Land and Resource Management Plan

Superior National Forest

Eastern Region
Milwaukee, Wisconsin
July 2004

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[O]ur actions demonstrate our commitment to sustainable development. Our success — and conservation in the 21st century — depend on making connections and investments every day across ownerships and boundaries. We are part of a much larger quest to achieve sustainable forest and resource management....

"Sustainability" is not just a slogan to the Forest Service.

- Dale Bosworth, USDA Forest Service Chief, *The Forest Service's Role in Fostering Sustainability*, speech to the Society of American Foresters, National Capital Chapter, Washington DC, May 29, 2001

Preface

The Land and Resource Management Plan (Forest Plan) establishes direction for natural resource management on the Superior National Forest. An environmental impact statement (EIS) accompanies the plan and describes the analysis used in developing the Forest Plan.

If any particular part of the plan or specific application of the plan is found to be invalid, the remainder of the plan and its application will not be affected.

For more information about the Forest Plan, please contact the Forest Supervisor at:

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Organization of the Forest Plan

The Forest Plan is organized into four chapters and four appendices.

Chapter 1 – Introduction. Discusses the general purpose of the Forest Plan, the Forest Plan revision process, the relationship of the Plan to other documents, and direction for implementing the Plan. This includes definitions of desired conditions, objectives, standards, and guidelines. Chapter 1 also describes how the Plan would be amended or revised in the future.

Chapter 2 – Forest-wide Management Direction. Presents management direction for the Forest as a whole. This chapter is organized by resource. First it describes Forest-wide desired conditions, objectives, standards, and guidelines. It then lists objectives for landscape ecosystems for forest type, age-class distribution, management indicator habitats, and within stand diversity.

Chapter 3 – Management Area Direction. Presents management direction for specific management areas. This chapter provides desired conditions, objectives, standards, and guidelines. This chapter also lists the management direction that is unique to the Boundary Waters Canoe Area Wilderness.

Chapter 4 – Monitoring and Evaluation. Presents a plan for monitoring and evaluating the effects of management practices.

Appendix A – Summary of the Analysis of the Management Situation. Summarizes ecological, social, and economic conditions on the Forest.

Appendix B – Minnesota National Forests ROS Mapping Criteria. Describes the characterizations of each Recreation Opportunity Spectrum (ROS) class.

Appendix C – Management Indicator Habitats. Lists the age groups and forest types that make up management indicator habitats.

Appendix D – Proposed and Probable Practices, Goods Produced, and Other Information. Displays an estimate of the goods and services provided, the proposed and probable management practices expected, and other information including land classification.

Appendix E – Canada Lynx. Provides information about managing Canada lynx.

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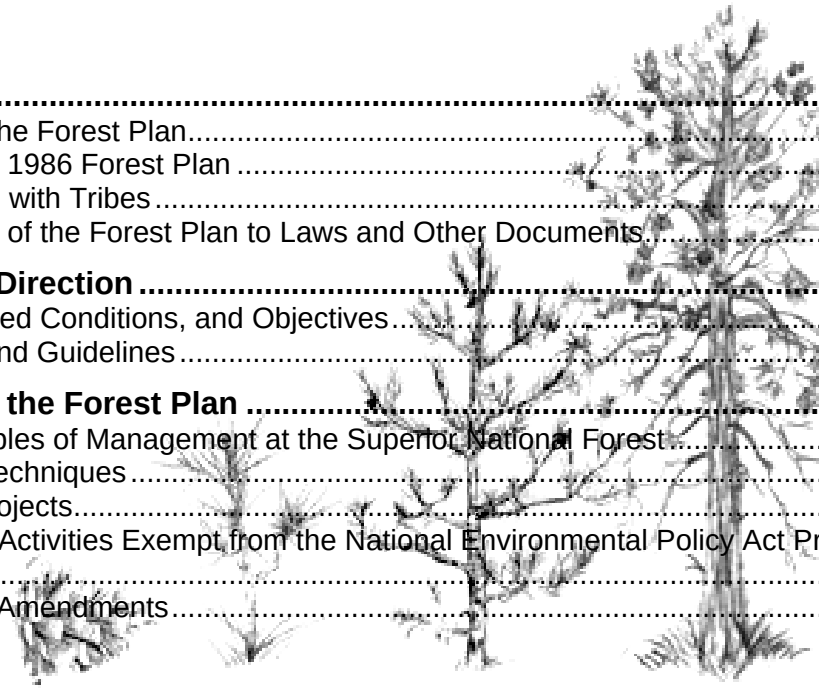

INTRODUCTION

Three million acres of land, water, rock, and trees cover the Superior National Forest, located in northeastern Minnesota's arrowhead region (Figure 1-1). The Forest spans 150 miles along the United States-Canadian border. This three-million-acre Forest is a rich and varied resource. The Forest provides pulpwood and sawtimber to the forest products industry. Visitors can find recreation opportunities year round, including travel in the Boundary Waters Canoe Area Wilderness.

Over 445,000 acres or 695 square miles of the Forest is surface water. In addition, more than 1,300 miles of cold water streams and 950 miles of warm water streams flow within the boundaries of the Superior National Forest, providing abundant fish habitat.

The northern forest community thrives with its pine, fir, and spruce trees and is home to numerous wildlife species including deer, moose, the gray wolf, and black bear. Northern Minnesota is home to Canada lynx and is one of the last strongholds of the gray wolf in the lower 48 States.

Purpose of the Forest Plan

The Forest Plan guides all natural resource management activities for the Superior National Forest. It describes desired resource conditions, resource management practices, levels of resource production and management, and the availability of suitable land for resource management. (Forest plans are also referred to as 'land and resource management plans'.)

The purpose of the Forest Plan is to provide management direction to ensure that ecosystems are capable of providing a sustainable flow of beneficial goods and services to the public. More specifically, it establishes:

- How the Forest should look if the Forest Plan is successfully implemented (Goals and Desired Conditions)
- Measurable, planned results that contribute to reaching the desired conditions (Objectives)
- Required action or resource status designed to meet the desired conditions and objectives (Standards)
- Preferable action used to reach desired conditions and objectives (Guidelines)
- Management direction that is applicable Forest-wide
- Management direction that is applicable only to specific management areas
- Management direction that is applicable only to specific landscape ecosystems
- Monitoring and evaluation requirements
- Designation of land as suitable or not suitable for timber production and other resource management activities

Land use determinations, standards, and guidelines constitute a statement of the Plan's management direction; however, the actual outputs, services, and rates of implementation are dependant on annual budgets from Congress.

Revising the 1986 Forest Plan

A Forest Plan for the Superior National Forest was issued in 1986. The National Forest Management Act regulations require that Forest Plans be revised every 10 to 15 years (36 CFR 219.10). In order to meet that requirement, the Superior National Forest teamed up with the Chippewa National Forest to revise their 1986 Forest Plans together. This Forest Plan is a result of that revision process.

The Chippewa and Superior National Forests did a joint environmental analysis and issued an environmental impact statement (EIS) together. However, there are two separate revised Forest Plans, one for each Forest.

The revised Forest Plan is based on the alternative that the Regional Forester selected in the *Record of Decision for Forest Plan Revision (2004)*. The

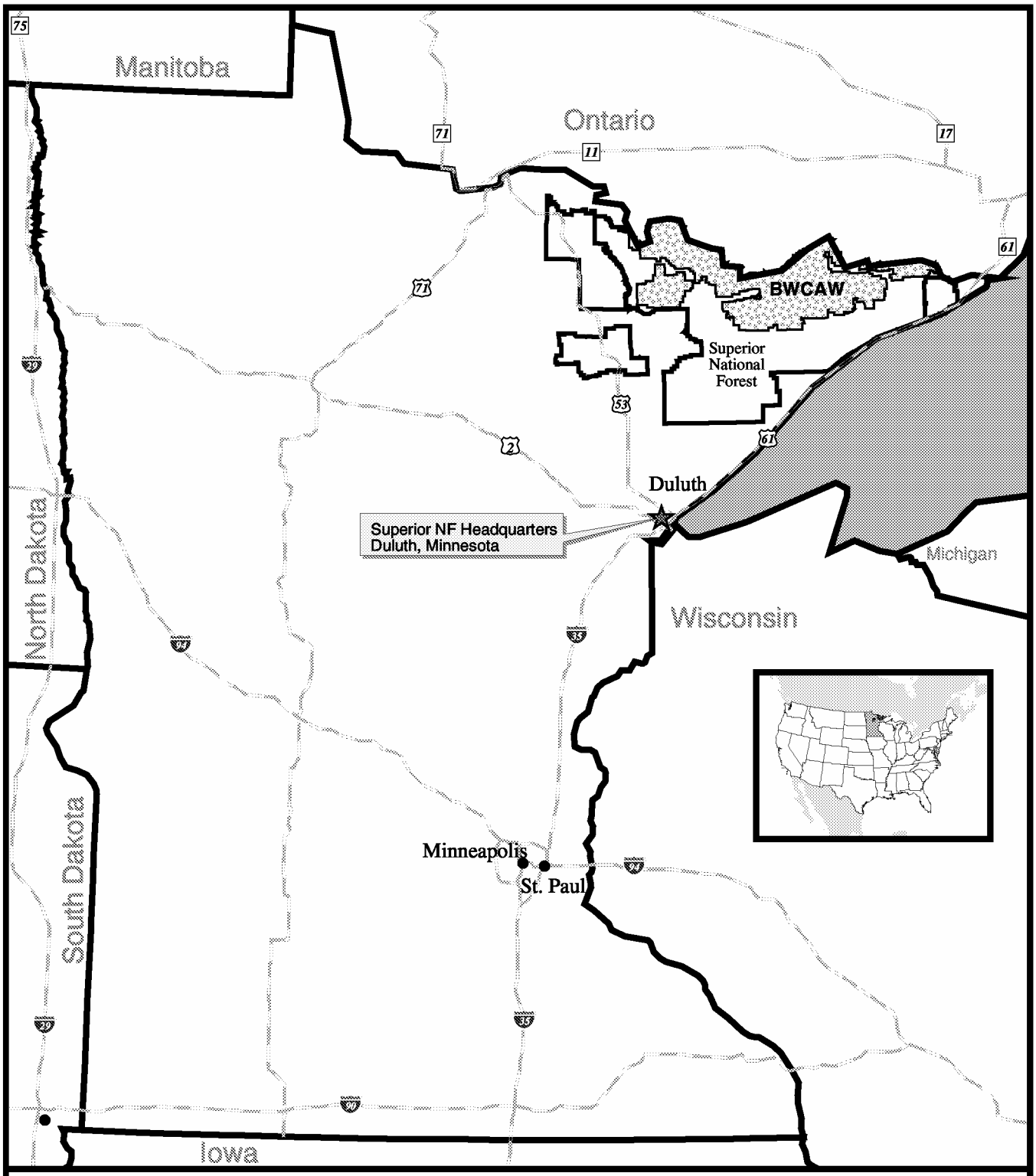

Figure 1-1 Area Map of the Superior National Forest

The Forest Service uses the most current and complete data available. Geographical Information System (GIS) data and product accuracy may vary from map to map. Data may be developed from sources of differing accuracy, accurate only at certain scales, based on modeling or interpretation other than those for which they were created, which may yield inaccurate or misleading results. The Forest Service reserves the right to correct, update, modify, or replace GIS products without notification. The Forest Service will not be liable for any activity involving this information.

