple uses provided on the FLNF. These influences can alter habitat and may result in either negative or positive impacts on species. These impacts, in turn, can affect species' viability and the availability of well-distributed habitats on the FLNF. Additionally, factors outside the control of the FLNF may affect the likelihood that rare species may remain viable within the planning area.

The affected environment and environmental effects for TE species and RFSS is described in the Biological Evaluation (BE: Appendix E). In particular, Chapters 3 through 5 of the BE provide detailed descriptions of TE species, RFSS, and their habitats, as well as discussion of factors that may affect species viability, and the effects of alternatives on their viability. Following discussion of the existing management direction and proposed changes common to all revised Plan alternatives, the remainder of this section is divided into subsections that provide detailed descriptions of general habitat conditions for species of potential viability concern on the FLNF, including those not currently designated as RFSS. These habitat conditions are combined into the following groups for this analysis:

- Rich Mesic Hardwoods
- Aquatic and Riparian Habitats
- Cliffs, Talus, and Exposed Rock Habitats
- Grasslands and Shrublands
- Wetlands
- Upland Forest
- Landscape Level Habitat

Landscape-level habitat is included in recognition of those species that use a variety of habitat types across a large landscape. This includes predators with large home ranges and other highly mobile species capable of covering great distances between hibernating, roosting, and foraging habitats.

Each habitat group subsection includes a discussion of existing conditions and environmental consequences for the general habitat, as well as the relevant specific habitat needs and effects on species when they vary from the habitat group discussion. It is important to note that this is not a site-specific analysis, as the revised Plan is a programmatic document. Consequently, the analysis for each habitat group is a tool for identifying and evaluating potential impacts on habitats and existing species. Site-specific detail and analysis is conducted at the project level, depending upon project-specific goals and objectives.

Table 3.8-1: Animal species of potential viability concern and their habitat groups on the Finger Lakes National Forest.

Common Name	Scientific Name	Federal status[1]	NY State status[2]	Habitat Groups[3]
MAMMALS				
Gray wolf	*Canis lupus*	E	E, X	Landscape
American beaver	*Castor canadensis*	SVC		Aquatic
Eastern cougar	*Puma* (=*Felis*) *concolor cougar*	E	E, X	Landscape
Canada lynx	*Lynx canadensis*	T	T, X	Landscape
Indiana bat	*Myotis sodalis*	E	E	Landscape
Eastern small-footed bat	*Myotis leibii*	S	SC	Landscape, Rock
BIRDS				
Northern goshawk	*Accipiter gentilis*	S	SC	Rich, Forest
Bald eagle	*Haliaeetus leucocephalus*	T	T	Landscape
Henslow's sparrow	*Ammodramus henslowii*	S	T	Grass/Shrub
Grasshopper sparrow	*Ammodramus savannarum*	SVC	SC	Grass/Shrub
Short-eared owl	*Asio flammeus*	S[4],SVC	E	Grass/Shrub
Upland sandpiper	*Bartramia longicauda*	S	T	Grass/Shrub
Northern harrier	*Circus cyaneus*	S	T	Grass/Shrub
Wood thrush	*Hylocichla mustelina*	SVC		Rich, Forest
American woodcock	*Scolopax minor*	SVC		Grass/Shrub
Field sparrow	*Spizella pusilla*	SVC		Grass/Shrub
REPTILES & AMPHIBIANS				
Jefferson salamander	*Ambystoma jeffersonianum*	S[4],SVC	SC	Rich, Wetland
Blue-spotted salamander	*Ambystoma laterale*	SVC	SC	Rich, Wetland
Wood turtle	*Glyptemys* (=*Clemmys*) *insculpta*	SVC	SC	Rich, Aquatic, Wetland
Bog turtle	*Glyptemys* (=*Clemmys*) *muhlenbergii*	T	E	Aquatic
Black rat snake	*Elaphe obsoleta obsoleta*	SVC		Rich, Rock
Longtail salamander	*Eurycea longicauda*	SVC	SC	Rich, Aquatic, Wetland
Northern slimy salamander	*Plethodon glutinosus*	SVC		Rich
MOLLUSKS				
Green floater	*Lasmigona subviridis*	S	T	Aquatic
INSECTS				
West Virginia white	*Pieris virginiensis*	S		Rich

[1] Federal Status Definitions:
T = threatened (under the Endangered Species Act)
E = endangered (under the Endangered Species Act)
S = sensitive - listed by Region 9 as Regional Forester sensitive species (RFSS) for the FLNF
SVC = species of potential viability concern not currently listed as T, E, or S.
[2] New York State Definitions (under State of New York Endangered Species Statute):
X = extirpated,
E = endangered
T = threatened
SC = special concern
[3] Habitat Group Definitions:
Rich: rich mesic hardwoods
Aquatic: aquatic and riparian habitats
Rock: cliffs, talus, and exposed rock habitats
Grass/Shrub: grasslands and shrublands
Wetlands: wetlands
Forest: upland forest
Landscape – landscape-level habitat.
[4] Species listed as RFSS in Region 9 but not on the FLNF.

Table 3.8-2: Plant species of potential viability concern and their habitat groups on the Finger Lakes National Forest.

Common Name	Scientific Name	Federal status[1]	NY State status[2]	Habitat Groups[3]
Yellow giant hyssop	*Agastache nepetoides**	SVC	T	Rock, Grass/Shrub, Forest
Wild onion	*Allium cernuum**	S	T	Rock
Canada milk vetch	*Astragalus canadensis**	S,SVC[4]		Rock, Grass/Shrub, Forest
Wild indigo	*Baptisia tinctoria*	S		Grass/Shrub, Forest
Blunt-lobed grapefern	*Botrychium oneidense**	S,SVC[4]	E	Rich, Wetland, Forest
Marsh bellflower	*Campanula aparinoides**	S,SVC[4]		Aquatic, Wetland
Tuckerman's sedge	*Carex tuckermanii*	SVC		Wetland
Black cohosh	*Cimicifuga racemosa*	SVC		Rich, Forest
Large yellow ladyslipper	*Cypripedium parviflorum* var. *pubescens**	S,SVC[4]	V	Rich, Wetland, Forest
Butternut	*Juglans cinerea*	S		Rich, Aquatic
Water-marigold	*Megalodonta beckii* var. *beckii**	S	T	Aquatic
Broad beech fern	*Phegopteris hexagonoptera*	S	V	Rich, Forest
Black-fruit mountain-ricegrass	*Piptatherum racemosum*	S		Rich, Rock, Forest
Swamp white oak	*Quercus bicolor*	SVC		Wetland
Culver's-root	*Veronicastrum virginicum*	S	T	Grass/Shrub, Wetland, Forest
Highbush cranberry	*Viburnum opulus* var. *americanum**	SVC		Aquatic, Wetland

* Species likely but not known to occur on the FLNF.

[1] Federal Status Definitions:
S = sensitive - listed by Region 9 as Regional Forester sensitive species (RFSS) for the FLNF
SVC = species of potential viability concern not currently listed as T, E, or S.

[2] New York State Definitions (under State of New York Endangered Species Statute):
X = extirpated,
E = endangered
T = threatened
SC = special concern
V = exploitably vulnerable

[3] Habitat Group Definitions:
Rich: rich mesic hardwoods
Aquatic: aquatic and riparian habitats
Rock: cliffs, talus, and exposed rock habitats
Grass/Shrub: grasslands and shrublands
Wetlands: wetlands
Forest: upland forest

[4] Species listed as RFSS in Region 9 but not on the FLNF

Species of particular concern are those with current viability outcomes that are approaching D or E. Tables under each habitat group subsection provide viability outcomes for the animal and plant species of potential viability concern associated with that habitat, both for the current condition and over the short-term under implementation of each alternative.

Some of the habitat groups include conditions that are also discussed in other sections of this Chapter: 3.2 Soils, 3.3 Water and Fisheries, 3.5 Vegetation, 3.6 Wildlife and Wildlife Habitat, and 3.12 Range Management. For the habitats discussed in those sections, this section references or summarizes that discussion, then expands on conditions or potential effects that would apply to species of potential viability concern and the niches they occupy. For habitats not addressed in other sections of this document, this section discusses the defining features, distribution, and limiting factors for, and potential effects on, the overall habitat and the microhabitats and species within them.

Existing Forest Plan Management Direction

The National Forest Management Act (NFMA) and Forest Service policy and regulations provide a great deal of management direction regarding species of potential viability concern. In addition to the analysis of impacts to avoid loss of viability for RFSS Forest Service policy also directs the Forest Service to develop management objectives and practices for RFSS, and to cooperate with states in inventory, protection, management, and planning for TE species and RFSS. In Region 9, the Forest Service has provided supplemental manual direction for evaluating and listing these species, and for development of conservation assessments, strategies, and agreements for these species.

The 1987 Forest Plan directs the Forest Service to promote[s] a diversity of life forms, including unique species and habitats (Goal 2). An objective to achieve this goal is to provide for a diversity of habitats in terms of composition, structure, and age. The 1987 Forest Plan recognizes RFSS and treats them as a protected group.

Forest-wide standards and guidelines for rare plants require the Forest Service to:

- Conduct surveys to identify existing populations or habitat
- Develop site plans on a case-by-case basis
- Limit use of an area with rare plants until a site plan is developed
- Investigate sites prior to beginning any new activity

Standards and guidelines for species of concern require that species included on State threatened and endangered species lists, or species that are of particular interest to the public, receive special attention in management of the Forest. Standards and guidelines require the Forest Service to develop management guidelines for habitats and reproduction sites, on a species by species basis, if monitoring shows management activities are negatively impacting a population. In the 1987 Plan, species-specific standards and guidelines only exist for heron rookeries and bluebirds.

Forest-wide standards and guidelines in the 1987 Plan identify vegetation composition objectives, as well as require maintenance of important or uncommon habitats or features, such as uncommon vegetation, mast trees, aspen, stands of aging forest, snags and den trees, and wetlands and ponds.

Under the 1987 Plan, the Forest Service is directed to maintain and enhance habitat that can support grassland and shrubland species in Management Prescriptions 1.2 and 1.3. Management Prescription 2.1 emphasizes upland forests using management techniques that tend to maintain mesic hardwoods, which include rich mesic hardwood habitat. Management Prescription 3.1 emphasizes upland forests using management techniques that can maintain most upland forest types of interest. Special Areas (Management Prescription 8.1) maintain particular unique or important biological,

recreational, or educational values. Management Prescription 8.1 is designed to maintain aging forest conditions across a range of forest habitats, and includes the only shale cliff habitat on the FLNF.

Proposed Changes in Management Direction Common to All Alternatives

Some of the direction contained in the 1987 Plan is redundant to agency policy, as documented in FSM and FSH, including regional supplements. Other aspects of management direction in the 1987 Plan, particularly the general direction for rare plants and species of concern, provide operational rather than strategic direction. To reduce redundancy, management direction documented in agency policy was removed from the revised Plan. Operational direction, which explains the "how-to" of everyday management on the Forest, was removed from the Plan and will be transferred to supplements of FSM and FSH.

Revised Forest Plan direction for maintaining viable populations of species on the Forest is primarily covered under Goal 2, which requires the Forest Service to maintain and restore quality, amount, and distribution of habitats to produce viable and sustainable populations of native and desirable non-native plants and animals.

Objectives under this goal include those for habitat composition, age-classes, and habitat features important to wildlife, similar to those in the 1987 Plan. Other objectives for this goal include those that require the Forest Service to work toward recovery of federally listed TE species; implement conservation strategies for RFSS; coordinate with the State of New York on rare species and natural community issues; maintain or enhance habitats for RFSS and manage for their viability or persistence; maintain fish populations through habitat restoration; and minimize the effects of non-native invasive species (NNIS) that can compete with and overcome native species. Goals 3 through 7, and associated objectives, provide direction for maintaining and restoring terrestrial and aquatic ecological systems and habitats, which support the viability of species associated with those habitats.

Forest-wide standards and guidelines for species of potential viability concern as a group are generally limited in the revised Forest Plan, as there is substantial direction contained within agency manuals and supplements. A new standard requires the Forest to maintain a regularly updated list of TE species and RFSS and make it readily available to the public. Another requires that sites are investigated prior to implementing ground-disturbing activities. Forest-wide guidelines specific to the northern goshawk protect nest sites from disturbance and management activities that could degrade habitat conditions.

Broad management area direction in the revised Forest Plan is similar to that of the 1987 Plan. Several MAs are renamed to reflect their emphasis and desired future condition more clearly. The revised Plan provides similar opportunities as the 1987 Plan for maintenance and enhancement of habitats.

The Future Old Forest Management Area is created for the revised Plan. This MA is similar to the Special Areas designated in the 1987 Plan for old growth development, but the emphasis of this area is to have larger, more contiguous blocks of land in which to allow aging forests to develop old-growth characteristics. Some characteristics of the Future Old Forest MA that will develop over the next several hundred years may be of benefit to some species of potential viability concern.

3.8.1.1 Rich Mesic Hardwoods and Associated Species

Existing Condition

Habitat Group Description

The term "rich mesic hardwoods" refers to different forest communities in different places, but the key habitat features are fertile, often calcareous soils (soils rich in calcium) and mesic (moist) conditions. The herbaceous layer tends to be lush and diverse, and usually includes species that are indicative of rich hardwood conditions, such as black cohosh and white baneberry. Many spring ephemeral plant species live in the understory of these habitats. In the Finger Lakes region, ecological communities where these conditions are found include maple-basswood rich mesic forest, and rich mesophytic forest (Reschke 1990). Forest types ascribed to these conditions are predominantly the sugar maple-basswood type.

Rich mesic hardwood habitat tends to occur on the FLNF as small to tiny patches within woods that are otherwise not rich. They tend to occur in a small enough size not to be mapped as stands – often less than an acre. This habitat is currently not well-distributed and not abundant on the FLNF. The distribution of this habitat is not well understood. There appears to be a much greater abundance of potentially suitable habitat than existing habitat.

There is currently only one known example of a stand of rich mesic hardwoods habitat documented from the Forest (Deller 2000). This stand has an occurrence of one of the plants of potential viability concern (butternut), and is discussed further in the Areas of Special Significance section (3.10) of this Chapter. Four additional stands have indications of high levels of productivity, but have not turned out to provide rich mesic hardwood habitat. Most other areas of enrichment documented on the Forest are small patches associated with streams, seepy banks, and higher tree diversity.

Ecological maps of the FLNF indicate that ecological landtypes (ELTs) 807 through 809 have the potential to offer suitable habitat for these species based on soils, topography, and associated potential natural vegetation (Table 3.5-7 in the Vegetation section 3.5 of this Chapter, DeGloria 1998). These ELTs combined make up almost 60 percent of the land area of the Forest, most in the northern half of the FLNF (see also discussion of ELTs in the Areas of Special Significance section 3.10). More than half of these acres, however, are currently in pastures, grasslands, or shrublands. Of the 3,200 acres of forested vegetation present on the potentially enriched ELTs, only about 20 acres is considered rich mesic hardwood forest. The remainder does not represent this habitat, in large part due to past land use history of agriculture and harvesting (DeGloria 1998). Consequently, these ELTs are not a reliable predictor of where this habitat currently occurs on the FLNF. Until more research is conducted to better understand the extent to which land use history has altered the potential of sites to grow this type of forest, it is not clear if these ELTs will be reliable in predicting where this habitat may occur in the future.

There are six plants and eight animals of viability concern associated with the rich mesic hardwood habitat (Table 3.8-3). Two of the plant species, blunt-lobed grapefern and large yellow ladyslipper, are not known to occur on the FLNF, but botanists knowledgeable in FLNF flora believe they are likely to occur in the region. Four of the animal species, Jefferson and blue-spotted salamanders, wood turtle, and the West Virginia white butterfly, are not known to occur on the FLNF, but occur within dispersal range and could be found on the Forest in the near future. Because rich mesic hardwood stands are predominantly an inclusion within the existing mesic hardwood forested landscape, additional relevant discussion of this habitat, and the effects of the revised Plan and its alternatives on this habitat, may be found in the Vegetation section (3.5) of this Chapter.

Table 3.8-3: Species of potential viability concern associated with rich mesic hardwoods on the Finger Lakes National Forest.

Plants	Animals
Blunt-lobed grapefern	West Virginia white
Black cohosh	Slimy salamander
Large yellow ladyslipper	Jefferson salamander
Butternut	Blue-spotted salamander
Broad beech fern	Black rat snake
Black-fruit mountain-ricegrass	Wood turtle
	Northern goshawk
	Wood thrush

Key Limiting Factors

The predominant limiting factor for species associated with the rich mesic hardwood habitat on the FLNF is the current habitat distribution, particularly in contrast to the potential for this habitat on the Forest based on ELTs. Species of rich mesic hardwoods tend to be limited across the Northeast by factors such as landform, soil origin, nutrients, and moisture. Availability of calcium, other nutrients, and mesic conditions are the key habitat features of this group. Consequently, high levels of soil fertility are generally associated with the habitat group. Areas with this high level of fertility are often converted from forest to agricultural land, unless they happen to coincide with steep or wet landforms, or have a more patchy distribution. On the FLNF, more than half of the ELTs that potentially could support this habitat have been converted to open or agricultural lands, and very little rich mesic hardwood habitat currently exists.

Land use history is another factor that may be limiting the distribution of this habitat on the Forest. In the FLNF, much of the landscape was converted to agricultural lands during the 19th century (see Introduction (3.1) and Vegetation (3.5) sections of this Chapter for a more detailed discussion of land use history and its effects on vegetation). Although some of these lands have been abandoned and have returned to forest, it is unclear to what extent historical agricultural use changed the potential of these lands to support the fertility and productivity that are characteristic of rich mesic hardwoods. Soil erosion and loss of fertility have been noted as part of the reason for abandonment of these lands at the turn of the century (DeGloria 1998).

Localized factors can also limit habitat suitability for species. In the southern portion of the FLNF, where acidic tills are more prevalent, soil fertility tends to be low, restricting rich mesic hardwoods to small patches or excluding the habitat entirely. Patches of rich mesic hardwood habitat, even in the more fertile northern portion of the Forest, are most likely to form in places that are moist and tend to pool organic matter, particularly at the bases of steep slopes. Also, because so many factors contribute to enriching sites, including moisture, nutrient levels, topography, and landform, rich mesic hardwood habitats vary in the degree of enrichment that may exist at any particular site. For many species of the rich mesic hardwood habitat, preferences for a particular level of enrichment are unknown.

Although rich mesic hardwood habitat is often best developed and most diverse in mature, multi-aged conditions with lots of shade and few openings, associated plant species vary by age and stand structure preferences, and tolerance of disturbance. Black cohosh, yellow ladyslipper, and broad beech fern are associated with mature woods and tend to grow in more open understories; none prefer dense shade (USDA Forest Service 2003b, 2003c, 2003j; see also the Biological Evaluation in Appendix E). These species appear to tolerate minor canopy disturbances, with yellow ladyslipper and black cohosh more likely to benefit from canopy gaps. Black-fruit mountain ricegrass also prefers open understories, but is associated with more open, steep, and rocky conditions (USDA Forest Service 2003l). Butternut requires sunlight to germinate, and is often associated with more disturbed habitats (USDA Forest Service 2003o), while blunt-lobed grapefern is associated with the thinner canopies of young, early successional forests (USDA Forest Service 2003a). The grapefern is also strongly dependent upon the presence of certain mycorrhizal species that might be enhanced by certain soil disturbances, although the plants themselves can be damaged

by soil disturbances. It should be noted that a far greater threat to butternut than any habitat concerns is the disease that is currently causing its decline. This disease is discussed in more detail in the Biological Evaluation.

Canopy cover and moist conditions are the features most important to the rich mesic hardwoods animal species. This is particularly true for the salamanders, the wood turtle, and the West Virginia white butterfly. On the FLNF, timber harvesting, invasive species, and herbivory are the primary threats that impact rich mesic hardwoods habitat and the species of potential viability concern that use it, and over which the Forest Service can have some control. Timber harvest and vegetation management can alter the moisture, light, and temperature regimes of a site; improve conditions for invasive species; and directly impact rare plants. Invasive species, especially garlic mustard, can out-compete native plants associated with this habitat, including both rare species and key food sources for the West Virginia white butterfly. Deer and other herbivores can directly impact plants by browsing on the lush understory, particularly orchids like the yellow ladyslipper.

Road mortality can be a significant factor for salamanders and turtles. Ninety-six percent (70.1 miles) of the roads in the FLNF area are State, county, town, or private roads; the Forest Service has jurisdiction over the remaining four percent (3.1 miles: FEIS, Table 3.19-1). Thus, alternatives to the revised Forest Plan represent no change from the current condition. Site-specific analyses for potential future road projects would include analyses of potential effects of the proposed actions on these species and on other resources.

3.8.1.2 Environmental Consequences

Direct and Indirect Effects by Alternative

Indicator 1 – Viability Outcomes

Effects Common to All Alternatives

All alternatives promote the protection, enhancement, or maintenance of species of potential viability concern, and the habitats on which these species depend. Although the role that the FLNF plays in contributing to the conservation of these species varies by alternative (for example by providing differing amounts and quality of suitable habitat conditions), all alternatives were developed with the premise that risks to viability will be minimized. Where adverse impacts cannot be avoided, management must not result in a trend toward federal listing.

Analysis of the alternatives, contained in the Biological Evaluation (BE: Appendix E), concluded that although there may be impacts on some species, implementation of any of the revised Plan alternatives is not likely to result in a trend toward federal listing, or loss of viability, for species listed as RFSS for the FLNF. Analysis of species viability by alternative focused on the predominant risk factors pertinent to the species and habitat groups. These risk factors are documented in literature reviews and summaries prepared for each species as part of the SVE process (USDA Forest Service 2004b), which are located in the project file. Risk factors are further documented in the BE for TE species and RFSS.

It is important to note that the assessment of viability risk factors depended in part on each species' distribution patterns and ranges, habitat requirements, and life history. For example, some species occur naturally in a localized or patchy distribution, either due to life history traits or habitat distribution, and thus never would occur in conditions described as Outcome A, B, or C; their natural condition may be D or E. Of

particular relevance to the FLNF, the size of the Forest alone, or the available area of suitable habitat on the Forest, is not large enough to provide for self-contained populations of some species, on the Forest, at Outcomes better than D. Although there may be high risks to the viability of some of these species on the FLNF due to factors beyond the control of the Forest, the Forest is contributing to overall regional scales of viability by maintaining or enhancing habitat for these species.

Table 3.8-4 displays the short-term effects, in terms of viability outcomes, for species of the rich mesic hardwood habitat group across alternatives. The future outcomes define what is expected at the end of the next 20 years. Long-term effects generally refer to effects at the end of a period of time when either the species or habitat trend has stabilized. Activities on the Forest have the potential to affect individual species within rich mesic hardwood habitats. Agency direction and Forest Service policy regarding protection of species of potential viability concern will reduce potential impacts. Factors outside the Forest Service's control that are increasing the viability risk for some of the species of potential viability concern include insects affecting large yellow ladyslipper and disease affecting butternut. Genetic isolation may result in short-term or long-term declines in viability, or may perpetuate individuals or occurrences at viability outcomes below C. Species potentially at risk from genetic isolation include the large yellow ladyslipper, broad beech fern, black-fruit mountain-ricegrass, and the three salamander species.

Among all alternatives, the greatest risks that the rich mesic hardwood habitat group faces are ground-disturbing and canopy-altering activities. While the extent of these activities may vary by alternative, the inability to predict the distribution of this habitat, and its current distribution in small isolated patches, suggest that all alternatives present some level of risk. Cutting or harvesting trees can have a direct impact on habitat through loss of canopy, road building, skidding logs, and soil compaction. Loss of canopy can also lead to increased ground temperatures and sensitivity to droughty conditions, as well as more vigorous competition from light-loving plants. Creation of early successional habitats through tree cutting can attract deer and other herbivores that can eat plants associated with rich mesic hardwoods. It is important to note, however, that none of the plant species in the rich mesic hardwood group are dependent on deep shade, and so some harvesting, particularly uneven-aged silvicultural systems and thinnings, may improve habitat quality by providing partial or "dappled" sunlight conditions.

Roads and trails associated with timber harvesting can affect the hydrology of rich mesic hardwood sites by affecting surface and subsurface water movement. Roads and trails can increase the possibility of introducing the seeds of non-native invasive species that compete for space, light, and nutrients, and can change ecosystem structure and function. Given the prevalence of garlic mustard along existing roads on the FLNF, any incursions of this plant into intact rich mesic hardwood stands could have dramatic impacts on existing flora and lead to higher viability risks for species in this group. Construction of trails for recreational or special use purposes, and motorized uses of trails, can have some of the same effects as roads.

Species of potential viability concern, and their associated habitats, are protected by agency and revised Forest Plan direction. For example, Forest-wide management direction protects riparian and wetland areas and vernal pools within rich mesic hardwoods that are important to several species. Forest-wide guidelines protect northern goshawk nests from disturbance during the nesting season and from habitat alteration year-round. Because rich mesic hardwood habitats on the Forest tend to occur in small, infrequent patches, the likelihood that a management action would affect individuals or populations within these habitats is low. The opportunity for human error in implementing revised Forest Plan direction exists, particularly in locating new occurrences of this habitat. Consequently, since alternatives do vary in the level of ground-disturbing and canopy-altering activities that could affect this habitat on the

FLNF, there may be some differences in the potential risk to this habitat as a result of human error. These differences are discussed below for each alternative and for the species that would most likely be affected by these differences.

The low viability outcomes (D or E) or declining outcomes for some species on the Forest are due to factors outside of the control of management direction contained in the revised Plan. Therefore, the effects of the revised Forest Plan on viability outcomes do not vary by alternative. Black cohosh is expected to remain at low risk (outcome A/B) across all alternatives in the short-term, as it appears to be more widespread on the Forest than originally thought based on inventories during 2003 and 2004 where more occurrences were found. Based primarily on uncertainties regarding its viability and habitat preference on the FLNF, blunt-lobed grapefern is expected to remain at outcome C across all alternatives (A. Gilman, personal communication, July 2003). Additional concerns regarding its viability will be discussed under Alternative 2. Due to a virulent disease that is causing decline across the species' range, butternut is expected to decline across all alternatives (see also the Biological Evaluation (BE: Appendix E) for more details). Black-fruit mountain-ricegrass has limited suitable habitat on the Forest, and none of the alternatives are able to contribute substantially more than the current condition in enhancing the quality of existing suitable habitat (see also the BE).

Viability outcomes do not change by alternative for several of the animal species associated with rich mesic hardwood habitat. For the northern goshawk, the placement of trails and other activities relative to nest sites represents greater potential impact than differences among alternatives. While there are differences among alternatives in the number of acres available for trails construction, these activities only impact the northern goshawk when they occur near a nest. Additionally, Forest-wide guidelines protect goshawk nest sites from disturbance and management activities that could degrade habitat conditions.

For the other species, important habitat features (for example, riparian or rocky areas) are protected in all alternatives. In addition, important features are available in more than one habitat type across the Forest, and/or potential habitat alteration (for example, reduction of canopy closure) is minimal relative to the species' needs.

There is no apparent difference in direct and indirect effects among alternatives for the wood thrush, but each effects analysis shows a decline from the current condition on the Forest. Management actions outlined in each alternative should provide ample suitable habitat for this species. The wood thrush population, however, has experienced a general decline in North America, particularly in the northeastern United States, from 1966 to 2003 (Sauer et al. 2003, NYDEC 2005). The reasons for the decline are largely unknown, but likely relate to changes in food abundance in vegetative structure related to succession on the breeding grounds (Holmes and Sherry 1988) or changes in winter habitat (NatureServe 2004). The future outcome of "C with a trend towards D," as indicated in Table 3.8-4, reflects the anticipated continuation of this range-wide population decline of wood thrush. Although the FLNF can maintain suitable habitat for the wood thrush under each alternative, the overall influence of the relatively small acreage of the FLNF cannot overcome range-wide population trends (SVE Bird Panel 2003).

Table 3.8-4: Range-wide and FLNF current and future (20 years) viability outcomes[1] for rich mesic hardwood species, by alternative, and including rationale for FLNF outcomes.

Species	Range: current-Future	FLNF Current	FLNF Alt. 1	FLNF Alt. 2	FLNF Alt. 3	Rationale
Animals						
Northern goshawk[3]	B	C	C	C	C	Abundance limited on the FLNF, one known and other possible nesting pairs; widespread but uncommon breeder in NY; range and numbers may be expanding in NY.
Wood thrush[3]	B, B→[2]C	B	**D***	**D**	**D**	Breeds on FLNF; considered widespread but moderately rare on the FLNF; habitat on FLNF increasing in quality and quantity and secure; widespread and common in NY; greatest threat from winter and breeding habitat loss at range-wide scale.
Slimy salamander	C-D	D	**C**	**C+**	**C+**	Protection of small streams helps viability; local populations probably are isolated, which threatens viability; status on FLNF unknown but habitat improving as forest lands mature; increasing mature, undisturbed forest on FLNF will enhance habitat, esp. under Alts. 2 and 3.
Jefferson salamander[3]	C-D	D	**C**	**C+**	**C+**	Not known on FLNF but known within dispersal range; 1 confirmed and 1 "Jefferson-complex" from Schuyler County; more easily impacted by fragmentation and less flexible than blue-spotted salamander; increasing mature, undisturbed forest on FLNF will enhance habitat, esp. under Alternatives 2 and 3.
Blue-spotted salamander[3]	B- to C+,C	D	**C**	**C+**	**C+**	Not known on FLNF but known within distribution range; 1 "Jefferson-complex" reported from Schuyler County; more hardy and more flexible than Jefferson salamander; increasing mature, undisturbed forest on FLNF will enhance habitat, especially under Alternatives 2 and 3.
Black rat snake[3]	C-D,C-D	D	**C**	**C**	**C**	Known from both Seneca and Schuyler County; habitat is wooded areas mixed with open areas. Likes rocky areas and old, hollow trees.
Wood turtle[3]	C→D,≤D	D	D	D	D	Not known from FLNF but known within dispersal range; suitable habitat available on FLNF; found in a variety of terrestrial habitats adjacent to streams.
West Virginia white butterfly	A-B,B-C	Unk.	Unk.	Unk.	Unk.	Not known from FLNF but known within dispersal range and likely; outcomes good, now and in twenty years, but dependent on food plants; susceptible to garlic mustard.
Plants						
Blunt-lobed grapefern	C-C	C	C	**C-**	C	Ephemeral, related to presence of soil mycorrhizae; low proportion of even-aged regeneration harvests in Alt. 2 (10 ac/yr).
Black cohosh[3]	A/B–A/B	A/B	A/B	A/B	A/B	Not of viability concern; FLNF is important to species' regional distribution due to ability to manage collecting and prevent over-collecting.
Large yellow ladyslipper[3]	B-D	D	D	**D+**	**D+**	Likely isolated population; limited suitable habitat; higher proportion of future old forest in Alt. 2 and more uneven-aged management in Alt. 3.
Butternut[3]	B-D	B	**D**	**D**	**D**	Disease is causing decline; loss of viability predicted even with protection measures.
Broad beech fern[3]	B-B	D	D	**D+**	**D+**	Isolated population; limited suitable habitat; higher proportion of uneven-aged management and future old forest in Alternatives 2 and 3.
Black-fruit mountain-ricegrass[3]	A-A	D	D	D	D	Isolated population; very limited suitable habitat.

Source: SVE Project File, Species Literature Reviews and Summaries
Notes:
[1] Viability outcomes are defined in the Affected Environment Introduction in this section.
[2] An arrow (→) indicates a trend; "C→D" means C with a trend towards D.
[3] Viability outcomes for species that occur in multiple habitat groups are identical across their groups, and were developed considering all positive, neutral, and negative effects across the habitats in which they occur.
* Outcomes in underlined, bold text are those that differ from the outcome based on current management.

Viability for the three salamander species is expected to increase slightly from the current condition under Alternative 1, and even more under Alternatives 2 and 3 because these Alternatives provide for more mature forest conditions in the Future Old Forest MA and fewer acres allocated to MAs that allow timber harvest. The greater influences on these species, however, are those affecting the species' overall, range-wide status. For the black rat snake, habitat conditions should improve equally on the FLNF under all three alternatives. Land development, succession of abandoned farmland and other open areas, and fragmentation of forests has led to range-wide habitat loss and increased mortality on roads for these species. For amphibians and reptiles, in particular, the Forest may become a refugium as habitat conditions improve on the Forest and diminish in the region overall. Even while surviving or thriving on the Forest, the overall regional viability of these species may decrease and individuals of these species may become genetically isolated from other populations. These effects do not change by alternative.

Alternative 1

As indicated in Table 3.8-4, implementation of Alternative 1, as compared to current management, does not lead to reductions in viability scores to levels below outcome C for most species. The reduction in viability outcome for butternut is due to a disease and not revised Plan implementation. For some species, viability scores remain at outcome D, indicating their viability risk remains as high with this alternative as the current condition. For example, broad beech fern and large yellow ladyslipper have outcomes that remain at D, but are also expected to do slightly worse in this alternative than in Alternatives 2 or 3. Alternative 1 provides less benefit to the three salamander species than do the other alternatives. Blunt-lobed grapefern is expected to benefit more under Alternative 1 and Alternative 3, than under Alternative 2.

The primary reason for the differences among the alternatives in viability outcomes for these species is related to habitat quantity and quality. As noted earlier for all alternatives, cutting of trees can have direct and indirect effects on rich mesic hardwood habitat, and so can affect suitability in terms of both quantity and quality. In particular, Alternative 1 is more likely than the other alternatives to use even-aged silvicultural systems in areas that may have patches of rich mesic hardwood habitat, simply because more acres are allocated to this possible use under this alternative. While all harvest techniques cause ground disturbance and reduce canopy closure, which can reduce habitat quality for some species, even-aged silvicultural systems reduce canopy closure more than other methods. In addition, while all alternatives will concentrate even-aged silvicultural systems in areas managed for oak-dominated forests, the plant species in this habitat group currently found on the Forest have been located in areas that have been managed for oak, or are in forest stands typed as oak. Consequently, Alternative 1 presents a higher risk of direct and indirect effects on patches of this habitat that may fall within areas managed for oak. Alternative 1 is likely to have the greatest proportion of road and trail building as most of the Forest is placed in management area designations that allow those activities.

The three salamanders are likely to benefit least from this alternative because they prefer the deep, moist litter in mature forests. Activities that create openings alter moisture levels on the forest floor, potentially making those areas less suitable. Large yellow-ladyslipper and broad beech fern will also benefit least under this alternative for similar reasons, although they are less sensitive to a more open canopy, as long as soil moisture is maintained. Blunt-lobed grapefern may continue to benefit somewhat more from this alternative because the alternative will continue to allow harvest of stands using even-aged silvicultural systems, which will eventually create the 40- to 60-year-old successional hardwood forests with which the species appears to be associated.

While Alternative 1 presents a slightly increased viability risk for five species in this group, the risks are likely to be small when compared to the current condition. Objectives, standards, and guidelines in the revised Forest Plan work

toward protection of species of potential viability concern, and help to mitigate, although not eliminate, this concern.

Alternatives 2 and 3

Alternatives 2 and 3, compared to current management, do not lead to reductions in viability scores to levels below outcome C for most species. Conditions may improve very slightly for large yellow ladyslipper and broad beech fern, and to a greater extent for the three salamanders. These species tend to be associated with mature or old forest habitats, which increase in these alternatives. Habitat quantity may decline slightly for blunt-lobed grapefern in Alternative 2 because only seven percent of the Forest will be in allocations that will create the 40-60 year old successional forest stands with which the species is most associated.

The types of effects on habitat quantity and quality from harvesting and road or trail construction and use will be the same for all alternatives. The effects will happen on fewer acres in both Alternatives 2 and 3, with the least in Alternative 2. Consequently, the risks of exposure of these species to potential threats related to timber harvesting, road and trail construction, and associated problems with NNIS and herbivory are reduced in these alternatives.

Alternative 2 allocates about 31% of the Forest in management areas where new road or motorized trail construction is prohibited; Alternative 2 allocates about 17%. In both alternatives, the new management area for future old forest is applied, where forests will develop old age characteristics. Alternative 2 provides about triple the amount of Future Old Forest in Alternative 3. The forest characteristics supported by these allocations are those associated with the best development of rich mesic hardwood habitat. Although short-term improvements are likely to be only slight, both alternatives are more likely to support improved habitat quality over the long-term as the Forest recovers from previous land uses.

Cumulative Effects

The cumulative effects analysis area for this habitat is the ecological subsections that encompass the Forest. Within these subsections off-Forest, human development, conversion to agriculture, timber harvest, invasive species, and herbivory are the primary threats that impact this habitat and the species of potential viability concern that use it.

The Finger Lakes region, particularly the Ontario Lake Plain, has historically experienced a great deal of agricultural development due to fertile soils. This area continues to maintain a high level of agriculture, and rich mesic hardwood forests that may have once dominated in the region tend to be fragmented into small parcels. Abandoned agricultural lands are generally developed for housing or industrial uses, and as population pressures continue to grow this process of conversion from agriculture to human development is likely to continue, with increasing forest fragmentation. This increasing development for human habitation, particularly low intensity development in rural areas, brings with it increased population of native species, such as deer, that are adapted to this level of development, and increased incidence of non-native invasive species. While much of the Allegheny Plateau is still forested, the rich mesic hardwood habitat occurs there in very small patches and can be quickly degraded or lost on lands that are not managed with species conservation in mind. Low-intensity human development is also starting to rise in this ecoregion as well.

On lands outside of the Forest within both ecoregions, timber harvest of all types is expected to continue. It is reasonable to assume that timber harvest in areas comprised mainly of mesic hardwood forests would impact areas of rich mesic hardwood habitat and associated species in ways similar to those described as direct and indirect effects.

The cumulative effects of each alternative on the viability of rich mesic hardwood species on the Forest are expected to be inconsequential. For most species of potential viability concern

associated with rich mesic hardwoods, the FLNF and the Finger Lakes region are not considered important to their distribution across their range. Consequently, actions that the Forest Service takes under any alternative will likely have little to no cumulative effect on the viability of the species across their ranges.

Management actions taken on the FLNF to maintain and protect rich mesic hardwoods habitat and the species associated with it can contribute to their viability over the long-term by providing habitat for local and regional populations. With continued pressure on mesic hardwood and rich mesic hardwood habitat from agriculture, low-intensity human development, and associated forest fragmentation, species of rich mesic hardwoods may become more restricted in their distribution in the Finger Lakes region over the long-term. At that time, conservation and sustainable management of these types of habitats may make the FLNF a more important area for some of the species associated with rich mesic hardwood habitat as their habitats continue to be lost off the Forest. For species in this group, particularly reptiles and amphibians, conservation and sustainable management of these types of habitats on the FLNF may lead to the Forest becoming a regional refugium, as habitat conditions improve on the Forest and diminish in the region overall. Even while surviving or thriving on the Forest, however, the overall regional viability of these species may decrease and individuals of these species may become genetically isolated from other populations. These effects do not change by alternative.

In addition to loss of habitat, large yellow ladyslipper, broad beech fern, blunt-lobed grapefern, and black-fruit mountain ricegrass are at a further disadvantage because only one or no known populations exist on the Forest, and few populations are known to occur near the Forest. Nearby populations allow species to breed between populations, and can help to repopulate areas where a small population has been lost. As forests in the region mature, there is the possibility that populations will expand onto the Forest, or previously unknown or small populations will be discovered. In this case, the Forest may provide improving habitat conditions for local populations of these species over the long-term. If there remain only one or very few populations of these species on the Forest over the long-term, with no additional gains off the Forest, there is the possibility that the populations on the FLNF will decline and eventually be lost in the long-term as the reproductive potential of these species decline. Even so, most of these species are not likely to decline across their range given the security of the bulk of the populations in New York State. The exceptions to this are large yellow ladyslipper and butternut, which are declining range wide. Because the contribution that the FLNF makes to the viability of these species is at the scale of local or regional populations, actions the Forest Service takes are not likely to contribute to this range-wide downward trend, especially given the protections these species will receive as long as they are of potential viability concern on the FLNF.

Other factors operating off the FLNF, and beyond its control, include the overall abundance and status of habitat region- or range-wide. The likelihood of a northern goshawk nesting on the Forest is greater if the species is abundant in the region. The greatest threats for many migratory species, like the wood thrush, are encountered off the Forest on wintering grounds and during migration. Such factors are unaffected by alternatives.

Several of the animal species associated with rich mesic hardwood habitat are not known to occur on the FLNF or do so at low numbers. For amphibians and reptiles, in particular, the Forest may in time become a refugium as suitable habitat diminishes in abundance in the region. Individuals of these species may become genetically isolated from other populations. Even while surviving or thriving on the Forest, the overall regional viability of these species may decrease. For additional information on cumulative effects for RFSS, see the Biological Evaluation (BE: Appendix E).

3.8.1.3 Aquatic and Riparian Habitats and Associated Species

Existing Condition

Habitat Group Description

Numerous ponds exist on the FLNF. Most are man-made, averaging one-half to one acre in size. Forty-six are livestock ponds created within pastures and 27 are wildlife ponds scattered throughout the rest of the Forest. Recent migration of beavers onto the Forest has resulted in a few additional water impoundments. The shore and littoral zone of Seneca Lake is also included in this habitat group, as the Forest Service now has some shoreline ownership along the lake. Seneca Lake is a deepwater lake that does not freeze over in the winter, and is only thermally stratified during the summer.

Riparian habitats are associated with the numerous small- to medium-sized streams that occur on the Forest. Most of these streams are intermittent, since the Forest is at the top of the watershed, and only extends about four miles from east to west. Such habitats have wide distribution across the Forest, and all but the smallest are visible on a topographic map. Although riparian zones often include wetlands, especially in areas of beaver influence, those wetlands and their associated species will be discussed under the wetlands species group later in this section.

There are four plants and five animals associated with the aquatic and riparian habitat (Table 3.8-5). Of the plants in this group, water-marigold and marsh bellflower are not known to occur on the FLNF, but are thought likely to occur by botanists knowledgeable about the flora in the Finger Lakes region. The green floater (a freshwater mussel) and the bog turtle do not occur on the FLNF and, at present, the Forest does not include suitable habitat for either species. The other animal species are associated primarily with riparian habitats. Longtail salamanders and wood turtles are not known to occur on the Forest, but they do occur within dispersal range and suitable habitat does exist on the Forest.

Table 3.8-5: Species of potential viability concern associated with aquatic and riparian habitats on the FLNF.

Plants	Animals
Water-marigold	American beaver
Marsh bellflower	Green floater
Butternut	Longtail salamander
Highbush cranberry	Bog turtle
	Wood turtle

Key Limiting Factors

An important factor limiting species of aquatic and riparian habitats on the FLNF is the availability of suitable habitat. There are no natural water bodies, aside from recent beaver impoundments, and no slow streams or rivers on the Forest, aside from Seneca Lake, which is adjacent to the Forest on the west. The stock and wildlife ponds are artificial and require periodic dredging and maintenance of earthen dams through vegetation removal. In addition, all of the ponds tend to have high levels of nutrients, as most are in areas that are or were once agricultural lands. The substrates are almost uniformly clay. These ponds tend to become eutrophic quickly, and with poor water quality tend to offer poor prospects to aquatic species needing high quality water, such as water-marigold (USDA Forest Service 2003p). Consequently, the portion of Seneca Lake at Caywood Point appears to be the only suitable habitat available on the FLNF for aquatic species.

Perennial streams are also very limited on the Forest, with eight such streams flowing through National Forest System lands. Most remaining streams are intermittent. Many streams cross the Forest and have varied ownership; some of the larger streams have only small segments managed by the FLNF. Private management activities such as agricultural use, development, and vegetation management, affects water quality on the Forest even though these activities are beyond direct Forest Service control.

In addition to habitat availability and distribution, more local conditions can also limit the suitability of habitat for species in this group. Marsh bellflower, butternut, and highbush cranberry are most strongly associated with wet calcareous to alkaline soils in the Finger Lakes region. These types of habitat conditions are quite limited on the FLNF, accounting for one percent of the land base (DeGloria 1998) and restricted primarily to the northern half of the Forest. Suitability of riparian habitats also depends on structural characteristics. Beavers can flood the riparian zone in portions of streams that they have impounded, changing suitability of the habitat. Species that make use of the riparian corridor (particularly plants) will often be eliminated due to this flooding, but also are likely to be adapted to beaver cycles and so can exploit riparian habitat that has reopened when a beaver dam has been abandoned. Humans have had a long history of use of waterway use as well, and the effects of that use on suitability, such as damming, pollution, clearing of vegetation, and scouring and straightening of channels, can still be found in many streams.

The quality of aquatic and riparian habitat that does exist on the FLNF can be threatened by a number of factors that are primarily related to changes in water and quality, including sedimentation, water temperature, pollutants, disturbance of shorelines, and/or introduction of invasive exotic species. These threats are all problems over which the Forest Service has some control, at least on federal lands. Invasive exotic species can be a particular problem both in water and along shorelines and stream banks. Grazing practices represent an important potential for impacts on the FLNF. Road building, timber harvesting, and recreational activities (foot traffic as well as motorized traffic), especially along the shores, at access points to the ponds and Seneca Lake, and at stream crossings also can affect aquatic and riparian habitats by changing the light regime along the shoreline, and by removing canopy trees that provide shade, regulate temperature, and contribute woody debris.

Management of vegetation can be beneficial to species that prefer more open conditions. Marsh bellflower and highbush cranberry, in particular, are associated with herbaceous and shrubby vegetation in the riparian zone, and with regular disturbances caused by flooding that prevent succession to forested conditions (USDA Forest Service 2003d, 2003e). Butternut is associated with disturbed, open conditions for establishment, but then helps to form a forest canopy along the riparian zone (USDA Forest Service 2003o).

For butternut and for highbush cranberry, threats from insects, disease, and hybridization are of far greater concern than habitat threats. The Biological Evaluation (BE: Appendix E) discusses the disease threatening butternut, which is the primary reason for its decline across the US Highbush cranberry has been observed to hybridize frequently with the commonly planted European highbush cranberry, which is a different taxon, and is threatened by a recently discovered defoliating Asian insect (USDA Forest Service 2003e). The insect defoliation and hybridization issues for this species are the primary reason for its viability concern on the FLNF.

At present, FLNF lands do not include suitable habitat for the green floater or the bog turtle, and will not unless lands with suitable habitat are acquired (USDA Forest Service 2004a, Nelson 2003, Niver 2003, Rosenbaum 2003).

The FLNF offers limited availability of perennial, low- to moderate-gradient streams, which are preferred habitat for beavers. Many of the streams on the FLNF are small and intermittent or ephemeral (see Water and Fisheries section 3.3 of this Chapter). Beavers may occupy artificial ponds if food is available (SVE Mammal Panel 2003), but stock ponds on the FLNF generally are unattractive to beavers because they usually are shallow and in open settings without suitable food nearby. Beavers have occasionally moved into wildlife or recreation ponds, although their presence is discouraged because they could interfere with the dikes and drainage necessary for maintenance of the ponds (C. Grove and C. Zimmer, personal communication, February

2005). Beaver activity is incompatible to many human values and land uses, particularly where it undermines roadbeds or floods agricultural land. There may be only one location on the FLNF where beavers could find suitable habitat without becoming a nuisance.

3.8.1.4 Environmental Consequences

Direct and Indirect Effects by Alternative

Indicator 1 – Viability Outcomes

Effects Common to All Alternatives

All alternatives were developed with the premise that risks to species viability will be minimized, and that species of potential viability concern will be protected. Analysis undertaken in the Biological Evaluation (Appendix E) concluded that none of the revised Plan alternatives were likely to result in a trend toward federal listing or loss of viability for RFSS. It is important to note, that some species may never achieve viability outcomes above D on the FLNF, due to such factors as local distribution of individuals or suitable habitat, life history traits, threats over which the Forest Service has no control (like diseases), or the small size of the FLNF relative to the larger size of a viable population. Although there may be high risks to the viability of some of these species on the FLNF, the Forest Service is contributing to overall regional scales of viability by maintaining or enhancing habitat.

Table 3.8-6 displays the short-term effects, in terms of viability outcomes, for species of the aquatic and riparian habitat group across alternatives. The future outcomes define what is expected in the short-term, which is generally the lifespan of a Forest plan. Long-term effects generally refer to effects at the end of a period of time when either the species or habitat trend has stabilized. Activities on the Forest have the potential to affect individuals of these species within aquatic and riparian habitats, although these effects will likely be restricted to the shores of Seneca Lake, or the ponds and streams scattered across the FLNF. Agency direction and Forest Service policy regarding protection of species of potential viability concern will reduce potential impacts. Factors outside the Forest Service's control that are increasing the viability risk for some of the species of this group, including insects and hybridization affecting highbush cranberry, and disease affecting butternut, may result in declines in viability, or may perpetuate individuals or occurrences at viability outcomes below C. Actions on private lands that affect habitat quality on federal lands (for example, shoreline of Seneca Lake) may also result in viability declines or outcomes below C.

For the plants and animals of viability concern associated with the aquatic and riparian habitat, the effects of the revised Forest Plan on viability outcomes do not vary by alternative. As discussed in more detail in the Water and Fisheries section (3.3) of this Chapter, the primary risks to aquatic and riparian habitat from implementation of the revised Plan and any of the alternatives is from ground-disturbing activities that can reduce water quality and affect riparian habitat. These habitats are specifically protected in the revised Plan through goals, objectives, standards, and guidelines (Water and Fisheries section 3.3). Since the types of aquatic or riparian habitat associated with these species are so limited on the Forest, the likelihood that a management action will affect individuals or populations is very low. The opportunity for human error exists in implementing revised Plan direction. Since alternatives do vary in the level of ground-disturbing activities that could affect aquatic and riparian habitat on the FLNF, there may be differences in the risk to this habitat due to human error. The Water and Fisheries section of this chapter (3.3) details those risks, which apply to the aquatic and riparian habitat group and the species associated with the habitat. Given revised Plan direction and regulations protecting these habitats and species of potential viability concern, the risks are small relative to the habitat that would be used by the plants, and would not lead to changes in expected viability outcomes for these species across alternatives.

As noted in the Biological Evaluation (BE: Appendix E) for water-marigold, activities along Seneca Lake at Caywood Point, including recreational use, vegetation management, and construction of any boating facilities, have the potential to create habitat quality problems for this plant, including sedimentation, increased nutrient loads, and pollution. Management of Caywood Point does not vary by alternative, and so these effects would be the same across the alternatives. Since this is the only potential habitat for the plant, Agency policy requires that management activities not lead to loss of viability on the Forest. Water-marigold is expected to remain at the B level for viability outcome across all alternatives, although showing a slight decline that recognizes both the potential effects of Caywood Point activities, and the effects of private lakeshore landowners and lake users on habitat quality.

Butternut's decline is related to its disease, and not implementation of any of the revised Plan alternatives. Decline for highbush cranberry is driven predominantly by defoliation by an Asian insect, and by genetic introgression through hybridization with the common landscaping plant European highbush cranberry. The low viability scores for this species on the FLNF are driven primarily by very limited habitat opportunities. Marsh bellflower is expected to remain at the C/D level for viability outcome, due to very limited habitat opportunities. Until locations of either species are documented on the Forest, the Forest Service cannot predict the effects of alternatives, and must rely on the effects and risks for its riparian habitat noted above and in the Water and Fisheries section (3.3) of this Chapter

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Table 3.8-6: Range-wide and FLNF current and future (20 years) viability outcomes[1] for aquatic and riparian species, by alternative, and including rationale for FLNF outcomes.

Species	Range: current-Future	FLNF Current	FLNF Alt. 1	FLNF Alt. 2	FLNF Alt. 3	Rationale
ANIMALS						
American beaver	C?,C?	C	C	C	C	Known from the Forest, but very few; suitable habitat limited.
Green floater	D?, D?	E_H[4]	E_H	E_H	E_H	Does not occur and no suitable habitat on Forest; known from 10 miles away
Longtail salamander[3]	D?, D?	D	D	D	D	Not known to occur on FLNF; the most sensitive of the streamside salamanders
Bog turtle	D?, D?	E_H	E_H	E_H	E_H	Does not occur and no suitable habitat on Forest; known from 30 miles away
Wood turtle[3]	C→[2]D,≤D	D	D	D	D	Not known from FLNF but known within dispersal range; suitable habitat available on FLNF. Found in a variety of terrestrial habitats adjacent to streams.
PLANTS						
Water-marigold	B-B-	B	**B-***	**B-**	**B-**	Potential future decline in habitat quality of Seneca Lake.
Marsh bellflower[3]	B-B/C	C/D	C/D	C/D	C/D	Very limited habitat requiring regular disturbance;
Butternut[3]	B-D	B	**D**	**D**	**D**	Disease is causing decline; loss of viability predicted even with protection measures.
Highbush cranberry[3]	B-C	D	D	D	D	Insect and hybridization causing decline; very limited habitat on the Forest.

Source: SVE Project File, Species Literature Reviews and Summaries
Notes:
[1] Viability outcomes are defined in the Affected Environment Introduction of this section.
[2] An arrow (→) indicates a trend; "C→D" means C with a trend towards D.
[3] Viability outcomes for species that occur in multiple habitat groups are identical across their groups, and were developed considering all positive, neutral, and negative effects across the habitats in which they occur.
[4] E_H refers to the "viability" of habitat for species that currently do not occur on the Forest or are unlikely to occur on the Forest in the future.
* Outcomes in underlined bold text are those that differ from the outcome based on current management.

Cumulative Effects

The cumulative effects analysis area for the aquatic and riparian habitat includes the 4 watersheds in which the FLNF is located, with some changes to exclude areas unlikely to be affected by Forest Service activities. The Water and Fisheries section (3.3) of this Chapter discusses the past, present, and foreseeable future actions that make up the context for cumulative effects analysis of this habitat. Minor adverse impacts and some beneficial impacts to this habitat are predicted. Adverse impacts are associated with risks that accompany ground-disturbing activities and the grazing program, while beneficial impacts are associated with riparian restoration efforts and monitoring to identify and correct problems.

Cumulative effects on the viability of species of aquatic and riparian habitat on the FLNF are expected to be inconsequential. For most species of potential viability concern associated with aquatic and riparian habitats, the FLNF and the Finger Lakes region are not considered important to their distribution across their range. Consequently, actions that the Forest Service takes under any alternative will likely have little to no cumulative effect on the viability of the species across their ranges.

Control over quality of aquatic and riparian habitat within the 4 watersheds of the analysis area is determined by multiple ownerships of shoreline, and watercraft regulations set by local municipalities. Actions taken by owners, such as more controls over non-point source pollution of shoreline property, can be beneficial. Other actions, such as continued introduction and re-introduction of invasive exotic pests, can threaten aquatic and riparian habitat. With continued pressures on the aquatic environment from lakeshore development, water control projects along rivers, and pollution from agricultural run-off, threats to species of potential viability concern in these habitats include loss of vegetation along shores, competition from invasive species, and degradation of water quality.

Actions that have occurred in the past, such as the creation of mill ponds which became suitable habitat for water-marigold, have contributed to shifts in habitat suitability for species of aquatic and riparian habitats. With the loss of mill ponds, and the continued declines in water quality and invasions by exotic organisms in the region and throughout the Northeast, species like water-marigold may find less and less suitable habitat.

Overall, it seems likely that future actions associated with other ownerships along rivers and lakes, and Seneca Lake in particular, are more likely to influence the viability of species of these habitats than activities undertaken by the FLNF. While the level of protection the FLNF offers for these habitats is generally higher than many other landowners, the FLNF offers a very small amount of aquatic and riparian habitat when looked at in the context of the habitat's distribution in the region and across New York. In particular, because the FLNF shoreline on Seneca Lake is so small, any actions the Forest Service takes to improve conditions for species like water-marigold will undoubtedly be outweighed by the overall lake conditions controlled by other ownerships. With only historical records for water-marigold from Seneca and Cayuga Lakes, any plants found in either lake would make the lake important to the species' statewide distribution.

Long-term declines in butternut and highbush cranberry across ranges and on the FLNF are expected due to insects, disease, and genetic problems. The Forest Service will continue to work cooperatively with researchers and other land managers to develop prevention actions that can be taken to help stall this decline on the Forest.

Due to loss of habitat, insects, and disease, some species of this habitat group, including marsh bellflower and highbush cranberry, are considered likely to occur but are currently not known to occur on the FLNF due to very limited suitable habitat. This creates a disadvantage for these species because it limits the ability of populations on the Forest to interact with populations outside the Forest. It also limits the ability of neighboring populations to re-establish on the Forest following a potential population loss

due to natural disturbance. If only one or very few populations of these species remain on the FLNF over the long-term, there is a possibility that the populations on the FLNF will decline and be lost as the reproductive potential of the Forest's populations decline. Because the contribution that the FLNF makes to the viability of these species is very small, actions the Forest Service takes are not likely to contribute to the downward trend, especially given the protections these species will receive as long as they are of viability concern on the Forest.

Of the animal species associated with aquatic and riparian habitat, the beaver is the only one known to occur on the FLNF, although only occasionally and in low numbers. Cumulative effects for beavers will show no change among alternatives. Potential habitat will continue to exist, but numbers of beavers cannot realistically increase on the Forest. This is because of the limited availability of suitable habitat where beavers could exist without potential conflict with human land uses. The Forest includes suitable habitat for the longtail salamander and wood turtle. Continued protection of riparian habitats according to Forest-wide management direction will preserve and enhance potential habitat for these species in the future, with no discernable differences among alternatives. Excessive or poorly controlled run-off can result in buildup of soft sediments, which can be a major problem for species such as wood turtles and longtail salamanders (P. Ducey, personal communication, July 2005).

For additional information on cumulative effects for RFSS, see also the Biological Evaluation (BE: Appendix E).

3.8.1.5 Cliffs, Talus, and Exposed Rock Habitats and Associated Species

Existing Condition

Habitat Group Description

The habitat for this group consists largely of un-forested or sparsely wooded shale slopes that are very steep to almost vertical (i.e., cliffs), and rock outcrops, which may be part of these slopes, or may occur elsewhere as small patches on the landscape. Ecological communities with these conditions include shale cliff, talus, and slope woodland communities. Cliffs and very steep shale slopes occur on the western edge of the National Forest at Caywood Point along the eastern shore of Seneca Lake. There may be additional suitable habitat to the north in Mill Creek Ravine, and a little further southeast within the Breakneck Creek and Sawmill Creek ravines. Additional examples of this habitat occur along the eastern shore of Seneca Lake off National Forest System lands, and may occur in portions of these and other ravines that are not on National Forest System land. Occurrences of rock outcrops are less predictable.

There are four plants and two animals associated with this habitat (Table 3.8-7). Of the four plants, yellow giant hyssop, wild onion, and Canada milk vetch are not known to occur on the Forest, but are thought likely to occur by botanists knowledgeable about the flora in the Finger Lakes region. Black-fruit mountain-ricegrass is known to occur at least once on the Forest. The black rat snake is not known to occur on the FLNF, but it does occur in the vicinity. Eastern small-footed bats are known to occur on the FLNF in summer, but abundance or frequency data are not available (NYDEC 2003, SVE Herpetology Panel 2003, SVE Mammal Panel 2003). Timber rattlesnakes (*Crotalus horridus*) historically occurred in rocky habitat in the FLNF region; the SVE Herpetology Panel (2003) did not consider this species because the species is not currently known to occur near the Forest (P. Ducey, personal communication, July 2005).

Table 3.8-7: Species of potential viability concern associated with cliffs, talus, and exposed rock habitats on the FLNF

Plants	Animals
Yellow giant hyssop	Black rat snake
Wild onion	Eastern small-footed bat
Canada milk vetch	
Black-fruit mountain ricegrass	

Key Limiting Factors

Amount, size, and distribution of habitat are key limiting factors for species dependent on cliff, talus, and exposed rock habitats on the FLNF. Cliff habitat is very limited on the FLNF, being restricted on National Forest System lands to about 10 to 20 acres at Caywood Point. These cliffs extend to the north and south of the Forest along the shore of Seneca Lake onto private lands. Mill Creek, Breakneck Creek, and Sawmill Creek ravines each account for another 30 to 40 acres, although it is likely that a much smaller proportion of these areas provides the open rock conditions needed by the species in this group. These ravines are also restricted to the northwestern portion of the Forest. Other steep, rocky areas on the Forest may provide habitat, but they tend to be shaded and so suitable habitat is probably limited and difficult to predict.

Local factors can also limit the suitability of habitat for these species. The rock substrate itself is an important feature of this habitat. Habitat suitability varies according to environmental characteristics of the rock, such as mineralogy, chemistry, and moisture, as well as light conditions, elevation, and slope. Of the sites that do exist on National Forest System land, the characteristics (high light conditions) that would make them suitable for the plant species associated with this habitat group may exist in limited quantity. In addition, the exact microhabitat necessary for good roosting habitat for eastern small-footed bat is not known. Given the patchy nature of the cliff, talus, and exposed rock habitat, dispersal of seeds or individuals across hundreds of acres of unsuitable habitat toward a small patch of suitable habitat is unlikely. Consequently, the limited availability and distribution of suitable habitat on the FLNF cannot be controlled or adjusted by Forest Service management direction or activities, as a practical matter, except through purchase of additional habitat.

The plant species associated with cliffs, talus, and exposed rock habitats vary in the amount of light, moisture, and nutrients preferred. Both wild onion and Canada milk vetch are associated with more calcareous substrates, while yellow giant hyssop and black-fruit mountain-ricegrass do not have a preference or tend to be found in acidic sites (see also the Biological Evaluation (BE: Appendix E; USDA Forest Service 2003f, 2003g, 2003k, 2003l). Yellow giant hyssop also requires steady moisture for its seeds to germinate; the others are tolerant of drier conditions. Wild onion appears likely to only occur on the FLNF in the cliff, talus, and exposed rock habitat, while Canada milk vetch and yellow giant hyssop are also found in dry open conditions that are not restricted to cliffs and rocks, and so are not limited to this habitat (also discussed under grasslands and shrublands).

Wild onion may also have the potential to occur in open grasslands, as it does in the western Great Lakes region (Sheviak 2005). It is not currently known to occur in this habitat in the Finger Lakes region, although it has been observed along a roadside in New York. It is not discussed as part of the grassland and shrubland habitat in this section. If wild onion is eventually found to occur in grasslands habitat, the analysis associated with this habitat as discussed in this subsection would apply.

Black-fruit mountain-ricegrass appears to tolerate more shade than the others, and is more strongly associated with the talus woodlands than the open cliff habitats. Black rat snakes hibernate in rocky crevices during the winter, whereas eastern small-footed bats use these areas as diurnal roosts during the summer.

Activities the Forest Service could undertake that may affect habitat or species include vegetation management activities within or adjacent to cliff, talus, and exposed rock habitat, which can alter

light, temperature, and moisture regimes, either to the detriment or benefit of some species. Vegetation management within this habitat can also increase access to habitat by people. Hikers represent a potential source of direct impact to these habitats through disturbance of nesting, roosting, or hibernating species of wildlife, or by trampling vegetation and contributing to erosion, which can alter microsite conditions. Invasion by exotic plants can also be encouraged through vegetation management and disturbance, although these sites tend to have a high level of natural disturbance related to exposure and colluvial movement of soil and rocks downhill. Consequently, these sites can be the most vulnerable to invasion by non-native plants, for which ground disturbance provides an opportunity for establishment with limited competition.

3.8.1.6 Environmental Consequences

Direct and Indirect Effects by Alternative

Indicator 1 – Viability Outcomes

Effects Common to All Alternatives

All alternatives were developed with the premise that risks to species viability will be minimized, and that species of potential viability concern will be protected. Analysis undertaken in the Biological Evaluation (Appendix E) concluded that none of the revised Plan alternatives were likely to result in a trend toward federal listing or loss of viability for RFSS. Some species may never achieve viability outcomes above D on the FLNF, due to such factors as local distribution of individuals or suitable habitat, life history traits, threats over which the Forest Service has no control (like diseases), or the small size of the Forest relative to the larger size of a viable population. Although there may be high risks to the viability of some of these species on the FLNF, the Forest is contributing to overall regional scales of viability by maintaining or enhancing habitat for these species.

Table 3.8-8 displays the short-term effects, in terms of viability outcomes, for species of the cliff, talus, and exposed rock habitat group across alternatives. The future outcomes define what is expected at the end of the next 20 years, which is generally the lifespan of a Forest plan. Long-term effects that may be discussed below generally refer to effects at the end of a period of time when either the species or habitat trend has stabilized. Activities on the Forest have a very limited potential to affect individuals of these species within these habitats, primarily because the habitat is limited on the Forest. Agency direction and Forest Service policy regarding protection of species of potential viability concern will reduce these potential impacts. Factors outside the Forest Service's control that are increasing the viability risk for some of the species of this group, including reproductive isolation affecting wild onion and black-fruit mountain-ricegrass, and declines that do not appear to be related to habitat management affecting yellow giant hyssop and Canada milk vetch, may result in declines in viability on the FLNF, or may perpetuate individuals or occurrences at viability outcomes below C. Yellow giant hyssop and Canada milk vetch are expected to remain at outcomes C and B/C, respectively, over the next 20 years across alternatives, although their decline is puzzling in relation to the large quantity of apparently suitable habitat outside of the cliff, talus a, and exposed rock habitat.

For the plants and animals of viability concern associated with this habitat, the effects of the revised Forest Plan on viability outcomes do not vary by alternative. As discussed in more detail in the Soil section (3.2) of this Chapter, the primary risk to cliff, talus, and exposed rock habitats is from ground-disturbing activities that can erode already thin soils and reduce soil productivity. These habitats are considered highly erosive, as they generally have slopes over 25 percent, and are protected by Agency policy as well as goals, objectives, standards, and guidelines in the revised Plan. Since cliff, talus, and exposed rock habitat is limited on the FLNF, the likelihood that a management action will affect individuals or populations in this habitat is very

low. The opportunity for human error exists in implementing revised Plan direction. Consequently, since alternatives do vary in the level of ground-disturbing activities that could affect this habitat on the FLNF, there may be some differences in the risk of human error. The Soil section (3.2) of this Chapter details those risks, which apply to the cliff, talus, and exposed rock habitat group and the species associated with it. Given the protections afforded these habitats and species of potential viability concern through regulations and revised Plan direction, these risks are quite small relative to the habitat that would be used by these species and would not lead to changes in expected viability outcomes for these species across alternatives.

As noted in the Biological Evaluation (BE: Appendix E) for wild onion and eastern small-footed bat, potential management effects do not vary by alternative for the exposed rock habitat found at Caywood Point, as all alternatives have the same management direction. The Caywood Point Special Area is not within lands considered suitable for timber harvesting, motorized trail uses, surface development of minerals, or development of wind power or communication sites. Management activities are limited to those that contribute to, or otherwise protect, the values of the area. Activities that could affect wild onion and the eastern small-footed bat, and the others in the exposed rock habitat group, could include trail development, and limited vegetation management mainly to maintain wildlife habitat, vegetative diversity, or to create or maintain vistas. Agency policy would require avoidance of known populations or a plan to minimize impacts during implementation of such activities.

It is likely that the amount of suitable habitat in the cliff, talus, and exposed rock habitat group will remain stable under all alternatives. New cliffs, rocky ledges, and talus slopes will not be created (aside from natural processes like rockslides), and the western exposure and shale rocks of the cliffs will likely perpetuate their open condition for quite some time. The quality of habitat is expected to remain stable or decline slightly over the planning period. Construction of trails or stairs down the cliffs to Seneca Lake could occur, but would be very limited by standards protecting soil and water. Improved access to the cliffs and other exposed rocky slopes via trails may encourage people to climb down or along them, increasing the chances of trampling or otherwise disrupting populations and habitat. Damage by such recreational use is a potential threat. Shale cliffs and shale talus slopes however, generally provide poor climbing opportunities, and any use that threatens populations in these habitats can lead to closure orders if needed.

Clearing vegetation along cliffs and steep rocky slopes, which is possible under any of the alternatives depending on management objectives, could make habitat more suitable for many of these species by providing needed sunlight. It can also improve habitat conditions for non-native invasive species (NNIS). Although NNIS are already present on most of the FLNF and are likely in these habitats, improved access to the cliffs via trails and vistas can also increase their extent. NNIS can compete effectively with the plants in this group because most do not do well in shade, and NNIS are generally opportunistic and take quick advantage of open sunny areas. Removal of NNIS may help to improve habitat, but the sites are natural places for opportunistic species. Competition between NNIS and species of potential viability concern will be a continuing problem once NNIS become established.

Outcomes for wild onion and black-fruit mountain-ricegrass are primarily driven by their limited habitat on the FLNF, which tends to limit the numbers of individuals that could exist on the Forest (see also the Biological Evaluation (BE: Appendix E)). Low numbers of individuals can lead to loss of populations from random natural disturbance events, as well as from reproductive isolation. Because of the limited available habitat on the FLNF, these species cannot be well distributed across the Forest. Poor distribution increases the risk from disturbances and reduces the reproductive capacity of populations. Thus, it is unlikely that these species will ever attain viability outcomes above D on the FLNF.

Table 3.8-8: Range-wide and FLNF current and future (20 years) viability outcomes[1] for cliff, talus, and exposed rock habitat species, by alternative, and including rationale for outcomes.

Species	Range: current-Future	FLNF Current	FLNF Alt. 1	FLNF Alt. 2	FLNF Alt. 3	Rationale
ANIMALS						
Black rat snake[2]	C/D-C/D	D	**C***	**C**	**C**	Known from both Seneca and Schuyler County; suitable habitat is wooded areas mixed with open areas.
Eastern small-footed bat[2]	Unk-A	≥C?	**A**	**A**	**A**	Too little information to predict current outcomes; future outcome assumes improved habitat and protection at hibernacula.
PLANTS						
Yellow giant hyssop[2]	B/C-C	B/C	**C**	**C**	**C**	Declining for unknown reasons; does not appear habitat limited.
Wild onion	A-A	D	D	D	D	Potential isolated population; very limited suitable habitat.
Canada milk vetch[2]	B/C-B/C	B/C	B/C	B/C	B/C	Declining for unknown reasons; does not appear habitat limited.
Black-fruit mountain ricegrass[2]	A-A	D	D	D	D	Isolated population; very limited suitable habitat.

Source: SVE Project File, Species Literature Reviews and Summaries
Notes:
[1] Viability outcomes are defined in the Affected Environment Introduction of this section.
[2] Viability outcomes for species that occur in multiple habitat groups are identical across their groups, and were developed considering all positive, neutral, and negative effects across the habitats in which they occur.
* Outcomes in underlined bold text are those that differ from the outcome based on current management.

Outcomes for yellow giant hyssop and Canada milk vetch are primarily driven by the uncertainty regarding the reason for their declines. Consequently, outcomes on the FLNF reflect the 20-year trend for the species across their ranges, as indicated by botanists knowledgeable about the species (USDA Forest Service 2003f, 2003g). The decline for yellow giant hyssop is of slightly more concern than that of Canada milk vetch simply because it has been declining over a longer period with no known cause. Available habitat for yellow giant hyssop and Canada milk vetch includes cliffs, talus, and exposed rock habitat and open areas associated with meadows, thickets, roadsides, and woodlands. While this habitat appears abundant, the species are not. It is suspected that Canada milk vetch needs calcareous substrates, and it is known that yellow giant hyssop requires constant moisture to germinate, although once established it can exist in drier conditions. It may turn out that microhabitat conditions needed by these species are far less common than are the open conditions with which they are associated. When the Forest Service understands more about these habitat relationships, this habitat group may change in suitability for these species.

For the black rat snake, habitat conditions should improve equally on the FLNF under all three alternatives. Land development, succession of abandoned farmland and other open areas, and fragmentation of forests, however, have led to habitat loss and increased mortality on roads on a range-wide scale for the black rat snake.

The outcomes for eastern small-footed bat are driven by different opportunities for timber management in the three alternatives, not by differences in activities that could affect cliffs, talus, and exposed rock habitats. These bats roost in rocky habitats, but may also roost in trees. They forage in a wide variety of habitats ranging from open lands to mature forests. Habitat associations for the eastern small-footed bat are discussed more completely as part of the Landscape-level Habitat and Associated Species Sub-section of this section (3.2.14) and in the Biological Evaluation (BE: Appendix E).

Cumulative Effects

The cumulative effects analysis area for this habitat is the ecological subsections that encompass the FLNF. The FLNF supplies an extremely small proportion of this type of habitat in this ecological region. For most species of potential viability concern associated with cliffs, talus, and exposed rock habitat, the FLNF and the Finger Lakes region are not considered important to their range-wide distribution. Consequently, actions that the Forest Service takes under any alternative will likely have little to no cumulative effect on the viability of the species across their ranges.

The Soil section (3.2) of this Chapter discusses the past, present, and foreseeable future actions that make up part of the context for cumulative effects analysis of this habitat. Minor adverse impacts are predicted, associated with risks that accompany ground-disturbing activities and the grazing program. These impacts are not expected to lead to changes in species outcomes over the long-term, however, mainly because species in this group do not appear to be strongly limited by ground disturbance. They are either limited by human disruptions (direct trampling or disturbance of roosting sites) or by factors beyond the control of the Forest Service, such as limited suitable habitat or low population numbers.

It is important to note that most of the cliffs, talus, and exposed rock habitat in the region are not protected for species of potential viability concern, and the overall ownership pattern in the analysis area is fragmented. While specific plans for trails, harvesting, or development in the analysis area are not known, such uses in suitable habitat are more likely outside the Forest, and could result in impacts to species of potential viability concern or their habitat. Invasive species are also increasing on non-Forest lands within the analysis area, and likely will continue to expand. This expansion increases the risk of these species invading rocky habitats on and off the Forest to the exclusion of species of potential viability concern.

Consequently, the impacts noted here could reduce or eliminate off-Forest populations of species of concern. This off-Forest population loss could alter metapopulation dynamics for populations on the Forest and could reduce their ability to recover from direct and indirect impacts. Loss of any populations near the Forest also would increase the importance of any populations that may be found on the FLNF for maintaining the species' regional and New York distribution. Many of these species, however, will continue to have viability scores below C on the Forest due to limited available habitat. Given these constraints, protections found in the revised Plan and across alternatives will help to ensure that any populations found will be maintained in order to ensure the species continued presence on the Forest, and to contribute to its viability in the region.

Black-fruit mountain-ricegrass is currently known from one site, and wild onion is considered likely to occur but is currently not known from the Forest due to very limited habitat. Their distributions outside the Forest are unknown, but are generally limited within the subsection. If there remain only one or very few populations of black-fruit mountain-ricegrass and wild onion on the Forest over the long-term, their interactions with other populations off the Forest, or with each other, are likely to be limited, leading to the possibility that the populations on the FLNF will decline and be lost as the reproductive potential of these species decline. Because the contribution that the FLNF makes to the viability of these species is very small, actions the Forest takes are not likely to contribute to this downward trend, especially given the protections these species will receive as long as they are of viability concern on the Forest.

Apparent declines in yellow giant hyssop and Canada milk vetch across their ranges and on the Forest are expected as long as there continues to be uncertainty regarding the reasons behind the decline. If these declines are determined to be related to microhabitat conditions that limit habitat suitability on the Forest, then cumulative effects will be similar to the other species in this group in terms of low population numbers. Until the Forest Service knows what these microhabitat conditions

are, it is unclear if there are management actions that can be taken by the Forest or by other landowners to improve habitat suitability for these species. Restrictions on activities that might affect these species will continue to protect any existing populations on the Forest.

Habitat conditions for the black rat snake should continue to improve on the FLNF under all three alternatives. As land development, succession of abandoned farmland and other open areas, and fragmentation of forests continues in the region, the FLNF may become a refugium for many species as habitat conditions improve on the Forest and diminish in the region overall. This may be particularly true for amphibians and reptiles. Populations of these species on the Forest may become genetically isolated from other populations. While surviving or thriving on the Forest, the overall regional viability of these species may decrease (SVE Herpetology Panel 2003). These effects do not change by alternative.

For more information on cumulative effects for RFSS, please see the Biological Evaluation (BE: Appendix E).

3.8.1.7 Grasslands and Shrublands and Associated Species

Existing Condition

Habitat Group Description

Grassland and shrubland habitats on the FLNF consist of pastures managed for livestock grazing, grasslands managed for wildlife, and shrub openings managed for wildlife habitat. Almost half of the FLNF is represented by these habitats. Although dominated by grasses and forbs, grasslands are interspersed with patches of shrubs and woodland, as well as ponds. Fences and corrals occur primarily on grasslands managed for livestock pasture. Grasslands are variable in shape and size, ranging from 25 to more than 250 acres. They are maintained by mowing, prescribed fire, and liming.

As the name implies, shrubland vegetation is dominated by shrubs and small patches of trees but also includes grasses and forbs. Shrublands vary from one to more than 200 acres in size, and often include man-made wildlife ponds. They are maintained by mowing, cutting, and prescribed fire, but on a longer time scale than grasslands. Shrublands and grasslands are scattered throughout the Forest, but grasslands are most common on the northern end of the Forest. All grasslands managed for wildlife are on the northern end of the Forest.

Grassland and shrubland habitat has occurred on the FLNF and in the Finger Lakes landscape at various levels historically. As noted in the Introduction (3.1) and Vegetation (3.5) sections of this Chapter, there is evidence that native peoples of the Finger Lakes region used fire to clear openings, maintain travelways, and to clear brush from wooded areas for more advantageous hunting. They also had well-established agriculture, including fields of corn and grains, as well as orchards. All of these activities would likely have created habitat for grassland and shrubland species. Most of these open lands, however, were located along lakes, including Seneca and Cayuga Lakes, as well as along the Ontario Lake Plain. Although there is historical evidence of brushy lands along the Hector Backbone (Marks and Gardescu 1992), there is no historical evidence of agriculture or villages on the FLNF. Consequently, during this time western and southern portions of the Forest may have provided some shrubland habitat, although not likely grassland habitat.