The USDA Forest Service is an equal opportunity provider.

June, 2004

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Forest Plan Revision Team
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(218) 335-8600

Selected Alternative is described in Chapter 2 of the Final EIS (Section 2.4.5) and in the Record of Decision.

The revised Plan is a result of extensive analysis and considerations addressed in the accompanying Final EIS. The EIS refers to or describes the planning process and the analysis procedures used to develop the revised Plan. The EIS also describes other alternatives for the Forest Plan considered in the planning process.

The revised Forest Plan will completely replace the 1986 Forest Plan.

Forest Plan Revision in the Future

The Forest Supervisor is required to review conditions of the land at least every five years to determine if the Forest Plan needs to be revised. If monitoring and evaluation indicate that immediate changes are needed and these needed changes cannot be handled by amendment, then it would be necessary to revise the Plan. As stated earlier, the Plan will be revised at least every 15 years.

Forest Service Planning Rules

The 2004 Forest Plan revision process was conducted under the 1982 version of the Forest Service planning rules as stated in CFR §219. However, the Forest Service is developing a new set of planning rules that are not adopted yet. Subsequent revisions or amendments to the Plan will be developed under applicable planning rules

Consultation with Tribes

Beginning in the mid-19th century, the government of the United States made treaties with the Ojibwe that created reservations and ceded areas of land in northern Minnesota to the federal government. The treaties also preserved the right of the Ojibwe bands to hunt, fish, and gather within the treaty area. This guarantee is important in the context of natural resource management. The Superior National Forest has a role in maintaining these rights because it is an office of the federal government responsible for natural resource management on land subject to these treaties.

To ensure the rights of sovereign Tribal governments are fully respected, the President has directed agencies to operate within a government-to-government relationship; to consult with Tribal governments prior to taking actions affecting resources in which Tribal governments may have an interest; to assess the impact of plans, projects, and programs to assure that Tribal governments' rights and interests are considered; and, to remove any procedural impediments to working directly and effectively with Tribal governments.

The Forest Service has been involved in government-to-government consultation throughout the process of preparing the revised Forest Plan. Government-to-government consultation between the federal government and federally recognized American Indian Tribal governments acknowledges the sovereign status of these tribes. The Forest Service generally goes above and beyond consultation normally carried out during a public scoping process under the National Environmental Policy Act.

Government-to-government consultation is ongoing between the Forest Service and American Indian tribes and bands that were signatory to the La Pointe Treaty of 1854, including the Grand Portage Band of the Lake Superior Chippewa, the Bois Forte Band of the Lake Superior Chippewa, and the Fond du Lac Band of the Lake Superior Chippewa. These bands do not have reservation in-holdings on the Superior National Forest, but they do have treaty right interests in the Forest. This consultation supports Executive Order 13175 (November 6, 2000), which recognizes the sovereignty of federally recognized American Indian tribes and the special government-to-government relationship between the United States government and American Indian tribes.

Relationship of the Forest Plan to Laws and Other Documents

Organic Administration Act

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…"

Multiple-Use Sustained Yield Act

In this Act, Congress again 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 Forest Management Act

The National Forest Management Act 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 regulations also establish analytical and procedural requirements for developing, revising, and amending forest plans. The Forest Plan embodies the provisions of the National Forest Management Act and regulations on forest plan implementation.

National Environmental Policy Act

The National Environmental Policy Act 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 the revision process. The revised Forest Plan has been analyzed and the potential effects have been disclosed in the accompanying EIS. The Act may also require environmental analysis and disclosure for some site-specific actions implemented under the Plan.

Endangered Species Act

One of the purposes of the Endangered Species Act is to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved. The Act requires Federal agencies to carry out programs for the conservation of endangered and threatened species in consultation with the US Fish and Wildlife Service.

Minnesota Sustainable Forest Resources Act

In 1995, the Minnesota Legislature passed the Sustainable Forest Resources Act to ensure the sustainable management, use, and protection of the State's forest resources to achieve the State's economic, environmental, and social goals. The Act encourages collaboration, education, research, monitoring, and information management to emphasize the learning and coordination that is needed to sustain forests. The Act also established the Minnesota Forest Resources Council. The Council helps develop and implement initiatives from the Sustainable Forest Resources Act. The Council also advises the Governor and federal, State, and local governments on sustainable forest resource policies and practices. While not legally subject to Minnesota statute, both the Chippewa and Superior National Forests actively participate with the Council in developing and implementing the voluntary forest management and landscape guidelines. The Forests also coordinated with the Council to develop objectives for landscape ecosystems and will use, as a minimum, the Council's Voluntary Site-level Guidelines for forest management.

Boundary Waters Canoe Area Wilderness Act

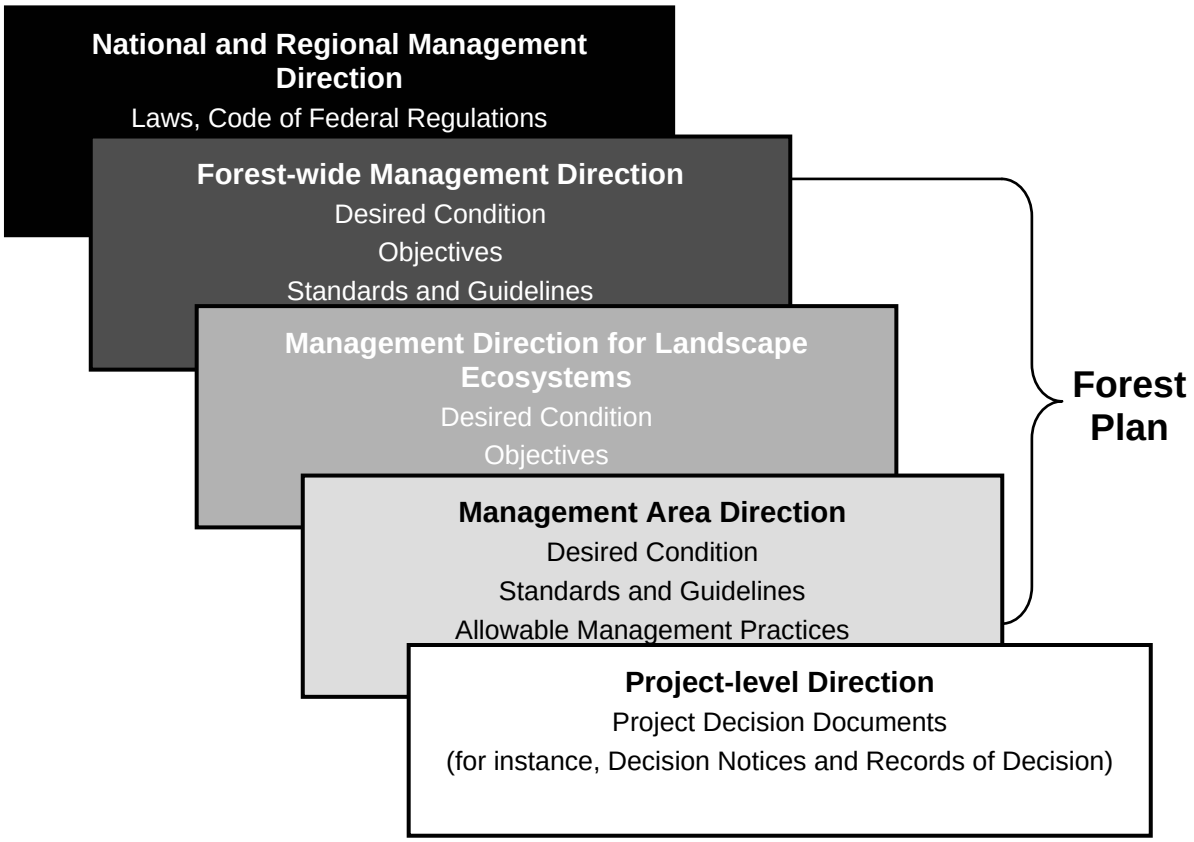
The 1964 Wilderness Act designated the Boundary Waters Canoe Area as a part of the National Wilderness Preservation System. The 1978 Boundary Waters Canoe Area Wilderness (BWCAW) Act added some acreage, eliminated much of the motorized watercraft use, essentially eliminated snowmobiling, and prohibited logging and mining federally-owned minerals. The legislation also directed the Forest Service to establish quotas for motorboat use.

The *BWCA Wilderness Management Plan and Implementation Schedule* (1993), an amendment to the 1986 Forest Plan, describes the management and uses that can occur in the BWCAW. The direction for BWCAW Management Areas is carried forward as it was in the amended 1986 Forest Plan. The direction in the *BWCA Wilderness Management Plan and Implementation Schedule* was also not changed in the revision process.