In the early 19th century, as settlers moved into the area that is now the FLNF, more open habitat was created in the form of agricultural fields and settlements. It is likely that species associated with grassland and shrubland habitats along the lakes moved into this newly available habitat. With land abandonment at the turn of the 20th century, some of these open lands became forested again. Federal ownership has led to the maintenance of about half of the FLNF in an open grassy or shrubby condition.

There are four plants and seven animals associated with the grassland and shrubland habitat (Table 3.8-9). Of the four plants in this group, yellow giant hyssop and Canada milk vetch are not known to occur on the Forest, but are thought likely to occur by botanists knowledgeable about the flora in the Finger Lakes region. Wild indigo and Culver's-root are known from one occurrence each on the Forest, although they were last observed in the 1980s. The upland sandpiper is not known to nest on the FLNF; the short-eared owl is known from one confirmed nesting occurrence on the Forest and others near the forest. The other birds listed in Table 3.8-9 are confirmed nesting species on the FLNF (Smith and Brown 1994, SVE Bird Panel 2003, NYDEC 2005, Gregoire 2003). Grasslands and shrublands, and the effects of the revised Plan and its alternatives on these habitats, are discussed further in the Wildlife and Wildlife Habitat (3.6) and Vegetation (3.5) sections of this Chapter.

Table 3.8-9: Species of potential viability concern associated with grassland and shrubland habitats on the FLNF.

Plants	Animals
Yellow giant hyssop	Northern harrier
Canada milk vetch	Short-eared owl
Wild-indigo	American woodcock
Culver's-root	Upland sandpiper
	Henslow's sparrow
	Field sparrow
	Grasshopper sparrow

Key Limiting Factors

The greatest limiting factors for grassland and shrubland habitat and associated species are its abundance and distribution across the landscape. Existence of openings at their current scale depends in large part on disturbances (management regimes) created and maintained by humans. There is no evidence of a natural disturbance regime that would create and maintain openings at this scale in this region. This habitat has been present on the FLNF at various levels historically. Until recently, however, this habitat on the Forest has been a small part of a much larger area of grassland and shrubland habitat maintained by humans off the Forest. As abandoned open lands in the region succeed to forest, or are developed, the open land on the FLNF becomes more isolated within the landscape, and this isolation can limit the suitability of the habitat on the Forest for several species, particularly the birds of viability concern associated with grassland and shrubland habitat (DeGraaf and Yamasaki 2001, Dettmers and Rosenberg 2003, Litvaitis 2003a, Robertson and Rosenberg 2003). Without continued management activity by humans to maintain most of the remaining grasslands and shrublands, these habitats will likely be lost from the Forest and region (DeGraaf et al. 1992, Litvaitis 2003a).

In addition to availability of open habitat, the quality of grassland and shrubland habitat can be limited by inherent soil qualities and characteristic vegetation. Canada milk-vetch and Culver's-root appear to prefer more nutrient-rich or calcareous soils in general, and so may be more limited in grasslands and shrublands that are impoverished through natural conditions or land use history (USDA Forest Service 2003g, 2003m, Biological Evaluation (BE: Appendix E)). In addition, Culver's-root and wild indigo tend to be prairie species. Outside of prairies, these species tend to occur in small isolated patches, and wild indigo in particular is dependent on fire to reduce competition and prepare seeds for germination. Conditions these species require are less suitable in regions where natural fire is not a regular occurrence and where succession to forest is quick, as in the FLNF.

Management activities on the FLNF can also have effects on habitat quality. Activities that can limit habitat suitability for grassland and shrubland species include overgrazing, timing of mowing or prescribed fire, as well as maintenance of open lands. Lands managed for livestock grazing present the potential risk for overgrazing, which can compromise the available habitat for Henslow's sparrow, upland sandpiper, and northern harrier. Grazing may also directly limit the plant species associated with grassland habitats, although their palatability to livestock is uncertain. Likewise, mowing can occur at times that disrupts the nesting activities of rare birds or the natural reproduction (such as flowering and seed set) of the plants of viability concern.

Structures that drain fields may limit suitability for yellow giant hyssop by drying out the sites too quickly, which will prevent seeds from germinating (USDA Forest Service 2003f). NNIS are also considered a threat to the plants of this group, as they are effective competitors with grassland and shrubland species. Liming of grasslands and shrublands may improve habitat conditions for some species by improving composition and creating nutrient-enriched conditions that species like Culver's-root prefer. Alternatively, repeated prescribed fire and maintenance of dry acidic conditions may be beneficial to species like wild indigo (see also the BE).

3.8.1.8 Environmental Consequences

Direct and Indirect Effects by Alternative

Indicator 1 – Viability Outcomes

Effects Common to All Alternatives

All alternatives were developed with the premise that risks to species viability will be minimized, and that species of potential viability concern will be protected. Analysis undertaken in the Biological Evaluation (Appendix E) concluded that none of the revised Plan alternatives were likely to result in a trend toward federal listing or loss of viability for RFSS. Some species may never achieve viability outcomes above D on the FLNF, due to such factors as local distribution of individuals or suitable habitat, life history traits, threats over which the Forest Service has no control (like diseases), or the small size of the Forest relative to the larger size of a viable population. Although there may be high risks to the viability of some of these species on the FLNF, the Forest is contributing to overall regional scales of viability by maintaining or enhancing habitat for grassland and shrubland species.

Table 3.8-10 displays the short-term effects, in terms of viability outcomes, for species of the grassland and shrubland habitat group across alternatives. The future outcomes define what is expected at the end of the next 20 years, which is generally the lifespan of a Forest plan. Long-term effects that may also be discussed below generally refer to effects at the end of a period of time when either the species or habitat trend has stabilized. Activities on the Forest have the potential to affect individual species within these habitats. Agency direction and Forest Service policy regarding protection of species of potential viability concern will reduce these potential impacts. Factors outside the Forest Service's control that are increasing the viability risk for some of the species of this group, including reproductive isolation affecting wild indigo and Culver's-root, declines that do not appear to be related to habitat management affecting yellow giant hyssop and Canada milk vetch, and loss of grasslands and shrublands off the Forest affecting the birds in this group, may result in declines in viability on the FLNF, or may perpetuate individuals or occurrences at viability outcomes below C. Yellow giant hyssop and Canada milk vetch are expected to remain at outcome C and B/C respectively over the next 20 years across alternatives, although their decline is puzzling in relation to the large quantity of apparently suitable habitat.

For the plants of viability concern associated with grassland and shrubland habitat, the effects of the revised Forest Plan on viability outcome do not vary by alternative. Availability and types of uses of this habitat do vary by alternative, and are discussed in detail in the Wildlife and Wildlife Habitat section (3.6) of this Chapter. Regardless of whether these habitats are grazed, mowed, or managed with prescribed fire, over 40 percent of the FLNF provides grassland and shrubland habitat under all the alternatives, which would seem substantial enough to provide plenty of habitat for associated species. Unfortunately, grassland and shrubland species continue to be rare and are not now, or are unlikely to be, well distributed across the planning area, and so will continue to be of viability concern. Until botanists can locate any populations of yellow giant hyssop and Canada milk vetch, it remains unclear what types of grassland and shrubland management

activities may be more or less beneficial to these plants.

Outcomes for wild indigo and Culver's-root are primarily driven by their low occurrence numbers and probable limitations on suitable habitat within grassland and shrubland areas (see also the BE). As prairie species, the habitat most suitable for these species tends to be limited, and there is a lot of competition from woody vegetation that quickly invades fields. Low numbers of individuals can lead to losses of populations from random natural disturbance events, as well as from reproductive isolation. Because the most suitable habitat is probably limited on the FLNF, species numbers are not likely to be well distributed across the planning area. Poor distribution increases the risk of loss from disturbances and reduces the reproductive capacity of populations. Consequently, it is unlikely that these species will ever attain viability outcomes above D on the FLNF.

Outcomes for yellow giant hyssop and Canada milk vetch are primarily driven by the uncertainty regarding the reason for their declines, and so do not vary by alternative (USDA Forest Service 2003f, 2003g). Consequently, outcomes on the FLNF reflect the 20-year trend for the species across their ranges. The decline for yellow giant hyssop is of slightly more concern than that of Canada milk vetch simply because it has been declining over a longer period with no known cause. Available habitat includes the grassland and shrubland habitat as well as cliffs, talus, and exposed rock habitats. While grassland and shrubland habitat appears abundant, the species are not. It is suspected that Canada milk vetch needs calcareous substrates, and it is known that yellow giant hyssop requires constant moisture to germinate, although once established it can exist in drier conditions. It may turn out that microhabitat conditions needed by these species are far less common than are the open conditions with which they area associated. When the Forest Service understands more about these habitat relationships, this habitat group may change in suitability for these species.

All the animal species of potential viability concern associated with grassland, grazing land, and shrubland are migratory birds. Differences in the alternatives might result in different effects for three of these species, but the greatest challenges to all of these species are related to habitat threats on range-wide or regional scales, which is unaffected by alternatives. Continued maintenance of abundant grassland and shrubland on the FLNF will provide substantial benefit to each of these species.

Table 3.8-10: Range-wide and FLNF current and future (20 years) viability outcomes[1] for grassland and shrubland species, by alternative, and including rationale for FLNF outcomes.

Species	Range: current-Future	FLNF Current	FLNF Alt. 1	FLNF Alt. 2	FLNF Alt. 3	Rationale
ANIMALS						
Northern harrier	C-C/D	C	**C/D***	**C/D+**	**C/D+**	Maintenance of habitat critical; habitat on public lands very important; habitat available and secure on FLNF but outcome may be worse than indicated if region-wide decline of grasslands increases; benefits from un-grazed grassland; confirmed breeder and migrant on FLNF but trends unknown.
Short-eared owl	C→D[2] C→D	C→D	C→D	C→D	C→D	Maintenance of habitat critical; habitat on public lands very important; habitat available and secure on FLNF but outcome may be worse than indicated if region-wide decline of grasslands increases; primarily migrant on FLNF; local population trends are unknown.
American woodcock	C-C→D	C	C	C	C	Trend of reduced quality and quantity of habitats across the Northeast; habitat management on FLNF important regionally to prevent worse outcome; benefits from grasslands and openings in forest; confirmed breeder on FLNF but trends unknown.
Upland sandpiper	C-C→D	D	**D-E**	**D-E+**	**D-E+**	Loss of habitat critical; managed habitat on public lands may not be enough to offset regional trends; suitable habitat available and secure on FLNF but species known only as migrant; benefits from un-grazed grassland.
Henslow's sparrow	E-E	E	E	E	E	Loss of habitat critical; suitable habitat available and secure on FLNF but managed habitat on public lands may not be enough to offset regional trends; confirmed breeder on FLNF, but declining since 2000.
Field sparrow	C→D-C→D	C→D	C→D	C→D	C→D	Loss of habitat critical; suitable habitat available and secure on FLNF but managed habitat on public lands may not be enough to offset regional trends; species common breeder on FLNF but trends unknown.
Grasshopper sparrow	D→E-D→E	D→E	D→E	**D→E+**	**D→E+**	Loss of habitat critical; suitable habitat available and secure on FLNF but managed habitat on public lands may not be enough to offset regional trends; benefits from un-grazed grassland; species moderately common breeder on FLNF and appears stable.
PLANTS						
Yellow giant hyssop[3]	B/C-C	B/C	**C**	**C**	**C**	Declining for unknown reasons; does not appear habitat limited
Canada milk vetch[3]	B/C-B/C	B/C	B/C	B/C	B/C	Declining for unknown reasons; does not appear habitat limited
Wild-indigo[3]	B-B-	D	D	D	D	Isolated population; limited suitable habitat.
Culver's-root[3]	B-B	D	D	D	D	Isolated population; limited suitable habitat.

Source: SVE Project File, Species Literature Reviews and Summaries
[1] Viability outcomes are defined in the Affected Environment Introduction of this section.
[2] An arrow (→) indicates a trend; "C→D" means C with a trend towards D.
[3] Viability outcomes for species that occur in multiple habitat groups are identical across their groups, and were developed considering all positive, neutral, and negative effects across the habitats in which they occur.
*Outcomes in underlined bold text are those that differ from the outcome based on current management.

Alternative 1

The most substantive difference among alternatives for grassland and shrubland species is in the acres allocated to the Grassland for Grazing MA and the Grassland for Wildlife MA, which is maintained without grazing. Alternative 1 allocates the most land overall (about 400 more acres than Alternatives 2 and 3) to grasslands, but the fewest acres (436 acres or three percent, versus 688 acres in Alternatives 2 and 3) to the Grassland for Wildlife MA. The northern harrier, upland sandpiper, and grasshopper sparrow are less tolerant of grazing activity than many species, particularly in instances where grazing is disruptive to nesting (SVE Bird Panel 2003). These species receive greater benefit from the greater acreage of un-grazed grassland provided by Alternatives 2 and 3.

Alternatives 2 and 3

Allocation of land to Grassland for Wildlife is the same in Alternatives 2 and 3 (688 acres, 4%) and greater than in Alternative 1. Accordingly, these alternatives provide more grassland for the northern harrier, the upland sandpiper, and the grasshopper sparrow where they will not be disturbed by grazing activity. The upland sandpiper is not known to nest on the FLNF at present, but does occur within dispersal distance. The other grassland species are more tolerant of grazing, thus less affected by differences in alternatives.

Alternatives 2 and 3 have less land allocated to shrubland (1,268 acres and 1,421 acres, respectively; 8% and 9%) than Alternative 1 (2,107 acres, 13%). This difference is caused by reallocation of some lands listed as shrubland under the 1987 Plan that have undergone natural succession and reverted to more forested habitats. Reallocating these lands to forested MAs does not represent habitat changes from current conditions.

The American woodcock could be adversely affected by Alternative 2. Woodcock use grasslands and forest openings as singing grounds and courtship display during spring; grassy fields are particularly important as night-time roosting sites during summer. Woodcock forage in moist shrubland and forest types of various successional stages (Sepik et al. 1981, DeGraaf and Yamasaki 2001). The increased allocation of land to Future Old Forest and other protected management areas (Existing and Candidate Research Natural Areas and Ecological Special Areas) decreases the number and distribution of temporary openings and early successional forest habitats created by timber management. Considering that more than one third of the Forest will be in grassland and shrubland habitats in Alternative 2, the effect of restricted forest management of woodcock is more likely to be in reduced distribution of available habitat than in reduced availability. The effect on viability of the species is negligible.

Cumulative Effects

The cumulative effects analysis area for grassland and shrubland habitat is the ecological subsections that encompass the Forest. For most species of potential viability concern associated with grassland and shrubland habitat, the FLNF and the Finger Lakes region are not considered important to their range-wide distribution. Consequently, actions that the Forest Service takes under any alternative will likely have little to no cumulative effect on the viability of the species across their ranges. The revised Forest Plan and any of the alternatives, however, have the potential to provide suitable habitat for many grassland and shrubland species, and can help contribute to regional and statewide viability.

While more than 40 percent of the FLNF is allocated to lands that support grassland and shrubland habitat across the alternatives, the FLNF supplies a very small proportion of this habitat across the ecological region. Currently, the region's agricultural landscape, particularly the Ontario Lake Plain, is dominant and provides abundant grassland and shrubland habitat. As indicated in the Wildlife and Wildlife Habitat section (3.6) of this Chapter, however, current land use trends suggest a slow decline in grasslands and shrublands as they are developed for housing, industry, or other uses. This increasing urbanization is likely over the

long-term to lead to habitat isolation and eventual loss of core habitat in the region. The grasslands and shrublands on the FLNF may at some point in the future serve as temporary refugia for species of grassland and shrubland habitats, but eventually the isolation will lead species dependent on large patches of this habitat, or those of small population size or numbers, to be lost from the Forest.

In addition to this somewhat gloomy outlook, many of the actions currently taking place within open habitats in the region, notably agricultural activity and use of herbicides, as well as development, are detrimental to the continued existence of several of these species. Non-native invasive species are common in these habitats; they can compete effectively with plants of viability concern as well as with plants that are desirable for animals of concern. Consequently, actions the Forest Service takes to maintain high quality grassland (especially those maintained without grazing) and shrubland within this landscape will contribute to the viability of most of the species of potential viability concern associated with this habitat. Alternatives do differ in terms of the proportion of grassland managed without grazing, but pasture management standards and guidelines as well as those protecting species of potential viability concern help to mitigate grazing concerns, and are not likely to shift outcomes for most of these species.

Culver's-root and wild indigo are currently each known from one site on the Forest. These two species are generally prairie species, and so in this part of the country beyond the prairie zone tend to occur in small isolated patches. It is likely that these two species historically found opportunities to inhabit the Forest when the land was opened up during the 1800s, and may have been found frequently off the Forest in open lands maintained by native peoples. Neither species is known to have occurred within the last 20 years in the analysis area except within the FLNF. Populations on the Forest are at a distinct disadvantage due to the lack of any neighboring populations off the Forest with which to interact. If there remain only one or very few populations of these species on the Forest over the long-term, their interactions with other populations off the Forest or with each other are likely to be limited, leading to the possibility that the populations on the FLNF will decline and be lost as the reproductive potential of these species decline. Given the protections provided these species by the revised Plan and its alternatives, it is unlikely that actions the Forest may take will contribute to the general decline of these species in the analysis area.
As noted for the previous habitat group, declines in yellow giant hyssop and Canada milk vetch across their ranges, within the ecological region, and on the Forest are expected as long as there continues to be uncertainty regarding the reasons behind the decline. Once the key limiting factors for these two species are understood, it will become clearer which, if any, management actions on or off the Forest are likely to have effects on viability. Restrictions on management actions within the FLNF that could have effects on these species may help to alleviate any contribution from the FLNF to negative effects occurring within the analysis area.

For more information on cumulative effects for RFSS, see the Biological Evaluation (BE: Appendix E).

Alternative 1

As was the case relative to direct and indirect effects, the most substantive difference in cumulative effects among alternatives stems from the acres allocated to Grassland for Wildlife that is maintained without grazing. This may be one of the rarest habitats in the region. The availability and quality of grassland and shrubland habitat is declining across the region. Grasslands are maintained primarily through grazing, cultivation or other agricultural activity, or other kinds of development (golf courses, for example). Maintenance of grasslands for wildlife habitat is too expensive and labor intensive for private landowners, but does occur on public lands such as refuges, wildlife management areas, or National Forests. Non-grazed grasslands maintained on public lands will likely become increasingly important as regional refugia for grassland species, including the birds of viability concern discussed in this

section. Alternative 1 will make the smallest contribution to this important habitat type.

Alternatives 2 and 3

Land allocation to Grassland for Wildlife is the same in Alternatives 2 and 3, and greater than in Alternative 1. Accordingly, the long-term, cumulative effect of these alternatives is a greater contribution of un-grazed grasslands for the potential benefit of the region's grassland species.

3.8.1.9 Wetlands and Associated Species

Existing Condition

Habitat Group Description

This broad habitat group includes all types of wetlands, including natural wetland communities such as beaver meadow complexes, forested swamps, marshes, spring seeps, and peatlands, as well as more artificial wetland communities, such as wet pastures and wet roadside ditches. It also includes less obvious wetlands, such as vernal pools and seepages. Wetland ecological communities that are represented now, or were described historically, on the FLNF include shallow emergent marsh, shrub swamp, red maple-hardwood swamp, perched swamp white oak swamp, and vernal pool. Of these communities, the perched swamp white oak swamp is considered rare in New York, and is restricted to the Finger Lakes region.

There are approximately 134 wetlands mapped on the FLNF accounting for approximately 226 acres (National Wetlands Inventory). They range in size from less than 0.1 acre to 21 acres and average almost 2 acres in size. Although wetlands are widely distributed across the Forest, they tend to be larger and more concentrated toward the north end, particularly to the north and east. There are also small, unmapped wetlands, and forested land with poorly drained soils, that can be located using county soil survey maps. Soil series that are most likely to support wetlands include Canandaigua (moderately high pH), Alden (variable pH), and Chippewa (acidic pH). These soils account for 500 to 600 acres of the Forest, or less than four percent of the land base (DeGloria 1998). Many wetlands are associated with rivers or streams, and share some of the same species of potential viability concerns discussed earlier for aquatic and riparian habitats.

There are seven plants and four animals associated with wetlands habitat (Table 3.8-11). Of the plants, blunt-lobed grapefern, marsh bellflower, large yellow ladyslipper, and highbush cranberry are not known to occur on the Forest, but are thought likely to occur by botanists knowledgeable about the flora in the Finger Lakes region. Tuckerman's sedge and Culver's-root are each known from one occurrence on the Forest, and swamp white oak is known from three locations on the Forest. The four animal species are not known to occur on the Forest, but all occur nearby and could be found on the Forest in the near future. The Forest is at the northern periphery of the longtail salamander's range in New York. Much of the Forest is unsuitable, but this species might be present in drainages on the southern parts of the Forest. Conditions on the Forest are suitable for the wood turtle, Jefferson salamander, and blue-spotted salamander (NYDEC 2003, SVE Herpetology Panel 2003).

Table 3.8-11: Species of potential viability concern associated with wetlands on the FLNF.

Plants	Animals
Blunt-lobed grapefern	Jefferson salamander
Marsh bellflower	Blue-spotted salamander
Tuckerman's sedge	Longtail salamander
Large yellow ladyslipper	Wood turtle
Swamp white oak	
Culver's-root	
Highbush cranberry	

Key Limiting Factors

One of the important limiting factors associated with wetland habitat is its current distribution. Based on recent National Wetlands Inventory mapping, wetlands on the FLNF tend to be widely dispersed, small, and poorly connected with each other. This is particularly true on the southern half of the Forest. This level of disconnection can make it difficult for some plant species to disperse to new habitat, forcing populations to remain small and complicating metapopulation interactions. Toward the north and east, several small wetland complexes extend along streams that pass along, through, or into the Forest. This part of the Forest may offer more opportunities for viable populations of wetland species because of the higher number of potentially suitable microsites, as well as connections that facilitate interactions between populations. Ownership of in the northern end, however, is fragmented and much of the wetland habitat is off National Forest System land.

Another factor that can limit existing wetland habitat for species is whether wetlands are open or forested. On the FLNF, open wetlands are generally less common than forested wetlands. During the 1790s, wetlands described for the FLNF were forested, and black ash was the predominant wetland species noted (Marks and Gardescu 1992). No beaver dams, open peatlands, wet meadows, alder thickets, or marshes were found along survey lines in the FLNF at that time. While land cover maps from the 1930s and 1980s suggest broader areas of wetlands (DeGloria 1998), of which some were open, Forest inventory data indicate that many of these wetlands have since become forested. Consequently, species like Culver's-root and marsh bellflower, which prefer open sites, will find habitat more limiting on the FLNF. Small, open areas within these forested swamps still occur, offering some potential habitat.

Another limiting factor related to habitat suitability for plants involves wetland pH, which is generally associated with the underlying chemistry of glacial materials and bedrock. Marsh bellflower, Tuckerman's sedge, large yellow ladyslipper, Culver's-root, and highbush cranberry all prefer, or are strongly associated with, wet, calcareous, and neutral to alkaline conditions in the Finger Lakes region (USDA Forest Service 2003d, 2003h, 2003c, 2003m, 2003e; see also the Biological Evaluation (BE: Appendix E)). Canandaigua and Alden soils are the only soils likely to provide the appropriate pH, as well as the poor drainage, to support wetlands. These soils are quite limited on the Forest, accounting for about two percent of the land base, and generally restricted to the northern portion of the Forest.

Additional factors that alter the suitability of wetland habitat for species include hydrology, water quality, light levels, and temperature. One of the primary limiting factors in this habitat on the FLNF is hydrology. A high level of moisture, and its relative constancy during the growing season, is of primary importance to most species of potential viability concern associated with these habitats. Many of these habitats include "vernal pools" (areas that hold water in early spring, retaining the water through early summer into July), whereas other pools occur at other times of the year. These pools, which tend to be very small and widely spread across the landscape, provide important habitat for many woodland amphibians that live a portion of their lives in water. Tuckerman's sedge is also associated with the edges of vernal pools on the Forest (USDA Forest Service 2003h). Such pools are not suitable for fish or other aquatic predators, but they are suitable for some small invertebrates upon which young amphibians prey. The size and patchiness of these pools tend to limit the distribution of species associated with them, and so each pool becomes critical for breeding success and population persistence.

While the plants of viability concern associated with wetland habitat all require a stable source of high soil moisture, they vary in the level of disturbance, light levels, and competition from other plants that they prefer or tolerate. Culver's-root and marsh bellflower prefer open areas, and are threatened by succession of open habitat to forest. Highbush cranberry and swamp white oak are both associated with floodplains, and benefit from periodic scouring

of river shores that open up the ground and can open the canopy somewhat (USDA Forest Service 2003e, 2003i). Highbush cranberry and swamp white oak, however, are able to persist into forested communities. Blunt-lobed grapefern is also associated with periodically scoured or flooded habitats, but it prefers thinner canopies and only appears once a forested stand has become established and aged for 40 to 60 years (A. Gilman, personal communication, July 2003; USDA Forest Service 2003a). Tuckerman's sedge and large yellow ladyslipper appear to tolerate a variety of light levels, although the sedge is also associated with floodplains and their periodic disturbances (USDA Forest Service 2003h, 2003c). The ladyslipper tends to be associated with more mature forested wetlands where gaps form periodically; it does not appear to tolerate either deep shade or degraded habitat.

Moist conditions and canopy cover that helps maintain the microclimate are the features most important, and most limiting, to the wetland animal species of potential viability concern. Salamanders require terrestrial and wetland habitats in close proximity to complete their life cycle. The Jefferson and blue-spotted salamanders are strongly associated with vernal pools as breeding habitat. The Jefferson salamander prefers undisturbed forests, whereas the closely related blue-spotted salamander apparently is hardier and more tolerant of forest disturbance and open habitats. The longtail salamander and wood turtle are associated more with stream-bank habitats and adjacent forest land.

Activities that affect wetland habitats, over which the Forest Service can have some management control, include beaver activity, roads and trails, vegetation management, and recreational development. Beaver activity, an important driver for physical and vegetation changes to wetlands that are not in pastures, can alternately create and destroy wetland habitats through reconfiguration of the landscape. Grazing by cattle serves as a similar driver in open wetlands contained within pastures, where cattle can alter vegetation by preferential grazing or avoiding certain species. Changes to hydrology can negatively impact wetlands by eliminating habitat and altering water quality and quantity. Roads, trails, recreational development, grazing, and other management activities in or near wetlands can change the local hydrology by impeding or changing the dynamics of water flow, making habitat more or less suitable for some species. Roads and trails form barriers to movement of some animal species, and can facilitate the invasion of wetlands by non-native invasive species. Grazing can affect water quality of wetlands through additions of nutrients that encourage dense vegetative growth. Logging alters the moisture levels, shading, and temperature of mature forest wetlands, making them unsuitable for some species. Timber management can also improve habitat for deer, which feed on large yellow ladyslipper and possibly other plant species of potential viability concern. Removal of trees in and around vernal pools can affect water temperature or hasten drying. Excessive or poorly controlled run-off can result in buildup of soft sediments, which can be a major problem for species such as wood turtles and longtail salamanders (P. Ducey, personal communication, July 2005).

3.8.1.10 Environmental Consequences

Direct and Indirect Effects by Alternative

Indicator 1 – Viability Outcomes

Effects Common to All Alternatives

All alternatives were developed with the premise that risks to species viability will be minimized, and that species of potential viability concern will be protected. Analysis undertaken in the Biological Evaluation (Appendix E) concluded that none of the revised Plan alternatives were likely to result in a trend toward federal listing or loss of viability for RFSS. Some species may never achieve viability outcomes above D on the FLNF, due to such factors as local distribution of individuals or suitable habitat, life history traits, threats over

which the Forest Service has no control (like diseases), or the small size of the FLNF relative to the larger size of a viable population. Although there may be high risks to the viability of some wetland habitat species on the FLNF, the Forest is contributing to overall regional scales of viability by maintaining or enhancing wetland habitat for these species.

Table 3.8-12 displays the short-term effects, in terms of viability outcomes, for species of the wetlands habitat group across alternatives. The future outcomes define what is expected at the end of the next 20 years, which is generally the lifespan of a Forest plan. Long-term effects generally refer to effects at the end of a period of time when either the species or habitat trend has stabilized. Activities on the Forest have the potential to affect individual species of potential viability concern within wetland habitats. Agency direction and Forest Service policy regarding protection of species of potential viability concern will reduce potential impacts. Factors outside the Forest Service's control are increasing the viability risk for some of the wetland habitat species and may result in further declines in viability, or may perpetuate individuals or occurrences at viability outcomes below C, on the FLNF. These factors include insects and hybridization affecting highbush cranberry; insects and reproductive isolation affecting large yellow ladyslipper; and reproductive isolation affecting Culver's-root. Blunt-lobed grapefern, marsh bellflower, Tuckerman's sedge, and swamp white oak are expected to remain in the outcome C range across all alternatives, although each is associated with risks to individuals or populations that could lead to a lower outcome.

Across all alternatives, the greatest risks that wetland habitat and associated species face are ground-disturbing and canopy-altering activities. The impacts to water quality and hydrology from ground-disturbing activities are discussed in detail in the Water and Fisheries section (3.3) of this Chapter. As noted in that section, these habitats are specifically protected in the revised Plan through goals, objectives, standards, and guidelines. Because wetland habitats on the Forest tend to be widely distributed and overall quite small, the likelihood that a management action will affect individuals or populations within these habitats is low. There are a large number of them, and the opportunity for human error exists in implementing revised Plan direction. Consequently, since alternatives do vary in the level of ground-disturbing activities that could affect this habitat on the FLNF, there may be some differences in the risk to wetland habitat of human error. The Water and Fisheries section (3.3) of this chapter details those risks, which apply to the wetland habitat group and the species associated with it. As noted above, these risks are small relative to the size and distribution of suitable habitat, and so would not lead to changes in expected viability outcomes for plant species of potential viability concern across alternatives or from the current situation.

Canopy-altering activities can also have impacts to wetland habitats, as noted earlier, through effects to light, temperature, and moisture. As noted above, these habitats are specifically protected in the revised Plan through goals, objectives, standards, and guidelines, which includes maintenance of functional habitat for species that use vernal pools. There are risks associated with human error, however, especially in the identification of small or uncommon wetland habitats or vernal pools, depending upon the time of year. Because the management areas vary in terms of the degree of canopy alteration likely, and the alternatives vary in the distribution and proportion of these management areas across the FLNF, the viability outcomes for some of these species do vary by alternative due to these risks.

Some species declines or low viability scores on the Forest are due to factors outside of the control of management direction contained in the revised Plan. As noted in other habitat groups, marsh bellflower is expected to remain at a viability outcome of C/D, and Culver's-root and highbush cranberry are likely to remain at outcome D, due to very limited habitat opportunities for calcareous wetlands. Until botanists can locate any populations of marsh bellflower or highbush cranberry, it will remain unclear which if any of the types of management activities that might occur within

these habitats may be more or less beneficial to these species. In addition, the range-wide decline of highbush cranberry is driven predominantly by defoliation by an Asian insect, and by genetic introgression through hybridization with the European highbush cranberry, which is a common landscaping plant. Habitat is limited for wood turtle and longtail salamander, and since potential habitat is protected on the Forest, there are no appreciable differences among the alternatives in terms of effects on these species. Alternatives that leave greater unbroken tracts of older forest surrounding wetlands will provide for larger populations of the amphibians and/or for gene flow among demes associated with separate wetlands (P. Ducey, personal communication, July 2005).

The risk presented to swamp white oak from timber management is the predominant threat to its viability. It is currently not protected as a RFSS, and it is expected to remain at outcome B/C under any alternative. There are only three populations known from the Forest, two of which are associated with small wetlands that seasonally may become dry and appear operable for timber management. Neither of these two small wetland areas is classified as perched swamp white oak swamp, as they do not have any of the characteristic species other than swamp white oak, and so they do not represent rare natural communities. All alternatives place one of these two small areas within MAs where timber harvesting is allowed, while the other is located within the Shrubland MA, where this recently created beaver swamp is managed for wildlife values. The risk of harvesting swamp white oak trees as part of a timber sale, given the small numbers of trees known on the Forest, is low. Swamp white oak trees in areas classified as wetlands are further protected due to standards and guidelines protecting wetland areas. If this situation were to occur, however, the risk of killing all individuals in a population through harvesting them is relatively high, and suggests that the species could decline from a B to a C viability outcome under any alternative.

Table 3.8-12: Range-wide and FLNF current and future (20 years) viability outcomes[1] for wetland species, by alternative, and including rationale for FLNF outcomes.

Species	Range: current-Future	FLNF Current	FLNF Alt. 1	FLNF Alt. 2	FLNF Alt. 3	Rationale
ANIMALS						
Jefferson salamander[3]	C-D	D	**C***	**C+**	**C+**	Not known on FLNF, but known within dispersal range; 1 confirmed and 1 "Jefferson-complex" from Schuyler County; more easily impacted by fragmentation and habitat change than blue-spotted salamander; increasing mature, undis-turbed forest on FLNF will enhance habitat, especially under Alternatives 2 and 3.
Blue-spotted salamander[3]	B- to C+,C	D	**C**	**C+**	**C+**	Not known on FLNF, but known within dispersal range; 1 "Jefferson-complex" reported from Schuyler County; more hardy and flexible than Jefferson salamander; increasing mature, undisturbed forest on FLNF will enhance habitat, especially under Alternatives 2 and 3.
Longtail salamander[3]	D?, D?	D	D	D	D	Not known to occur on FLNF; the most sensitive of the stream-side salamanders.
Wood turtle[3]	C→D[2],≤D	D	D	D	D	Not known from FLNF but known within dispersal range; suitable habitat available on FLNF; found in a variety of terrestrial habitats adjacent to streams.
PLANTS						
Blunt-lobed grapefern[3]	C-C	C	C	**C/D**	C	Ephemeral, related to presence of soil mycorrhizae; low proportion of even-aged regeneration harvests in Alt. 2 (10 ac/yr).
Marsh bellflower[3]	B-B/C	C/D	C/D	C/D	C/D	Very limited habitat requiring regular disturbance;
Tuckerman's sedge	Unk	C/D	C/D	**C**	**C**	Isolated population; uncertainty regarding distribution; lower risks in Alts. 2 and 3 due to allocation of population to Future Old Forest
Large yellow ladyslipper[3]	B-D	D	D	**D+**	**D+**	Likely isolated population; limited suitable habitat; higher proportion of future old forest in Alt. 2 and more uneven-aged management in Alt. 3.
Swamp white oak	A/B-A/B	B	**B/C**	**B/C**	**B/C**	Few populations on Forest in restricted rare habitat; risk from timber harvesting greatest threat
Culver's-root[3]	B-B	D	D	D	D	Isolated population; limited suitable habitat.
Highbush cranberry[3]	B-C	D	D	D	D	Insect and hybridization causing decline; very limited habitat on the Forest.

Source: SVE Project File, Species Literature Reviews and Summaries
Notes:
[1] Viability outcomes are defined in the Affected Environment Introduction of this section.
[2] An arrow (→) indicates a trend; "C→D" means C with a trend towards D.
[3] Viability outcomes for species that occur in multiple habitat groups are identical across their groups, and were developed considering all positive, neutral, and negative effects across the habitats in which they occur.
* Outcomes in underlined bold text are those that differ from the outcome based on current management.

Alternative 1

The primary differences among the alternatives in viability outcomes for wetland species is related to habitat quantity and quality. Timber production can have direct and indirect effects on forested wetland habitats through altering the canopy. All harvest techniques reduce canopy closure and could, therefore, alter the moisture and temperature regimes, reducing habitat quality for some species. Even-aged silvicultural systems reduce canopy closure more than other methods, and Alternative 1 has more acres allocated to this possible use than

the other alternatives. None of the wetland plant species of potential viability concern, however, are dependent on deep shade, and so some harvesting, particularly uneven-aged silvicultural systems and thinnings, may actually improve habitat quality. Using even-aged silvicultural systems in forested wetlands can also attract deer and other herbivores, increasing the risk of herbivory compared to other alternatives.

Large yellow ladyslipper is expected to do slightly worse under Alternative 1 than the other two alternatives. While this species is currently at a viability outcome of D, and is not known to occur on the Forest due to limited suitable habitat, Alternative 1 has greater potential for even-aged silvicultural systems in potentially suitable habitat. This type of management can have negative impacts to wetland habitat. In addition, large yellow ladyslipper is often associated with seepage swamps that are often not identified as part of the National Wetlands Inventory due to their small size and degree to which they are embedded within upland forests. These types of areas are also easy to overlook in the field, and so the risk of altering suitable habitat for this species is greater where there are more opportunities to do so.

For similar reasons, Alternative 1 provides less benefit to Jefferson and blue-spotted salamanders than the other alternatives. These species prefer the deep, moist litter in mature forests. Management activities that create openings alter moisture levels on the forest floor, potentially making those areas less suitable. These salamander species are also associated with the rich mesic hardwoods habitat, but because of the relative acreage in the habitat groups, alternative-related differences are more likely to be realized in the wetland habitats.

Blunt-lobed grapefern will remain at outcome C in Alternative 1 due in part to uncertainties regarding its precise habitat needs on the Forest. Also, Alternative 1 will continue to allow even-aged timber harvest methods, which will eventually create the 40 to 60 year old successional hardwood forests, in particular red maple-hardwood swamps, with which blunt-lobed grapefern appears to be associated (A. Gilman, personal communication, July 2003; USDA Forest Service 2003a).

Tuckerman's sedge is expected to remain at a viability outcome of C/D under Alternative 1, primarily because the single location for this sedge is associated with a series of vernal pools in one stand that is placed within a management area where timber harvesting is allowed. Harvesting can alter the light regime and hydrology of these vernal pool habitats, leading them to dry more quickly. While Tuckerman's sedge is associated with variable light levels, it does require stable hydrology. Management direction in the revised Plan and its alternatives protect these habitats, as discussed in the Water and Fisheries section (3.3) of this Chapter, but because vernal pools are small and easily overlooked there is greater risk of error in application of this direction. With only a single population, an error at this site or others could lead to a decline or loss of viability on the Forest. There is, however, a great deal of uncertainty regarding the distribution of this species, which is often overlooked, and so more populations as well as suitable habitat for it may be found on the Forest with additional inventories.

Alternative 2

Habitat conditions may improve very slightly over the short-term for large yellow ladyslipper, and to a greater extent for Jefferson and blue-spotted salamanders. These species tend to be associated with mature or old forest habitats, which increase dramatically over the long-term under Alternative 2. As described above under Alternative 1, the salamander species also are associated with the rich mesic hardwoods habitat, but alternative-related differences are more likely to be realized in the wetland-related habitats.

Habitat quality is expected to improve for Tuckerman's sedge, as the site for this species is allocated to the Future Old Forest MA where timber harvesting will not occur, or will occur only to facilitate ecological restoration. These improvements in habitat quality are expected to result in slight increases in viability outcomes

over the next 20 years. Habitat quantity may decline slightly for blunt-lobed grapefern under Alternative 2 because only seven percent of the Forest will be in allocations that will create the 40 to 60 year old successional forest stands with which the species is most associated.

The types of effects on wetland habitat and associated species from ground-disturbing and canopy-altering activities will be the same under Alternatives 1 and 2. The effects, however, will happen on far fewer acres under Alternative 2. Alternative 2 allocates 1,127 acres to the Oak Hickory Management Area which is predominately managed using even-aged systems while Alternative 1 allocates 6,779 acres to Oak Hickory. Consequently, the risks of exposure of the two salamanders, large yellow ladyslipper, and Tuckerman's sedge to these potential threats are reduced in Alternative 2.

Alternative 3

Habitat conditions, and consequently viability outcomes for Jefferson and blue-spotted salamanders, large yellow ladyslipper, and Tuckerman's sedge, are expected to remain the same under Alternatives 2 and 3. Future Old Forest MA allocations and increased acreage allocated to the Northern Hardwood MA for Alternative 3 are likely to provide higher quality habitat over the long-term, and will lead to short-term improvements by removing the risk associated with large canopy alterations. As in Alternative 2, the existing site for Tuckerman's sedge is placed within the Future Old Forest MA under Alternative 3, and so effects under this alternative are the same as discussed above for this species. The proportion of the Forest allocated to MAs where even-aged silviculture is likely to be used is intermediate in Alternative 3 between that in Alternative 1 and Alternative 2. It is expected that Alternative 3 will be adequate to maintain the current viability outcome for blunt-lobed grapefern.

Cumulative Effects

The cumulative effects analysis area for wetlands habitat includes the 4 watersheds in which the FLNF is located, with some changes to exclude areas unlikely to be affected by activities on the FLNF. The Water and Fisheries section (3.3) of this Chapter discusses the past, present, and foreseeable future actions that make up the context for cumulative effects analysis of wetlands habitat. Minor adverse impacts, and some beneficial impacts, to this habitat are predicted. Adverse impacts are associated with risks that accompany ground-disturbing activities and the grazing program, while beneficial impacts are associated with riparian restoration efforts and monitoring to identify and correct problems.

For most species of potential viability concern associated with wetland habitat, the FLNF and the Finger Lakes region are not considered important to their range-wide distribution. Consequently, actions that the Forest Service takes under any alternative will likely have little to no cumulative effect on the viability of wetlands species across their ranges. The FLNF is considered important to the New York distribution for three plant species: blunt-lobed grapefern, large yellow ladyslipper, and swamp white oak. Although viability outcomes for two of these species vary by alternative (blunt-lobed grapefern and large yellow ladyslipper, Table 3.8-12), the positive cumulative impacts to these species, over the long-term, of actions taken on the Forest to protect their habitats will likely outweigh the risks associated with the alternatives. The FLNF, managed under the revised Plan and any of the alternatives, has the potential to provide suitable habitat for all three species, and can help contribute to regional and statewide viability.

Wetland habitats are generally more abundant off the Forest, particularly to the north, than on National Forest System land. Agriculture and residential development are common on lands surrounding the Forest, and off-Forest timber production does not generally have sustained-yield objectives. Development and agriculture can eliminate wetland habitat and alter water quality and quantity. Roads, trails, dams, and

other developments in or near wetlands can change the local hydrology, changing habitat suitability for some species.

Historically, the conversion of forest to farmland, development, and intensive timber harvest, altered or eliminated many wetlands, reducing habitat and likely populations of species of potential viability concern across the analysis area. Many of these wetlands can still be found embedded within agricultural lands with little protection. Some wetlands are protected through designation as State Wildlife Management Areas, other conserved land designations, or within Montezuma National Wildlife Refuge. New York Best Management Practices (BMPs) for silvicultural operations help mitigate some effects on private ownerships. Most of the wetlands that occur partially on the Forest and partially off-Forest are embedded within agricultural lands.

Most species of potential viability concern in wetland habitats are recovering from the effects of intensive habitat changes over past decades and centuries. While some activities on the Forest may impact these habitats in the next 20 years, the effects will be minimal given the protections the habitats are afforded in the revised Plan. The affects on National Forest System land are also less than declines resulting from past land conversions and continued impacts to wetlands outside the Forest. The impacts of off-Forest agricultural activities on wetlands that cross the Forest boundary will continue to have negative consequences for the wetlands on the Forest, and will further restrict potential habitat for species of potential viability concern. Due to historical impacts and continued pressure on these habitats off-Forest, recovering and high quality wetlands on the Forest are more important than ever as habitat for species of potential viability concern.

For the longtail salamander and the wood turtle, the cumulative effects of implementing the revised Forest Plan, under any of the alternatives, would be continued preservation and enhancement of suitable riparian habitats associated with wetlands. Although these species are not known to occur on the Forest, they do occur in the vicinity. The Forest may become important habitat for these species in the future as habitat conditions improve on the Forest and diminish in the region overall.

The Jefferson and blue-spotted salamanders are not known to occur on the Forest, although extensive on-Forest surveys have not been conducted and they do occur within dispersal range and are likely to occur on the Forest in the future. There are potential alternative-related cumulative effects for Jefferson and blue-spotted salamanders that stem from the relative allocation of lands to Future Old Forest and other protected MAs, including Existing and Candidate Research Natural Areas and Ecological Special Areas. These effects are considered theoretical and potential, not proven, due to the lack of current records for these species on the FLNF.

Alternatives 2 and 3 allocate substantially more land to these MAs than Alternative 1. As the forests on these MAs age, they will provide more and more of the undisturbed mature forest, including deep litter and woody debris, which the Jefferson and blue-spotted salamanders require. Over many decades, there likely would be increasing divergence between the abundance and quality of habitats provided on the Forest under Alternative 1 versus Alternatives 2 and 3. In the opinion of some zoologists (SVE Herpetology Panel 2003), the FLNF could become a refugium for some species, particularly amphibians, as the availability, distribution, and quality of important habitats diminishes across the region. Should this be the case, the development of old forest habitats on the FLNF over time could become extremely important to the viability of these species on a regional scale.

3.8.1.11 Upland Forest and Associated Species

Existing Condition

Habitat Group Description

This habitat includes most of the deciduous and mixed deciduous-coniferous forest in the area, excluding only the rich mesic hardwoods habitat. It encompasses Appalachian oak-hickory and oak-pine forests, beech-maple mesic forests, and hemlock-northern hardwood forests. These forest communities are the dominant or "matrix" types on the FLNF, in which the other habitats noted here are embedded as small patches. Mesic hardwood forests of beech, maple, and the enriched variants tend to occur more frequently to the north, while oak-dominated forests tend to occur more frequently to the south. Hemlock-northern hardwood forests tend to be restricted to the ravines. These major forest communities and their abundance, distribution, and history on the FLNF are discussed in more detail in the Vegetation section 3.5 of this Chapter.

There are nine plants and six animals associated with the upland forest habitat (Table 3.8-13). Of the nine plants, yellow giant hyssop, Canada milk vetch, blunt-lobed grapefern, and large yellow ladyslipper are not known to occur on the Forest, but are thought likely to occur by botanists knowledgeable about the flora in the Finger Lakes region. Black cohosh is found at several sites on the Forest and is likely to be more common than originally thought. The remaining four plants are each known from one occurrence on the Forest. Northern goshawks and wood thrushes nest on the Forest. Both species occur in, but neither is restricted to, upland forest habitat. Adult salamanders inhabit upland forest areas surrounding suitable breeding habitat. Black rat snakes also occur in these forests (P. Ducey, personal communication, July 2005).

Table 3.8-13: Species of potential viability concern associated with upland forests on the FLNF.

Plants	Animals
Yellow giant hyssop	Jefferson salamander
Canada milk vetch	Blue-spotted salamander
Wild-indigo	Longtail salamander
Blunt-lobed grapefern	Black rat snake
Black cohosh	Northern goshawk
Large yellow ladyslipper	Wood thrush
Broad beech fern	
Black-fruit mountain-ricegrass	
Culver's-root	

Key Limiting Factors

The distribution of upland forest habitat is not considered limiting, and so factors that tend to limit species in this habitat are related to characteristics that make the habitat more suitable or of higher quality for certain species. The primary limiting factor associated with this habitat is the amount of forest cover provided. Features of importance to several species in this group include: closed canopy conditions, large patch size, large trees, and small openings that occur through disturbances related to the death of single or small groups of trees. Some species prefer the older versions of this habitat while others prefer younger areas, edges, and gaps. In the oak and pine forest types, disturbances included fire, leading to characteristic sparse understories without the deep shade more typical of mesic hardwood forests. These forests are often referred to as "open oak woods." Old forest and fire-regulated versions of upland forest habitat are very rare on the FLNF because of the extensive land-use history of agriculture, timber harvesting, and fire suppression.

While this broad habitat group is a dominant habitat on the Forest, some species have stronger preferences for certain natural communities within this habitat. These natural communities may be less well distributed. In particular, dry oak forests and dry woodland openings are more likely to be found in the

southern half of the Forest than the northern half. Within these oak forests, wild indigo is most likely to be found in the driest or most open woodlands available on the Forest (USDA Forest Service 2003n). Consequently, habitat for wild indigo was considered by botanists reviewing the species to be very restricted on the FLNF (SVE Dicot Panel 2003; see also the BE in Appendix E).

All of the plant and animal species associated with the upland forest habitat have been discussed in other habitat groups, and their preferences have been discussed for those groups. While species associated with upland forest are known to occur in forest, woodland, and openings associated with this group, this habitat may not be preferred. Blunt-lobed grapefern, black cohosh, and large yellow ladyslipper appear to have fewer preferences than the others, and their habitats include both rich mesic hardwoods and upland forests. They do differ from each other, however, in that the grapefern prefers successional hardwood stands while black cohosh prefers mature stands; large yellow ladyslippers can be found in either mature stands with light canopies and open understories, or in early successional stands of mixed shrubs and saplings (USDA Forest Service 2003a, 2003b; Sheviak 2005). While yellow giant hyssop, Canada milk vetch, wild indigo, and Culver's-root are strongly associated with open habitats, they are also found in openings within forests or in open woodland conditions and edges (USDA Forest Service 2003f, 2003g, 2003m). They all appear, however, to be best adapted for open, disturbed, sunny conditions that are best achieved in the other groups mentioned, and Culver's-root has a strong preference for calcareous conditions. All of the plant species in this habitat group appear to tolerate some disturbance. Northern goshawks and wood thrushes also are tolerant of disturbance; both species forage in stands of varying ages from early succession to mature forests.

On the FLNF, timber harvesting, invasive species, and fire are the primary factors that impact upland forest habitat and the species of potential viability concern that use it, and over which the Forest Service can have some control. Timber harvest can alter forest age and canopy conditions, which may affect habitat suitability for some species and/or directly impact species. Timing and location of vegetation management, trail management, and other activities, have the potential to enhance or negatively affect habitat suitability, depending on species-specific needs. Fire was a dominant disturbance factor shaping the oak forests of this group during the 18th century. Its suppression over the past two centuries has led to slow shifts in dominance from oak forests to mesic hardwood forests, and may limit the preferred habitat for some species. Invasive plant species are an additional threat because they compete with native species and can alter ecosystem structure and function.

Road mortality can be a significant factor for salamanders. Ninety-six percent (70.1 miles) of the roads in the FLNF area are State, county, town, or private roads; the Forest Service has jurisdiction over the remaining four percent (3.1 miles: FEIS, Table 3.19-1). Thus, alternatives to the revised Forest Plan represent no change from the current condition. Site-specific analyses for potential future road projects would include analyses of potential effects of the proposed actions on these species and on other resources.

3.8.1.12 Environmental Consequences

Direct and Indirect Effects by Alternative

Indicator 1 – Viability Outcomes

Effects Common to All Alternatives

All alternatives were developed with the premise that risks to species viability will be minimized, and that species of potential viability concern will be protected. Analysis undertaken in the Biological Evaluation (Appendix E) concluded that none of the revised Plan alternatives were likely to result in a trend toward federal listing or loss of viability for RFSS. Some species may never achieve

viability outcomes above D on the FLNF, due to such factors as local distribution of individuals or suitable habitat, life history traits, threats over which the Forest Service has no control (like diseases), or the small size of the Forest relative to the larger size of a viable population. Although there may be high risks to the viability of some upland forest species on the FLNF, the Forest is contributing to overall regional scales of viability by maintaining or enhancing habitat for these species.

Table 3.8-14 displays the short-term effects, in terms of viability outcomes, for species of the upland forest habitat group across alternatives. The future outcomes define what is expected at the end of the next 20 years, which is generally the lifespan of a Forest plan. Long-term effects generally refer to effects at the end of a period of time when either the species or habitat trend has stabilized. Activities on the Forest have the potential to affect individual species of potential viability concern within these habitats. Agency direction and Forest Service policy regarding protection of species of potential viability concern will reduce potential impacts. Factors outside Forest Service control, and seemingly unrelated to habitat management, are increasing the viability risk for some of the species of this group. These include: reproductive isolation affecting wild indigo, broad beech fern, black-fruit mountain-ricegrass, and Culver's-root; insects and reproductive isolation affecting large yellow ladyslipper; and declines affecting yellow giant hyssop and Canada milk vetch. These factors may result in further declines in viability for upland forest species on the FLNF, or may perpetuate individuals or occurrences at viability outcomes below C. Black cohosh and blunt-lobed grapefern are expected to remain in the vicinity of outcome C or better across all alternatives. The grapefern, however, is associated with risks to individuals or populations that could lead to a lower outcome.

For most of the plants and animals of viability concern associated with upland forest habitat, the effects of the revised Forest Plan on viability outcome do not vary by alternative. The effects of the revised Plan and its alternatives on all of the plant species in this group have been discussed in previous habitat groups. Even though this is a different habitat, the effects of management on this habitat are similar enough that the outcomes for these species are the same.

The effects of all alternatives on yellow giant hyssop, Canada milk vetch, wild indigo, and Culver's root are discussed in the Grassland and Shrubland habitat group subsection of this section (3.8.8). While the alternatives vary in the proportion of temporarily open land that might be created during an even-aged timber harvest, grassland and shrubland habitats are far more widespread and offer more opportunities for open habitat in general. As discussed for grasslands and shrublands, outcomes for yellow giant hyssop and Canada milk vetch are primarily driven by the uncertainty regarding the reason for their declines, and so do not vary by alternative. They have what appears to be abundant habitat, yet they continue to show signs of decline.

Wild indigo and Culver's-root appear to be associated with particular habitat conditions; Culver's root is associated with calcareous openings and wild indigo is associated with dry acidic openings in oak woods. Culver's-root is represented on the Forest by one small population that has not been seen for nearly 20 years. Botanists consider these habitats very restricted on the Forest, and so outcomes for these species are at the D level and are expected to remain there. Until botanists can locate Culver's-root again, it will remain unclear which if any of the types of management activities associated with these areas may be more or less beneficial to this plant. In all alternatives, both sites for these species are allocated to MAs where prescribed fire and management to support their viability on the Forest is allowed.

The effects of all alternatives on blunt-lobed grapefern, black cohosh, large yellow ladyslipper, broad beech fern, and black-fruit mountain-ricegrass are discussed in the Rich Mesic Hardwoods habitat group subsection (3.8.2) of this section. The effects of alternatives on upland forest habitat are not

expected to be any different than those discussed for Rich Mesic Hardwoods. Under all alternatives, black cohosh will remain at outcome A/B in the upland forest habitat because it appears to be more widely distributed across a variety of habitat conditions than originally suspected. Botanists consider habitat for black-fruit mountain-ricegrass to be limited on the Forest, and so the outcomes for this species are driven primarily by concerns for its isolation on the Forest, not from management actions (see also the Biological Evaluation (BE: Appendix E)).

While the alternatives do vary in their outcomes for blunt-lobed grapefern and broad beech fern, the environmental impacts associated with the alternatives do not differ between rich mesic hardwoods and upland forest habitat. Broad beech fern tends to prefer the more mature forests in either habitat, and so will be equally affected by timber harvesting and ground-disturbing activities in either habitat. Blunt-lobed grapefern tends to prefer successional hardwood forests of most any type, and so will also be equally affected by timber harvesting in either habitat. The outcomes for broad beech fern are primarily driven by limited preferred calcareous and older habitats, and concerns about isolation of the single population known from the Forest. Outcomes for blunt-lobed grapefern are driven primarily by uncertainties regarding its precise habitat needs on the Forest.

For the northern goshawk, the placement of trails and other activities relative to nest sites represents greater potential impact than differences among alternatives. While there are differences among alternatives in the number of acres available for trails construction, these activities only impact the northern goshawk species when they occur near a nest. Additionally, Forest-wide standards protect goshawk nest sites from disturbance and management activities that could degrade habitat conditions.

The northern goshawk and wood thrush both utilize a range of habitats, from mature forest to shrubby habitat (Rivera et al. 1998, DeGraaf and Yamasaki 2001, Marshall et al. 2003). Each of the alternatives would provide an adequate diversity of forest, shrubland, and open habitats for these birds to nest and forage.

Table 3.8-14: Range-wide and FLNF current and future (20 years) viability outcomes[1] for upland forest species, by alternative, and including rationale for FLNF outcomes.

Species	Range: current-Future	FLNF Current	FLNF Alt. 1	FLNF Alt. 2	FLNF Alt. 3	Rationale
ANIMALS						
Jefferson salamander[3]	C-D	D	**C**	**C+**	**C+**	Not known on FLNF but known within dispersal range; 1 confirmed and 1 "Jefferson-complex" from Schuyler County; more easily impacted by fragmentation and less flexible than blue-spotted salamander; increasing mature, undisturbed forest on FLNF will enhance habitat, esp. under Alternatives 2 and 3.
Blue-spotted salamander[3]	B- to C+,C	D	**C**	**C+**	**C+**	Not known on FLNF but known within distribution range; 1 "Jefferson-complex" reported from Schuyler County; more hardy and more flexible than Jefferson salamander; increasing mature, undisturbed forest on FLNF will enhance habitat, especially under Alternatives 2 and 3.
Longtail salamander[3]	D?, D?	D	D	D	D	Not known to occur on FLNF; the most sensitive of the streamside salamanders
Black rat snake[3]	C-D,C-D	D	**C**	**C**	**C**	Known from both Seneca and Schuyler County; habitat is wooded areas mixed with open areas. Likes rocky areas and old, hollow trees.
Northern goshawk[3]	A-B	C	C	C	C	Abundance limited on the FLNF, one known and other possible nesting pairs; widespread but uncommon breeder in NY; range and numbers may be expanding in NY.
Wood thrush[3]	B, B→C[2]	B	**C→D***	**C→D**	**C→D**	Breeds on FLNF; considered widespread but moderately rare on the FLNF; habitat on FLNF increasing in quality and quantity; widespread and common in NY; greatest threat from winter and breeding habitat loss at range-wide scale.
PLANTS						
Yellow giant hyssop[3]	B/C-C	B/C	**C**	**C**	**C**	Declining for unknown reasons; does not appear habitat limited
Canada milk vetch[3]	B/C-B/C	B/C	B/C	B/C	B/C	Declining for unknown reasons; does not appear habitat limited.
Wild-indigo[3]	B-B-	D	D	D	D	Isolated population; limited suitable habitat.
Blunt-lobed grapefern[3]	C-C	C	C	**C/D**	C	Ephemeral, related to presence of soil mycorrhizae; low proportion of even-aged regeneration harvests in Alt. 2 (10 ac/yr).
Black cohosh[3]	A/B–A/B	A/B	A/B	A/B	A/B	Not of viability concern; FLNF is important to the species' regional distribution due to ability to manage collecting and prevent over-collecting.
Large yellow ladyslipper[3]	B-D	D	D	**D+**	**D+**	Likely isolated population; limited suitable habitat; higher proportion of future old forest in Alt. 2 and more uneven-aged management in Alt. 3.
Broad beech fern[3]	B-D	D	D	**D+**	**D+**	Isolated population; limited suitable habitat; higher proportion of uneven-aged management and future old forest in Alternatives 2 and 3.
Black-fruit mountain-ricegrass[3]	A-A	D	D	D	D	Isolated population; very limited suitable habitat.
Culver's-root[3]	B-B	D	D	D	D	Isolated population; limited suitable habitat.

Source: SVE Project File, Species Literature Reviews and Summaries
Notes:
[1] Viability outcomes are defined in the Affected Environment Introduction of this section.
[2] An arrow (→) indicates a trend; "C→D" means C with a trend towards D.
[3] Viability outcomes for species that occur in multiple habitat groups are identical across their groups, and were developed considering all positive, neutral, and negative effects across the habitats in which they occur.
* Outcomes in underlined bold text are those that differ from the outcome based on current management.

While the alternatives do vary in their outcomes for blunt-lobed grapefern and broad beech fern, the environmental impacts associated with the alternatives do not differ between rich mesic hardwoods and upland forest habitat. Broad beech fern tends to prefer the more mature forests in either habitat, and so will be equally affected by timber harvesting and ground-disturbing activities in either habitat. Blunt-lobed grapefern tends to prefer successional hardwood forests of most any type, and so will also be equally affected by timber harvesting in either habitat. The outcomes for broad beech fern are primarily driven by limited preferred calcareous and older habitats, and concerns about isolation of the single population known from the Forest. Outcomes for blunt-lobed grapefern are driven primarily by uncertainties regarding its precise habitat needs on the Forest.

For the northern goshawk, the placement of trails and other activities relative to nest sites represents greater potential impact than differences among alternatives. While there are differences among alternatives in the number of acres available for trails construction, these activities only impact the northern goshawk species when they occur near a nest. Additionally, Forest-wide standards protect goshawk nest sites from disturbance and management activities that could degrade habitat conditions.

The northern goshawk and wood thrush both utilize a range of habitats, from mature forest to shrubby habitat (Rivera et al. 1998, DeGraaf and Yamasaki 2001, Marshall et al. 2003). Each of the alternatives would provide an adequate diversity of forest, shrubland, and open habitats for these birds to nest and forage.

Cumulative Effects

The cumulative effects analysis area for upland forest habitat is the ecological subsections that encompass the Forest. As noted for direct and indirect effects, the cumulative effects analysis for the plant species in this habitat group has been discussed in the context of the Grassland and Shrubland habitat group for the species of openings, and the Rich Mesic Hardwoods habitat group for species of forests. These discussions found that cumulative effects across alternatives for these plant species were likely inconsequential due to the small contribution the FLNF land base makes to the viability of these species across their ranges. These discussions also concluded that the revised Plan and any of the alternatives have the potential to provide suitable habitat for many of these species, and can help to contribute to regional and statewide viability.

This is especially true for black cohosh and blunt-lobed grapefern, because the FLNF and the Finger Lakes region are considered important to the New York distribution of these species. As discussed for other habitat groups, the FLNF sits in an ecological region where forests are highly fragmented by agriculture, residential development, and roads. Agriculture and timber harvesting have altered upland forests as they've altered rich mesic hardwood forests, primarily by eliminating habitat, reducing soil productivity, and facilitating invasion by non-native species. Given the diversity of conditions black cohosh appears to tolerate, and the successional hardwood stands that blunt-lobed grapefern appears to prefer, it seems likely that simply managing forests sustainably will help to maintain suitable habitat for these species on the Forest. All alternatives appear to achieve this goal, although Alternatives 1 and 3 will likely be more successful over the long-term for blunt-lobed grapefern.

The cumulative effects on northern goshawks and wood thrushes of implementing any of the three alternatives will be continued preservation of suitable nesting and foraging habitat on the Forest. The northern goshawk and wood thrush inhabit the upland forest, but they take advantage of features in other habitats. Forest-wide standards protect northern goshawk nests from disturbance during the nesting season and from habitat alteration year-round. Factors outside the Forest Service's control include the overall abundance and status of habitat region-wide or range-wide. For example, the likelihood of a northern goshawk nesting on the Forest is greater if they are abundant in the region.

For the wood thrush, there is no apparent difference in cumulative effects among alternatives, but each shows a decline from the current condition on the Forest. Management actions under each alternative should provide ample suitable habitat for this species. The wood thrush population, however, has experienced a general decline in North America from 1966 to 2003, particularly in the northeastern United States (Sauer et al. 2003, NYDEC 2005). The reasons for the decline are largely unknown, but most plausibly related to changes in food abundance in vegetative structure related to succession on the breeding grounds (Holmes and Sherry 1988). Changes in winter habitat also may be factors in the decline (NatureServe 2004). The future outcome of "C with a trend towards D," as indicated in Table 3.8-14, reflects the anticipated continuation of this range-wide population decline. Despite the fact that the FLNF can maintain suitable habitat for the wood thrush under each alternative, the overall influence of the relatively small acreage of the FLNF cannot overcome range-wide population trends (SVE Bird Panel 2003).

3.8.1.13 Landscape Level Habitat and Associated Species

Existing Condition

Habitat Group Description

Some wildlife species use a variety of habitat types across a large landscape. Many of these species are predators that cover square miles of territory on a regular basis in large home ranges. Other landscape level species, like bats, are highly mobile and capable of covering great distances between hibernating, roosting, and foraging habitats. Some species have strong preferences for particular habitats, whereas others exploit locally abundant resources opportunistically.

Table 3.8-15: Species of potential viability concern associated with landscape level habitats on the FLNF.

Animals
Gray wolf
Canada lynx
Eastern cougar
Indiana bat
Eastern small-footed bat
Bald eagle

Key Limiting Factors

The gray wolf, Canada lynx, and eastern cougar are not known to occur on the FLNF (Table 3.8-15). The FLNF, adjacent lands, and the region as a whole likely do not supply cover or denning habitat in parcels sufficiently large to accommodate the home ranges of these species. Availability of appropriate prey may not be sufficient to support populations of these predators, partly due to limited regenerating and young forest habitat. The human population density and current land use patterns adjacent to the FLNF and in central New York State also reduce the suitability of habitat on the Forest for some of these species. Wolves, lynx, and cougars are large predators that can create conflicts with agricultural activities, particularly the raising of livestock. Bald eagles occur on the Forest only as rare visitors or migrants, not as a nesting species. Levels of protection at hibernacula and availability of maternal roosting habitat are potential limiting factors for bats.

The Biological Evaluation (BE: Appendix E) discusses in greater detail the natural history, limiting factors, and potential management effects of the revised Forest Plan on these landscape level habitat species.

3.8.1.14 Environmental Consequences

Direct and Indirect Effects by Alternative

Indicator 1 – Viability Outcomes

Effects Common to All Alternatives

Table 3.8-16 displays the short-term effects, in terms of viability outcomes, for species of the upland forest habitat group across alternatives. The future outcomes define what is expected at the end of the next 20 years, which covers the lifespan of a Forest Plan. Long-term effects generally refer to effects at the end of a period of time when either the species or habitat trend has stabilized. Activities on the Forest have the potential to affect individual species of potential viability concern within these habitats. Agency direction and Forest Service policy regarding protection of species of potential viability concern will reduce potential impacts.

The role that the FLNF plays, however, and the potential impacts that management activities on the Forest might have on landscape-level species, differs between species. By definition, the habitat requirements of landscape-level species extend beyond the Forest. The area of the FLNF is so small in comparison to the area required by gray wolves, Canada lynx, or eastern cougars that it is unlikely that any amount of habitat management on the Forest under any of the alternatives could influence the regional viability of these species. Similarly, it is unlikely that any management activity would make the Forest more or less suitable for bald eagles, either as a stop-over during migration or for nesting. The FLNF can manage the two bat species' summer habitat for roosting and foraging, but hibernacula, a critical habitat component for viability of bat species, do not occur on the Forest.

Analysis of alternatives relative to the viability of landscape-level species focuses on their habitat requirements, life history features, distribution, abundance, population trends, and risk factors. Predicted future viability outcomes consider results for both short-term (15 to 20 years covered by the revised Forest Plan), and long-term (100 years or more). Background information and viability outcomes for each species are documented in literature reviews and summaries prepared for each species as part of the SVE process, which are part of the project file. Additional detail for each of these species is provided in the Biological Evaluation (BE: Appendix E).

The analysis of alternatives contained in the BE concludes that implementation of any of the alternatives for the revised Plan will have no effect on the gray wolf, Canada lynx, or eastern cougar. These species are not known to occur on the Forest. In addition, it is unlikely that habitat conditions on the FLNF, adjacent lands, and the region as a whole are likely to become suitable in the foreseeable future. Similarly, implementation of the revised Forest Plan will have no effect on bald eagles, which are uncommon visitors to the Forest. These outcomes are unaffected by the alternatives for the revised Forest Plan.

Table 3.8-16: Range-wide and FLNF current and future (20 years) viability outcomes[1] for landscape-level species, by alternative, and including rationale for FLNF outcomes.

Species	Range: current-Future	FLNF Current	FLNF Alt. 1	FLNF Alt. 2	FLNF Alt. 3	Rationale
ANIMALS						
Gray wolf	D-C	E_H[3]	E_H	E_H	E_H	Does not occur and no suitable habitat on Forest.
Canada lynx	A-B	E_H	E_H	E_H	E_H	Does not occur and no suitable habitat on Forest.
Eastern cougar	E-E	E_H	E_H	E_H	E_H	Does not occur and no suitable habitat on Forest.
Bald eagle	A-A	A	A	A	A	Not known to nest on FLNF; occurs on Forest as rare visitor or migrant.
Indiana bat	E-E	A_H[4]	A_H	A_H	A_H	Not known to occur on Forest; suitable habitat is available, abundant, and secure on the FLNF; population increasing in Northeast despite continuing decline range-wide.
Eastern small-footed bat[2]	Unk-A?	≥C?	**A_H***	**A_H**	**A_H**	Too little information to predict current outcomes; future outcome based on improving habitat and protection at hibernacula.

Source: SVE Project File, Species Literature Reviews and Summaries
Notes:
[1] Viability outcomes are defined in the Affected Environment Introduction of this section.
[2] Viability outcomes for species that occur in multiple habitat groups are identical across their groups, and were developed considering all positive, neutral, and negative effects across the habitats in which they occur.
[3] E_H refers to the low "viability" of habitat for species that currently do not occur on the Forest or are unlikely to occur in the Forest in the future.
[4] A_H refers to high "viability" or suitability of habitat even though the species is not known to occur on the Forest.
* Outcomes in underlined bold text are those that differ from the outcome based on current management.

Additionally, the analysis of alternatives in the BE concludes that implementation of any of the alternatives for the revised Plan is not likely to adversely affect the Indiana bat, and is unlikely to result in a trend toward federal listing, or loss of viability for the eastern small-footed bat. Activities on the Forest do have the potential to affect habitat or individuals of both bat species, although usually only on small patches scattered across the Forest. Because of the limitations of its size and location relative to the overall population and distribution of these bat species, however, potential habitat on the FLNF is not important to the overall viability of either species. General Agency direction and Forest Service policy regarding protection of species of potential viability concern, and specific guidance on retention of wildlife reserve trees that serve as roost trees for bats, further reduce potential impacts. Rocky areas used by eastern small-footed bats for roosting will be unaffected in all alternatives. Factors outside the Forest Service's control, including protection of winter hibernacula and the availability of summer roosting and foraging habitat on regional and range-wide scales, hold substantially greater potential for affecting viability of Indiana bats and eastern small-footed bats than any management actions undertaken by the FLNF.

Alternative 1

Alternative 1 provides the greatest opportunity to manage forested land to create and maintain habitat for roosting Indiana bats because this alternative includes the greatest allocation of FLNF land to the Oak Hickory Management Area (6,779 acres, 41% of the FLNF). The forest type emphasized in this MA is preferred by Indiana bats. Additionally, Alternative 1 includes the greatest opportunity for timber management in general with 7,169 acres (44%) allocated to the Oak Hickory and Northern Hardwood MAs, and 6,677 acres (41%) of suitable land for timber harvest. Carefully managed timber harvest and vegetation management can improve the quality

of roosting habitat. The significance of this increased management opportunity may be negligible, however, as the FLNF already provides suitable habitat that is not fully exploited by Indiana bats.

The likelihood for incidental take of Indiana bats on the FLNF is directly proportional to the amount of tree-cutting activity, but it is extremely low under all three alternatives. This is because if Indiana bats occur on the FLNF, they do so in extremely low numbers; the overall availability of suitable roosting or foraging habitat on the Forest and in the Central New York region is high; the percent of National Forest System lands affected by tree removal in a given year is low; many tree-removal activities occur during the winter when Indiana bats are hibernating; and management direction provides for the protection and retention of potential roost trees and snags.

Section 3.7 (Threatened and Endangered Species) and the Biological Evaluation (Appendix E) discuss in greater detail the potential effects of the revised Forest Plan on Indiana and eastern small-footed bats.

Alternative 2

Alternative 2 provides the most limited opportunity to manage forested land to create and maintain habitat for roosting bats with the lowest allocation of FLNF land to the Oak Hickory Management Area (1,127 acres, 7%) and the least suitable land for timber harvest (3,846 acres, 23%). The significance of this reduced management opportunity may be negligible, as the Forest already provides suitable habitat that is not fully exploited by Indiana and eastern small-footed bats.

Alternative 3

Opportunities for forest management in Alternative 3 are intermediate to those in Alternatives 1 and 2, with 4,036 acres (25%) allocated to the Oak Hickory MA and 5,700 acres (35%) in suitable land for timber harvest. As noted above, the significance of these management opportunities may be negligible however, as the FLNF already provides suitable habitat that is not fully exploited by Indiana and eastern small-footed bats.

Cumulative Effects

The analysis area for species that use large landscapes is the two ecological sections that encompass the FLNF: the Erie and Ontario Lake Plain and the Northern Glaciated Allegheny Plateau. These ecological sections are large enough to encompass whole populations of these species; subsections may not be large enough.

The cumulative effects of implementing the revised Forest Plan under any of the three alternatives would be continued preservation, maintenance, and enhancement of suitable summer roosting and foraging habitat for the bat species. There would be no long-term change in status and therefore no cumulative effects on gray wolf, Canada lynx, eastern cougar, and bald eagle under any alternative (see also the Biological Evaluation (BE: Appendix E)).

3.9 RECREATION OPPORTUNITIES AND FOREST SETTINGS

Issue Statement

Public concern is focused on differing opinions about the appropriate mix of recreational opportunities and forest settings that should be emphasized on the Finger Lakes National Forest (FLNF). Recreation opportunities can be described along a continuum of settings ranging from highly developed, with dense concentrations of visitors and alterations to the landscape, to more primitive settings where natural forces dominate and the evidence of people are hardly noticeable. Some people prefer to recreate in developed settings where services such as constructed camping pads, potable water, and toilet facilities are available while others prefer a more primitive setting where services and facilities are reduced or non-existent.

Trails on the FLNF provide a wide range of settings and opportunities. Some people would prefer to utilize the trail system with motorized vehicles such as snowmobiles while others prefer non-motorized travel such as bicyling, horseback riding, or hiking. These uses of the Forest can compete against one another because one type of recreation activity does not always complement the setting for another type of activity. Unauthorized trail development and use also occur. Trail system planning is needed to identify the right mix of trails and trail types in order to meet the needs of Forest users.

In addition, there is a concern that certain resource management actions, such as timber, grazing, and recreation management, can have impacts on each other as well as impacts to other resources such as wildlife and plants. The following section analyzes the effects of multiple-use management, including recreation opportunities and timber management, on the Forest. Effects of recreation management on other resources can be found in their respective section of Chapter 3 in this document.

Indicator 1 – Desired Recreation Opportunity Spectrum Classes by Management Area

The Forest Service uses a nationally recognized classification system called the Recreation Opportunity Spectrum (ROS) to help describe different recreation settings, opportunities, and experiences, and to guide management activities (USDA Forest Service 1986). The amount and location of each ROS class provides an effective way to compare the forest settings and recreation opportunities emphasized in each alternative. Nationally, recreation settings vary from primitive, where there is little evidence of other people, more difficult access, and more opportunities for self-reliance, to more developed rural areas that offer more facilities, improved access, and opportunities to interact with other recreationists. Table 3.9-1 describes the characterizations of each ROS class on the FLNF.

ROS is referred to in two different ways. The first is as an inventory tool to describe the existing array of recreation settings. This application describes the existing condition of the Forest and is referred to as the “Inventoried ROS Class.” The second way ROS is used is to set management direction, referred to as the “Desired ROS Class.” Each management area is assigned a Desired ROS class

This indicator highlights the differences among alternatives because each alternative has different management area allocations and associated Desired ROS Classes to guide recreation management.

Indicator 2 – Number of Acres Available for Future Trail Development by Trail Activity

The Forest Service provides trails as a recreation opportunity for the public. A trail is a linear feature constructed for the purpose of allowing the free movement of people, stock or snowmobiles. There are many types of trail activities that the Forest Service manages, including, but not limited to, hiking, horseback riding, bicycling, cross-country skiing, and snowmobiling. Trails are constructed to standards according to their designed use. The designed use of a trail is the use that requires the highest level of development. Many trails provide for more than one type of trail use.

Currently the FLNF has an established trail system that provides for hiking, horseback riding, cross-country skiing, snowmobiling, and bicycling; summer off-highway vehicles (OHVs) are prohibited. Under the revised Forest Plan bicycles, saddle, pack and draft animals shall be allowed only on National Forest System trails that are designated for that use. The revised Forest Plan also sets management area standards and guidelines that will restrict certain types of trail uses, therefore limiting the number of acres available for future trail development by use type. Comparing the acres of land available for future trail development by use type will provide an effective way of comparing trail opportunity emphases among alternatives.

Indicator 3 – Acres of Land Available for Future Developed Recreation Facilities

The Forest Service constructs and maintains developed recreation facilities such as campgrounds, picnic areas, and trailheads. Each developed recreation facility is designed for a capacity that is measured in terms of the maximum number of “people at one time” (PAOT) that can be served at any given site. Each developed recreation facility is measured with a PAOT capacity that provides specific opportunities in a developed setting depending on the site.

The Forest Plan does not propose any new specific developed recreation facilities, but does allow for future development based on demand. Some management areas are open to future recreation facility development while others limit or prohibit development. Identifying the acres of land available for future developed recreation facilities is an effective way of comparing future opportunity emphases among alternatives.

Indicator 4 – Acres of Land Available for Future Recreation Special Use Activities

The Forest Service, in partnership with private and commercial groups, provides assistance to visitors seeking quality recreation experience on public lands. Partnerships between the Forest Service and private and commercial groups are formalized through Recreation Special Use Permits. Recreation activities under special use permits provide a small fraction of total visitor days experienced on the National Forest, but are an important segment to the visitor, the Forest Service, the resources, and the economy of surrounding communities. Recreation Special Use Permits formalize a partnership to assure that the public has reasonable access to National Forest opportunities, that the use resulting from them is of the highest quality, that the resources are protected, and that the public learn the unique attributes of the environment.

Forest Plan management area (MA) descriptions provide guidance on where recreation use permits are appropriate across the FLNF. Some MAs are open to future recreation special uses while others limit or prohibit the activity. Identifying the acres of land available for future recreation special use activities is an effective way of comparing future opportunity emphases among alternatives.

Indicator 5 – Acres of Land Available for Future Timber Harvest and Grazing Activities

The Forest Service manages land in accordance with the National Forest Management Act (NFMA) and the Multiple Use and Sustained Yield Act of 1960 (MUSYA). Multiple-use land management activities are primarily designed to complement each other, but in some cases demand for resources compete resulting in desirable and undesirable effects. Recreation management, timber, and grazing are resource areas that coexist with the multiple-use ethic. The revised Forest Plan MA descriptions provide guidance on what resource areas are emphasized across the FLNF. This indicator will identify management areas and acreage where timber harvesting and grazing management can occur and highlight the potential effects to recreation resources.

Table 3.9-1: Description of Recreation Opportunity Spectrum (ROS) classes on the Finger Lakes National Forest.

ROS Element	Rural (R)	Roaded Natural (RN)	Semi-primitive Motorized (SPM)	Semi-primitive Non-motorized (SPNM)
Access	All methods of access and travel may occur, but subject to formal regulations.	All methods of access and travel may occur, when compatible with intended activities; zones of motorized use.	Travel on trails designed for or open to snowmobiles.	Trails are closed to motorized use.
Remoteness	Remoteness from sites and sounds of human activity not available or important.	Remoteness from continuous sounds of human activity is of moderate importance.	Nearby sights and sounds of human activity are relatively rare. Distant sounds may be heard.	Nearby sounds of human activity are relatively rare. Distant sounds may be heard.
Visitor Management	On-site regimentation and control is obvious.	On-site regimentation and controls are few.	On-site regimentation and controls are few.	On-site regimentation and controls are rare.
On-Site Recreation Development	Recreation structures and facilities readily evident, but appropriate for setting; designed for high use levels. Information and interpretive facilities may be large and complex.	Recreation structures and facilities may be present, but are provided primarily for protection of the resource rather than user convenience. Facilities are rustic and harmonize with a backcountry setting.	Recreation structures and facilities may be present, provided primarily for site protection rather than user convenience. Facilities are rustic and harmonize with the natural setting.	Recreation structures and facilities may be present but provided primarily for site protection rather than user convenience. Facilities are rustic and harmonize with the natural setting.
Social Encounters	Moderate to high concentrations of people at one time.	Moderate concentrations of users on roads; moderate to low evidence or interactions with others on trails and at facilities.	Low interaction between users. Campsites seldom within sight or sound of another group except during peak periods.	Low interaction between users. Campsites seldom within sight or sound of another group except during peak periods.
Visitor Impacts	Very noticeable but managed to prevent physical resource degradation.	Use noticeable but not degrading to resources.	Use noticeable but not degrading to resources or backcountry setting.	Human use noticeable but not degrading to resources.

Source: Based on the USDA 1986 ROS Book.
Notes: These descriptions are desired future condition setting indicators and not management area standards and guidelines.

Analysis Area

The analysis area for direct and indirect effects includes all federal land managed by the FLNF. This area represents National Forest System lands where recreation resources exist, and lands where management activities could impact those resources. The analysis area for cumulative effects includes all FLNF lands and the lands administered by other owners, both public and private, which provide recreation opportunities within and near the FLNF.

3.9.1 Affected Environment

Introduction

The FLNF is a popular recreation destination in the Finger Lakes Region of central New York. Historically the role of the National Forest has been to provide high-quality scenery and opportunities for dispersed recreation such as hiking, horseback riding, hunting, fishing, and camping in undeveloped settings. More recently the Forest Service has developed a recreation niche statement that includes the following (USDA Forest Service 2004e):

- Provide high quality scenery along with opportunities for viewing to support tourism
- Provide diverse and high quality trail-based recreation in undeveloped natural settings for all seasons
- Provide large contiguous public land areas for dispersed recreation opportunities
- Provide low intensity development for water based recreation

Within the Finger Lakes region opportunities for outdoor recreation are not limited to National Forest System lands. The FLNF provides 16,439 acres of public land. On other public lands, such as national parks, State parks, and national wildlife refuges, non-governmental organization lands, and private tourism lands serve to connect and expand the range of recreation opportunities within the region.

Recreation and tourism within New York State are important to the State, regional, and local economies. In the Finger Lakes region, tourism is recognized as an economically important industry. The Finger Lakes region offers visitors a chance to connect with rural America, with its unique small towns and patchwork of agriculture and forests framed by the large lakes. Many people visit the Finger Lakes region for tasting wines produced from locally grown vintners. The region's State parks feature gorges and waterfalls created from centuries of water cutting through ancient sea beds. The region is also host to many large and small museums, shopping, and the Watkins Glen International Race Track. The FLNF plays a unique role in complementing the private tourism sector by providing predominantly natural settings and nature-based recreation opportunities.

Existing Forest Plan Management Direction

A recreation goal of the 1987 Forest Plan is to "provide types of recreation that require a large, relatively undeveloped land area that includes providing 'room to roam' opportunities for relative solitude and freedom from restrictions." This goal was accomplished by objectives relating to facilities and trails maintenance as well as blueberry management and fish stocking.

There are four management areas (MAs) emphasizing recreation opportunities: Interloken Trail (8.1A), Finger Lakes Trail (8.1B), Ravine Trail (8.1C), and Caywood Point (8.1E). Recreation opportunities are also addressed in other MAs as part of multiple-use management.

The 1987 Plan used a ROS inventory mapping criteria that differed from the national criteria. The Plan provides very general direction for managing recreation opportunities and settings using the ROS classification system.

Forest wide standards and guidelines address management of trails for hiking, skiing,

snowmobiling, and horseback riding. Loop trails are encouraged over linear trails. User groups are encouraged to participate in trail maintenance through cooperative agreements. Horseback riding is allowed on all FLNF lands except on trails where prohibited. Summer off-highway vehicles are not allowed on the FLNF. Mountain bikes were not mentioned in the 1987 Plan, however Forest Plan Amendment (No. 3, dated March 2002) has opened up two trail sections for this use.

Proposed Changes in Management Direction Common to All Alternatives

The revised Forest Plan provides a single goal for recreation that states: "Provide a diverse range of high quality, sustainable recreation opportunities that complement those provided off National Forest System lands." The objectives focus on reducing recreation facility deferred maintenance and operating to quality standards, promoting partnerships for efficient management and enhanced public services, and completing site specific management plans for a high quality, sustainable recreation program.

In the revised Forest Plan there are two management areas (MAs) that specifically emphasize recreation opportunities: Recreation and Education Special Area and North Country Scenic Trail Special Area. The Recreation and Education Special Area includes Caywood Point and the North Country Scenic Trail Special Area includes a corridor surrounding the trail. The Interloken Trail and Ravine Trail will not be individual MAs and will be managed under the Forest-wide standards and guidelines.

Management area descriptions identify management toward desired Recreation Opportunity Spectrum classes. Since the 1987 Forest Plan, the Forest Service has adopted the national ROS inventory criteria.

Future trail development, developed recreation facilities, and recreation special uses are limited or prohibited in some management areas to complement desired future conditions.

The revised Forest Plan uses the ROS system to a greater degree by assigning a desired ROS class to each management area's desired future condition. Management areas (MAs) were assigned ROS classes based on the theme of their management area description. Quantities of desired ROS classes for each alternative are summarized in Table 3.9-9.

Horseback riding and bicycle use will only be allowed on designated trails and pastures. Summer off-highway vehicles will continue to be prohibited across the Forest with no opportunities for future summer OHV trail development.

As part of the revised Forest Plan, a trails assessment was completed on a proposal presented by the public for the FLNF (USDA Forest Service 2004c). The assessment analyzed current and future trail opportunities and provided a final risk/benefit index rating based on pre-determined criteria. The assessment identified three of the proposed trails that will be carried forward through the site-specific planning process, including the Burnt Hill Alternative (3.3 miles), Horse Camp Connector (0.25 miles) and Pearsall Loop Trail (5.6 miles). All three trails are proposed for multiple-uses and will be more accurately located on the ground following site-specific analysis. All new trail developments should fulfill a demonstrated need for additional capacity to the existing trail system.

Existing Condition

For planning purposes, recreation supply is defined as the opportunity to participate in a desired recreation activity in a preferred setting. Three components of supply are settings, activities and facilities. Recreationists choose a setting and activity to create desired experiences. The FLNF manages a variety of settings and facilities.

Recreation Opportunity Spectrum Inventory

The ROS is a planning tool used to identify and evaluate the supply of recreation settings on national forests based on actual on-the-ground conditions (Table 3.9-1). The ROS inventory system helps characterize the existing condition of the Forest's recreation resource. The FLNF ROS inventory indicates that current conditions can provide limited opportunities, settings, and experiences.

Two ROS classes are currently inventoried on the FLNF, as shown in Table 3.9-2. These settings include Roaded Natural and Rural.

Approximately 45 percent of the Forest is inventoried in the Roaded Natural ROS class. Within these areas developed recreation opportunities such as campgrounds, picnic areas and other facilities are common.

The remaining 55 percent of the Forest is inventoried in the Rural ROS class. Within rural areas the environment may be considerably altered and private homes and communities may be present. Sights and sounds of people are common and visitor interactions are moderate to high.

Table 3.9-2: Inventoried Recreation Opportunity Spectrum (ROS) classes for the FLNF.

ROS Class	Acres	Percent
Rural (R)	9,103	55%
Roaded Natural (RN)	7,336	45%

Source: FLNF GIS Data (layer: fl_ros)

Developed Recreation

Recreation facilities are developed within different outdoor settings to facilitate desired recreational use. Developed recreation is the term used to describe areas with facilities such as campgrounds, picnic areas, trail shelters, and interpretive sites.

Developed recreation facilities provide varying levels of user comfort and convenience based on the desired (not inventoried) ROS setting. For instance, the trail shelter along the North Country Trail corridor is managed to meet Semi-primitive Non-motorized standards consistent with the Desired ROS of the management area. This means the shelter is constructed with local materials, rustic in nature to blend in with the surrounding environment, and provides a limited capacity for low visitor interactions.

In contrast, Blueberry Patch Campground is located within an area managed to meet the Desired ROS objectives of Roaded Natural. Blueberry Patch developed recreation site contains constructed features such as hardened camping pads, trash removal and vault toilets to accommodate a large number of people.

Table 3.9-3: FLNF developed recreation facility capacities.

Facility Type	Number of Areas	Total Capacity (PAOT)
Campgrounds	3	175
Trail Shelters	1	6
Fishing Sites	2	39

Source: FLNF INFRA Data
Definition:
[1] PAOT: the capacity of developed recreation facilities in terms of "people at one time" a site can support

Currently, there are six developed sites managed by the FLNF to accommodate an array of recreation activities. The Forest Service defines the capacity of developed recreation facilities in terms of "people at one time" a site can support (PAOTs). Table 3.9-3 lists the facility types provided across the Forest and their current capacity in PAOTs.

Dispersed Recreation

Dispersed recreation is defined as those activities such as fishing, hunting, and trail activities such as hiking, snowmobiling, cross-country skiing, bicycling, and horseback riding that occur outside of developed recreation sites. There are also many dispersed recreation uses, such as roadside camping and picnicking, outside of locally popular developed recreation areas. Trailheads and parking areas facilitate dispersed use of the Forest.

Large lakes, streams, and ponds are natural attractors for Forest visitors. They provide popular dispersed recreation opportunities for fishing, canoeing, wildlife viewing, swimming, and relaxing.

The FLNF trail system is managed for multiple-uses. Multiple-use trails provide for various trail users to utilize the same sections of trail. For instance, many of the snowmobile trails on the Forest also provide for cross-country skiing and hiking. Some trails, such as the North Country Trail, provide only for single uses to preserve a Semi-primitive Non-motorized recreation experience. The total FLNF trail system is approximately 38 miles. Table 3.9-4 displays the distances of miles of trail opportunities provided on the Forest by use type.

Approximately 38 miles of summer non-motorized and 15 miles of winter non-motorized trails, including the North Country National Scenic Trail (NCT), traverse the FLNF. About 3.5 miles of the NCT are located on the FLNF. In addition to the NCT, many FLNF trails provide a multitude of day and limited overnight hiking opportunities (Table 3.9-4).

There are approximately 14 miles of designated snowmobile trails within the FLNF (Table 3.9-4). Snowmobile trail opportunities vary from year-to-year depending on snow conditions.

Table 3.9-4: FLNF miles of trails by managed use.

Trail Managed Use	Miles
Hike	38
Horseback riding	17
Cross-country ski	15
Snowmobile	14
Bicycling	16

Source: FLNF INFRA Data
Notes: Total trail system is 38 miles. Some trails allow for multiple uses along single sections of trail.

Additionally, there is a network of non-system "user created" trails on the FLNF. Non-system trails are referred to as "unauthorized" trails. Unauthorized trails are trails on National Forest System lands that are not managed as part of the transportation system, for example, informal routes and paths, abandoned travel ways, off-road vehicle tracks, or paths constructed by visitors that have not been designated. Many of these routes are old roads and skid trails that no longer serve the purpose for which they were intended and that were never properly restored to natural conditions. These routes have not been analyzed or determined to be necessary for the forest transportation system. The occurrence of unauthorized trails on the Forest create user conflicts that may include getting lost or confused when encountering routes not marked or mapped, or resource conflicts when an activity occurs in an area that is incompatible with resource values. A decision to designate or eliminate an unauthorized trail is determined through site-specific analysis and will not be made in the Forest Plan. The revised Forest Plan will limit bicycles, saddle, pack and draft animals to National Forest System trails that are designated for that use. Management area allocations will determine the acreage available for trail use and use type.

Recreation Special Uses

Recreation special uses provide the public a service that the Forest Service typically cannot provide. The recreating public continues to ask for a diversity of experiences, settings and opportunities on National Forest System lands. This diversity is better provided by private groups. Currently, recreation special uses on the FLNF typically consist of special event permits for competitive horse rides and snowshoe and running races. No outfitter and guide permits are currently in effect.

Recreation Demand

Recreation demand is defined by the complex relationship between people's desires and preferences, availability of time, availability of facilities, and price. The evaluation of current and future demand for recreation on the FLNF is based on recent surveys that identify and quantify:

- Estimated number of current recreation visits to the FLNF
- Participation rates for recreation activities within the State of New York and Finger Lakes Region
- Future activity demand based on projected population growth

A recent National Visitor Use Monitoring (NVUM) study by the Forest Service provides baselines for estimating current recreation on the FLNF (Table 3.9-5). These numbers only account for people visiting developed or dispersed sites for the purpose of engaging in a recreation activity. They do not include the thousands of people who simply drive through the FLNF.

Table 3.9-5: Baselines for recreation site use on the Finger Lakes National Forest.

Type of Recreation Site	Current Percentage of Total Estimated Forest Recreation Visits
Day-Use Developed Sites	30%
Overnight Use Developed Sites	3%
General Forest Areas (Dispersed Sites)	68%

Source: USDA Forest Service 2001e
Notes: Statistics interpolated from Green Mountain and Finger Lakes National Visitor Use Monitoring Study (2001).

Based on the NVUM data, developed recreation areas (day-use and overnight) accommodate approximately 33 percent of the Forest's estimated recreation visits. The remaining 68 percent of recreation visits can be defined as "dispersed recreation" that occurs away from developed sites in general forest areas.

Current and future recreation demand is addressed in the New York State "Final Statewide Comprehensive Outdoor Recreation Plan" (2003). This report provides recreation participation rates within New York and estimates future trends and growth through 2020 (Table 3.9-6). According to the report, visiting historic sites and hiking are the most popular activities concerning the FLNF. Within the State, visiting historic sites is projected to receive the most growth (6.38%) through 2020.

Table 3.9-6: Number of people participating in recreation activities in New York State and projected increase through 2020.

Activity	1998 Partici-pation (millions)	1998 % of Popula-tion	Projected Increase Through 2020
Visiting Historic Sites	3.68	24.83%	6.38%
Hiking	3.15	21.25%	4.87%
Camping	1.92	12.92%	5.24%
Hunting	1.87	12.64%	5.92%
Horseback Riding	1.36	9.10%	4.83%
Cross-Country Skiing	.78	5.26%	5.42%
Snowmobiling	.76	5.12%	4.20%

Source: Final Statewide Comprehensive Outdoor Recreation Plan (2003)

New York State's report also analyzed recreation supply and demand by county and activity. Table 3.9-7 shows a "relative index of need" that indicates the degree to which additional facilities are needed to meet future demand. The 10-point scale provides an index where one indicates an ample supply of recreation resources relative to demand and ten indicates the opposite that most sites are heavily used (Table 3.9-7). All of the index ratings for Seneca and Schuyler counties are in the range of four to five indicating that there is an equal supply and demand of recreation facilities.

Demographic information also reveals trends affecting recreation demand. As a large segment of the American population ages, demand is growing for less physically challenging activities, such as wildlife viewing and photography and

driving for pleasure. The desire for easier access to facilities and forest settings is increasing as the physical abilities of the aging population decrease.

Table 3.9-7: Relative index of need for recreation-related facility types in Seneca and Schuyler Counties.

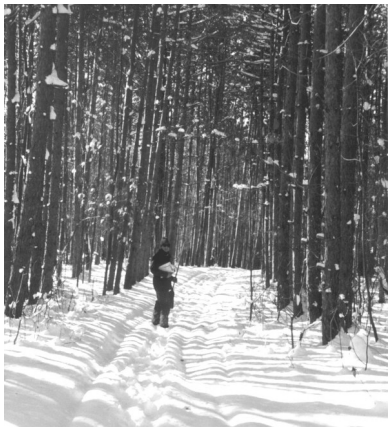
County	Camping	Hiking	Cross-country Skiing	Snow-mobiling
Schuyler	5	4	4	5
Seneca	5	5	5	4

Source: New York State Comprehensive Outdoor Recreation Plan (2003)
Notes: Ratings on a 10-point scale where one indicates a large availability of recreation resources relative to demand and ten indicates most sites are heavily used.

Timber and Grazing Impacts

Recreation resources and timber and grazing resources co-exist on the FLNF. There are many instances where recreation trails run through pastures with active grazing. There are also instances where timber sales have been designed to operate concurrently with trail operations. Site-specific mitigation measures to reduce competing resource impacts of recreation, timber and grazing are analyzed and proposed during project planning.

For more information see the Timber Management and Range Management sections (3.11 and 3.12) of this Chapter.



3.9.2 Environmental Consequences

Direct and Indirect Effects by Alternative

Indicator 1 – Desired Recreation Opportunity Spectrum (ROS) Classes by Management Area

Desired ROS classes emphasizing different recreation settings were identified for each management area (Table 3.9-8). As shown in Table 3.9-9, each alternative provides for varying quantities of desired ROS classes across the Forest.

Table 3.9-8: Management area desired Recreation Opportunity Spectrum (ROS) classes.

Management Area	Desired ROS Class
Grassland for Wildlife Grassland for Grazing Recreation & Education Special Area	Rural
Shrubland Northern Hardwood Oak Hickory	Roaded Natural
Future Old Forest	Semi-primitive Motorized
Ecological Special Area North Country Scenic Trail Special Area Research Natural Area	Semi-primitive Non-motorized

Source: Revised FLNF Forest Plan (2006)

Table 3.9-9: Estimated distribution of desired Recreation Opportunity Spectrum (ROS) classes by alternative.

Desired ROS	Alt. 1	Alt. 2	Alt. 3
	acres (%)	Acres (%)	Acres (%)
Rural (R)	6,566 (40%)	6,156 (37%)	6,156 (37%)
Roaded Natural (RN)	9,276 (56%)	5,442 (33%)	7,646 (47%)
Semi-primitive Motorized (SPM)	0 (0%)	3,821 (23%)	1,398 (9%)
Semi-primitive Non-motorized (SPNM)	597 (4%)	1,020 (6%)	1,239 (8%)

Source: FLNF GIS Alternatives Layers

Effects Common to All Alternatives

In all alternatives, management activities would move the Forest towards desired ROS classes. Management activities may meet a less developed, but are not permitted to meet a more developed, ROS class than the Desired ROS class for the management area. Existing facilities, access, services, and use levels, which do not meet the desired ROS class, will be permitted until they can be managed to meet the desired future condition.

Even though all management areas have desired ROS classes, recreation may not be the primary emphasis. For instance, Candidate Research Natural Areas have a desired ROS class of Semi-primitive Non-motorized. Recreation would be subordinate and not be emphasized, as stated in the desired future condition and standards and guidelines.

The desired ROS class would provide direction for recreation opportunities and settings that may be managed or proposed within the management area.

Alternative 1

Alternative 1 provides for most of the Forest to be managed toward the Rural (40%) and Roaded Natural (56%) Desired ROS classes. There will be no Semi-primitive Motorized class emphasized and Semi-primitive Non-motorized will account for four percent of the forest (Table 3.9-9).

Recreation management toward Rural and Roaded Natural settings will emphasize a balance of recreation settings in the built and natural environment. In the desired Rural ROS class the enhancement of developed recreation sites for high concentrations of visitors in a natural setting will be emphasized. The desired Roaded Natural ROS class will provide for recreation developments primarily for the protection of resources and not for user comfort. Table 3.9-1 displays the management emphases for each desired ROS class. In Alternative 1, desired ROS classes are the most similar to on-the-ground conditions (inventoried ROS classes, Table 3.9-2).

Alternative 2

Alternative 2 provides for more of the Forest to be managed toward the Semi-primitive Motorized (23%) and Semi-primitive Non-motorized (6%) Desired ROS classes than Alternative 1. Rural (37%) and Roaded Natural (33%) Desired ROS classes will continue to make up the majority of the Forest recreation direction, but less than in Alternative 1 (Table 3.9-9).

Managing recreation opportunities in the Semi-primitive Motorized and Semi-primitive Non-motorized Desired ROS classes reduces developed recreation opportunities. Future recreation management will emphasize resource protection as opposed to the comfort of Forest visitors. Table 3.9-1 displays the management emphases by ROS class. Alternative 2 has the least acres in Roaded Natural ROS classes and the most acres in the Semi-primitive Motorized ROS class of the alternatives. This alternative, compared the others, provides more opportunities to experience remoteness and closeness to nature with semi-primitive character.

Alternative 3

Alternative 3 is similar to Alternative 1 because most of the Forest would be managed in the Rural (37%) and Roaded Natural (47%) Desired ROS classes. Alternative 3 places more emphasis, however, on Semi-primitive Motorized than Alternative 1 and less than Alternative 2. Semi-primitive Non-motorized ROS classes will be emphasized greatest in this alternative.

In Alternative 3 the public would have a variety of recreation opportunities with a majority in the Rural and Roaded Natural ROS classes, which emphasize improved access and developed recreation opportunities such as campgrounds and picnic areas. Compared to Alternative 1 there would be more opportunity to experience remoteness and closeness to nature with semi-primitive character.

Indicator 2 – Number of Acres Available for Future Trail Development by Trail Activity

Effects Common to All Alternatives

Under all alternatives, the majority of FLNF lands (69 percent or more) remain open for future trail development. The revised Forest Plan provides management area descriptions that allow and prohibit certain types of future trail uses including hiking, cross-country skiing, horseback riding, bicycling, and snowmobiling. In management areas with desired ROS classes that are incompatible with existing trail uses, those uses will generally be permitted until they can be managed to meet the desired future condition. A summary of acres of land available for future trail development by use type and alternative is provided in Table 3.9-10.

Opportunities for future hiking and cross-country ski trails are essentially the same (+/- 1%) in all alternatives. Approximately 97 percent of the Forest will remain open to future hiking and cross-country ski trail development.

Table 3.9-10: Acres (percent) of FLNF available for future trail development by use type and alternative.

Use Type	Alt. 1	Alt. 2	Alt. 3
	acres (%)	acres (%)	acres (%)
Hiking & Cross-Country Skiing[1]	15,878 (97%)	15,895 (97%)	15,895 (97%)
Horse[1]	15,878 (97%)	15,731 (96%)	15,731 (96%)
Bicycling[1]	15,878 (97%)	15,731 (96%)	15,731 (96%)
Snowmobiling[2]	15,624 (95%)	11,380 (69%)	13,584 (83%)

Source: Revised FLNF Forest Plan (2006) and FLNF GIS Alternatives Layers
Notes:
[1] Management areas that allow future trail development for hiking and cross-country skiing, horse use, and bicycling include: Grassland for Grazing, Grassland for Wildlife, Shrubland, Northern Hardwood, Oak Hickory, Recreation & Education Special Areas, Ecological Special Areas, and Future Old Forest. Future horse and bicycling trail development is prohibited in the North Country Trail Management Area. All future trail development is prohibited in Existing and Candidate Research Natural Areas
[2] Management areas that allow future trail development for snowmobiling include: Grassland for Grazing, Grassland for Wildlife, Shrubland, Northern Hardwood, and Oak Hickory.

Opportunities for future horseback riding trails are also essentially the same for all alternatives. Approximately 96 to 97 percent of the Forest will remain open to future horseback riding trail development.

Future bicycle trail development will be allowed on 96 to 97 percent of the FLNF.

In all alternatives, there will be a diversity of opportunities for future trail uses on the FLNF. All future trail developments will be contingent upon management area direction, demonstrated demand, and site specific analyses.

Future acres of land available for development of snowmobile trails will vary among alternatives.

Alternative 1

Alternative 1 provides for the most (95%) of the Forest to remain open for future snowmobile trail development.

Alternative 2

Alternative 2 provides for the least (69%) of the Forest to remain open for future snowmobile trail development.

Alternative 3

Alternative 3 is intermediate and provides for 83 percent of the Forest to remain open for future snowmobile trail development.

Indicator 3 – Acres of Land Available for Future Developed Recreation Facilities

Effects Common to All Alternatives

The revised Forest Plan does not analyze any specific proposals for new developed recreation facilities. New developed recreation facilities would be considered based on demonstrated visitor demand, and would be subject to site-specific NEPA analysis. Trends in visitor demand have the potential to add or reduce developed recreation facility capacity or alter existing facilities to accommodate changing social demands.

Management area (MA) descriptions provide direction on where future developed recreation facilities may be constructed. Some MAs do not have any restrictions, while others limit or prohibit new construction based on the desired future condition, standards, and guidelines.

Table 3.9-11 displays the difference between acres of land available for future developed recreation facilities by alternative.

Future developed recreation facilities are prohibited in the Existing and Candidate Research Natural Area MA. This MA accounts for three percent of the FLNF in all alternatives.

Table 3.9-11: Acres (percent) of the FLNF available for future developed recreation facilities by constraint level.

Constraint Level	Alt. 1	Alt. 2	Alt. 3
	acres (%)	acres (%)	acres (%)
Open[1]	15,842 (96%)	11,598 (71%)	13,802 (84%)
Limited[2]	36 (0%)	4,297 (26%)	2,093 (13%)
Prohibited[3]	561 (3%)	544 (3%)	544 (3%)

Source: Revised FLNF Forest Plan (2006) and FLNF GIS Alternatives Layers
Notes:
[1] **Open** – No management area restrictions for future development of recreation facilities; MAs considered "open" include the Grassland for Grazing, Grassland for Wildlife, Shrubland, Northern Hardwood, Oak Hickory, and Recreation & Education Special Area MAs.
[2] **Limited** – Management area prescription limits future development of recreation facilities. MAs considered "limited" include: Future Old Forest, Ecological Special Area, and North Country National Scenic Trail Special Area MAs.
[3] **Prohibited** – Management area prescription prohibits future development of developed recreation facilities. Existing and Candidate Research Natural Areas MA is the only MA future developed recreation facilities are "prohibited".

Alternative 1

Alternative 1 allows 96 percent of the Forest to remain open to future developed recreation facilities while three percent is closed to future developed recreation facilities (Table 3.9-11).

This alternative provides the highest potential to add PAOT capacities (maximum number of people that that can be served at one time) to the developed recreation infrastructure.

Alternative 2

Alternative 2 limits future developed recreation facilities on about one-fourth (26%) of the Forest and leaves 71 percent of the Forest open for future developed recreation facilities. The ability to add PAOT capacity is reduced in Alternative 2 compared to Alternatives 1 and 3.

Alternative 3

Alternative 3 provides that 84 percent of the Forest will remain open to future developed recreation facilities while 13 percent of the Forest will be limited. This alternative provides for more future developed recreation facility PAOT capacity than Alternative 2, but less than Alternative 1.

Indicator 4 – Acres of Land Available for Future Recreation Special Uses

Effects Common to All Alternatives

Management Area (MA) descriptions provide direction for where recreation special uses are compatible with resources across the forest. Some MAs have no restrictions on future recreation special use activities while others limit or prohibit associated activities. All recreation special uses must comply with Forest Service policies and laws not discussed in the Forest Plan.

Even though recreation special uses are not in high demand on the FLNF, the revised Forest Plan provides direction on where future recreation uses are appropriate with desired future conditions. Existing recreation special use permits will not be impacted by any proposed alternative.

Future recreation special uses are prohibited in the Existing and Candidate Research Natural Area MA. The amount (3%) of the FLNF prohibited for future recreation special uses is similar across all alternatives (ranging from 544 to 561 acres). Table 3.9-12 summarizes the acres of land available for potential future recreation special use activities into three categories.

Table 3.9-12: Acres (percent) of FLNF available for future recreation special uses by constraint level.

Constraint Level	Alt. 1	Alt. 2	Alt. 3
	acres (%)	acres (%)	acres (%)
Open	15,624 (95%)	11,380 (69%)	13,584 (83%)
Limited	254 (2%)	4,515 (27%)	2,311 (14%)
Prohibited	561 (3%)	544 (3%)	544 (3%)

Source: Revised FLNF Forest Plan (2006) and FLNF GIS Alternatives Layers
Notes:
[1] **Open** – No management area restrictions for future development of recreation special uses; MAs considered "open" include the Grassland for Grazing, Grassland for Wildlife, Shrubland, Northern Hardwood, and Oak Hickory MAs.
[2] **Limited** – Management area prescription limits future development of recreation special uses. MAs considered "limited" include: Future Old Forest, Ecological Special Area, Recreation & Education Special Areas, and North Country National Scenic Trail Special Area MAs.
[3] **Prohibited** – Management area prescription prohibits future recreation special uses. Existing and Candidate Research Natural Areas MA is the only MA future recreation special uses are considered "prohibited".

Alternative 1

Alternative 1 allows for 95 percent of the Forest to remain open to future recreation special use activities. Two percent of the Forest will have limitations on future recreation special use activities related to MA desired future conditions.

The majority of the Forest will remain open to future recreation special uses in Alternative 1. This will provide for a higher capacity and greater diversity of recreation special use activities across the Forest.

Alternative 2

Alternative 2 allows for 69 percent of the Forest to remain open to future recreation special use activities. Twenty-seven percent of the Forest will have limitations related to MA desired future conditions.

Alternative 2 will continue to provide for the majority of the Forest to remain open to future recreation special use activities, but will have less opportunity for future special use activities than Alternative 1. This will reduce the capacity and diversity of future recreation special use activities across the Forest.

Alternative 3

Alternative 3 provides for 83 percent of the Forest to remain open to future recreation special use activities. Fourteen percent of the forest will be limited to recreation special use activities that specifically complement the desired future condition of the management area.

Alternative 3 will offer more opportunities for future recreation special use activities than Alternative 2, but less than Alternative 1. Thus, the capacity and diversity of recreation special use activities will also be less than Alternative 1 and more than Alternative 2.

Indicator 5 – Acres of Land Available for Future Timber Harvest and Grazing Activities

Effects Common to All Alternatives

In the revised Forest Plan, timber management is allowed in the Oak Hickory and Northern Hardwood Management Area allocations and grazing management is allowed in the Grasslands for Grazing Management Area allocation. In all alternatives the Desired Recreation Opportunity Spectrum class for the Oak Hickory and Northern Hardwood MAs is Roaded Natural and the Desired ROS class for the Grassland for Grazing MA is Rural. The alternatives provide for varying amounts of land to be allocated to these Management Areas.

Timber harvest and grazing management typically impact recreation resources because of road building and other alterations to the recreation setting. Open lands for grazing, bound by fences and populated by livestock, provide for rural character in the landscape. Grasslands also provide opportunities for long-distance viewing of Seneca and Cayuga Lakes. Timber and grazing management can have both positive and negative impacts to recreation resources.

Direct and indirect negative effects of timber harvesting may involve noise from harvest activities, temporary closure of recreation facilities or trails due to health and safety concerns, and visuals. Negative impacts of grazing management may include the presence of barriers, such as gates and fencing, and cows.

Direct and indirect positive effects for both grazing and timber management, and associated road building, can include improved access to an area for recreation activities such as driving for pleasure, sightseeing, gathering forest products, hunting and fishing; improved habitat for hunting and wildlife viewing opportunities; and cleared areas for roadside dispersed camping.

Alternative 1

In Alternative 1 the amount of land in management area allocations that allow timber harvesting is 7,169 acres and the total amount of land in the MA allocation that allows grazing is 5,912 acres. Although timber harvest and grazing will not occur on all of the acres in these MAs, Alternative 1 has the most potential for management activities that positively and negatively impact the recreation resource.

Alternative 2

Alternative 2 has the least amount (4,174 acres) of land in management area (MA) allocations that allow timber harvesting. Alternative 2 has the same amount (5,250 acres) of land in the MA allocation that allows grazing as Alternative 3, which is less than in Alternative 1. Alternative 2 would have the least potential for timber and

grazing management activities that positively and negatively impact the recreation resource.

Alternative 3

Alternative 3 has an intermediate amount (6,225 acres) of land in management area allocations allowing timber harvest. Alternative 3 has the same amount (5,250 acres) of land in MAs allowing grazing management as Alternative 2, which is less than Alternative 1. Alternative 3 would have an intermediate potential for timber and grazing management activities that positively and negatively impact the recreation resource.

Cumulative Effects

Cumulative effects are discussed using recreation emphases on federal and non-federal lands within and near the National Forest. Providing outdoor recreation opportunities can be considered a public-private partnership endeavor. Federal, State, and local governments are all involved, with each having its own particular niche in the market. Federal and State governments focus on opportunities that require large land bases, such as wildlife areas, developed sites with few amenities, and primitive areas. Local governments tend to focus on population-oriented facilities, such as athletic fields and community parks. The private sector is also a large provider, as demonstrated by the Finger Lakes Region's marinas, museums, and wineries.

In general, national forests have the greatest ability to provide more dispersed forms of recreation due to their large land bases. State forests and counties are not able to supply as many dispersed forms of recreation. State parks generally provide a higher level of development than federal developed camping and recreation facilities.

All alternatives will maintain or increase the FLNF's attraction as a destination recreation area, versus a thoroughfare to other regional recreation areas. The FLNF provides unique dispersed recreation experiences related to having a large, undeveloped land base and, therefore, does not adversely compete with recreation on nearby State and local lands.

The large land base of the FLNF is able to provide recreation opportunities such as horseback riding and bicycling in dispersed natural settings that other service providers are unable to accommodate. Changing management direction from allowing horseback riders and bicyclists to travel cross-country on the Forest to limiting them to designated trails will reduce impacts to the natural and social environment. This change in management direction is not expected to adversely affect other public and private recreation service providers. Reducing impacts from unmanaged recreation will provide for overall improved conditions on the Forest.

As the population continues to grow and lands become developed, public lands such as the FLNF will increasingly be seen as a place of relaxation and quiet retreat. As forest recreation demands grow, recreation activities are likely to conflict, especially on trails, in the backcountry, at developed sites, and on roads and their nearby environments. The alternatives, to varying degrees, allow a mix of dispersed and developed recreation experiences that provide opportunities for a unique experience in the Finger Lakes Region of New York. Societal expectations of finding a recreation experience that relies on large land bases on National Forest System lands would be met with any of the alternatives.

The primary challenge for National Forest recreation managers is to maintain the unique high quality natural settings and dispersed recreation experiences that the public seeks on federal land. In the future, supply and demand for recreation uses may shift, but the variety of recreation opportunities that can be provided on National Forest System lands would ensure some level of user satisfaction. Maintaining an array of forest settings and opportunities helps level fluctuating responses to weather, travel distance, or societal values about when or what recreation activities to pursue. All alternatives, therefore, have positive cumulative effects on the recreation resource on the Forest and within the region.

3.10 AREAS OF SPECIAL SIGNIFICANCE

Issue Statement

Public concern is focused on the desire for designation of special areas, resolution of existing candidate Research Natural Areas, and determination of the most appropriate mix, size, and configuration of future old growth and other special areas. This is an issue within the broader topic of restoration, protection, maintenance, and enhancement of biological and ecological diversity, and conservation of species, communities, and ecosystems.

Indicator 1 – Acres of Research Natural Areas (RNAs), Candidate Research Natural Areas (cRNAs), Ecological Special Areas (eSAs), and Future Old Growth Areas

The first indicator to be used in this effects analysis is acres of Research Natural Areas (RNAs), candidate RNAs (cRNAs), ecological special areas (eSAs), and future old growth areas. This indicator highlights the differences among alternatives because it describes the mix, size, and configuration of various management designations designed to conserve special natural features and representative ecological communities.

Indicator 2 – Percentage of Ecological Units Represented Within the Ecological Reference Area Network (RNAs, cRNAs, eSAs, and Future Old Growth Areas)

The second indicator to be used in this effects analysis is percentage of ecological units represented within the ecological reference area network (including RNAs, cRNAs, eSAs, or future old growth areas). This indicator highlights the differences among alternatives by describing the extent to which the mix, size, and configuration of these special management designations represent the range of ecological communities found on the Finger Lakes National Forest (FLNF).

Analysis Area

The analysis area for direct and indirect effects includes all federal land managed by the FLNF. This area represents National Forest System lands where special areas and features exist, and the lands where those resources could receive impacts from management activities.

The analysis area for cumulative effects includes all FLNF lands and the lands administered by other owners, both public and private, which fall within the Finger Lakes Highlands subzone of the Appalachian Plateau ecozone in New York (Reschke 1990). This area represents an ecological region in which special features that occur across the region, including on the FLNF, can be protected using a variety of mechanisms.

3.10.1 Affected Environment

Introduction

The introduction to Chapter 3 (3.1.4) introduces the reader to the concepts of ecosystem management and the coarse filter/fine filter approach to the analysis of biodiversity. The terrestrial vegetation and natural communities of the FLNF are discussed in detail in the Vegetation section (3.5) of this Chapter. The Vegetation section (3.5), therefore, serves as background information and context for the discussion to take place here. The revised Forest Plan does not identify any areas for addition to the National Wilderness Preservation System, or for addition to the National Wild and Scenic Rivers System. The revised Plan identifies known rare or exemplary natural communities for conservation through management area designations where extractive uses are not allowed, such as the Research Natural Area, Ecological Special Area, or Future Old Forest MAs. The discussion of affected environment and environmental consequences for rare or

exemplary natural communities is found predominantly in this section, although they are also introduced in the Vegetation section (3.5).

A fundamental principle of conservation biology is that representative examples of each type of ecological system, along with their full ranges of variation in composition, structure, and function, should be conserved in a way that prevents extractive management (for example, timber harvesting), while allowing some management activities that restore or maintain the system (Huggard 2004). Conservation in this context includes areas that have been removed from harvesting due to management area allocations or regulation, as well as areas that are inoperable or unproductive because of site factors (Huggard 2004). These types of areas provide ecological reference or benchmark conditions for baseline monitoring and research, provide refuge for rare species, and provide some ecological conditions or functions that are not otherwise available across the landscape. These areas together can be described as an ecological reference area network, and include such formal designations as Research Natural Areas, or other administrative designations like ecological areas, natural areas, special areas, or unsuitable lands. In this way, a network of reference areas contributes to biological diversity, an element of ecosystem sustainability.

Dramatic changes have occurred to ecosystems within the Finger Lakes region over the past 200 years or more (see also the Introduction in this Chapter). While the land was used by native peoples prior to European settlement, large areas of land within the Finger Lakes Highlands ecozone were in mature forests of predominantly mesic hardwoods (Marks and Gardescu 1992). Most of this land was cleared for settlement during the 19th century, and there are currently very few known sites of old growth forest within the ecozone; none are known on the FLNF. Much of the land is recovering, but a substantial proportion of the Ontario Lake Plain region and the low elevation or flatter parts of the Finger Lakes Highlands are either still in agriculture or are becoming desirable for housing development.

While New York State has a relatively high proportion of its land in conserved areas (25%), very little land within the Finger Lakes Highlands (outside of the FLNF) is conserved through public ownership or conservation easements (NYS CSCIC 2003). About 22,000 acres in the Finger Lakes Highlands are conserved in some way through public ownership, representing about 4 percent of the ecozone, and of that about 60 percent is the FLNF. The remaining areas include town and State parks, State wildlife management areas, and State reforestation areas. The FLNF is by far the largest block of land within the ecozone in which opportunities for conservation exist.

Wilderness

Based on Recreation Opportunity Spectrum criteria and on the Roadless Inventory conducted by the FLNF in 2004, there are no proposed additions to the National Wilderness Preservation System in this Plan revision (refer to FEIS Appendix C). The road network on the FLNF precludes the Forest from meeting the maximum one-half mile of road per 1,000 acre criteria for meeting wilderness potential.

Wild and Scenic Rivers

Due to the lack of potentially eligible streams, and the fact that Wild and Scenic River (WSR) management was not identified as a planning concern in this planning period, WSR evaluation was not conducted at this time. There are no proposed additions to the National Wild and Scenic Rivers System in this Plan revision (refer to FEIS Appendix D).

Research Natural Areas (RNAs)

Research Natural Areas are permanently protected and maintained in a natural condition. These areas include: (1) unique ecosystems or ecological features, (2) habitat for rare or sensitive species of plants and animals, and (3) high-quality examples of common ecosystems. RNAs are intended to represent the least

3.1.4), ecosystems that develop in the face of the natural dynamics with which they are associated provide insight into how species and other levels of biodiversity develop, survive, and thrive within a natural system. Such examples also contribute to knowledge of the extent to which management activities can change natural dynamics and biodiversity associated with a particular ecosystem. Regions that have little remaining old growth, like the Finger Lakes, can foster old growth development by minimizing extractive uses in designated areas and allowing these areas to develop under natural processes.

National Forest System lands can be conserved for current or desired future old growth characteristics through a number of designations, including both congressional and administrative designation by the Forest Service. Congressional designations and some administrative designations, such as RNAs, are generally permanent. Designation of sites in these more permanent designations will lead to long-term development of old growth characteristics as only natural disturbance processes are allowed to disrupt these areas.

Designation of sites as eSAs can lead to long-term development of old-growth characteristics when these characteristics are consistent with the values for which the area is designated. Some eSAs may be designated for a vegetative condition that requires regular disturbance, such as woodland savannas that need fire. In these cases, if the natural pattern of disturbance has been disrupted, managers are often allowed to introduce the disturbance to maintain the desired vegetation. Most eSAs, however, are protected over the long-term and so have the potential to develop or maintain old-growth characteristics.

The Forest Service is also able to make use of the management area or zoning concept to define a management prescription that would foster old growth characteristics. Such management area designations are fairly common across national forests. While they are less permanent than congressional designation or RNA establishment, they are similar to eSAs in that long-term maintenance in those administrative designations can lead to the same desired old growth characteristics.

And finally, the Forest Service recognizes that even within management areas or zones considered generally suitable for timber management, there will always be a certain proportion of these areas that will be unsuitable, due to physical or economic inoperability, or to low productivity. Areas such as these are also likely over time to develop old growth characteristics, and provide opportunities for improving representation of less common ecosystem types. Areas considered inoperable due to economic constraints may have a higher risk than other unsuitable areas of changing to suitable status because economic suitability can change with markets.

Existing Forest Plan Management Direction

The 1987 Plan does not contain any goals or objectives specific to special area designations. Goal 2 includes the protection of unique habitats and species. Standards and guidelines are specific to the management area prescriptions for areas of special significance.

Research Natural Areas (MA 8.1D)

The 1987 Plan for the FLNF did not establish any RNAs, but did designate ten areas as potential old growth special areas (Management Area 8.1D) and as candidates for RNA designation (Table 3.10-1). Under the 1987 Plan these areas are managed as Special Areas, and in a way that does not preclude potential for future designation.

Forest Service Manual (FSM 4063.3) describes the types of management allowed within RNAs, including limits on vegetation management, facility construction, and trail construction. Timber harvesting and motorized uses are not allowed within these areas. All uses but research and education tend to be discouraged.

Ecological Special Areas (eSAs)

Ecological special areas are areas having the uncommon or outstanding values noted earlier. The eSA designations referred to here are those with biological, geological, or ecological values. On the FLNF, there is one area that is currently associated with this designation, the older forest portions of the Ravine Trail Special Area (8.1C). In the loop trail portion of the Ravine Trail, timber harvesting and motorized uses are not allowed, and natural succession to old growth is emphasized. The trail into the ravine is managed for a diversity of vegetation types and ages. Potential old-growth areas (8.1D) are considered special areas, but because they were identified in the 1987 Plan as candidate RNAs, they are discussed under RNAs.

Areas currently identified in the Forest Plan as having special recreational, heritage, or historical values include Caywood Point, which was recently designated a Special Area on the Forest (8.1E), and the Finger Lakes and Interloken Trails (8.1A & B). These areas are discussed in the Recreation Opportunities (3.9) and Heritage Resources and Tribal Relations (3.15) sections of this Chapter.

Future Old Growth Areas

The 1987 Plan defines old growth as a self perpetuating vegetative community that has reached a dynamic steady state. The dominant vegetation is considered to be climax with all age classes present. To represent ecologically sound habitats, the definition indicates that old growth will not be silviculturally treated. This definition is built into the vegetative composition objectives for the 1987 Plan, which recommends that old growth communities represent a variety of ecological land types on the Forest. Forest-wide standards and guidelines also indicate that old growth stands will not be managed for resource production and will be protected from disturbance. Low-impact foot trails and low-impact educational and research uses are permitted.

The 1987 Forest Plan identifies ten areas for development of future old growth in Management Area Prescription 8.1D. The management direction for these areas is included under RNAs. The Ravine Trail (MA 8.1C) also has older forest characteristics in the ravine, and these characteristics are protected, as noted above under eSAs. There is no additional direction in the Forest Plan for old growth.

The 1987 Plan, in Appendix A, also identifies lands unsuitable for timber management, and when trees may be cut in these areas. In unsuitable areas outside of shrublands, trees may be cut for public safety, prevention of spread of insects or disease, or to create vistas. These exceptions are also true for the candidate RNAs and the eSA in the 1987 Plan. Many of these unsuitable areas are likely to develop old growth characteristics over time.

Proposed Changes in Management Direction Common to All Alternatives

The revised Forest Plan clarifies management direction in Goal 2 by replacing it with a more explicit goal, Goal 6, which states that the FLNF will protect rare or outstanding biological, ecological, or geological areas on the FLNF. This goal is also supplemented by a new goal (Goal 5), which seeks to maintain or restore ecological processes and systems on the FLNF within desired ranges of variability, and includes objectives to achieve this goal.

Concepts of old growth have changed over the last 17 years, based on the tremendous amount of research and inventory that has taken place within the Northeast during that time (Davis 1996). The old growth definition in the 1987 Plan is outdated and is replaced with one that is based on the most recent scientific information, and an acknowledgement of the high level of variability associated with old growth forests in the eastern US. In the revised Forest Plan, old growth is defined as a patch of relatively old forest of at least 5 to 10 acres that has escaped catastrophic or stand-replacing disturbance associated with the prevailing natural disturbance regimes of the Forest. Such old growth stands exhibit a long

history of continuity and a demonstrated future via replacement dynamics. Composition objectives for old growth have been replaced with an objective under Goal 5 that states at least five percent of each ecological type on the Forest be managed for old growth characteristics.

A Forest-wide standard was incorporated into the revised Forest Plan for protection of significant rare or uncommon natural communities to ensure that their composition, structure, and functioning are maintained or improved. In addition, a Forest-wide guideline was built into the revised Plan to ensure that the ecological values of eSAs are protected during management activities that may occur adjacent to them.

The primary change in management direction that affects special area designation on the FLNF is the shift in approach to old growth designations. In the revised Forest Plan, old growth values have been separated from RNA values. When scientists from the Forest Service research branch were evaluating the existing cRNAs to determine if they were suitable for inclusion into the RNA network, they were concerned about the small size of these areas and duplication of forest types. There is also concern that most of the lands designated for future old growth conditions are too small to achieve old-growth values in a meaningful way.

Consequently, the Forest Service developed a new management area for the FLNF called Future Old Forest (FOF). The emphasis of this MA is to maintain natural conditions and limit timber harvesting and new motorized trail uses. Removal of trees may occur in the FOF MA for a limited number of reasons, such as improving habitat for rare species or prevention of infestations by exotic pests, but such activities will occur at small scales and when timber production is not the primary focus. Because the existing road network through the FLNF is outside of Forest Service jurisdiction, and because of the high recreational value of existing snowmobile trails, the Forest Service did not prohibit existing motorized uses in this designation.

Within the landscape context of the Finger Lakes region, this does not diminish the value that these areas will develop over time in providing old forest conditions. True old growth may never develop on the FLNF due to land use history and the existing road network. Old-growth characteristics, however, may develop in Future Old Forests, as well as in the RNAs, cRNAs, and eSAs.

Additional changes include the approach to designation of ecological special areas and candidate Research Natural Areas. cRNAs are meant to be large ecological reference areas with relatively intact ecosystems, therefore the Forest Service evaluated the current cRNAs and identified the most intact and largest cRNA of each ecological type for consideration as cRNAs in the revised Plan (Hector Oak Woods and Sawmill Creek Ravine, Table 3.10-1, Burbank 2004). Candidate RNAs have greater restrictions on tree removal than Future Old Forest, in order to maintain or restore the special values associated with the cRNA. Non-manipulative research use is the primary emphasis of the cRNA. The remaining smaller forested cRNAs (Potomac Creek Woods, South of Blueberry Patch, Townsend Road Oak Woods, and Mill Creek Ravine, Table 3.10-1, Burbank 2004) were recognized as capturing similar ecological values but at a smaller scale. These areas, and any new areas identified as ecologically significant, were considered for designation in the Ecological Special Area MA. Restrictions on tree removal in these areas are similar to those in Future Old Forest. Public use and interpretation of these areas is an emphasis along with protection. Shrubland and other open areas that were not of ecological significance were not considered for these designations. The unsuitable lands within management areas suitable for timber management continue to be considered part of the network of ecological reference areas as well.

Existing Condition

Indicator 1 – Acres of RNAs, cRNAs, eSAs, and Future Old Growth Areas

There are no designated RNAs in the 1987 Plan. There are 552 acres of the FLNF designated as candidate RNAs, eSAs, and areas of potential future old growth in the 1987 Plan (Table 3.10-1). This represents two percent of the Forest. There are no stands of existing old growth known to occur on the FLNF.

Candidate Research Natural Areas

Areas within designated cRNAs (Management Prescription 8.1D) represent some of the soil conditions and vegetation types common to the FLNF (see also the Vegetation section (3.5) of this Chapter). These include eight wooded sites and two shrub opening sites. The wooded sites include Appalachian oak-hickory forests on moist and dry sites, and hemlock-northern hardwood ravines. These sites were selected because they appeared to be the least disturbed examples of these forest communities on the Forest, although all have been disturbed and none are considered old growth. The shrubby sites are in the process of succeeding to woodland. These sites were selected for research and study of the succession of agricultural landscapes in the region back to forest. The cRNAs range in size from 6 to 107 acres, accounting for a total of 331 acres (Table 3.10-1).

Table 3.10-1: Acres of RNAs, cRNAs, eSAs, and future old growth areas on the FLNF under the 1987 Plan.

Site Name	Status	Acres
Hector Oak Woods	Candidate RNA	75
Potomac Creek Woods	Candidate RNA	41
South of Blueberry Patch	Candidate RNA	26
Sawmill Creek Ravine	Candidate RNA	107
Townsend Road Oak Woods	Candidate RNA	15
Mill Creek Ravine	Candidate RNA	20
Compartment 65 Shrub Opening	Candidate RNA[1]	6
Compartment 78 Oak Woods	Candidate RNA[1]	8
Compartment 14 Shrub Opening	Candidate RNA[1]	14
Compartment 61 Area	Candidate RNA[1]	19
Ravine Trail	eSA	36
Unsuitable lands[2]	--	185
Total		**552**

Source: ROD, Forest Plan, Forest GIS data, management area and timber model feature classes.
Notes:
[1] Under the revised Plan, these sites are no longer considered viable candidates for RNA designation.
[2] Unsuitable lands considered here as future old growth include only those lands classified as reserved (Lands Suitability Class (LSC) 300 series), marginal (LSC 700 series) or unregulated (LSC 800 series) that are not maintained as wildlife openings, are not reserved as cRNAs or eSAs, and are not currently being used by cattle.

In 1987 after the Plan had been finalized, a committee of scientists completed field evaluations for all candidate RNAs on the FLNF (Burbank 2004, Putnam 1989). Four of the candidate areas were rejected as lower quality than other sites. Two shrub opening areas (the Compartment 65 and 14 areas in Table 3.10-1) were rejected by the committee, who recommended two different shrub areas as better candidates. However, these two new recommended shrub openings were never designated as Special Areas through a Forest Plan amendment, nor were the rejected shrub openings removed from their Special Area designation. Two wooded sites (the Compartment 78 and 61 sites in Table 3.10-1) were also considered better represented by other candidates in the Management Prescription 8.1D.

Consequently, the committee recommended that eight sites, including two new shrub sites and the remaining six wooded sites, be considered as candidates for RNA designation. Those sites originally designated as cRNAs (Table 3.10-1), but not recommended by the committee for RNA designation, remain cRNAs and continue to be managed according to the 1987 Plan MA 8.1D standards and guidelines until the Forest Plan is revised to reflect their change in status.

Because the purpose of RNA establishment is to provide a relatively unmodified area as a baseline for study of changes in ecosystems in other parts of the landscape (FSM 4060), shrub openings are no longer considered appropriate for designation as RNAs. The two shrub openings recommended by the committee will therefore not be recommended by the Forest Service for establishment as RNAs, however they will continue to be managed as cRNAs under the 1987 Plan.

Very little research, inventory, or monitoring has been undertaken in the existing or proposed cRNAs since the committee reviewed them and establishment records were prepared in 1988. This may be because there is not a great deal of scientific interest in these areas currently and/or because their existence has not been well communicated to the scientific community.

A recent evaluation of the existing and proposed cRNAs, in light of the purpose and need for establishing RNAs identified by the Forest Service, suggests that there is only a need to designate one RNA of each of the major forest types on the FLNF (Burbank 2004). As noted earlier, the candidates, not including the shrublands, represent duplication of two primary forest types on the FLNF. Two cRNAs will be recommended for RNA designation from the six sites that have been evaluated, one from an Appalachian oak-hickory type and one from a hemlock-hardwood ravine type. The remaining four sites are recommended to be maintained in a special designation to protect their important ecological values.

Ecological Special Areas

The Ravine Trail eSA represents a small area of older forest in a hemlock-hardwood ravine, surrounded by regenerating forests and forest plantations succeeding into natural vegetation. The area is 36 acres in size (Table 3.10-1). There has been little research, inventory, or monitoring conducted within the Ravine Trail eSA, although there is broad public support for the area to remain a special area and for protection of its large tree characteristics. The FLNF has reviewed new information regarding additional areas that have been identified as having special values (Burbank 2004), and will recommend some of these areas for eSA designation, as discussed later in this Section.

Future Old Growth Areas

Based on the definition of old growth identified in the affected environment introduction, there are no known old-growth stands on the FLNF. Stands allocated to MA 8.1D in the 1987 Plan are considered future old growth areas because they have been designated for that purpose. These areas account for 331 acres and are identified as cRNAs in Table 3.10-1. These stands originated between 1914 and 1958, based on tree ring counts during silvicultural inventories. There are a few areas of mature or large trees, in particular in the ravines where previous historical land use and management was more limited. Most of the landscape of the FLNF was managed and used to such a degree that old-growth characteristics are generally non-existent. There has been little investigation of the ravines, and so there is a remote possibility that some of the steepest portions may contain some old-growth characteristics.

Lands considered unsuitable for timber management that fall within otherwise suitable management areas, as noted earlier, are also considered potential future old growth because they are reserved from timber management. Most of these areas on the FLNF are small, ranging in size from 1 to 44 acres, and averaging 13 acres. Those not associated with areas reserved from harvesting due to MA allocation in the 1987 Plan are generally unsuitable because they are areas that are wet, are within pastures

and used by cattle as cover, are maintained wildlife openings, are unproductive, or otherwise have resource protection constraints. Of these lands, only those considered wet, unproductive, or having resource protection constraints are likely to develop old growth characteristics over time. Such lands account for approximately 185 acres on the FLNF (Table 3.10-1).

An analysis of older forest areas across the FLNF (Burbank 2006) identified 21 stands accounting for 442 acres that are at least 100 years old, the age identified by the Forest Service as the point where a forest transitions from mature to old. Most of these stands are less than 30 acres in size, and five have been partially harvested recently through thinnings, shelterwood cuts, or uneven-aged management. Of these stands, three are more than 120 years old and only one is at least 150 years old, a bit less than half the maximum age for long-lived hardwood species in the Northeast. The oldest stand is not protected in a special management area, and stand records indicate that it is a two-aged stand with a 1982 harvest that has created a 22-year-old understory stand beneath the old overstory. Approximately 2,510 acres of forest are identified as 80 years old or older (Burbank 2006), which include stands that are likely to become old within the planning cycle covered by the revised Forest Plan. These lands are currently not considered future old growth because they are not managed for that purpose or are not otherwise reserved from harvesting. They are the oldest stands on the Forest, however and if allowed to continue aging, have the potential to develop old growth characteristics over a shorter time than other stands.

New Information

Over the past several decades, various individual researchers, including The Nature Conservancy and New York State agencies, have surveyed or evaluated lands in the Finger Lakes area to find places considered to be ecologically or biologically important, unique, or fragile. Information gathered by these sources was used to identify areas that should be designated as Special Areas in the 1987 Forest Plan. The process, however, of identifying such areas continues to evolve, and new areas are occasionally found. Consequently, information used during the development of the 1987 Plan is outdated.

Over the last 14 years, the Forest Service, local botanists, and the New York Natural Heritage Program (NYNHP) have conducted field surveys for significant ecological features (rare species, habitats, and natural communities) in some areas of the FLNF. Several FLNF sites for rare, uncommon, or unique plants, and one natural community of statewide significance, were found (Table 3.10-2). Several other areas have been identified as relatively high-quality natural communities that could be added to the future old growth network on the Forest. An area of potential ecological significance was identified at Caywood Point during the summer of 2005 that will require additional investigation (Wesley 2005).

As of 2003, 23 sites (1,182 acres), including the six wooded cRNA sites noted earlier and the Ravine Trail eSA, have been identified that contain at least one significant feature – a rare or uncommon plant, or a rare or high quality example of an ecological community (Burbank 2004). Some sites have a combination of significant feature types (natural communities, plants, animals). While 16 of the sites are not currently in a protected management designation, they are protected during project work through standards and guidelines and project mitigation.

Table 3.10-2: Rare, uncommon, or unique plants and natural communities found on the FLNF.

Plants	Natural Communities
Aronia melanocarpa	Perched swamp white oak swamp
Baptisia tinctoria	
Carex rosea	
Carex tuckermanii	
Cypripedium acaule	
Juglans cinerea	
Juglans nigra	
Lobelia cardinalis	
Phegopteris hexagonoptera	
Piptatherum racemosum	
Polygonum arifolium	
Quercus bicolor	
Viola palmata	

The 23 significant sites have been evaluated as part of a review of Special Areas on the FLNF, and 11 of these sites were recommended for protection through special management area designation in this Forest Plan revision (Burbank 2004). Special designations considered during the revision included candidate RNA, Ecological Special Area, and Future Old Forest. These 11 sites include the six current cRNA sites noted earlier, the Ravine Trail eSA, and four new areas (Table 3.10-3). Most of the existing protected sites are recommended for expansion (Burbank 2004). The remaining 12 sites appear to be relatively easy to protect through standards and guidelines, as their values are associated with rare or uncommon plants that can be excluded from management actions (Burbank 2004). Of the four new sites, none are considered of high enough quality or large enough to be designated as RNAs.

In addition to inventories and surveys completed over the past few years, there has been recent interest in stands on the Forest that are mature and approaching the old age class (for example, stands 80 years old and older), that appear to have been continuously forested since federal ownership, and that have had limited harvesting (Burbank 2006). There has currently been no systematic inventory of such stands on the Forest to determine if any are older than stand inventory data may suggest, or have developed some old growth characteristics. Evaluations of stand and field data during the 1987 Forest Plan for identification of 8.1D management area locations did not locate any old growth forest at that time.

modified and most intact examples of ecosystems within a particular region.

A national network of RNAs helps protect genetic, species, ecosystem, and landscape level biological diversity. RNAs representing the natural condition of common ecosystems serve as baseline or reference areas. To help answer resource management questions, RNA baseline areas can be compared with similar ecosystems undergoing silvicultural or other management prescriptions. RNAs make an important contribution to ecosystem management as a monitoring tool measuring the effects of management activities in other areas.

RNAs are managed to maintain natural features and processes. Because of an emphasis on natural condition, they are excellent areas for studying ecosystems or their component parts, and for monitoring successional and other long-term ecological changes. Non-manipulative research and monitoring activities are encouraged in RNAs and can be compared with manipulative studies conducted in other areas. In addition, RNAs serve as sites for low-impact educational and recreational activities.

Ecological Special Areas (eSAs)

National Forest System lands (except Wilderness) that contain scenic, historical, geological, botanical, zoological, palentological, recreational, or other special characteristics often merit special management area designation. Areas with such designations are managed to protect and, where appropriate, foster public use and enjoyment of the areas. Other uses are permitted within the areas to the extent that they are in harmony with the purpose for which the area was designated. These special areas can be designated congressionally or administratively by the Forest Service. Congressional designation of eSAs is considered permanent, while administrative designation is not. The areas considered in this section are those with significant biological or geological features, and are considered as an “ecological special areas” group.

Future Old Growth Areas

Old growth has been defined in various ways over the years (Leverett 1996). In the broadest terms, old growth forests are represented by the oldest examples of forested stands that have survived catastrophic or stand-replacing disturbances associated with the prevailing natural disturbance regime. While old growth forests in New York are not generally undisturbed, the disturbances associated with them tend to be very small and scattered enough to allow large patches of forest to mature to old ages. These old forests often have at least half of the canopy trees at half of the maximum age or older for the species represented, with a few trees at or near the maximum age. Depending upon the physical characteristics of a particular site, as well the forest type, some old growth stands may include small trees and look much younger than they really are, while others may never reach maximum age due to frequently occurring natural disturbances like fire or flooding.

There is debate regarding applicability of some of the standard old growth characteristics to some forest types, notably oak-hickory forests. White and White (1996) suggest that old-growth oak-hickory forests include the following characteristics: (1) not initiated by a logging or agricultural event; (2) trees at or near the maximum size and age for the species, site, and disturbance regime; (3) low tree growth rates; (4) no large lower branches or branch scars on trees; (5) tree crowns that are flat-topped and spreading; and (6) trees of all ages, although many canopy species may not be in the understory. The primary difference between oak-hickory forests and other eastern forests is that old-growth oak forests are not assumed to be at equilibrium in terms of species composition, at least in terms of the time and geographical scale commonly used to evaluate old-growth stands.

One of the attributes most valued about old growth is that it serves as an example of how forests develop within a particular region under natural processes and disturbance regimes. As discussed in the Chapter 3 Introduction (section

Table 3.10-3: Areas of significance recommended for special designation in the revised Forest Plan.

Site Name	Special Designation[1] Current	Special Designation[1] Recommended	Acres	Special Values
Hector Oak Woods	cRNA	cRNA	78	Appalachian oak-hickory forest that is mature in some portions and provides rare plant habitat
Potomac Creek Woods	cRNA	eSA or FOF	139	Mature hemlock-northern hardwood forest and ravine.
South of Blueberry Patch	cRNA	eSA or FOF	102	Mature, seasonally wet Appalachian oak-hickory forest
Sawmill Creek Ravine	cRNA	cRNA	131	Mature hemlock-northern hardwood forest along a series of ravines formed by Sawmill Creek and its tributaries
Townsend Road Oak Woods	cRNA	eSA or FOF	12	Mature Appalachian oak-hickory forest on gentle slopes with high diversity.
Mill Creek Ravine	cRNA	eSA or FOF	38	Ravine with mature hemlock –northern hardwood forest and Appalachian oak-hickory forest, a diverse flora, waterfall, and a rare fish population.
Ravine Trail	eSA	eSA or FOF	37	Mature hemlock ravine with a hiking trail.
Gorge Trail	None	eSA or FOF	28	Ravine with hemlock-northern hardwood forest, Appalachian oak-hickory forest, and enriched hardwood forest with high tree species diversity and rare and uncommon plants.
Blueberry Patch Swamp	None	eSA or FOF	44	Perched swamp white oak swamp, a rare natural community in New York state.
Potomac Ravine	None	eSA or FOF	21	Ravine with mature sugar maple-basswood rich mesic forest including butternut.
Breakneck Creek	None	eSA or FOF	33	Deep, dry oak ravine.
Total			**663**	

Source: Burbank (2004); Forest GIS data, management area and significant area coverages
[1] cRNA = candidate Research Natural Area; eSA = Ecological Special Area; FOF = Future Old Forest

Indicator 2 – Percentage of ecological units represented within the ecological reference area network (RNAs, cRNAs, SMAs, and future old growth areas)

Landtype Associations

The FLNF worked cooperatively with Cornell to develop a landscape-level map of ecological types on the FLNF called Landtype Associations (LTAs) (DeGloria 1999). These maps are based on a GIS model that uses a series of regional maps related to topography, soils, climate, geology, and general vegetation tendencies. Six LTAs have been identified for the FLNF (Table 3.10-4). Conservation biology stresses the importance of representing the ecological types that occur within each landscape in some type of protected designation, as these types are presumed to vary both in character and in response to management.

Of the six landtype associations (LTAs) on the FLNF, five are represented in some protected category, but at generally small proportions ranging from less than one percent to seven percent, with two represented at five percent or greater (Table 3.10-4).

Ecological Landtypes

During the 1990s, the Forest Service worked cooperatively with Cornell University to develop ecological maps of the Forest. Based on ecological mapping principles and the data available from soils mapping, Dr. Steve DeGloria

of Cornell developed a modeling approach to mapping ecological landtypes (ELTs) on the FLNF (DeGloria 1998). The model was built within a Geographic Information System (GIS), which was used to analyze several geographic datasets on soils and topography to develop ELT concepts for the FLNF, and to generate maps of potential ELTs. Fourteen ELTs were identified, and their distribution across the Forest and in special areas is shown in Table 3.10-5.

All 14 ecological landtypes (ELTs) found on the FLNF are represented in some protected category, but at relatively small percentages ranging from one percent to 24 percent (Table 3.10-5). Most of the Forest's ELTs have less than 10 percent of their acreage in a protected category, and nine out of 14 have less than five percent protected.

Table 3.10-4: Acres and proportion of the FLNF and of special designations (cRNAs, eSAs, and future old growth areas) under the 1987 Plan in each LTA

LTA	FLNF	Special Desig.
	acres (percent)	acres (percent of LTA)
Allegheny Uplands	1,563 (10%)	8 (<1%)
Allegheny Sideslopes	3,222 (20%)	56 (2%)
Transitional Allegheny Moraine & Hills	2,224 (13%)	146 (7%)
Transitional Allegheny Lowlands	8,697 (53%)	315 (4%)
Finger Lakes Ravines, Cliffs & Ledges	174 (1%)	0 (0%)
Finger Lakes Till & Lake Plain	559 (3%)	27 (5%)
Total	**16,439 (100%)**	**552 (3%)**

Source: DeGloria (1998), Forest GIS data, management area, timber model, and LTA feature classes

While the ELTs correlate well with existing soil conditions, correlations with forest types defined by Mohler (1991) or ecological communities defined by Reschke (1990) have been poor, which is likely due in large part to the young age of the forests, limited sampling in older forests, and land use history (DeGloria 1998). Because the ELTs represent real differences in soil conditions on the ground, it is possible that the potential natural vegetation described for these ELTs will eventually develop in the way predicted. Consequently, there is value in representing examples of the various ELTs across the Forest within special designations to help clarify how soils, topography, and land use history affect vegetation development on the Forest. ELT mapping for the FLNF only exists for the National Forest System lands present in the late 1980s, and has not been extended to lands acquired since then.

Table 3.10-5: Acres and proportions[1] of the FLNF and of special designations (cRNAs, eSAs, and future old growth areas) under the 1987 Plan in each ELT.

ELT	FLNF	Special Desig.
	acres (percent)	acres (percent of ELT)
801	810 (6%)	10 (1%)
802	1,240 (9%)	7 (1%)
803	183 (1%)	5 (3%)
804	998 (8%)	85 (9%)
805	1,881 (14%)	175 (9%)
806	84 (1%)	4 (4%)
807	4,558 (34%)	42 (1%)
808	2,205 (17%)	33 (2%)
809	1,064 (8%)	21 (2%)
810	83 (1%)	7 (8%)
811	42 (<1%)	1 (4%)
812	22 (<1%)	5 (21%)
813	57 (<1%)	14 (24%)
814	35 (<1%)	1 (3%)
TOTAL	**13,262[2] (100%)**	**410 (3%)**

Source: DeGloria (1998), Forest GIS data, management area and ELT feature classes
Notes:
[1] Proportions are based on ELT acres mapped
[2] Total ELT acres are less than 16,439 because ELTs were mapped only on the FLNF ownership during the late 1980s.

3.10.2 Environmental Consequences

Direct and Indirect Effects by Alternative

Indicator 1 – Acres of RNAs, cRNAs, eSAs, and Future Old Growth Areas

Effects Common to All Alternatives

In all alternatives, areas identified as part of the ecological reference area network, including cRNAs, eSAs, Future Old Forest, and some unsuitable lands will be managed similarly in respect to conservation of ecological attributes. There is abundant Forest Service policy direction on management of RNAs, and candidates would be managed as if they were RNAs until they are administratively established. Management for timber and motorized or developed recreation are prohibited from these areas, as well as from eSAs. Timber management is not allowed in lands considered unsuitable for such activity. In the Future Old Forest MA, recreational use can include winter motorized uses, but no new motorized trails are allowed. Extraction of minerals is allowed in all of these areas, but only if it does not disturb the ground. Consequently, the effects of the revised Forest Plan on the values represented by these management designations are positive. The alternatives, however, vary in the amount, location, and type of protected designation used.

In addition, while not included within the reference area network, the North Country National Scenic Trail MA (NCT) and the Recreation and Education Special Area MA (RSA) both offer some opportunities for development of old forest conditions. They were not included in the network because their emphasis is on recreation and not natural disturbance regimes or limited management. Both of these areas are not part of the lands suitable for timber management, however, and it is likely that forested portions of each will continue to age and develop more structural complexity over time. Old growth characteristics in portions of these two MAs are possible with the

management direction provided for these areas. The RSA includes the same acreage (218 acres) across all alternatives, while the NCT is represented only in Alternatives 2 and 3, where it comprises 164 acres in each.

Alternative 1

Alternative 1 has the fewest acres within the ecological reference area network at 783 acres, or five percent, of the Forest (Table 3.10-6). This increases the current acreage in these designations by 40 percent, although Alternative 1 does not allocate any acres to the Future Old Forest MA. The cRNAs, eSAs, and unsuitable lands identified in this alternative will develop into old forests over time, however, and may eventually develop some old-growth characteristics.

Table 3.10-6: Acres and proportion of RNAs, cRNAs, eSAs, and future old growth forest by alternative

Management Area	Alt. 1 Current Mgt.	Alt. 2	Alt. 3
	acres (percent)	acres (percent)	acres (percent)
RNA/cRNA	561 (3)	544 (3)	544 (3)
eSA	36 (<1)	312 (2)	531 (3)
Future Old Forest MA	0 (0)	3,821 (23)	1,398 (9)
Unsuitable lands	186 (1)	177 (1)	182 (1)
TOTAL	**783 (5)**	**4,854 (30)**	**2,655 (16)**

Source: Forest GIS data, alternatives and timber model feature classes

Research Natural Areas

In Alternative 1, which represents the current management alternative, all of the current cRNAs remain candidates (Table 3.10-8). One area recommended for addition as an ecological area, Breakneck Creek, was added because it is a ravine in an area of recently acquired land (Table 3.10-7). These designations amount to 561 acres (Table 3.10-6). Lands were recently acquired adjacent to Hector Oak Woods cRNA, which were used to enlarge the cRNA to include more of the forest in that area. No additional expansions of existing cRNAs are proposed in Alternative 1, and so several areas recommended for expansion did not expand (Tables 3.10-7).

One effect of this alternative on current or potential cRNAs is that the four existing cRNAs considered unqualified by the scientific committee will be designated cRNAs. These areas will appear in national databases as potential research sites for scientists studying unmodified natural conditions, while in reality offering poor prospects for such research. The remaining cRNAs, while offering some duplication in forest vegetation, will provide researchers with better opportunities. Under Alternative 1 the five areas proposed for expansion will not represent the full research potential of which they are capable. If researchers want to conduct studies in the expansion areas, they may have research goals that conflict with emphases in adjacent management areas.

Ecological Special Areas

Under Alternative 1 the area of the Ravine Trail eSA, known as “The Ravine” in the revised Forest Plan alternatives, remains the same designation and size, 36 acres (Tables 3.10-6,8). The remaining three recommended areas, the Gorge Trail, Blueberry Patch Swamp, and Potomac Ravine, are not designated. Areas of ecological value that were not designated will be protected by project-by-project application of standards and guidelines. These standards and guidelines should maintain the characteristics that are important at these sites, although it still entails a minor amount of risk.

Future Old Growth Areas

The 597 acres designated as eSAs or cRNAs in Alternative 1 have the potential to eventually develop old forest characteristics, although it may be many decades before old growth by strict definition may develop in these areas. In addition, areas of unsuitable land within MAs that allow timber management, accounting for 186 acres (Table 3.10-6), will be allowed to age and will also develop some old forest characteristics eventually. An analysis of age classes within the reference area of this alternative indicates that 60

percent of the acres are at least 70 years old, and that over 75 percent are at least 60 years old. This age class distribution suggests that a substantial majority of the reference area may begin developing old growth characteristics in 90 years.

This alternative does not allocate any acres to the Future Old Forest MA and therefore only small blocks of land, mostly under 100 acres in size, may develop into old forest. Given natural disturbance regimes in the Northeast, including fires, downbursts, and small tornados, there is a higher probability under Alternative 1 that a major disturbance event could devastate any one of these small old forest areas, or several of them.

Alternatives 2 and 3

The acreage within the ecological reference area network across these two alternatives varies from 4,854 acres (30%) in Alternative 2 to 2,655 acres (16%) in Alternative 3 (Table 3.10-6). Under Alternatives 2 and 3, all areas recommended for special area designation are placed in one of the three management areas associated with future old growth areas (ESAs, RNAs, and FOF). While the type of designation may vary between Alternatives 2 and 3, the total acreage of areas with significant features protected is the same: 1,103 acres (7%) of the Forest (Table 3.10-7). Areas of unsuitable forest with potential to become old forest also do not vary much in size between the alternatives (Table 3.10-6). The size difference is primarily a result of differences in overlap with other reference area network designations. The variation in total acres across these two alternatives therefore rests with the amount of Future Old Forest.

Table 3.10-7: Acres of each site recommended for special area designation that were allocated to the RNA/cRNA, eSA, or future old growth areas, by alternative.

Site Name	Alt. 1 (acres)	Alt. 2 (acres)	Alt. 3 (acres)
Hector Oak Woods	259	332	332
Potomac Creek Woods	41	145[1]	145
South of Blueberry Patch[2]	26	127	127
Sawmill Creek Ravine	107	212	212
Townsend Road Oak Woods	15	44[1]	44
Mill Creek Ravine	33	96	96
The Ravine (Ravine Trail)	36	31	31
The Gorge (Gorge Trail)	0	57[1]	57
Blueberry Patch Swamp[2]	0	--	--
Potomac Ravine	0	26	26
Breakneck Creek	33	33	33
TOTAL	**550**	**1,103**	**1,103**

Source: Forest GIS data, alternatives and significant area coverages
Notes:
[1] In this alternative, the entire site has been included as part of Future Old Forest; the acres represent the size at which the site would otherwise be designated in a special designation if it was not included as Future Old Forest.
[2] Blueberry Patch Swamp has been combined with South of Blueberry Patch in Alternatives 2 & 3.

Research Natural Areas

In Alternatives 2 and 3, two out of the eleven cRNAs recommended for designation as RNAs in Alternative 1 are recommended for RNA designation, and account for 544 acres in both alternatives (Table 3.10-6). These cRNAs represent two primary forest types on the FLNF – Appalachian oak-hickory forest in Hector Oak Woods, and hemlock/hemlock-northern hardwood forest in Sawmill Creek Ravine (Table 3.10-8). The size of these two areas has increased substantially from the existing condition, with Hector Oak Woods at 332 acres and Sawmill Creek Ravine at 107 acres (Table 3.10-7). There does not appear to be a large block of northern hardwood forest of high quality that could be designated as an RNA. The potential for

ecological development of a large block of high-quality northern hardwood forest, which could be designated as an RNA, may be more likely under Alternatives 2 and 3 than in Alternative 1.

While Sawmill Creek Ravine and Hector Oak Woods are not pristine areas, they appear to be the most intact large ecological systems on the Forest with the least conflict with other uses. Designation of these areas as RNAs will have a positive effect by prohibiting or discouraging most uses except research. Under some circumstances, manipulation may be allowed (such as management-ignited fire) in order to reestablish natural disturbance regimes. Designation will enhance research opportunities on the Forest, offering researchers larger study areas in some of the least-modified ecosystems in the region. Because RNA designation is permanent, and Forest Service ownership is long-term, these areas will be suitable for long-term ecological studies.