Forest Service Directives

Management direction in the Forest Service Directive System, including the Forest Service Manual (FSM)

Figure 1-2. Hierarchy of management direction for national forests



and the Forest Service Handbook (FSH), is part of forest management direction and is not repeated in the Forest Plan. Management direction also includes applicable laws, regulations and policies, although they may not be restated in the Forest Plan.

Direction for managing National Forest System land comes from a variety of levels. National and regional direction includes laws, executive orders, regulations, and Forest Service policy. Figure 1-2 illustrates the hierarchy of management direction beginning with national and regional direction at the highest level and ending with site- specific, project-level direction when the Forest Plan is implemented.

Superior NF Fire Management Plan

The *Fire Management Plan* provides information necessary to implement management direction for wildland and prescribed fire found in the Forest Plan. The *Fire Management Plan* provides an overview of the fire management programs on the Forest and serves as a reference document of operational procedures for Forest personnel. The Forest Plan does not repeat the information in the *Fire Plan*.

Wild and Scenic Rivers Act

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 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.

Minnesota Forest Resources Council Voluntary Site-level Guidelines

The Forest Service will implement the MFRC management guidelines when managing forest resources on the National Forest. These measures are described in *Sustaining Minnesota Forest Recourses: Voluntary site-level Management Guidelines*. Standards and guidelines in the Forest Plan are intended to provide equal or greater protection to the

resources addressed by the MFRC guidelines. Some of the Forest Plan standards and guidelines may:

- Provide direction or guidance not provided in the MFRC guidelines
- Give additional explanation or detail on how to implement the MFRC guidelines
- Provide direction that modifies the MFRC guidelines or
- Have an approach that differs from the MFRC guidelines in order to comply with law, regulation, or policy

A provision of the MFRC guidelines is that they may be modified if the modifications provide equal or greater benefits to resources. Individual MFRC guidelines will be implemented as guidelines for management on NFS land, unless they are restated as standards in the Forest Plan. In general, however, MFRC guidelines are not restated in the Forest Plan. Forest Plan standards and guidelines take precedence over the MFRC guidelines in any situation where management direction from these two sources appears to conflict.

Forest Service Memorandums of Understanding with Tribes

At this time (May 2004) there are Memorandums of Understanding (MOU) under consideration (Bois Forte, Fond du Lac, and Grand Portage and the Superior NF). These MOUs are written plans between the Forest Service and other parties for carrying out their separate activities in a coordinated and mutually beneficial manner and for documenting a framework for cooperation. The MOU speaks to cooperation and forming management partnerships between the Forest and Band. The Forest Plan directs implementation of the MOU by providing goals, objectives, standards and guidelines on consultation and interaction between the Forest and the Band.

MANAGEMENT DIRECTION

Management direction is guidance for managing resources and uses on National Forest System land. This direction has been developed for resources (for instance, wildlife and vegetation) on a Forest-wide basis and for management areas. Chapter 2 contains management direction that applies Forest-wide, and more specific direction for management areas is in Chapter 3.

Goals, desired conditions, and objectives often form the purpose and need for site-specific projects. Not every project will further each goal and objective, but those goals and objectives that are prescriptive in nature and apply to the project are not optional.

Some management direction refers to existing conditions. Existing conditions are the conditions found at the time of Forest Plan revision unless otherwise noted in the resource-specific or management area-specific direction.

Goals, Desired Conditions, and Objectives

Goals and desired conditions are broad statements that describe the situation that the Forest Service will strive to achieve. They are generally timeless and not measurable. Goals and desired conditions describe the ends to be achieved, rather than the means of doing so. They are a narrative description of the state of the land and resources expected when objectives and their associated standards and guides are fully met.

Goals and desired conditions are not absolutes. Their primary purpose is to be considered when planning management activities. Efforts will be made to move resources toward desired conditions or maintain the current condition (if the current condition is the desired condition).

In many cases, there will be short-term impediments to reaching desired conditions, such as the current state of the resource, but the long-term aim would be to reach the desired conditions. Some areas on the landscape may be far from the desired condition, while

other parts may be in the desired condition or have a greater likelihood of reaching it sooner.

Goals are broad statements of the Forest's overall purpose, while desired conditions describe what the Forest should look like in the future.

Objectives are measurable steps taken within a specified timeframe to move towards a desired condition. Objectives are generally achieved by implementing a site-level project or activity. However, objectives are not 'targets'. Targets for outputs are dependent upon budgets and may or may not reflect Forest Plan emphasis areas.

Forest-wide objectives have been developed for resources, such as water (see Chapter 2). Specific objectives were also developed for each landscape ecosystem (see Chapter 2) and for some management areas (see Chapter 3).

Standards and Guidelines

Standards and guidelines are the specific technical direction for managing resources. They provide another link in moving toward the desired conditions.

Standards and guidelines apply Forest-wide to National Forest System land, unless more specific management area direction is found in Chapter 3 of the Plan.

Only measures that are specific to the Superior National Forest are included in the standards and guidelines. Laws, regulations, and policies that apply to the entire National Forest System are not reiterated in the standards and guidelines. In addition, desired conditions and objectives that have a prescriptive component are not repeated in the standards and guidelines.

Standards are required limits to activities. These limitations help the Forest to reach the desired conditions and objectives. Standards also ensure compliance with laws, regulations, executive orders, and policy direction. Deviations from standards must be analyzed and documented in Forest Plan amendments.

Guidelines are preferable limits to management actions that may be followed to achieve desired conditions. Guidelines are generally expected to be carried out. They help the Forest to reach the desired conditions and objectives in a way that permits operational flexibility to respond to variations over time. Deviations from guidelines must be analyzed during project-level analysis and documented in a project decision document, but these deviations do not require a Forest Plan amendment.

IMPLEMENTING THE FOREST PLAN

The revised Forest Plan provides a framework and context that guides the Superior National Forest's day-to-day resource management operations (Figure 1-3). It is a strategic, programmatic document and does not make project-level decisions.

The National Forest Management Act requires that "permits, contracts and other instruments for use and occupancy" of National Forest System lands be "consistent" with the Forest Plan (16 U.S.C. 1640(i)). In the context of a Revised Plan, the National Forest Management Act specifically conditions this requirement in three ways:

1. These documents must be revised only "when necessary;"
2. These documents must be revised as "soon as practicable;"
3. Any revisions are "subject to valid existing rights."

Basic Principles of Management at the Superior National Forest

A set of fundamental principles guides management at the Superior National Forest. Direction in the Forest Plan adds to and qualifies these basic principles.

Principle 1

The Forest Service will follow laws and regulations as well as policies in Forest Service Manuals and Handbooks that relate to managing National Forest System land. In addition, numerous treaties and trust responsibilities, laws, regulations, and policies govern the use and protection of forest resources that may be of Tribal interest or covered under Tribal reserved rights. The Plan is designed to supplement, not replace, direction from these sources.

Principle 2

The Forest Service will coordinate management activities with the appropriate local, State, or Tribal governments as well as with other federal agencies.

Principle 3

The Forest Service will actively consult with Tribal governments and collaborate with interested organizations, groups, and individuals.

Principle 4

The Forest Service will manage the Superior National Forest for multiple uses. The Superior National Forest is open for any legal public activity or management action, unless specially restricted in law, policy, or the Forest Plan. While allowed, such activities and actions may require administrative review and authorization before they are implemented.

Tools and Techniques

The Forest will reach its desired conditions for vegetation through natural ecological processes and by using a diverse range of management tools and techniques.

To the extent practical, timber management will be used to emulate naturally occurring disturbances (fire and windstorms for instance). These management practices will include both even-aged and uneven-aged techniques. Clearcutting will continue to be used on the Forest when it is the optimal method to meet the objectives and requirements of the Forest Plan. The Forest will also use shelterwood, group selection, individual tree selection harvesting, and other harvest treatments to create or maintain multi-aged and uneven-aged stands.

Prescribed fire will be used alone or with silvicultural treatments to mimic the effects of natural fire. Management-ignited fire and lightning-caused fire will help maintain, enhance, and restore natural ecological processes on the Forest. Minimum Impact Management Tactics will generally be used in wildland fire suppression and prescribed fire application to reduce adverse fire suppression effects.

The Forest will promote re-growth of harvested or other disturbed forests with a variety of regeneration practices. This includes regenerating forests through tree planting, seeding, and natural regeneration. Some areas will naturally change through forest succession.

The Forest will also reach its desired conditions for human uses by using a diverse range of management tools and techniques. Environmentally sustainable management practices will provide commodity and non-commodity resources to contribute to the social and economic stability of local communities. Management practices to achieve this include prescribed fire, timber harvest, and traditional gathering activities.

The Forest will provide recreation opportunities in a multiple-use setting by using management tools such as the Scenery Management System and the Recreation Opportunity Spectrum.

Ecological functions of watersheds and riparian areas will be enhanced or restored through techniques such as reconstructing or improving road and trail crossings, decommissioning unneeded roads, or using silvicultural treatments or fire to enhance shade, coarse woody debris recruitment, or bank stability in riparian areas.

The Forest may create new roads and trails if needed for site-level projects or to respond to increased demand. The majority of these roads will be OML 1 and temporary. They will be closed to public

motorized use after they are not needed.

Site-level Projects

"Implementing the Forest Plan" means developing and implementing site-level forest management projects in order to reach the desired conditions established in the Forest Plan (Figure 1-3).

Project-level compliance with the National Forest Management Act is primarily concerned with consistency with the Plan and the Act's regulations.

Compliance with the National Environmental Policy Act involves the correct environmental analysis process for a specific proposal, proper documentation, and public disclosure of effects in an environmental assessment, environmental impact statement, or categorical exclusion. When necessary, the Forest will perform environmental analysis on site-level projects and activities. An analysis file or project file is available for public review, but it is not always necessary to document the analysis in the form of an environmental assessment or environmental impact statement.

Environmental analysis of site-level projects will use as its basis the data and evaluations in the Forest Plan and the EIS for the Forest Plan. Environmental analysis of site-level projects will be linked to the Final EIS accompanying the revised Plan.