Ecological Special Areas

Alternatives 2 and 3 designate all of the areas recommended for special area status in a protected designation. Aside from the two areas designated as cRNAs, the remaining sites are either designated as eSAs or as Future Old Forest (Table 3.10-8), for a total of 1,103 acres (Table 3.10-7). Acres of eSA designation total 312 acres in Alternative 2, and 531 acres in Alternative 3 (Table 3.10-6).

The effect of either eSA or Future Old Forest designation on the values associated with these areas is that these sites will be protected from extractive uses such as timber harvesting or surface extraction of minerals. Developed recreational uses will also be minimized or prohibited. There are no roads or motorized trails through these areas, and either designation will continue to protect them from motorized uses. Roads or trails bound some areas, and so the values of these areas may be vulnerable to incursions from motorized users. Under some circumstances, manipulation may be allowed to reestablish natural disturbance regimes or protect the values for which the areas are established.

Table 3.10-8: Management area designations[2] for existing cRNAs, existing eSAs, and areas recommended for special designation, by alternative.

Site Name	Alt. 1	Alt. 2	Alt. 3
Hector Oak Woods	cRNA	cRNA	cRNA
Potomac Creek Woods	cRNA	FOF	eSA
South of Blueberry Patch[1]	cRNA	eSA	eSA
Sawmill Creek Ravine	cRNA	cRNA	cRNA
Townsend Road Oak Woods	cRNA	FOF	eSA
Mill Creek Ravine	cRNA	eSA	eSA
Compartment 65 Shrub Opening	cRNA	OH	OH
Compartment 78 Oak Woods	cRNA	OH	OH
Compartment 14 Shrub Opening	cRNA	FOF	FOF
Compartment 61 Area	cRNA	NH	OH
The Ravine (Ravine Trail)	eSA	eSA	eSA
The Gorge (Gorge Trail)	NH	FOF	eSA
Blueberry Patch Swamp[1]	NH	eSA	eSA
Potomac Ravine	OH	eSA	eSA
Breakneck Creek	cRNA	eSA	eSA

Source: Forest GIS data, alternative and significant area coverages

Notes:

[1] South of Blueberry Patch and Blueberry Patch Swamp are combined in one special area referred to as “Blueberry Patch” in Alternatives 2 and 3.

[2] Management Area Designations: OH = Oak Hickory, FOF = Future Old Forest, NH = Northern Hardwood, cRNA = Candidate Research Natural Area, eSMA = Ecological Special Area

Future Old Growth Areas

As noted earlier, primary differences between Alternatives 2 and 3 in allocations to the reference area network lie in allocations to the Future Old Forest MA. Like under Alternative 1, areas of land unsuitable for timber harvesting within the Northern Hardwood or Oak Hickory MAs represent one percent of the Forest (Table 3.10-6), and will provide for small patches of future old growth under both Alternatives 2 and 3,

as they will not be harvested due to low productivity or site constraints. There are small differences among the two alternatives in age class distribution of the reference area network. Under Alternative 2, only 45 percent of the network is 70 years old or older, and 63 percent is 60 years old or older, while under Alternative 3, 51 percent is 70 years old or older and 68 percent is 60 years old or older. Consequently, both alternatives provide a network that will be a little younger than under Alternative 1, with Alternative 2 younger than Alternative 3. In any case, close to two-thirds of the reference area network in these alternatives is in the mature age class and may start developing old growth characteristics in 90 years. The slight reduction in age for the networks in these alternatives is a result of enlarging the size of the reference areas to ecological boundaries when possible, and providing connections among areas. This enlargement necessitated including some younger stands of trees, while building the network around the older stands.

The Future Old Forest Management Area is specifically designed to allow large tracts of forested land on the FLNF to develop into old forest, and possibly develop old-growth characteristics over the long-term. As noted in Table 3.10-6, Alternative 2 allocates the most acres to the Future Old Forest MA (3,821 acres) compared to Alternative 1 (zero acres) and Alternative 3 (1,398 acres). Both the RNA/cRNA and eSA designations will lead to old forest conditions, therefore, potential future old growth in these alternatives amounts to 4,854 acres (30%) in Alternative 2, and 2,655 acres (16%) in Alternative 3, compared to 783 acres (5%) in Alternative 1 (Table 3.10-6).

Although Alternative 2 provides almost twice as much land as Alternative 3 in the reference area network, the difference between them is far smaller than with the very small allocation in Alternative 1. Alternative 3 provides over three times the amount of land that could develop old forest conditions than provided in Alternative 1. Alternative 2 provides over six times the amount provided in Alternative 1.

Alternatives 2 and 3 provide an ample increase in the land area allowed to develop into old forest. This is a positive impact for the FLNF region, which has very little public or conservation land where this natural development is possible or likely. Having a portion of the public or conserved landbase in old forest conditions is beneficial because it provides managers a means of comparison between forest development in silviculturally regulated forests versus a natural disturbance regime. Providing for these old forest conditions also provides opportunity for species that may have locally declined or disappeared, as a result of land use history, to eventually return to these areas.

Alternatives 2 and 3 have the greatest potential for old forest conditions to develop on larger areas of the Forest (30% and 16%, respectively) due to the Future Old Forest allocation in these two alternatives. Large blocks of contiguous forest are allocated to this management area under both alternatives. By comparison, Alternative 1 provides the least potential for old forest conditions to develop because the blocks of land where these conditions could develop are small and fragmented.

In Alternative 2, four large blocks of land are designated as Future Old Forest, two of which surround the cRNAs on three sides. These blocks are well distributed across the Forest, with the three blocks toward the south close together, offering linkage opportunities across minimal amounts of open land. The northernmost block is separated from the others by grassland habitat. In Alternative 2, seven of the eleven areas recommended for special area status are embedded within these blocks.

In Alternative 3, there are three large blocks of land allocated to the Future Old Forest MA, allocated in a manner to build connections between areas of Future Old Forest and the other two special designations (cRNA and eSA). One area of Future Old Forest connects the Hector Oak Woods cRNA with The Gorge and Blueberry Patch eSAs, while another surrounds the Sawmill Creek Ravine cRNA. These blocks occupy the center of the FLNF, without the northernmost block in Alternative 2 included in the network. They are separated by grassland habitat that

traverses the entire federal ownership along Mathews Road, and by an area of Shrubland and Oak Hickory MA in the Potomac and Foster Ponds area. The remaining eSAs are scattered across the rest of the Forest, and are generally separated from each other and from Future Old Forest by forested and open land. Forested management areas connecting and adjacent to these areas will contribute to forested linkages between the blocks and other special designations, and with forested lands adjacent to the FLNF.

The areas of Future Old Forest in Alternative 3, like Alternative 2, include concentrations of stands that are at least 80 years old, while avoiding plantations and early successional habitats (Burbank 2006). Not all areas of mature forest were allocated to these designations, however, because such areas also provide opportunities for forest products like high quality sawtimber.

In terms of conservation planning and design, Alternative 2 provides more benefits than Alternative 1 or 3, due mainly to having blocks spread across the Forest from north to south, with most blocks linked to each other, and with special features contained within these blocks rather than isolated and embedded within more intensively managed lands. The values associated with intact, functioning ecosystems, which are part of the desired future condition for these special designations, are better enhanced with Alternative 2. The distribution of the blocks in this alternative, and their proximity to each other and the edges of the Forest, facilitate the movement of species that use this habitat into these areas. In addition, the larger number of blocks and larger area overall, help mitigate the risk of a large catastrophic disturbance event destroying an entire block or the special features within it.

Alternative 3 would be intermediate in terms of benefits for conservation planning and design as it has more than three times the land within protected MAs as in Alternative 1, although a little more than half of the lands of Alternative 2 (Table 3.10-6). Alternative 3 does provide some linkages, particularly those between three of the other special designations (Hector Oak Woods, The Gorge, and Blueberry Patch) to Future Old Forest blocks.

The town road network throughout the Future Old Forest MA is one negative effect that cannot be controlled by Plan revision. Having a greater proportion of the land in areas that are protected will require more monitoring and enforcement of protection measures in Alternative 2 as compared to Alternative 3. Closure orders can be issued for any of these areas, but they will only apply to Forest Service roads and trails, and will also need to be enforced.

Indicator 2 – Percentage of ecological units represented within the ecological reference area network (RNAs, cRNAs, eSAs, and future old growth areas)

Effects Common to All Alternatives

As noted for the previous indicator, areas within the ecological reference area network will be managed similarly for natural forest ecosystem processes and development of old forest or old growth conditions. Consequently, the percentages are not broken out in this section among the three management area types. The effect of these designations will be similar in that all of the areas will develop without extraction of commodities and with limited to moderate recreational use. Existing snowmobile trails will be allowed to continue within the Future Old Forest designation, although this is not likely to have major effects on development of old forest conditions. It may have more of an effect on the ability of animal species to navigate through these areas. More details on the effects of this designation on wildlife species are found in the Wildlife section (3.6) of this Chapter.

As noted previously, portions of the NCT and RSA MAs have the potential to develop old forest conditions and possibly old growth characteristics. While the management of these two MAs is focused on recreational opportunities, and tree cutting may occur as a result for new trail, vista, or recreational facility development, they are not considered suitable for timber management. Consequently, portions of these MAs have the potential to represent ecological

types where extractive uses are not allowed and management may be more limited. The RSA at Caywood Point in particular includes ecological types that are not common on the rest of the Forest, and may provide some of the best opportunities to represent these types. The extent to which projects and maintenance activities proposed in these areas affect existing patches of maturing forest will dictate the extent to which these areas serve to represent ecosystem types in the reference area network.

Alternative 1

In Alternative 1, all of the existing cRNAs and eSAs remain designated, and any new areas or expansion of existing areas occurred on newly acquired lands that did not have ELT mapping. Therefore the proportion of ELTs represented in the reference area network in this alternative is almost identical to that of the existing condition described above. All 14 ELTs are represented in the network, but at percentages ranging from one to 30 percent (Table 3.10-9). Most ecological landtypes have less than ten percent of their acreage in the reference area network, and nine out of 14 have less than five percent represented in the network.

Revised Forest Plan objectives for Goal 5 indicate a desire to manage at least five percent of each ecological type present on the Forest for old growth characteristics. Alternative 1 will not meet the objective for nine of the 14 ELTs on the Forest. With this alternative, achievement of the objective would require acquisition of new lands and allocation of some of those lands to the RNA/cRNA, eSA, or Future Old Forest MAs, or identification of some of these lands as otherwise unsuitable for timber harvesting. It should be noted that there are about 360 acres of land within these designations under Alternative 1 that have not been mapped with ELTs. There is a possibility that the representation of ELTs within protected areas could improve once it is known which ELTs are in these areas.

All of the six LTAs on the FLNF are represented within the reference area network, with proportions ranging from less than 1 to 13 percent of the Forest (Table 3.10-10). Half of the six LTAs are represented at 5 percent or more, while the other half do not meet the revised Forest Plan objective of representation of ecological types noted previously. LTAs not well represented include Allegheny Uplands, Allegheny Sideslopes, and Transitional Allegheny Lowlands. These are generally the more productive lands on the Forest, and comprise the bulk of the Hector Backbone. As noted for ELTs, land acquisition within these LTAs and allocation of new lands to the reference area network would be required to meet revised Forest Plan objectives under Alternative 1.

Alternative 2

All ELTs and LTAs are represented at above five percent in Alternative 2. This alternative has the highest representation of ELTs in protected management areas, ranging from 14 to 72 percent of ELTs represented (Table 3.10-9). LTAs are similarly well represented in this alternative, ranging from 10 to 50 percent (Table 3.10-10). This level of representation means it is more likely that much of the variation within ELTs and LTAs will also be managed for natural processes and older forest conditions. For one of the ELTs, representation is substantially greater than 50 percent of the area occupied on the Forest by that mapped ELT, which is generally higher than typically reserved for conservation of biodiversity associated with particular ecological systems.

Alternative 3

Alternative 3 is intermediate in providing representation of ELTs in areas managed for natural processes and older forest conditions. Like Alternative 2, all LTAs and ELTs are represented at higher than the revised Plan objective of 5 percent. The proportion of LTAs represented ranges from 7 to 44 percent (Table 3.10-10), while the proportion of the 14 ELTs represented in these management areas ranges from 6 to 43 percent (Table 3.10-9).

Three ELTs and three LTAs (half of the LTAs) are each represented at less than ten percent, compared to none in Alternative 2, and 11 of 14 ELTs and 6 of 7 LTAs in Alternative 1. While slightly higher than the minimum desired, representation of these six ecological types in the reference area network may not capture the entire range of variability associated with these systems. As noted earlier, ELTs have not been mapped on the entire current ownership of the FLNF, and so the ELTs may have additional acreage already protected in the unmapped portion of the network. There are 565 acres that have been allocated to the network under this alternative that have not been mapped for ELTs.

Cumulative Effects

The cumulative effects of all alternatives on RNAs/cRNAs, eSAs, and future old growth areas would be minor, but represent positive gains for the region. Past actions in the cumulative effects analysis area influenced the identification of the current pool of special areas. For example, the wide variety of land uses that have occurred in the last 150 years (such as timber harvest, agriculture, and road building) dramatically influenced the structure and composition of native plant communities of the pre-European settlement landscape (Marks and Gardescu 1992). These landscape-wide vegetation changes have narrowed the potential pool of representative native plant community types from which special areas could be identified.

Other past actions in the analysis area that influenced the identification of areas for special designation include designation of other public lands that prohibit or severely restrict ground disturbance, as well as past Forest Service planning efforts on the FLNF. Public lands managed for natural processes or protection of biodiversity include existing cRNAs (designated through past Forest planning efforts on the FLNF), and other areas designated by the State, towns, and conservation organizations. As noted previously, about four percent of the ecozone is represented in conserved areas, of which 60 percent is the FLNF. Of the remaining 40 percent probably a small proportion is managed for non-extractive uses. Many of these are gorges and wetlands, with most of the upland forest areas managed for multiple uses, primarily timber. Consequently, the FLNF is the area with the greatest opportunity for conservation of many of the ecological types and their associated processes and species in the analysis area.

All of the alternatives would contribute to an increase in the amount of these protected designations on public lands within the analysis area. The increase in these lands would be minor relative to the total acreage of forestland in the analysis area. Within the primary ecological region for the FLNF, the Forest represents less than two percent of the lands available for these designations. As minor as these acres are, given the limited availability of lands in the analysis area for these types of designations, any increases will be a positive gain for the region.

It is reasonably foreseeable that extractive or ground-disturbing activities could occur on Forest Service or private lands in the vicinity of RNAs/cRNAs, eSAs, or Future Old Forest under all of the alternatives. Such activities could lead to indirect effects on riparian portions downstream from these areas, but the cumulative effects would be minor because Forest Service actions would be influenced by standards and guidelines for protecting watersheds and riparian areas, as well as guidelines that protect the functioning of special designations adjacent to planned management activities. These indirect effects would be least noticed in Alternative 2, where most RNAs/cRNAs and eSAs are located within large areas of Future Old Forest. Under all of the alternatives, areas receiving cRNA, eSA, or Future Old Forest designation would experience minimal negative cumulative effects because of their protected status. Implementation of Alternatives 2 or 3, which include the full suite of designations, would have small but beneficial cumulative effects to other resources such as watershed, riparian areas, and some rare natural resources, because of the management guidelines associated with these areas.

Table 3.10-9: Acres and proportions[1] of ecological landtypes (ELTs) represented within the ecological reference area network (cRNAs, eSAs, and future old growth areas) across alternatives.

ELTs	Existing Condition		Alternative 1 Current Management		Alternative 2		Alternative 3	
	(acres)	(%)	(acres)	(%)	(acres)	(%)	(acres)	(%)
801	10	1	10	1	330	41	219	27
802	7	1	7	1	473	38	282	23
803	5	3	5	3	84	46	79	43
804	85	9	86	9	503	50	315	32
805	175	9	183	10	906	48	426	23
806	4	4	4	4	39	47	15	18
807	42	1	42	1	655	14	281	6
808	33	2	34	2	401	18	150	7
809	21	2	21	2	539	51	272	26
810	7	8	7	8	12	14	5	7
811	1	4	2	4	6	14	4	10
812	5	21	5	23	7	33	7	31
813	14	24	17	30	41	72	23	40
814	1	3	1	3	11	31	11	31
Total	410	3	423	3	4,007	30	2,089	16

Source: DeGloria (1998), Forest GIS data, ELT, timber model, and alternative feature classes
Notes:
[1] Total acres used to develop proportions are based on total ELT acres mapped for the FLNF, or 13,2 acres as shown in Table 3.10-5. The difference in acres between ELT total acres and the current ownership acreage of 16,439 is due to differences in data accuracy between the data used to develop ELTs and the current FLNF ownership data; and because ELTs were mapped only on the FLNF ownership during the late 1980s when the total acreage was approximately 13,370 acres.

Table 3.10-10: Acres and proportions of landtype associations (LTAs) represented within the ecological reference area network (cRNAs, eSAs, and future old growth areas) across alternatives.

Landtype Areas	Existing Condition	Alternative 1 Current Management	Alternative 2	Alternative 3
	acres (percent of LTA)	acres (percent of LTA)	acres (percent of LTA)	acres (percent of LTA)
Allegheny Uplands	8 (<1%)	8 (<1%)	788 (50%)	684 (44%)
Allegheny Sideslopes	56 (2%)	65 (2%)	1,468 (46%)	736 (23%)
Transitional Allegheny Moraine and Hills	146 (7%)	285 (13%)	921 (41%)	494 (22%)
Transitional Allegheny Lowlands	315 (4%)	359 (4%)	1,586 (18%)	683 (8%)
Finger Lakes Ravines, Cliffs, and Ledges	0 (0%)	15 (9%)	37 (21%)	12 (7%)
Finger Lakes Till and Lake Plain	27 (5%)	52 (9%)	55 (10%)	44 (8%)
Total	**552 (3%)**	**783 (5%)**	**4,854 (30%)**	**2,654 (16%)**

Source: DeGloria (1998), Forest GIS data, LTA, timber model, and alternative feature classes

3.11 TIMBER MANAGEMENT

This section focuses on the effects of the timber management program on the Finger Lakes National Forest (FLNF) in terms of the quantity of timber harvesting that could occur and the mix of silvicultural harvest methods that could be used to achieve desired resource objectives. The effects from timber management on the recreation resource, wildlife, vegetation composition, and socio-economic resources of the FLNF are discussed in the respective Chapter 3 sections (Recreation Opportunities 3.9, Wildlife and Wildlife Habitat 3.6, Vegetation 3.5, and Socio-Economics 3.20). The effects from timber management on the other physical and biological resources are discussed in relevant sections of Chapter 3. The impacts of timber management on forest type composition and age classes are discussed in the Vegetation (3.5) section of this Chapter.

Issue Statement

Public concern is focused on the role of timber harvesting, the amount of timber harvested, harvest methods, and management intensity. In addition, impacts of timber management activities on recreation, wildlife, and socio-economic resources are a concern. Other concerns include the continued use of FLNF timber sales as demonstrations of sustainable forestry.

Public concerns are addressed through various alternatives. This analysis will compare how the alternatives address:

- Levels of timber harvesting (intensity)
- Methods and uses for timber production (amount of even-aged and uneven-aged silvicultural systems)

Indicator 1 – Acres of Land Identified as Suitable for Timber Production

The first indicator to be used for this analysis is the acres of FLNF land identified as suitable for timber production. Suitable land for timber production is the basis for determining the maximum amount of timber volume that could be harvested sustainably over the long-term on National Forest System lands. FLNF inventory data was reviewed to ensure that only appropriate productive land was identified for timber management. Newly acquired land was also assessed for its suitability for timber management.

This indicator highlights the differences among alternatives because the acres of land suitable for timber production vary between each alternative. This is because the amount of land identified as suitable for timber production varies based on management area direction and management area allocation. The Oak Hickory and Northern Hardwood Management Areas (MAs) are the only MAs that have lands that can be considered suitable for timber production in the revised Plan.

Indicator 2 – Timber Sale Volume (Allowable Sale Quantity)

The second indicator for timber management is the timber volume that could be sustainably harvested each year through commercial timber sales. This volume is referred to as the allowable sale quantity (ASQ) and is determined based on the acres of land identified as suitable for timber management. This indicator reflects the maximum amount of timber volume that could be harvested from the FLNF and is measured in thousands of board feet (MBF) or thousand cubic feet (MCF). This indicator highlights the differences among alternatives because the ASQ would vary depending on the amount of land identified as suitable for timber production.

Indicator 3 – Silvicultural Prescriptions: Acres by Timber Harvest Method

The third indicator for timber management is the acres of even-aged and uneven-aged silvicultural treatments that could be used to meet short and long-term vegetative composition and age class objectives. Generally, tree species that require more sunlight benefit from even-aged silvicultural systems. Shade-tolerant species can be managed with either even-aged or uneven-aged silvicultural systems. This indicator does a good job of highlighting the differences among alternatives because vegetative composition and age class distributions would vary by alternative according to the mix of even-aged and uneven-aged silvicultural systems.

Analysis Area

The analysis area for direct and indirect effects includes all federal land managed by the FLNF.

The analysis area for cumulative effects includes all FLNF lands and the lands administered by other owners, both public and private, within Schuyler and Seneca Counties.

3.11.1 Affected Environment

Introduction

The FLNF, located in Schuyler and Seneca Counties, is New York's only National Forest and is one of the smallest National Forests in the country. Composition, age, and structure of the major forest communities present today on the FLNF are a result of a long history of land use. Across the central Finger Lakes region more than 70 percent of the landscape was forested in the 1790s. The land was divided and cleared for farming in the 1800s. By the early 1900s farms were abandoned, and between 1938 and 1941 more than 100 farms were purchased for what is now the FLNF. Early management of these lands focused on stabilization of the soil by planting conifers and development of a cooperative grazing program. By the 1950s, the soil had been stabilized, the forest was regenerating, and a sustainable grazing program was well established. In 1954 the Forest Service assumed responsibility for the administration of these federal lands because of their history of multiple-use management. In 1985 the Hector District of the FLNF was officially established.

Silvicultural treatments for high-quality sawtimber production began on the FLNF in the 1970s. By 1985 about 260 acres of hardwoods had been regenerated and about 450 acres had been commercially thinned. These treatments were instrumental in the improvement of the quality of the timber on the FLNF. They also improved wildlife habitat by creating a more diverse mix of forest types and age classes across the forested landscape.

The Forest Service recognizes the need to manage sustainable forest ecosystems as part of meeting natural resources objectives. The principle reason for harvesting timber is to meet resource management objectives, including desired conditions for scenery, vegetative composition, wildlife habitat, timber products, and forest health. Achieving sustainable forest ecosystems involves the conservation and restoration of ecosystem structure, composition, and processes. Timber management is an important tool in managing sustainable forest ecosystems.

Timber Sale Volume (Allowable Sale Quantity)

Allowable Sale Quantity (ASQ) is defined as the quantity of timber that may be sold from the area of suitable land covered by the Forest Plan for a time period specified by the Plan. This quantity is usually expressed on an annual basis as the average annual allowable sale quantity (36 CFR 219.3). The ASQ is the sum of all the wood products and expressed in thousands of board feet (MBF) or thousands of cubic feet (MCF).

Although a national forest may exceed the annual ASQ in a given year, the sum total of timber volume sold over the 10 year planning period cannot exceed the overall ASQ. ASQ is not a goal for production; it is a maximum amount that could be harvested sustainably. The ASQ can increase but cannot decline throughout the 15 decades. The National Forest Management Act (NFMA) limits the amount of timber to be sold to a quantity that is equal to or less than which can be removed annually in perpetuity on a sustained-yield basis. This is referred to as "Non-Declining Yield."

Only volume produced from timber harvesting on lands identified as suitable for timber management contributes to the ASQ. Timber harvesting may be used as a management tool on other National Forest System lands to achieve objectives associated with their values; however, this volume does not contribute to the ASQ.

Lands Suitable for Timber Production-Suitable Forest Lands

Suitable forest land constitutes the land base for determining the ASQ where management for timber production occurs on a regulated basis. Land is considered tentatively suitable forest land when it has the capability of producing 20 cubic feet of commercial wood per acre per year.

The process for determining forest land suitability is described in 36 CFR 219.14. There are four major steps in determining suited forest land:

1. The first step separates forest land from non-forest land (grassland, shrubland, roads, power-lines, wildlife openings, and water).
2. The forest land is then reduced by lands withdrawn by an Act of Congress, the Secretary of Agriculture or the Chief of the Forest Service; lands which the Forest Service cannot assure restocking (reforestation) within 5 years; and lands where irreversible damage to the soils or watersheds would occur.
3. The remainder is considered tentatively suitable forest lands.
4. The tentatively suited forest land is further reduced by site-specific issues and land allocation decisions made during the Forest planning process to determine the suitable forest land acres. These reductions include management area designations, areas that require excessive logging costs, designated recreation sites, and Threatened, Endangered, and Sensitive species habitat, among others.

Existing Forest Plan Management Direction

The 1987 Forest Plan directs the Forest Service through Forest-wide goals and objectives to manage timber to maintain and enhance vegetation diversity, wildlife habitats, and vistas; improve the health and condition of the forest ecosystem; and produce high quality sawtimber and other wood products. Timber harvesting through commercial timber sales will be done if it helps achieve these conditions and other management area objectives and if the environment can be adequately protected.

Forest-wide standards and guidelines associated with timber harvest activities are designed to minimize adverse resource effects to resources. FLNF timber sales also serve as demonstrations of sustainable forest management in the Finger Lakes region. The 1987 Forest Plan provides vegetation management objectives that determine projected annual outputs by forest type and harvest method (Table 3.11-1). The Plan recognizes the selection of the proper harvest method depended primarily on the desired management objective. The Plan provides definitions for the silvicultural systems to be used to manage the timber resource. Although there are many harvest methods used in managing forest lands, there are only two silvicultural systems discussed in the Plan: 1) even-aged silvicultural system (including clearcutting, standard shelterwood, delayed (with reserves) shelterwood, and thinning); and 2) uneven-aged silvicultural system (including individual tree and group selection). Direction on selection of system and harvest method to achieve desired management objectives are provided in the

Forest-wide and MA standards and guidelines, and an appendix to the 1987 Plan (Appendix A).

Even-aged Silvicultural System

The 1987 Forest Plan provided for the use of even-aged silvicultural system harvest methods to achieve resource objectives such as diversity of stand types and age classes, regeneration of species which are intolerant to shade such as oak, aspen, and locust, regeneration of high-risk and sparse stands, prevention of the spread of insects and disease, and to produce high-quality sawtimber and other wood products. The 1987 Plan indicated that even-aged shelterwood methods would be the most common type of harvest on the FLNF. Shelterwoods accomplish desired even-aged resource objectives while retaining important stand attributes such as structure and visual quality.

Table 3.11-1: 1987 Forest Plan timber production objectives by harvest method.

Harvest Method	Acres
Shelterwood	30
Overstory Removal	20
Thinning Harvest	50
Uneven-aged Harvest	15
Clearcut Red Pine	10
Clearcut Locust	3
Clearcut Aspen	2

Shelterwood cutting is normally conducted with two closely associated harvests. The first cut removes at least 50 percent of the overstory trees to create regeneration of seedlings. The removal cut is conducted three to seven years after the first cut to release the new stand of seedlings and saplings. Ideally, 40 to 50 years after the removal cut, thinning harvests are conducted every 15 to 20 years throughout the rotation to maintain healthy stand conditions and to favor desirable tree species.

A variation of the shelterwood harvest method is “shelterwood with reserves” harvesting. The Forest Plan referred to this method as “delayed shelterwood” and it is also known as “deferment cutting.” This method is similar to shelterwood harvesting, except the removal cut is delayed 30 to 40 years. Delayed shelterwoods are desirable for the regeneration of stands in visually sensitive areas where even-aged management is the preferred silvicultural system. This is a two-aged silviculture method which has the advantages and some disadvantages of both the even-aged and uneven-aged silviculture systems.

Clearcutting is a harvest method used to create conditions for shade intolerant tree species. On the FLNF, clearcut methods are more correctly called clearcutting with reserves, according to the Society of American Foresters (SAF) terminology. Clearcutting is used to regenerate new stands of aspen and locust, create early successional wildlife habitat, and convert non-native conifers to native hardwoods.

Intermediate cuts, referred to in the Forest Plan as thinnings, and are to be used to accelerate growth of individual trees, release oak mast trees, and salvage individual trees. Frequency of thinnings is determined based on the type of trees being managed, the productivity of the site, and the overall resource objectives for the area.

Uneven-aged Silvicultural System

The 1987 Forest Plan provided for the use of uneven-aged silvicultural system harvest methods to achieve resource objectives such as diversity of species and age classes within a stand, maintain continuous forest cover in areas with highly sensitive views, maintain shade along streams, regenerate tree species that are tolerant of shade, and produce high-quality sawtimber and other wood products.

The individual tree selection harvest method is to be used primarily in mixed hardwood stands where shade-tolerant species are desired, hemlock stands, and areas receiving high public use. The group selection harvest method will generally result in cuts of two acres maximum and be used in: mixed hardwood stands where species that are intermediately tolerant to intolerant are desired; white pine and spruce stands; areas needing removal of high-risk and

low-quality trees; areas needing small, temporary openings for wildlife and visuals; and to facilitate the conversion of even-aged stands to uneven-aged stands. Uneven-aged management entries in hardwood stands are normally every 15 to 20 years.

Individual tree and group selection cutting is used to regenerate shade tolerant tree species while maintaining a continuous tree canopy. It is often used in highly sensitive visual areas such as roadsides, trails and recreation sites. It is also used to remove individual trees in riparian areas to maintain shade along streams.

Reforestation, Release, and Timber Stand Improvement

The 1987 Forest Plan provided direction to adequately regenerate harvested areas within five years after regeneration cuts by either natural or artificial means. Site preparation methods such as mechanical, hand, and prescribed fire are provided to ensure regeneration as well as direction for surveys to ensure minimal stocking levels to meet desired resource objectives. The Plan also provided direction for the non-commercial release of young desirable tree species to achieve objectives such as enhancing the survival of oak stands.

The 1987 Plan determined that only two management areas, 2.1 and 3.1, contain lands that are suitable for timber production.

Management Area 2.1, continuous forest canopy, is predominantly managed to emphasize uneven-aged silviculture that maintains continuous forest cover (canopy). The main intent of this MA is to provide natural-appearing, vigorous stands of trees in areas that are visually sensitive. Approximately two percent of the FLNF is currently managed as MA 2.1.

Management Area 3.1, mosaic of forest conditions, is predominantly managed to emphasize a variety of stand ages across the landscape. Even-aged silviculture is used to maintain oaks, aspen, locust, and conifers. Approximately 41 percent of the FLNF is currently managed as MA 3.1.

Proposed Changes in Management Direction Common to All Alternatives

The revised Forest Plan continues the 1987 Forest Plan direction for the use of timber harvesting to achieve multiple resource management objectives but provides clarification in the goals, objectives, standards, guidelines, and MA direction.

Goals associated with timber management in the revised Forest Plan include: to maintain and restore the quality, amount, and distribution of habitat (Goal 2); to provide for a sustainable supply of forest products (Goal 8); to demonstrate innovative, ecologically sound management practices and provide a range of information and educational opportunities (Goals 9 and 12); and to support regional and local economies through resource production and protection (Goal 14).

Objectives associate with these goals include: forest composition and structural objectives, to provide high-quality sawtimber and other wood products for local economies, and establish a demonstration forest site.

Forest-wide standards and guidelines have been updated and refined to clarify the selection of silvicultural systems, application of even-aged and uneven-aged silviculture, and reforestation.

The revised Forest Plan will redistribute the acres of suitable timberlands and provide a different ASQ based on new information provided by an updated and more intensive forest inventory and more reliable growth and yield timber models. The forest inventory was more intensive than those previously conducted and provides a better picture of the existing vegetation types that will be the basis for more accurately identifying lands that are suitable for timber management.

Management areas identified as suitable for timber management in the revised Forest Plan, Oak Hickory and Northern Hardwood MAs, have new names that reflect desired vegetative conditions. These areas, however, generally maintain similar management direction as their counterparts (Management Area 2.1 and 3.1, respectively) in the 1987 Plan.

Existing Condition

Forest Productivity

Timber productivity is measured by the number of cubic feet of wood per acre per year that can be grown. Due to the small elevation variation on the FLNF and adjoining private lands, there is little variation of forest productivity between the two. The most productive sites are generally in the northern part of the Forest, due to deeper soils. Generally, the poorer sites occur along the Hector Backbone where the soils tend to be shallower and in wetter areas.

The National Forest Management Act (NFMA) directs that stands shall generally have reached culmination of mean annual increment prior to a regeneration harvest. This would apply to clearcuts and shelterwoods. The age when a northern hardwood stand reaches culmination of mean annual increment is generally before 50 years. For oak stands, the culmination of mean annual increment is between 35 and 45 years (Table 3.11-2). NFMA also restricts harvesting to productive timberlands where there is assurance that such lands can be adequately restocked within five years of harvest.

Suitable Forest Land

The 1987 Plan identified 6,086 acres (46%) of the FLNF lands as suitable for timber management. This represents about 70 percent of the forested lands. Suitable timberland must have the capability of producing 20 cubic feet of commercial wood per acre per year. Since the 1987 Plan, 1,159 acres have been acquired, of which 85 percent of are tentatively suitable for timber production.

Timber Sale Volume (Allowable Sale Quantity)

The 1987 Forest Plan determined the average annual ASQ to be 400 thousand board feet (66.8 thousand cubic feet) for the planning period. Over the life of the 1987 Plan, the actual volume harvested and sold averaged 248 thousand board feet annually.

The Forest Plan set vegetative composition and age class objectives to be accomplished through commercial timber harvesting. Since the average annual ASQ was not met, most of these objectives were not obtained. Limited budgets were a primary reason for not meeting desired objectives. Other factors that contributed to this shortfall include: over-estimates for pulpwood and firewood markets, including assumptions used for determination of suitable lands; effect of standards and guidelines; and estimation of growth and yield.

Table 3.11-2: Culmination of mean annual increment (CMAI) for FLNF species.

Species	Site Index[1]	CMAI Age
Upland Oaks	50	35 years
	60	45 years
Northern Hardwoods	50	59 years
	60	50 years
	70	44 years
Non-native Softwoods[2]	40	35 years
	50	40 years
White Pine	40	80 years
	50	70 years
	60	60 years
	70	60 years
	80	50 years

Source: USDA, Soil Conservation Service
Notes:
[1] Site index is a measure of productivity determined by how tall a tree grows over a certain amount of time; the higher the productivity, the higher the site index.
[2] Including Virginia pine, scotch pine, and red pine.

Silvicultural Prescriptions (Timber Harvest Methods)

It is often difficult for the public to recognize the harvests on the FLNF as even-aged or uneven-aged. Uneven-aged treatments may retain 60 percent of the trees present before the harvest. Thinning harvest and the first shelterwood harvest cut often retain the same amount of trees. Short-term harvest methods are therefore very similar. Long-term silviculture objectives, however, are quite different.

Most private lands in the Finger Lakes region do not have forest management plans. Most harvesting on private lands, especially on farm woodlots, consists of liquidation harvesting of high quality sawtimber. Larger woodlots generally receive selection harvesting. Given the predominance of these silvicultural methods on private lands, shade-intolerant species, such as oak, will eventually be replaced with shade-tolerant species such as maple (Birch 1983).

Both even-aged and uneven-aged silvicultural methods have been used during the last planning period. These harvest methods have successfully established regeneration, improved stand quality, improved wildlife habitat, and accomplished other Forest Plan objectives.

Delayed shelterwood harvest methods, also known as shelterwood with reserves, have been used on a limited based on the FLNF. Monitoring by the Forest Silviculturist from 1993 to 2005 of a shelterwood with reserves near the Potomac Campground has shown that this method has met the objectives of establishing oak regeneration although growth of the new stand is restricted due to the partial shade (USDA Forest Service 1993 to 2005).

During harvest operations, skid trails and log landings are normally built to move the logs from the stump to nearby roads. Soil disturbance from skidders, logging noise, scenery change, and increased truck traffic on rural roads potentially impact other resources. A Forest Service timber contract inspector supervises timber sale operations to minimize these disturbances and protect other resource values.

Timber Markets

In 2002, sawmills and other wood processing plants processed 1.7 million cubic feet of wood products in Seneca and Schuyler Counties. The majority (63%) of the wood was sawtimber and veneer. Firewood composed 35 percent of the wood, and 2 percent was shipped to paper mills in Pennsylvania (RPA 2002). In 2002, less than one percent of the wood harvested within the two counties was from the FLNF. Two sawmills in Schuyler County utilized most of the FLNF wood.

Harvest levels on the FLNF have little impact on the wood supply in the Finger Lakes region. There are no mills dependent upon the Forest for a wood supply. If the Forest Service offers high-quality sawtimber for sale, local sawmills have been and are expected to, buy FLNF timber. The markets for pulpwood, firewood, and chipwood are very limited. There is little expectation that roundwood (pulpwood, firewood, and chipwood) markets will improve in the near future.

3.11.2 Environmental Consequences

Direct and Indirect Effects by Alternative

Although there have been changes proposed in the revised Forest Plan goals, objectives, and Forest-wide standards and guidelines, the overall direction associated with timber management on the FLNF to meet different resource objectives would not be greatly altered. Each alternative, however, has a different level of opportunity for timber management over the short and long-term time period. The difference in the opportunity for timber management by alternative is highlighted by the indicators since each alternative has a different mix of MA allocations where timber harvest is emphasized.

Indicator 1 – Acres of Land Identified as Suitable for Timber Production

Effects Common to All Alternatives

The amount of land identified as suitable for timber production varies among alternatives by the amount of land allocated to management areas where timber production is appropriate. The MAs that are appropriate for timber production include: Northern Hardwood and Oak/Hickory Management Areas. These MAs also contain some lands that are not appropriate for timber production, such as inclusions of steep slopes, wet soils, and riparian areas. Outside the Oak Hickory and Northern Hardwood MAs timber harvest occurs infrequently and does not contribute to the ASQ. Table 3.11-3 displays the amount of land suitable for timber management.

Suitable forest land determination is a step-by-step process. Generally, once the tentatively suitable forest land is determined, the alternatives deviate from each other due to allocation of management area designations. The amount of suitable forest land has effects on the opportunity for timber harvesting to achieve desired vegetative objectives.

Table 3.11-3: Acres of FLNF land suitable for timber production by alternative.

	Alt. 1 Current Mgt.	Alt. 2	Alt. 3
	acres (percent)	acres (percent)	acres (percent)
Suitable Land	6,677 (41%)	3,846 (23%)	5,700 (35%)

Source: FLNF GIS database, timber model layer 2004

Alternative 1

Alternative 1 has the greatest amount of land suitable for timber management, including 5,811 acres (36%) that the 1987 plan had determined suitable and an additional 866 acres (5%) of newly acquired lands, for a total of 6,677 acres (41%) (Table 3.11-3).

Alternative 2

This alternative has the least amount of lands considered suitable for timber management. A total of 3,846 acres (23%) of land would be considered suitable for timber management (Table 3.11-3). This includes 277 acres (2%) of newly acquired lands. A substantial portion of the tentatively suitable timberlands is allocated to the Future Old Forest MA in this alternative.

Alternative 3

Compared to the other alternatives, Alternative 3 is intermediate in the amount of land suitable for timber management. A total of 5,700 acres (35%) are considered suitable for timber management, which includes 476 acres (3%) of newly acquired lands (Table 3.11-3). Compared to Alternative 2, this alternative has smaller blocks of the Future Old Forest MA, which are located west of Ballard Pond and east of Sassafras Pond, which are not part of the suitable land base.

Indicator 2 – Timber Sale Volume (Allowable Sale Quantity)

Effects Common to All Alternatives

The application of vegetation treatments and allocations to various management areas affects the potential volume of timber produced under each alternative. For the purpose of this analysis, the short-term covers the first decade and the long-term reaches 15 decades into the future.

Table 3.11-4 displays the proposed average annual ASQ for each alternative. The timber volumes are the maximum amount of timber products that could be sustainably harvested and sold. The volume numbers are based on the SPECTRUM model outputs for the decade and displayed as average annual units (See Appendix B for more information on the modeling process). Volumes are displayed in thousands of board feet (MBF) for all commercial wood products including sawtimber, pulpwood, commercial firewood, and other wood products. The SPECTRUM model outputs are calculated assuming full funding of the timber program and availability of product markets. The model also incorporates known

resource conditions and revised Forest Plan vegetative objectives, standards, and guidelines.

For all alternatives, the ASQ consists of a 50/50 mix of sawtimber to pulpwood in the first decade, and would change to a 60/40 mix in 150 years.

Alternative 1

Alternative 1 has the highest ASQ compared to the other alternatives. It would provide an ASQ of 425 thousand board feet annually for the first and second decades modeled (3.11-4). This alternative reflects the increase of suitable timberlands from newly acquired lands, raising the ASQ from the 1987 Plan. Starting in the third decade through decade 15 (150 years), the annual ASQ would increase to 439 thousand board feet.

Table 3.11-4: Proposed average annual allowable sale quantity (ASQ) for the next 15 decades, by alternative.

Decade	Alt. 1 Current Mgt.	Alt. 2	Alt. 3
	(MBF)[1]	(MBF)[1]	(MBF)[1]
1	425	94	258
2	425	94	258
3 to 15	439	94	258

Notes: This analysis was run for each decade up to 150 years into the future.
Source: SPECTRUM model output 2004 and 2006 for FLNF.
Notes:
[1] MBF = Thousand Board Feet

Alternative 2

Alternative 2 has the lowest ASQ compared to the other alternatives. It provides an ASQ of 94 thousand board feet annually for the first decade. In 150 years, the annual ASQ would remain at 94 thousand board feet.

Alternative 2 provides the least opportunity for timber harvest compared to the other alternatives due to the allocation of tentatively suitable lands to MAs that prohibit or restrict harvesting that contributes to ASQ.

Alternative 3

Harvest levels are intermediate under Alternative 3 compared to the other alternatives. Alternative 3 provides an ASQ of 258 thousand board feet annually for the first decade. In 150 years, the annual ASQ would remain at 258 thousand board feet.

Alternative 3 provides the greatest amount of sawtimber in the short-term. Although the total volume harvested (ASQ) would be less than in Alternative 1, Alternative 3 contains more stands of quality sawtimber trees within the Northern Hardwood MA. Over the long-term, the amount of high-quality oak sawtimber would decrease with Alternative 3.

Indicator 3 − Silvicultural Prescriptions: Acres by Timber Harvest Method

Effects Common to All Alternatives

All alternatives provide opportunities to implement a mixture of all harvesting methods. Table 3.11-5 shows the average annual acres proposed to be harvested on the Forest between 2005 and 2014. This analysis assumes that although any silvicultural methods may be used, generally even-aged silvicultural systems will be used in the Oak Hickory MA and uneven-aged silvicultural systems (individual tree and group selection) will be used in the Northern Hardwood MA. Clearcutting would occur in stands of aspen, locust, and non-native conifers. Shelterwoods and thinnings would occur in oak-hickory stands.

Alternative 1

As indicated in Table 3.11-5, Alternative 1 would have the most projected acres (97 acres) of even-aged timber harvest annually. Harvesting could occur on 43 percent (land allocated to Northern Hardwood and Oak-Hickory MAs) of the FLNF under Alternative 1.

Alternative 2

This alternative would have the lowest projected amount of even-aged (20 acres) harvesting, as well as the lowest projected total acres (35 acres) harvested annually (Table 3.11-5). Harvesting

could occur on 26 percent (land allocated to Northern Hardwood and Oak-Hickory MAs) of the FLNF under Alternative 2.

Alternative 3

Alternative 3 would be intermediate in the amount of timber harvesting compared to the other alternatives. Timber harvesting could occur on 38 percent (land allocated to Northern Hardwood and Oak-Hickory MAs) of the FLNF. Most of the projected annual harvesting would be even-aged cutting methods (51 acres).

Table 3.11-5: Projected average annual acres to be harvested between 2005 and 2014.

Harvest Method	1987 Plan	Alt. 1 Current Mgt.	Alt. 2	Alt. 3
	acres percent	acres percent	acres percent	acres percent
Thinning	50 (42%)	55 (42%)	10 (28%)	29 (33%)
Shelterwood Regeneration	30 (25%)	25 (19%)	5 (14%)	12 (14%)
Selection	15 (12%)	35 (26%)	15 (43%)	36 (41%)
Shelterwood Removal	20 (17%)	9 (7%)	3 (8%)	6 (7%)
Clearcut	5 (4%)	8 (6%)	2 (7%)	4 (5%)
Total	**120**	**132**	**35**	**87**

Source: SPECTRUM model output 2004 and 2006 for FLNF.

Cumulative Effects

The Finger Lakes region is characterized by small woodlands in a highly fragmented landscape. Most landowners do not have sustained-yield timber harvest objectives and harvesting on private woodlots is harvesting of large diameter, high quality sawtimber. The FLNF and other public lands (State forests and State wildlife management areas) provide opportunities to demonstrate a variety of timber harvesting methods.

Alternative 1 and 3 provide the greatest variety of harvesting methods, including shelterwood harvesting, clearcutting, and thinning harvesting individual tree and group selection. As a result, Alternatives 1 and 3 provide the greatest opportunity for demonstrating sustainable forest management.

Alternative 2 provides fewer opportunities than Alternative 1 and 3 to demonstrate various timber harvest methods. Alternative 2, however, would provide opportunities to demonstrate restoration of old-growth conditions.

Alternative 3 provides opportunities to demonstrate timber harvest methods as well as restoration of old-growth conditions.

Harvest levels on the FLNF have little impact on the wood supply in the Finger Lakes region. There are no mills dependent upon the Forest for a wood supply. If the Forest Service offers high-quality sawtimber for sale, local sawmills have been, and are expected to, buy FLNF timber.

Timber markets in the Finger Lakes region are currently influenced by harvesting on private lands. The FLNF contributes less than one percent of the total volume harvested within Seneca and Schuyler Counties. In the long-term, there will be increased pressure to convert private timberlands into primary and secondary homes. Timber management will not be an objective for many of these new landowners. Woodlands on private lands will increasingly be managed for recreation and wildlife objectives (Birch 1983). The Forest Service's multiple-use management objectives will become increasingly important to the public because private management focuses on fewer uses. Public lands, including the FLNF, could fill a regional niche by providing high-quality sawtimber and demonstrating sustainable forest management practices.

3.12 RANGE MANAGEMENT

Issue Statement

Public concern is focused on the availability of resources for maintenance of grassland, pasture, and infrastructure, and the need for monitoring of grazing management effects on grassland species and aquatic ecosystems. Range management is part of the general issue of biodiversity and ecosystem management. See Wildlife section 3.16 and Water and Fisheries section 3.3 for more information about the impacts of grazing to those resources. Monitoring and evaluation information can be found in the revised Forest Plan.

Indicator 1 – Animal Unit Months (AUMs)

The first indicator to be used in the rangeland and grazing effects analysis is the amount of feed required by an animal unit (AU) for one month. The AU is a production measurement based on one mature (1,000 lb.) cow having an average daily forage consumption of 26 pounds of dry matter. Animal Unit Months (AUMs), based on the number of rangeland acres grazed with livestock, are calculated for each alternative. These calculations account for the need to conserve sufficient ungrazed vegetation for grassland-dependent wildlife species, notably songbirds, by limiting the amount of forage utilized by cattle to 60 percent of the total forage in the pasture. The AUMs per acre are approximately 2.4. This indicator effectively highlights the differences among alternatives because it quantifies the available forage needs for livestock based on differences in acres available by alternative.

Indicator 2 – Number of Livestock Watering Facilities Maintained, Enhanced, or Created

The second indicator to be used in the rangeland and grazing effects analysis is the number of livestock watering facilities maintained, enhanced, or created. This indicator does a good job of highlighting the differences among alternatives because maintenance and construction needs can be readily quantified.

Analysis Area

The analysis area for direct and indirect effects includes all federal land managed by the Finger Lakes National Forest (FLNF). The analysis area for cumulative effects includes all FLNF lands and the lands administered by other owners, both public and private, near the FLNF.

3.12.1 Affected Environment

Introduction

Cattle and livestock grazing are common in the Finger Lakes region of New York. Grazing on the FLNF was started more than 60 years ago to demonstrate sustainable and productive uses of the land. Grazing on the FLNF allows farmers to use their own land for more intensive purposes like farming cash crops (Geisler and Silberling 1992).

Grazing of cattle and some horses has occurred on much of the FLNF since formation of the Hector Cooperative Grazing Association in 1943. Since then, the Association has been issued a grazing agreement to implement sustainable grassland management strategies. The terms of the agreement require that range management activities adhere to standards and guidelines outlined in the Allotment Management Plan (AMP). A detailed environmental review of the AMP occurred in 1999 and a decision was made to continue livestock grazing by re-issuance of the agreement for a 10-year term.

Existing Forest Plan Management Direction

The 1987 Forest Plan as amended in 1999 identified the role of range management on the FLNF to enable livestock owners to maintain a historic livelihood and continue to demonstrate sustainable agriculture. The goal of range management, as identified in the Plan, is to produce range forage commensurate with demand and compatible with other Forest uses. Standards and guidelines for range management identify practices to ensure sustainability; these include direction on forage production and utilization, forage improvement, and fence construction and maintenance.

The 1987 Forest Plan standards and guidelines recognize the interrelationship of grazing and pasture use by many species, notably birds and humans, directing that no more than 60 percent of annual forage production will be utilized by domestic livestock.

In 1999 the 1987 Plan Amendment 2 and the Allotment Management Plan addressed issues regarding management of grasslands suitable for livestock grazing and grassland dependent wildlife species. Decisions in the Amendment address the level and intensity of grazing and the adequacy of pasture infrastructure, such as fences, watering ponds, and corrals. Program funding, and the complementary uses of pastures by livestock, wildlife, and recreationists, were also examined.

Proposed Changes in Management Direction Common to All Alternatives

The revised Forest Plan will continue the overall direction of the amended 1987 Plan with added clarification of goals, objectives, standards and guidelines. The revised Plan's Goal 7 provides for sustainable use of Grasslands for Grazing on the FLNF. The revised Plan also includes an objective that provides for functioning livestock watering facilities to support approximately 10,000 AUMs annually.

The existing Plan did not provide Forest-wide standards and guidelines direction. The revised Forest Plan includes Forest-wide standards and guidelines for range management. Proposed changes in management direction consist of new guidance related to other resources, such as recreation, wildlife and soils. The revised Forest Plan will provide guidance and emphasis on preventing new non-native invasive species (NNIS) infestations as well as containing, controlling, and treating established NNIS infestations. Another proposed change in management direction is the clarification of management objectives for water quality in streams, wetlands, ponds, and riparian areas.

The revised Forest Plan's Goal 4 provides for maintenance or restoration of aquatic, fisheries, riparian, vernal pools, and wetland habitats. The Forest Service has added the following objective to Goal 4 in the revised Forest Plan: "Take needed measures to control cattle access on all water resources (including stock ponds, streams, wetlands, seasonal pools, and riparian areas) within the next ten to fifteen years." Standards and guidelines excluding livestock from grazing in and near wetlands, ponds, streams, and riparian areas will not be fully implemented when the revised Forest Plan takes effect because it will take many years to fence out (or in other ways exclude) livestock from all such areas. In the meantime, the Forest Service plans to allow continued grazing.

Existing Condition

Currently 4,894 acres, 29 percent of FLNF, are grazed with cattle annually between May 15 and October 30. A permit issued to the Hector Grazing Association provides terms for grazing their members' livestock. The number of beef and dairy cattle permitted to graze five months annually is 1,600 head (individual cows or cow/calf pairs) or 11,803 AUMs. The actual number of cattle annually grazing averages 1,280 cow and cow/calf pairs, or 9,432 AUMs, because not all infrastructure improvements (watering ponds, fences, corrals) are completed on newly acquired grasslands added to the grazing

program in 1999. Fifty-six watering facilities (46 ponds and 10 troughs) currently exist on the FLNF. Of these facilities, 11 ponds and 3 troughs require maintenance over the next 10 to 15 years.

Annual agency appropriations to maintain existing infrastructure and funding for survey, design, and construction of new watering ponds and fences are limited. Maintenance and construction projects are prioritized as funding allows (USDA Forest Service 1999d, 2003q, 2004d).

Pastures are variable in size, ranging from about 25 acres to 250 acres. Vegetation in pastures grazed with livestock is dominated by grasses and forbs, with some shrub and forest areas interspersed. To provide for wildlife habitat needs in grasslands, no more than 60 percent of forage is available for livestock consumption. Annual mowing on selected fields promotes desirable forage growth, although goldenrod, knapweed, and other non-native invasive plants continue to persist. Mowing is typically delayed until after songbird nesting is complete when some non-native invasive plant seeds have already been dispersed. See section 3.5.2 for more information on Non-native Invasive Species.

A wide variety of songbirds are reliant on rangelands for nesting. Annual monitoring of available forage and songbird use is done throughout the rangelands. See section 3.6 for more information on wildlife and wildlife habitat.

3.12.2 Environmental Consequences

Direct and Indirect Effects by Alternative

Indicator 1 – Animal Unit Months (AUMs)

Effects Common to All Alternatives

All alternatives would accomplish the goals and objectives of the revised Forest Plan by providing sustainable use of grasslands for grazing on the FLNF. Under all alternatives, there will be no reduction in acreage currently grazed annually and that have infrastructure (such as fencing and livestock ponds) in place. Under all alternatives, sufficient vegetation for wildlife using grazed fields is provided. None of the alternatives propose more than 60 percent of the available forage for use by livestock. In the Grassland for Grazing Management Area additional infrastructure improvements, such as fencing and livestock ponds, will be made on acres that do not already have improvements. This means that improvements will be made on 544 acres in Alternative 1 and 159 acres in Alternatives 2 and 3.

Alternative 1

Under Alternative 1, 36 percent of the FLNF, or 5,912 acres, is designated in the Grassland for Grazing Management Area and is available for grazing. This alternative has a production estimate of 9,705 AUMs and can provide forage for 1,317 cow and cow/calf pairs (Table 3.12-1).

Alternatives 2 and 3

Alternatives 2 and 3 allocate 5,250 acres (662 acres less than Alternative 1) to the Grassland for Grazing MA. Alternatives 2 and 3 have production estimates of 9,510 AUMs and can provide forage for 1,291 cow and cow/calf pairs (Table 3.12-1). Areas in the Grassland for Grazing Management Area in Alternative 1 are designated as Grasslands for Wildlife in Alternatives 2 and 3.

Table 3.12-1: Variations in animal unit months (AUMs) and water facilities maintained, enhanced, or created on the FLNF by alternative.

Indicator	Alt. 1 Current Mgt.	Alt. 2	Alt. 3
Indicator 1: Animal Unit Months (AUMs)	9,705 AUMs	9,510 AUMs	9,510 AUMs
Indicator 2: Number of Watering Facilities Maintained, Enhanced or Created	21 facilities	16 facilities	16 facilities

Source: USDA Forest Service 2003r, USDA Forest Service 1999a

Indicator 2 – Number of Livestock Watering Facilities Maintained, Enhanced, or Created

Effects Common to All Alternatives

Based on current condition inventories, eleven of the existing 46 watering ponds and three of ten existing watering troughs require maintenance over the next 10 to15 years under all alternatives. The Hector Grazing Association's annual grazing fees are used by the Forest Service for grazing infrastructure improvement, including watering pond construction and maintenance. The Forest Service gives fee credits to the Hector Grazing Association for making grazing infrastructure improvements themselves.

Alternative 1

Under Alternative 1 a total of 21 facilities may be created, maintained, or enhanced over the next 10 to 15 years. An estimated six ponds and one trough will require construction as an additional six pastures are brought into production on lands that do not currently have grazing infrastructure (Table 3.12-1).

Over the next 10 to 15 years, the accumulation of fee credits applied to the Hector Grazing Association's annual grazing fees will continue as the six new watering pond construction costs and watering facility maintenance costs are paid in the year they occur by the Hector Grazing Association.

Alternatives 2 and 3

Under Alternatives 2 and 3 a total of 16 facilities (five less than in Alternative 1) may be created, maintained, or enhanced over the next 10 to 15 years. An estimated two ponds will be constructed as two additional pastures are brought into production on lands that do not currently have grazing infrastructure (Table 3.12-1).

Over the next 10 to 15 years, the accumulation of fee credits applied to the Hector Grazing Association's annual grazing fees will be less than in Alternative 1 as only two new watering ponds will be built and watering facility maintenance costs are paid in the year they are incurred by the Hector Grazing Association.

Cumulative Effects

Within the Finger Lakes region there is a decline in the available grazing land resources because of a variety of economic factors including development and changes in the tax structure (USDA Forest Service 1999b). Implementing Alternative 1 would have the most positive cumulative impacts in the area surrounding the FLNF by increasing grazing land potential for area farmers. Required infrastructure improvements would make additional acres available for grazing. More land (662 acres) would be available with greater forage production (AUMs) than in Alternatives 2 and 3. No negative cumulative effects on the range resource would occur by adding additional watering facilities to the existing system.

Implementing Alternatives 2 or 3 would also have positive cumulative effects on the grazing resource by increasing grazing land potential for area farmers through additional infrastructure improvements. Although forest production (AUM) in Alternatives 2 and 3 is less than in Alternative 1, production will still increase from the existing condition.

3.13 NON-RECREATION SPECIAL USE MANAGEMENT

Non-recreation special uses include all uses of National Forest System lands, improvements, and resources, except those involved in the disposal of timber, minerals, livestock grazing, commercial recreation activities, or those administrative actions necessary to the management of those lands, improvements, and resources.

Issue Statement

There is on-going concern and debate about special use management on the Finger Lakes National Forest (FLNF). Specifically, there is concern about what special uses are appropriate for the FLNF and where those uses would be allowed. The revised Forest Plan will determine where special uses activities should be allowed and the standards and guidelines for these uses. Gathering of forest products is discussed in Special Forest Products Section 3.17.

Indicator 1 – Acres in Management Area Allocations Allowing Wind Power Development, New Communication Sites, and New Gas Pipelines

The first indicator to be used in this effects analysis is acres in management area allocations allowing development of wind power facilities, new communication sites, and new gas pipelines. This indicator does a good job of highlighting the differences among alternatives because each alternative has a different mix of management area allocations allowing these types of use. These uses require a level of development, site alteration, and ongoing management that is not compatible with all management areas.

Wind power facilities involve a number of wind-driven power generating units spread over an area of consistent wind. Facilities are served by a power line, access road, and associated infrastructure. Larger sites that can accommodate more generator units with only small amounts of additional infrastructure are generally more efficient economically than the same number of units spread across more sites.

Communication sites involve a tower sufficient to place antennas at the proper height, a building or cabinet, a power line or onsite power supply, and an access route, which is usually a road.

Wind power and communication site developments typically require high lands that are free of obstructions. They are highly visible and require initial and ongoing vegetation management. These uses require high land or sites where the topography channels the wind to create a steady, dependable power source, or from which broadcasters can reach large areas or populations or cell phone companies and other two-way communication users can reach significant numbers of travelers on main roads. While there has been no serious interest yet in the development of wind power sites on the FLNF, evolving technology and increasing national concern over the nation's energy supply make this an important indicator.

Gas pipelines involve linear corridors that require construction and excavation. Pipelines do not always follow roads and maintenance may involve excavation and vegetation management. Even if development of oil and gas resources continue to be prohibited on FLNF lands under the revised Forest Plan, development of these resources may occur on private lands in the immediate area. The need to transport natural gas resources to the market may lead to requests to develop pipelines that cross FLNF land. Increasing national concern over the nation's energy supply make this an important indicator.

Indicator 2 – Acres in Management Area Allocations Allowing New Discretionary Authorizations

The second indicator to be used in this effects analysis is acres in management area allocations allowing new discretionary authorizations that include facilities or development. Discretionary authorizations are forms of non-recreation special uses allowed by permit, easement, or lease from the Forest Service. Discretionary authorizations that include facilities or development allow uses such as water systems serving homes or communities, utilities, beehives, roads where other access might be possible over non-federal land, and activities such as commercial photography involving props, scenery modification, or large numbers of people requiring supporting infrastructure. Discretionary uses not involving facilities or development, such as research, are considered on a case-by-case basis throughout the Forest and are not included in this indicator.

Hereafter, “discretionary uses” shall mean those including facilities or development. Discretionary uses may occur as a point feature, such as a sign; a linear feature, such as a road; or an area, such as a field under cultivation. Discretionary uses may vary in length of time from a one-day temporary event to thirty years or more. Effects of discretionary uses range from digging a posthole to excavating, reshaping, and revegetating land for a road or pond. The principle use that is not discretionary is access to private land that is surrounded by NFS land. Authorizing some form of access to these inholdings is mandated by the Alaska National Interest Land Conservation Act of 1980. This indicator is appropriate because the amount of management area allocations that allow discretionary authorizations differs by alternative.

Analysis Area

The analysis area for direct and indirect effects includes all federal land managed by the FLNF.

The analysis area for cumulative effects includes all FLNF lands and lands administered by other owners, both public and private. Most non-recreation special uses are for the benefit of lands in other ownership, so they occur primarily near boundary lines and on both federal and non-federal land. Some non-recreation special uses, such as electricity transmission lines or communication sites, can have effects far from National Forest System land.

3.13.1 Affected Environment

Introduction

The FLNF was created from lands acquired by the Soil Conservation Service in the 1930s. Some of the purchased lands came with preexisting facilities or activities that had to be authorized by special use permits. Changes in demographics over time have resulted in more development on non-federal land within and adjacent to the National Forest System lands. This has caused an increased demand for utilities and improved roads. Since the 1950s, changes in technology have increased pressure to use high land of the FLNF for communication sites.

Existing authorized uses of FLNF lands, and those that might reasonably be requested in the future, can be dependent on several individual factors or a combination of factors including: topography or elevation; the presence of private land or existing infrastructure such as roads, trails, and power lines; or the presence of water or large openings.

Consolidation of federal ownership resulting from land acquisition diminishes pressure for authorizing special uses because most special uses are in conjunction with adjoining private land. This includes uses such as access roads, water systems, and utility lines. Conversely, in areas where the Forest is intermixed with private

lands, the intermingled ownership means more demand for these kinds of uses.

Burnt Hill communication site is a designated electronic site. With the recent interest in alternative energy sources, it is probable the FLNF will receive some attention as a potential site for wind power production facilities. Regional natural gas resource exploration may lead to development, which in turn may increase pressure on the Forest to allow infrastructure for oil and gas transport. The FLNF is a popular location for large non-commercial group activities of up to 1,500 people.

Existing Forest Plan Management Direction

The 1987 Forest Plan did not establish specific goals and objectives for non-recreation special use management. The 1987 Forest Plan contains standards and guidelines for minerals, corridor lines, and spray application of effluents. Special use infrastructure such as utility lines or pipelines will be buried and attempts will be made to use existing corridor routes. Spray application of effluent on the FLNF is not allowed. The 1987 Forest Plan does not provide specific direction regarding communication sites or the gathering of forest products for commercial uses.

As part of its Management Situation analysis, the Plan recognizes that each special use request would be reviewed critically due to the limited size of the FLNF, and that authorizations for exclusive use would rarely be granted.

Access to private lands that are surrounded by National Forest System land is mandated by law and must be sufficient to allow the owner reasonable enjoyment of that land. Access to private lands may occur across any management area.

It is USDA Forest Service policy not to approve any discretionary use of National Forest System land that can be accommodated on private land. Uses with public benefits are viewed more favorably than those with private or exclusive benefit. In the event of a conflict between proposed non-recreation special uses, the proposal involving the greater public benefit takes precedent. Requests for uses involving public benefit are processed before those involving more limited private benefit. Requests are processed on a first-come, first-served basis. Simultaneous uses that do not conflict can be authorized. Conflicts are resolved in favor of the existing use, or by seniority. There may be situations where an assessment process that includes public participation may determine an existing use must be altered or terminated to accommodate a greater public need.

Proposed Changes in Management Direction Common to All Alternatives

There are new Forest-wide and management area standards and guidelines in the revised Forest Plan that provide specific administrative and management direction for a wide range of non-recreation special uses, including direction regarding what uses are appropriate on FLNF land. The revised Plan does not issue authorizations for non recreation special uses. Authorizations are issued based on site-specific applications.

Existing Condition

Since the 1950s, technological changes have increased pressure for communication sites on high land in the FLNF. The Burnt Hill communication site was in use prior to completion of the 1987 Forest Plan and Forest Service policy regarding electronic site designation. In recognition of historical use, Burnt Hill is a designated electronic site. Two government agencies have been authorized to use the Burnt Hill electronic site, and Forest Service radio equipment is there as well. These two authorizations are included in the existing non-recreation special use authorizations listed in Table 3.13-1.

The other authorizations include an apiary, facilities used in conjunction with grazing permits,

roads providing access to private lands within the Forest, utility lines providing electricity and telephone service to residents living on private land within or near the Forest, and a residential water system.

In addition to these, the FLNF annually processes two to three temporary use requests. These temporary uses include non-commercial group events, such as weddings and family reunions, and filming. Forest Service policy is to emphasize administration of existing authorizations over processing of new requests. Declining budgets increase the pressure to administer existing authorizations while still providing customer service by processing some new requests. Recent moves to automate authorization and bill preparation and record keeping have resulted in significant savings in those areas, but have created new impacts in data maintenance.

Table 3.13-1: Existing non-recreation special use authorizations on the FLNF.

Use Type	Number of Authorizations
Agricultural	2
Electric lines	5
Private Roads	2
Communication facilities	2
Telephone lines	2
Water systems	1

Source: INFRA/SUDS database

If consolidation of federal ownership occurs, the pressure for authorizing special uses diminishes because most uses are in conjunction with adjoining private land. This includes uses such as access roads, water systems, and utility lines. In areas where the Forest has expanded, the intermingled ownership means more pressure for these kinds of uses. Private lands within the FLNF are usually accessed using existing public roads. Lands are acquired subject to these existing public road rights. Some of these roads have been abandoned, therefore access to some private lands may need to be authorized by an easement or permit.

The demand to approve new uses is expected to continue as both land acquisition and development of adjacent private land continue. Technological developments will also lead to more requests, such as for placement of fiber optic cable.

3.13.2 Environmental Consequences

Direct and Indirect Effects by Alternative

Indicator 1 – Acres in Management Areas Allowing Wind Power Development, New Communication Sites, and New Gas Pipelines

Management Areas that allow wind power development, new communication sites, and new gas pipelines include:

- Grassland for Grazing
- Grassland for Wildlife
- Shrubland
- Northern Hardwood
- Oak Hickory

Effects Common to All Alternatives

All alternatives allow for some degree of non-recreation special uses. All alternatives allow the possibility of some pipeline east to west and north to south corridors.

Alternative 1

Alternative 1 allows 15,624 (95%) acres of the Forest to be considered for the development of wind power, communication sites, and new gas pipelines. The only areas excluded from consideration for the development of wind power, communication sites, and new gas pipelines are the special areas, which would include some areas within the North Country Trail corridor. This would give the Forest Service the most flexibility in siting non-recreation special uses.

The central ridge, known as the Hector Backbone, would be available, as would other high ground that might provide opportunities for wind power development and cell phone coverage for State Routes 227, 79, and 414 (Table 3.13-2). There are many areas of the

Forest that, in conjunction with the rectangular road grid, provide ample opportunity for both east to west and north to south corridors for gas pipelines.

Table 3.13-2: Acres available on the FLNF for wind power, communication site development, and gas pipelines by constraint level and alternative.

Constraint Level	Alt. 1	Alt. 2	Alt. 3
	acres (percent)	acres (percent)	acres (percent)
Open[1]	15,624 (95%)	11,380 (70%)	13,584 (83%)
Prohibited[2]	815 (5%)	5,059 (30%)	2,855 (17%)

Source: FLNF GIS Management Area layer and revised Forest Plan
Notes:
[1] **Open** – No management area restrictions for future wind power development. MAs in the "open" category include: Grassland for Grazing, Grassland for Wildlife, Shrubland, Northern Hardwood, and Oak Hickory.
[2] **Prohibited** – Management Area prescription prohibits future wind power. MAs in the "prohibited" category include: Future Old Forest, Ecological Special Area, Recreation & Education Special Areas, North Country National Scenic Trail Special Area, and Existing and Candidate Research Natural Areas.

Alternative 2

Alternative 2 allows 11,380 acres (70%) of the Forest to be considered for the development of wind power, communication sites, and new gas pipelines. This alternative provides the least amount of opportunity for siting non-recreation special uses.

Most of the central ridge would not be available for wind power development and cell phone coverage for State Routes 227, 79, and 414. East to west gas pipeline corridors would be restricted to the northern edge of the Forest, the area between Searsburg and Seneca Roads, and a narrow band north of Matthews Road to Burnt Hill and then southeast to State Route 227. North to south corridors must generally be along Logan Road on the west and Vorhees Road on the east (Table 3.13-2).

Alternative 3

Alternative 3 allows 13,584 acres (83%) on the Forest for the development of wind power, communication sites, and new gas pipelines. Parts of the central and high ridge would be in management areas that allow these uses and some would not. Alternative 3 is intermediate between the other two Alternatives in opportunity to allow these special uses to occur (Table 3.13-2).

Less of the central ridge is available for wind power development and cell phone coverage for State Routes 227, 79, and 414 than in Alternative 1 and more than in Alternative 2. East to west corridors are available for consideration for gas pipelines throughout the Forest, while direct north to south corridors are still limited to Logan Road and Vorhees Road as in Alternative 2 (Table 3.13-2).

Indicator 2 – Number of Acres Allowing New Discretionary Authorizations

A full range of discretionary uses can be considered in the following management areas:

- Grassland for Grazing
- Grassland for Wildlife
- Shrubland
- Northern Hardwood
- Oak Hickory
- Recreation and Education Special Areas

Other MAs include a variety of restrictions. Future Old Forest, Ecological Special Area, North Country National Scenic Special Area, and Existing and Candidate Research Natural Areas MAs only allow new discretionary uses for research and education. Some other new uses may be allowed in certain circumstances.

Alternative 1

A full range of discretionary uses can be considered on 15,842 acres of the Forest. New discretionary uses are allowed on a restricted basis within the 597 acres of Ecological Special Areas and Existing and Candidate Research Natural Areas (Table 3.13-3). This alternative would allow the Forest Service the most flexibility and least restrictions for issuing new discretionary authorizations.

Alternative 2

A full range of discretionary uses can be considered on about 11,598 acres of the Forest. New discretionary uses are allowed on a restricted basis within the 4,841 acres of Future Old Forest, Ecological Special Areas, North Country National Scenic Trail Special Areas, and Existing and Candidate Research Natural Areas (Table 3.13-3). This alternative allows the least amount of opportunities for issuing discretionary authorizations.

Table 3.13-3: Acres (percent) available on the FLNF for new discretionary uses by constraint level and alternative.

Constraint Level	Alt. 1	Alt. 2	Alt. 3
	acres (percent)	acres (percent)	acres (percent)
Open[1]	15,842 (96%)	11,598 (71%)	13,802 (84%)
Limited[2]	597 (4%)	4,841 (29%)	2,637 (16%)

Source: FLNF GIS Management Area layers and revised Forest Plan
Notes:
[1] **Open** – No management area restrictions for future wind power development. MAs in the "open" category include: Grassland for Grazing, Grassland for Wildlife, Shrubland, Northern Hardwood, and Oak Hickory.
[2] **Prohibited** – Management Area prescription prohibits future wind power. MAs in the "prohibited" category include: Future Old Forest, Ecological Special Area, Recreation & Education Special Areas, North Country National Scenic Trail Special Area, and Existing and Candidate Research Natural Areas.

Alternative 3

A full range of discretionary uses can be considered on about 13,802 acres of the Forest. New discretionary uses are allowed on a restricted basis within the 2,637 acres of Future Old Forest, Ecological Special Areas, North Country National Scenic Trail Special Areas, and Existing and Candidate Research Natural Areas (Table 3.13-3). This alternative is intermediate between Alternatives 1 and 2 for opportunities for issuing discretionary authorizations.

Cumulative Effects

Effects Common to All Alternatives

All alternatives will have positive cumulative effects because the Forest Service allows non-recreation special uses that cannot be provided on private or non-National Forest System lands. These uses relate directly to the opportunity to develop, use, and enjoy that private land.

The ownership pattern of the FLNF is a mosaic of public land and intermingled private land. Most non-recreation Special Uses are in conjunction with adjoining private land, such as roads providing access, utility lines providing electricity and telephone service, and water systems. Such uses have effects on both private and federal land. These effects may include excavation and re-shaping of the land, removal or management of vegetation, disturbance of heritage resources, landscape changes that affect scenery and views, temporary air quality degradation during construction or maintenance, planned or unplanned re-direction of water, and changes to plant and wildlife habitat. These effects are identified during the environmental review and mitigated through the enforcement of the terms and conditions of the authorization. There may also be economic effects to the extent development stimulates the local economy, increases the value of the parcel of land being developed, and increases the tax base.

Other non-recreation special uses benefit a large area, such as an electronic site, electricity transmission line, or apiary. Others benefit other types of authorized activities, such as livestock grazing. These kinds of uses have effects on

lands of other ownership. In addition to the site-specific physical effects cited above, other effects can include improved public health and safety due to enhanced telecommunications; improved crop productivity due to the pollinating activity of the bees from the permitted apiary; and economic development opportunities and the subsequent increase in tax base due to increased infrastructure for delivering utilities or communications.

The cumulative effects on all ownerships depend on the restrictions on types of uses allowed on National Forest System land. If a use is allowed on National Forest System land, the same effects will also occur on adjoining lands crossed by that use. Conversely, where uses are restricted on National Forest System land, there are no effects on adjoining lands and no enhancements of adjoining properties that are cause by actions on FLNF lands.

All alternatives allow a range of uses over a broad area, providing opportunities to meet needs for use and enjoyment of private lands and for regional development. Alternative 1 allows the broadest range of uses over the greatest area and has the greatest range of positive and negative effects. Alternative 2 is the most restrictive and minimizes the positive and negative effects. Alternative 3 is intermediate between Alternatives 1 and 2.

3.14 VISUAL RESOURCES

Issue Statement

Concern is focused on continuous succession and growth of forest vegetation that is causing change to the landscape and reducing or eliminating some viewsheds. Viewshed management can enhance opportunities for viewing near or distant scenery. Viewsheds include individual observer positions (vistas) or the total visible area from multiple observer positions. Vistas include a point or area along a travelway from which people view scenery and include the land that is managed to allow the viewshed to be seen.

Indicator 1 – Acres in Management Areas with Similar Opportunities for Viewshed Management

The indicator to be used in this effects analysis consists of groups of management areas (MAs) with similar opportunities for viewshed management. Management areas were categorized into one of three groups including those with the greatest potential, moderate potential, or least potential to create, maintain, or enhance viewsheds. This indicator highlights the differences among alternatives because each alternative has different acreage amounts in each of the three viewshed management groups.

Analysis Area

The analysis area for direct and indirect effects includes all federal land managed by the Finger Lakes National Forest (FLNF).

The analysis area for cumulative effects includes all FLNF lands and the lands administered by other owners, both public and private, which are located adjacent to, or provide views to and from, National Forest System lands. Haze, weather conditions, time of day, vantage point, and the activity or feature being viewed all play a role in determining the distance from which an activity or feature is visible on the landscape.

3.14.1 Affected Environment

Introduction

The FLNF is known for its scenic beauty derived from natural features such as: land form, vegetation, and water features; rural settlement patterns; working landscape and associated cultural elements; and land stewardship. The visual beauty of the land helps draw visitors who enjoy using the Forest for recreational purposes. This natural and cultural landscape offers an attractive place to live, attracts tourism, and brings economic benefits to the Region. The 2001 Visitor Use Monitoring results ranked viewing scenery among the highest primary activities that brought people to the FLNF (USDA Forest Service 2001e).

The FLNF is located over 1,000 feet above Cayuga and Seneca Lakes on what is referred to as the Hector Backbone, with recently acquired property on Seneca Lake.

In addition to the natural qualities of the FLNF landscape, there are qualities that have been created by people over time which also contribute to the Forest's visual resource. From the late eighteenth century to the early twentieth century, the land was used for farming. The region then suffered an economic and population decline. Remnants of the area's agricultural history still exist, including grazing lands, foundations, wells, fences, and plantings. The current network of roads, laid out in a one mile square grid pattern, is a strong visual element of the land today. This network stems from an effort in the 1700s to give veterans of the Revolutionary War parcels of State land as payment for their services. Over time, abandoned farms have grown into mature forest through natural succession or planting, closing in some of the landscape visible in the past. Some open lands have been maintained through grazing, mowing, hand tool cutting, and prescribed fire.

Existing Forest Plan Management Direction

The 1987 Forest Plan does not establish specific goals or objectives for the visual resource. Direction for the visual resource is found within Forest-wide standards and guidelines and management area standards and guidelines. The Forest-wide standards and guidelines provide direction for Visual Quality Objectives (VQOs) for onsite and offsite views; definitions of visual conditions; relationships between visual resources and other resources; treatment of slash and other timber debris; visual guidelines for snags within openings; and trail views. Management area standards and guidelines (S&Gs) are associated with S&Gs for the recreation resource.

The FLNF Visual Management System establishes criteria to determine VQOs for on-site (within one-half mile of the viewer) and off-site views (more than one-half mile from the viewer). These objectives vary depending on whether activities can be seen from certain areas and viewer sensitivity. The 1987 Plan identifies and defines three VQOs including Retention (alterations made by people are not visually evident), Partial Retention (alterations made by people must appear subordinate within the surrounding natural appearing landscape), and Modification (alterations may dominate the original surrounding landscape but constructed facilities must be compatible with the landscape). These objectives provide for a variety of management activities that allow varying degrees of change to the landscape. These objectives are an adaptation of criteria defined in the National Forest Visual Management System Handbook (USDA Forest Service 1974).