The following are some examples of project-level decisions that may require additional environmental analyses and disclosure as the revised Forest Plan is carried out:

- Timber harvest
- Wildlife improvement projects
- Prescribed burn projects
- Watershed improvement or restoration projects
- Trail or road construction

Operational Activities Exempt from the National Environmental Policy Act Procedures

Resource inventories, action plans, and schedules do not require additional environmental analysis and disclosure at the project level.

The following are some examples of operational activities that do not constitute site-specific decisions and therefore are exempt from National Environmental Policy Act procedures:

- Developing five-year wildlife action plans
- Developing fire-situation reports
- Scheduling maintenance for developed recreation sites
- Preparing land ownership adjustment plans

Budgets

Annual Forest budget proposals are based on the activities and actions required to achieve the desired conditions and objectives of the Forest Plan. The Forest budgets are approved on an annual basis by Congress.

The National Forest System appropriation from Congress provides funds for stewardship and management of all 192 million acres of federal land and the natural ecosystems on that land across the country. These appropriated funds are key for translating the desired conditions and objectives stated in the Forest Plan to on-the-ground results.

Upon receipt of the final budget, the Forest annually prepares an implementation budget. This budget is a result of program development, annual work planning, and monitoring processes. These processes supplement the Forest Plan and make the annual adjustments and changes needed to reflect current priorities within the overall management direction contained in the Plan. Therefore, the funding distribution between program components and the intensity or level of activities in those programs is a reflection of the Plan as well as the will of Congress. The final determining factor in carrying out the intent of the Forest Plan is the level of funding, which dictates the rate of implementation of the Plan.

Forest Plan Amendments

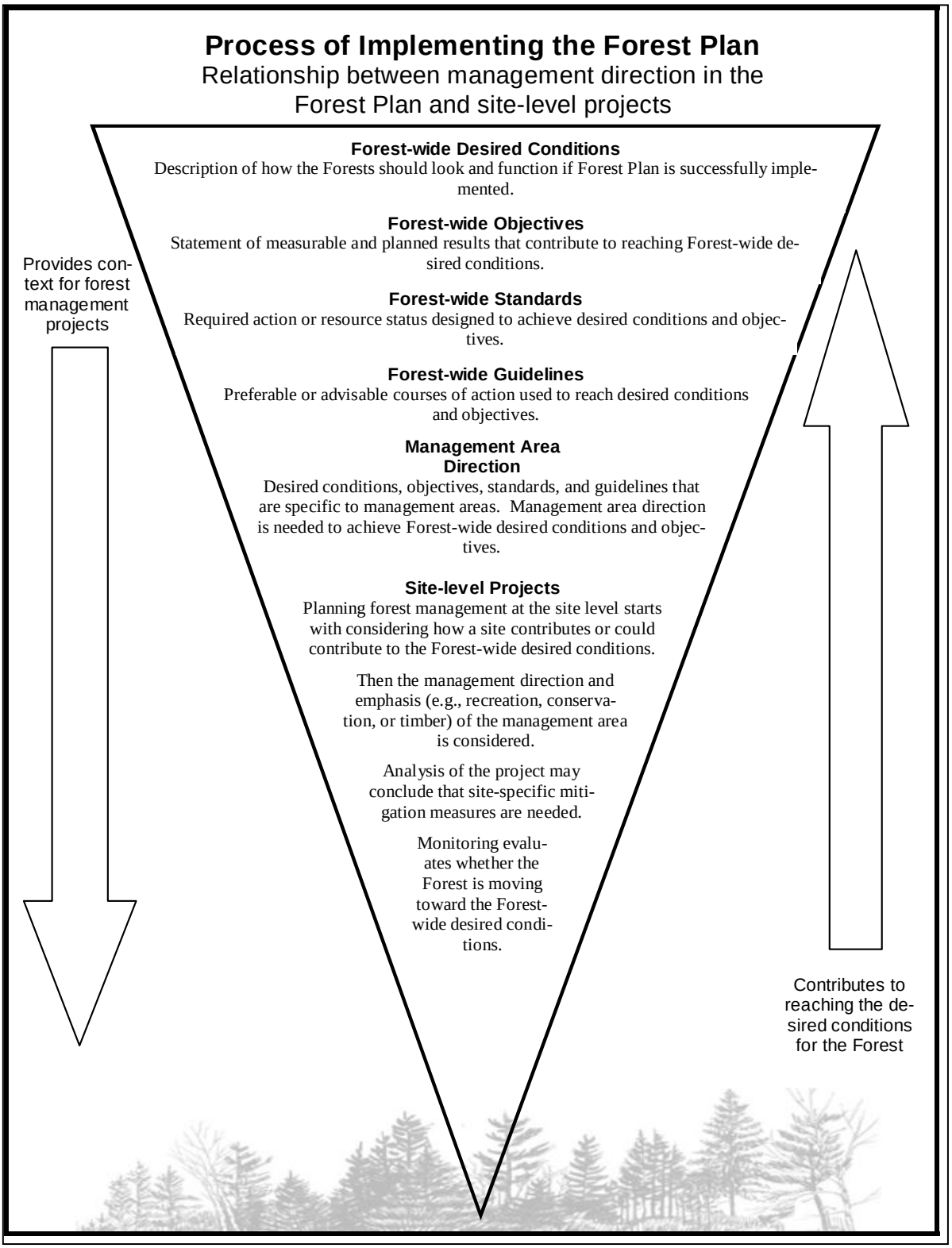
Most proposed activities will be consistent with direction in the Forest Plan. When necessary management actions are found to be inconsistent with Plan direction or site-specific analysis shows an error in the Plan, the Plan or the proposal must be adjusted according to the analysis. Adjusting the Plan would require an amendment.

The need to amend management direction may result from:

- Changes in physical, biological, social, or economic conditions
- Recommendations of an interdisciplinary team based on the results of monitoring and evaluation
- Determination by the Forest Supervisor that existing or proposed projects, permits, contracts, cooperative agreements, or other instruments authorizing occupancy and use are appropriate, but not consistent with elements of the Forest Plan management direction
- Errors in planning found during implementation. Conflicts may be identified between different sections of management direction, for instance there could be discrepancies in the selected alternative map and the narrative description of the selected alternative. The Forest Plan does not prioritize management direction, therefore a discrepancy would need to be resolved by determining the management intent using a variety of information, such as the planning record, EIS, and the revised Forest Plan. Minor technical errors may be corrected via errata and may not require a Plan amendment.

The Forest Supervisor will determine whether proposed changes to the Forest Plan are significant or non-significant. ("Significance", as used here, is defined by the National Forest Management Act regulations and is different than significance as used under the National Environmental Policy Act.)

Figure 1-3. Process of implementing the Forest Plan: relationship between management direction in the Forest Plan and site-level projects



Chapter 2 Forest-wide Management Direction

Introduction

Chapters 2 and 3 present management direction for the Forest that will guide Forest managers in reaching desired outcomes. The management direction in Chapter 2 is broad and applies everywhere on the Forest; whereas Chapter 3 presents management direction for specific management areas that reflects the variety of different uses and resources in the management areas.

Direction for management areas is typically more specific than Forest-wide direction. When planning a site-level project, managers will first consult the Forest-wide direction and then determine if there is more specific direction for the management area.

Forest-wide management direction describes goals, desired conditions, objectives, standards, and guidelines for the major resource program areas on the Forest. Programs are arranged according to the ecosystem management framework, beginning with physical resources and then moving through biological, social, and economic resources.

The standards and guidelines do not repeat management direction found in laws, regulations, Forest Service Handbook, Forest Service Manual, or other policies. The Forest Service will follow applicable laws, including the following:

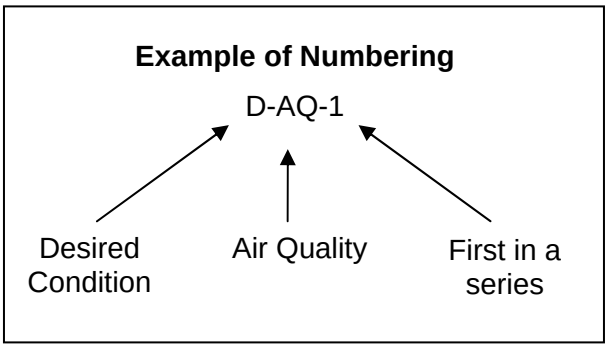
- National Environmental Policy Act
- National Forest Management Act
- Multiple-use Sustained Yield Act
- Organic Administration Act
- Alaska National Interest Lands Conservation Act
- Native American Graves Protection and Repatriation Act
- Endangered Species Act
- Freedom of Information Act
- Archeological Resources Protection Act
- National Historic Preservation Act
- Wild and Scenic Rivers Act
- Federal Land Policy and Management Act
- Clean Water Act
- Federal Clean Air Act
- Shipstead-Newton-Nolan Act

In addition to the standards and guidelines, the Forest will also do the following to reach the desired conditions:

- Assess natural resource and social conditions with monitoring and evaluation
- Provide employees with training on up to date management practices and with scientific knowledge and technologies
- Collaborate with landowners, other land managers, and the public
- Develop strategies to address specific resource concerns

Key to Numbering

D	Desired Condition
O	Objectives
S	Standard
G	Guideline
AQ	Air Quality
CM	Cooperative Management
FW	Forest-wide
HR	Heritage Resources
ID	Insects, Diseases, and Disturbance Processes
LA	Land Adjustment
MN	Minerals
PH	Public Health and Hazardous Materials
REC	Recreation
RMV	Recreation Motor Vehicles
RTL	Trails
RWA	Water Access
SC	Scenic Resources
SE	Social and Economic Stability
SU	Special Uses
TM	Timber Management
TR	Tribal Rights and Interests
TS	Transportation Systems
VG	Vegetation Management
WL	Terrestrial and Aquatic Wildlife
WS	Watershed Health, Riparian Areas, and Soil Resources



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FOREST-WIDE GOALS

Through forest management and planning, The Forest Service will strive to achieve the following goals:

- Promote ecosystem health and conservation using a collaborative approach to sustain the nation's forests and watersheds.
- Protect, and where appropriate, restore soil, air, and water resources.
- Provide for a variety of life by managing biologically diverse ecosystems.
- Provide for sustained forest product uses in an environmentally acceptable manner.
- Provide forest settings and natural resources that enhance social and economic benefits at local, regional, and national levels.
- Provide a variety of uses, values, products, and services for present and future generations by managing within the capability of sustainable ecosystems.
- Provide management direction that enhances social and economic benefits for individuals and communities:
  - Emphasize scenic quality in areas of high interest to people
  - Emphasize a variety of forest settings that provide for a spectrum of social opportunities and benefits for people
  - Maintain a road and trail system that provides opportunities for people to access the National Forest
  - Contribute to local, regional, and national economies by providing natural resources in a socially and environmentally acceptable manner
  - Contribute to efforts to sustain the American Indian way of life, cultural integrity, social cohesion, and economic well-being.
- Develop and use the best scientific information available to deliver technical and community assistance and to support ecological, economic, and social sustainability.