Proposed Changes in Management Direction Common to All Alternatives

The revised Forest Plan increases emphasis on visual resources by adding Goal 16, which directs the Forest Service to maintain or enhance visual resources such as viewsheds, vistas, overlooks, and special features.

The following two objectives were added under the visual goal:

- Complete a transition from the current Visual Management System to the Scenery Management System
- Maintain or enhance visual quality on the Forest

The Forest Service updated the Visual Management System at the National Level to the Scenery Management System (SMS) (USDA Forest Service 2000b). The SMS incorporates new computer technology and applies elements and objectives at the project level to incorporate the existing and desired landscape character. The Forest Service has made a decision to convert to the SMS for the FLNF after the Forest Plan revision process is complete.

As part of the revised Plan Forest-wide standards and guidelines, visual condition guidelines were updated to replace the 1987 visual condition standards. Changes include making the visual conditions guidelines instead of standards. In addition, the revised Plan S&Gs for the visual resource are separated from S&Gs for the recreation resource.

Existing Condition

The FLNF landscape is characterized by a patchwork pattern of forested areas and open pastures, shrublands, and grasslands. Private land and National Forest System lands are interspersed, creating direct views for FLNF neighbors.

The forested areas are concentrated along the southern-third of the FLNF with open lands predominating along the flatter northern two-thirds. Small ravines, creeks, and wildlife ponds

add to the visual enjoyment throughout the Forest. Numerous roads, trails, water bodies, and developed facilities, both on and off FLNF land, provide views. Viewsheds come in many shapes and sizes, some are far reaching and panoramic, others are on an intimate scale and allow views directly adjacent to the viewer.

Along travelways, viewsheds provided by pasture and grassland management require less maintenance than those cut out of shrubland and forest. As shrub and forest lands mature, and vegetation grows, opportunities for viewing scenery have been reduced and continued maintenance is needed. Hedge rows growing adjacent to travel ways are gradually filling in, limiting views in some areas. Viewsheds (including vistas) created as a result of timber harvest are serving a temporary role in scenery enhancement.

3.14.2 Environmental Consequences

Direct and Indirect Effects by Alternative

Indicator 1 – Acres of FLNF Land in Management Area Allocations with Similar Opportunities for Viewshed Management

Effects Common to All Alternatives

All alternatives meet the intent of the goal to maintain or enhance visual resources and offer a diverse range of vegetative types across the FLNF, which includes grassland, shrubland, and mature forest. This landscape mosaic creates the overall landscape character of the FLNF. The alternatives differ in the amount, location, and degree of viewshed management permitted by management area.

For this analysis, management areas were placed in three groups according to the opportunity they provide for viewing scenery and visual resource management, which includes the creation, maintenance, and enhancement of viewsheds.

Group 1: Grassland for Grazing, Grassland for Wildlife, and Shrubland Management Areas

Grasslands provide the greatest opportunity for viewing foreground, middleground, and background scenery. Shrublands offer some restrictions on viewing scenery, depending on the composition and location of shrub species in relation to the viewer. Because of their relatively short vegetation, however, shrublands and grasslands provide similar opportunities for viewing scenery.

These management areas allow creation and maintenance of viewsheds through grazing, mowing, hand tool cutting, and fire, perpetuating grassland and shrubland conditions and associated viewing opportunities over the short and long-term. Shrubland maintenance is critical in order to keep the vegetation from succeeding into a forested condition. Once this process has occurred, returning a stand to the shrub condition is difficult.

Since these management areas provide the greatest opportunity for viewing scenery, developments and activities in or adjacent to these management areas may be more difficult to mitigate due to the low growing vegetation with little ability to act as screening.

Group 2: Recreation and Education Special Areas, North Country National Scenic Trail Special Area, Oak Hickory, and Northern Hardwood Management Areas

Mature oak hickory and northern hardwood stands restrict viewing of foreground, middleground, and background scenery, yet complement adjacent grasslands and shrublands in creating a landscape mosaic. The Recreation and Education Special Areas and North Country National Scenic Trail Special Area MAs consist of a variety of vegetative types, ranging from open to forested land. Successional forest growth in these four MAs has the potential to decrease viewing opportunities, both on-site (within one-half mile from the viewer) and off-site (more than one-half mile from the viewer).

Recreation and Education Special Areas, North Country National Scenic Trail Special Area, Oak Hickory, and Northern Hardwood Management Areas allow creation and maintenance of permanent and temporary vistas. The North Country Trail is designed to take advantage of views to the surrounding countryside. Recreation and Education Special Areas are designed to preserve and enhance the scenic values of the areas. Protection and enhancement of scenery are priorities in these areas, however, there is potential to lose views along the trail if active management does not occur in areas with low growing vegetation.

Timber harvest can affect opportunities for viewing. Even-aged timber harvest (up to 30 acres in size) may lead to temporary vistas and openings and increase opportunities for viewing near or distant scenery. Group selection timber harvest may provide small temporary vistas (less than 1 acre in size) and opportunities to view near or distant scenery over the short-term. Visual effects may occur from tree residue or slash (branches and small stems cut and left to lie close to the ground and decay over time) until seedlings or sprouts grow up to mitigate the appearance. Fire may be used to regenerate oak and/or to mitigate visual effects of tree residue.

Since these management areas provide moderate opportunities for viewing scenery, developments and activities in or adjacent to these management areas may be difficult to mitigate in some areas due to the temporary and permanent openings with low growing vegetation and little ability to act as screening. There would be opportunity to mitigate by choosing a different development location, allowing a permanent vista to grow up through natural regeneration or planting, or not creating temporary openings that look out at the development.

Group 3: Future Old Forest, Ecological Special Areas, and Existing and Candidate Research Natural Areas Management Areas

Management areas in Group 3 currently have a similar vegetative condition and restrict viewing of foreground, middleground, and background scenery, yet complement adjacent grasslands and shrublands in creating a landscape mosaic. Successional forest growth in these MAs has the potential to decrease viewing opportunities, both on-site (within one-half mile from the viewer) and off-site (more than one-half mile from the viewer).

Vista and timber management restrictions in these management areas result in less opportunities for viewing of foreground, middleground, and background scenery than in the other MA groups. Existing vistas in the Future Old Forest and Ecological Special Areas may be maintained, however, new permanent vistas may not be created. Existing and Candidate Research Natural Areas do not allow for vista management and allow vegetation management only to meet MA desired future conditions.

In the long-term, stands of trees in these MAs may mature to taller heights than in the Group 2 MAs because timber harvesting is restricted. When viewed as middleground or background vegetation, taller stands have the potential to restrict views, depending upon the terrain and background scenery.

Since these management areas are most restrictive for viewing scenery, developments and activities in or adjacent to these management areas would be less visible and easier to mitigate due to the abundance of mature vegetation to act as screening.

Alternative 1

Alternative 1 least restricts viewshed management and offers the greatest opportunities for viewing scenery because under this alternative the most acres are in Groups 1 and 2 and the least in Group 3 (Table 3.14-1).

Alternative 2

Alternative 2 most restricts viewshed management and offers the least opportunities for viewing scenery because under this alternative the most acres are in Group 3 and the least in Groups 1 and 2 (Table 3.14-1).

Alternative 3

Alternative 3 is intermediate between Alternatives 1 and 2 for opportunities for viewing scenery and viewshed management. Permanent openings associated with grassland and shrubland aesthetics vary little between Alternatives 2 and 3. Alternative 3 differs from Alternative 2 in that more lands are allocated to Group 2 and less to Group 3. Alternative 3 therefore provides more opportunities for creating and maintaining vistas than Alternative 2 (Table 3.14-1).

Table 3.14-1: Acres of National Forest System lands on the FLNF grouped by management areas with similar opportunities for viewshed management.

Management Area Group	Alt. 1 Current Mgt.	Alt. 2	Alt. 3
	acres (percent)	acres (percent)	acres (percent)
Group 1[1]	8,455 (52%)	7,206 (44%)	7,359 (45%)
Group 2[2]	7,387 (44%)	4,556 (28%)	6,607 (40%)
Group 3[3]	597 (4%)	4,677 (28%)	2,473 (15%)
Total (100%)	16,439	16,439	16,439

Source: FLNF GIS alternative MA layer
Notes:
[1] Group 1: Grassland for Grazing, Grassland for Wildlife, and Shrubland
[2] Group 2: Recreation and Education Special Areas, North Country National Scenic Trail Special Area, Oak Hickory, and Northern Hardwood
[3] Group 3: Future Old Forest, Ecological Special Areas, and Existing and Candidate Research Natural Areas

Cumulative Effects

In the Finger Lakes region, a loss of scenic viewsheds has continued since farms were abandoned during the Great Depression (1920s). As farming has diminished, old fields on private lands within the FLNF's viewshed have been left to grow. This growth has affected the ability to view scenery yet, at the same time, has helped to create the landscape mosaic that people value today. Some open lands continue to be maintained with haying, and more recently vineyard management. Vegetation growth on private lands located in the foreground of the FLNF can restrict views of the Forest. Conversely, when vegetation on private lands grows, there is potential to impact viewsheds on FLNF lands that currently offer scenic vistas.

All alternatives will have positive cumulative effects on the visual resource as seen from on and off site. The Forest Service manages grasslands, shrublands, and forestlands using goals for visual resource management. This creates a landscape mosaic that private lands and associated development do not provide.

Alternative 1 provides the most opportunities for viewshed management, and therefore it will have the most positive effects on the visual resource, in the short and long-term. Alternative 2 would have the least opportunities for viewshed management and therefore the least positive cumulative effects on the visual resource. Alternative 3 is intermediate.

3.15 HERITAGE RESOURCES AND TRIBAL RELATIONS

Issue Statement

Public concern is focused on the need to protect and preserve significant heritage resource-related sites and provide more information and education about heritage resources on the Finger Lakes National Forest (FLNF). The Forest plan has specific standards and guidelines for heritage resources and heritage interpretation and education.

Indicator 1 – Number of Existing and Potential Heritage Sites Located in Management Areas that Allow Ground-Disturbing Activities

The indicator to be used in this effects analysis is the number of existing and potential heritage sites located in management areas that allow ground-disturbing activities which would disturb such sites. Known historic archaeological sites and areas with high potential to contain prehistoric archaeological sites occur throughout the Forest, and in virtually every MA, although they are not distributed evenly. Much of the significance or value of these sites lies in the information they contain; this information is embedded in the spatial relationship between artifacts, features, and sites. Ground-disturbing activities can alter or destroy these spatial relationships; therefore, standards and guidelines are designed to prevent or minimize such effects. This indicator does a good job of highlighting the differences among alternatives because it identifies the potential for increased impacts to existing heritage resource sites from ground disturbing management activities.

Analysis Area

The analysis area for direct and indirect effects includes all federal land managed by the FLNF. This is the area potentially subject to ground-disturbing activities that could impact heritage resources because the actions and consequences that affect such resources are highly localized.

The analysis area for cumulative effects includes all FLNF lands and the lands administered by other owners, both public and private, in Seneca, Schuyler, and Tompkins Counties. This analysis area provides a meaningful background context for determining the relative significance of heritage resources.

3.15.1 Affected Environment

Introduction

The pre-European occupation of New York by native peoples can be divided into three periods: the Paleo-Indian period (roughly 12,500 to 9,000 years ago); the Archaic period (9,000 to 3,500 years ago); and the Woodland period (3,500 years ago to contact with European settlers roughly 400 years ago).

Paleo-Indians are typically portrayed as hunters of large mammals, such as caribou, mastodon, and moose-elk, but the archaeological remains that have been recovered from northeastern North American sites show that these people more regularly exploited a wide range of small animal and plant food resources. Paleo-Indian sites are generally campsites and resource extraction sites, including quarries and kill sites characterized by the presence of stone tools (Funk 1978). Paleo-Indian artifacts have been recovered from Tompkins County south of the FNLF, indicating that Paleo-Indians were present in the general area (Hartgen 2003).

The Archaic is typically divided into Early, Middle, and Late Periods. The era as a whole was marked by an expansion of subsistence practices, including hunting, fishing, and gathering, all made possible by a diversifying environment in the wake of the melting glaciers. Food sources included deer, bear, elk, smaller mammals, birds, turtles, fish, and shellfish, as well as nuts, seeds, and other plant materials.

The Early Woodland Period, while culturally a continuation of the Late Archaic, was marked by the introduction of pottery. Personal decorative ornaments and tailored clothing seem well established by the end of this period, and permanent pole structures for shelter/housing were generally in use by this time. In addition, burials involving red ochre (a mineral used for ritual purposes) have been dated to this period. The Middle Woodland period was characterized by a continuing increase in overall population, reaching its peak during this period. It is also during this time that population concentration at specific settlement sites during summer months reached its height. Subsistence practices began to move toward horticulture, though at this time it was still a mixed subsistence pattern. The Late Woodland period is well documented in New York State, and was marked by a shift to permanent settlements. Horticulture was widely practiced, and ceramic design became increasingly complex. The Iroquoian culture was developing at this time. It eventually became the dominant cultural and political force in what is now New York State and for a wider area around these boundaries. The Iroquoian model for self-government provided a model for what became the United States.

The FLNF is located in what was a boundary area between the Seneca and Cayuga Nations of the Iroquois Confederacy. Cayuga villages east of the FLNF appear to have existed earlier than the Seneca villages, with the Cayuga settlements dating to about 1600 A.D. and before, while the Seneca villages date to 1700 A.D. and later. This differential suggests that the political boundary between the two members of the confederacy may have been shifting through the seventeenth and eighteenth centuries as the population and history of the groups underwent social and political transformations. The Iroquois were forced out of the area in the late eighteenth century after the American Revolution by the so-called Sullivan campaign in 1779. This military action was a crucial piece of New York frontier history: raiding parties were dispatched throughout the Finger Lakes region and proceeded to bring devastation to the Iroquois, burning their villages, cornfields, and orchards along both Seneca and Cayuga Lakes (Delle and Heaton 2003a).

Historic Period Sites

At a general level, there are four broadly defined historic periods:

1. Conquest and pioneer settlement, 1775-1800
2. Settlement and agricultural "boom", 1800-1865
3. Economic and population decline, 1865-1900
4. Rural abandonment and federal management, 1900-present

Prior to its becoming federally managed land, the territory making up the FLNF was a patchwork of privately owned farmsteads. These farmsteads were established in the early to middle 19th century, and abandoned and sold to the government in the 20th century.

The Finger Lakes region was settled by Euro-Americans upon the removal of the Seneca and Cayuga tribes through a series of military and legislative actions during the late 18th century. Land had been promised to New York veterans of the Revolutionary War as payment for their services, and to meet their obligation the State proposed to create the “New Military Tract” in 1782. The land in central New York was surveyed from 1790 to 1792 under the direction of Moses Dewitt, and ultimately the New Military Tract would include twenty-eight townships with each consisting of 6,000 acres (Heaton 1998). Large-scale settlement did not occur upon the completion of the survey. Many soldiers did not claim their patents, while others chose to sell their claims to land speculators who resold the parcels to individual settlers (Ellis et al. 1967).

During the first three decades of the 1800s an influx of migrants from New England populated numerous rural areas in New York, including the Finger Lakes region. These early settlers prospered by taking advantage of the region's rich natural resources. The construction of local and statewide transportation networks facilitated their participation in production for regional markets.

In the latter half of the 19th century, the region entered into a sharp economic and population decline as the landscape suffered from over-exploitation and economic competition. After the Civil War, farmers in New York State as a whole, and especially farmers located in less than ideal agricultural areas such as the uplands of the Hector Backbone, suffered from competition with midwestern farmers.

As American expansion moved westward, transportation networks and shipping interests were reoriented away from the agricultural lands of the northeast. Many local farmers migrated to the Midwest, other rural areas of New York, or to urban centers in search of better opportunities. These trends intensified through the turn of the century, and by the 1930s south-central New York was in a state of crisis. This crisis prompted the government to intervene and purchase large tracts of sub-marginal farmland, including the farmsteads whose remains are now archaeological sites in the form of cellar holes, barn and outbuilding foundations, artifact scatters, and field boundary walls readily visible on the landscape (Heaton 1998, Delle and Heaton 2003a).

Existing Forest Plan Management Direction

The 1987 Plan has a goal to protect significant cultural and historic resources. Objectives to achieve this goal include: to protect, inventory, and evaluate cultural resources. The Forest-wide standards and guidelines provide direction regarding inventory and protection of cultural resource sites. Management areas also have standards and guidelines for cultural resources. Heritage resources are protected from disturbance by federal and State law because they are considered valuable, unique, fragile, and non-renewable.

Every Forest Service project is subject to review by the FLNF Archeologist and subsequent concurrence by the State Historic Preservation Officer (SHPO). The Forest Service inventories sites within each project's Area of Potential Effect, and makes recommendations to FLNF project designers and decision-makers about how to proceed.

The known heritage resources on the FLNF are primarily historic archaeological sites dating to the 19th century. Approximately 2,121 acres are also considered highly sensitive for the presence of yet-to-be-discovered prehistoric archaeological sites. This estimate was derived from a GIS-based sensitivity model produced for the FLNF (Hartgen 2003). The lack of more identified prehistoric sites to date is at least partially a function of the lack of intensive surveys on the Forest.

Proposed Changes in Management Direction Common to All Alternatives

The revised Forest Plan will continue management direction provided in the 1987 Plan with more specific objectives consistent with Forest Service goals and legal obligations, and a revised set of standards and guidelines reflecting the language and intent of new and/or revised laws and regulations.

The most significant of these changes is in the area of tribal relations and the treatment of human remains. The revised Forest Plan directs the Forest to formally consult with appropriate tribes (per the amended National Historic Preservation Act), and to adhere to the legal protocols established by the Native American Graves Protection and Repatriation Act (NAGPRA) in dealing with any human remains discovered on the Forest.

Another significant objective in the revised Forest Plan will be to address the backlog of unevaluated sites. Very few Forest sites have been studied to evaluate whether or not they are eligible for the National Register of Historic Places and, therefore, should be considered "significant." By doing such evaluations, the FLNF will be better able to identify where to focus protection and preservation activities, and efforts to interpret significant sites for the public.

Existing Condition

New York's rich cultural heritage is amply represented in the Finger Lakes region, especially near the lake shores. Because historic preservation laws generally apply only to State and federally sponsored projects, heritage resources on private lands are at risk. The incremental loss of these resources on private lands increases the relative value of such sites on public lands.

The full extent of the heritage resources on the FLNF is unknown, but knowledge increases annually. What is currently known about the number and distribution of heritage resource sites is based on an original Cultural Resource Overview (Crane and Perry 1977), historical research and field projects run by academic archaeologists (Delle and Heaton 2003a, 2003b; Heaton 1998, 2003; Heaton and Wurst 2000), a new heritage resources overview focusing on prehistoric and ethnohistoric resources (Hartgen 2003), and numerous small project-specific surveys undertaken by Forest Service archaeologists over the last 20 years.

More specifically, the FLNF has located more than 100 historic period archaeological sites, but only three prehistoric archaeological sites. The condition of most of these sites is fair to good, with very few vandalized or severely disturbed sites (an exception to this would be in long-term grazing allotments where a number of cellar holes have been filled in). There is also one standing structure on the Forest that is a significant historic property: the so-called "Queen's Castle," located at Caywood Point and listed on the National Register of Historic Places.

Opportunities for public education, participation, and partnerships over the course of the 1987 Plan have been extensive. Field instructional courses (Delle and Heaton 2003a), undergraduate summer field schools in archaeology (Heaton and Wurst 2000), associated public presentations and publications, interpretive programs about the Queen's Castle (Lusk 2004), and brochures and on-site interpretive signage have all occurred during the life of the 1987 plan. The Friends of the FLNF is also enthusiastic about producing and promoting additional educational and interpretive initiatives related to the history of this area. The Visitors Center Inc. is interested in FLNF historical interpretation, as is the Lodi Historical Society, among other local groups.

On occasion, through partners and/or consultants, the Forest Service has the opportunity to do more broad-scale surveys in keeping with the Archaeological Resources Protection Act's mandate to get 100 percent inventory. As a result, knowledge of the number, distribution, and range of types of heritage resources increases annually. Forest Service monitoring indicates that implementation of standards and guidelines has resulted in protection and preservation of sites within project areas (USDA Forest Service 1998a).

Forest-wide standards and guidelines, and methods for protecting heritage resources, have been shown to do a good job of preserving the condition of sites once the sites are identified. The spatial integrity of many historic archaeological sites on the FLNF has already been compromised in some way, most notably in active and historic grazing allotments where sites were often filled-in and graded-over at some point in the past (as a protective measure for cattle and/or for ease of management of the pasture). The value of these sites has been compromised but not eliminated.

Therefore, as a general rule, historic archaeological sites in grasslands have already been subject to at least some, and often substantial, disturbance, while those in forested

management areas tend to be better preserved, and the condition of those located in shrubland is variable depending on the specific land-use history of the tract.

The Forest Service currently keeps representatives of the Seneca and Cayuga Nations apprised about FLNF projects and programs, and is seeking to improve consultation efforts.

3.15.2 Environmental Consequences

Direct and Indirect Effects by Alternative

Indicator 1 – Number of Existing and Potential Heritage Sites Located in Management Areas that Allow Ground-Disturbing Activities

Archaeological sites on the FLNF exist on or just below the ground surface. Such sites' value and significance (eligibility for the National Register of Historic Places) lies largely in the information that can be extracted from them about past peoples, events, environments, and their relationships to one another, and to a lesser extent, in their importance as geographic markers informing us about past land-use patterns. In addition, prehistoric Native American sites often have a meaningful spiritual component that warrants the physical preservation of a site regardless of its "informational" value. The tangible information embedded in sites is most meaningful (or most likely to be understandable) when the physical, spatial relationships between the sites' artifacts and features are preserved. Ground-disturbing activities compromise or destroy these spatial relationships (integrity).

Although there is opportunity for soil disturbance within the Grassland for Grazing, Grassland for Wildlife, Shrubland, Oak Hickory, and Northern Hardwood Management Areas (MAs), only a relatively small portion of the MAs would actually be subject to ground-disturbing activities in any given alternative. The estimated acreage for various ground-disturbing activities is provided in the Forest Plan Proposed and Probable Practices (revised Forest Plan, Appendix D). Although these acres are specific to Alternative 3, they are not expected to vary by alternative except those associated with timber harvest activities. The Timber Management section of Chapter 3 (Table 3.11-5) provides the potential acres harvested under each alternative.

Effects Common to All Alternatives

All alternatives do a good job of protecting heritage resources since standards and guidelines, and in-field methods and measures for protecting sites, are effective when implemented. Opportunities for education, interpretation and research to benefit the public will continue under all alternatives.

Occasional human error in implementation can result in damage to heritage resource sites. Therefore, under all alternatives, it can be anticipated that heritage resources will be considered in the planning process and protected in general, but that adverse effects on such sites will occur as a function of the frequency and/or amount of ground-disturbing activities because of the correlation with greater opportunities for human error.

Areas proposed for the Oak Hickory and Northern Hardwood MAs contain a disproportionate amount of the acreage deemed sensitive for the presence of prehistoric archaeological sites (Table 3.15-2 and Figure 3.15-2). Sixty-five percent of the "sensitive" acres are in these MAs in Alternative 1, although these MAs represent only 43 percent of the Forest. In Alternative 2, 41 percent of the "sensitive" acres are in these MAs, which represent 25 percent of the Forest. In Alternative 3, 61 percent of the "sensitive" acres are in these MAs, which represent 38 percent of the Forest.

It is probable that the spatial integrity of any *pre*-historic archaeological site on the Forest has already been slightly compromised because of the long land-use history of logging and farming – but that is almost always the case for prehistoric sites in the Northeastern United States, and does not automatically diminish their ability to yield information or their significance.

Table 3.15-1: FLNF management area acreages by alternative.

Management Areas	Alt. 1 Current Mgt.	Alt. 2	Alt. 3
	acres (percent)	acres (percent)	acres (percent)
Grassland for Grazing and Grassland for Wildlife	6,348 (39%)	5,938 (36%)	5,938 (36%)
Shrubland	2,107 (13%)	1,268 (8%)	1,421 (9%)
Oak Hickory and Northern Hardwood	7,169 (43%)	4174 (25%)	6,225 (38%)
Ecological Special Areas, Future Old Forest, and Existing and Candidate Research Natural Areas	597 (4%)	4,677 (28%)	2,473 (15%)
Recreation and Education Special Areas and North Country National Scenic Trail Special Area	218 (1%)	382 (2%)	382 (2%)

Source: GIS Alternative layers

When standards and guidelines are implemented, all sites are ostensibly protected in their present condition and, in some cases, enhanced through stabilization efforts. Monitoring results indicate that human error in implementing such standards results in occasional damage to sites. While this error rate is not high, the fact that archaeological sites are unique and non-renewable resources means that when one is compromised or lost it cannot be "fixed," replaced, or re-grown. Thus, over time, the population of sites will be reduced incrementally as a function of the frequency and/or amount of ground-disturbing activities. On this basis, one could argue that alternatives that allow more ground-disturbing activities in non-grazing acreage will have more effects on heritage resources than those that propose fewer ground-disturbing activities.

Forest management activities could potentially result in impacts to heritage resources. These activities include timber, wildlife openings, recreation, mineral, grazing and special use management as well as fire, road, and facilities management. The impacts from these activities are discussed below.

Timber management activities, primarily the transportation (skids and roads) and processing (landings) activities associated with logging, result in the greatest amount of ground-disturbance and, therefore, potential damage to heritage resource sites. As a result, transportation and processing activities are most regulated when they are proposed on or near heritage sites. Areas proposed for the Oak Hickory or Northern Hardwood MA contain the highest amount of the acreage deemed sensitive for the presence of prehistoric archaeological sites (Table 3.15-2, Figure 3.15-2). Therefore, timber management activities in these MAs warrant greater attention for protecting heritage resources.

The creation and maintenance of Wildlife Openings may have direct effects on heritage resources depending on the methods used. By and large, the use of prescribed fire, mowing and/or hand-tools to create or maintain an opening will not have an effect. The use of brush hogs and other potentially ground-disturbing moderate-to-heavy mechanized equipment certainly could have effects if standards and guidelines were not followed.

Recreation management activities that have the potential for direct and indirect effects on heritage resources include construction and maintenance of recreation facilities, such as campgrounds and parking areas, and trails (tread work, drainage, and bridges). Direct effects could be, for example, the product of the ground-disturbance required in construction activities, or with

straightening, widening, or re-routing trails. Indirect effects include incidental erosion patterns associated with trail maintenance; the establishment of drainage structures, such as culverts and water bars, that direct flows on or into sites; and increased site vandalism based on the proximity of campgrounds.

Potential effects from special use management result from gathering of special forest products and the potential of gathering to affect traditional tribal rights, uses, and interests. In addition, ground-disturbing activities associated with easements and utility corridors have the potential for both direct and indirect effects.

Potential effects of grazing management activities include the placement and maintenance of fencing, gates, and corrals. Standards and guidelines (S&Gs) designed specifically for the Grassland for Grazing Management Area supplement the Forest-wide S&Gs and will provide for protection of heritage resources. It should also be noted that most of the significant ground-disturbing and/or site impact events in grasslands have occurred in the past, thus the future maintenance of grasslands is likely to have a relatively small further effect on heritage sites.

Fire itself has a relatively minor effect on subsurface heritage resources. Fire management methods used to fight, control, or "mop-up" after a fire may have direct effects, such as those resulting from bull-dozer or hand tool constructed fire breaks, and/or indirect effects.

The effects from road management result from construction, reconstruction, and maintenance of roads and travelways. Roads management has the potential to affect heritage resource sites to the extent that these activities disturb "new" heritage resource areas in proximity to the road activities. This is particularly true for historic period sites which have a direct association with the historical transportation network. Widening travelways or shoulders can have an adverse effect. Altering or replacing drainage structures, such as culverts or ditches, has the potential for both direct effects and indirect effects including erosion, undercutting sites, or sedimentation.

Effects from facilities management result from the maintenance, reconstruction, remodeling, and/or removal of facilities considered historic in nature (listed or determined eligible for the National or State Register of Historic Places). Facilities management activities have the potential to cause direct effects to heritage resource property.

Table 3.15-2: Acres with prehistoric site potential[1] in FLNF management areas by alternative.

Management Areas	Alt. 1 Current Mgt.	Alt. 2	Alt. 3
	acres (percent)[2]	acres (percent)[2]	acres (percent)[2]
Grassland for Grazing and Grassland for Wildlife	630 (30%)	594 (28%)	594 (28%)
Shrubland	100 (5%)	71 (3%)	73 (3%)
Oak Hickory and Northern Hardwood	1371 (65%)	880 (41%)	1304 (61%)
Ecological Areas (Future Old Forest, Special Areas & CRNAs)	20 (1%)	537 (25%)	131 (6%)
Recreation Special Areas & National Scenic Trail Special Area	0	19 (<1%)	19 (<1%)
Total Acres with Prehistoric Site Potential	**2121**	**2121**	**2121**

Source: GIS Alternatives layers; Hartgen 2003
Notes:
[1] "Acres with prehistoric site potential" are broad estimates of areas where as-yet undiscovered prehistoric archaeological sites are most likely to occur, based on a GIS model developed for the FLNF (Hartgen 2003).
[2] The "%" figure represents the percent of the total 2,121 acres of "highly sensitive" areas on the Forest.

Table 3.15-3: Number of known historic sites[1] in FLNF management areas by alternative.

Management Areas	Alt. 1 Current Mgt.	Alt. 2	Alt. 3
	number of sites (percent)[2]	number of sites (percent)[2]	number of sites (percent)[2]
Grassland for Grazing and Grassland for Wildlife	50 (48%)	49 (47%)	49 (47%)
Shrubland	14 (13%)	8 (7%)	11 (10%)
Oak Hickory and Northern Hardwood	36 (35%)	19 (18%)	31 (30%)
Ecological Areas (Future Old Forest, Special Areas & CRNAs)	4 (4%)	26 (25%)	11 (10%)
Recreation Special Areas & National Scenic Trail Special Area	1 (1%)	3 (3%)	3 (3%)
Total Number of Known Historic Sites	**105**	**105**	**105**

Source: FS site inventory records; Delle & Heaton 2003a
Notes:
[1] "Known historic sites" are largely the archaeological remains of 19th century farm- and home-steads, and the occasional mill, school, or other structure.
[2] The "%" figure represents the percent of the total of 105 known sites.

Alternative 1

Forest-wide standards and guidelines are designed to protect all heritage resource sites on the Forest from the effects of management activities. Occasional human error leads to resource damage from time to time. In Alternative 1 nearly half of the known historic sites (48%) and a third (30%) of the Forest acres with high likelihood of containing prehistoric sites are located in the Grassland for Grazing and Grassland for Wildlife Management Areas (Table 3.15-3 and Figure 3.15-1), with the balance of the historic sites mostly in the Oak Hickory or Northern Hardwood MAs (35%) and the Shrubland MA (13%). A disproportionate 65 percent of the acres with high potential for prehistoric sites, however, exists within the Oak Hickory or Northern Hardwood MAs, which together represent 43 percent of the Forest in Alternative 1 (Table 3.15-2 and Figure 3.15-2). Monitoring suggests that because the Oak Hickory and Northern Hardwood MAs will be subject to more ground-disturbing activities than other MAs, and because much of the ground disturbance (and associated site impacts) in Grassland for Grazing and Grassland for Wildlife MAs have already occurred, that there is a correspondingly greater (if still small) likelihood that heritage sites in the Oak Hickory or Northern Hardwood MAs will be affected. Therefore, Alternative 1 has the potential to have greater effects on heritage resources than Alternative 2 and slightly more than Alternative 3.

Alternative 2

In Alternative 2 the distribution of known historic sites in non-grassland management areas shifts dramatically (Table 3.15-3 and Figure 3.15-1). Twenty-five percent of the known historic sites are located in Recreation and Education Special Areas and Future Old Forest, while only 18 percent are in active timber management areas (Oak-Hickory or Northern Hardwood MAs). Based on the logic presented for Alternative 1, Alternative 2 would therefore have less potential effect on heritage resources than either of the other Alternatives.

Alternative 3

From a heritage resources perspective, the distribution of sites and activities in Alternative 3 closely resembles Alternative 1 (Figures 3.15-1 and 3.15-2). Under Alternative 3, Oak-Hickory and Northern Hardwood MAs contain 30 percent of the known historic sites and 61 percent of the acres sensitive for prehistoric sites. Grassland for Grazing and Grassland for Wildlife MAs contain 47 percent of the known historic sites and 28 percent of the sensitive acres. The Shrubland MA contains 10 percent of the known historic sites and only three percent of the sensitive acres. Therefore, based on the logic presented for Alternative 1, the potential effects of

Alternative 3 would be slightly less than Alternative 1 and greater than Alternative 2.

Cumulative Effects

Implementation of any of the alternatives will achieve the goal of providing protection and stewardship of heritage resources on the FLNF. Forest Service management will result in increased importance of heritage sites on the FLNF over time because they will be better protected and preserved than those on privately owned lands, and there should be few or no adverse cumulative effects.

The Forest Plan's proposed standards and guidelines are designed to protect heritage resource sites from adverse effects associated with management activities under all alternatives. Over time, some portion of this population of sites will be damaged or destroyed through inadvertent human error as a function of the frequency and amount of ground-disturbance that takes place. By comparison, site protection conditions on lands surrounding the FLNF will be generally poor given relatively unregulated patterns of development and a low level of site protection and stewardship.

Although all alternatives will have positive effects, Alternative 2 has the greatest potential for positive cumulative effects. Alternatives 1 and 3 will likely have small and comparable cumulative effects on heritage resources, and both will have incrementally greater negative cumulative effects than Alternative 2. The greater effects in Alternatives 1 and 3 are due to the presence of a higher number of historic sites and a higher proportion of acres deemed sensitive to the presence of prehistoric archaeological sites that occur in the Oak Hickory and Northern Hardwoods Management Areas (Figures 3.15-1 and 3.15-2).

Figure 3.15-1: Number of Known Historic Sites in Varied Management Areas by Alternative

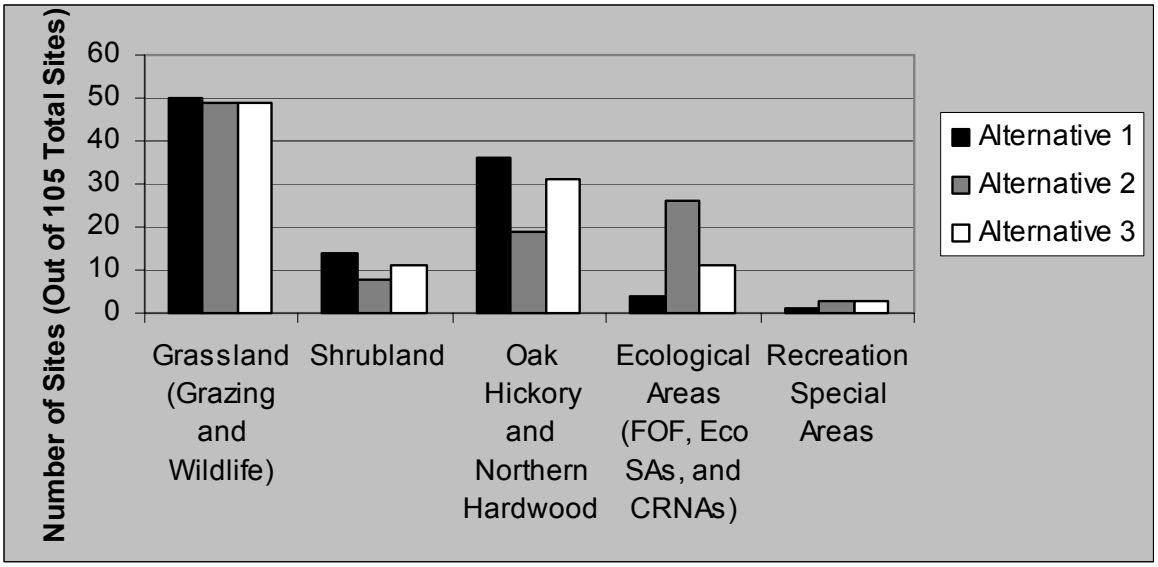
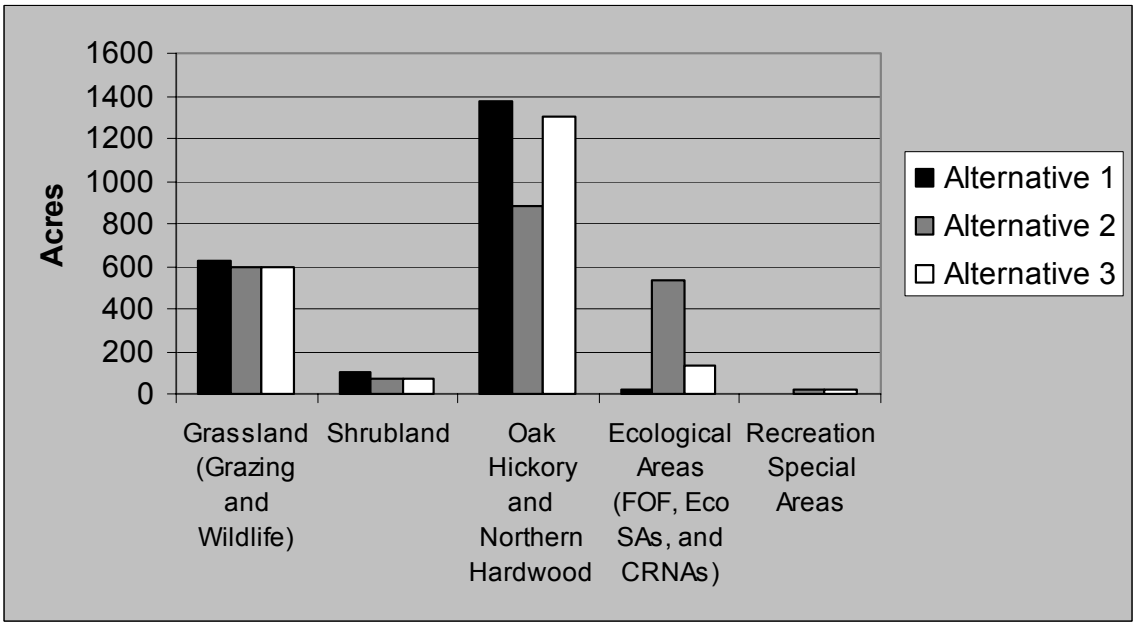


Figure 3.15-2: Acres with Prehistoric Site Potential in Varied Management Areas by Alternative



3.16 FIRE MANAGEMENT

Wildland fire includes both wildfire and wildland fire use. **Wildfire** is defined as "unwanted wildland fire." **Wildland fire use** is defined as "the management of naturally ignited wildland fires to accomplish specific pre-stated resource management objectives in predefined geographic areas outlined in Fire Management Plans." Wildland fire use will not be used on the Finger Lakes National Forest (FLNF). **Prescribed fire** includes "any fire ignited by management actions to meet specific objectives." **Fire use** includes both wildland fire use and prescribed fire application to meet resource objectives.

Issue Statement

Public concern is focused on defining the ecological role of fire on the FLNF. The issue of fire ecology is part of the broad plan revision issue of restoring, protecting, maintaining, and enhancing biological and ecological diversity. The ecosystem and biodiversity issue is addressed in several sections of this chapter including the Vegetation section (3.5) and Soil section (3.2).

There is a desire to manage wildland and prescribed fire so that various vegetation types and species can be maintained, public and firefighter safety is assured, and facilities such as houses, buildings, administrative sites, campgrounds, and communication sites, are protected. Of particular concern is the interface between increased private development and public lands. This is referred to as the Wildland Urban Interface (WUI) and includes lands within a mile and a half from improvements, such as homes and powerlines.

Indicator 1 – Acres in Management Area Allocations Where Wildfire would be suppressed

The first indicator to be used in this effects analysis is the acres in management area allocations where wildfire would be suppressed. This indicator shows what portions of the FLNF would be subjected to wildfire suppression activities in the event unwanted wildfire were to occur either through natural or unnatural means.

Indicator 2 – Acres in Management Area Allocations where Prescribed Fire would be allowed

The second indicator to be used in this effects analysis is acres in management area allocations where prescribed fire would be allowed to achieve vegetation management objectives. This indicator does a good job of highlighting the difference among alternatives because the amount of potential acres subjected to prescribed fire varies by management area.

Analysis Area

The analysis area for direct and indirect effects includes all federal land managed by the FLNF.

The analysis area for cumulative effects includes all FLNF lands and the lands administered by other owners, both public and private, on areas immediately adjacent to the FLNF. This area represents lands where wildfire suppression and prescribed fire use could cross ownership boundaries and may involve cooperative activities.

3.16.1 Affected Environment

Introduction

This section describes aspects of past fire history, wildland urban interface, fire as a natural disturbance factor, fire effects on certain forest types, and current uses of fire as a resource management tool, including prescribed fire use.

Fire History

Prior to European settlement, the use of fire by the Iroquois had an ecological role as a disturbance factor between Seneca and Cayuga Lakes, which is now part of the FLNF. The 1790 Land Survey records of the military tracts that are now the FLNF show that brushy open conditions and evidence of fire were prevalent in the area between Seneca and Cayuga Lakes (Marks and Gardescu 1992). It is suspected that fires in this area were used by the Iroquois, possibly to drive deer or to clear brush between Seneca and Cayuga Lakes. Surveyors noted in some cases that the woods were burned by people. Evidence of fire was particularly common in association with an Iroquois road along the east shore of Seneca Lake. The surveyors described the west-facing uplands as open woods with occasional open, scrubby areas. They described the timber as being destroyed by fire in some places, and thick with underbrush in some places. The vegetative composition in these areas was predominantly black and white oak, some beech, and pine.

Large fires probably occurred between 1790 and 1890 as a result of human activities during European settlement such as land clearing and logging slash. Land within the military tracts was distributed to Revolutionary War veterans in the late 1790s. From that time until 1890, the forests were cleared for agriculture or harvested for timber. Unnatural fuel accumulations in combination with drought resulted in severe fires. Although most current day wildfires are relatively small, there was a history of large fires during the last 150 years.

Between 1890 and the Great Depression, farmland within the FLNF was abandoned due to soil depletion and other factors. Legislation during the 1930s authorized the reforestation of abandoned farmland and planting of conifers on the most eroded, depleted soils by the USDA Soil Conservation Service. Modern fire control was initiated during this “Conservation Era.”

The FLNF has had seven wildfires totaling six acres during the 20-year period from 1983 to 2002. This averages approximately 0.5 wildfires per year burning a total of 0.4 acres annually. All wildfires on the Forest during this period have been human-caused.

Wildland Urban Interface

The Wildland Urban Interface (WUI) is considered to be those areas where development and the "wildland" interface and intermix and which are prone to wildfires or the rapid spread of wildfires under certain climatic conditions. Factors including fuels, slope of the land, and climate are all taken into consideration when determining whether or not property is susceptible to wildfire. On the FLNF, factors that contribute to increased fuel loadings and potential fire hazards close to encroaching development include ice storm damage, logging slash and natural thinning from second-growth timber stands that are over-stocked.

The concept of the WUI has emerged after two decades of destructive wildland fire across the nation. Wildland fire has become a more frequent occurrence in WUI areas and has resulted in heavy loss to private property. The nationally accepted definition of WUI is an area within a mile and a half of two or more homes per forty acres. Given this definition, all of the FLNF is considered part of the WUI. All of the wildland fires that have occurred on the Forest have occurred within the WUI. Although not causing the widespread damage to property that occurs in western US forests, the potential for destructive wildland fire is increasing on the FLNF as

development on private lands intermingled with National Forest System lands continues.

Ecological Role of Fire

A disturbance is an ecological event that "disrupts ecosystem, community, or population structure, and changes resources, substrate, or the physical environment" (White and Pickett 1985). Examples of natural landscape disturbance include fire, flooding, disease, landslides, or wind throw of trees. The 18th century land records for the military tract recorded disturbances caused by wind, fire, beavers, and native people. Data from these records suggest that fire played an important ecological role on the FLNF. Fire appeared to be the most prevalent disturbance in the FLNF region. While open oak forests and brush were evident between Seneca and Cayuga Lakes, areas east of Cayuga Lake were virtually absent of these indications of fire.

These data also indicate that the FLNF occupies a transition zone between oak-dominated forests that extend into the region from the south and west, and the mesic hardwood forests that dominate the Finger Lakes region from Cayuga Lake north and east. In the Towns of Hector and Ovid, a substantial area of oak dominated forest was present that was associated with a high level of fire disturbance. It is likely that the use of fire by Native Americans maintained an area of tension between mesic hardwoods and oak and pine along southern and western portions of the Backbone. See the Vegetation section (3.5) of this chapter for more information.

Frequency and distribution of species that dominate a given site commonly change following a disturbance. Community composition tends to shift toward more shade tolerant species in the absence of continued or regular disturbances. Succession refers to the process of changes in species composition following disturbance.

Periodic fire caused by Native American practices seems to be responsible for oak dominance along the southern and western portions of the Backbone at the time of European settlement. Black and white oaks require fire to maintain their presence at the northern edges of their range, including in the Finger Lakes region of New York. Red oak does not require fire to be present in an area, but fire does seem to be an important factor in perpetuating oak dominance because it reduces non fire-resistant competitors. The recent decrease in fire frequency due to human suppression may be a significant factor in the decline of red and white oak (Lorimer 1985, Abrams 2005). This is of particular concern at the northern edges of their range where they are most in contact with shade tolerant hardwoods that have a competitive advantage when fire is not a regular occurrence.

The repeated and often patchy distribution of disturbance patterns across the landscape, including fire, creates a mosaic of vegetation sizes, ages, and composition. Disturbance can be a powerful influence on community composition and biodiversity. Typically, the greater the variety of disturbance types and the number of communities represented, the greater the total biodiversity of a given region. Survey records from the military tract in Hector and Ovid indicate a high diversity of tree species, particularly along and slightly east of the Backbone where mesic hardwoods and oaks and pine intermingled. This intermingling was likely the result of variable fire intensities over time as the fires were allowed to burn themselves out as they moved into more mesic ecosystems.

Variation in the natural occurrence of fire in the Northeast is due to regional variations in climate, topography, and soils. The pattern of fire occurrence generally increases from east to west. In the north-central United States and south-central Canada, lightning ignitions are common, and fire is frequent even in the absence of human-caused fire. In contrast, dry lightning strikes and resulting fires are rare in the mesic hardwood forests of New York, as evidenced by the Military Tract data for areas east of Cayuga Lake dominated by mesic hardwoods. It is not surprising, therefore, that humans have historically caused most of the large wildfires in the region.

Occasional periods of short but intense drought can increase fire danger, especially in conifer stands, which have thick duff due to slow decomposition and a general lack of burning. Other parameters influence fire frequency beyond drought conditions and source of ignition. Fuel accumulation and flammability are important factors contributing to the occurrence of fire on the Forest. Historically, agricultural clearing and logging contributed significantly to severe fires. Today, windstorms, ice damage and insect and disease outbreaks similarly may create fuel loads that could support intense fires. On the FLNF, non-native conifer plantations established in the 1930s are falling apart and adding to the fuel load. Disturbances coupled with locally intense drought can lead to conditions that will allow fire to burn intensely.

Fire in Mesic Hardwoods

Mesic hardwood forests cover approximately 2,700 acres and account for 31 percent of the FLNF forested landscape (Tables 3.5-8 and 3.5-15). The forest types include red maple, black walnut, sugar maple/beech/yellow birch, sugar maple/basswood, black cherry/ash, and mixed northern hardwood types. Conifers are a minor component of these forest types, occurring as small patches on some moist, nutrient-enriched sites. Low and moderate intensity fires have been disturbance agents that have converted mesic hardwoods forest to oak, white pine, aspen, and other early to mid-successional species.

Fire in Oak-hickory and Oak-Pine

Oak dominated forests cover approximately 2,700 acres and account for about 31 percent of the FLNF forested landscape (Tables 3.5-8 and 3.5-15). Oak-hickory and oak-pine forests are dominated by a combination of red, white, black and chestnut oaks. White pine is a common associate. Pitch pine was recorded from Satterly Hill during the 1790 surveys but does not naturally occur there now. These forest types occupy the dry, dry-mesic, acidic soil types. During the pre-European settlement period, human use of fire was the dominant disturbance agent perpetuating this community (Marks and Gardescu 1992). The oak dominated communities are generally located along the Hector Backbone and the south and west facing slopes in the southern portion of the FLNF. On the driest sites, these oak-dominated communities may be able to persist indefinitely without fire (DeGloria 1998).

Fire in Softwoods

The softwood forest types cover approximately 3,000 acres and account for about 35 percent of the FLNF forested landscape (Tables 3.5-8 and 3.5-15). The forest types include jack pine, red pine, white pine, white pine/hemlock, hemlock, scots pine, tamarack, white spruce/Norway spruce, pitch pine, and white pine/oak types. Except for native white pine, hemlock, and oak species, the remaining forest types were planted in the 1930s to reclaim abandoned agricultural land. Approximately 1,900 acres are native forest types. Stands of these forest communities have an irregular distribution across the FLNF. The plantations are concentrated in the south along Burnt Hill and the larger areas of native softwoods are concentrated in the middle of the Forest near Sawmill Creek and in ravines.

The conifer plantations are aging and will be falling apart over the next 50 to 100 years, to be naturally replaced by native vegetation compatible with ecological tendencies. About half of the plantations are now in the process of falling apart and will be replaced by native forest types within 15 years. Fuel loading will increase as a result of this process. Red pine and Norway spruce are likely to persist for several more decades as they are long-lived species.

White pine is a native species that is promoted through disturbances such as fire or agricultural abandonment. White pine is not a late successional species, and so will decline to small numbers relative to hemlock and hardwoods. It does better on the drier soils but it will mix with hemlock in the ravines and gorges.

Hemlock is a late successional species and does best on the FLNF in the wetter soils found in the ravines and gorges. Hemlock is very susceptible to fire damage and fire has decreased its

abundance on the drier sites. The absence of fire in the moist ravines and gorges has promoted hemlock stands that comprise some of the oldest trees on the FLNF.

Fire in Aspen

Aspen forest currently covers approximately 239 acres and makes up about three percent of the FLNF forested landscape (Tables 3.5-8 and 3.5-15). Aspen historically occupied less than one percent of the natural vegetation of the FLNF. Aspen is an early successional community dependent upon severe disturbance. While aspen was not a large part of the 18th century landscape on the FLNF, it was found on four of the military tracts (Marks and Gardescu 1992). Non-commercial activities, including prescribed fire would be required to maintain this forest type on the FLNF.

Prescribed Fire

Fires can be managed for resource benefits through the use of management-ignited prescribed fire.

On the FLNF, prescribed fire can be used in management areas that allow its use to meet particular objectives. Some of these objectives include:

- Reduction of hazardous fuel loading in the Wildland Urban Interface to reduce the risk of intense wildfire
- Create, maintain, or improve wildlife habitat (grassland, shrubland, and permanent upland openings)
- Preparation of sites for restoration of species such as oak, pine, and aspen
- Create, maintain, or improve plant community composition by influencing the scale and pattern of vegetation across the landscape, including changing successional patterns, while maintaining ecological functions and processes
- Control interactions between plant communities and insects and/or disease
- Promotion of blueberry production
- Create or maintain scenic vistas
- Maintenance and enhancement of rangeland

Prescribed fire is an integral component of the FLNF fuels treatment program, which started in earnest during the mid-1970s to achieve multiple vegetative management objectives. The program consists of mechanical and prescribed fire activities. Mechanical treatment includes the use of chainsaws, brush saws, brush-hogs, or related equipment to remove or reduce specific vegetation from a site. The use of prescribed fire will almost always accomplish multiple objectives within the same treatment area or unit. For example, a prescribed fire used to maintain wildlife habitat may also reduce fuel loadings. An understory prescribed fire to promote fire-adapted oak may also benefit individual fire-adapted ground flora.

Fire Regimes and Fire Condition Classes

A fire regime is a generalized description of the role of fire within an ecosystem, characterized by fire frequency, predictability, seasonality, intensity, duration, and scale.

A national assessment was completed in 2001 that quantifies land condition in the United States (Schmidt et al. 2002). The analysis describes the degree of departure from the fire regime and historical fire cycles due to fire exclusion and other influences such as timber harvesting, grazing, insects and disease, and the introduction of non-native plants.

This coarse-scale analysis identifies changes to key ecosystem components such as species composition, structural stage, tree or shrub stand age, and canopy closure. It characterizes the landscape by five “Fire Regime Groups” and three “Fire Condition Classes.” Wildfire risk conditions are identified by the Fire Regime Groups and are measured by the Fire Condition Classes. The natural historical frequency and severity of fire within an ecosystem is the identified Fire Regime. The Fire Condition Class identifies the departure of current conditions from the historical condition (Table 3.16-1).

Fire Condition Classes categorize and describe vegetation composition and structure conditions that currently exist within the Fire Regime Groups. These Classes serve as generalized wildfire risk rankings. The risk of loss of key ecosystem components from unwanted wildfire increases from Condition Class 1 (lowest risk) to Condition Class 3 (highest risk) (Table 3.16-2).

Table 3.16-1: Historical natural fire regimes.

Fire Regime Group	Fire Frequency[1] (years)	Fire Severity[2]
I	0-35	Low severity
II	0-35	Stand replacement severity
III	35-100+	Mixed severity
IV	35-100+	Stand replacement severity
V	200+	Stand replacement severity

Source: Schmidt et al. 2002
Notes:
[1] Fire frequency is the average number of years between fires.
[2] Fire severity is the effect of the fire on the dominant overstory vegetation.

Table 3.16-2: Condition class[1] descriptions and associated fire regimes and management options.

Condition Class	Fire Regime	Example Management Options
Condition Class 1	Fire regimes are within a historical range and the risk of losing key ecosystem components is low.	Where appropriate, these areas can be maintained within the historical fire regime by use of prescribed fire, mechanical treatments, or prevention of non-native invasive weeds.
Condition Class 2	Fire regimes have been moderately altered from their historical range. The risk of losing key ecosystem components is moderate.	Where appropriate, these areas may need moderate levels of restoration treatments, such as fire use and hand or mechanical treatments, to be restored to the historical fire regime.
Condition Class 3	Fire regimes have been significantly altered from their historical range. The risk of losing key ecosystem components is high.	Where appropriate, these areas may need high levels of restoration treatments, such as hand or mechanical treatments, before fire can be used to restore the historical fire regime

Source: Schmidt et al. 2002
Notes:
[1]Condition classes are a function of the degree of departure from historical fire regimes resulting in alterations of key ecosystem components such as species composition, structural stage, stand age, and canopy closure. One or more of the following activities may have caused this departure: fire suppression, timber harvesting, grazing, introduction and establishment of exotic plant species, insects or disease (introduced or native), or other past management activities

Existing Forest Plan Management Direction

The 1987 Forest Plan does not have a specific goal related to fire management. The 1987 Plan does direct the Forest Service to protect the integrity of soil, air, and water, with an associated objective to prevent and extinguish all wildfires on the FLNF.

The Forest Plan provides Forest-wide standards and guidelines regarding the use of prescribed fire, planning and monitoring, fire prevention, and fire detection and suppression. This direction includes:

- All wildfires detected on the FLNF will be suppressed.
- Cooperative agreements will be maintained with local volunteer fire departments for assistance with detection and suppression activities.
- High hazard areas will be patrolled during unusually dry conditions.
- Fire prevention will be accomplished through a number of avenues including signing, local school visits, and distribution of prevention materials to local fire departments and community groups.
- Prescribed fire may be used to maintain shrub openings and vistas, promote oak reproduction, control pond dike vegetation, promote vigor of blueberries, provide secondary habitat for many wildlife species, and provide forage for wildlife and livestock.
- The Forest Service will notify local and State officials in advance of prescribed burning.

Management area standards and guidelines discuss when and where prescribed fire is an appropriate management tool.

Proposed Changes in Management Direction Common to All Alternatives

The revised Forest Plan continues the direction of 1987 Plan related to fire management on the FLNF. The revised Plan, however, places greater emphasis on reducing hazardous fuels with the addition of a goal to maintain or restore ecological processes. This goal has two associated objectives related to fire management: to manage the oak-pine natural communities, and to reduce hazard fuels where needed to reduce threats to private property, habitats, or ecosystem components.

Forest-wide standards and guidelines were rewritten to focus on using and/or suppressing fires based on plans and updated smoke management practices. A guideline was also added to consider fire effects on dead wood providing wildlife habitat.

Existing Condition

Secondary and primary home development intermixed with forest and rangeland increases the hazard of wildland fire in the WUI. This development intermingles with US Forest Service ownership.

Description of Fire-Adapted Ecosystems, Communities, and Species

There is one primary ecological community on the FLNF that is likely to be fire-adapted and require restoration of its fire regime: the Appalachian oak-hickory forest (Reschke 1990), which is generally described as oak-hickory in this analysis. As noted earlier, while this community may not require fire in the heart of its range further south, in the north at the edge of its range it is likely to require fire to maintain its occurrence as a relict of the pre-European settlement landscape. In addition, there is evidence that oak forests across the East are slowly converting through natural succession to mesic hardwood forests (Abrams 2005). Appalachian oak-hickory forests comprise 17 percent of the Finger Lakes National Forest, and 31percent of the forested landbase (Tables 3.5-14 and 3.5-15).

In addition, survey records from the 1790s suggest that there may have been other forest and woodland communities that occurred on the FLNF due to a regular fire regime. It is not clear if an active prescribed fire regime would be able to restore any of them to the FLNF. Since these communities do not presently exist, they are listed below based on their known occurrences within the ecological regions that include the FLNF and the presence of key species of these communities in the survey records for the FLNF (Reschke 1990, Marks and Gardescu 1992). These include:

- Oak-pine forests (including Appalachian oak-pine forest or pitch pine-oak forest)
- Woodland/barren communities (including pitch pine-scrub oak barrens, oak openings, and pitch pine-oak-heath rocky summits)

Mesic hardwoods also comprise 17 percent of the Forest and 31 percent of the forested landbase (Tables 3.5-8 and 3.5-15). There is little evidence that fire has played an important or frequent role in maintaining these mesic hardwood forest types (Marks and Gardescu 1992). Therefore fire should be considered a small-scale natural process in these types on the FLNF. Based on an analysis of the 1790s survey data, it is likely that during pre-European settlement, approximately one-third of the FLNF was dominated by oaks or oaks and pine, while two-thirds was dominated by mesic hardwoods (Table 3.5-14).

It is generally believed that the bulk of the FLNF falls into Fire Regime III, mixed severity, and Fire regime V, stand replacement severity (softwoods), and can be described by Condition Classes 1 and 2 (Table 3.16-2). Condition Class 3 may exist in small areas of the southern and western slopes of the Forest where species such as pitch pine were once present but no longer exist naturally.

The scope of the fuels program has been similar to the natural role that fire has played on the Forest. The prescribed fire portion of the fuels program has averaged approximately 200 to 300 acres per year over the past planning period (1989 to present). Fuel treatments have been concentrated in openings, grasslands, and shrublands to maintain open conditions, not unlike the use of fire by Native Americans. Burning has not been allowed to extend into native forests from these open land fires, as they might have under the pre-European fire regime. Limited burning in oak understories to promote regeneration has been conducted with mixed success. Annual fuels treatment accomplishments, including both prescribed fire and mechanical methods, for this period are shown in Figure 3.16-1.

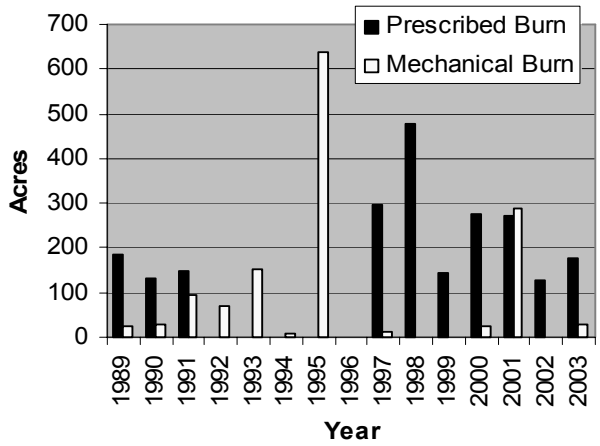


Figure 3.16-1: Fuel treatment accomplishments on the FLNF 1989 to 2003.

3.16.2 Environmental Consequences

Direct and Indirect Effects by Alternative

Indicator 1 – Acres in Management Area Allocations Where Wildfire would be suppressed

Effects Common to All Alternatives

The Forest-wide potential effects of wildfire, based on average and historical conditions, will

be generally small-scale across all alternatives. Wildfires would be suppressed within all FLNF management areas for all alternatives.

Indicator 2 – Acres in Management Area Allocations where Prescribed Fire would be allowed

Effects Common to All Alternatives

Prescribed fire can be used to achieve desired vegetative conditions in all management areas. Within the Existing and Candidate Research Natural Areas (RNA) prescribed fire can only be used where needed to maintain the values for which the areas were established. All alternatives provide the same opportunities for the use of prescribed fire as a management tool. Although there is opportunity for prescribed fire within all MAs, only a small portion of the MAs would actually be subject to prescribed fire in any given alternative.

Prescribed fire results in consumption, and subsequent reduction, in the amount of woody fuels within a treated area. Burns usually result in a mixture of burned, partially burned, and unburned vegetation. The amount of fuel reduction will depend on initial conditions, including fuel moisture, type, size, and arrangement. Fuel reductions are temporary, lasting until vegetation becomes reestablished. Reestablishment can occur within one year for fine, grassy fuels.

Burn plans, required for each prescribed fire treatment, outline particular ranges of conditions under which a prescribed fire will be conducted, in order to minimize the volume of particulate matter and smoke emissions produced. Prescribed fires are typically planned when fuel moistures are low to promote more complete combustion. Prescribed burn prescriptions include proper ignition techniques and patterns, knowing the site specific fuel properties, and working under weather conditions that promote good smoke dispersion (see Air Quality section of this chapter for more details on prescribed fire effects). This process would be the same for all alternatives.

Cumulative Effects

Wildfire occurrence is infrequent on lands immediately adjacent to the FLNF. Local fire departments work with landowners to suppress any wildfires that occur. Cooperative suppression efforts between federal, state, and local agencies would occur for wildfires that threaten multiple landowners within the FLNF area.

Prescribed fire is also a rare occurrence on adjacent private lands. Since the amount of acres on the FLNF that would have prescribed fire used as a management tool is relatively low, the cumulative effects associated with prescribed fire over the short and long-term would be considered minimal.

Fuel load reductions temporarily lower the probability of ignition within treated areas. These reductions have the greatest value when conducted in areas that have a higher than average fuel load and are located adjacent to, or near, improvements such as houses or other buildings, administrative sites, campgrounds, and communication sites.

Using fire to improve the viability of fire-adapted communities may also help to increase or sustain community types, or individual plant or animal species that are rare or uncommon on the Forest.

3.17 SPECIAL FOREST PRODUCTS

Introduction

Special forest products are defined by the Forest Service as a subset of forest products that the Agency permits to be sold from lands within the National Forest System. They include:

- Non-timber vegetative products, such as mosses, fungi, bryophytes, roots, bulbs, berries, seeds, wildflowers, ferns, and transplants of shrubs
- Non-convertible timber products that cannot be measured in cubic feet of wood, such as Christmas trees, tree sap, boughs, bark, cones, burls, and transplants of trees
- Convertible timber products that can be measured in cubic feet of wood, such as posts, poles, rails, shingle and shake bolts, firewood, fence stays, mine props, and bow staves

Issue Statement

Public concern is focused on the need for more guidance on how to address permits for gathering of special forest products. There were also concerns regarding the need for more guidance on what types of products can be gathered, where they can be gathered, and the availability of special forest products in general. There has been public interest in seeing greater availability of black locust as a special forest product beyond what is needed for Forest Service administrative use.

Indicator 1 – Acres in Management Area Allocations that Allow the Collection of Special Forest Products (Acres of Availability)

The indicator to be used in this effects analysis is acres of availability. This indicator highlights the differences among alternatives because the number of acres in MAs that allow the collection of special forest products varies by alternative. This indicator can also serve as a means of general discussion on availability for various types of uses. Acres of availability for black locust will be addressed specifically due to concerns about its availability and interest in expanding its use.

Analysis Area

The analysis area for direct and indirect effects includes all federal land managed by the Finger Lakes National Forest (FLNF). This area represents National Forest System lands where special forest products can be managed, and where different management emphases can have effects on availability of these products.

The analysis area for cumulative effects includes all FLNF lands and the lands administered by other owners, both public and private, within Schuyler and Seneca Counties in New York. This area was chosen because the cumulative impacts of Forest Service ownership and management of special forest products are most strongly connected to the communities within these counties.

3.17.1 Affected Environment

Introduction

Gathering special forest products allows people to fulfill cultural needs, live off the land, and supplement their income (Emery 1997, 1999). It is a way of life for many people in economically depressed areas. It serves as one of many sources of income, and although the amount of money generated is small, it may be a critical part of some people's household income (Emery 1997, 1999).

The Forest Service manages special forest products in response to an increased interest in gathering. National Forests have been directed to design and implement programs that provide special forest products for public needs, at

sustainable levels. At the same time, National Forests are charged with providing these products without compromising the integrity of ecosystems.

The types of products gathered on the FLNF are varied, but are assumed to be of limited quantity and extent based on interactions with gatherers and infrequent requests for gathering information or permits. Gathering of blueberries has been a long-standing tradition on the FLNF, and may extend back prior to federal ownership. Locust was planted during the 1950s on the Forest to stabilize soils, and to provide for local use as fenceposts. Little is known about other uses of special forest products on the FLNF.

The Forest has not conducted a comprehensive assessment of special forest products, their uses, or those who gather them, and there is no known comprehensive assessment for the region that can be consulted. Consequently, there was limited additional direction that could be added to the revised Forest Plan regarding specific products. There continue to be general concerns regarding the lack of management guidance in the 1987 Forest Plan related to special forest product management. This gap has led to uncertainty regarding which products should be regulated by permitting, what constraints should exist on harvesting of certain products, and trends in the welfare and supporting habitats of the species that provide these products of interest.

Existing Forest Plan Management Direction

The 1987 Forest Plan does not list any goals, objectives, standards or guidelines for the management or sustainability of special forest products as a group. Some management areas contain indirect guidance about certain special forest products.

In the 1987 Forest Plan, Management Area Prescription 1.3 (Shrubland MA) specifically identifies blueberry management as an emphasis and includes a series of six standards and guidelines. The 1987 Plan recognizes the high demand for fruit picking, a recognition that visitors tend to concentrate in known areas like Blueberry Patch Campground, and a desire to expand management to other shrublands.

The Plan also identified an objective for maintaining locust stands by clearcutting 3 acres/year. Locust is highly desirable for fenceposts and other farm uses that require rot-resistant wood. The FLNF currently uses these fenceposts for maintaining fencing on its grazed lands. While the Forest does not sell permits for locust fenceposts currently, there has been some public interest expressed in harvesting the locust for posts, as well as expanding this use to include planting of hybrids for harvesting of posts, production of various wood crafts, and education.

Collection of special forest products that require permits is generally inconsistent with agency policy on management of Research Natural Areas and candidates (RNA/cRNA), as well as with Forest Plan management direction for Potential Old Growth (8.1D). New permits for collection are not allowed in Newly Acquired Lands (MA 9.2), although permits and uses that existed on the land at the time of purchase can generally continue. There are no additional restrictions placed on the sale of special forest products within the remaining management areas.

Forest Service policy governs how the gathering of special forest products is administered on the FLNF. Under Forest Service policy, permits are generally not required for gathering of small amounts of minor products, such as cones, mushrooms, berries, acorns, or nuts, as long as these products are intended for personal use, and as long as they can be harvested sustainably. This type of gathering is described as incidental or free use. There is currently no requirement to track the incidental use of special forest products.

Permits are required for products that are gathered in larger amounts, involve improvements on the ground, are intended for sale by the gatherer, have value that can be appraised and recovered by the Government, are in limited supply, or otherwise require controls on use in order to maintain viability of species or

sustainability of gathering. Such permits are issued for either personal use or for commercial use (products intended for sale by the gatherer). When products are gathered for commercial use, both a special forest product permit and a special use permit are required.

Within the last five years, special forest product gathering that requires a permit also requires the development of a product plan that governs the sustainable harvesting of that product. Such plans specify any restrictions on amounts that can be gathered, location of gathering, time of year, and other related constraints, which are then entered into a database. Restrictions in these plans are built into the permits, and permittees are required to comply with them. Data on permits for special forest products that were issued before this new database was implemented are not readily available.

Collection of plants that are listed as Regional Forester Sensitive Species on the FLNF, or Threatened, Endangered, rare, or exploitatively vulnerable by New York State is prohibited by Forest Service policy.

Proposed Changes in Management Direction Common to All Alternatives

The revised Forest Plan seeks to address the lack of any programmatic direction for special forest products through Goal 8, which provides for a sustainable supply of forest products. An objective was added to this goal that seeks to provide sustainable opportunities for harvest of special forest products. In addition, a standard and a guideline were added specifying when permits for collection of certain products will or may be required, in order to do a better job at monitoring the uses on the Forest.

Management areas in the revised Forest Plan also specify when restrictions on gathering of special forest products exist. Gathering of special forest products that require a permit, whether for commercial or personal use, is prohibited in Future Old Forest, RNA/cRNA, and Ecological Special Area management areas. As noted earlier, limited exceptions are allowed for gathering by permit for research purposes in RNAs/cRNAs. Recreation/Education Special Areas and the North Country Scenic Trail restrict special forest product gathering to non-commercial activities, or incidental and personal use permit gathering.

The revised Forest Plan removes language in objectives that speaks directly to black locust, although there are no prohibitions to its use. The revised Plan maintains language within the Shrubland Management Area that emphasizes shrubs that produce fruit. There is no longer specific language regarding blueberry management although blueberry management will still occur.

Existing Condition

Introduction

Limited information has been gathered over the last 15 years on the amounts of special forest products collected over this time or the effects of collecting on various species and their habitats. The Forest Service on the FLNF currently has product plans for the collection of three products: saplings, firewood, and dead/down wood. Most of these products are gathered for personal use. Because these products require permits, they are tracked by the Forest Service, although data needed to estimate 15-year trends in use of these products has not been readily available.

Over the past four years, only permits for firewood have been issued, ranging from nine permits in 2001 to 14 permits in 2004, with a slight increase in permit numbers over that time. Firewood gathering has averaged about 24 cords per year, also increasing slightly over this time. Based on the limited amount of gathering of these products over the last 15 years and the fact that they are governed by product plans, the use of these products appears sustainable. While commercial gathering is also allowed on the Forest, there are no permits that have been issued recently for this type of gathering, and no product plans for commercial uses have been developed.

Data does exist on blueberry management, although no data are available on blueberry gathering. From 1987 to 2001, only 40 percent of the projected output of five acres of blueberry management annually was achieved. The size of the Blueberry Patch area has declined from five acres to two acres, where the remaining three acres have decadent blueberry bushes in old shrublands that are succeeding to forest.

No tracking is currently done on incidental use of other special forest products, which is likely due to the perceived low level of use or interest on the Forest. It is known that there are a number of types of these "minor" products that are gathered from the FLNF, based on an informal survey of Forest staff. There is no information available to suggest quantities of products gathered or levels of use, although levels and amounts are perceived to be low by district staff. Consequently, no trends can currently be described for these special forest products on the Forest.

It is known that gathering of ginseng (*Panax quinquefolius*) and other medicinal plants has increased greatly on national forests in the Lake States and Southern Tier over the last 15 years. Ginseng is currently not known from the Forest, and medicinal plant collecting has not appeared to increase on the FLNF over the last 15 years, although interest in it has. It is possible that as the Forest continues to mature and recover from its agricultural past, habitat for these plants and other valuable special forest products may become more suitable over the long-term, and collecting may become a cause for concern.

Indicator 1 – Acres of Availability

Acres of availability depend on the administrative approval for use of a certain SFP, suitability of the landbase for certain SFPs, and the actual desired location for the desired product. There are also two types of products to consider in this analysis – those not requiring a permit (incidental use), and those requiring a permit, either for personal use of commercial resale. In addition, availability of locust trees is discussed as this tree is currently restricted to patches where it was planted, and some alternatives may restrict the use of locust products in certain areas.

Incidental Use Gathering

Incidental gathering of small amounts of minor products, such as cones, mushrooms, berries, acorns, or nuts, is generally considered free use not requiring a permit. To the extent that use of these types of products does not cause notable damage to the environment or certain areas, the gathering of these products tends to be allowed across the entire Forest, and so is not constrained by administrative approval or to certain locations. The only constraints are simply how these products are distributed naturally across the Forest. Consequently, all 16,439 acres of the FLNF are considered currently available for incidental gathering of minor products (Table 3.17-1). Until a comprehensive assessment is completed, it is the assumption of the FLNF that current use levels of products that do not require a permit are acceptable, are not causing damage, and are compatible with management direction for all areas of the Forest.

Personal and Commercial Use Permit Gathering

The types of uses requiring permits on the FLNF involve some level of wood or plant cutting and removal. Products requiring permits can also include those being gathered commercially, but no such permits exist at this time on the FLNF.

Uses requiring a permit involve a greater level of environmental alteration and so are further constrained by the management areas in which they may occur. Under the 1987 Plan, there is no distinction between commercial use and personal use for gathering that requires a permit. Management areas in the 1987 Plan prohibit, are inconsistent with, and/or restrict the types of gathering that require a permit include Potential Old Growth Management Areas (8.1D), which include candidate RNAs and Newly Acquired Lands (9.2). These areas account for 1,418 acres on the FLNF, and so there remains 15,021 acres available for types of gathering that require a permit (Table 3.17-1). Like gathering for

incidental use products, suitability for gathering requiring a permit on these remaining acres may also be constrained by the capacity of the land to produce the desired products sustainably, or the ability of the Forest Service to manage these uses.

Black Locust

Black locust (*Robinia pseudoacacia*) is a tree species not considered native to New York State, although its range does extend as far north as central Pennsylvania (Huntley 1990). It has rot resistant wood that is highly prized for fenceposts. Because it fixes nitrogen and has rapid early growth, it was widely planted in abandoned agricultural areas with soil erosion and productivity problems, like the FLNF.

While use of black locust on the FLNF has up to this point been administrative, there has been public interest in seeing locust available for public use. If locust were to be provided for personal use as fenceposts, it would require a permit and would be treated as other special forest products needing permits, like firewood. If locust were intended for sale as posts by the gatherer, then this activity would be considered commercial in nature and would require two permits. In either case, the lands available for potential gathering of locust for fenceposts would be the same acreage as that for other products requiring permits (Table 3.17-1).

There are several stands on the FLNF that continue to be managed for black locust in order to perpetuate the supply of fenceposts needed to manage the grazed lands on the Forest. Currently, these areas account for 188 acres in 21 stands across the Forest. Of these, 14 acres in two stands occur in management area 9.2, where locust management is not allowed under the 1987 Plan. Therefore, on the Forest currently there are 174 acres of locust in 19 stands that are available for locust management (Table 3.17-1). Lands available for establishing new stands of locust would be represented by the same acres noted above for products requiring permits, or 15,021 acres (Table 3.17-1).

Table 3.17-1: Acres available for various types of special forest product uses in the 1987 Plan.

Special Forest Product Use	Acres (percent)
Incidental Gathering	16,439 (100)
Permit Required (commercial or personal use)	15,021 (91)
Locust Posts	174 (1)

Source: FLNF GIS data, 2004 stand coverage and management area coverage.

3.17.2 Environmental Consequences

Direct and Indirect Effects by Alternative

Effects Common to All Alternatives

The effects of the changes in management guidance in the revised Forest Plan will be the same across all alternatives, and will generally be positive. The 1987 Forest Plan has limited direction for special forest products management in general, focusing on direction for management of blueberries in shrubland areas and specific expectations for harvesting of locust. The revised Forest Plan is designed to provide more general guidance and direction in the area of special forest products management. The objective under Goal 8 requiring sustainable opportunities for harvest of special forest products will necessitate an analysis of the products being used and their characteristics, values, and trends. This will help the Forest Service identify which species require permits and what permit rules should apply. This in turn will lead to greater certainty both within the Forest Service and among the public regarding which products can be collected, in what locations, and what type of permit or restrictions are needed.

The removal of language in the revised Forest Plan regarding specific output expectations for blueberry or locust management provides increased flexibility for managers, which is also a positive effect. Public interest in certain forest products, and budgets for management of these products, can fluctuate widely over the planning period. Keeping Forest Plan direction for special forest product management more general at this time recognizes these fluctuations and allows managers to adapt to changing public interests and program priorities. Blueberry or locust management is not curtailed or otherwise restricted by focusing on general management guidance, and so there are no direct or indirect effects to these products as a result of the changes in guidance in the revised Forest Plan.

Regardless of alternative, proposals for gathering that would require a permit for personal or commercial use would be governed by individual product plans that specify constraints on collection, as well as by Forest-wide direction for sustainability and resource protection. The level of gathering that requires a permit is low on the Forest currently, and is generally restricted to small areas and small quantities of products, primarily firewood. Any potential commercial uses are expected to be small-scale and local. Ground disturbance from these activities is expected to be minimal because most activities disturb only vegetation and do not involve heavy machinery. Consequently, while there may be differences among alternatives in acres of availability, few environmental consequences are anticipated from these types of gathering.

Indicator 1 – Acres of Availability

Effects Common to All Alternatives

Incidental Use Gathering
Under the revised Forest Plan, the entire FLNF remains open to incidental gathering for personal use of special forest products, regardless of alternative (Table 3.17-2). Given the limited levels of such use that appears to take place on the Forest currently, incidental use is not expected to have notable environmental consequences in any of the alternatives. Revised Plan direction to provide sustainable opportunities for gathering of special forest products will help to gauge whether any incidental uses are reaching thresholds of sustainability, which will lead to adjustments in management of these products.

Over the next 15 years, some products gathered for incidental use may become highly valued enough to lead to the need for permitting. Such changes in administration of these products are usually documented in supplements to the Forest Service Manual system. If such a change were to happen, the effects associated with permit gathering described below would then apply. The Forest Service does not anticipate any products known to be gathered at this time increasing in value enough to warrant a change from incidental use to requiring a permit for use. Black locust, which is not currently gathered by the public, is an example of a product that will require a product plan and permit for gathering if there is public interest in this SFP.

Personal and Commercial Use Permit Gathering
Management areas vary in what types of permit gathering they allow, prohibit, or otherwise constrain, as noted in the Proposed Changes in Management Direction Common to All Alternatives. Because management area allocation varies by alternative, the acres of land available for special forest products gathering also vary by alternative. This variation in acres of availability is expected to result in little to no variation in effects by alternative, and effects are predicted to be inconsequential.

Lands available for personal use permit gathering range from 72 and 96 percent of the Forest across alternatives, with Alternative 1 providing the highest proportion and Alternative 2 providing the lowest (Table 3.17-2). Even under Alternative 2, almost three-quarters of the Forest will be available for these types of uses. Given the low level of current and historical use, it is likely that all alternatives will supply an adequate amount of land for personal use gathering, and limits on use may be more a function of Forest Service budgets and staffing for administration rather than land availability.

Table 3.17-2: Acres and proportion of the FLNF available for various types of special forest product uses by alternative.

Special Forest Product Use Type	Alt. 1 Current Management	Alt. 2	Alt. 3
	acres (percent)	acres (percent)	acres (percent)
Incidental Gathering[1]	16,439 (100)	16,439 (100)	16,439 (100)
Personal Use Permit[2]	15,842 (96)	11,761 (72)	13,966 (85)
Commercial Use Permit[3]	15,624 (95)	11,379 (69)	13,584 (83)
Locust Posts			
Personal use permit[2]	188 (1)	85 (<1)	170 (1)
Commercial permit[3]	188 (1)	70 (<1)	155 (1)

Source: FLNF GIS data, 2004 stand and alternatives layers
[1] Incidental gathering is allowed in all management areas.
[2] MAs that allow gathering under personal use permits with no additional restrictions include: Northern Hardwood, Oak Hickory, Grassland for Grazing, Grassland for Wildlife, Shrubland, Recreation and Education Special Areas, and North Country National Scenic Trail (NCST).
[3] MAs that allow gathering under commercial-use permits with no additional MA restrictions include: Northern Hardwood, Oak Hickory, Grassland for Grazing, Grassland for Wildlife, and Shrubland.

Lands available for commercial use permits vary by alternative from 69 percent to 95 percent of the Forest (Table 3.17-2). Alternative 1 provides the greatest acres available, while Alternative 2 again provides the least. As noted for personal use permits, even under Alternative 2, more than two-thirds of the Forest remains open to commercial use gathering. Commercial use gathering is currently nonexistent on the Forest, and so it is likely that all alternatives will supply an adequate amount of acres available for commercial gathering. As noted for personal use gathering, Forest Service budgets and staffing are more likely to limit the availability of permits than the acres of land in suitable management areas.

Black Locust

For availability of existing black locust stands, Alternative 2 has substantially lower acreage available than either Alternative 1 or 3, which are similar with Alternative 3 slightly less than Alternative 1 (Table 3.17-2). Even with less than half of existing stands potentially available for gathering under permit in Alternative 2, this use has not yet occurred on the Forest, and no product plans or analysis of limits have been developed. Consequently, it is likely that the 70 to 85 acres available in Alternative 2 will still be adequate to meet demand over the next 15 years. In addition, over two-thirds of the Forest will still be available in which creation of new stands of locust can occur to meet additional needs. Across alternatives, then, while there are differences in acres of availability of locust for gathering, these differences appear to be minor and of little consequence in terms of the opportunity for use of this SFP.

Cumulative Effects

There is no comprehensive assessment, or readily available data, on special forest product gathering in New York or within the two counties that comprise the cumulative effects analysis area. Nor is there data on special forest product uses, ecology, values, and trends on the FLNF and within the analysis area. Without this data it is difficult to determine the Forest's contribution to or importance in the region for this activity, as well as whether a particular product and its supporting habitat can sustain long-term gathering. It is clear that the FLNF represents a substantial proportion of public lands within the analysis area, upwards of 60 percent (see also the Areas of Special Significance section of this Chapter for discussion of public lands within this region). Private landowners often restrict special forest product gathering on their property due to concerns for liability or for their natural resources. Consequently, the FLNF is an important provider of opportunities for special forest product gathering to the public.

Past actions that have contributed to the availability of special forest products on the Forest predominantly, and within the analysis area to a lesser extent, include creation and maintenance of shrubby areas for berry picking,

management of forests, and introduction of black locust. On the Forest, these actions have produced a history of special forest product use, and expectations that these uses will continue. The lack of general guidance in the 1987 Forest Plan leads to the perception that these products are limitless and always available, when in fact this may not be the case.

The guidance provided in the revised Forest Plan for management of special forest products, which is the same across all alternatives, will ultimately lead to improved likelihood of sustainable management of SFPs on the FLNF. As more is learned about the SFPs gathered on the Forest, those products that appear to be at risk for sustainability will be identified, and their uses will be limited to sustainable levels. Some products that are currently gathered for incidental use, or are not currently available for gathering, may gain value over time, or may become more abundant and able to support additional gathering. Others may start to decline in abundance. In these cases, SFPs may be identified as needing permits due to these changes, and product plans will be developed to identify constraints and limits on collection.

While the alternatives vary in the proportion of the Forest available for special forest products gathering and black locust opportunities, all alternatives offer opportunities for most types of gathering on at least two-thirds of the Forest, which is a substantial majority of the land. Given that the areas available are so widespread, it is likely that gatherers will find opportunities, and public expectations can be met, across much of the Forest.

Maintaining a substantial proportion of the Forest open for gathering of SFPs will also ensure that there are abundant opportunities for gathering provided in the analysis area. With limits on availability of private lands for gathering, and with low levels of current use on the FLNF, there is much room for sustainable growth in this use of the Forest. The primary factor limiting the growth of this use is more likely to be agency budget and staffing than land availability. Opportunities for public-private partnerships may help to mitigate this administrative concern. Overall, then, all alternatives will have positive cumulative effects for gathering of special forest products.

3.18 MINERALS

Issue Statement

Public concern is focused on the availability of oil and gas resources for lease on the Finger Lakes National Forest (FLNF) and the effect that this activity could have on the region's "sense of place." Sense of place can be referred to as community values and is discussed in the Socio-economic section (3.20) of this chapter.

Indicator 1 – Acres in Management Area Allocations Available for Mineral Leasing

The first indicator to be used in this effects analysis is total acres in management area allocations available for mineral leasing. Pursuant to Section 370 of the Energy Policy Act of 2005, all federal land within the boundary of the Finger Lakes National Forest is withdrawn from oil and gas leasing. Therefore availability for mineral leasing does not vary by management area (MA).

Indicator 2 – Acres in Management Area Allocations Open to Surface Occupancy

The indicator to be used in this effects analysis is the number of acres in management area allocations open to surface occupancy. Surface occupancy is ground disturbance that occurs when conducting mineral extraction activities. Management areas either allow or prohibit surface occupancy.

An increase in the number of acres allowing surface occupancy would increase the potential effects of mineral exploration and development on the Forest for that alternative. This indicator does a good job of highlighting the differences among alternatives because management area allocations vary by alternative.

Analysis Area

The analysis area for direct and indirect effects includes all federal land managed by the FLNF. This area represents National Forest System lands where gravel resources exist, and the lands that could receive impacts from surface occupancy.

The analysis area for cumulative effects includes all FLNF lands and the lands administered by other owners, both public and private, in Schuyler and Seneca Counties.

3.18.1 Affected Environment

Introduction

The FLNF and surrounding lands are underlain by stratigraphic units belonging to the Ordovician Trenton-Black River Formations. First drilled and put into production in the 1880s, the Trenton-Black River Formations still produce and represent extremely important reservoirs for natural gas in the Northeast. Producing horizons occur at depths ranging from 6,000 to 10,000 feet below the surface (Romito 2004).

The FLNF sits astride an important fracture zone of the Trenton-Black River Formations. Natural gas production and leasing is occurring in areas surrounding the Forest. Theoretically, these favorable geologic conditions and the probable presence of hosting formations at the producing horizon depth, give the FLNF high potential for the occurrence of natural gas (Romito 2004).

From 1874 to 1984, the entire FLNF was under leases for oil and gas exploration and development. Several dry holes were drilled on nearby private lands but no surface disturbance occurred on the Forest. The structure and stratigraphy in the immediate area of the FLNF were not considered favorable for production.

Portions of Seneca and Cayuga counties have produced natural gas from shallow reservoirs since the early 1960s. In 1997, Seneca County

had approximately 135 gas wells in the Fayette Waterloo-Field. Drilling to the Trenton-Black River formation is taking place in both Seneca and Schuyler Counties and industry interest in leasing is high (Tamm 2003). Gas wells are presently being drilled into Trenton-Black River gas reservoirs on private lands in the vicinity of the FLNF and within Seneca Country. In the northwest portion of Schulyer County there are gas storage wells.

Oil and gas are broad terms that describe fluid minerals. The Trenton Black River formation is primarily a gas reservoir. Types of activities that may occur with development of these minerals include: seismic surveys, site preparation, rigging up, drilling, rigging down, well completion, construction of production facilities, plugging, and site reclamation.

Gravel deposits occur on the southern end of the Forest. Information indicates that the majority of sand and gravel operations located near the forest are small pits servicing local markets (Romito 2005). Just south of the Forest is a mining operation called Hanson Aggregates formally DeWitt Corporation. In 1984 one small pit was developed on the southern end of the Forest for administrative use.

Existing Forest Plan Management Direction

The 1987 Forest Plan has a goal to help meet the Nation's energy needs by leasing for gas exploration and development in a way that is compatible with conserving surface resources and their uses. The Plan also states that the goal of meeting the nation's energy needs has the desired results of leasing for gas and oil exploration over the entire acreage of the FLNF.

Forest-wide standards and guidelines (S&Gs) state that all FLNF lands are considered available for oil and gas leasing. Forest-wide S&Gs for minerals prohibit surface disturbing mineral activities on lands with sensitive environmental conditions. Management area S&Gs provide additional direction on oil and gas activities.

There is an inconsistency in the plan regarding rangelands. Forest-wide S&Gs exclude rangelands from surface disturbing activity. Management area S&Gs for rangelands, however, allow surface disturbing activities.

Proposed Changes in Management Direction Common to All Alternatives

Unlike the 1987 Forest Plan, the revised Forest Plan will not have a specific goal with objectives for minerals. The revised Plan will have Forest-wide S&Gs for common variety minerals and leasable minerals, but lands are withdrawn from oil and gas leasing under the Energy Policy Act of 2005. The revised Plan also includes S&G direction for recreational mineral collecting.

Management area standards and guidelines exclude certain portions of the Forest from mineral-related surface disturbance. The inconsistency in the 1987 Forest Plan related to rangeland is resolved. Rangelands are available for surface occupancy-related to mineral and gravel extraction.

Existing Condition

The Finger Lakes region is in the early stages of natural gas development. On private lands near the Forest, productive wells are currently being drilled to the deep Trenton-Black River gas reservoirs. If all of the lands on the FLNF were geologically favorable, a potential of 15 to 32 wells could be drilled into federally owned minerals, dependent on the spacing assigned to each well by the State. Most federally permitted wells would be drilled from multi-well drilling pads, which would result in approximately 10 to 15 pads on the FLNF. Current exploration indicates that only a small portion of the Forest is likely to be prospective to deep gas. Based on the location of recent exploratory wells, it is highly likely that one or two structural features favorable to the accumulation of gas exist on the Forest. Much of the federal minerals could be drilled directionally from adjoining private lands (Tamm 2003).

In response to an industry proposal in 1998 to lease the entire Forest for oil and gas development, the Forest Service issued a Record of Decision (ROD) in which they decided not to lease the oil and gas resource (USDA Forest Service 2001c). The ROD stated that if new information became available and prompted a new proposal, then additional analysis would occur at that time. New information includes a change in public attitude toward the need to access the natural gas under the FLNF. This may be in the form of a domestic energy crisis or other unforeseen event. It would not include a new request for leasing.

Currently, there are no leases for oil or gas on the Forest. The Interior Appropriation Bills for Fiscal Years 2001, 2002, 2003, 2004, and 2005 have included language that prohibits the leasing of oil or gas resources on the FLNF. Pursuant to Section 370 of the Energy Policy Act of 2005, all federal land within the boundary of the Finger Lakes National Forest is withdrawn from oil and gas leasing. Gravel deposits occur on the southern end of the Forest. In 1984 one small pit was developed on the Forest for administrative use.

3.18.2 Environmental Consequences

Direct and Indirect Effects by Alternative

Indicator 1 – Acres in Management Area Allocations Available for Mineral Leasing

Effects Common to All Alternatives

Under all alternatives, federal lands on the FLNF would not be available for oil and gas leasing, pursuant to Section 370 of the Energy Policy Act of 2005. Therefore, there would be no potential effects from oil and gas leasing activities under any of the alternatives. Gravel deposits occur on the southern end of the Forest. In 1984 one small pit was developed on the Forest for administrative use.

Indicator 2 – Acres in Management Area Allocations Open to Surface Occupancy

Effects Common to All Alternatives

Surface occupancy for sand and gravel extraction is allowed in five management areas: Grassland for Grazing, Grassland for Wildlife, Shrubland, Northern Hardwood, and Oak Hickory (Table 3.18-1). Types of activities that may occur are test pits, site preparation, extraction, crushing, and site reclamation. The potential effects from these activities would be negligible under all alternatives due to the limited occurrence of sand and gravel on the Forest.

Alternative 1

Under Alternative 1, surface occupancy could occur on 15,624 acres; however, not all of these acres would be occupied (Table 3.18-1). . Alternative 1 provides the greatest flexibility for development of FLNF mineral resources because it allocates the most acres to management areas that allow for surface occupancy.

Alternative 2

Under Alternative 2, surface occupancy could occur on 11,380 acres (Table 3.18-1). Alternative 2 provides the least flexibility for development of FLNF mineral resources because it allocates the least acres to management areas that allow for surface occupancy.

Alternative 3

Under Alternative 3, surface occupancy could occur on 13,584 acres (Table 3.18-1). This alternative allows for an intermediate level of flexibility for development of FLNF mineral resources compared to Alternatives 1 and 2.

Table 3.18-1: Acres in management area allocations open to surface occupancy.

Management Areas	Alt. 1 Current Mgt.	Alt. 2	Alt. 3
	acres (percent)	acres (percent)	acres (percent)
Grassland for Grazing	5,912 (36%)	5,250 (32%)	5,250 (32%)
Grassland for Wildlife	436 (3%)	688 (4%)	688 (4%)
Shrubland	2,107 (13%)	1,268 (8%)	1,421 (9%)
Northern Hardwood	390 (2%)	3,047 (19%)	2,189 (13%)
Oak Hickory	6,779 (41%)	1,127 (7%)	4,036 (25%)
Total	**15,624 (95%)**	**11,380 (69%)**	**13,584 (83%)**

Source: FLNF GIS Alternative 1, 2 and 3 MA layers
Notes:
The following management areas are not open to surface occupancy: Future Old Forest, Ecological Special Areas, Recreation And Education Special Areas, North Country National Scenic Trail Special Area, and Existing and Candidate Research Natural Areas.

Cumulative Effects

No oil and gas leasing will occur on the FLNF pursuant to Section 370 of the Energy Policy Act of 2005, therefore there will be no cumulative effects from oil and gas leasing activities. Cumulative effects under all of the alternatives include the combined effects of all phases associated with typical sand and gravel operations. The limited historical use, combined with limited available resources on the Forest, is anticipated to continue with negligible cumulative effects.

3.19 ROAD MANAGEMENT

Issue Statement

Concern is focused on maintenance of the existing road network, and construction of new roads, to provide access within and to the Forest while minimizing environmental impacts.

Indicator 1 – Acres in Management Area Allocations that Restrict Road Development and Construction

The indicator used in this effects analysis is the number of acres in management area allocations that restrict development and construction of new permanent and temporary roads. This indicator does a good job of highlighting the differences among alternatives because it describes the extent to which restrictions apply to the development and construction of roads. This can be measured in number of acres by management area.

Analysis Area

The analysis area for direct and indirect effects includes all federal land managed by the Finger Lakes National Forest (FLNF).

The analysis area for cumulative effects includes all FLNF lands and transportation systems, and the adjacent lands administered by other owners, both public and private, with transportation systems that link to, or are directly affected by, actions taken on FLNF lands.

3.19.1 Affected Environment

Introduction

The transportation region surrounding the FLNF can be characterized as a rural road system; there are no freeways, interstates, or expressways, and paved State roads and paved and gravel county roads are typical (Table 3.19-2). Daily traffic figures are available for secondary roads and some segments of county roads in Schuyler County. The road system in and around the FLNF is largely based on a one-mile grid system. The major roads are State Routes 414, 79, 96A, 96, and 227.

The Forest Road system and surrounding roads provide adequate access to public and private lands in and around the FLNF. No new road construction has occurred on FLNF since the 1987 Forest Plan because the 1987 Plan did not allow new road construction. A minor amount (less than one mile) of road reconstruction has focused on remedying problems that need to be fixed for resource purposes. In the last ten years, no road construction has occurred on the FLNF to provide public access to isolated areas surrounded by private land.

Following completion of the 1987 Plan, analyses were done that addressed the following subjects: road management objectives and design criteria, cost efficiency, road obliteration after use, maintenance, access issues, and gate locations.

In 1999, a new Forest Service road policy was enacted. This policy was intended to prevent road development in inventoried roadless areas and required the Forest Service to complete a thorough Roads Analysis Process (RAP). The RAP determines the minimum road system needed, establishes transportation management objectives and priorities, and identifies unneeded roads. The Forest Service completed the required RAP for the FLNF as a component of Plan revision (USDA Forest Service 2003s).

Road maintenance is an important component of retaining safe access to the Forest. Some roads are more expensive and difficult to maintain than others. These factors, as well as resource impacts and level of use, play a part in the road system planning process.

Existing Forest Plan Management Direction

There are no goals or objectives for road (transportation) management in the 1987 Forest Plan. Forest-wide standards and guidelines are divided into three categories: general, road design and construction, and operation and maintenance.

In general, Forest-wide standards and guidelines in the existing Plan direct the Forest Service as follows:

- No new permanent roads will be constructed, except to provide access to gas wells.
- Analysis of any new road construction will address support of short and long-term management area and road management objectives, and will meet road design, management, and operations specifications outlined in the current Forest Service Manual.
- Economic and environmental effects will be considered in the development and construction of any new temporary roads needed for timber access.
- Unneeded forest roads will be obliterated.
- Forest Service road managers will work cooperatively with local officials regarding town maintained roads crossing through, or accessing, public lands.
- Forest roads will be maintained at levels identified in each management area and dependent on use and traffic levels.

Proposed Changes in Management Direction Common to All Alternatives

The revised Forest Plan direction for roads management is similar to the 1987 Plan, but has been updated to meet new Forest Service policies. Forest-wide standards related to road operation and maintenance clarify that public access should be controlled to meet management area objectives. Forest-wide standards and guidelines also allow for new road construction. Some management area standards and guidelines, however, restrict or prohibit new road construction.

Existing Condition

In general, the existing Forest Road system, in conjunction with local, private, county, and State highways, provides adequate access to public lands. A Roads Analysis Process completed in 2003 concluded that "…the transportation system on the FLNF is currently meeting the strategic intent of the guidance in the [1987] Forest Plan." This report highlighted areas where the network could be improved and noted that the existing system would require few, if any, additional roads to meet both current and future access needs.

Primary Forest access occurs by several major State and county highways including NY 96, NY 79, NY 227, NY 228, NY 414, and County Roads 1 and 137, which border or run through the Forest. Road density within the FLNF ranges from 0 to 2.9 miles per square mile.

Ninety-six percent (70.1 miles) of the roads in the FLNF area are State, county, town, or private roads. The Forest Service has jurisdiction over the remaining four percent (3.1 miles) (Table 3.19-1). These roads provide access to campgrounds and partial access to Caywood Point. Caywood Point and Potomac Campground Roads are gated year-round. Blueberry Patch Campground Road is gated in the winter. Backbone Horse Camp is not gated or plowed in the winter. Some of the gated roads offer parking facilities.

On the FLNF, 53.0 miles, or 71.8 percent, of the roads have gravel surfacing (Table 3.19-2). Surfacing material can be used as an indicator of a road's potential for erosion and sedimentation. The 6.4 miles (8.6%) of bituminous (paved) roads on the Forest have the least potential for erosion and sedimentation, while the 14.5 miles (19.6%) of native surface (dirt) roads have the most potential for erosion and sedimentation. Gravel has typically been used in areas with high erosion and sedimentation potential to mitigate the effects.

Table 3.19-1: Total classified road miles in the FLNF.

Ownership	Road
	miles (percent)
Forest Service	3.09 (4.2%)
State/County/Town/Private	70.87 (95.8%)
Total	**73.96**
Source: USDA Forest Service 2003s	

Table 3.19-2: Surface type for roads in the FLNF.

Road Surface Type	All Roads	FS Roads
	miles (percent)	miles (percent)
Bituminous (Paved)	6.35 (8.6 %)	0.00 (0.0 %)
Gravel	53.01 (71.8 %)	1.57 (50.8 %)
Native (Dirt)	14.51 (19.6 %)	1.52 (49.2 %)
Total	**73.90**	**3.09**
Source: USDA Forest Service 2003s		

3.19.2 Environmental Consequences

Direct and Indirect Effects by Alternative

Indicator 1 – Acres in Management Area Allocations that Restrict Road Development and Construction

Effects Common to All Alternatives

All alternatives allow for the development and construction of temporary or permanent roads within the following management areas (MAs): Grassland for Grazing, Grassland for Wildlife, Shrubland, Northern Hardwoods, and Oak Hickory.

The development and construction of temporary or permanent roads is restricted within the following MAs: Future Old Forest, Ecological Special Areas, Recreation and Education Special Areas, North Country National Scenic Trail Special Area, and Existing and Candidate Research Natural Area.

Even though there are differences in acres allowing development and construction of new temporary or permanent roads under each alternative, the existing road system will provide adequate access to the FLNF and nearby private lands in the short-term. Therefore, all alternatives will meet Forest road access needs.

Opportunities for new road construction to meet long-term access needs to the FLNF and nearby private lands vary by alternative.

Alternative 1

Alternative 1 allows 15,624 acres (95%) of the Forest to remain open to the development and construction of new temporary or permanent roads (Table 3.19-3). Alternative 1 provides the most opportunities for future road construction.

Alternative 2

Alternative 2 allows 11,380 acres (69%) of the Forest to remain open to the development and construction of new temporary or permanent roads (Table 3.19-3). Alternative 2 provides the least amount of opportunities for new road construction compared to Alternatives 1 and 3.

Alternative 3

Alternative 3 allows 13,584 acres (83%) of the Forest to remain open to the development and construction of new temporary or permanent roads (Table 3.19-3). Alternative 3 is intermediate between Alternatives 1 and 2 in opportunities for new road construction.

Table 3.19-3: Acres in FLNF management area allocations that allow road construction, by alternative.

Management Area	Alt. 1 Current Mgt.	Alt. 2	Alt. 3
	acres (percent)	acres (percent)	acres (percent)
Grassland for Grazing	5,912 (36%)	5,250 (32%)	5,250 (32%)
Grassland for Wildlife	436 (3%)	688 (4%)	688 (4%)
Shrubland	2,107 (13%)	1,268 (8%)	1,421 (9%)
Northern Hardwood	390 (2%)	3,047 (19%)	2,189 (13%)
Oak Hickory	6,779 (41%)	1,127 (7%)	4,036 (25%)
Total	**15,624 (95%)**	**11,380 (69%)**	**13,584 (83%)**

Source: FLNF GIS Alternative Layers

Cumulative Effects

Effects Common to All Alternatives

Cumulative effects of the development and construction of temporary or permanent roads consist of providing adequate access to Forest lands for the life of the plan (10 to15 years).

There is room for improvement, however, and the main issues are related to budget, road management, the environment, recreational opportunities, and Forest access. Improvements to Forest Roads, as well as providing financial assistance to local and other federal agencies, could be implemented with increased budgets. The Forest Service will continue to work with towns and counties to maintain roads and provide access to the FLNF. Improving road conditions would in turn reduce road system impacts on Forest resources, such as reducing sediment delivery into waterways.

An extensive transportation network serves the FLNF. The existing road system is meeting current access needs, however, the Forest could do a better job of providing additional trailhead parking and access points for both dispersed recreation and for elderly and disable access to water bodies.

Given the restrictions in all three alternatives, and that the existing road system is meeting the access needs of the Forest, there should be little change from current management practices. Providing access to dispersed recreation, trailhead parking, and allowing access to some water bodies for the elderly or disabled could be done within management areas that allow the development and construction of temporary or permanent roads.

New road development and improvements on adjacent public and private lands have been minimal and are expected to continue as such.

Based on the relatively minor potential increase in new road maintenance and development, and continuing collaboration with towns and counties, there would be no measurable cumulative impact in regards to the issue of planning for and managing roads and the transportation system in the short and long-term.

3.20 SOCIAL AND ECONOMIC FACTORS

Issue Statement

Public concern is focused on the costs and benefits of having National Forest System lands in Schuyler and Seneca Counties. Concern is also focused on the role the Forest Service has in addressing community concerns and opportunities. The areas of tax loss from Forest Service land ownership and acquisition; potential revenues and employment that could be generated from forest products, tourism, other forest related activities; and changing demographics are also of concern.

Indicator 1 – Community Values

The social indicator to be used in this effects analysis is community values. This includes people's feelings, relationships, preferences, expectations, and sense of place for their communities and for the Finger Lakes National Forest (FLNF). Information on community values was obtained from county plans, observations, community interactions with the FLNF staff, and public input during the planning process. This indicator will highlight the differences among alternatives by determining how each alternative relates to community values.

Indicator 2 – Economic Impacts

This indicator measures the collective effects of FLNF management on local economies by projecting the number of jobs in each employment sector and employment income by sector for each alternative.

Indicator 3 – Forest Payments to Counties

Indicator 3 measures the Forest Service's financial contribution to counties made through direct payments including the Payment in Lieu of Taxes (PILT) and the Secure Rural Schools and Community Self Determination Act of 2000. This indicator highlights the differences among alternatives by estimating the direct monetary contribution to counties based on each alternative.

Indicator 4 – Present Net Value

Present Net Value (PNV) is the measure used to calculate the economic efficiency of managing a national forest. This economic efficiency analysis seeks to measure all of the costs and benefits associated with each alternative. PNV figures are derived by subtracting costs from benefits to yield a net value. Future values (benefits received in the future) are discounted using a standard discount rate to obtain a present value (the worth of future benefits at this time). Benefits consist of both market values for resources, such as timber, and non-market assigned values for resources such as recreation (USDA FS RPA 1990). The PNV of an alternative is the discounted sum of all benefits minus the sum of all costs associated with the alternative. Following Forest Service standard procedures a four percent discounted rate is used. This indicator does a good job of highlighting the differences among alternatives because it measures the difference in the long-term value of management activities.

Analysis Area

The analysis area for direct and indirect effects includes Schuyler and Seneca Counties in New York (Figure 3.20-1). These two counties contain FLNF lands and the towns most directly affected by Forest management activities. Towns within the two counties with National Forest System lands are Lodi, Hector, and Covert. In order to provide regional context and comparison to this analysis, parts of Tompkins County and New York State are also discussed.

The analysis area for cumulative effects is the same area used for direct and indirect effects and includes New York's Schuyler and Seneca Counties. This area was chosen because the cumulative social and economic impacts of Forest Service ownership and management are

most strongly connected to the communities within these counties.

3.20.1 Affected Environment

Introduction

This section describes the Forest's social and economic environment and the potential social and economic effects of implementing the three Plan revision alternatives. Most of the material used in this section is taken either directly or indirectly from a report titled "Social and Economic Assessment: Green Mountain National Forest, VT and Finger Lakes National Forest, NY," which was prepared by the University of Vermont through a Forest Service Challenge Cost Share Grant. This assessment is referred to as the Socio-Economic Assessment in this section (Stokowski et al. 2004). A variety of counties, towns, and villages in the vicinity of the FLNF were included in the data summaries and affected environment analyses. Table 3.20-1 and Table 3.20-2 show the analysis area. Other towns in the three counties were not included in the assessment due to their distance from the FLNF. The Forest Service actually manages FLNF land in only two of the three counties studied (Schuyler and Seneca) and FLNF lands fall within the boundaries of only three towns in these two counties (Lodi, Hector, and Covert). Thus, for purposes of comparison in the narrative analysis that follows, towns and counties were subdivided into three groups that reflect different types of relationships with the FLNF. (Village data are already aggregated into Town totals.)

Schuyler County, Seneca County, and New York State information is also included in many of the tables to provide regional context and for the purpose of comparison. Much of the available data is collected on the State, county, and town level.

Table 3.20-1: Towns Studied in the Social and Economic Assessment.

1. Towns with FLNF Lands		**FLNF Acres**
Schuyler County	Town of Hector	11,145
Seneca County	Town of Lodi	4,143
	Town of Covert	1,151
2. Towns in Schuyler and Seneca Counties with No FLNF Lands		
Schuyler County	Town of Dix	
	Town of Montour	
	Town of Catharine	
Seneca County	Town of Ovid	
	Town of Romulus	
3. Towns in Adjacent County with No FLNF Lands		
Tompkins County	City of Ithaca	
	Town of Ulysses	

Source: FLNF GIS Alternative Layers, Stokowski et al. 2004

Schuyler County has 19,224 residents and encompasses 329 square miles (210,560 acres) (Stokowski et al. 2004). The county contains 11,145 acres (approximately 68%) of the FLNF, which are located in the town of Hector (Table 3.20-1). Schuyler County is located on the southeast and southwest sides of Seneca Lake.

Seneca County has 33,342 residents and contains 330 square miles (211,200 acres) (Stokowski et al. 2004). Seneca County contains 5,294 acres (approximately 32%) of the FLNF, which is located in the towns of Lodi and Covert (Table 3.20-1). Seneca County is located between Seneca and Cayuga Lakes, with Seneca Lake to the west and Cayuga Lake to the east.

Tompkins County contains 492 square miles (314,880 acres) and has 96,501 residents (Stokowski et al. 2004). There are no FLNF lands in Tompkins County, which is located on the southeast and southwest sides of Cayuga Lake (Table 3.20-1). Ithaca, the largest city in Tompkins County, is home to Cornell University and Ithaca College.

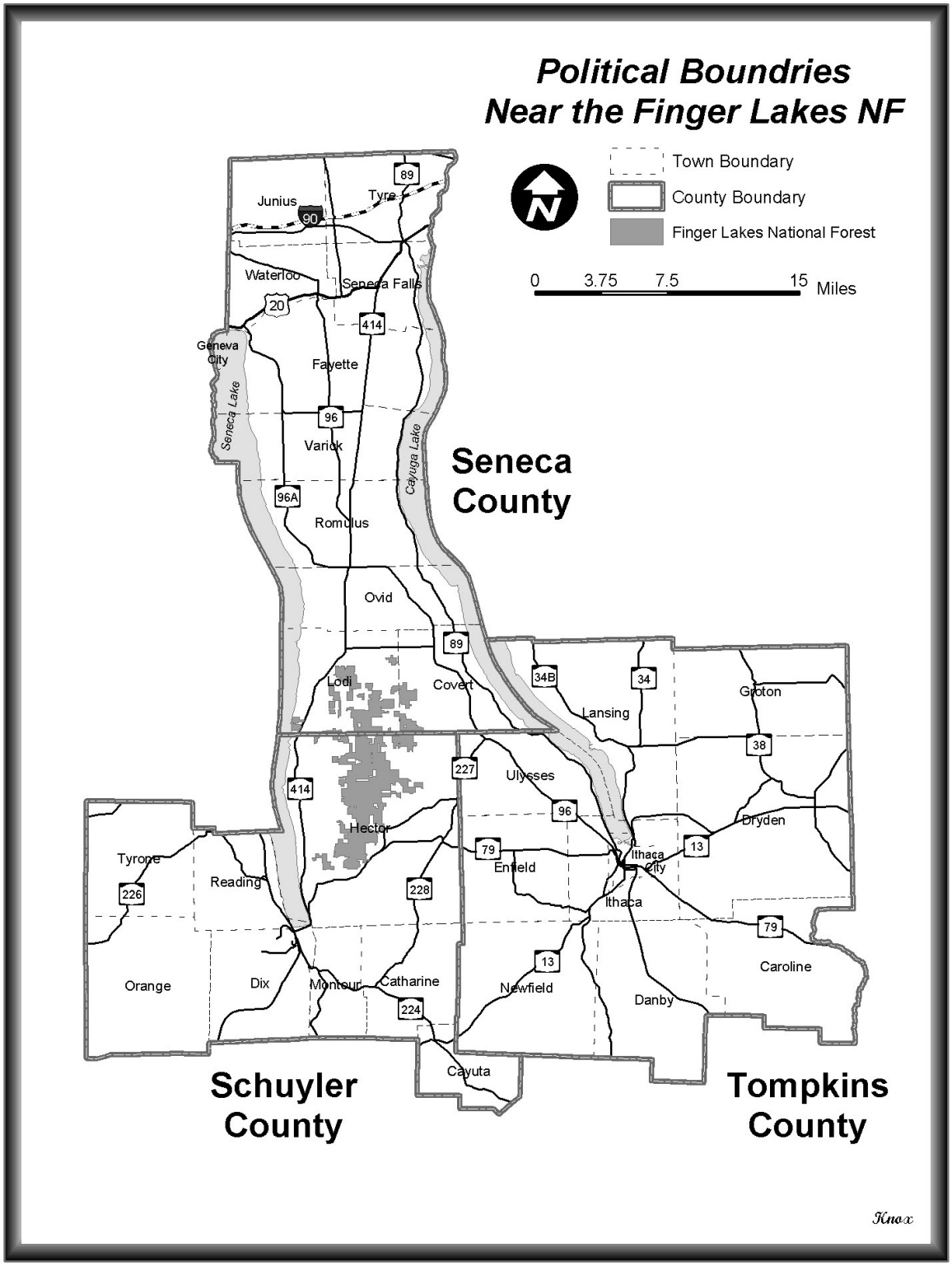


Figure 3.20-1: Counties and Towns in the Analysis Area

Table 3.20-2: Places Near the Finger Lakes National Forest, New York

County	City / Town	Village	Notes
Schuyler	Hector	Burdett	Village lies entirely within Town of Hector
	Dix	Watkins Glen	Village lies mostly in Dix (81.8%), but a portion is also in the Town of Reading (18.2%)
	Montour	Montour Falls	Village lies mostly in Montour (91.4%), but a portion is also in the Town of Dix (8.6%)
	Catharine	Odessa	Village lies partly in Catharine (60%), and partly in the Town of Montour (40%)
Seneca	Lodi	Lodi	Village lies entirely within Town of Lodi
	Covert	Interlaken	Village lies entirely within Town of Covert
	Ovid	Ovid	Village lies mostly in Ovid (96.2%), with a small portion in Romulus (3.8%)
	Romulus		
Tompkins	Ithaca City		
	Ulysses Town	Trumansburg	Village lies entirely within Town of Ulysses

Source: Stokowski et al. 2004

The FLNF is within a day's drive of a number of large urban areas, most notably Buffalo, Rochester, Syracuse, Cleveland, Toronto, and New York City. Figure 3.20-1 shows the regional location of the FLNF.

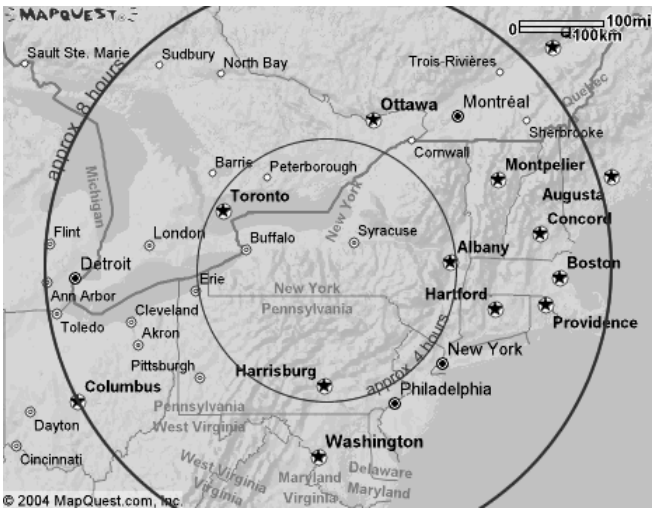


Figure 3.20-2: Cities included within four and eight hour driving times of the Finger Lakes National Forest. Source: MapQuest

The Towns of Hector, Lodi, and Covert are all small rural towns with low population densities and populations ranging from 1,429 to 4,423 residents (Stokowski et al. 2004). Hector and Lodi are located on the eastern shore of Seneca Lake while Covert is on the western shore of Cayuga Lake. The area is generally low moderate to moderate income with most employment coming from the Service Industry.

Local residents' involvement in FLNF issues and activities has shown that residents care very strongly about the FLNF. The FLNF plays an important role in the area by providing recreational opportunities, heritage resources, natural areas, wildlife habitats, educational opportunities, wood, forage, and other social and economic benefits.

Trends

Population

The towns of Hector and Lodi increased in population from 1990 to 2000 with Hector having a ten percent and Lodi a three percent growth. Covert had a population loss of one percent. Seneca County as a whole had a one percent decrease in population while Schuyler and Tompkins counties both increased by three

percent. This slow or negative population growth is less than New York State's population growth, which grew by five percent from 1990 to 2000 (Table 3.20-3). Hector and Ovid had the highest increases in population density in the study area, 9.74 percent and 19.56 percent respectively. The majority of the towns in the analysis area showed a decrease in population density (Table 3.20-4).

Table 3.20-3: Percent Change for Total Population and Three Age Categories, for New York State and Counties Adjacent to the Finger Lakes National Forest between 1990 and 2000.

	Total Population	Population Age < 20	Population Age 20- 65	Population Age > 65
	percent change	percent change	percent change	percent change
New York State	**5%**	**8%**	**5%**	**4%**
Schuyler County	**3%**	**-2%**	**5%**	**6%**
Burdett village	-4%	-15%	8%	-25%
Catherine town	-3%	-15%	1%	13%
Dix town	2%	4%	3%	-5%
Hector town	10%	2%	14%	9%
Montour town	-3%	-15%	1%	0%
Montour Falls village	-3%	-15%	3%	-1%
Odessa village	-37%	-43%	-34%	-38%
Watkins Glen village	-3%	5%	-2%	-13%
Seneca County	**-1%**	**-7%**	**2%**	**1%**
Covert town	-1%	-5%	-1%	8%
Interlaken village	-1%	10%	-8%	2%
Lodi town	3%	-7%	6%	18%
Lodi village	-7%	-7%	-6%	-13%
Ovid town	20%	23%	31%	-16%
Ovid village	-7%	16%	-15%	-16%
Romulus town	-20%	-34%	-4%	-43%
Tompkins County	**3%**	**0%**	**3%**	**6%**
Ithaca City	-1%	0%	1%	-19%
Trumansburg Village	-2%	-7%	-3%	15%
Ulysses Town	-3%	-8%	-4%	14%

Source: U.S. Census Data Sets. http://factfinder.census.gov *1990 Summary File 1, Table QT-P1A. 2000 Summary File 1, Table P12*

Table 3.20-4: Comparison of Population Densities[1] in 1990 and 2000 for New York State and Counties Adjacent to the Finger Lakes National

	1990	2000	% Change 1990-2000
	residents per square mile	residents per square mile	residents per square mile
New York State	**381.04**	**401.93**	**5.48%**
Schuyler County	**56.77**	**58.48**	**3.01%**
Burdett village	396.91	368.04	-7.27%
Catherine town	61.37	59.73	-2.67%
Dix town	113.03	116.10	2.72%
Hector town	43.16	47.37	9.74%
Montour town	136.55	131.29	-3.85%
Montour Falls village	612.96	597.01	-2.60%
Odessa village	814.88	509.92	-37.42%
Watkins Glen village	1,186.56	1,155.38	-2.63%
Seneca County	**103.67**	**102.62**	**-1.01%**
Covert town	71.30	70.70	-0.85%
Interlaken village	2,423.08	2,592.31	6.98%
Lodi town	42.02	43.04	2.43%
Lodi village	654.39	592.98	-9.38%
Ovid town	74.41	88.96	19.56%
Ovid village	1,592.86	1,457.14	-8.52%
Romulus town	66.90	53.86	-19.49%
Tompkins County	**197.66**	**202.71**	**2.55%**
Ithaca city	1,014.80	625.15	-38.40%
Trumansburg village	1,331.40	1,306.61	-1.86%
Ulysses town	148.76	144.78	-2.67%

Source: U.S. Census Data Sets *http://factfinder.census.gov*
Notes: [1] Population density is calculated by dividing the total population by the dry land area (not "total square miles"). Assumes that the area did not change significantly between 1990 and 2000.

Table 3.20-5: Racial Composition for New York State and Counties Adjacent to the Finger Lakes National Forest

	1990					2000				
	Total Pop.	White Pop.	% White	Non-White Pop.	% Non-White	Total Pop.	White Pop.	% White	Non-White Pop.	% Non-White
New York State	17,990,455	13,385,255	74.4%	6,819,226	25.6%	18,976,457	12,893,689	67.9%	6,082,768	32%
Schuyler County	18,662	18,353	98.3%	309	1.7%	19,224	18,548	96.5%	676	3.5%
Seneca County	33,683	32,731	97.2%	952	2.8%	33,342	31,682	95.0%	1,660	5.0%
Tompkins County	94,097	84,874	90.2%	9,223	9.8%	96,501	82,507	85.5%	13,994	14.5%

Source: Source: U.S. Census Data Sets. *http://factfinder.census.gov.* 1990 Summary File 1, Table P006; 2000 Summary File 1, Table P7.
The categories for 1990 were: White, Black, American Indian, Eskimo or Aleut, Asian or Pacific Islander, and Other. The categories for 2000 were: White Alone, Black or African American Alone, American Indian or Alaska Native Alone, Asian Alone, Native Hawaiian and Other Pacific Islander Alone, Some Other Race Alone, and Two or More Races

The racial composition of the populations in the three towns with FLNF land is predominantly white. Since 1990 there has been an increase in the non-white population with increases of approximately 200 percent in Hector, 96 percent in Lodi, and 30 percent in Covert (Stokowski et al. 2004). The counties have also experienced an increase in their non-white populations (Table 3.20-5).

The majority of the population in the three towns is between the ages of 20 and 65 (Table 3.20-14). The portion of residents in this age group has remained relatively steady from 1990 to 2000. The portion of the population under age 20 and over age 65 has also remained relatively stable since 1990. New York State, Schuyler, Seneca, and Tompkins County all exhibit this same trend.

Education

From 1990 to 2000, there has been a general statewide decrease in the percentage of people with less than a high school education. This trend is consistent in the towns with FLNF lands and all three counties. The percentage with a high school diploma or equivalent has remained fairly constant, while the percent with some college or an associate degree has generally decreased. Covert has seen a ten percent increase of those with bachelors degree or higher, and Lodi and Hector have had a one percent or less increase (Stokowski et al. 2004). Tompkins County has a much higher percentage of those with bachelors degrees or greater than either Seneca or Schuyler Counties (Figure 3.20-3).

Below Poverty Level

A household includes all the people who occupy a housing unit as their usual place of residence. Households are classified by type according to the sex of the head of household and the presence of relatives. All towns in the study area saw a decrease from 1989 to 1999 in the number of Married Couple Households below the poverty level. Most towns experienced an increase in the number of other types of families below the poverty level. The towns of Hector, Covert, and Lodi followed this same trend and also had an increase in individuals below the poverty level. Table 3.20-6 displays the number and change of households below the poverty level by household type.

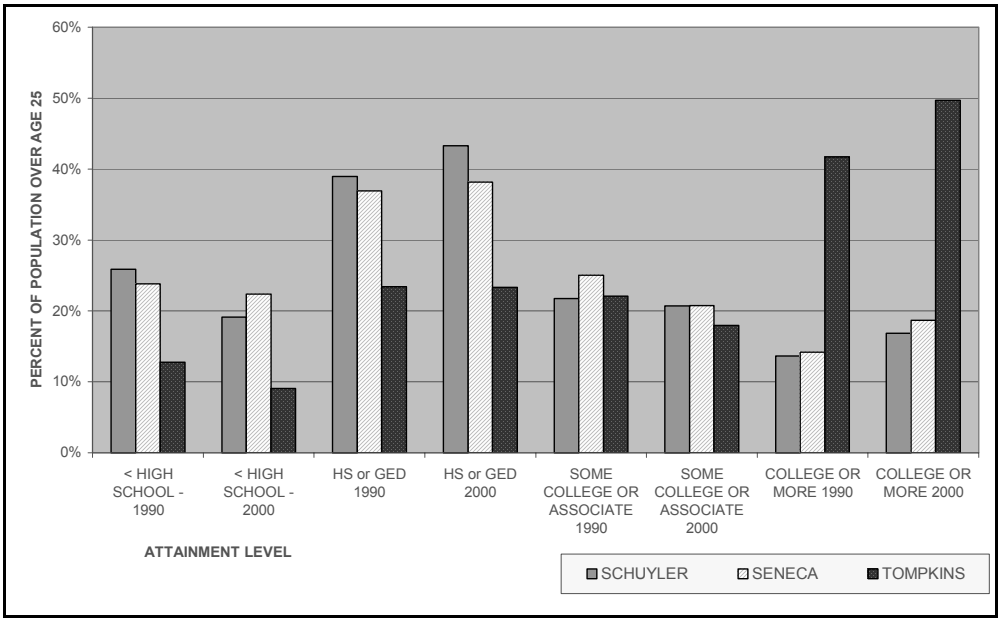


Figure 3.20-3: Educational Attainment Levels for Seneca, Schuyler and Tompkins Counties. Source: U.S. Department of Commerce, Census Bureau 2000t

Forest Users

Trends in forest use and users can be derived from a number of sources including visitor use and national trend surveys. Little information, however, is available for the FLNF, towns, and counties. The 2000 National Visitor Use Monitoring (NVUM) (USDA Forest Service 2001e) survey for the FLNF was conducted in conjunction with the Green Mountain National Forest in Vermont, making it difficult to derive much specific information on FLNF use and users. From the NVUM information, it is estimated that the FLNF currently has approximately 27,000 visits per year. The 2001 National Survey of Fishing, Hunting and Wildlife-Associated Recreation (USDI 2002) found a decrease in wildlife related recreation activities such as hunting, angling, and wildlife watching in New York State from 1991 to 2001. The National Survey on Recreation and the Environment shows increases in the number of people participating in most outdoor recreational activities from 1995 to 2003 in the states of MA, NH, NY, MA, and VT (The Interagency National Survey Consortium 2000-2002).

Employment and Income

The dominant occupation changed from 1990 to 2000 in Seneca and Schuyler counties from the category of Technical, Sales and Office occupations to Management, Professional, and Related occupations (Stokowski et al. 2004). Management, Professional, and Related occupations continue to be the dominant occupations in Tompkins County. Farming, Fishing, and Forestry remain the least dominant occupations with substantial decrease from 1990 to 2000 in all three counties and in New York State.

The unemployment rate has varied by county. Generally, Schuyler County has seen greater increases in unemployment over the past 12 years (2.9% increase), Seneca has had only a 1 percent increase, and Tompkins County has remained about the same (0.2% decrease). Table 3.20-7 shows county trends in unemployment.

From 1989 to 1999 average per capita income increased in all three counties at a higher rate than the New York Sate average. The Census

Bureau defines "personal per capita income" as the mean income computed for every man, woman, and child in a particular group. It is derived by dividing the total income of a particular group by the total population in that group. Schuyler County had the largest percent increase with 57.4 percent; Seneca County had the smallest with 42.1 percent. Table 3.20-8 shows the actual per capita income and percentage increase for New York State; Schuyler, Seneca and Tompkins Counties; towns with FLNF lands; and nearby towns.

Income from industries affected by FLNF management, such as forestry, wood products and processing, farming, and tourism, are tracked through the Bureau of Economic Analysis Standard Industrial Classifications (SIC). Trends in income from the Wood Products and Processing industry are difficult to determine because the industry figures for Seneca and Schuyler counties could not be disclosed due to confidentiality concerns. These counties both had an increase in income from this employment sector from 1980 to 1990. Tompkins County had an increase from 1980 to 1990 but had a decrease from 1990 to 2000. From 1980 to 2000, income from Agricultural Services, Forestry, Fishing and Other SIC has increased in Seneca and Tompkins counties. Schuyler County had less than 10 jobs in this SIC category from 1980 to 2000, therefore there is no available earnings figure. All three counties showed an increase in Farming SIC income from 1980 to 2000 but Schuyler and Tompkins Counties showed decreases from 1990 to 2000. Since 1980, income from farming in the three counties has consistently been substantially higher than forestry related income. Tables 3.20-9 through Table 3.20-11 show the income trends in these three SIC groups.

Tourism is a particularly difficult industry to assess because there is no single set of indicators that reflect the complexity of tourism-related economic activity. Moreover, the causal relationships between events or policy changes and tourism activity are not well understood. While it would be desirable to include information about tourism retail sales, retail data are presented as a single category in State and county statistics, and the proportion attributed to recreation and tourism is not identified. Other sectors listed do not segregate tourism related income from resident and business spending.

These indicators represent a collection of SIC groups having tourist receipts. The SIC categories include:

Eating and Drinking Places – This SIC group includes establishments that sell prepared food and drinks, including restaurants, refreshment stands, and fast food restaurants, for both on-site eating and take-away for immediate consumption.

Hotels and Other Lodging – This SIC group includes commercial and non-commercial establishments that provide lodging, with or without meals, including hotels, motels, camping facilities, and other lodging establishments.

Amusement and Recreation Services – This SIC group includes establishments not classified elsewhere that provide entertainment services

Motion Pictures – This SIC group includes businesses that produce, distribute, or show motion pictures, or similar television or film productions (Stokowski et al. 2004).

The total income from tourism related SIC groups has increased over the past 20 years. New York State's income from these sectors has grown by approximately 289 percent, Schuyler County's income has increased by about 350 percent, while Seneca and Tompkins Counties increases have been 172 percent and 152 percent, respectively. Table 3.20-12 shows the total tourism related income growth over the last 20 years.

Housing

From 1990 to 2000, housing values in the study area generally increased. Towns with FLNF lands and nearby towns had percent increases that were higher than the percent increase for New York State. The town in the area with a decrease in housing value was Ithaca City. Table 3.20-13 displays area trends in housing values.

Table 3.20-6: Comparison of the Number of Families and Individuals, by Household Type, Below Poverty Level Between 1989 and 1990 for New York State and Counties Adjacent to the Finger Lakes National Forest

	Number of Married Couple Families			Number of Other Families			Unrelated Individuals		
	1989	1999	% Change 1989-1999	1989	1999	% Change 1989-1999	1989	1999	% Change 1989-1999
New York State	**600,762**	**819,170**	**36.4%**	**995,009**	**1,209,351**	**21.5%**	**681,525**	**663,681**	**-2.6%**
Schuyler County	**958**	**646**	**-32.6%**	**480**	**1,048**	**118.3%**	**588**	**499**	**-15.1%**
Burdett Village	0	0	N/A	15	17	13.3%	14	12	-14.3%
Catherine Town	116	55	-52.6%	89	137	53.9%	64	31	-51.6%
Dix Town	112	151	34.8%	81	205	153.1%	183	157	-14.2%
Hector Town	365	118	-67.7%	92	335	264.1%	92	103	12.0%
Montour Town	38	56	47.4%	65	121	86.2%	79	75	-5.1%
Montour Falls Village	19	39	105.3%	62	122	96.8%	96	94	-2.1%
Odessa Village	52	14	-73.1%	28	28	0.0%	15	11	-26.7%
Watkins Glen Village	55	49	-10.9%	58	146	151.7%	102	115	12.7%
Seneca County	**1,443**	**1,276**	**-11.6%**	**1,005**	**1,312**	**30.5%**	**935**	**1,051**	**12.4%**
Covert Town	47	74	57.4%	36	80	122.2%	44	70	59.1%
Interlaken Village	28	13	-53.6%	13	39	200.0%	14	26	85.7%
Lodi Town	72	116	61.1%	39	62	59.0%	41	53	29.3%
Lodi Village	19	47	147.4%	21	20	-4.8%	17	27	58.8%
Ovid Town	103	94	-8.7%	30	45	50.0%	80	87	8.8%
Ovid Village	31	12	-61.3%	30	45	50.0%	32	19	-40.6%
Romulus Town	202	118	-41.6%	28	76	171.4%	23	36	56.5%
Tompkins County	**2,846**	**1,887**	**-33.7%**	**2,159**	**2,602**	**20.5%**	**10,683**	**10,416**	**-2.5%**
Ithaca City	668	416	-37.7%	863	808	-6.4%	7,309	7,497	2.6%
Trumansburg Village	17	12	-29.4%	45	48	6.7%	38	41	7.9%
Ulysses Town	110	21	-80.9%	61	156	155.7%	189	160	-15.3%

Source: U.S. Census Data Sets: *http://factfinder.census.gov* 1990 Summary File 1, Table P16. 2000 Summary File 1, Table P18.

Table 3.20-7: Unemployment Rates Between 1990 and 2002 for New York State and Counties Adjacent to the Finger Lakes National Forest

Year	Schuyler County			Seneca County			Tompkins County		
	Civilian Labor Force	Number Unempl.	Unempl. Rate (%)	Civilian Labor Force	Number Unempl.	Unempl. Rate (%)	Civilian Labor Force	Number Unempl.	Unempl. Rate (%)
1990*	9,214	497	5.4	16,476	754	4.6	49,243	1,793	3.6
1991*	9,196	712	7.7	16,513	1,021	6.2	48,445	2,095	4.3
1992*	9,063	784	8.7	16,726	1,102	6.6	48,026	2,261	4.7
1993*	8,924	661	7.4	16,159	1,016	6.3	48,925	1,957	4.0
1994*	8,652	598	6.9	15,589	951	6.1	48,988	1,867	3.8
1995*	8,774	531	6.1	14,932	897	6.0	49,066	1,727	3.5
1996*	9,036	506	5.6	15,262	812	5.3	49,446	1,496	3.0
1997*	9,000	530	5.9	15,380	836	5.4	50,378	1,572	3.1
1998*	8,881	519	5.8	15,704	756	4.8	50,499	1,453	2.9
1999*	9,122	530	5.8	15,936	877	5.5	52,064	1,465	2.8
2000	8,87	491	5.5	15,575	756	4.9	51,843	1,371	2.6
2001	8,925	591	6.6	15,687	674	4.3	52,578	1,375	2.6
2002	9,224	770	8.3	16,590	921	5.6	54,102	1,831	3.4

Source: Employment and Unemployment, State and Local Unemployment Rates. LAUS Statistics
Notes: * Calculations for these years are adjusted to incorporate revised intercensal population.

Table 3.20.-8: Per Capita Income for New York State and Counties Adjacent to the Finger Lakes National Forest

	1989 (dollars)	1999 (dollars)	% Change 1989-99
New York State	$ 16,501	$ 23,389	41.7%
Schuyler	$ 10,825	$ 17,039	57.4%
Burdett village	$ 10,711	$ 16,588	54.9%
Catherine town	$ 10,896	$ 16,496	51.4%
Dix town	$ 10,778	$ 16,682	54.8%
Hector town	$ 11,307	$ 19,601	73.4%
Montour town	$ 11,676	$ 16,983	45.5%
Montour Falls village	$ 10,632	$ 15,671	47.4%
Odessa village	$ 12,752	$ 18,639	46.2%
Watkins Glen village	$ 12,149	$ 17,096	40.7%
Seneca	$ 12,408	$ 17,630	42.1%
Covert town	$ 13,075	$ 19,757	51.1%
Interlaken village	$ 12,640	$ 14,782	16.9%
Lodi town	$ 11,421	$ 16,640	45.7%
Lodi village	$ 9,287	$ 13,709	47.6%
Ovid town	$ 11,681	$ 18,329	56.9%
Ovid village	$ 12,389	$ 15,666	26.5%
Romulus town	$ 10,397	$ 16,332	57.1%
Tompkins	$ 13,171	$ 19,659	49.3%
Ithaca city	$ 9,213	$ 13,408	45.5%
Trumansburg village	$ 14,572	$ 22,773	56.3%
Ulysses town	$ 14,875	$ 22,516	51.4%

Source: U.S. Census Data Sets. *http://factfinder.census.gov*
Source: U.S. Census Data Sets *http://factfinder.census.gov* 1990 Summary File 3, Table P114A; 2000 Summary File 1, Table P82.

Table 3.20-9: Income from Wood Products and Processing for New York State and Counties Adjacent to the Finger Lakes National Forest 1980, 1990, and 2000.

	1980	1990	2000
	Thousands of dollars	thousands of dollars	Thousands of dollars
New York State	**243,914**	**476,651**	**608,958**
Schuyler	1,398	2,578	(D)[1]
Seneca	1,800	5,735	(D)[1]
Tompkins	169	2,208	1,500
Total For Counties Shown [2]	**3,367**	**10,521**	**1,500**

Source: Bureau of Economic Analysis, Regional Economic Accounts; Local Area Personal Income – Series CA05. *http://www.bea.doc.gov/bea*
Notes:
[1] Not shown to avoid disclosure of confidential information. This information is included in statewide totals.
[2] Totals do not include information omitted to avoid disclosure of confidential information. Economic, social, and other trends that may affect the Forest and to limit irreversible commitments of resources to keep options open for future generations.

Table 3.20-10: Forest-Dependent Income from Agricultural Services, Forestry, Fishing and Other for New York State and Counties Adjacent to the Finger Lakes National Forest for 1980, 1990, and 2000.

	1980	1990	2000
	thousands of dollars		
New York State	104,067	490,612	985,255
Schuyler County	(L)[1]	(L)[1]	(L)[1]
Seneca County	(L)[1]	68	107
Tompkins County	(L)[1]	(L)[1]	82

Source: Bureau of Economic Analysis, Regional Economic Accounts; Local Area Personal Income – Series CA05. *http://www.bea.doc.gov/bea*
Notes:
[1] Less than 10 jobs, but the estimates for this item are included in the statewide totals.

Table 3.20-11: Forest-Dependent Income from Farming for New York State and Counties Adjacent to the Finger Lakes National Forest for 1980, 1990, and 2000.

	1980	1990	2000
	thousands of dollars		
New York State	520,907	745,006	770,433
Schuyler	1,465	2,767	2,211
Seneca	1,705	7,459	9,582
Tompkins	8,227	15,867	13,908

Source: Bureau of Economic Analysis, Regional Income from Farming Economic Accounts; Local Area Personal Income – Series CA05, *http://www.bea.doc.gov/bea*.

Table 3.20-12: Income from Tourism-Related Industries for New York State and Counties Adjacent to the Finger Lakes National Forest 1980, 1990, and 2000.

	1980 thousands of dollars	1990 thousands of dollars	2000 thousands of dollars
New York State	**5,389,673**	**12,647,248**	**20,979,928**
Schuyler County	2,145	3,872	9,639
Seneca County	3,993	6,848	10,881
Tompkins County	20,442	42,730	51,506
Total for Counties Shown	**26,580**	**53,450**	**72,026**

Source: Bureau of Economic Analysis, Regional Economic Accounts; Local Area Personal Income, Series CA05. *http://www.bea.doc.gov/bea*

Table 3.20-13: Comparison of Median Housing Values in 1990 and 2000 for New York State and Counties Adjacent to the Finger Lakes National Forest

	1990 (dollars)	2000 (dollars)	% Change 1990 to 2000
New York State	**131,600**	**148,700**	**13.0%**
Schuyler County	**48,500**	**68,400**	**41.0%**
Burdett Village	36,600	64,400	76.0%
Catherine Town	43,800	67,700	54.6%
Dix Town	48,000	68,400	42.5%
Hector Town	52,700	77,200	46.5%
Montour Town	48,700	66,500	36.6%
Montour Falls Village	44,200	58,700	32.8%
Odessa Village	49,000	68,400	39.6%
Watkins Glen Village	51,000	67,200	31.8%
Seneca County	**57,500**	**72,400**	**25.9%**
Covert Town	61,900	75,400	21.8%
Interlaken Village	48,500	60,500	24.7%
Lodi Town	46,300	68,900	48.8%
Lodi Village	36,000	47,100	30.8%
Ovid Town	55,100	71,600	29.9%
Ovid Village	49,900	66,100	32.5%
Romulus Town	53,700	68,900	28.3%
Tompkins County	**94,700**	**101,600**	**7.3%**
Ithaca City	133,300	96,200	-27.8%
Trumansburg Village	92,400	112,200	21.4%
Ulysses Town	91,500	103,000	12.6%

Source: U.S. Census Data Sets *http://factfinder.census.gov* 1990 Summary File 1, Table H023B. 2000 Summary File 4, Table HCT66.

Existing Forest Plan Management Direction

Social / Economics

One goal of the 1987 Forest Plan is to promote the economic stability of local communities by providing a consistent flow of goods and services on which local communities depend, and minimizing disruptions to the local economy that may result from management decisions. There is also a goal to retain the ability to respond to a changing environment to keep abreast of economic and social trends that may affect the Forest.

Objectives to achieve these goals include providing forage, timber products, and support for the tourism industry.

The administrative section includes Forest-wide standards and guidelines for human and community development. Some of these standards and guidelines direct the Forest Service to identify Forest related opportunities that will not compete with local businesses and will enhance the economic self-sufficiency of local communities.

Selection of the 1987 Forest Plan was partly based on the desire to maximize net public benefits. These benefits are both qualitative and quantitative in nature. The benefits range from increasing primitive and semi-primitive opportunities for recreation to maintaining the annual amount of wood cut at or below present levels.

Forest Service Ownership and Land Acquisition Priorities

The goal for land adjustment in the 1987 Forest Plan was to consolidate National Forest land ownership for more effective management. An objective of this goal was to pursue State enabling legislation to carry out land acquisitions and exchanges to improve FLNF ownership patterns.

If New York State enabling legislation for acquisition is obtained, land acquisitions must satisfy one or more of the following:

1. Accomplish objectives of public law or regulations
2. Meet demand for National Forest System resources
3. Result in more efficient landownership patterns
4. Result in lower resource management cost

In addition, the 1987 Plan directs the FLNF land acquisition program to focus on the following priorities:

1. Protection of existing National Forest values and benefits
2. Full, free unencumbered access for the public and National Forest permittees and users
3. Meeting identified management needs in soil and water protection, scenery preservation, wildlife habitat improvement, timber production, special uses, and dispersed recreation
4. Resolving occupancy trespass and encroachment onto federal land

Since the 1987 Plan was signed the FLNF has acquired approximately 2,800 acres. These lands include: Caywood Point; a significant parcel with frontage on Seneca Lake; grasslands for grazing and wildlife; and some additional Forest land. The 1987 Plan contains a management area for newly acquired lands that protects natural resources and management options until studies are done to determine the desired future conditions for these areas. There is no specific direction as to how desired future conditions for newly acquired lands will be determined, only that a study will be conducted.

Proposed Changes in Management Direction Common to All Alternatives

The revised Forest Plan will continue much of the current management direction in promoting economic stability of local communities. The revised Pan will also place a greater focus on

the increased role of tourism in the Finger Lakes region; community interest and involvement in FLNF management; and the cultural needs and values of diverse populations, rural, urban, and Native American. The changes are found in revised goals and objectives that strive to:

- Provide a wide range of uses and activities
- Provide a diverse range of high quality, sustainable recreation
- Support regional and local economies through resource production and resource protection
- Maintain and enhance partnerships
- Provide a diverse range of information and education

The revised Forest Plan still contains a goal to improve management effectiveness through land adjustment activities. The revised Plan no longer contains direction to pursue State enabling legislation. Land adjustment priorities are set forth in Forest-wide standards and guidelines and are similar to those in the 1987 Plan. Guidelines have been added to provide direction for assigning newly acquired lands a management area immediately after Forest Service purchase.

Existing Condition – Social

The existing conditions section will discuss the current situation of social and economic factors in Schuyler and Seneca Counties and the towns within these two counties with National Forest System lands. These include Hector, Covert, and Lodi. The existing condition in Tompkins county and New York State will also be provided to add context and provide comparative information.

Population

The population and age distribution of Schuyler, Seneca, and Tompkins Counties, the towns of Hector, Covert, Lodi, and the towns near the FLNF are shown in Table 3.20-14. Most of the population in the area is between the ages of 20 and 65. The population of all three counties is predominantly white (Table 3.20-5). Hector, Covert, and Lodi are all over 95 percent white while Ithaca City has the highest percentage of non-white population (26.1%) (Stokowski et al. 2004).

More than 60 percent of the people in Schuyler and Seneca Counties were living in the same house in 2000 as they were in 1990, and more than 80 percent of the population of these two counties is native to New York (Stokowski et al. 2004).

Education

More than 50 percent of the age 25 and over population in Schuyler and Seneca Counties have an educational level of a high school diploma, GED, or less (Stokowski et al. 2004). The towns of Hector, Covert and Lodi have 48 percent, 35 percent, and 55 percent, respectively, at this educational level. In contrast, Tompkins County has only 31 percent of the over 25 population with a high school diploma, equivalent or less. Schuyler and Seneca Counties have 35 percent and 36 percent of the over 25 population with some college or greater as an educational level. Hector, Covert, and Lodi have 46 percent, 49 percent, and 38 percent, respectively. Tompkins County has a considerably higher percentage with some college or higher at 67 percent.

Recreational Forest Use and Users

As stated earlier, the FLNF receives an estimated 27,000 visits a year. Many Forest users are nearby residents (USDA Forest Service 2001e). Forest uses include a variety of trail activities such as hiking, biking, horseback riding, cross-country skiing, snowshoeing, and snowmobiling. Other Forest use activities include berry picking, gathering of forest products, camping, picnicking, fishing, hunting, wildlife watching, outdoor education, and viewing scenery. The Forest Service does not have data on specific numbers for these uses or demographic information on the users.

Table 3.20-14: Total Population and Population Distribution in 2000 by Age Category for New York State and Counties Adjacent to the Finger Lakes National Forest

County/Town	Total Population	Population Under 20	Percent of Population Under 20	Population Ages 20 to 65	Percent of Population Ages 20 to 65	Population Over 65	Percent of Population Over 65
	residents	residents	percent	residents	percent	Residents	percent
New York	**18,976,457**	**5,211,251**	**27%**	**11,316,854**	**60%**	**2,448,352**	**13%**
Schuyler	**19,224**	**5,446**	**28%**	**10,963**	**57%**	**2,815**	**15%**
Burdett Village	357	91	25%	218	61%	48	13%
Catherine Town	1,930	560	29%	1,138	59%	232	12%
Dix Town	4,197	1,157	28%	2,320	55%	720	17%
Hector Town	4,854	1,418	29%	2,902	60%	534	11%
Montour Town	2,446	580	24%	1,359	56%	507	21%
Montour Falls Village	1,797	389	22%	910	51%	498	28%
Odessa Village	617	175	28%	362	59%	80	13%
Watkins Glen Village	2,149	569	26%	1,194	56%	386	18%
Seneca	**33,342**	**8,955**	**27%**	**19,337**	**58%**	**5,050**	**15%**
Covert Town	2,227	610	27%	1,248	56%	369	17%
Interlaken Village	674	212	31%	333	49%	129	19%
Lodi Town	1,476	423	29%	857	58%	196	13%
Lodi Village	338	114	34%	179	53%	45	13%
Ovid Town	2,757	722	26%	1,660	60%	375	14%
Ovid Village	612	203	33%	317	52%	92	15%
Romulus Town	2,036	519	25%	1,283	63%	234	11%
Tompkins	**96,501**	**27,100**	**28%**	**60,144**	**62%**	**9,257**	**10%**
Ithaca City	29,287	7,916	27%	19,535	67%	1,836	6%
Trumansburg Village	1,581	456	29%	878	56%	247	16%
Ulysses Town	4,775	1,277	27%	2,802	59%	696	15%

Source: U.S. Census Data Sets. http://factfinder.census.gov
1990 Summary File 1, Table QT-P1A. 2000 Summary File 1, Table P12

Partnerships

The FLNF has much community interest as reflected by the number of groups involved with the Forest. The use of partnerships and volunteers to assist with Forest management activities has increased over the life of the 1987 Forest Plan. Some of the areas where partnerships and volunteers have assisted with management activities include:

- Heritage projects
- Caywood Point Visitor Center Feasibility Study
- Road and trail maintenance
- Trail planning
- Rehabilitation projects and pasture fence maintenance
- Fish stocking
- Pastureland management
- Shrubland management
- Ecological mapping
- Bird population monitoring
- Wildlife projects
- Education
- Law enforcement and firefighting

Land Use

Schuyler County is 65 percent forested and 31 percent agricultural. Less than 1 percent of the land is residential (Schuyler County Planning Commission 2004). The vast majority of residential land use is for primary homes. Seasonal homes in Schuyler and Seneca Counties make up 13.7 percent and 8.1 percent, respectively. The towns with the highest percentages of seasonal homes were Hector (15.4%), Covert (19.9%), Lodi (25.1%), and Romulus (16.3%). Three of these towns, Hector, Covert, and Lodi, contain FLNF lands. Approximately 65 percent of the Seneca County land area is agricultural (USDA Forest Service 2001b). Schuyler and Seneca counties also have a number of recreational areas including Watkins Glen State Park, Cayuga Lake State Park, Sampson State Park, Seneca Lake State Park, Montezuma National Wildlife Refuge, Connecticut Hill State Wildlife Management Area, Lodi State Park, Smith Park, Sugar Hill State Forest, Women's Rights National Historical Park, and a number of campgrounds and marinas.

Community Values

No specific surveys have been done to identify community values relating to natural resource management in the two counties. Town and county plans are considered to be representative of community values and visions for the future. Goals and objectives in the Schuyler County Comprehensive Plan call for:

- Conserving and supporting agriculture
- Supporting economic growth and development
- Promoting tourism
- Preserving rural character and small town quality
- Preserving and promoting natural resources
- Preserving sensitive natural assets
- Protecting water supplies
- Providing quality education
- Preserving historic resources
- Cultivating the arts
- Improving recreational opportunities
- Implementing fair taxation policies
- Preventing sprawl, simplifying access to safe affordable housing
- Maintaining and improving roads, designating scenic roads
- Providing affordable transportation

(Schuyler County Planning Commission 2004).

Public input on FLNF activities provided information on community attitudes towards the FLNF. Many consider the FLNF a unique and special place. They feel that public land, such as the FLNF, are rare in the region. This was documented in the comments received on the FLNF Oil and Gas Draft Environmental Impact Statement (USDA Forest Service 2001b). Public input received throughout the Forest Plan revision process has expressed a desire for:

- A range of uses and opportunities on the FLNF
- A balanced approach to management
- Protection of natural resources
- Protection of cultural and heritage resources
- A range of wildlife habitat and ecological areas

The FLNF has a unique history and special relationship to local communities. It was through grassroots support of local residents that this area was designated a National Forest in the 1980s when it was being considered for disposal as federal land. Local communities and their interests have always played a very important role in FLNF management (USDA Forest Service 2001b).

Existing Condition – Economic

Income

The Census Bureau defines "personal per capita income" as the mean income computed for every man, woman, and child in a particular group. It is derived by dividing the total income of a particular group by the total population in that group. Schuyler and Seneca Counties are in the bottom tier counties for average personal per capita income (PPCI) in New York State. The average PPCI for Schuyler County is 73 percent of New York State's PPCI, the PPCI for Seneca County is 75 percent of the State's PPCI and the PPCI for Tompkins County is at 84 percent of the State PPCI. The towns of

Hector and Covert have average PPCIs higher than their respective county averages. The average PPCI in the town of Lodi is slightly lower than the PPCI for Seneca County (Table 3.20-8).

According to the US Census Bureau, "household income" is computed by adding the income of the householder and all other individuals 15 years old and over in the household, whether they are related to the householder or not. (This differs from "income of families," because family income refers to the incomes of household members who are related to the householder, the person or persons in whose name the home is owned, being bought, or rented.) Schuyler and Seneca Counties' household incomes are clustered between $10,000 and $59,999. The counties have higher percentages of households in these ranges than New York State overall. The Counties have lower percentages than New York State in the over $60,000 and under $10,000 household income ranges. Table 3.20-15 shows ranges and percents of household incomes.

Employment and Income by Sector

Employment sectors are traditionally defined for economic analysis by the US Standard Industrial Classification (SIC) system. This information was compiled on the county level. The major occupation in all three counties in 2000 was Managerial, Professional, and Related Occupations. The occupational category of Farming, Fishing, and Forestry has the lowest number of people in these three Counties (Table 3.20-16).

In each County, the type of industry (industry sector) with the greatest number employed was the Service Industry (Table 3.20-17). As of 2000, approximately 1,300 of a total 22,651 employed people in Schuyler and Seneca Counties were employed in the Farming, and Agricultural Service, Forestry, and Fishing industry sectors. Employment in tourism related services for the two counties is approximately 6,500 (Table 3.20-12).

Table 3.20-15: Household Income in 1999 for New York State and Counties Adjacent to the Finger Lakes National Forest

Income Category	New York State	Schuyler County	Seneca County	Tompkins County
	Households (percent)	households (percent)	households (percent)	households (percent)
Less than $10,000[1]	809,507 (11.47%)	594 (8.05%)	963 (7.68%)	4,534 (12.43%)
$10,000 - $19,999	862,161 (12.21%)	1,189 (16.12%)	2,028 (16.16%)	5,472 (15.01%)
$20,000 - $29,999	821,634 (11.64%)	1,189 (16.12%)	1,967 (15.68%)	4,940 (13.55%)
$30,000 - $39,999	773,471 (10.95%)	1,187 (16.09%)	1,839 (14.66%)	4,255 (11.67%)
$40,000 - $49,999	672,709 (9.53%)	845 (11.46%)	1,308 (10.42%)	3,673 (10.07%)
$50,000 – $59,999	591,627 (8.38%)	741 (10.05%)	1,287 (10.26%)	3,208 (8.80%)
$60,000 – $74,999	706,085 (10.00%)	727 (9.86%)	1,212 (9.66%)	3,554 (9.75%)
$75,000 – $99,999	746,384 (10.57%)	517 (7.01%)	1,200 (9.56%)	2,908 (7.97%)
Over $100,000	1,077,017 (15.25%)	386 (5.23%)	743 (5.92%)	3,920 (10.75%)

Source: U.S. Census Data Sets. http://factfinder.census.gov

Table 3.20-16: Dominant Occupations in 2000 for Residents in New York State and Counties Adjacent to the Finger Lakes National Forest

Occupation	Schuyler County	Seneca County	Tompkins County
	number employed (percent)	number employed (percent)	number employed (percent)
Management, Professional, and Related	2,557 (30%)	4,463 (30%)	24,201 (50%)
Service	1,555 (18%)	2,539 (17%)	7,028 (15%)
Technical, Sales, and Office	1,909 (22%)	3,559 (24%)	10,370 (22%)
Farming, Fishing, and Forestry	189 (2%)	149 (1%)	354 (1%)
Construction, Production, Laborers, and Transportation	2,374 (28%)	3,987 (27%)	6,239 (13%)
Total	**8,584**	**14,697**	**48,192**

Source: U.S. Census Data Sets. http://factfinder.census.gov, 2000 Summary File 4, Table QT-P27

Table 3.20-17: Employment in 2000 by Industry for New York State and Counties Adjacent to the Finger Lakes National Forest

	New York State	Schuyler County	Seneca County	Tompkins County
Employment by Place of Work	Number employed	number employed	number employed	number employed
Total Full-time and Part-time	10,493,766	7,984	14,667	62,631
By Type				
Wage and salary employment	8,988,196	4,644	11,048	54,138
Total proprietors employment	1,505,570	3,340	3,619	8,493
Farm proprietors employment	39,142	369	523	543
Non-farm proprietors employment	1,466,428	2,971	3,096	7,950
By Industry				
Farm employment	60,153	446	707	903
Nonfarm employment	10,433,613	7,538	13,960	61,728
Private employment	8,950,695	6,388	11,387	55,158
Agricultural services, forestry, fishing and other	74,130	124	(D)[1]	834
Mining	9,027	(L)[2]	(D)[1]	311
Construction	454,430	548	719	1,363
Manufacturing	904,712	744	1,934	5,033
Transportation and public utilities	516,630	202	424	1,517
Wholesale trade	482,895	173	723	1,018
Retail trade	1,485,288	1,445	2,907	8,266
Finance, insurance, and real estate	1,085,310	442	667	2,346
Services	3,938,273	2,705	3,838	34,470
Government and government Enterprises	1,482,918	1,150	2,573	6,570
Federal, civilian	145,489	67	163	337
Military	57,239	36	68	203
State and local	1,280,190	1,047	2,342	6,030
State government	251,278	228	615	799
Local government	1,028,912	819	1,727	5,231

Source: Bureau of Economic Analysis. http:/www.bea.doc.gov/; Regional Data, Local Area Annual Estimate, Table CA 25.

Notes:

[1] (D) Not shown to avoid disclosure of confidential information, but the estimates for this item are included in the totals.

[2] (L) Less than 10 jobs, but the estimates for this item are included in the totals.