Forest Service Mission

To sustain the health, diversity, and productivity of the nation's forests and grasslands to meet the needs of present and future generations.

FOREST-WIDE DESIRED CONDITIONS, OBJECTIVES, STANDARDS, AND GUIDELINES

Cooperative Management

Desired Condition

D-CM-1 The Forest works cooperatively with other landowners and land managers to protect, enhance, and restore physical and biological resources as well as social and economic values. Cooperative management includes tribal, State, county, local governments as well as other federal agencies.

Key cooperators include the following:

- Grand Portage Band of Chippewa Indians
- Fond du Lac Band of Lake Superior Chippewa
- Bois Forte (Nett Lake) Band of Chippewa
- Minnesota Department of Natural Resources
- Cook County
- Koochiching County
- Lake County
- St. Louis County
- US Fish and Wildlife Service
- North Central Forest Experiment Station
- University of Minnesota
- Voyageurs National Park
- Ontario Ministry of Natural Resources
- Minnesota Forest Resources Council
- Regional partners with the Lake Superior Lakewide Management Plan and Great Lakes Ecological Assessment
- Minnesota Department of Transportation
- The Nature Conservancy
- State Historical Preservation Office and the Advisory Council on Historic Preservation
- Private Landowners
- Environmental Protection Agency
- Special Interest Groups (e.g., timber industry, conservation organizations, etc…)

All Resources

Consistency with Minnesota Forest Resources Council (MFRC) Voluntary Site-level Guidelines

G-FW-1 The Forest Service will implement the MFRC management guidelines when managing forest resources on the National Forest. These measures are described in *Sustaining Minnesota Forest Resources: Voluntary site-level Management Guidelines*.

Standards and guidelines in the Forest Plan are intended to provide equal or greater protection to the resources addressed by the MFRC guidelines. Some of the Forest Plan standards and guidelines may:

- Provide direction or guidance not provided in the MFRC guidelines
- Give additional explanation or detail on how to implement the MFRC guidelines
- Provide direction that modifies the MFRC guidelines or
- Have an approach that differs from the MFRC guidelines in order to achieve compliance with law, regulation, or policy

A provision of the MFRC guidelines is that they may be modified if the modifications provide equal or greater benefits to resources.

Individual MFRC guidelines will be implemented as guidelines for management on NFS land, unless they are restated as standards in this Forest Plan. In general, however, MFRC guidelines are not restated in this Forest Plan.

Forest Plan standards and guidelines take precedence over the MFRC guidelines in any situation where management direction from these two sources appears to conflict.

Listed below are examples of resource areas where the Forest Plan standards and guidelines differ from MFRC guidelines.

Cultural Resources - The MFRC guidelines recognize that specific requirements pertaining to the protection and management of cultural (heritage) resources differ depending upon land ownership, project funding sources, and the jurisdiction of the project licensing or permitting authority. While the guidance provided by the MFRC guidelines includes some discussion of federal cultural resource management, the specific direction that the Forest Service must adhere to is in federal law, regulation, and policy. In following federal direction, the Forest Service meets and goes beyond the MFRC guidelines pertaining to cultural resource protection.

Visual Quality – The Forest Service will use the Scenery Management System (SMS) rather than the MFRC Visual Quality Guidelines to manage scenic resources on the National Forests. The SMS is a system that was developed by the Forest Service and is used on National Forests across the country. It has been specifically adapted in this Forest Plan for use in northern Minnesota. The MFRC Visual Quality Best Management Practices are generally consistent with the SMS, although differences do exist in terminology, processes, and scale and range of application.

Forest Soil Productivity - MFRC guidelines that provide general recommendations for the protection of soil productivity will generally be followed. As recommended in Part 2 of *Sustaining Minnesota Forest Resources: Voluntary site-level Management Guidelines* (page 7 of the Forest Soil Productivity section), it is very important that managers evaluate soil conditions on the sites they manage. The Forest Service has developed detailed inventories and associated interpretations of soils on National Forest System (NFS) land. This site-specific information has enabled the Forest Service to refine or tailor management direction to help ensure the productive capacities of sites on NFS land are not reduced due to forest management. In some cases, the detailed information has resulted in management direction that is more specific than the general direction provided in the MFRC guidelines. An example of such direction

in the Forest Plan are guidelines limiting management activities based on specific mapping units of the Forest's terrestrial ecological unit inventory.

Riparian Area, Water Quality, and Wetland Protection - Direction in the Forest Plan is based on the desire to both protect and enhance the same riparian area ecological functions and aquatic/terrestrial linkages discussed in Part 2 of the MFRC guidelines (pages 5 and 6 of the Riparian Area section). Riparian management direction in the Forest Plan not only reflects the intent of the MFRC site-level mitigative guidelines but goes beyond that to enhance or restore ecological functions in all riparian areas. Facets of the Forest Plan that differ from specific MFRC guidelines for riparian management are a matter of approach rather than substance or intent. Some key examples of these differences are:

1. The approach to riparian management in this Forest Plan is based on identifying site-specific boundaries of functional riparian areas along lakes, streams, and open water wetlands. Wide functional riparian areas are subdivided into two Riparian Management Zones (RMZs). The zone nearest the lake or stream is called the "near-bank" zone; the zone further removed from the lake or stream is called the "remainder" zone.

   Forest Plan management direction provided for "near-bank" RMZs is to actively manage vegetation for the primary purpose of enhancing or restoring the functional linkage between aquatic and terrestrial ecosystems, and to favor long-lived site-suitable tree species; "remainder" RMZs are to be managed for extended rotations of site-suitable tree species. This differs from current MFRC Guidelines which employ a single-tier RMZ and are designed to mitigate impacts on riparian areas from management activities which are not necessarily focused on riparian function.

2. To protect against excessive in-channel sediment generation in streams, direction is provided in the Forest Plan to cap, at 60%, the combined acreage of upland open land and young (<age 16) forest at the 6th level (12-digit Hydrologic Unit Code) watershed (landscape) scale. Direction is also provided to increase the amount of forest greater than age 15 in any 6th level watershed where the combined acreage of upland open land and young (<age 16) forest is currently more than 60% of the total watershed area. This differs from current MFRC Guidelines which include no direction addressing the watershed (landscape) scale.

Physical & Biological Resources

-

Air Quality and Smoke Management (AQ)

Desired Conditions

D-AQ-1 Air on the Forest is of high quality so that:

- Ecosystems are not impaired by stressors originating in the air (for example, acid deposition, direct injury to vegetation by air pollutants, detrimental changes to soil chemistry and mercury contamination of fish).
- The health of visitors, residents, and employees is not impaired.
- Visibility does not impair scenic quality.
- Other air quality related values are not adversely affected

D-AQ-2 New and modified industrial facilities do not degrade Forest resources or uses.

D-AQ-3 Air emissions resulting from National Forest management actions do not degrade natural resources or uses of the Forest.

Objectives

O-AQ-1 Maintain the ambient air on the Forest within the National Ambient Air Quality Standards and the Minnesota Ambient Air Quality Standards.

Standards & Guidelines

S-AQ-1 Prescribed burning activities on the National Forest will only be conducted if they comply with requirements of the most current Minnesota Smoke Management Plan.

Minerals (MN)

Desired Condition

D-MN-1 Exploration and development of mineral and mineral material resources is allowed on National Forest System land, except for federally owned minerals in designated wilderness (BWCAW) and the Mining Protection Area (MPA).

D-MN-2 Ensure that exploring, developing, and producing mineral resources are conducted in an environmentally sound manner so that they may contribute to economic growth and national defense.

Standards & Guidelines

Federal Minerals

Outside the BWCAW and Mining Protection Area (MPA)

S-MN-1 No permit is required for nondestructive exploration of federal minerals such as geologic mapping, geochemical studies, or geophysical surveys where timber cutting does not occur.

S-MN-2 The removal of more than 5,000 cubic yards of mineral materials per year from any source requires an approved development and reclamation plan.

Inside the BWCAW

S-MN-3 No permit, lease, or other authorization will be issued for the exploration of or mining of minerals owned by the United States.

S-MN-4 No permit is required for nondestructive activities, such as, geologic mapping, geochemical studies, or geophysical surveys where disturbance is minimal.

S-MN-5 No permit will be issued for mining federal peat and marl deposits.

Inside the MPA

S-MN-6 No permit, lease, or other authorization will be issued for the exploration of, or mining of minerals owned by the United States.

S-MN-7 No permit is required for nondestructive

activities, such as, geologic mapping, geochemical studies, or geophysical surveys where disturbance is minimal.

S-MN-8 No permit will be issued for mining federal peat and marl deposits.

S-MN-9 The Forest Service will provide sand and gravel for public and private use.

Non-federal Minerals

Outside the BWCAW and MPA

S-MN-10 The use of National Forest System land for exploration and development of non-federal mineral rights will be governed by the reserved or outstanding rights indicated in the chain of title.

S-MN-11 A permit is not required for occupancy of federal surface for exploration or development of the underlying mineral estate unless the chain of title indicates one is appropriate.