Economic Impacts

An economic model, known as the IMPLAN model, provides information on the current condition of Forest Service management's contribution to employment and income in the two counties, as well as the economic impacts of revised Forest Plan alternatives. The information for the current condition (Tables 3.20-18 to 3.20-21) provided through the IMPLAN model is based on 2003 Forest program revenues and expenditures (see FEIS Appendix B for more information on analysis processes). Forest Service management of the FLNF currently contributes 33 jobs and almost 1.2 million dollars in income to the two counties with National Forest System lands.

Housing

In 2000, the median housing values in Schuyler and Seneca Counties were $68,400 and $72,400, respectively. The 2000 median housing value for Tompkins County was $101,600. The 2000 median housing value for New York State is substantially higher at $148,700 (Table 3.20-13). The median housing values for Schuyler, Seneca, and Tompkins Counties are 46 percent, 49 percent, and 68 percent, respectively, of the New York State median housing value.

Forest Payments to Counties

There are three types of federal payments reaching municipalities that have USDA Forest Service land. These include the Payment in Lieu of Taxes (PILT) (1976 Payments in Lieu of Taxes Act, P. L. 94-565, 31 U.S.C. 6901- 6907, as amended); and two types from the Secure Rural Schools (codified in 16 U.S.C. 500) and Community Self Determination Act of 2001 (Public Law 106-393) – the 25-Percent and the Full Payment Funds. Each county receives PILT funds and either the 25-Percent Fund or the Full Payment Fund, whichever they chose under the Secure Rural Schools and Community Self Determination Act (Secure Schools Act).

PILT payments are based on the acreage of National Forest System lands within a county in the preceding fiscal year. Federal law currently authorizes an annual per-acre amount of $1.92, subject to a maximum per town resident (population) cap.

The legislation calls for the payment amount to be indexed by the inflation rate. Congress, however, rarely appropriates the full amount. The Secure Schools Act was intended to stabilize payments made to support education. Two methods of calculating payments are available: the 25 Percent Fund or the Full Payment Fund. Both Schuyler and Seneca County elected to use the Full Payment Fund.

The amount a county receives for the Full Payment Fund is based on the "historical percentage" received by a county. At the present time, this means that the total amount that is sent to New York for distribution to the counties choosing Full Payment is based on history and will not vary if more land is acquired by the Forest Service. The total amount distributed is calculated as the average of the three highest annual 25 Percent Fund Payments for the FLNF between 1986 and 1999 multiplied by the historical percentage of land in the counties. It will be adjusted annually by one-half of the Consumer Price Index rate.

Payments to counties from PILT and Secure Schools have generally increased since 1996 (Figure 3.20-4 and Figure 3.20-5). Since 1996, the total payments to both counties have more than tripled from $21,396 to $70,067.

The Forest Service also contributes to Schuyler and Seneca Counties through cooperative agreements with the sheriff departments to fund their assistance with patrolling National Forest System lands, and has cooperative agreements with towns to assist with road maintenance.

Present Net Value of Existing Forest Plan

Present Net Value for the 1987 Forest Plan has been recalculated using updated SPECTRUM modeling information for timber outputs and monetary values, updated grazing outputs and values and NVUM recreation outputs and 1990 RPA assigned values. The existing PNV is $(3,402), which is the same as Alternative 1, and is displayed in Table 3.20-22.

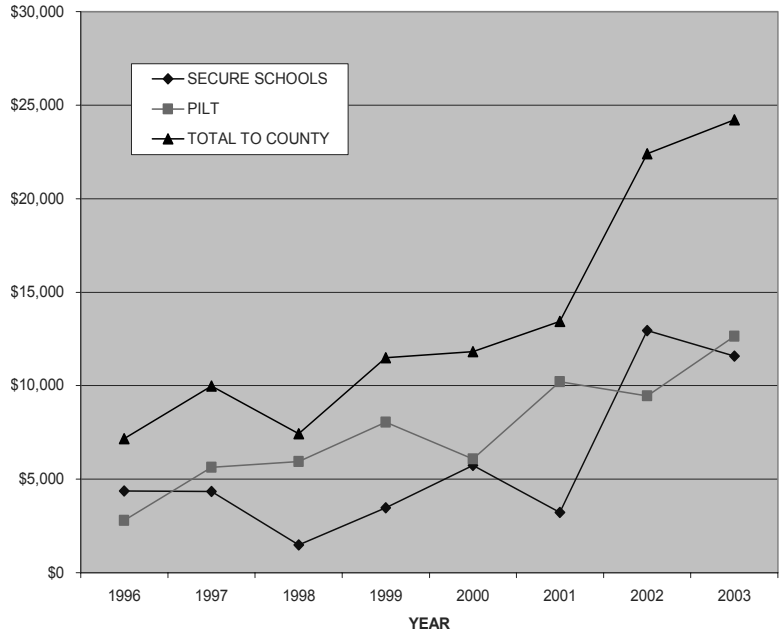


Figure 3.20-4: Federal Payments to Schuyler County

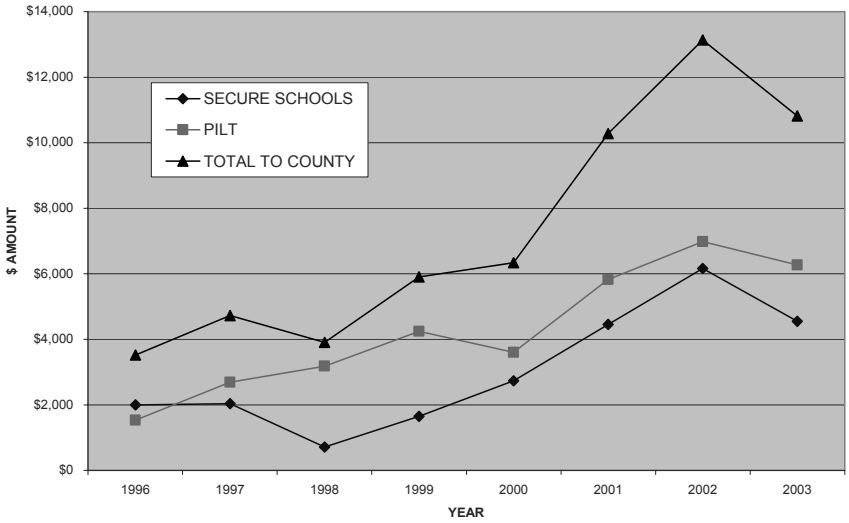


Figure 3.20-5: Federal Payments to Seneca County

3.20.2 Environmental Consequences

Direct and Indirect Effects by Alternative

The following discussion addresses the potential social and economic effects of Forest management associated with each alternative. The first indicator focuses on potential social effects. The remaining three indicators focus on the potential economic effects. The indicators are described at the beginning of this section.

Indicator 1 – Community Values

Effects Common to All Alternatives

All alternatives will protect natural, heritage, and cultural resources. This will be accomplished through the implementation of Forest-wide standards and guidelines.

A range of wildlife habitats and ecological areas is also provided in all alternatives. This will be accomplished by providing a range of uses and habitats in the management area (MA) descriptions of the revised Plan. It is also accomplished by providing a range of management areas in land allocations.

All alternatives support agriculture by retaining grazing. Alternatives 2 and 3 have slightly less land available for grazing (5,250 acres, 32%) than Alternative 1 with 5,912 acres (36%).

Alternative 1

Alternative 1 provides more opportunities for timber harvesting, grazing, trail development, and snowmobile trail use than the two other alternatives. It does not provide opportunities for semi-primitive recreation, it provides the least acres in the Grasslands for Wildlife MA, and it provides the least area of closed canopy forest. With this in mind, Alternative 1 provides a limited range of management opportunities to address community values.

Alternative 2

Alternative 2 provides the fewest opportunities for timber harvesting, trail development, and snowmobile trail use. It provides the greatest opportunities for semi-primitive recreation, the largest area in closed canopy forest, and the largest area in continuous forest. It provides approximately the same amount of Grasslands For Grazing and Grasslands For Wildlife as Alternative 3. With this in mind, Alternative 2 provides a limited range of management opportunities to address community values. This limited range is different than that found in Alternative 1, because it emphasizes different management opportunities.

Alternative 3

Alternative 3 is intermediate and provides fewer opportunities for timber harvesting, trail development, and snowmobile trail use than Alternative 1, but more opportunities than Alternative 2. It provides more opportunities for semi-primitive recreation and areas of closed canopy forest than Alternative 1, but fewer opportunities than Alternative 2. Alternative 3 provides approximately the same amount of Grasslands for Grazing and Grasslands for Wildlife as Alternative 2. Of the three alternatives, this alternative provides the broadest range of management opportunities to address community values.

Indicator 2 – Economic Impacts

The following examines the effects of the alternatives on employment and labor income opportunities within the analysis area of Schuyler and Seneca counties. This information was developed using the FEAST/IMPLAN (Forest Economic Analysis Spreadsheet Tool/Impacts Analysis for Planning) model. The FEAST/IMPLAN estimates of economic impacts include direct, indirect, and induced effects on the economic condition of the analysis area in terms of employment and income.

An example of a direct impact is the payment a logger receives from the harvesting and sale of trees to a wood products facility. The indirect

effects are when the wages of the logger are spent on car maintenance and groceries. Induced impacts are when the auto repair shop owner and grocery store owner pay rent on their buildings and buy insurance and other goods and services. Another example of indirect and direct impacts is the revenue a resort owner receives from vacationers and then the subsequent investment of that income in fishing boat maintenance and buying bait.

The IMPLAN (Impact Analysis for Planning) model traces the ripple effects of localized economic, socio-political, or resource management changes on a region's employment, production, income, and natural resource base. The IMPLAN system consists of (USDA Forest Service 2004f):

- A rich database of socio-economic information
- Software that constructs a model of an economy delineated by US and/or zip code boundaries
- An analysis program that estimates the impacts of projects, programs, policies, and economic changes on a region

IMPLAN provided detailed reports on Schuyler and Seneca Counties describing trade, production, consumption, taxes, welfare and social security payments, savings and investment, debt, employment, and income. National average NVUM survey-based recreation visitor spending profiles were used in estimating impacts. IMPLAN modeled complex economic interactions and provided this information for FEAST. Forest information on program expenditures and revenues for the current situation and each alternative are entered into FEAST. The Current Situation columns in the tables use actual revenue and expenditure data from Forest Service programs in 2003. This information is provided in comparison to the projected expenditures and revenues for each alternative. Information was based on Fiscal Year 2003 revenues and expenditures. FEAST uses this information and the IMPLAN input to describe impacts to employment and labor income by resource program, major industry, and planning alternative (see FEIS Appendix B for more information on the analysis process).

Effects Common to All Alternatives

All alternatives would contribute positively to the local economy. The recreation and timber programs would contribute the most jobs and industry income. There are no major differences among alternatives in the economic contribution (Sendak 2004).

Alternative 1

Alternative 1 provides the most potential for employment and industry income contributions from Forest Service programs (Tables 3.20-18 and 3.20-19). The increase is due to the greater volume of timber harvested. The Manufacturing sector would have the greatest increase in employment and income from this alternative (Table 3.20-20 and 3.20-21).

Alternative 2

Alternative 2 provides the least potential for employment and industry income contributions from Forest Service programs (Tables 3.20-18 and 3.20-19). A number of sectors would see moderate increases in income and employment from this alternative (Tables 3.20-20 and 3.20-21) but not as great an increase as in Alternative 1.

Alternative 3

Alternative 3 provides a slightly greater potential for employment and industry income contributions from Forest Service programs (Tables 3.20-18 and 3.20-19) than Alternative 2. The Manufacturing sector would have the greatest increase in employment and income from this alternative (Tables 3.20-20 and 3.20-21) but not as great an increase as in Alternative 1.

Table 3.20-18: Employment Contributed by the FLNF by Program and Alternative

Resource	Current # of Jobs	Alt. 1 # of Jobs	Alt. 2 # of Jobs	Alt. 3 # of Jobs
Recreation	11	11	11	11
Wildlife and Fish	1	1	1	1
Grazing	2	3	2	2
Timber	3	20	5	12
Minerals	0	0	0	0
Payments to States/ Counties	1	1	1	1
Forest Service Expenditures	15	20	18	18
Total Forest Management	33	56	37	45
% Change from Current	---	68.5%	12.9%	36.1%

Source: FLNF FEAST Spreadsheet/IMPLAN Model 2006

Table 3.20-19: Labor Income by Program and Alternative

Resource	current	Alt. 1	Alt. 2	Alt. 3
	thousands of dollars			
Recreation	$243.4	$243.4	$243.4	$243.4
Wildlife and Fish	$27.5	$27.5	$27.5	$27.5
Grazing	$25.3	$26.1	$26.1	$25.5
Timber	$69.7	$502.1	$113.2	$290.2
Minerals	$0.0	$0.0	$0.0	$0.00
Payments to Counties	$19.4	$19.4	$19.4	$19.4
Forest Service Expenditures	$796.6	$1091.4	$930.6	$983.4
Total Forest Management	$168.4	$1909.7	$1359.5	$1589.3
%Change from Current	---	61.6%	15.0%	34.5%

Source: FLNF FEAST Spreadsheet/IMPLAN Model 2006

Table 3.20-20: Employment by Major Industry by Alternative

Industry	Current	Alt 1	Alt 2	Alt 3
	jobs	jobs	jobs	jobs
Agriculture	3	8	4	6
Mining	0	0	0	0
Utilities	0	0	0	0
Construction	1	1	1	1
Manufacturing	2	10	2	6
Wholesale Trade	1	1	1	1
Transportation, & Warehousing	1	1	1	1
Retail Trade	4	6	5	5
Information	0	0	0	0
Finance & Insurance	0	0	0	0
Real Estate, Rental & Leasing	1	1	1	1
Prof., Scientific & Technical Services	1	1	1	1
Management of Companies	0	0	0	0
Admin., Waste Management & Removal Services	0	0	0	0
Educational Services	0	0	0	0
Health Care & Social Assistance	1	2	1	2
Arts, Entertainment & Recreation	1	1	1	1
Accommodation & Food Services	7	8	7	8
Other Services	1	2	1	1
Government (Federal, State, & Local)	9	12	10	10
Total Forest Management	**33**	**56**	**37**	**45**
% Change from Current	**---**	**68.5%**	**12.9%**	**36.1%**

Source: FLNF FEAST Spreadsheet/IMPLAN Model 2006

[1] Calculations are average annual for the first decade.

Table 3.20-21: Labor Income by Major Industry by Alternative

Industry	Current	Alt 1	Alt 2	Alt 3
	thousands of dollars			
Agriculture	$44.63	$197.3	$60.2	$122.5
Mining	$0.9	$1.4	$1.0	$1.1
Utilities	$0.1	$0.2	$0.1	$0.1
Construction	$35.1	$43.8	$38.2	$40.3
Manufacturing	$37.5	$205.0	$55.0	$123.1
Wholesale Trade	$23.2	$37.6	$25.4	$30.8
Transportation, & Warehousing	$35.3	$59.6	$39.6	$48.3
Retail Trade	$84.8	$117.8	$93.6	$103.5
Information	$3.4	$5.2	$3.8	$4.4
Finance & Insurance	$6.6	$12.4	$7.7	$9.7
Real Estate, Rental & Leasing	$23.6	$33.2	$27.5	$29.5
Prof., Scientific & Technical Services	$25.2	$37.3	$28.8	$32.2
Management of Companies	$3.3	$7.9	$3.9	$5.7
Admin., Waste Management & Removal Services	$5.9	$8.6	$6.5	$7.4
Educational Services	$6.2	$10.0	$7.1	$8.3
Health Care & Social Assistance	$42.8	$69.1	$49.4	57.6
Arts, Entertainment & Recreation	$16.1	$19.0	$16.8	$17.7
Accommodation & Food Services	$115.6	$127.4	$118.6	$122.2
Other Services	$17.5	$29.5	$20.0	$24.0
Government (Federal, State, & Local)	$654.4	$887.4	$756.3	$800.7
Total Forest Management	**$1,181.8**	**$1909.7**	**$1359.5**	**$1589.3**
% Change from Current	**---**	**61.6%**	**15.0%**	**34.5%**

Source: FLNF FEAST Spreadsheet/IMPLAN Model 2006
[1] Calculations are average annual for the first decade.

Indicator 3 – Forest Payments to Counties

Effects Common to All Alternatives

Payment in Lieu of Taxes (PILT)

As discussed previously, counties receive PILT to replace tax revenue lost due to the public nature of lands administered by federal agencies. The amount is based on the amount of acreage administered by certain federal agencies, population, a schedule of payments, the Consumer Price Index, other federal payments made in the prior year, and the level of funding allocated by the Congress. Since these payments are based on the amount of acreage under Forest Service administration, these payments are not affected by changes in the Forest Plan and resource output levels as a result of direction provided in the Forest Plan.

Secure Rural Schools and Community Self Determination Act

Both Schuyler and Seneca counties chose the Full Payment that is based on the State's three highest 25 Percent Fund payments between 1986 and 1999. Basing Secure Schools Act payments on past revenues means that the payments would not vary among alternatives.

Indicator 4 – Present Net Value (PNV)

When considering quantitative issues, PNV offers a consistent measure in dollars for comparison of alternatives. Benefits are both market values, as in timber, and non-market assigned values as in recreation.

To determine the PNV for each alternative, Recreation Visitor Days (RVD) for assigned value recreational use categories were developed from NVUM 2000 data and historical use estimates. The assigned value categories used in the analysis are:

- Camping, Picnicking, and Swimming
- Mechanized Travel and Viewing Scenery
- Hiking, Horseback Riding, and Water Travel
- Winter Sports
- Resorts
- Wilderness
- Other Recreation (except Wildlife & Fishing)
- Hunting
- Fishing
- Non-consumptive Wildlife Uses

National recreation use demand projections were used to estimate the number of users in each category for each decade for the next 150 years. The demand information was obtained from Projections of Outdoor Recreation Participation to 2050 (Bowker et al. 1999). Projected recreational use and the assigned values were multiplied to determine the projected value per year. Forest program costs and revenues were obtained from 2003 Forest budget information and SPECTRUM, the timber model. Revenues are not reduced for payments made to states and counties.

While the planning horizon for the Forest Plan is 10 to 15 years, the PNV analysis considers costs and benefits into the future to account for long-term benefits and to discount costs. Dollars are constant dollars with no allowance for inflation. A four percent discount rate per year was used over a period of 150 years. The reduction of PNV in any alternative as compared to the most financially or economically efficient solution is the economic trade-off, or opportunity costs, of achieving that alternative (see FEIS Appendix B for more information on the analysis process).

Table 3.20-22: Present Net Value (PNV)[1]

	Alt. 1	Alt. 2	Alt. 3
	thousands of dollars	thousands of dollars	thousands of dollars
Non-Market Assigned Value	$16,123	$16,123	$16,123
Market Value without Timber	-$22,188	-$22,188	-$22,188
Timber Market Value	$2,663	$432	$1,487
TOTAL PNV	**-$3,402**	**-$5,633**	**-$4,578**

Source: FLNF SPECTRUM Model and 2001 National Visitor Use Monitoring Data
Notes:
[1] Present Net Value (PNV) is the measure used to calculate the economic efficiency of managing a National Forest.

Effects Common to All Alternatives

The PNV for non-market assigned values is the same for all alternatives. Recreation use demand and values are not estimated to vary by alternative. The Forest Service provides opportunities for a variety of recreational experiences and the supply of these experiences exceeds the demand. Demand for recreational experiences dictates the level of use not the alternatives and the alternatives will change the number or capacity of developed recreation sites. The PNV market values for resources other than timber are also not expected to vary by alternative. These values include all the costs and revenues received from all other Forest Service programs. The Forest Service traditionally uses federal funds to pay for management of public lands. Table 3.20-22 shows these values as being constant in all three alternatives.

Alternative 1

Alternative 1 provides the highest Present Net Value due to the greater potential amount of timber to be harvested and the greater area under even-aged silvicultural systems.

Alternative 2

Alternative 2 provides the lowest Present Net Value due to the lower potential amount of timber to be harvested and the lower potential amount of even-aged management.

Alternative 3

Alternative 3 is intermediate and provides the middle Present Net Value due to the intermediate potential amount of timber harvesting and even-aged management.

Cumulative Effects

The Forest Service's management policies, combined with the effects of decisions and actions taken by those of other agencies, private industry, and private landowners, will affect the overall social and economic condition of the area but cumulative affects among alternatives would be minimal. The overall cumulative effects of Forest Service management to the communities in the two counties with FNS lands should continue to be socially and economically beneficial over the short-term and long-term.

Determining cumulative effects involves identifying the incremental impacts of Forest Service actions that add to other past, present and reasonably foreseeable future actions. Analyzing cumulative environmental consequences of the revised Forest Plan and alternatives requires delineation of the cause and effect relationships between proposed actions and the resources, ecosystems, and human communities of concern. Socio-economic changes within the economic impact analysis area are caused by actions initiated by individuals, businesses, governments, and other organizations. During the next decade, thousands of decisions made by individuals and by people within these organizations will affect such things as area employment, income, population, and housing. Economic impact area cumulative impacts are more affected by external business decisions than by Forest Plan decisions.

Cumulative economic effects related to the FLNF's resource management programs are difficult to predict. Most of the variables shaping the economic environment are beyond the control of the Forest Service. Other industries (State, counties, private landowners, and private industry) also play important roles in providing jobs and income within the two counties.

3.21 OTHER DISCLOSURES

3.21.1 Unavoidable Adverse Effects

The application of Forest-wide standards and guidelines and resource protection measures would limit the extent and duration of any adverse environmental effects. Nevertheless, some adverse effects are unavoidable. For detailed disclosure of all effects, including unavoidable adverse effects, see the preceding Environmental Consequences (Chapter 3) discussions for each resource area discussed. Implementation of any of the alternatives would generally move the landscape and ecosystem towards greater productivity and improved condition, but adverse environmental effects may occur even with standards and guidelines in place to control the effects.

3.21.2 Relationship between Short-term Uses of the Environment and Long-term Productivity

Short-term uses are those expected to occur on the Forest over the next 10 to 15 years. These uses include, but are not limited to, recreation use, grazing, timber harvest, and prescribed fire. Long-term productivity refers to the capability of the land to provide resource outputs for a period of time beyond the next 10 to 15 years.

The minimum management requirement established by regulation (36 CFR 219.27) provides for the maintenance of long-term productivity of the land. Minimum management requirements prescribed by Forest-wide standards and guidelines will be met under all alternatives. Minimum requirements assure that long-term productivity of the land will not be impaired by short-term uses.

Although all alternatives were designed to maintain long-term productivity, there are differences among alternatives in the long-term availability or condition of resources. There may also be differences among alternatives in long-term expenditures necessary to maintain desired conditions. These types of differences among the alternatives are described in Chapters 2 and 3 of the Final Environmental Impact Statement (FEIS).

3.21.3 Irreversible and Irretrievable Commitment of Resources

Irreversible and irretrievable commitment of resources is defined in the Forest Service Handbook 1909.15 as follows:

Irreversible commitment of resources means that nonrenewable resources are consumed or destroyed. Examples include mineral extraction, which consumes nonrenewable minerals and potential destruction of such things as heritage resources by other management activities.

Irretrievable commitment of resources includes opportunities foregone. They represent trade-offs in the use and management of forest resources. Irretrievable commitment of resources can include expenditure of funds, loss of production, or restrictions on resource use.

Decisions made in a forest plan do not represent actual irreversible or irretrievable commitment of resources. A forest plan determines the types of activities that are appropriate on the national forest and the locations where those activities could occur. It does not make site-specific or project decisions. The decision to irreversibly or irretrievably commit resources occurs when the Forest Service makes a project or site-specific decision.

Examples of irretrievable resource commitments associated with the Forest Plan decision are as follows:

- Commodity outputs and uses (such as motorized recreation) would be curtailed or eliminated in areas recommended for and subsequently designated as Research Natural Areas.
- Opportunities for non-motorized recreation, solitude, and primitive experiences would be foregone if portions of the Forests are not allocated for these purposes.
- Timber volume outputs would be foregone on land determined as not suitable for harvest.
- Commodity outputs would be reduced or foregone in areas allocated to specific uses or purposes, such as developed recreation sites.
- Non-commodity values, including scenic resources, may be reduced or foregone in areas allocated to commodity uses.

To the degree that an alternative preserves or encourages the development of mature and old forest habitat, opportunities to develop early successional habitat are reduced. The reverse is also true, to the degree that an alternative preserves or encourages the development of early successional habitat, opportunities to develop mature and old-forest habitat is reduced.

3.21.4 Environmental Justice

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," mandates that "…each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations" (59 Fed. Reg. 7629, 1994). Evidence shows that low-income and minority populations bear a disproportionate risk of suffering adverse environmental conditions in their communities. Some examples of this problem include the siting of toxic waste facilities, landfill operations, or unmonitored factory dumping grounds, in impoverished or heavily ethnic areas. In order to protect the rights and health of these populations, the Executive Order requires federal agencies to consider and analyze the demographics of a location subject to a proposed federal action, including Forest Plan revision, within the NEPA framework.

Principles for considering environmental justice under NEPA are set forth in "Environmental Justice, Guidance under the National Environmental Policy Act" (Council on Environmental Quality 1997). Before a policy, proposal or, as in this case, a Forest Plan is implemented, the likelihood of a disproportionate effect on minority or low-income populations must be investigated and disclosed. The standards used to analyze environmental justice in a given location are as follows: 1) if the demographics of the location show a minority or low-income population greater than, but less than two times greater than the state average, and there are community-identified environmental justice issues, then the potential for environmental injustice, i.e., ethnic or financial discrimination, exists; and 2) if the demographics of the location show minority or low-income populations equal to or less than that of the state average, then the potential for environmental injustice is considered nonexistent.

Affected Environment and Environmental Impacts

Tables 3.21-1 and 3.21-2 compare the ethnic and income demographics for the counties (Seneca and Schuyler) that potentially would be affected by the implementation of a revised Forest Plan to New York State averages.

Table 3.21-1: Ethnic demographics in 1990 and 2000 for the FLNF, by county and State.

	Native American		African American		Asian		Hispanic	
	1990	2000	1990	2000	1990	2000	1990	2000
	percent	percent	percent	percent	percent	percent	percent	percent
Schuyler County	0.3	1.0	0.8	1.6	0.2	0.3	0.9	1.2
Seneca County	0.2	0.7	1.6	2.5	0.6	0.9	1.1	2.0
New York State	0.3	0.8	15.9	16.5	3.9	6.0	12.3	15.1

Source: U.S. Department of Commerce, Census Bureau 2004d; and U.S. Department of Commerce, Census Bureau 2004b.

The above table demonstrates that neither Schuyler nor Seneca County contains an ethnic population segment greater than two times that of the New York State average. In Schuyler County, the Native American population is greater than, but not two times greater than, the State average. All other ethnic population segments are smaller than the State average for both counties.

Adoption and implementation of the revised Forest Plan, regardless of the alternative chosen, is not expected to have a disproportionate effect on the Schuyler County Native American population, or any other ethnic population. Activities permitted under the revised Forest Plan are not contemplated for areas in which concentrated Native American populations reside, and no physical or financial ripple effects on ethnic populations are expected to occur. Further, any project work implemented under the revised Forest Plan will be subject to NEPA analysis, including environmental justice assessment.

The above table (3.21-2) shows that neither of the counties analyzed bears individual poverty levels greater than two times the State average; rather, the poverty levels in both counties are lower than that within the State as a whole. Adoption and implementation of the revised Forest Plan is not expected to have a disproportionate effect on low-income populations, regardless of the alternative chosen. Activities permitted under the revised Forest Plan are not contemplated for areas in which low-income populations are concentrated. Any project work implemented under the revised Forest Plan would be subject to NEPA analysis, including environmental justice assessment.

Table 3.21-2: Income demographics for Seneca and Schuyler Counties and New York State in 1990 and 2000.

Location	Below Poverty Level	
	1990 (%)	1999 (%)
Schuyler County	11.2%	11.8%
Seneca County	10.4%	11.5%
New York State	13.0%	14.6%

Source: U.S. Department of Commerce, Census Bureau 2004d; and U.S. Department of Commerce, Census Bureau 2004b.

Forest Plans have an estimated life of 10 to 15 years. Although it is impossible to definitively state whether or not a Forest Plan will disproportionately affect minority or low-income populations ten years into the future, the Forest Service can use US Census data to reasonably assess the potential for disproportionate effect. To that end, the Forest Service can use the Census data to get a sense of prospective growth of such populations by looking at and extrapolating historical data. Tables 3.21-1 and 3.21-2 contain data not only from the 2000 US Census, but also from the 1990 US Census. By identifying trends in population data, the Forest Service can hypothesize about the future growth of minority and low-income populations, and based on agency hypotheses determine whether the adoption and implementation of a revised Forest Plan will disproportionately affect these populations in the future.

Minority and low-income populations in both Schuyler and Seneca counties, as well as in New York State, increased across the board between 1990 and 1999. In both counties, African American, Asian, and Hispanic populations increased but are still substantially below statewide populations. Low-income populations also remain below the statewide average. Based upon the extrapolation of the 1990 and 2000 Census data, these populations are expected to remain well below statewide populations into the future. Because the comparison of 1990 and 2000 population data makes it clear that African American, Asian, Hispanic, and low-income populations will not be the subject of environmental justice issues in the foreseeable future, no further analysis of these populations will be conducted during the Forest Plan revision process. Because Native American population percentages in Schuyler County continue to exceed statewide levels, that population will be addressed further.

As shown in Table 3.21-3, Native American populations in both Schuyler and Seneca counties and in New York State increased substantially in terms of total population percentage between 1990 and 2000. Extrapolation of the 1990 and 2000 Census data indicates that the Native American population will continue to increase into the future. At no point in the foreseeable future, however, is it expected that the Native American population percentage in either county will be more than twice that of the statewide Native American population. As a result, it is anticipated that adoption and implementation the revised Forest Plan will not bear a disproportionate impact on Native American populations.

Adoption and implementation of the revised Forest Plan is not expected to have a disproportionate adverse direct, indirect, or cumulative impact on minority or low-income populations over the life of the Plan, regardless of the alternative selected. No issues related to potential disproportionate impacts on either of these demographic groups were identified during public involvement associated with the Forest Plan revision process.

Table 3.21-3: Actual and projected Native American populations in Seneca and Schuyler Counties and New York State for 1990, 1999, and 2008.

	1990	2000	Projected for 2008
	population (percent of total)	population (percent of total)	population (percent of total)
Schuyler County	50 (0.3%)	192 (1.0%)	737 (3.7%)
Seneca County	84 (0.2%)	237 (0.7%)	668 (2.0%)
New York State	62,651 (0.3%)	171,581 (0.8%)	470,132 (2.4%)

Source: U.S. Department of Commerce, Census Bureau 2004a; and U.S. Department of Commerce, Census Bureau 2004c.

Chapter 4 Preparers

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Fishing Derby at Potomac Pond

4.1 FOREST PLAN REVISION TEAM

4.1.1 Interdisciplinary Core Team

Name	**Melissa Reichert**
Position	Forest Planner, Green Mountain and Finger Lakes National Forests
Education	Masters of Landscape Architecture (MLA), University of Massachusetts; BA Psychology, University of Vermont
Experience	4 years USDA Forest Service experience Forest Planning, 10 years community, land use and natural resource planning for the Windham Regional Commission in Brattleboro, VT and 2 years in site planning and design, aesthetic review and Act 250 permitting, Southern Vermont Engineering, Brattleboro, VT
Contribution	Team leader and program manager for the overall GMFL Plan revision process; assisted in development of alternatives; compiled information on past GMFL management; wrote portions and reviewed Draft Environmental Impact Statements, Revised Forest Plans, and supporting documentation; developed and coordinated public meetings and public involvement

Name	**Michael Dockry**
Position	Assistant Forest Planner, Green Mountain and Finger Lakes National Forests
Education	BS Forest Science and certificate in Environmental Studies, University of Wisconsin Madison; MS Forest Resources (Forest Ecology) Penn State University
Experience	8 years of experience as a natural resource planner, forester, and ecologist in WI, Bolivia, NY, and VT
Contribution	Managed the overall Finger Lakes Plan revision process; assisted in development of alternatives; compiled information on past GMFL management; wrote portions and reviewed Draft Environmental Impact Statements, Revised Forest Plans, and supporting documentation; developed and coordinated public meetings and public involvement; coordinated yield table development

Name	**Diane Burbank**
Position	Ecologist, Green Mountain and Finger Lakes National Forests
Education	MS Forest Ecology, Michigan State University; BS Forestry, University of Vermont
Experience	12 years USDA Forest Service experience in VT as Forest Ecologist
Contribution	Wrote portions of Draft and Final Environmental Impact Statements and Revised Forest Plans; prepared assessments of plant species viability and areas of special significance; analyzed distribution of biological diversity based on various ecological classifications and rare or uncommon plants, animals, and natural communities; presented information at public meetings on ecosystem management and biodiversity

Name	**John Sease**
Position	Wildlife Biologist, Green Mountain and Finger Lakes National Forests
Education	MS Wildlife Management, University of Alaska, Fairbanks; BA Wildlife Management, University of Maine, Orono
Experience	1 year USDA Forest Service experience with GMNF, 17 years USDOC National Marine Fisheries Service as Wildlife Biologist in Management and Research
Contribution	Wrote portions of and edited Draft and Final Environmental Impact Statements and Revised Forest Plans

Name	**Holly Knox**
Position	Assistant Forest Planner, Writer/Editor, Public Affairs, Green Mountain and Finger Lakes National Forests
Education	MA Geography (Plant Ecology), University of California, Davis; BS Environmental Geography, Ohio University
Experience	6 years USDA Forest Service experience in OH, CA, NY, and VT as Botanist, Ecologist, Public Affairs, Writer/Editor, and Assistant Forest Planner
Contribution	Wrote, reviewed, and edited portions of the Draft and Final Environmental Impact Statements and Revised Forest Plans; developed, coordinated, and participated in internal and external meetings, assisted in development of alternatives

Name	**Robert Burt**
Position	Forest Silviculturist, Green Mountain and Finger Lakes National Forests
Education	BS Forest Management, West Virginia University
Experience	31 years USDA Forest Service experience in PA, MN, WV, and VT as forester, assistant ranger, and silviculturist
Contribution	Completed Allowable Sales Quantity Analysis, Assisted in development of Standards and Guidelines, wrote portions of Draft and Final EIS, public meetings

Name	**Jeff Le Febvre**
Position	Transportation Planner and Engineer, Green Mountain and Finger Lakes National Forests
Education	BS Engineering, Norwich University, Northfield Vermont
Experience	16 years experience Civil & Environmental Engineering in HI and VT
Contribution	Wrote portions of Draft and Final Environmental Impact Statements and Revised Forest Plans relating to forest transportation

Name	**Ryan Knox**
Position	GIS Analyst, Green Mountain and Finger Lakes National Forests
Education	BS Environmental Geography, Ohio University
Experience	4 years USDA experience in CA and VT as GIS Specialist, Geographer, and Cartographer
Contribution	Performed analysis of current management situation and alternatives, quantitative and qualitative evaluation of Roadless Areas, produced all map-related products, completed Recreation Opportunity Spectrum analysis for GM and FL, and participated in internal and external meetings.

Name	**Jay Strand**
Position	Forest NEPA, Appeals, and Litigation Coordinator, Green Mountain and Finger Lakes National Forests
Education	BA Agriculture/Forest Management, Oklahoma State University
Experience	20 years experience with USDA Forest Service in OK, AR, TX, MN, NH, VT, and NY as Forester, Silviculturist, and NEPA specialist
Contribution	Wrote portions of Draft and Final Environmental Impact Statements and Revised Forest Plans and provided NEPA oversight to the planning process

Name	**Jennifer Morrissey**
Position	Recreation Planner, Green Mountain and Finger Lakes National Forests
Education	MS Natural Resource Planning University of Vermont; BA Harvard University
Experience	9 years recreation planning with University of Vermont and Lake Champlain Land Trust
Contribution	Edited portions of Draft and Final Environmental Impact Statements and Revised Forest Plans, participated in internal and external meetings

4.1.2 Extended Interdisciplinary Team

Name	**Paul Brewster**
Position	Forest Supervisor, Green Mountain and Finger Lakes National Forests
Education	MS Natural Resources Policy and Economics, Michigan State University, 1985; BS Forestry, University of Massachusetts-Amherst, 1976
Experience	28 years of experience as silviculturist, land management planner, recreation and wilderness manager, District Ranger, Deputy Forest Supervisor, and Forest Supervisor in district, forest, regional, and national-level assignments in Oregon, Minnesota, West Virginia, Alaska, Missouri, Vermont, and New York.
Contribution	Selected Preferred Alternative, reviewed and suggested edits for the Draft and Final Environmental Impact Statements and Revised Forest Plans, participated in internal and external meetings

Name	**Martha Twarkins**
Position	District Ranger, Hector District, Green Mountain and Finger Lakes National Forests
Education	BS Forest Management, Colorado State University
Experience	26 years with USDA Forest Service in CO, CA, and NY. Positions included Forester, Planning Officer, and District Ranger
Contribution	Reviewed and suggested edits for the Draft and Final Environmental Impact Statements and Revised Forest Plans, participated in internal and external meetings

Name	**Stephen Kimball**
Position	District Ranger, Rochester and Middlebury Districts, Green Mountain and Finger Lakes National Forests
Education	BS Forest Resources, University of Minnesota; Graduate Studies at University of Washington and Oregon State University
Experience	27 years USDA Forest Service experience in natural resource planning and project implementation, including 5 years as District Ranger on the Green Mountain National Forest
Contribution	Assisted in reviewing Draft Environmental Impact Statements, Revised Forest Plans, and supporting documentation; participated in public meetings and public involvement; assisted in preparing Roadless Area Evaluations and Wilderness Need Assessment

Name	**Gina Owens**
Position	Manchester District Ranger, Green Mountain and Finger Lakes National Forests
Education	BS Wildland Recreation Management, Washington State University
Experience	15 years USDA Forest Service experience in recreation management in MT, OR, WA, AK, and VT, including 1 year as District Ranger on the Green Mountain National Forest
Contribution	Assisted in reviewing Draft Environmental Impact Statements, Revised Forest Plans, and supporting documentation; participated in public meetings and public involvement

Name	**Tracy J. Tophooven**
Position	District Ranger, Rochester & Middlebury Ranger Districts, Green Mountain and Finger Lakes National Forests
Education	BS Biology & Wildlife Management, University of Wisconsin-Stevens Point
Experience	15 years USDA Forest Service experience in natural resource management in WI, MI, and VT, including 1 year as District Ranger on the Green Mountain National Forest
Contribution	Assisted in reviewing Final Environmental Impact Statements, Forest Plan, and supporting documentation; participated in public meetings and public involvement

Name	**Michael C. Liu**
Position	District Ranger, Hector District, Green Mountain and Finger Lakes National Forests
Education	BS Forest Management; Humboldt State University in California; post graduate studies in silviculture and forest engineering at Washington and Oregon State Universities
Experience	20 years experience in ID, CA, MT, CO, and AK as IDT leader, special projects coordinator for ski area development proposals, deputy district ranger, district ranger, timber and recreation planner, and instructor for public participation courses
Contribution	Wrote ROD Introduction & Vision for Finger Lakes National Forest

Name	**Ann Acheson**
Position	Regional/Zone Air Quality Specialist
Education	BS Wildlife Biology, Colorado State University; MS Earth Resources, Colorado State University
Experience	20 years experience with USDA Forest Service in Rocky Mountains and northeast US in wildlife management, and air quality and smoke management analysis and program management.
Contribution	Contributed to air quality portions of Draft Environmental Impact Statement and Revised Forest Plan.

Name	**Robert Bayer**
Position	NEPA Coordinator, Green Mountain and Finger Lakes National Forests
Education	BS Math and Computer Science, State College of NY at Brockport; MS Forest Management, Michigan Technological University
Experience	19 years USDA Forest Service experience in CA, WI, and VT as Forester, Analyst, and NEPA Specialist
Contribution	Wrote portions of Draft Environmental Impact Statements; participated in public meetings

Name	**Dave Bosch**
Position	Realty Specialist serving as Special Uses Program Manager, Green Mountain and Finger Lakes National Forests
Education	BA in Geology, Case Western Reserve University
Experience	27 years USDA Forest Service experience in CA and VT as a Realty Specialist working in Lands, Recreation, and Special Uses
Contribution	Wrote portions of the Plan related to Non-Recreation Special Uses and renewable energy, and advised on Recreation Special Uses

Name	**Nancy Burt**
Position	Soil Scientist, Green Mountain and Finger Lakes National Forests
Education	BS in Forestry (minor in Soil Science)
Experience	27 years USDA Forest Service experience working in soil and water protection and restoration. Of this time, 15 years has been on the GM&FLNF
Contribution	Wrote the following Affected Environment and Environmental Consequences sections for the EIS: FLNF – Soil; GMNF – Soil, Water

Name	**Bryan Davis**
Position	Technical Writer/Editor consultant to Green Mountain and Finger Lakes National Forests
Education	Currently completing MS Natural Resources Planning, University of Vermont; BS Recreation, Park and Tourism Sciences, Texas A&M University
Experience	2 years experience with USDA Forest Service in CO, CA and VT; 3 years experience in non-profit land conservation
Contribution	Edited Revised Forest Plan and FEIS; compiled and edited FEIS Chapter 3 and Appendix G – Responses to Public Comments; participated in internal meetings

Name	**Bill Culpepper**
Position	Forest Management Team Leader, Green Mountain and Finger Lakes National Forests
Education	BS Forest Science, Pennsylvania State University
Experience	4 seasons as seasonal Forestry Technician in trails, silviculture, and timber, Avery RD, Idaho Panhandle National Forests; 3 1/2 years as Forester in silviculture, Cold Springs RD, Ouachita National Forest; 3 1/2 years as Resource Assistant on Uwharrie RD, National Forests in North Carolina; 15 years as Silviculturist on Wayah RD, National Forests in North Carolina; 2 1/2 years as Forest Management Team Leader, Green Mountain & Finger Lakes National Forests
Contribution	Participated in draft and review of revised Forest Plan; participated in internal and external public meetings; member of Forest Plan Revision Extended ID Team

Name	**MaryBeth Deller**
Position	Botanist, Green Mountain and Finger Lakes National Forests
Education	MS Botany, University of Vermont; BS Botany, University of Vermont; BA Natural History and Journalism, Goddard College
Experience	4 years experience as Botanist for GMFL; 6 seasons experiences as Biological Technician for GMFL
Contribution	Wrote NNIS portions of Draft and Final Environmental Impact Statements and Revised Forest Plans, contributed to all botanical sections

Name	**Russ Eastwood**
Position	Wilderness Program Director, Green Mountain and Finger Lakes National Forests
Education	BS Natural Resource Management, University of Connecticut
Experience	25 years USDA Forest Service experience as a field technician in trails and Wilderness, in WV and VT
Contribution	Assisted in editing Revised GM Forest Plan

Name	**Ed Griffith**
Position	Land Adjustment, Green Mountain and Finger Lakes National Forests
Education	A.A.S. Agriculture, VT Technical College; A.A.S. Forestry, Paul Smith's College; BS Forestry, West Virginia University
Experience	26 years USDA Forest Service VT in Land Adjustment; 9 years USDA Forest Service Montana in Fire Control, Timber, and Wild & Scenic Rivers
Contribution	Assisted in development and review of anything associated with Land Adjustment

Name	**Clay Grove**
Position	Forest Wildlife Biologist, Green Mountain and Finger Lakes National Forests
Education	BS Wildlife Biology and Management, SUNY College of Forestry, Syracuse
Experience	30 years USDA Forest Service experience in Rocky Mountains and northeast US as wildlife biologist
Contribution	Wrote portions of Draft and Final Environmental Impact Statements and Revised Forest Plans, participated in public meetings

Name	**Susan Howle**
Position	Environmental Coordinator, Green Mountain & Finger Lakes National Forests
Education	MS Geography, University of Massachusetts, Amherst; BS Geography, Middle Tennessee State University
Experience	4.5 years USDOI Bureau of Land Management experience in NV as Environmental Coordinator and Supervisory Natural Resource Specialist; 2 years USDA Forest Service experience in VT as Environmental Coordinator.
Contribution	Wrote and edited portions of DEIS, FEIS, and Revised Forest Plan; assisted in public meeting coordination; served as member of content analysis team; responded to public comments.

Name	**Donna E. Harloff**
Position	Acting Recreation Planner, Green Mountain and Finger Lakes National Forests
Education	Master's in Landscape Architecture with an emphasis in Resource Analysis and Planning, Kansas State University; BS Business Administration with an emphasis in Organizational Management, University of Colorado
Experience	16 years natural resource management experience, including recreation and wilderness management, special use administration, site analysis and design, scenic resource analysis, special use permit administration, interpretation, and management; coordinated wild and scenic river eligibility assessment for Sequoia National Forest; 3 years as acting and assistant wilderness management officer for the Gila and Aldo Leopold Wilderness Areas and acting/assistant manager of the Gila Cliff Dwelling National Monument; 4 years experience as the Cleveland National Forest Landscape Architect, interdisciplinary team member, and Cleveland National Forest's representative to the Southern California Forest Plan Revision Team
Contribution	Prepared response to comments concerning recreation resources; updated and edited the FEIS, Affected Environment and Environmental Consequences for Recreation Opportunities and Forest Settings

Name	**Brian Keel**
Position	Monitoring and Research Coordinator for Green Mountain and Finger Lakes National Forests; Vermont Monitoring Cooperative Field Coordinator for Lye Brook Wilderness; Timber Stand Improvement (TSI) and Reforestation Specialist for Green Mountain National Forest
Education	BS General Biology, Fairleigh Dickinson University; MS Forestry, College of Environmental Science and Forestry, SUNY Syracuse; presently working on PhD in plant conservation at Antioch New England Graduate School
Experience	16 years experience with USDA Forest on GMNF in vegetation management with a specialization in TSI and Reforestation
Contribution	Wrote AMS for Ecosystem Management for GMNF

Name	**Carol Knight**
Position	Special Uses/Lands Forester
Education	MS Management, Antioch New England, BS Biology/Outdoor Education Northland College
Experience	18 years experience with USDA Forest Service including 14 years in Vermont and 4 years in California
Contribution	Contributed to special forest products section of Draft Environmental Impact Statement

Name	**Dave Lacy**
Position	Archaeologist and Heritage Resources specialist, Green Mountain and Finger Lakes National Forests
Education	MA Anthropology, University of Massachusetts/Amherst; BA Anthropology, Boston University
Experience	20 years experience as GMFL Archaeologist; additional previous 8 years field work in New England
Contribution	Wrote and edited portions of the Draft Environmental Impact Statement and revised Forest Plan including Goals, Objectives, Standards and Guidelines, Monitoring and Evaluation, and Environmental Consequences components relevant to Heritage Resources and Tribal Relations; presented a public forum on Forest Service history

Name	**Donna Marks**
Position	Landscape Architect, Green Mountain and Finger Lakes National Forests
Education	BS Landscape Architecture, Rutgers University
Experience	24 years USDA Forest Service experience in IN, NY, OH, and VT as Landscape Architect
Contribution	Edited and revised Forest-wide and Management Area standards and guidelines for visual resources, wrote and edited portions of Visuals-related sections of Draft and Final Environmental Impact Statements and Revised Forest Plans

Name	**Ann Mates**
Position	Resource Information Coordinator, Green Mountain and Finger Lakes National Forests
Education	MRR Recreation Resources Administration, North Carolina State University; BS Resource Management, SUNY College of Environmental Science and Forestry
Experience	15 years USDA Forest Service experience on Green Mountain and Finger Lakes National Forests as Recreation Planner and Resource Information Coordinator
Contribution	Contributed to writing of Management Area 8.8 description, recreation-related goals, objectives, indicators, and standards and guidelines; calculated recreation benchmarks and financial contribution.

Name	**Nort Phillips**
Position	South Zone Fire Management Officer, Green Mountain and Finger Lakes National Forests
Education	AA Applied Arts, Vincennes University, Indiana
Experience	32 years experience with the GMFL in fire, recreation, and wilderness
Contribution	Wrote and edited portions of Draft and Final Environmental Impact Statements and Revised Forest Plans

Name	**Scott Rotman**
Position	NEPA Coordinator, Green Mountain National Forest
Education	BA International Relations, Colgate University; JD Rutgers School of Law – Newark; currently completing PhD in Natural Resources Management, State University of New York, College of Environmental Science and Forestry
Experience	4 years NEPA experience with USDA Forest Service, USDOI Bureau of Land Management (OR), and private consulting (CA); 5 years experience in environmental law and general litigation
Contribution	Wrote and edited portions of Draft Environmental Impact Statement; participated in internal and external meetings

Name	**Steve Roy**
Position	Fisheries Biologist, Green Mountain and Finger Lakes National Forests
Education	BS Fish/Wildlife Management, University of New Hampshire
Experience	20 years USDA Forest Service experience in fisheries management and 5 years US Fish and Wildlife Service experience in fish management and hatcheries
Contribution	Drafted objectives for fisheries standards and guidelines, assisted drafting water and riparian resources standards and guidelines, wrote portions of and reviewed Draft and Final Environmental Impact Statements and Revised Forest Plans, participated on Forest Plan revision interdisciplinary teams

Name	**Doreen Urquhart**
Position	Realty Specialist, Green Mountain and Finger Lakes National Forests
Education	MS Public Administration and Management, Saint Michael's College, Vermont; BS Natural Resource Management - Forestry, Rutgers University, NJ
Experience	19 years USDA Forest Service experience in MI, LA, NH, and VT in Lands, Minerals, Timber, and Recreation; 5 years NH Fish and Game Department in Land Management
Contribution	Mineral Management and Land Adjustment input

Name	**Chad VanOrmer**
Position	Recreation Planner, Green Mountain and Finger Lakes National Forests
Education	MS Resource Recreation and Tourism, University of Idaho; BS Forestry, Southern Illinois University
Experience	2 years Tennessee Valley Authority, Land Between The Lakes National Recreation Area as a trails and recreation special uses technician; 3 years USDA Forest Service as a recreation planner in AK and VT
Contribution	Wrote and edited portions of the Draft Environmental Impact Statement and Revised Forest Plan (recreation, wilderness, and Wild and Scenic Rivers related information, goals and objectives, standards and guidelines, roadless evaluations); participated in internal and external public meetings

Name	**John Wilson**
Position	Budget & Accounting Officer
Education	BA Business Management & Sociology, Alma College, Alma Michigan
Experience	25 years experience with USDA, Forest Service in VT
Contribution	Compiled data concerning payments to states and payments in lieu of taxes.

Name	**Greg Wright**
Position	Recreation Forester, Green Mountain and Finger Lakes National Forests
Education	BS Resources Management (Forestry), State University of New York College of Environmental Sciences and Forestry at Syracuse University
Experience	29 years USDA Forest Service experience in NY, CO, SD, and VT. Served in a variety of resource and recreation positions at the Ranger District level and at Forest Headquarters
Contribution	Wrote portions of and edited Draft and Final Environmental Impact Statements and Revised Forest Plans. Participated in public meetings.

4.2 SUPPORT STAFF

4.2.1 Regional Office Support

Name **Sam Emmons**
Position Regional Planner

Name **Rickard Hokans**
Position Analyst

Name **Claudia Mielke**
Position Land Planner - RHW

Name **Mark Hummel**
Position Public Involvement Specialist

Name **Michael Ablutz**
Position Regional Silviculturist

Name **Eugene DeGayner**
Position Regional Ecosystem Planning Biologist

Name **John Romanowski**
Position PM Recreation

Name **Ted Shank**
Position Regional Ecosystem Planning Biologist

Name **Frank Robbins**
Position Transportation Planner

Name **Theodore Geier**
Position Regional Planning Hydrologist

Chapter 5 Groups and Individuals Contacted

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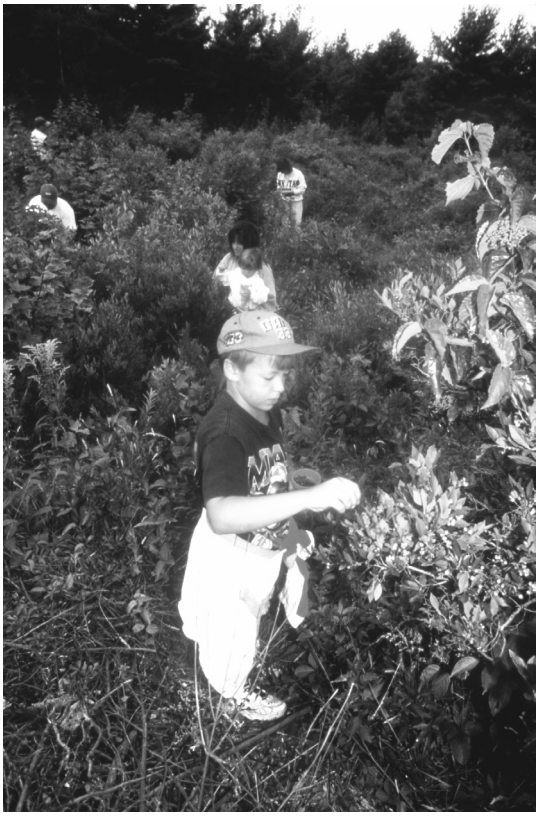

Blueberry Pickers

5.1 AGENCIES

5.1.1 Federal

Consulting Agency

National Park Service: North Country National Scenic Trail

Federal Agencies Receiving Documents

Advisory Council on Historic Preservation
Bureau of Land Management
Chequamegon-Nicolet National Forest
Chippewa-Superior National Forest
Environmental Protection Agency
Federal Aviation Administration
Federal Energy Regulatory Commission
Federal Highway Administration
Hoosier National Forest
Monongahela National Forest
Montezuma National Wildlife Refuge
National Marine Fisheries Service
National Park Service
Natural Resources Conservation Service
NOAA Office of Policy and Strategic Planning
Office of Environmental Policy and Compliance
Ohio River Basins Commission
Rural Utilities Service
Shawnee National Forest
Susquehanna River Basins Commission
U.S. Army Engineers North Atlantic Division
U.S. Coast Guard Environmental Impact Branch
U.S. Department of Agriculture
U.S. Department of Energy
U.S. Department of Interior
U.S. Fish and Wildlife Service
U.S. Geological Survey
U.S.D.A. APHIS PPD/EAD
U.S.D.A. Forest Service
U.S.D.A. National Agricultural Library
U.S.D.A. Natural Resource Conservation Service
Wayne National Forest
White Mountain National Forest

US Representatives Receiving Documents

Sherwood L. Boehlert
Maurice D. Hinchey
John R. Kuhl

US Senators Receiving Documents

Hillary Rodham Clinton
Charles E. Schumer

5.1.2 Native American Tribal Government

Cayuga Nation
Seneca Nation

5.1.3 State

State Agencies Receiving Documents

*May include multiple Bureaus or Divisions within a Department

New York State Bureau of Wildlife
New York State Conservation Council
New York State Conservation Department
New York State Department of Environmental Conservation
New York State Department of Transportation
New York State Fish and Wildlife
New York State Horse Council
New York State Natural Heritage Program
New York State Parks, Recreation, and Historic Preservation Planning Bureau
New York State Trails Council

New York State Governor Receiving Documents

George E. Pataki

New York State Senators Receiving Documents

David J. Valesky
James L. Seward
Michael F. Nozzolio
George H. Winner, Jr.

New York State District Representatives Receiving Documents

Thomas O'Mara
Brian Kolb
Barbara Lipton

5.1.4 County

Schuyler County Environmental Management Council
Schuyler County Planning
Schuyler County Soil and Water Conservation District
Seneca County Chamber of Commerce
Tompkins County Legislature
Tompkins County Soil and Water Conservation District

5.1.5 City and Town

City of Ithaca
Town of Covert
Town of Dix
Town of Hector
Town of Lodi
Town of Ovid
Village of Trumansburg
Village of Watkins Glen

5.2 INTERESTED LIBRARIES, GROUPS, BUSINESSES, AND ORGANIZATIONS

5.2.1 Libraries

- Cornell Department of Planning Library
- Geneva Free Library
- Hector-Pert Memorial Library
- Interlaken Public Library
- Lodi-Whittier Library
- Montour Falls Library
- S. P. Dulton Memorial Library (Odessa)
- Tompkins County Public Library
- Trumansburg Ulysses Library
- Watkins Glen Public Library
- Wayland Free Library

5.2.2 Groups, Businesses, and Organizations

Citizens Campaign for the Environment
College of Menominee Nation
Cornell University
Farr Brothers
Finger Lakes Forest Watch Congress
Finger Lakes Land Trust
Finger Lakes Trail Conference
Friends of Allegheny Wilderness
Friends of Finger Lakes NF
Greystone
Hector Cooperative Grazing Association
Hollier Logging
IOGA of New York
Ithaca College
Kestral Haven Avian Migration Observatory
Morgan Logging and Excavation
Sierra Club
State University of New York (SUNY)
SUNY- Cortland
The Ruffed Grouse Society
The Wilderness Society
U.S. Institute for Environmental Conflict Resolution
UTC Land Management Group, Inc.

5.3 INTERESTED INDIVIDUALS

Bernard Ahouse
Kristofer A. Alberga
James B. Argentati
Chris Ballantyne
Sunshine Bannister
Charles A. Baudinet
Shawn Beard
Donna Beckwith
Howard Beye
Patricia Bliss
Al Breisch
Ron Bremer
Irene Brown
Michael Burger
Michael Callahan
David Cameron
Bob Chambers
Duane Chapman
John Confer
Marion Crawford
John Dahl
Elaine Dalrymple
Dr. James C. Dawson
David deCalesta
Kim A. DeVivi
Sean Dillman
Robert Dirig
Mike, Carmen, and Michael Dockry
Thomas Donnelly
Tim Dorward
Phillip Dressing
Pete Ducey
George Eisman
John Dixon Elder
Raymond Eldridge III
Sam Emmons
Kathryn Engel
Harry E. Farr
Tom and Maria Feneziani
Jim Fravil
Robert Gianniny
Bradley R. Gill
Dereth Glance
Evan H.C. Grant
John and Suzanne Gregoire
Kevin Griffith
Clint Halftown
Brenda Halter-Glenn
Danielle Hautaniemi
Kenneth and Maureen Hendel
John Heslop
Sally Hess-Samuelson
Al Hicks
Sarah K. Highland
Leroy Hollier
Ken Howell
Alex Hyland
Tom Jasikoff
Lois Jennings
Paul Karczmarczyk
C. William Kilpatrick
Chris Kimball-Peterson
Andrea King
Whitney Kirk
Moe Koch
John C. Kohena
Mary Krueger
Abram and Gunther Kurtz
Grace K. LaDouce
Barbara Levesque
Doug Little
Charlene Lopez
Laura Mantius
George McGonigal
David McLallen
Kathleen Mitchell
Thomas Morgan
Barb Morley
Thomas E. Nelson Jr.
Stasia Newell and Tim Dunlap
Robyn Niver
Harold Palmer
Paul Pennock
Judy Perez
Alicia Plotkin
Arthur Portmore
Timothy Post
John H. Potter
Paul Predmore
Janice Preston
Mackenzie Quarella
Andrew Raddant
Christine Rader
Lawrence Reverby
Erin Reynolds
Michael Reynolds
Gary Robertson
M. Kate Robinson
Ron Rohrbaugh
Ken Rosenberg
Edward Rukki
Paul Salon
Stanley Scharf
Karolyn Shea
Charles Sheviak
Alanna Simpson
Frank Sinicropi
Dr. Charles Smith
Robert B. Smith
Barry Snyder
Jeff Soule
Donna Starr
Amelia Stevens
John R. Swanson
Fred Szarka
Robert Thorborg
Rick Timko
Carl Van Vleet
Troy Weldy
David Werier
F. Robert Wesley
Margaret Wiernicki
Tom Wolfe
Robert Zaremba
Andrew Zepp
Janet Zuckerman

Chapter 6 Literature Cited

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Chapter 7 Glossary

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7.1 GLOSSARY

Abbreviations and Acronyms

AA	Analysis Area
AASHTO	American Association of State Highway and Transportation Officials
ADA	Americans with Disabilities Act
AMS	Analysis of the Management Situation
APE	Area of Potential Effects
ASQ	Allowable Sale Quantity
ATV	All-Terrain Vehicle
AUM	Animal Unit Month
BA	Biological Assessment
BE	Biological Evaluation
BEIG	Built Environment Image Guide
BLM	Bureau of Land Management
BMP	Best Management Practice
CCF	One Hundred Cubic Feet
CE	Cumulative Effects
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CMAI	Culmination Mean Annual Increment
cRNA	Candidate Research Natural Area
CUA	Concentrated Use Area
DBH	Diameter at Breast Height
DEIS	Draft Environmental Impact Statement
DFC	Desired Future Condition
EIS	Environmental Impact Statement
ELT	Ecological Land Type
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FEIS	Final Environmental Impact Statement
FLNF	Finger Lakes National Forest
FOF	Future Old Forest
FR	Forest Road
FS	Forest Service
FSH	Forest Service Handbook
FSM	Forest Service Manual
FVS	Forest Vegetation Simulator
FY	Fiscal Year
GIS	Geographic Information System
GFA	General Forest Area
GPS	Global Positioning System
I&E	Information and Education
IDT	Interdisciplinary Team
LNT	Leave No Trace
LRMP	Land and Resource Management Plan (“Forest Plan”)
LTA	Land Type Association
MA	Management Area
MBF	One Thousand Board Feet
MCF	One Thousand Cubic Feet
M&E	Monitoring and Evaluation
MM	One Million
MMBF	One Million Board Feet
MIS	Management Indicator Species
MUSY	Multiple-Use and Sustained-Yield Act
NCT	North Country National Scenic Trail
NEPA	National Environmental Policy Act
NF	National Forest
NFMA	National Forest Management Act
NFS	National Forest System
NNIS	Non-native Invasive Species
NOI	Notice of Intent
NRHP	National Register of Historic Places
ORV	Off-Road Vehicle
PAOT	People At One Time
PILT	Payment in Lieu of Taxes
PNV	Present Net Value
RAP	Roads Analysis Process
RARE	Roadless Area Review and Evaluation
RD	Ranger District
RFSS	Regional Forester Sensitive Species
PPM	Parts Per Million
RMO	Road Management Objective
RN	Roaded Natural
RNA	Research Natural Area
ROS	Recreation Opportunity Spectrum
ROD	Record of Decision
S&Gs	Standards and Guidelines
SA	Special Area
SHPO	State Historic Preservation Office(r)
SMS	Scenery Management System
SPM	Semi-primitive Motorized
SPNM	Semi-primitive Non-motorized
SUP	Special Use Permit
SVE	Species Viability Evaluation
TES	Threatened, Endangered, and Sensitive
TEPS	Threatened, Endangered, Proposed, and Sensitive

TSI	Timber Stand Improvement
TDD	Telecommunication Device for the Deaf
TTY	Teletype
USDA	United States Department of Agriculture
USDI	United States Department of Interior
USFS	United States Forest Service
USFWS	USDI Fish and Wildlife Service
USNPS	USDI National Park Service
VIS	Visitor Information Services
VMS	Visual Management System
VQO	Visual Quality Objective
WFU	Wildland Fire Use
ZOI	Zone of Influence

Terms

The following definitions and/or descriptions clarify terminology used in the revised Plan and Final Environmental Impact Statement. References are cited within parentheses. Where a reference is cited, it served as the primary source of the definition/description for that particular term. Where no reference is cited, the definition/description was developed for this Plan revision from a variety of sources.

The descriptions and definitions are in alphabetical order.

[A]

ABIOTIC – Non-living. Climate is an abiotic component of ecosystems.

ACQUISITION – Obtaining land through purchase, exchange, and donation.

ADAPTIVE MANAGEMENT – A type of natural resource management that implies decisions are made as part of an on-going process. Monitoring the results of actions will provide a flow of information that may indicate the need to change a course of action. Scientific findings and the needs of society may also indicate the need to adapt resource management to new information.

ADMINISTRATIVE USE – Use of National Forest System land, interests in land, or other resources, by the Forest Service, or an individual or entity authorized by the Forest Service, for purposes incidental to the protection, administration, or management of the National Forest.

AERIAL LOGGING – Removing logs from a timber harvest area by helicopter. Fewer roads are required, so the impact to an area is minimized.

AFFECTED ENVIRONMENT – The natural environment that exists at the time an area is being analyzed.

AGE CLASS – An age grouping of trees according to an interval of years, usually 20 years. A single age class would have trees that are within 20 years of the same age, such as 1-20 years or 21-40 years.

AIRSHED – A geographic area that shares the same air.

ALL-TERRAIN VEHICLE (ATV) – Any motorized, off-highway vehicle 50 inches or less in width, having a dry weight of 600 pounds or less that travels on three or more low-pressure tires with a seat designed to be straddled by the operator. Low-pressure tires are 6 inches or more in width and designed for use on wheel rim diameters of 12 inches or less, utilizing an operating pressure of 10 pounds per square inch (psi) or less as recommended by the vehicle manufacturer.

ALLOTMENT (range allotment) – The area designated for use by a prescribed number of livestock for a prescribed period of time. Though an entire Ranger District may be divided into allotments, all land will not be grazed, because other uses, such as recreation or tree plantings, may be more important at a given time.

ALLOWABLE SALE QUANTITY (ASQ) – The amount of timber that may be sold within a certain time period from an area of suitable land. The suitability of the land and the time period are specified in the Forest Plan.

ALLOWABLE USE – An estimate of proper range use. Forty to fifty percent of the annual growth is often used as a rule of thumb on ranges in good to excellent condition. It can also mean the amount of forage planned to be used to accelerate range rehabilitation.

ALTERNATIVE – Alternatives provide options for meeting the purpose and need of a Plan revision process by emphasizing reasonable ways to resolve management issues as though each alternative were a separate Forest Plan. While all alternatives provide a wide range of multiple uses, goods and services, they respond to the issues needing change in different ways and describe a different desired future condition.

AMERICANS WITH DISABILITIES ACT (ADA) – Law requiring that persons with disabilities not be denied access to the programs provided to all other people by State and local governments, public accommodations, public transportation, and commercial establishments, solely because of their disability. The ADA does not apply to the programs and facilities of federal agencies with the exception of designated wilderness (ADA Title V Section 507(c)).

ANADROMOUS FISH – Species of fish that mature in the sea and migrate into streams to spawn.

ANALYSIS OF THE MANAGEMENT SITUATION (AMS) – Using Resource Assessments and the existing Forest Plan as background, the AMS determines the ability of the area covered by the Forest Plan to supply goods and services in response to societal demands. The AMS speculates on the expected results or potential problems should the existing Forest Plan direction continue; discusses whether or not these problems need to be resolved and determines the potential to resolve them in a Plan Revision. If the Plan revision can resolve potential problems, the AMS proposes a range of values within which a possible solution may occur.

ANIMAL UNIT MONTH (AUM) – The quantity of forage required by one mature cow and her calf (or the equivalent, in sheep or horses, for instance) for one month.

ANNUAL MAINTENANCE – Work performed to maintain serviceability or repair failures during the year in which they occur. Includes preventive and/or cyclic maintenance performed in the year in which it is scheduled to occur. Unscheduled or catastrophic failures of components or assets may need to be repaired as a part of annual maintenance.

APPROPRIATE MANAGEMENT RESPONSE – Specific actions taken in response to a wildland fire to implement protection and fire use objectives.

AQUIFER – A body of rock that is saturated with water or transmits water. When people drill wells, they tap water contained within an aquifer.

AREA OF POTENTIAL EFFECT (APE) – The spatial extent of a proposed project's possible impact/effect, including non-contiguous areas like borrow pits, log landings, or equipment storage areas, within which significant Heritage Resources should be identified and protected. This term was established in the regulations pertaining to the National Historic Preservation Act.

ASPECT – The direction a slope faces. A hillside facing east has an eastern aspect.

ASSESSMENT (Resource Assessment) – A compilation of background material on the status of a particular resource area, on a local, regional, or national scale. A Resource Assessment describes the present condition of a particular resource and speculates on the future condition of the resource based on current and expected trends. Assessments address management problems, new policy and direction, monitoring results, and the existing condition of the resource on the forest.

[B]

BACKGROUND – A term used in the management of visual resources or scenery. It refers to the visible terrain located four miles to infinity from the viewer.

BASAL AREA – The cross-section area of a tree stem including bark, in square feet, and commonly measured at breast height (4.5 feet above ground). This parameter is often used in silvicultural equations and/or models for determining growth and yield of forest stands.

BENCHMARKS – (benefits, costs, and values) Benchmarks define the maximum and minimum levels of output. These limits take into account land capability, projected resource demands, and cost efficiency. The benchmark process demonstrates the Forests' ability to respond to timber harvesting issues and management concerns represented in the problem statements.

BENEFIT – Inclusive term used to quantify the results of a proposed activity, project, or program; expressed in monetary or non-monetary terms.

BEST MANAGEMENT PRACTICES (BMPs) – A set of measures implemented during the course of logging or livestock grazing, to prevent or minimize discharges, such as mud, petroleum products, and woody debris, from getting into steams, ponds, lakes, and rivers. They are also meant to maintain natural water temperatures by requiring that trees be left along streams and other water bodies (New York State Department of Conservation 2004).

BIOLOGICAL CONTROL – The use of natural means to control unwanted pests. Examples include introduced or naturally occurring predators such as wasps or hormones that inhibit the reproduction of pests. Biological controls can sometimes be alternatives to mechanical or chemical means.

BIOLOGICAL DIVERSITY (biodiversity) – The variety of life forms and processes within an area. Included in the consideration of diversity are genetic variation, number and distribution of species, and the ways in which the variety of biologic communities interact and function.

BIOLOGICAL EVALUATION (Threatened, Endangered, Proposed, and Regional Forester Sensitive Species) – The use of a variety of tools, including review of existing literature and data, field survey, and data gathering and analysis, to determine the presence of, and effects of activities on, threatened, endangered, proposed, and sensitive species (FSM 2670).

BIOMASS – The total weight of all living organisms in a biological community.

BIOME – The complex of living communities maintained by the climate of a region and characterized by a distinctive type of vegetation. Examples of biomes in North America include the tundra, desert, prairie, and the western coniferous forest.

BIOTA – The plant and animal life of a particular region.

BIOTIC – Living; for example, green plants and soil microorganisms are biotic components of ecosystems.

BOARD FOOT – A measurement term for lumber or timber. It is the amount of wood contained in an unfinished board 1 inch thick, 12 inches long, and 12 inches wide. Often used variations are MBF (thousand board feet) and MMBF (million board feet).

BROADCAST BURN – A prescribed fire that burns a designated area. These controlled fires can reduce wildfire hazards, improve forage for wildlife and livestock, or encourage successful regeneration of trees.

BROWSE – Twigs, leaves, and young shoots of trees and shrubs that animals eat. Browse is often used to refer to the shrubs eaten by big game, such as deer.

BUFFER – A land area that is designated to block or absorb unwanted impacts to the area beyond the buffer. Buffer strips along a trail could block views that may be undesirable. Buffers may be set aside next to wildlife habitat to reduce abrupt change to the habitat.

[C]

CANDIDATE RESEARCH NATURAL AREA (cRNA) – An area that has high potential for designation as a research natural area, and is being recommended for protection until it has undergone formal evaluation and it has been decided whether to designate it as an RNA (this authority rests with the Regional Forester, with concurrence of the Research Station Director) or to manage the area under another management area prescription.

CANOPY – The part of any stand of trees represented by the tree crowns. It usually refers to the uppermost layer of foliage, but it can be use to describe lower layers in a multi-storied forest.

CAPABILITY – The potential of an area of land to produce resources, supply goods and services, and allow resource uses under an assumed set of management practices and at a given level of management intensity. Capability depends upon current conditions and site conditions such as climate, slope, landform, soils, and geology, as well as the application of management practices, such as silviculture or protection from fire, insects, and disease.

CAPITAL IMPROVEMENT – The construction, installation, or assembly of a new fixed asset, or the significant alteration, expansion, or extension of an existing fixed asset, to accommodate a change of purpose.

CAPITAL INVESTMENT – An input that increases the stock of natural or manmade resources (assets) needed to maintain or increase the flow of outputs in the future. Benefits resulting from capital investments are normally recouped in excess of one year.

CAVITY – A hole in a tree often used by wildlife species, usually birds, for nesting, roosting, and reproduction.

CHEMICAL CONTROL – The use of pesticides and herbicides to control pests and undesirable plant species.

CLEANING – Form of release cutting that removes trees the same age as the young stand (FSM 2470).

CLEARCUT – Even-aged cutting method in which the entire standing crop of trees from an area is removed at one time (FSM 2470).

CLIMAX – The culminating stage in plant succession for a given site. Climax vegetation is stable, self-maintaining, and self-reproducing.

COARSE FILTER MANAGEMENT – Land management that attempts to address the needs of a majority of native species through management of natural landscapes and communities (*see* Fine Filter Management).

COHORT – A population of plants or animals having approximately the same age.

COMMERCIAL FOREST LAND – Forest land that has not been withdrawn by the Congress, the Secretary of Agriculture, or the Chief of the Forest Service, and is producing, or is capable of producing, crops of industrial wood without irreversible damage to soils, productivity, or watershed conditions, and with reasonable assurance that adequate restocking can be attained within five years after final harvesting.

COMMERCIAL OPERATIONS – Using timber sales for cost effective vegetation management on lands that are not part of the timber base.

COMMERCIAL THINNING – Thinning operation where the material cut can be sold on the market as opposed to a pre-commercial thinning.

COMMERCIAL USE (SPECIAL USES) – Any use or activity on National Forest System land where (a) an entry or participation fee is charged, or (b) the primary purpose is the sale of a good or service, and in either case, regardless of whether the use or activity is intended to produce a profit (36 CFR 251.51).

COMMON VARIETY MINERALS – Earth construction materials including rock or stone, sand and gravel, pumice aggregate, pumicite, cinders, and soil materials suitable for compacted earth structures.

COMMUNITY (Natural Community) – An interacting assemblage of organisms, their physical environment, and the natural processes that affect them (Thompson and Sorenson 2000).

COMMUNICATION SITE – A developed area with a structure sufficient for placement of antennas for the transmission or reception of electronic intelligence at the proper height; a building or cabinet, a power line or onsite power supply, and an access route. Most are served by telephone or fiber optic lines.

CONCENTRATED USE AREA – A relatively undeveloped area, outside of developed recreation sites, where management is invested because recreation use there leaves evident impacts.

CONCERN LEVEL – Similar to Viewer Sensitivity in the Visual Management System. Concern levels are a measure of the degree of public importance placed on landscapes viewed from travelways and use areas. Concern levels are divided into three categories: levels 1 (high), 2 (moderate), and 3 (low).

COMPOSITION – The types of organisms and environmental features present in a particular area.

CONCOMITANT – Events that are coincident in time and so clearly related that one probably is a direct result of the other.

CONGRESSIONALLY DESIGNATED WILDERNESS – *see* Wilderness

CONIFER – A tree that produces cones, such as a pine, spruce, or fir tree.

CONNECTIVITY (of habitats) – A condition in which the spatial arrangement of land cover types allows organisms and ecological processes (such as disturbance) to move across the landscape. Connectivity is the opposite of fragmentation.

CONSTRAINT – A qualification of the minimum or maximum amount of an output or cost that could be produced or incurred in a given time period.

CONSUMPTIVE USE – Resource use that reduces the supply, such as logging and mining.

CONTOUR – A line drawn on a map connecting points of the same elevation.

CONVERTIBLE PRODUCTS – Timber products that can be measured in cubic feet of solid wood (FSH 2409.18, sec. 87).

CORRIDOR – A landscape feature that allows animal movement between two patches of habitat or between habitat and geographically discrete resources.

COVER – Any feature that conceals wildlife or fish. Cover may be dead or live vegetation, boulders, or undercut streambanks. Animals use cover to escape from predators, rest, and/or feed.

COVER TYPE (forest cover type) – A descriptive classification of forestland based on existing tree species in a given land area (FSM 2470).

CRITICAL HABITAT – Areas designated for the survival and recovery of species listed as threatened or endangered under the federal Endangered Species Act.

CROWN HEIGHT – The distance from the ground to the base of the crown of a tree.

CULMINATION MEAN ANNUAL INCREMENT (CMAI) – The point in the growth of a tree where mean annual increment (total tree volume at any point in time divided by total age) is at a maximum. This "culmination point" for mean annual growth is regarded as the ideal harvesting or rotation age in terms of most efficient volume production.

CULTURAL LANDSCAPE – Human-altered landscapes, especially those slowly evolving landscapes with scenic vegetation patterns or scenic structures. Addition of these elements creates a visually pleasing complement to the natural character of a landscape.

CULTURAL RESOURCE – *see* Heritage Resource

CUMULATIVE EFFECTS – Effects on the environment that result from separate, individual actions and that, collectively, become significant over time.

[D]

DECISION CRITERIA – The rules and standards used to evaluate alternatives to a proposed action on National Forest System land. Decision criteria are designed to help a decision maker identify a preferred choice from the array of alternatives.

DECOMMISSION – Demolition, dismantling, removal, obliteration, and/or disposal of a deteriorated or otherwise unneeded asset or component, including necessary cleanup work. This action eliminates the deferred maintenance needs for the fixed asset. Portions of an asset or component may remain if they do not cause problems or require maintenance.

DEFERRED MAINTENANCE – Maintenance that was not performed when it should have been or when it was scheduled and which, therefore, was put off or delayed for a future period. When allowed to accumulate without limits or consideration of useful life, deferred maintenance leads to deterioration of performance, increased costs to repair, and decrease in asset value. Deferred maintenance needs may be categorized as critical or non-critical at any point in time. Continued deferral of non-critical maintenance will normally result in an increase in critical deferred maintenance.

DELAYED SHELTERWOOD – Even-aged cutting method in which most of a stand of trees is removed through a cutting designed to regenerate a new crop with seed and protection provided by a portion of the stand. No removal cut is implemented. The remaining portion of the stand is retained at least for 20 percent into the rotation of the new stand, but usually 40 to 60 years.