S-MN-12 The protection of federal surface will be accomplished through negotiating with the mineral owner or operator and implementing applicable State and federal Laws.

S-MN-13 Where a federal permit is required, mitigation measures and management requirements will be established to minimize and mitigate adverse environmental effects.

G-MN-1 Land disturbed by mineral development activities or facilities will generally be reclaimed as soon as practical. Reclamation work will generally reflect the landscape character and processes of the surrounding landscape. Reclamation measures will generally be implemented so that the mining project areas would meet the pre-project SIO as soon as practical.

Watershed Health, Riparian Areas, and Soil Resources (WS)

Desired Conditions

D-WS-1 Watersheds and their components:

a. Are part of healthy ecosystems that meet the needs of current and future generations
b. Provide for State, tribal, and local beneficial uses
c. Are protected or enhanced to provide for unique plant and animal communities, special habitat features, habitat linkages, wildlife corridors, aquatic ecosystems and riparian ecosystems.

D-WS-2 Water-related recreational, subsistence and commercial uses (such as access for powered or non-powered watercraft; opportunities and access for activities such as fishing, swimming, camping, wild rice harvesting, and aesthetics) are provided for within the limits of aquatic ecosystem capability.

D-WS-3 Watersheds and soils are maintained or restored in a way that allows for the conservation of the genetic integrity of native species. Physical properties of soils are maintained and enhanced. Watershed and habitat restoration projects are natural appearing and favor the use of native materials or naturalized species to the extent practical.

D-WS-4 Management activities do not reduce existing quality of surface or groundwater or impair designated uses of surface and ground water.

D-WS-5 Water quality, altered stream flow, and channel stability do not limit aquatic biota or associated recreational uses. Water in lakes, streams, and wetlands meets or exceeds State water quality requirements.

D-WS-6 Watersheds provide an appropriate quantity, quality, and timing of water flow. Stream channels and lakeshores are stable. Stream temperatures are maintained within their natural range and are not increased by lack of shading or because of channel instability. Stream

channels, including those in wetlands, are able to transport water and sediment without changing their pattern, dimension, and profile. Sensitive stream types are protected and improved. Management activities protect or promote quality of habitats that occur in the riffle areas of streams, improving stable channel characteristics.

D-WS-7 The physical integrity and hydrologic connectivity of pool depressions in seasonal ponds is maintained to assure seasonal retention of water.

D-WS-8 Hydrologic connectivity of aquatic ecosystems and wetlands is maintained or restored to assure passage of water, sediment, nutrients, wood, invertebrates, and fish and to facilitate freshwater mussel dispersal. The number of impoundments is minimized. Waters affected by dams are managed as much as practical to mimic natural lake levels and seasonal flows. Stream flows and lake levels on waters not affected by dams are suitable to protect habitat and maintain natural hydrologic processes.

D-WS-9 Fine sediment from management activities does not adversely affect lake, stream, and wetland habitats. Macro-invertebrates are represented in the approximate proportion expected for high quality waters. Fish habitats are in good to excellent condition and are spatially distributed and connected to allow stable populations of fish, reptiles, and amphibians to persist within their natural ranges. Natural reproduction of fish is not limited by habitat condition.

D-WS-10 Riparian areas serve as landscape connectors. Riparian areas, habitats, and associated vegetative communities are diverse in composition and structure and support native and desired non-native wildlife and plant species appropriate to site, soil, and hydrologic characteristics. Plants are present at a variety of ages and sizes and at densities adequate to provide bank stability. Where suitable to the site, a multi-layered forest canopy is present in the riparian area, providing shade, leaf-litter, and coarse woody debris to lakes, streams, and wetlands. Some of these sites have an overstory of conifer that provides shade for aquatic and wetland ecosystems and thermal cover for wildlife. Super canopy trees provide nest sites for riparian associated species. Openings in riparian area vegetation resulting from road crossings, trails, campsites, water access, or other recreational uses, occur infrequently and result in minimal alterations of riparian ecological function.

D-WS-11 Riparian ecosystems filter runoff. Some of the mature and decadent trees from riparian ecosystems have fallen into lakes, streams, and wetlands, providing bank stability and habitat complexity. Other mature and decadent trees are retained in the riparian ecosystem, providing habitat for amphibians and other species and a reservoir of large wood to supply aquatic and wetland systems.

D-WS-12 Soils recover from natural disturbance events and absorb the effects of human disturbances without reducing productivity and function. Soils contribute to ecosystem sustainability. Soil-hydrologic function and productivity is protected, preserving the ability to serve as a filter for good water quality and regulation of nutrient cycling. Soil exposure is minimized. There is minimal compaction, displacement, and puddling. Severely burned conditions resulting from management-ignited fire occur infrequently.

D-WS-13 Floodplains have little or no new facility development. Floodplains are able to store and transmit floodwaters, fulfill their natural role in regulating water quality, and present minimum risk to human safety and property.

D-WS-14 Aquatic and terrestrial resource issues are addressed using a collaborative watershed-based approach. The ecological composition, structure, and function of individual lakes, streams, wetlands, upland and lowland soil and the watersheds and landscapes in which they are nested, is understood and routinely used as a source of information.

Objectives

O-WS-1 Improve and protect watershed conditions to provide the water quality, water quantity, and soil productivity necessary to support ecological functions and intended beneficial water uses.

O-WS-2 Restore ecological integrity on all or parts of one or two of the Forest's fifth level watersheds per year by:

- Enhancing or re-establishing the natural ecological process and diversity of riparian areas (aquatic ecosystems, riparian ecosystems, and wetlands) on National Forest System land.
- Improving road and trail crossings of streams and wetlands to assure soil stability, unimpeded flow, sediment transport, and/or passage of fish.
- Characterizing the ecological composition, structure function, and patterns of individual lakes, streams, wetlands, upland and lowland soil (terrestrial ecological classification units) and the watersheds and landscapes in which they are nested.

O-WS-3 Within "near-bank" riparian management zones, as part of all actions involving vegetation management, favor management for long-lived tree species (such as white pine, red pine, black spruce, tamarack, etc.) suitable for the site, at stand densities suitable for the site.

O-WS-4 Within "near-bank" riparian management zones, increase the basal area in situations where basal area is less than 60 sq. ft./acre and the site is capable of supporting a higher basal area.

O-WS-5 Within "remainder" riparian management zones, as part of all actions involving vegetation management, favor management for extended rotation of tree species (either long- or short-lived) suitable for the site.

O-WS-6 Reconstruct an average of one-half to three miles of stream channel per year, based on principles of stream geomorphology, to enable the flow of water and sediment to occur without resulting in a change in stream pattern, dimension, and profile.

O-WS-7 Decrease the Forest's contribution of non-point water pollutants to all watersheds or water bodies for which a Total Maximum Daily Load has been determined.

O-WS-8 Increase the amount of forest cover that is age 16 or older on NFS land in sixth level watersheds where the total (all ownerships) combined acreage in upland open plus upland young (<age 16) forest is above or approaching 60% of the total watershed area.

O-WS-9 Protect and restore areas where soils are adversely impaired and contributing to an overall decline in watershed condition, soil productivity, soil quality, and soil function. Do this by using management practices, inventory and monitoring results, and findings from the inventory of ecological units.

O-WS-10 During all management actions involving soil disturbance:

- Maintain adequate ground cover and soil organic layers, both during and after treatment, to minimize erosion (including rill and gully formation) and allow water to infiltrate the soil.
- Minimize soil displacement, nutrient loss, and effects of severe burning.
- Restore and re-vegetate disturbed areas.
- Provide for the maintenance of physical, chemical and biological properties of the forest floor (soil organic matter, surface O layer) that make soil productive.
- Protect soil-hydrologic functions by minimizing rutting, puddling, and compaction.

At the project level, this objective does not apply to the portions of disturbed areas that, by design, are converted long term or permanently to a non-productive condition (such as gravel pits or the actual compacted or paved surfaces of all season roads or trails, parking lots, or water

access ramps).

Standards & Guidelines

Watershed Health

S-WS-1 Management actions on NFS land will not increase the total (all ownerships) acreage of upland young forest (<16 years), and upland openings to the point where the combined acreage exceeds 60% of the total area of any 6th level watershed. Upland openings include permanent openings, roads and associated clearings, parking lots, cropland, pastures, borrow pits, utility rights of way, town sites, homes and yards, and upland brush, and grass. In 6th level watersheds that already exceed the 60% threshold, no action on NFS land will be taken that causes a net whole watershed increase of more than 1% in open and young forest conditions.

S-WS-2 Excavated soil material, construction debris, spoils or debris from dredging projects, and debris and soil moved from upland sites during timber management activity (such as timber harvest, shearing or brush raking) will be deposited or spread out in upland locations. Stabilize soil deposited in this manner with vegetation.

S-WS-3 Salvage and reuse topsoil for site rehabilitation during construction projects or other land use activities. When topsoil is unsuitable for reuse, other methods or tools such as sodding, hydro-seeding, fertilization, or erosion-resistant matting may be used to help rehabilitate disturbed areas.

G-WS-1 Restore eroded sites, generally employing natural-appearing stabilization materials. Native species will be used in the restoration of vegetative cover. Non-native annuals may be used as nurse crops to obtain rapid stabilization while slower-growing native species are becoming established.

G-WS-2 Project-level planning for activities that have the potential to increase water pollution from non-point sources within 6th level watersheds contributing to impaired (Federal Clean Water Act Section 303(d)-listed) waters listed because of conventional pollutants will include:

a) Documentation that the project is located within a watershed that contributes runoff to an impaired water body, and

b) A documented plan for how Best Management Practices will be implemented, monitored and evaluated (for watersheds and pollutants where Total Maximum Daily Loads (TMDLs) have not been established), or

c) A description of how the project complies with the NFS share of pollution reduction goals (for watersheds and pollutants which have established TMDLs).

For Riparian Areas as a Whole (Both the Aquatic and Non-aquatic Portions)

S-WS-4 Water quality Best Management Practices, which are represented by some of the MN Forest Resources Council (MFRC) Voluntary Site Level Forest Management Guidelines, will be implemented as standards on NFS land.

Refer to guideline G FW-1 for a discussion of the overall relationship between MFRC site level guidelines and the management direction established in this Forest Plan.

S-WS-5 New facilities (such as roads, trails, campsites, and buildings) within riparian or floodprone areas will be discouraged If such facilities are built in riparian or floodprone areas, they will be constructed and maintained in a way that minimizes adverse impacts to the ecological function of the area.

S-WS-6 Management activities involving heavy equipment crossing (by road, trail, or skid trail) of any stream or drainage ditch, or operations on the immediate shoreline of any lake or open water wetland will be designed and conducted in a way that:

a. Limits the number of crossing locations to the absolute minimum needed to conduct the activity

b. Maintains or improves channel stability (dimension, pattern and profile) or shoreline stability in the affected or connected waters

c. Uses filter strips as directed by Forest Plan guideline G-WS-4 and MFRC site level guidelines.

Aquatic Portion of Riparian Areas (Lakes, Streams, and Open Water Wetlands)

S-WS-7 When removing beaver dams or other channel obstructions from streams, control hydrologic discharge to minimize the potential for downstream flooding, sedimentation, and associated impacts on channel morphology and habitat, including wild rice beds.

S-WS-8 On lakes and wetlands where the Forest Service controls the discharge of water, minimum flow will be established to minimize impacts on downstream resources.

G-WS-3 Coarse woody debris will be removed from streams and lakes only if it presents a hazard to people or structures or creates an impassible barrier to watercraft. Where coarse woody debris impedes passage for recreational watercraft, restrict removal to the minimum amount necessary for safe passage.

Non-Aquatic portion of Riparian Areas

G-WS-4 On slopes averaging 18% or steeper, the width of filter strips adjacent to lakes or streams will be either 150 ft. from the ordinary high water mark, 150 ft. from the bankfull elevation, or the width of the entire slope that is adjacent to the water's edge, which ever is greater.

Exceptions to filter strip guidelines are allowed for projects specifically designed for stream, lakeshore, or wetland restoration.

G-WS-5 In project areas subject to soil or vegetation disturbance, where the landward limit of the functional riparian area has not been site-specifically identified as part of project planning, a default "near bank" and "remainder" riparian management zone width of 100 feet each will generally be used along lakes, open water wetlands and streams.

Near-Bank Riparian Management Zone

(Also see additional direction for the near-bank zone in objectives for Watershed Health.)

S-WS-9 Within the near-bank zone, harvest trees only to maintain or restore riparian ecological function.

S-WS-10 Within the near-bank zone, do not deposit debris or spoils from maintenance, construction, or dredging. However, depositing materials for habitat improvement or restoration is allowed.

G-WS-6 Within the near-bank zone, minimize soil disturbance and avoid activities that may destabilize soils or add sediment to the water.

G-WS-7 Within the near-bank zone, minimize mowing or any other activity involving intensive removal of understory vegetation.

Soils

G-WS-8 Follow the limitations on management activities as specified in Table G WS-8.

G-WS-9 During resource management activities, minimize adverse impacts to soil productivity by striving to have no more than 15 percent of a treatment area in a detrimentally compacted, eroded, rutted, displaced, or severely burned condition

G-WS-10 When conducting prescribed burns on ELTs 7, 8, 9, 11, 12, 16, 17, and 18, minimize the loss of forest floor (surface O layer). Provide for:

a. Igniting burns only when the Canadian Fire Weather Index System Build Up Index (BUI) is 50 or less. (If the BUI system becomes outdated, another predictive model or index system may be used provided it

affords a level of organic soil layer protection that is equivalent to a BUI of 50 or less.)

b. Adjustment of ignition timing and firing patterns

c. Taking into account vegetation type, topography, number of days since precipitation, wind, air temperature, humidity, and fuel loadings.

G-WS-11 On Ecological Land Types (ELTs) 7, 8, 9, 11, 12, 16, 17, and 18, management activities used for vegetation competition control will be designed and conducted in ways that minimize loss of the forest floor (surface O layer and duff layer).

Wetlands

S-WS-11 Activity fuels will not be pushed into windrows that encircle wetlands.

S-WS-12 Natural wetlands will not be used for sewage disposal for administrative purposes, unless done for research to develop operational guidelines or after such guidelines are established.

G-WS-12 Use of wetlands under frozen conditions for temporary roads and skid trails will generally be permitted as long as no fill is placed in the wetland. These roads or trails will be blocked to discourage vehicle use under unfrozen conditions.

G-WS-13 Wetland impacts will be avoided whenever possible. Where impacts are unavoidable, minimize and compensate for loss when undertaking projects.

S-WS-13 Where utility rights–of-way are constructed across wetlands, the crossings will be designed and maintained to preserve hydrologic and riparian function.

G-WS-14 Avoid felling trees into non-forested wetlands, except where done for purposes of habitat restoration.

G-WS-15 Wetlands will be managed to prevent the reduction of their water quality, fish and wildlife habitat, and aesthetic values. Management actions will not reduce water quality within a wetland, or upstream or downstream of a wetland, unless restoration of natural conditions is the primary goal of the activity.

Table G-WS-8. Limits on Management Activities Designed to Safeguard Soil Productivity on Superior National Forest. (Mitigations are shown as codes which are listed and explained in Table G-WS-8a. A brief description of each ELT, and principle threats to soil productivity associated with activities on each ELT, is shown in Table G-WS-8b).

Activity/Limitation	Ecological Landtype (ELT) Number																	
	1	2	3	4	5**	6	7	8	9	10	11	12**	13	14	15	16	17	18**
Skidding	Ax, B	A	Ax , B	A	#, A	A	B, E	E	B, E	Ax	B, E	#,A, E	B	Ax, B,	Ax, B	Ax, B, E	#,Ax, B, E	#, A, E
Landings	A	A	A	A	#, A	A	+	+	--	Ax	+	--	+	Ax	Ax	#, Ax	#	--
Whole tree Logging	+	+	+	+	--	#	#, E, F	+, E, F	#, E, F	+	#, E, F	--	+	+	+	+, E, F	#, E, F,	#, E, F,
Tracked vehicles (feller buncher etc)	Ax	A	Ax	A	#, A	A	+	+	#	+	+	#	+	+	+	+	#	#, A
Temp roads, trails	#, Ax	#, A	#, Ax	#, A	#, A	#, A	+	+	+	Ax, B	+	--	+	Ax	Ax	+	--	--
Discing	Az, B	--	Az, B	--	--	--	B	B	--	Az, B	B	--	B	Az, B	Az	B	--	--
Reforestation	+	+	+	+	E	+	E, F	+	+	+	E, F	E, F	+	+	+	E, F	E, F	E, F
Machine Planting	Ax, B	--	Ax, B	--	--	--	Ax, B	Ax, B	#, B	Ax, B	B	--	B	Ax, B	Ax, B	B	--	--
Bracke scarification and Barrel scarification	Az	--	Az	--	--	--	C, E	C, E	#	Az	C, E	--	C	Az	Az	C, E	C, E	--
Blading, Shearing, Rockraking	Ax, B	A	Ax, B	A	#, A	A	D, E	D. E	D, E	Ax, D	D, E	#, D, E	D	Ax, D	Ax, D	Ax, D, E	--	--
Machine Piling/Bundler	Ax	A	Ax	A	#, E	E	E	E	--	+	E	#, E,	+	+	+	E	E	#, E
Prescribed Fire	+	+	+	+	#, E, F, G	+	E, F, G	E, F, G	#, E, F, G	+	E, F, G	#, E, F, G	+	+	+	E, F, G	E, F, G	#, E, F, G
Use of low psi tires or other equipment with similar integrity	H	H	H	H	H	H	+	+	+	+	+	--	+	+	+	+	H	H

Table G-WS-8a. Activity Limit Codes Used in Table G-WS-8	
Code	**Activity Limitation Designed to Protect Soil Productivity**
**	No activities are permitted on these ELTs for purposes of timber production. Activities done for salvage, or to achieve other multiple use desired conditions or objectives are strongly discouraged on these ELTs and are subject to any applicable limitations shown elsewhere in this table.
+	Practice permitted on this ELT, subject to any applicable limitations specified elsewhere in this table.
--	Practice not permitted on this ELT.
#	Practice is strongly discouraged on this ELT. If undertaken, it is subject to any applicable limitations specified elsewhere in this table.
A	Limit activity to frozen soil (frozen to a depth that will support equipment that is being used).
Ax	Limit activity to frozen soil (frozen to a depth that will support equipment that is being used) or during normal dry period (generally July 1- Sept 15).
Az	Limit activity to normal dry period (generally July 1-Sept 15).
B	On slopes exceeding 18%, confine operations to the lower end of slopes and avoid creating long uninterrupted equipment "paths" that could channel water and erode soil. For slopes that exceed 35%, design for and favor activities that would provide for use of equipment and techniques that minimize operations on these slopes.
C	Bracke scarification not allowed when slopes exceed 18%.
D	Shearing not allowed on unfrozen ground when slopes exceed 18%, with the exception that it may be permitted during dry conditions if mineral soil is not exposed.
E	Retain/return distributed slash or woody debris and, where appropriate, retain stumps and bark on site.
F	Determine long term strategy on these ELTs for soil nutrient and tree nutrient efficiency. Favor maintaining or converting to pine/conifer type within LE vegetation composition by type objectives, and favor vegetation objectives for older growth stages. If existing stand is aspen/birch, favor partial cut & under plant to convert, or leaving more residual basal area when converting.
G	Follow G-WS-10.
H	Take precautionary measures to minimize soil disturbance when using this equipment on these sites.