DEME – A locally interbreeding population of organisms.

DEN TREE – A live or dead tree, at least 10" dbh, containing a natural cavity in the main stem or with exfoliating bark used by wildlife for nesting, brood rearing, hibernating, roosting, daily or seasonal shelter and escape.

DEPARTURE – A schedule which deviates from the principle of non-declining flow by exhibiting a planned decrease in the timber sale and harvest schedule at any time in the future. A departure can be characterized as a temporary increase, usually in the beginning decade(s) of a planning period, over the base sale schedule that would otherwise be established, without impairing the future of a Forest's long-term sustained-yield capacity.

DESIGNATED COMMUNICATION SITE (SPECIAL USES) – An area of National Forest System land designated through the forest planning process. It may be limited to a single communication facility but most often includes more than one. A designated communication site provides the leaseholder more flexibility to manage other communication facilities on the site.

DESIRED FUTURE CONDITION – Land or resource conditions that are expected to result if goals and objectives are fully achieved.

DEVELOPED RECREATION – Recreation activities that are dependent on the presence of constructed features or facilities. Examples include camping in a campground or using a picnic area.

DEVELOPED RECREATION SITE – An area with a concentration of constructed features or facilities managed primarily for the enhancement of recreation activities. Examples include campgrounds, picnic areas, interpretive sites, and trailheads.

DIAMETER AT BREAST HEIGHT (dbh) – The diameter of a tree 4 and 1/2 feet above the ground on the uphill side of the tree.

DISPERSED RECREATION – Recreation that does not occur in a developed recreation site, such as hunting, backpacking, and scenic driving.

DISTURBANCE – any relatively discrete event in space and time that disrupts ecosystem, community, or population structure and changes resources, substrate, or the physical environment (White and Pickett 1985).

DIVERSITY – The distribution and abundance of different plant and animal communities and species within the area covered by a land and resource management plan.

DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS) – The draft version of the Environmental Impact Statement that is released to the public and other agencies for review and comment.

[E]

EARLY SUCCESSIONAL FOREST – The biotic (or living) community that develops immediately following the removal or destruction of forest vegetation in an area. For instance, grasses may be the first plants to grow in an area that was burned.

EARLY SUCCESSIONAL SPECIES – Those plant or animal species characteristic of early successional forest stages.

EASEMENT – The right of use over the property of another owner.

ECOLOGICAL APPROACH – An approach to natural resource management that considers the relationships among all organisms, including humans, and their environment.

ECOLOGICAL LAND TYPE (ELT) – An area of land hundreds to low thousands of acres in size, with a well-known succession of forest species on unique soil materials. Ecological Land Type classification is based on geomorphic history, nature of soil substrata, and potential natural vegetation.

ECOLOGY – The interrelationships of living things to one another and to their environment, or the study of these interrelationships.

ECOREGION – An area over which the climate is sufficiently uniform to permit development of similar ecosystems on sites that have similar properties. Ecoregions contain many landscapes with different spatial patterns of ecosystems.

ECOSYSTEM – A dynamic arrangement of living organisms interacting with each other and their non-living environment. Living organisms include plants and animals. The non-living environment includes soils, landforms, weather, and disturbances.

ECOSYSTEM MANAGEMENT – An approach to the management of natural resources that strives to maintain or restore the sustainability of ecosystems and to provide present and future generations a continuous flow of multiple benefits in a manner that is harmonious with ecosystem sustainability.

ECOSYSTEM RESTORATION – The process of reestablishing, to the extent possible, the structure, function, and composition of ecosystems.

ECOTONE – The transition zone between two biotic communities, such as between a wetland and adjacent forest, or between a mixed hardwood forest type and a white pine forest type.

EDGE – The margin where two or more vegetation patches meet, such as a permanent or temporary opening or grassland next to a mature forest stand or a northern hardwood stand next to an aspen stand.

ELEMENT (of ecosystems) – An identifiable component, process, or condition of an ecosystem.

ELIGIBILITY – Qualification of a river for possible inclusion in the national Wild and Scenic River system through determination that it is free-flowing and with its adjacent land area possesses at least one outstandingly remarkable value.

ENDANGERED SPECIES – A plant or animal that is in danger of extinction throughout all, or a significant portion, of its range. Endangered species are identified by the Secretary of the Interior in accordance with the Endangered Species Act of 1973.

ENDEMIC PLANT/ORGANISM – A plant or animal that occurs naturally in a certain region and whose distribution is relatively limited geographically.

ENVIRONMENTAL ANALYSIS – An analysis of alternative actions and their predictable long and short-term environmental effects. Environmental analyses include physical, biological, social, and economic factors.

ENVIRONMENTAL ASSESSMENT – A brief version of an Environmental Impact Statement.

ENVIRONMENTAL IMPACT STATEMENT (EIS) – A statement of environmental effects of a proposed action and alternatives to it. The EIS is released to other agencies and the public for comment and review.

EPHEMERAL STREAM – A stream, or portion of a stream, with a recognizable streambed, typically consisting of stones, cobbles, or bedrock, that flows only in direct response to precipitation and receives little or no water from springs and no long-continued supply from melting snow or other sources. Its channel is at all times above the water table.

ERICACEOUS – Pertaining to or like plants of the heath family, which are low growing woody plants with small evergreen leaves and small, bell-shaped, pink or purple flowers, common in nutrient-poor environments like bogs. Examples include heather or cranberry.

EROSION – The wearing away of the land surface by wind, water, ice, or other geological agents.

EVALUATION PLANTATION – A planting of genetically superior trees to compare the performance of trees or families of trees, and to provide a source for future reforestation efforts.

EVEN-AGED SYSTEM – Silvicultural system that produces stands in which all trees are about the same age; that is, the difference in age between trees forming the main crown canopy level will usually not exceed 20 percent of the rotation length (FSM 2470).

EXPLORATION (MINERALS) – Establishing the location, size, grade, or reserves of a mineral or energy resource by gathering direct evidence of the resource. Direct data gathering techniques may include drilling holes or digging pits to sample or test a known suspected zone of interest.

EXTANT – Still in existence; not extinct, destroyed, or lost.

EXTIRPATE – Eradicate, or cause the extinction of, a plant or animal species on a local or regional scale. For example, eastern cougars and gray wolves were extirpated from Vermont by 1900 because of loss of habitat and directed killing for predator control.

EXTIRPATION – Eradication or extinction of a plant or animal species on a local or regional scale.

EXTRACTION – The process of mining or removing mineral deposits, oil, or gas from the earth.

[F]

FAUNA – The animal life of an area.

FEATHERING – Partial cutting of trees along an edge to create a transition in heights between areas and/or a transition in stand density between stands of different densities (FSH 559).

FELLING – Cutting down trees.

FINAL CUT – The removal of the last seed bearers or shelter trees after regeneration of new trees has been established in a stand being managed under the shelterwood system of silviculture.

FINE FILTER MANAGEMENT – Management that focuses on the welfare of a single species, or only a few species, rather than the broader habitat or ecosystem (*see* Coarse Filter Management).

FIRE CYCLE – The average time between fires in a given area.

FIRE MANAGEMENT PLAN – A strategic plan that defines a program to manage wildland and prescribed fires and documents the Fire Management Program in the approved land use plan. The plan is supplemented by operational plans such as preparedness plans, preplanned dispatch plans, prescribed fire plans, and prevention plans (Zimmerman 1998).

FIRE REGIME – The characteristics of fire in a given ecosystem, such as the frequency, predictability, intensity, and seasonality.

FIRE USE – The combination of wildland fire and prescribed fire application used to meet resource objectives (Zimmerman 1998).

FISHERIES HABITAT – Streams, lakes, and reservoirs that support, or have the potential to support, fish.

FIXED ASSET – A constructed feature such as a building, dam, bridge, road, campground, trail, or other item of infrastructure. Real property improvements. Facilities in the general sense. These are things for which we have a responsibility.

FLOOD PLAIN – A lowland adjoining a watercourse. At a minimum, the area is subject to a one percent or greater chance of flooding in a given year.

FLORA – The plant life of an area.

FORAGE – All browse and non-woody plants that are eaten by wildlife and livestock.

FORB – A broadleaf plant that has little or no woody material in it.

FOREGROUND – A term used in management of visual resources or scenery. The part of a scene or landscape that is nearest to the viewer, generally found from the observer up to one-half mile away.

FOREST – When used with a capital “F,” this term refers to the Finger Lakes National Forest.

FOREST COVER TYPE – *see* Cover Type

FOREST HEALTH – A measure of the robustness of forest ecosystems. Aspects of forest health include biological diversity; soil, air, and water productivity; natural disturbances; and the capacity of the forest to provide a sustainable flow of goods and services for people.

FOREST MATRIX – The least fragmented, most continuous pattern element of a landscape; the vegetation type that is most continuous over a landscape.

FOREST PLAN – *see* Land and Resource Management Plan

FOREST PLAN REVISION – A formal modification of an existing Forest Plan used to address changes in the natural, social, and economic environment. The Plan revision takes into account new information and scientific knowledge about resources on and off National Forests that shed new light on the assumptions of the existing Plan, and make the predicted impacts of the existing Plan less accurate and/or acceptable.

FOREST ROADS OR TRAILS – A road or trail wholly or partly within or adjacent to and serving the National Forest System that the Forest Service determines is necessary for the protection, administration, and utilization of the National Forest System and the use and development of its resources.

FOREST SUPERVISOR – The official responsible for administering National Forest System lands on an administrative unit, usually one or more National Forests. The Forest Supervisor reports to the Regional Forester.

FOREST VEGETATION SIMULATON (FVS) – A national computer model used for growth and yield projections.

FRAGMENTATION – The physical division of contiguous areas into progressively smaller patches of increasing degrees of isolation from each other.

FROST HEAVE – A land surface that is pushed up by the accumulation of ice in the underlying soil.

FUELS – Plants and woody vegetation, both living and dead, that are capable of burning.

FUELS MANAGEMENT – The treatment of fuels that would otherwise interfere with effective fire management or control. For instance, prescribed fire can reduce the amount of fuels that accumulate on the forest floor before the fuels become so heavy that a natural wildfire in the area would be explosive and impossible to control.

FUELWOOD – Wood cut into short lengths for burning.

FUNCTION – All the processes within an ecosystem through which the elements interact, such as succession, the food chain, fire, weather, and the hydrologic cycle.

[G]

GAME SPECIES – Any species of wildlife or fish that is harvested according to prescribed limits and seasons.

GENERAL FOREST AREA – National Forest System lands outside of Developed Recreation Sites and trails, and excluding designated wilderness, that typically contain a wide spectrum of recreation settings and opportunities.

GEOCACHING – A sport where individuals or organizations set up caches, using Global Positioning System (GPS) coordinates, and share the locations of these caches on the Internet. GPS users can then use the location coordinates to find the caches.

GEOMORPHIC PROCESSES – Processes that change the form of the earth, such as volcanic activity, running water, and glacial action.

GEOMORPHOLOGY – The science that deals with the relief features of the earth's surface.

GEOGRAPHIC INFORMATION SYSTEMS (GIS) – GIS is both a database designed to handle geographic data as well as a set of computer operations that can be used to analyze the data.

GLOBAL POSITIONING SYSTEM (GPS) – a navigational system using satellite signals to fix the location of a receiver on or above the earth's surface.

GOAL – A concise statement that describes a desired condition to be achieved sometime in the future. It is normally expressed in broad terms and is timeless in that it has no specific date by which it is to be completed. Goal statements form the principle basis from which objectives are developed. Goals serve as a blueprint for the Forest Plan and lay the groundwork for the rest of the Plan.

GOODS AND SERVICES – The various outputs, including on-site uses, produced by forest and rangeland resources (36 CFR 219.3).

GROUND FIRE – A fire burning along the forest floor that does not affect trees with thick bark or high crowns.

GRASSLAND FOR GRAZING – Areas where grassland forage is primarily managed for livestock.

GRASSLAND FOR WILDLIFE – Areas where grasslands are managed primarily for wildlife habitat and no livestock grazing occurs.

GROUND WATER – The supply of fresh water under the earth's surface in aquifers and soils.

GROUP SELECTION CUTTING – Uneven-aged cutting method in which small groups of trees, usually no more than one acre in size, are removed to meet a predetermined goal of size distribution and species in the remaining stand.

GUIDELINE – A guideline is a preferred or advisable course of action that promotes the achievement of Forest Plan goals and objectives. A project-level analysis and a signed decision (by the responsible official) are required in order to deviate from an established guideline.

GUIDING – Providing services or assistance (such as supervision, protection, education, training, packing, touring, subsistence, interpretation, or other assistance) to individuals or groups, in their pursuit of a natural resource-based outdoor activity, for pecuniary remuneration or other gain. The term "guide" includes the holder's employees, agents, and instructors.

[H]

HABITAT – The area where a plant or animal lives and grows under natural conditions.

HABITAT CAPABILITY – The ability of a land area or plant community to support a given plant or animal species.

HABITAT DIVERSITY – The number of different types of plant or animal species habitat within a given area.

HABITAT DIVERSITY INDEX – A measure of improvement in habitat diversity.

HARD SNAG – Snags composed essentially of sound wood on the outside.

HAZARDOUS FUELS – Naturally occurring vegetation, both live and dead, that given a wildfire occurrence would present a higher than normal resistance to control. Hazardous fuels may be measured by tons per acre, fuel arrangement, and/or continuity or burning characteristics.

HEALTHY FOREST – A condition wherein a forest has the capacity, across the landscape, for renewal, for recovery from a wide range of disturbances, and for retention of ecological resiliency, while meeting current and future needs of people for desired levels of values, uses, products and services.

HERITAGE RESOURCE – Historic landscapes, archaeological sites, buildings, structures, features, artifacts, Native American Traditional Cultural properties, and/or related clusters of these (referred to as "districts"). They are deemed "significant" if they meet, or may meet, the criteria for eligibility to the National and State Registers of Historic Places (NR). Any Heritage Resource that is considered significant (NR-eligible) may be referred to as a "historic property."

HIBERNACULA – Plural form of hibernaculum.

HIBERNACULUM – A shelter, such as a cave or abandoned mine, occupied during the winter by a hibernating animal, such as an Indiana bat. A known Indiana bat hibernaculum is one in which Indiana bats have been found hibernating during any winter since 2000/2001.

HIGH RISK STAND – Stand that will not survive another ten years or will have a net loss of timber volume in the next ten years.

HISTORIC LANDSCAPE – A geographic area (including both cultural and natural resources and the wildlife or domestic animals therein), associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values. There are four general types of historical landscapes, not mutually exclusive: historic sites, historic designed landscapes, historic vernacular landscapes, and ethnographic landscapes.

HORIZONTAL DIVERSITY – The distribution and abundance of different plant and animal communities, or different stages of plant succession, across an area of land; the greater the numbers of communities or successional stages in a given area, the higher the degree of horizontal diversity.

HYDROLOGIC CYCLE – Also called the water cycle, this is the process of water evaporating, condensing, falling to the ground as precipitation, and returning to the ocean as run-off.

HYDROLOGY – The study of water on the surface of the land, in the soil and underlying rocks, and in the atmosphere.

[I]

IGNEOUS ROCK – Rocks formed when high temperature, molten mineral matter cools and solidifies.

IMPLAN® – An economic impact assessment modeling system. IMPLAN allows the user to easily build economic models to estimate the impacts of economic changes in their states, counties, or communities.

IMPOUNDMENTS – Structures used to collect and confine water, as if in a pond.

IMPROVED ROAD – An improved road is any constructed or existing feature or facility created on the land for the purpose of travel by passenger vehicles (four wheeled, two wheel drive) which are legally owned and operated on Forest roads and highways, and vehicles are greater than 50 inches in width. Said facility will have an area for vehicles to travel on and will incorporate some manner for disposal of surface runoff.

IMPROVEMENT CUTTING – Intermediate cutting made in stands that are past the sapling stage, for the purpose of improving the composition and quality by removing trees of undesirable species, form, or condition, from the main canopy (FSM 2470).

INDICATOR SPECIES – A plant or animal species related to a particular kind of environment. Its presence indicates that specific habitat conditions are also present.

INDIGENOUS (species) – Any plant or animal species native to a given land or water area by natural occurrence.

INDIVIDUAL TREE SELECTION – Uneven-aged cutting method in which selected trees from specified size or age classes are removed over the entire stand area to meet a predetermined goal of size or age distribution and species composition in the remaining stand (FSM 2470).

INFRA – An integrated data management tool where Forest managers enter, manage, and report accurate information and associated financial data in an inventory of constructed features on the land (such as buildings, dams, bridges, water systems, roads, trails, developed recreation sites, range improvements, administrative sites, heritage sites, general forest areas, and wilderness). The database also includes information on permits and contracts that alter Forest land.

INSTREAM FLOW – The quantity of water necessary to meet seasonal stream flow requirements to accomplish the purposes of the national forests, including, but not limited to fisheries, visual quality, and recreational opportunities.

INTEGRATED PEST MANAGEMENT (IPM) – A process for selecting strategies to regulate forest pests in which all aspects of a pest-host system are studied and weighed. The information considered in selecting appropriate strategies includes the impact of the unregulated pest population on various resources values, alternative regulatory tactics and strategies, and benefit/cost estimates for these alternative strategies. Regulatory strategies are based on sound silvicultural practices and ecology of the pest-host system and may consist of a combination of tactics such as timber stand improvement plus selective use of pesticides. A basic principle in the choice of strategy is that it be ecologically compatible or acceptable.

INTERDISCIPLINARY TEAM – A team of individuals with skills from different disciplines that focuses on the same task or project.

INTERIOR FOREST – An area of late successional or old growth forest that is large enough, and of an appropriate shape, to provide conditions that minimize predation, parasitism, and microclimate fluctuations associated with forest edges. These interior forest conditions provide habitat for a diversity of wildlife and plant species.

INTERMEDIATE CUT – The removal of trees from a stand sometime between the beginning or formation of the stand and the regeneration cut. Types of intermediate cuts include thinning, release, and improvement cuttings (FSM 2470).

INTERMITTENT STREAM – A stream that flows: 1) part of the time, such as after a rainstorm, during wet weather, or during part of the year; 2) only at certain times, when it receives water from springs (spring fed) or from some surface source (surface fed), such as melting snow in mountainous areas.

INTERPRETATION – Communication and education that forges emotional and intellectual connections between the interests of the audience and the inherent meanings in the resource.

INTRADEME INTERACTIONS – Interactions like breeding and dispersal within a locally interbreeding population of organisms or deme

INVASIVE SPECIES – A species that is: 1) non-native (or alien) to the ecosystem under consideration, and 2) whose introduction causes, or is likely to cause, economic or environmental harm or harm to human health.

INVASIVE SPECIES, APPROACHES:

- Contain – Prevent the spread of the invasive species beyond the perimeter of patches or infested areas. Tolerate invasive species within established infestation areas, but suppress or eradicate outside those areas.
- Eradicate – Totally eliminate an invasive species from the Forest or location. Eradication methods may include the following, either individually or in combination:
- Suppress – Prevent reproduction throughout the target area and reduce the area coverage of the invasive species. Prevent the invasive species from dominating the area, but accept low levels.
- Tolerate – Accept the continued presence of established infestations and the probable spread to ecological limits for

certain invasive species. Use preventive practices to preclude new infestations.

INVASIVE SPECIES, METHODS OF CONTROL:

- Biological – The deliberate introduction and establishment of natural enemies to reduce the target species' competitive or reproductive capacities. Includes, but is not limited to, insects and pathogens such as fungi. The purpose is not eradication, but to reduce densities and rate of spread to an acceptable level.
- Chemical – Direct and broadcast application of approved herbicides, following EPA label requirements, USDA policy, and Forest Service policy and direction (FSM 2150, FSH 2109.11, FSH 2109.12, and FSH 2109.13).
- Cultural/Land Use – Practices that discourage initial infestation of invasive species. Includes, but is not limited to, seeding, planting and retaining brush and tree canopy cover, and minimizing the extent and duration of exposed soil during management actions.
- Physical/Mechanical – Hand or mechanical labor to physically remove all or any part of the plant. Includes, but is not limited to, hand digging, mowing, tilling, and burning.

IRRETRIEVABLE – One of the categories of impacts mentioned in the National Environmental Policy Act to be included in Environmental Impact Statements. An irretrievable effect applies to losses of production or commitment of renewable natural resources. For example, while an area is used as a ski area, some or all of the timber production there is irretrievably lost. The loss of timber production during that time, however, is not irreversible, because it is possible for timber production to resume if the area is no longer used as a ski area.

IRREVERSIBLE – A category of impacts mentioned in statements of environmental impacts that applies to non-renewable resources, such as minerals and archaeological sites. Irreversible effects can also refer to effects of actions that can be renewed only after a very long period of time, such as the loss of soil productivity.

ISSUE – A subject or question of wide-spread public discussion or interest regarding management of National Forest System land.

[L]

LADDER FUELS – Vegetation located below the crown level of forest trees that can carry fire from the forest floor to tree crowns. Ladder fuels may be low-growing tree branches, shrubs, or smaller trees.

LAND ADJUSTMENT – Changing National Forest System land ownership through acquisition, exchange, or disposal of land or interest in land.

LAND ALLOCATION – The commitment of a given area and its resources to the compatible combination of goods, services, and uses specified by a regional management goal or by a past management prescription.

LAND CAPABILITY – Tendency of a land area to grow a particular natural community (such as hardwoods, spruce-fir) due to various environmental factors like soil or climate, if management were not applied. In many places on the Forest, the current community is different from land capability (as indicated by the Ecological Landtype) for the same area because past management altered the vegetation on the site. Given enough time without additional management, the vegetation may revert to the community indicated by land capability.

LANDFORM – A natural feature of the surface of the land; includes such features as slopes, valleys, plateaus, and ridges.

LANDING – Any place where cut timber is assembled for further transport from the timber sale area.

LANDLINE – National Forest System boundary lines.

LANDSCAPE – A large land area composed of interacting ecosystems that are repeated due to factors such as geology, soils, climate, and human impacts. Landscapes are often used for coarse filter analysis.

LANDSCAPE CHARACTER – Particular attributes, qualities, and traits of a landscape that give it an image and make it identifiable or unique.

LAND AND RESOURCE MANAGEMENT PLAN (LRMP) – Formal name for the Forest Plan, the LRMP is a document that guides all long-range natural resource management activities for a National Forest. It is a roadmap and tool for reaching a collective vision for the future. It is a living, flexible document and can be amended to a variety of changing conditions over time. The Plan establishes goals and management standards and guidelines for all management programs and practices, resource uses, and resource protection measures.

LAND USE PLANNING – The process of organizing the use of lands and their resources to best meet people's needs over time, according to the land's capabilities.

LAND TYPE ASSOCIATION (LTA) – Areas of common ecosystem characteristics that generally number in the thousands of acres. LTAs are defined by similarities in general topography, geomorphic processes, geology, soil, and potential plant community patterns.

LATE SUCCESSIONAL FOREST – A forest beyond the age of economic maturity, generally beyond 100 years of age. These forests are older, have larger trees, and have more structural complexity than mature forest, and they are either in the process of or have developed old growth characteristics. They may exhibit evidence of past human or natural disturbances. These forests may exist as entire stands or as smaller patches within younger stands. (*see* Succession)

LEASABLE MINERALS – These include coal, oil, gas, phosphate, sodium, potassium, oil shale, and geothermal steam (FSM 2811.2).

LEAVE NO TRACE – A program supported by the non-profit Leave No Trace Center for Outdoor Ethics, in partnership with public and private land managers, to promote and inspire responsible outdoor recreation through education and research. Four federal land management agencies, including the USDA Forest Service, actively promote the Leave No Trace principles of responsible, low-impact use to build awareness, appreciation, and respect for our wildlands.

LIBERATION CUTTING – Form of release cutting that removes older, larger trees that overtop a more desirable younger stand (FSM 2470).

LIFE HISTORY – The sequence of changes making up the span of an organism's life.

LITTER (forest litter) – The freshly fallen, or only slightly decomposed, plant material on the forest floor. This layer includes foliage, bark fragments, twigs, flowers, and fruit.

LOGGING RESIDUE (slash) – The residue left on the ground after timber cutting. It includes unutilized logs, uprooted stumps, broken branches, bark, and leaves. Certain amounts of slash provide important ecosystem roles, such as soil protection, nutrient cycling, and wildlife habitat.

LONG-TERM SUSTAINED YIELD – The highest uniform wood yield from lands being managed for timber production that may be sustained under a specified management intensity consistent with multiple-use objectives.

LOW-QUALITY STAND – Stand made up of trees that have a poor potential to produce timber products.

[M]

M – Thousand. Five thousand board feet of timber can be expressed as 5M board feet.

MACRO-CLIMATE – The general, large-scale climate of a large area, as distinguished from the smaller scale micro climates within it.

MAINTENANCE – The act of keeping fixed assets in acceptable condition. It includes preventive maintenance, normal repairs, replacement of parts and structural components, and other activities needed to preserve a fixed asset, so that it continues to provide acceptable service and achieves its expected life. Maintenance excludes activities aimed at expanding the capacity of an asset or otherwise upgrading it to serve needs different from, or significantly greater than, those originally intended.

MANAGEMENT ACTION – Any activity undertaken as part of the administration of the National Forest.

MANAGEMENT AREAS – Areas of the National Forest designated in the Forest Plan as having similar management objectives. Similar to city planning zones.

MANAGEMENT DIRECTION – A statement of multiple-use and other goals and objectives, the associated management prescriptions, and standards and guidelines for attaining them.

MANAGEMENT INDICATOR SPECIES (MIS) – A wildlife species whose population will indicate the health of the ecosystem in which it lives and, consequently, the effects of forest management activities to that ecosystem. MIS species are selected by land management agencies. (*see* Indicator Species)

MANAGEMENT PRACTICE – A specific activity, measure, course of action, or treatment.

MANAGEMENT PRESCRIPTION – Management practices and intensity selected and scheduled for application on a specific area to attain multiple-use and other goals and objectives.

MASS MOVEMENT/WASTING – The down-slope movement of large masses of earth material by the force of gravity. Also called a landslide.

MAST TREES – Species that provide nuts and fruits. These include the oak group, American beech, hop hornbeam and black cherry.

MATURE TIMBER – Trees that have attained full development, especially height, and are in full seed production.

MEAN ANNUAL INCREMENT OF GROWTH – The total increase in size or volume of individual trees. Can also refer to the increase in size and volume of a stand of trees at a particular age divided by that age in years.

MECHANIZED VEHICLES – Any contrivance which travels over ground, snow, or water on wheels, tracks, skids, or by floatation, and is propelled by a living power source contained, or carried on or within, the device.

MESIC – Moderately moist.

METAPOPULATION – A group of locally interbreeding populations, or demes, each isolated in a patch of habitat. The persistence of the metapopulation is dependent on the persistence of the demes and movement of animals among demes to exchange genes.

MICRO-CLIMATE – The climate of a small site. It may differ from the macro-climate of the area due to aspect, tree cover (or the absence of tree cover), or exposure to winds.

MIDDLEGROUND – A term used in the management of visual resources, or scenery. It refers to the visible terrain between the foreground and background in a landscape. The area is located from one-half to four miles from the observer.

MINERAL – Inorganic material that includes sand, gravel, and stone.

MINERAL MATERIALS, COMMON VARIETY – Also referred to as Salable Minerals or Mineral Materials, include construction and landscaping materials (cinders, sand, gravel, boulders, loose rock, and common clay) and minerals of similar occurrence commonly used as aggregate, rip-rap, ballast, borrow, or fill.

MINERAL RIGHTS – Owning minerals beneath the surface of the ground; often it is someone other than the owner of the surface.

MINERAL SOIL – Soil that consists mainly of inorganic material, such as weathered rock, rather than organic matter.

MISSION (of the USDA Forest Service) – "To Care for the Land and Serve the People." As set forth in law, the Forest Service mission is to achieve quality land management under the sustainable multiple-use management concept to meet the diverse needs of people.

MITIGATION – Actions taken to avoid, minimize, or rectify the impact of a land management practice.

MIXED STAND – A stand consisting of two or more tree species.

MONITORING AND EVALUATION – The periodic evaluation of forest management activities to determine how well objectives are met and how management practices should be adjusted. (*see* Adaptive Management)

MORTALITY – Trees that were merchantable and have died within a specified period of time. The term mortality can also refer to the rate of death of a species in a given population or community.

MOSAIC – Areas with a variety of plant communities over a landscape, such as areas with trees and areas without trees occurring over a landscape.

MOTORIZED VEHICLES – Any contrivance which travels over ground, snow, or water on wheels, tracks, skids or by floatation and is propelled by a nonliving power source contained, or carried on or within, the device.

MULTIPLE USE – Managing National Forest resources in a manner to best meet the needs of the American people, recognizing that not all uses can occur on all acres, and that changing needs and conditions over time will change the combination and intensity of use. Productivity of the land and sustainability of ecosystems is maintained, and the interrelationships among resources and the effects of use are monitored and evaluated. Multiple-use management does not necessarily prescribe the combination of uses that will give the greatest dollar return or the greatest unit output.

[N]

NATIONAL AND STATE REGISTERS OF HISTORIC PLACES (NR) – Listings of historic properties (or heritage resources) that meet the criteria of significance established by the National Historic Preservation Act and New York State Historic Preservation Act.

NATIONAL ENVIRONMENTAL POLICY ACT OF 1969 (NEPA) – Congress passed NEPA in 1969 to encourage productive and enjoyable harmony between people and their environment. One of the major tenets of NEPA is its emphasis on public disclosure of possible environmental effects of any major action on public lands. Section 102 of NEPA requires a statement of possible environmental effects to be released to the public and other agencies for review and comment.

NATIONAL FOREST MANAGEMENT ACT OF 1976 (NFMA) – NFMA is the primary statute governing the administration of National Forests. NFMA requires the Secretary of Agriculture to assess forest lands, develop management programs based on multiple-use and sustained yield principles, and implement a Land and Resource Management Plan for each National Forest.

NATIONAL FOREST SYSTEM ROADS – Those roads wholly or partly within, or adjacent to and serving, the national forests, and other areas administered by the Forest Service that have been included in the Forest Transportation Atlas (36 CFR 212.1 and 261.2).

NATIONAL FOREST SYSTEM TRAILS – Those trails wholly or partly within, or adjacent to and serving, the National Forests, and other areas administered by the Forest Service that have been included in the Forest Transportation Atlas (36 CFR 212.1 and 261.2).

NATIONAL PARK SERVICE (NPS) – The agency of the US Department of the Interior responsible for the administration of National Parks, Monuments, and Historic Sites. The NPS is distinct from the USDA Forest Service both administratively and by mission.

NATIONAL RECREATION AREA – Congressionally designated areas that have outstanding combinations of outdoor recreation, aesthetic attractions, and proximity to potential users. They may also have cultural, historical, archaeological, pastoral, wilderness, scientific, wildlife, and other values contributing to public enjoyment.

NATIONAL QUALITY STANDARDS – The level of quality the Forest Service expects to provide the public at recreation sites and trails. These standards form the baseline for estimating the total cost of providing quality opportunities for recreation visitors and customers' desires.

NATIONAL TRAIL SYSTEM (National Recreation Trail System/National Scenic Trail System) – A national system of recreation, scenic and historic trails established in order to provide for the ever-increasing outdoor recreation needs of an expanding population and in order to promote the preservation of, public access to, travel within, and enjoyment and appreciation of the open-air, outdoor areas and historic resources of the nation. The Appalachian Trial and Long Trail are components of this system.

NATURAL BARRIER – A natural feature, such as a dense stand of trees or downfall, that will restrict animal travel.

NATURAL DISTURBANCE – *see* Disturbance

NATURAL INTEGRITY (a.k.a. ecosystem integrity) – The capability of an ecosystem to support and maintain the structure and function characteristic of its particular location.

NATURAL RANGE OF VARIATION – *see* Range of Variability

NEST TREE – Tree containing large nests, built by crows, herons, or hawks, that from the ground resemble a platform of sticks and are two to three feet in diameter. These may be used by owls, which do not build nests, or they may be re-used by crows, herons, and hawks, among other species.

NET PUBLIC BENEFITS – An expression used to signify the overall long-term value to the nation of all outputs and positive effects (benefits) less all associated inputs and negative effects (costs) whether they can be quantitatively valued or not. Net public benefits are measured by both quantitative and qualitative criteria rather than a single measure or index. The maximization of net public benefits to be derived from management of the National Forest units is consistent with the principles of multiple-use and sustained-yield management.

NO-ACTION ALTERNATIVE – The most likely condition expected to exist in the future if management practices continue unchanged.

NON-COMMERCIAL VEGETATIVE TREATMENT – The removal of trees for reasons other than timber production.

NON-CONSUMPTIVE USE – The use of a resource that does not reduce the supply. For instance, bird watching is a non-consumptive use of wildlife. Boating and fishing are non-consumptive uses of water.

NON-CONVERTIBLE PRODUCTS – Timber products that do not have a common standard conversion to cubic feet of solid wood (FSH 2409.18).

NON-DECLINING YIELD – A level of timber production planned so that the planned sale and harvest for any future decade is equal to or greater than the planned sale and harvest for the preceding decade.

NON-GAME – Wildlife species that are not hunted for sport.

NON-NATIVE INVASIVE SPECIES (NNIS) – An organism that has been purposefully or accidentally introduced outside its original geographic range, and that is able to proliferate and aggressively alter its new environment, causing harm to the economy, environment, or human health (Executive Order 13112).

NON-POINT SOURCE POLLUTION – Pollution whose source is not specific in location. The sources of the discharge are dispersed, not well defined, or constant. Rain storms and snowmelt often make this type of pollution worse. Examples include sediments from logging activities and runoff from agricultural chemicals.

NON-RECREATION SPECIAL USE PERMITS – A general definition other than the recreation class of special uses. These include agriculture, community and public information, energy generation and transmission, communications, feasibility, research, training, cultural resources, and historical classes, among other uses.

NON-RENEWABLE RESOURCE – A resource whose total quantity does not increase measurably over time, so that each use of the resource diminishes the supply.

NORTHERN HARDWOODS – Primarily sugar maple, yellow birch, and beech. May include red maple, white ash, black cherry, white pine, and hemlock.

NOTICE OF INTENT (NOI) – A notice in the federal register of intent to prepare an environmental impact statement on a proposed action.

NOXIOUS WEED – A plant species generally considered detrimental to the environment, crops or other desirable plants, livestock, land, or other property, or to be injurious to public health. Noxious weeds can be native or exotic, invasive or non-invasive.

NUTRIENT CYCLE – The circulation of chemical elements and compounds, such as carbon and nitrogen, in specific pathways from the non-living parts of ecosystems into the organic substances of the living parts of ecosystems, and then back again to the non-living parts of the ecosystem. For instance, nitrogen in wood is returned to the soil as the dead tree decays. The nitrogen again becomes available to living organisms in the soil and, upon their death, the nitrogen is available to plants growing in that soil.

[O]

OBJECTIVE – A concise, time-specific statement of measurable and planned results that respond to pre-established goals. An objective forms the basis for further planning by defining both the precise steps to be taken and the resources to be used in achieving identified goals. Objectives identify quantities of items within the 15 year Forest Plan time frame.

OFF-ROAD VEHICLE – Any motorized vehicle designed for or capable of cross-country travel on, or immediately over, land, water, sand, snow, ice, marsh, swampland, or other natural terrain; except that such term excludes (A) any registered motorboat, (B) any fire, military, emergency, or law enforcement vehicle when used for emergency purposes, and any combat or combat support vehicle when used for national defense purposes, and (C) any vehicle whose use is expressly authorized by the respective agency head under a permit, lease, license, or contract.

OFF SITE VIEWS – A term used in management of visual resources. The view beyond foreground, includes middleground and background views.

OLD GROWTH FOREST – A patch of relatively old forest of at least 5 to 10 acres that has escaped catastrophic or stand-replacing disturbance associated with the prevailing natural disturbance regimes of the Forest. Such old growth stands exhibit a long history of continuity and a demonstrated future via replacement dynamics.

ON-SITE VIEW – A term used in management of visual resources. *see* Foreground

OPENING – An area where crown closure of vegetation is less than 50 percent and height of vegetation is less than 20 percent of that of the surrounding trees. *see also* Permanent Upland Opening, Temporary Opening, Wetland Opening.

OPERATIONS – Activities related to the normal performance of the functions for which a fixed asset or component is intended to be used. Includes tasks such as janitorial services, vault toilet pumping, grounds upkeep, and law enforcement patrols.

ORGANIC SOIL – Soil at least partly derived from living matter, such as decayed plant material.

OUTFITTING – Providing, through rental or livery, any saddle or pack animal, vehicle or boat, tents or camp gear, or similar supplies or equipment, for pecuniary remuneration or other gain. The term "outfitter" includes the holder's employees, agents, and instructors.

OUTSTANDING MINERAL RIGHTS – Rights owned by a party other than the surface owner at the time the surface was conveyed to the United States.

OUTSTANDINGLY REMARKABLE VALUES – The identification of outstandingly remarkable values is one of the primary bases for determining Wild and Scenic River eligibility. The Wild and Scenic Rivers Act defines these values as those characteristics that make the river worthy of special protection. Outstandingly Remarkable Values can include scenery, recreation, fish and wildlife, geology, history, culture, and other similar values.

OVERSTORY – The upper canopy layer; the plants below comprise the understory.

[P]

PARENT MATERIAL – The mineral or organic matter from which the upper layers of soil are formed.

PARTIAL RETENTION – A visual quality objective which, in general, means human activities may be evident but must remain subordinate to the characteristic landscape.

PASSERINE – A bird of the very large and diverse taxonomic order Passeriformes, sometimes referred to as perching birds or, less accurately, as songbirds. More than half of all living species of birds are passerines, including species as varied as chickadees, crows, jays, wrens, thrushes, swallows, warblers, and sparrows.

PATCH – An area of vegetation that is similar in structure and composition.

PATCH CUT – A clearcut that creates small temporary openings in a stand of trees, usually between 1 to 15 acres in size.

PEOPLE AT ONE TIME (PAOT) – A recreation capacity determination expressed in the number of people a recreation site, facility or area can accommodate at one time.

PERCOLATION – Downward flow or infiltration of water through the pores or spaces of rock or soil.

PERENNIAL STREAM – A stream that contains permanently present surface water and where water flows occur throughout the year except possibly during extreme drought or during extreme cold when ice forms (FSM 2526.05).

PERMANENT UPLAND OPENING – An opening dominated by perennial grasses, forbs, sedges and shrubs, that has less than 16 percent stocking of trees and less that 10 percent tree cover. Vegetation in permanent upland openings is periodically cut or burned to prevent vegetative succession and tree growth. Optimal size of permanent upland openings is one-half to ten acres. Permanent upland openings may be designed primarily for single or multiple uses, including but not limited to wildlife habitat, recreational uses, or scenic vistas.

PERMITTED GRAZING – Grazing on a National Forest range allotment under the terms of a grazing permit.

PERSONAL USE – The use of a forest product, such as firewood, for home use and not for commercial use.

PERSONAL USE OF MINERALS – Recreational mineral activities which contribute to the personal enjoyment of mineral collecting as a leisure activity and not for the purpose of realizing personal financial gain either through the sale of the material or through an exchange for other goods or services. The exchange of mineral specimens, and/or the fabrication by the collector of functional or decorative items from the collected material, and the disposal of same, are not considered to constitute a commercial activity as long as the motive for doing so is the further enjoyment of a leisure activity and not for profit.

PEST – A plant, animal, or environmental stress which the land manager determines to be detrimental to achieving resource management objectives

PLANNING AREA – The area of National Forest land covered by a Regional Guide or Forest Plan.

PLANNING PERIOD – The time frame for which goods, services, and effects were projected in the development of the Forest Plan.

PLANTATION – A forest crop or stand raised artificially, either by seeding or planting of young trees.

POINT SOURCE POLLUTION – Pollution traceable to a discharge of pollutants from a discernable, confined, and discrete conveyance, such as a discharge from a sewage treatment plant.

POLE/SAPLING – The stage of forest succession in which trees are between 3 and 7 inches in diameter and are the dominant vegetation.

POLE TIMBER – Trees at least 5 inches in diameter, but smaller than the minimum size for sawtimber.

PRE-COMMERCIAL THINNING – Removing some of the trees from a stand that are too small to be sold for lumber or firewood, so the remaining trees will grow faster.

PREDATOR – An animal that lives by preying on other animals. Predators are at or near the tops of food chains.

PRE-EXISTING USE – Land use that may not conform to a zoning ordinance but existed prior to the enactment of the ordinance.

PREFERRED ALTERNATIVE – Chosen from among the alternatives developed to address the range of solutions to the Forest's management problems. The Regional Forester, using the Decision Criteria, selects the preferred alternative that he/she feels best resolves management problems within the context of the mission and priorities of the Forest Service. This Alternative then becomes the basis for the Draft Forest Plan and Draft Environmental Impact Statement.

PREPARATORY CUT – The removal of trees near the end of a rotation to open the canopy and allow the crowns of seed bearing trees to enlarge. Improves seed production and encourages natural regeneration. (*see* Rotation)

PREPAREDNESS – Activities that lead to a safe, efficient, cost-effective fire management program in support of land and resource management objectives through appropriate planning and coordination (Zimmerman 1998).

PRESCRIBED FIRE – Any fire ignited by management actions to meet specific objectives. A written, approved prescribed fire plan must exist and NEPA requirements must be met prior to ignition (Zimmerman 1998).

PRESCRIPTION – Management practices selected to accomplish specific land and resource management objectives.

PRESENT NET VALUE (PNV) [a.k.a. Net Present Value (NPV) or present net worth] – The difference between the discounted value (benefits) of all outputs to which monetary values or established market prices are assigned and the total discounted costs of managing the planning area.

PRODUCTIVE – The ability of an area to provide goods and services and to sustain ecological values.

PROTECTIVE STRIP – A portion of land that provides largely undisturbed soil to separate soil-disturbing activities from streams, ponds, wetlands, and seasonal pools. The purpose of the protective strip is to protect the soil's infiltration capacity and to filter out sediment.

PUBLIC LAND – Land for which title and control rests with a federal, state, regional, county, or municipal government.

PUBLIC INVOLVEMENT – The use of appropriate procedures to inform the public, obtain early and continuing public participation, and consider the views of interested parties in planning and decision making.

PULPWOOD – Wood suitable for manufacturing into wood pulp for paper products.

[R]

RANGE – Land on which the principle natural plant cover is composed of native grasses, forbs, and shrubs that are valuable as forage for livestock and big game.

RANGE MANAGEMENT – The art and science of planning and directing range use; intended to yield the sustained maximum animal production and perpetuation of the natural resources.

RANGE OF VARIABILITY (a.k.a. natural range of variation or historic range of variability) – The variability in composition, structure, and dynamics of ecosystems before EuroAmerican influence, including the variation of physical and biological conditions within an area due to climatic fluctuations and disturbances of wind, fire, and flooding.

RANGER DISTRICT – The administrative sub-unit of a National Forest that is supervised by a District Ranger who reports directly to the Forest Supervisor.

RAPTOR – A bird of prey, such as an eagle or hawk.

ROADLESS AREA REVIEW AND EVALUATION II (RARE II) – A national inventory of roadless and undeveloped areas within the National Forests and Grasslands that was completed in 1979.

RECHARGE – The addition of water to ground water by natural or artificial processes.

RECORD OF DECISION (ROD) – An official document in which a deciding official states the alternative that will be implemented from a prepared Environmental Impact Statement.

RECREATION EVENTS SPECIAL USE PERMITS – A special use designation within the Recreation Special Use category of "Facility Related Activities." Recreation events include organized events of a temporary nature, such as animal, vehicle, or boat races; fishing contests; rodeos; adventure games; and fairs

RECREATION OPPORTUNITY SPECTRUM (ROS) – A formal Forest Service classification system designed to delineate, define, and integrate outdoor recreation opportunities in land and resource management planning. ROS classes are used to describe all recreation opportunity settings, from natural, undisturbed, and undeveloped to heavily used, modified and developed. ROS designations attempt to describe the kind of recreation experience one may expect to have in a given part of the National Forest. The ROS classes include:

- Urban – This setting is characterized by a substantially urbanized environment, although the background may have natural-appearing elements. Affiliation with individuals and groups is prevalent, as is the convenience of sites and opportunities. Large numbers of users can be expected, both on-site and in nearby areas. Facilities for highly intensified motor vehicle use and parking are available. Regimentation and controls are obvious and numerous.
- Rural – This setting is characterized by a substantially modified natural environment. Sights and sounds of humans are readily evident and the interaction between users is often moderate to high. A considerable number of facilities are designed for use by a large number of people and are often provided for special activities. Facilities for intensified use and parking are available. Motorized use may be present on designated roads and trails and off-road (where not restricted). In this setting the probability for experiencing affiliation with individuals and groups is prevalent, as is the convenience of sites and opportunities. Opportunities for challenges, risk taking, and use of outdoor skills are generally unimportant. Management activities and designed roads or highways may dominate the natural landscape. Structures are readily apparent.
- Roaded Natural – This setting is characterized by a predominately natural appearing environment with moderate evidence of the sights and sounds of people. Interaction between users may be low to moderate, but with evidence of other users prevalent. Opportunities for both motorized and non-motorized forms of recreation are possible. Motorized use may be present on designated roads and trails, and off-road (where not restricted). In this setting there is an equal probability of experiencing affiliation with other user groups and experiencing isolation from sights and sounds of humans. Challenge and risk opportunities associated with more primitive types of recreation are not very important. Natural settings may have modifications that range from being easily noticed to strongly dominant; roads and/or highways present; structures readily apparent.
- Semi-primitive Motorized – This setting is characterized by a predominately natural or natural-appearing environment of moderate to large size (generally greater than 2,500 acres). Interaction between users is low, but there is often evidence of other users. Motorized use may be present on designated roads and trails and off-road (where not restricted). In this setting there is a moderate probability of experiencing isolation from the sights and sounds of humans and self-reliance through the application of outdoor skills in an environment that offers challenge and risk. Management activities mimic natural occurrences. Primitive roads may be present, but structures are rare and isolated. Snowmobile use is possible.
- Semi-primitive Non-motorized – This setting is characterized by a predominately natural or natural-appearing environment of moderate to large size (generally greater than 2,500 acres). Interaction between users is low, but there is often evidence of other users. Motorized use is generally not present. In this setting there is a high probability of experiencing isolation from the sights and sounds of humans and self-reliance through the application of outdoor skills in an environment that offers challenge and

risk. Management activities mimic natural occurrences. Primitive roads may be present and structures are rare and isolated.
- Primitive – A classification of wilderness and recreation opportunity. It is characterized by an essentially unmodified environment where trails may be present, but structures are rare, and where it is highly probable to be isolated from the sights and sounds of people.

ROS CLASS, DESIRED – Management tool used to describe the desired array of recreation settings across the Forest. Desired ROS classes guide recreation management and describe the desired condition of the Forest in the future. All management areas have an associated Desired ROS class to guide recreation management.

ROS CLASS, INVENTORIED – An inventory tool used to describe the existing array of recreation settings for lands within the Forest boundary. Inventoried ROS describes the existing condition of the Forest. (*see also* Recreation Opportunity Spectrum (ROS) and Desired ROS Class)

RECREATION RIVER – Wild and Scenic Rivers Act Usage: Classification applied to rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

RECREATION SPECIAL USE PERMITS – A class of special use permits for recreation uses that serve the public, protect public health and safety, and protect the resource. These include such categories as outfitting and guiding, group use, facility related activities, and winter recreation. Within each of these categories there could be several “designations” of special use permits (FSM 2720).

REFORESTATION – The restocking of an area with forest trees, by either natural or artificial means, such as planting.

REGENERATION – The renewal of a tree crop by either natural or artificial means. The term is also used to refer to the young crop itself.

REGENERATION CUTTING (Harvest Cut) – Includes four basic cutting methods used to regenerate a forest: clearcut, seed-tree cut, shelterwood cut, and selection cut. Trees are removed from the stand to create conditions that will allow the forest to renew or reproduce itself. This is accomplished under either an even-aged management system or an uneven-aged management system.

REGIONAL FORESTER – The official of the USDA Forest Service responsible for administering an entire region of the Forest Service.

REGIONAL FORESTER SENSITIVE SPECIES – Those plant and animal species identified by a Regional Forester for which population viability is a concern, as evidenced by:
- Significant current or predicted downward trends in population numbers or density.
- Significant current or predicted downward trends in habitat capability that would reduce a species existing distribution (FSM 2670.5).

RELEASE TREATMENT – Intermediate treatment or cutting designed to free a young stand (not past the sapling stage) of desirable trees from the competition of undesirable trees that threaten to suppress them. Cleaning and liberation cutting are types of release (FSM 2470).

REMOVAL CUT – The removal of the last seed bearers or shelter trees after regeneration is established.

REPAIR (OF ASSETS) – Work to restore a damaged, broken, or worn-out fixed asset, component, or item of equipment to normal operating condition. Repairs may be done as annual maintenance or deferred maintenance activities.

REHABILITATION (OF ASSETS) – Renovation or restoration of an existing fixed asset or any of its components in order to restore the functionality or life of the asset. Because there is no significant expansion or change of purpose for the fixed asset, the work primarily addresses deferred maintenance.

REPLACEMENT (OF ASSETS) – Substitution or exchange of an existing fixed asset or component with one having essentially the same capacity and purpose.

REPLACEMENT TREE – A live or partially dead tree left to become a hard snag and eventually a soft snag replacement.

RESEARCH NATURAL AREA (RNA) – A physical or biological unit in which current natural conditions are maintained insofar as possible. These conditions are ordinarily achieved by allowing natural physical and biological processes to prevail without human intervention. Under unusual circumstances, however, deliberate manipulation may be utilized to maintain the unique feature that the Research Natural Area was established to protect. Research natural areas are part of a national network of ecological areas designated in perpetuity for research and education and/or to maintain biological diversity on National Forest System lands. RNAs are intended for non-manipulative research, observation, and study (FSM 4060).

RESERVE TREES – Trees left for wildlife in areas where timber is being cut. See snag, den, and mast trees.

RESIDUAL STAND – The trees remaining standing after an event such as selection cutting.

RESILIENCE – The degree, manner and pace of restoration of the structure and function of the original ecosystem after disturbance (Westman 1978).

RESOURCE ASSESSMENT – A compilation of background material on the status of a particular resource area, on a local, regional and national scale. The Resource Assessment describes the present condition of a particular resource, and speculates on the future condition of the resource based on current and expected trends.

RESPONSIBLE OFFICIAL – The Forest Service employee who has been delegated the authority to carry out a specific planning action.

RESTORATION (of ecosystems) – *see* Ecosystem Restoration

REVEGETATION – The re-establishment and development of a plant cover by either natural or artificial means, such as re-seeding.

RIPARIAN AREAS – Riparian areas are three-dimensional ecotones (an ecological transition zone) where functional and process interactions take place between terrestrial and aquatic ecosystems. Riparian areas extend down into the groundwater, up above the canopy, outward across the floodplain and up the near-slopes draining water from the terrestrial ecosystem, and along the water course or feature. Riparian areas are geographically delineable, highly variable in width, and include the water feature: stream, wetland, pond, or seasonal pool (Paraphrased from Riparian Management in Forests of the Continental Eastern United States, p. 29).

RIPARIAN ECOSYSTEM – A transitional ecosystem between the aquatic ecosystem and the adjacent terrestrial ecosystem; identified by soil characteristics or distinctive vegetation communities that require free or unbound water.

ROAD DECOMMISSIONING – Activities that result in the stabilization and restoration of unneeded roads to a more natural state.

ROAD DENSITY – Quantity of road mileage per unit area, commonly measured as miles of road per square mile of land area.

ROAD IMPROVEMENT – Activity that results in an increase of an existing road's traffic service level, expansion of its capacity, or change in its original design function.

ROAD MAINTENANCE – The ongoing upkeep of a road necessary to regain or restore the road to the approved road management objective (FSM 7712.3).

ROAD MANAGEMENT OBJECTIVE (RMO) – Defines the intended purpose of an individual road based on management area direction and access management objectives. Road management objectives contain design criteria, operation criteria, and maintenance criteria (FSH 7709.55).

ROAD OBLITERATION – Process of removing a road from the landscape. Obliterations are used on system and temporary roads, which are to be removed from service (decommissioned). Obliteration can include removing evidence of any access points; removing any structures from the roadbed (such as culverts, bridges, signs, guide rails, etc.); and restoring wetlands and riparian areas.

ROAD OPERATION MAINTENANCE LEVEL (ROML) – The level of service provided by, and maintenance required for, a specific road (FSH 7709.58).

- Level 1 (Closed for more than 1 year) – Assigned to intermittent-service roads during the time they are closed to vehicular traffic. The closure period must exceed one year. Basic custodial maintenance is performed to keep damage to adjacent resources to an acceptable level and to perpetuate the road to facilitate future management activities. Roads receiving maintenance Level 1 may be of any type, class, or construction standard, and may be managed at any other maintenance level while they are open for traffic. While being maintained at Level 1, they are closed to vehicular traffic, but may be open and suitable for non-motorized uses.
- Level 2 (High-clearance vehicles) – Assigned to roads open for use by high clearance vehicles. Passenger car traffic is not a consideration. Traffic is normally minor, usually consisting of one or a combination of administrative, permitted, dispersed recreation, or specialized uses. Log haul may occur at this level.
- Level 3 (Passenger vehicles; surface not smooth) – Assigned to roads open and maintained for travel by a prudent driver in a standard passenger car. User comfort and convenience are not considered priorities. Roads in this maintenance level are typically low speed, single lane with turnouts and spot surfacing. Some roads may be fully surfaced with either native or processed material.
- Level 4 (Passenger vehicles; smooth surface) – Assigned to roads that provide a moderate degree of user comfort and convenience at moderate traffic speeds. Most roads are double lane and aggregate surfaced. Some roads, however, may be single lane. Some roads may be paved and/or dust abated.
- Level 5 (Passenger vehicles-dust free; possibly paved) – Assigned to roads that provide a high degree of user comfort and convenience. These roads are normally double lane, paved facilities. Some may be aggregate surfaced and dust abated.

ROAD, PRIVATE – A road under private ownership authorized by a Special-Use Authorization, or a road that provides access pursuant to a reserved or private right.

ROAD, PUBLIC – Any road or street under the jurisdiction of and maintained by a public authority and open to public travel (23 U.S.C. 101(a)).

ROAD, TEMPORARY – Road authorized by contract, permit, lease, other written authorization, or emergency operation, not intended to be part of the forest transportation system and not necessary for long-term resource management.

ROAD, TRAFFIC SERVICE (LEVELS) –

- A: Free flowing, mixed traffic; stable, smooth surface; provides safe service to all traffic.
- B: Congested during heavy traffic, slower speeds and periodic dust; accommodates any legal-sized load or vehicle.
- C: Interrupted traffic flow, limited passing facilities, may not accommodate some vehicles. Low design speeds. Unstable surface under certain traffic or weather.
- D: Traffic flow is slow and may be blocked by management activities. Two-way traffic is difficult, backing may be required. Rough and irregular surface. Accommodated high clearance vehicles. Single purpose facility.

ROAD, UNCLASSIFIED – Roads on National Forest System lands that are not managed as part of the forest transportation system, such as unplanned roads, abandoned travelways, and off-road vehicle tracks that have not been designated and managed as a trail. Includes those roads that were once under permit or other authorization and were not decommissioned upon the termination of the authorization (36 CFR 212.1).

ROTATION – The number of years required to establish and grow timber crops to a specified condition of maturity.

ROUNDWOOD – Pulpwood and fuelwood prepared in the round state, such as house logs and telephone poles.

RUN-OFF – The portion of precipitation that flows over the land surface or in open channels.

[S]

SALVAGE CUTTING – Intermediate cutting made to remove trees that are dead or in imminent danger of being killed by injurious agents (FSM 2470).

SANITATION CUTTING – Intermediate cutting made to remove dead, damaged, or susceptible trees to prevent the spread of pests or pathogens (FSM 2470).

SAPLING – A general term for a young tree more than a few feet tall and an inch or so in diameter that is typically growing vigorously.

SAWTIMBER – Trees that are nine inches in diameter at breast height or larger that can be made into lumber.

SCALE – In ecosystem management, it refers to the degree of resolution at which ecosystems are observed and measured.

SCENERY MANAGEMENT SYSTEM (SMS) – A systematic approach for determining the relative value and importance of scenery in a national forest. SMS is to be used in the context of ecosystem management to inventory and analyze scenery in a national forest, to assist in establishment of overall resource goals and objectives, to monitor the scenic resource, and to ensure high-quality scenery for future generations.

SCENIC RIVER – Wild and Scenic Rivers Act Usage: Classification applied to rivers, or sections of rivers, that are free of impoundments; where shorelines or watersheds are still largely primitive and shorelines are largely undeveloped, but accessible at places by a road.

SCOPING – The ongoing process to determine public opinion, receive comments and suggestions, and determine issues during the environmental analysis process. It may involve public meetings, telephone conversations, or letters.

SEASONAL POOL (a.k.a. vernal pool) – A seasonal pool is a contained basin depression lacking a permanent above ground outlet. In the Northeast, it fills with water with the rising water table of fall and winter or with the melt-water and runoff of winter and spring snow and rain. Many vernal pools in the Northeast are covered with ice in the winter months. They contain water for a few months in the spring and early summer. By late

summer, a vernal pool is generally, but not always, dry.

A seasonal pool, because of its periodic drying, does not support breeding populations of fish. Many organisms have evolved to use a temporary wetland where they are not eaten by fish. These organisms are considered connected to, or indicative of, vernal pools because they use a vernal pool for various parts of their life cycle. In New England and New York, the easily recognizable connected species are the fairy shrimp, the wood frog, and salamanders of the genus *Ambystoma* (for example spotted, Jefferson, marbled, and blue-spotted salamanders). The Green Mountain and Finger Lakes National Forests will define Seasonal Pools as those seasonally filled basins that are occupied for breeding purposes by one or more of these connected species (Kellogg et al. 2004).

SECOND-GROWTH FOREST – An area of forest that has established after some kind of human intervention that has removed some or all of the previous forested area.

SEED TREE CUTTING – Even-aged cutting method in which most of the mature timber from an area is removed in one cut except for a small number of desirable trees retained to provide seed or shelter for regeneration (FSM 2470).

SENSITIVE SPECIES – *see* Regional Forester Sensitive Species

SERAL – Any stage of the sequence of changes in plant and animal communities on a site over time. (*see* Succession)

SHADE TOLERANT SPECIES – Term used to describe plants that prefer to grow in the shade (ex. sugar maple or hemlock).

SHADE INTOLERANT SPECIES – Term used to describe plants that prefer to grow in sunny, open conditions (ex. aspen or black locust).

SHELTERWOOD CUTTING – Even-aged cutting method in which a stand of trees is removed through a series of cuttings designed to establish a new crop with seed and protection provided by a portion of the stand (FSM 2470).

SHELTERWOOD WITH RESERVES – *see* Delayed Shelterwood

SIDE TRAIL (SPUR TRAIL/CONNECTING TRAILS) – Side trails and connecting trails provide additional points of public access to national recreation, national scenic or national historic trails and connections between such trails. Spur trails may intersect a national trail and provide passage to points of interest or facilities within the trail corridor.

SILVICULTURAL SYSTEM – Entire process by which forest stands are tended, harvested, and replaced. It includes all cultural practices performed during the life of the stand, such as regeneration cutting, fertilization, thinning, improvement cutting, and use of genetically improved sources of tree seeds and seedlings.

SILVICULTURE – Application of principles underlying the growth and development of single trees and of the forest as a biological unit, to control forest establishment, composition, structure and growth. The selection of an appropriate silviculture system for a management area depends on the stated resource objectives.

SINGLE TREE SELECTION – *see* Individual Tree Selection

SITE PREPARATION – The general term for removing unwanted vegetation, slash, roots, and stones from a site before reforestation. Naturally occurring wildfire, as well as prescribed fire, can prepare a site for natural regeneration.

SIZE CLASS – One of the three intervals of tree stem diameters used to classify timber in the Forest Plan database. The size classes are: Seedling/Sapling (less than five inches in diameter); Pole Timber (five to seven inches in diameter); Sawtimber (greater than seven inches in diameter).

SKID ROADS (a.k.a. tractor roads) – Roads constructed for the purpose of transporting cut trees to a landing. They are ordinarily constructed by ground clearing and/or excavation (FSH 2409.15).

SKID TRAILS – Trails constructed for the purpose of transporting cut trees to a skid road or landing. The resultant ground disturbance created by skidding logs on the ground by all skidding and yarding methods. Skid trail construction normally does not include ground excavation or clearing (FSH 2409).

SKIDDING – Hauling logs by sliding with a cable, not on wheels, from stump to a collection point.

SKIJORING – A winter sport in which a person wearing skis is drawn over snow or ice by a dog.

SLASH – The residue left on the ground after timber cutting or left after a storm, fire, or other event. Slash includes unused logs, uprooted stumps, broken or uprooted stems, branches, bark, among others.

SLUMP – A landslide where the underlying rock masses tilt back as they slide from a cliff or escarpment.

SMALL GAME – Birds and other small animals normally hunted or trapped.

SNAG – Includes standing dead or partially dead trees that are at least six inches in diameter at breast height (dbh) and 20 feet tall. (*see* Hard Snag and Soft Snag)

SNOWMOBILE – A motor vehicle that is designed exclusively for use over snow and that runs on a track or tracks and/or a ski or skis.

SOFT SNAG – Snags with wood, especially sapwood, in an advanced stage of decay.

SOIL COMPACTION – The reduction of soil volume. For instance, the weight of heavy equipment on soils can compact the soil and thereby change it in some ways, such as in its ability to absorb water.

SOIL PRODUCTIVITY – The inherent capacity of a soil to support the growth of specified plants, plant communities, or a sequence of plant communities. Soil productivity may be expressed in terms of volume or weight/unit are/year, percent plant cover, or other measures of biomass accumulation (FSM 2509.18, 2.05; Effective 9/3/91).

SOIL QUALITY – The capacity of the soil to function within ecosystem boundaries to sustain biological productivity, maintain or enhance water and air quality, and support human health and habitation.

SOUND WOOD – Timber that is in solid, whole, good condition. Sound wood is free from damage, decay, or defects.

SPECIAL AREA (SA) – National Forest System lands (except wilderness) that contain outstanding examples of plant and animal communities, geological features, scenic grandeur, or other special attributes. SAs can be designated by the Forest Service or by legislation. SAs are managed to emphasize recreational and other specific related values. Other uses are permitted within SAs to the extent that they are in harmony with the purpose for which the area was designated.

SPECIAL FOREST PRODUCTS – Products or natural resources that are not the traditional timber and fiber products. Examples include such products as floral greenery, Christmas trees and boughs, mushrooms, transplants (trees, shrubs or herbaceous plants), cones, medicinal plants, cuttings, herbs, fuelwood, tree sap, nuts, berries, lichen, fungi, decorative wood, and pitch.

SPECIAL USE AUTHORIZATION – An authorization issued to an individual or group by the USDA Forest Service for use of National Forest System land for a special purpose. Examples might be a Boy Scout Jamboree, a water system serving private land, or a bicycle race. Authorizations can be in the form of permits, easements, or leases.

SPECIES OF LOCAL INTEREST – Species having State, or local, importance. These may be species with declining populations, appearing on State lists but not Federal Threatened and Endangered or Eastern Region's Sensitive Species lists; they may be locally abundant species presenting extraordinary opportunities.

SPECIES VIABILITY EVALUATION (SVE) – A qualitative process for gathering information on species for which viability may be a concern now or during the next 10 to 20 years. The process includes identifying at-risk species, compiling literature and unpublished information on those species, and using that information to develop and analyze Forest Plan revision alternatives.

SPECTRUM – A specific linear program model designed for Forest Service planning.

STAND – A group of trees that occupies a specific area and is similar in species, age, and condition.

STANDARD – A required course of action, or level of attainment, that promotes the achievement of forest plan goals and objectives. Standards found in a forest plan impose limits on natural resource management activities, generally for environmental protection.

STATE HISTORIC PRESERVATION OFFICE(R) (SHPO) – The National Historic Preservation Act establishes an oversight role for this office/position vis-à-vis federal agencies operating within the states. Thus, the SHPO must concur with federal agency decisions which have the potential to affect NR-eligible properties (a.k.a. "significant Heritage Resources").

STEWARDSHIP – Caring for the land and its resources to pass healthy ecosystems to future generations.

STOCKING LEVEL – The number of trees in an area as compared to the desirable number of trees for best results, such as maximum wood production.

STRUCTURE – How the parts of ecosystems are arranged, both horizontally and vertically. Structure might reveal a pattern, mosaic, or total randomness of vegetation.

SUCCESSION – The sequence of changes in plant and animal communities on a site over time.

SUCCESSIONAL STAGE – *see* Seral

SUITABILITY – The appropriateness of certain resource management to an area of land. Suitability can be determined by environmental and economic analysis of management practices.

SUITABLE FOREST LAND – Forest land that constitutes the land base for determining the allowable sale quantity (ASQ) and is managed for timber production on a regulated basis.

SUMMER OFF-ROAD VEHICLE – All off-road vehicles except snowmobiles. (*see* Off-Road Vehicle)

SURFACE RESOURCES – Renewable resources that are on the surface of the earth, such as timber and forage, in contrast to ground water and minerals which are located beneath the surface.

SURFACE RIGHTS – Ownership of the surface of the land only; right to use the surface of the land.

SUSTAINABILITY (ecosystem sustainability) – The ability of an ecosystem to maintain its structure and function, and to remain resilient, in order to continue to support its biological diversity and productivity over time (*see also* Resilience).

SUSTAINABILITY (general) – The ability of an ecological, economic, and/or social system to maintain structure and function, and to remain resilient, in order to continue to support biological diversity (including humans and their social and economic organization) and system productivity over time.

SUSTAINABLE – The yield of a natural resource that can be produced continually at a given intensity of management is said to be sustainable.

SUSTAINED YIELD – The yield that a renewable resource can produce continuously at a given intensity of management.

[T]

TAKE – Take is defined in the Endangered Species Act as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect any threatened or endangered species. Harm may include significant habitat modification that kills or injures a listed species through impairment of essential behavior such as nesting or reproduction.

TARGET – A national forest's annual accomplishment goals for natural resource programs. Targets represent the commitment the Forest Service has to the Congress to accomplish the work that the Congress has funded and are often used as a measure of the Agency's performance.

TAXON (TAXA) – A group of organisms at any level of the taxonomic hierarchy. The major taxa are the species and genus and the higher taxa, including the family, order, class, phylum, and kingdom. Minor taxa include subspecies and varieties.

TEMPORARY OPENING – An opening created by silvicultural treatment (for example clearcut or shelterwood cut), or natural event for example wind throw, ice damage, pest outbreak), that is intended and allowed to be reoccupied by young trees. Temporary openings are dominated by tree seedlings and saplings and, with time, will grow into a wooded stand.

TEMPORARY ROAD – Road needed only for short-term use, such as by timber purchasers for access to a single timber sale.

THERMAL COVER – Cover used by animals against weather.

THINNING – Intermediate cutting made to stimulate the growth of the trees that remain and to increase the total yield of useful material from the stand (FSM 2470).

THREATENED SPECIES – Those plant or animal species likely to become endangered throughout all or a specific portion of their range within the foreseeable future as designated by the US Fish and Wildlife Service under the Endangered Species Act of 1973.

TIMBER CLASSIFICATION – The classification of forested lands into land management alternatives according to how the land relates to management of the timber resource there.

TIMBER STAND IMPROVEMENT (TSI) – Actions to improve growing conditions for trees in a stand, such as thinning, pruning, prescribed fire, or release cutting.

TRACTOR LOGGING – A logging method that uses tractors to carry or drag logs from the stump to a collection point.

TRAIL – A designated path or travelway of varying width which is maintained for varied recreational uses.

TRAIL VEHICLE – Vehicles designed for trail use, such as bicycles, snowmobiles, trail bikes, trail scooters, and all-terrain vehicles (ATVs).

TREATMENT AREA – The site-specific location of a resource improvement activity.

TREE IMPROVEMENT – The science of dealing with the causes of resemblances and differences among trees related by descent. It considers the effects of genes and the response to environmental factors.

TYPE CONVERSION – The conversion of the dominant vegetation in an area from forested to non-forested or from one species to another.

[U]

UNDERBURN – A burn by a surface fire that can consume ground vegetation and "ladder" fuels.

UNDERSTORY – The trees and woody shrubs growing beneath the overstory in a stand of trees.

UNEVEN-AGED SYSTEM – Silvicultural system involving manipulation of a forest to simultaneously maintain: a) continuous high-forest cover, b) recurring regeneration of desirable species, and c) orderly growth and development of trees through a range of diameter or age classes to provide a sustained yield of forest products. Cutting methods that develop and maintain uneven-aged stands are single-tree selection and group selection (FSM 2470).

UNREGULATED HARVEST – Tree harvest that is not part of the allowable sale quantity (ASQ). It can include the removal of cull or dead material or non-commercial species. It also includes volume removed from non-suitable areas for research, to meet objectives other than timber production (such as wildlife habitat improvement), or to improve administrative sites (such as campgrounds).

UNSUITABLE LANDS – Forest land that is not managed for timber production because (a) the land has been withdrawn by the Congress, the Secretary of Agriculture, or the Chief of the Forest Service; (b) the land is not producing or capable of producing crops of industrial wood; (c) technology is not available to prevent irreversible damage to soils, productivity, or watershed conditions; (d) there is no reasonable assurance that lands can be adequately restocked within 5 years after final harvest, based on existing technology and knowledge, as reflected in current research and experience; (e) there is at present, a lack of adequate information to respond to timber management activities; or (f) timber management is inconsistent with or not cost efficient in meeting the management requirements and multiple-use objectives specified in the Forest Plan.

UTILITY CORRIDOR – A linear tract of land of varying width, forming a passageway through which various commodities such as oil, gas, electronic intelligence, and electricity may be transported.

[V]

VARIETY CLASS – A way to classify landscapes according to their visual features. This system is based on the premise that landscapes with the greatest variety or diversity have the greatest potential for scenic value.

VEGETATION MANAGEMENT – Activities designed primarily to promote the health of forest vegetation for multiple-use purposes.

VEGETATION TYPE – A plant community with distinguishable characteristics.

VERNAL POOL – *see* Seasonal Pool

VERTICAL DIVERSITY – Stand diversity that results from different canopy layers or tiers of vegetation.

VIABLE POPULATION – A population that has the estimated numbers and distribution of reproductive individuals to ensure the continued existence of the species throughout its existing range within the planning area (FSM 2670.5).

VIEWER SENSITIVITY – Amount and expectation of viewers determined for all areas of the National Forest using the defined areas described below:

- High Viewer Sensitivity Locations: federal or State highways; Roads averaging at least 150 vehicles per day; Roads primarily providing access to highly sensitive recreation sites; National Scenic or National Recreation trails; Heavily used seasonal trails through areas with recognized scenic attractions; Riparian areas with heavy fishing, boating,

swimming, and other uses highly dependent on viewing scenery; Recreation and Education Special Areas; Ecological Special Areas with unique scenic features; Town centers or concentrations of residences; Developed recreation sites except for trailheads within moderately sensitive locations; Observation sites along highly sensitive travelways.

- Moderately sensitive locations do not qualify as highly sensitive but get more than twice as much use as general undeveloped areas that provide the same recreation opportunity. Moderately sensitive locations include the following areas: Roads and trails shown on National Forest recreation maps except those described as least sensitive; Concentrated use areas and observation sites along moderately sensitive travelways; Riparian areas receiving low to moderate use which is double that of adjacent undeveloped lands;
- Least sensitive locations are all areas not qualifying as having high or moderate sensitivity. They include: Travelways maintained primarily for non-recreation purposes such as timber access roads and utility line clearings; Areas where use primarily has little dependence on scenic viewing. Use examples include hunting or gathering of fuelwood and Christmas trees.

VISUAL CONDITIONS:

- Permanent – A visual condition is being maintained over time. Permanent alterations include but are not limited to: wetland and permanent upland openings, scenic vistas, parking areas, roads, trails, signs, ski facilities, towers, and other structures.
- Temporary – A visual condition is allowed to recover over time. Temporary alterations include but are not limited to: timber harvest.
- Enhancement – A visual condition is improved by increasing positive scenic attributes in the landscape.
- Rehabilitation – A visual condition is improved by removing existing visual impacts.

VISUAL QUALITY OBJECTIVE (VQO) – A desired level of excellence based on physical and sociological characteristics of an area. Refers to degree of acceptable alteration of the natural appearing landscape. The five levels of VQO are:

(1) Preservation – Alterations are caused by ecological changes only.
(2) Retention – Alterations made by people are not visually evident to the casual forest visitor
(3) Partial Retention – Alterations made by people must appear subordinate within the surrounding natural appearing landscape.
(4) Modification – Alterations may dominate the original surrounding landscape, but constructed facilities must be compatible with the landscape.
(5) Maximum Modification – Alterations dominate the original surrounding landscape to a high degree, and do not relate completely to natural appearing form, line, color, or texture.

VISUAL RESOURCE – A part of the landscape important for its scenic quality. It may include a composite of terrain, geologic features, or vegetation.

[W]

WATCH LIST – A list of plant and animal species that may be of concern to the Forest, but which do not meet criteria for inclusion in the Regional Forester's Sensitive Species list. These species could include those that are not known to occur now on the Forest although they may have historically been here; species that may not be of viability concern on the Forest but are rare or listed in the State; species that are exhibiting population trends that are starting to be of concern, but not to the point where viability on the Forest is at moderate or high risk; or species that are new to the Forest and have not yet been evaluated for viability.

WATERSHED – The entire region drained by a waterway or into a lake or reservoir. More specifically, a watershed is an area of land above a given point on a stream that contributes water to the streamflow at that point.

WATER TABLE – The upper surface of groundwater. Below it, the soil is saturated with water.

WATER YIELD – The runoff from a watershed, including groundwater outflow.

WETLAND – Those areas that under normal circumstances are inundated by surface or ground water with a frequency sufficient to support a prevalence of vegetation or aquatic life that requires saturated or seasonally-saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar area such as seeps, sloughs, potholes, wet meadows, river overflows, mud flats, and natural ponds (FSM 2527.05).

WETLAND OPENING – Includes open and shrub wetland areas dominated by mosses, herbaceous plants, and shrubs of varying heights. Trees are absent or sparse, generally representing less than 25 percent of the cover. Wetland openings on the GMNF include beaver meadow complexes, shrub swamps, open peatlands (including bogs and fens), marshes, sedge meadows, wet upland meadows, and wet shores. Most open wetlands on the GMNF are associated with rivers and are influenced by recent beaver activity; few are old and stable wetlands like peatlands. *see also* Wetland

WHOLE TREE LOGGING – The process of felling and transporting the trimmed bole in one piece to a landing. The bole is then separated into wood products at the landing that include sawlogs, pulpwood, firewood, and/or tops for wood chips.

WILD RIVER – Wild and Scenic Rivers Act Usage: congressionally designated rivers, or sections of rivers, that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted.

WILDERNESS – The Wilderness Act of 1964 defined a wilderness as an area of undeveloped federal land designated by the Congress that has the following characteristics: (1) It generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) It has outstanding opportunities for solitude or a primitive and unconfirmed type of recreation; (3) It has at least 5,000 acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) It may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value (Wilderness Act, Sec. 2(c)).

WILDLAND FIRE – Any non-structure fire, other than prescribed fire, that occurs in the wildland (Zimmerman 1998).

WILDLAND FIRE SUPPRESSION – An appropriate management response to wildland fire that results in curtailment of fire spread and eliminates all identified threats from the particular fire. All wildland fire suppression activities provide for firefighter and public safety as the highest consideration, but minimize loss of resource values, economic expenditures, and/or the use of critical firefighting resources (Zimmerman 1998).

WILDLAND FIRE USE – The management of naturally ignited wildland fires to accomplish specific pre-stated resource management objectives in predefined geographic areas outlined in Forest Fire Management Plans. Operational management is described in the Wildland Fire Implementation Plan. Wildland fire use is not to be confused with "fire use," which is a broader term that encompasses more than just wildland fires (Zimmerman 1998). (*see* Fire Use)

WILDLIFE HABITAT DIVERSITY – The distribution and abundance of different plant and animal communities and species within a specific area.

WINDTHROW – Trees uprooted by wind.

WIND TOWERS – Includes individual wind towers for wind energy testing and monitoring facilities (small individual site-specific meteorological towers and instrumentation facilities) as well as wind energy development projects (includes wind turbine facilities, as well as access roads, electrical and transmission facilities, and other support facilities).

WOOD FIBER PRODUCTION – The growing, tending, harvesting, and regeneration of harvestable trees.

WOODLAND PRODUCTS – Harvestable items from forests. These include fuelwood, posts, fruit, maple sap, and Christmas trees.

[Y]

YARDING – Moving the cut trees from where they fell to a centralized place (landing) for hauling away from the stand.

[Z]

ZONE OF INFLUENCE (ZOI) – The area influenced by Forest Service management activities.

8.1 INDEX

This index contains a list of a few key words used throughout the document. While not an exhaustive list, it is another tool for using this document. For each term, pages are listed on which either the term is used substantively or the topic is discussed substantively even though the term is not used. A range of pages may indicate a long discussion or separate uses of the term on each page.

Pages are identified by chapter and therefore do not include the chapter prefix before each number.

Air Quality: Chapter 2 Page (2-): 6; Chapter 3 Pages (3-): 6, 15, 21, 35-40, 243, 266

Bicycling: Chapter 2 Page (2-): 10; Chapter 3 Pages (3-): 189, 192, 193, 194, 198, 202

Campgrounds: Chapter 3 Pages (3-): 8, 189, 193, 198, 230, 255, 256, 260, 268, 270, 282, 301

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