Table G-WS-8b. Ecological Land Types (ELTs) on Superior National Forest	
ELT	Description
1	Lowland, moist loamy soils with plant communities that are transitional between uplands & lowlands. Somewhat poorly drained soils are susceptible to rutting and compaction when saturated.
2	Lowland, wet loamy and clayey soils with plant communities typical of wetlands. Can be forested or wetland shrub. Soils are susceptible to rutting and compaction due to continuous saturated conditions.
3	Lowland, moist silty clay loam and clay soils with plant communities transitional between uplands & lowlands. Somewhat poorly drained soils are susceptible to rutting & compaction when saturated.
4	Lowland, wet clay loam, silty clay and clay soils with plant communities typical of clayey wetlands. Soils are susceptible to rutting and compaction due to continuous saturated conditions.
5	Lowland, acidic, poorly- decomposed organic soils composed mainly of sphagnum and hypnum mosses with bog plant communities adapted to permanently wet soils. Soils are susceptible to rutting and compaction due to continuous saturated conditions.
6	Lowland, acidic to neutral organic soils composed of decaying woody plants and forbs with plant communities adapted to permanently wet soils. Soils are susceptible to rutting and compaction due to continuous saturated conditions.
7	Upland, moderately well-drained sand and gravel soils with plant communities adapted to a fluctuating water table in a sandy root zone. Soils are susceptible to nutrient loss due to thinner surface organic layer and coarse textured soils.
8	Upland, well-drained sand and gravel soils with a water table at an estimated depth of 5 to 8 feet and with plant communities having both upland and lowland species. Soils are susceptible to nutrient loss due to thinner surface organic layer and coarse textured soils.
9	Upland, droughty gravel and sand soils with plant communities adapted to droughty conditions and a root zone dominated by gravels. Soils are susceptible to nutrient loss due to thinner surface organic layer and coarse textured soils.
10	Upland, moderately well- drained silty clay loam and clay soils with upland plant communities. Silty soils will retain water long enough to create temporarily saturated soil in wet conditions and be more susceptible to rutting and compaction.
11	Upland, well-drained sandy loam & loamy sand soils. Gravelly subsurface; plant communities adapted to dry site. Soils susceptible to nutrient loss due to thin surface organic layer & coarse textured soils.
12	Upland, poor to well-drained, bouldery, loamy soil. The ground is also covered with boulders. Plant communities have adapted to these site conditions. On some sites, the ground may be covered with boulders with very little vegetation. Soils are susceptible to nutrient loss due to lack of surface organic layer or organic layer underlain with boulders.
13	Upland, well-drained sandy loam & loamy sand soils with a gravelly subsurface and plant communities representative of dry uplands.
14	Upland, moderately well-drained, sandy loam to silt loam soils with a subsurface layer of dense soil that retains water for longer periods of time in some locations, and plant communities that have relatively high requirements for nutrients & moisture. Subsurface layer of dense soil will retain water long enough to create temporarily saturated soil in wet conditions and be more susceptible to rutting & compaction.
15	Upland, well-drained to moderately well-drained loam, clay loam & silt loam soils, and plant communities with a high requirement for nutrients and moisture. Silt & clay soils will retain water long enough to create temporarily saturated soil in wet conditions, more susceptible to rutting & compaction.
16	Upland, well-drained sandy loam or loam soils, 20 to 40 inches deep over bedrock. Plant communities have adapted to dry conditions and shallow soils depths to bedrock. Soils susceptible to nutrient loss due to the thinner surface organic layer and shallow soil depth.
17	Upland, well-drained sandy loam soils, 8-20” deep over bedrock. Plant communities have adapted to droughty conditions and shallow soils depths to bedrock. Soils are susceptible to nutrient loss due to the thinner surface organic layer and shallow soil depth.
18	Upland, droughty loam, and sandy loam soils, less than 8” deep over bedrock, with bedrock outcrops occurring on 5 to 30 percent of the ground surface. Plant communities have adapted to very dry conditions. Mosses commonly cover the ground. Soils are susceptible to nutrient loss due to the thinner surface organic layer and shallow soil depth.

Insects, Diseases, and Disturbance Processes

Desired Condition

D-ID-1 Resource conditions minimize undesirable fire, insect, and disease outbreaks. When such events occur, healthy ecosystems are resilient and able to recover.

Insects and Disease

D-ID-2 Integrated pest management approaches are used to avoid epidemics and infestations of undesirable native or non-native invasive species.

D-ID-3 Insects and diseases are present and fulfilling their ecosystem function. Epidemics, when they occur, do not last longer than would be expected in a healthy ecosystem.

Fire

D-ID-4 Accumulations of natural and activity fuels are treated to enhance ecosystem resiliency and to maintain desired fuel levels.

D-ID-5 Fire is present on the landscape, restoring or maintaining desirable attributes, processes, and functions of natural communities.

D-ID-6 The presence of wildland fire on the landscape is appropriate and desirable, but unwanted wildland fire is actively suppressed where necessary to protect life, investments, and natural resources. The full range of appropriate management responses are considered for unwanted wildland fires.

Objectives

O-ID-1 Increase the amount of forest restored to or maintained in a healthy condition to reduce risk of and damage from fires, insects, and diseases.

Fire

O-ID-2 Establish, maintain, or improve the condition of vegetation using prescribed fire, mechanical treatments, and other tools.

O-ID-3 Treat areas of highest fire risk (based on Fire Regime and Condition Class) to minimize effects of unwanted wildland fire.

O-ID-4 Reduce fuels and control vegetation in the understory of stands that had naturally occurring low intensity surface fires.

O-ID-5 Provide a program where firefighter and public safety are the highest priority with every fire management activity.

O-ID-6 Use activity fuel and hazard fuel reduction methods, including prescribed fire, to meet vegetation objectives and to minimize mechanical ground disturbance of riparian areas.

Standards & Guidelines

G-ID-1 Minimum Impact Management Tactics (MIMT) will generally be used in managing wildland fire and prescribed fire to reduce adverse effects. MIMT will be applied in both operational and logistical functions.

G-ID-2 Avoid delivery of chemical retardant, foam, additives, or gray water to all surface waters and riparian areas. A line officer or designee may grant an exception when there are overriding and immediate unsafe conditions. In life threatening emergencies, the Incident Commander can grant exception to this guideline.

G-ID-3 Utilize existing natural or man-made barriers, such as drainages, cliffs, streams, roads, and trails instead of constructed firelines for prescribed fire and suppression activities where practical and safe for firefighters and the public.

G-ID-4 Areas that are identified as Wildland Urban Interface and have vegetation conditions that are in Condition Class 2 or 3 will be given highest priority for hazardous fuels treatment.

Timber

Desired Condition

D-TM-1 The amount of commercial timber sales available for purchase is at a level that is sustainable over time. Mills operating in northern Minnesota can depend on a consistent level of timber harvest on the National Forest.

Objectives

O-TM-1 Provide commercial wood for mills in northern Minnesota. Harvest material to supply sawmills, veneer mills, paper mills, and mills constructing engineered wood products (hardboard, particleboard, oriented strand board, etc.). Also provide posts, poles, and logs for log home construction.

Standards & Guidelines

S-TM-1 Plan, schedule, and harvest timber to meet O TM-1 only on land identified as suitable for timber management: Land Suitability Classes 500, 510, and 520.

G-TM-1 On land identified as not suitable for timber management, allow timber harvest if necessary for salvage or to enhance or achieve desired conditions or multiple-use objectives other than O-TM-1.

G-TM-2 Clearcutting may be used to regenerate the following forest types: jack pine, red pine, spruce-fir, oak, aspen, aspen-spruce/fir, paper birch, and lowland conifers.

S-TM-2 Harvest using even-aged regeneration methods (clearcutting, seed tree, shelterwood) may create a temporary forest opening no larger than 1,000 acres in size.

Exceptions: temporary forest openings from even-aged harvest exceeding those limits established above are permitted;

a. On an individual timber sale basis after 60 days public notice and review by the Regional Forester; or

b. When the size of the area harvested is as a result of catastrophic condition such as fire, insect and disease attack, or windstorm.

G-TM-3 Openings that are greater than 1,000 acres will generally be separated from other temporary openings by manageable forested stands.

S-TM-3 Temporary openings created by even-aged regeneration harvest will no longer be considered open when regenerating trees reach 10 feet high.

S-TM-4 Five years after clearcutting or final removals in seed tree or shelterwood harvest, stands must be adequately restocked. The minimum trees per acre necessary to adequately restock forests after even-aged tree harvest are shown in Table S-TM-4 by forest type group.

Table S-TM-4. Minimum trees per acre at five years of age necessary to adequately restock forests after tree harvest.

Forest Type Group	Minimum Trees* per Acre
Conifers	400
Northern Hardwoods, Birch, and Ash	1,000
Aspen	4,000
*Any commercial tree species may be included in the minimum.	

G-TM-4 Allow harvest of white cedar trees (in any forest type) only when re-growth of cedar is likely to be successful or for research purposes.

G-TM-5 In stands 20 acres or larger that were regenerated with clearcuts, retain a minimum of 5% of the stand in legacy patches of live trees where no harvest occurs. Wherever possible these should be at least two acres in size. These legacy patches will protect soil organic matter and associated organisms and remaining vegetation will aid in the re-colonization of the adjacent managed area.

G-TM-6 In northern hardwoods forest types, generally maintain a closed canopy (70% or greater where possible) of mature forest

vegetation in a minimum 200-foot zone surrounding seasonal ponds. Seasonal ponds included in this guideline must typically persist at least six weeks and be free of fish. The area will generally be managed to prevent the soil and water from warming excessively, to prevent erosion, and to provide large woody debris and leaf litter.

S-TM-5 Even-aged regeneration harvest (clearcutting, seed tree, shelterwood) is allowed after a stand has reached at least 95% of culmination of the mean annual increment. This does not preclude salvage using even-aged harvest after natural disturbances such as fire, wind, insects, or disease or to meet other resource objectives.

Generally, the following forest type groups reach the culmination of mean annual increment at the ages shown in Table S-TM-5.

G-TM-7 A full suite of timber harvest practices will be allowed. Harvest practices will generally be selected because they provide the most appropriate strategy to achieve or optimize achievement of multiple use management objectives**.** See Table G-TM-7.

Table S-TM-5. Minimum Age for Even-aged Regeneration Harvest

Forest Type Group	Minimum allowable age* for even-aged regeneration harvest
Northern Hardwoods	90
Lowland Conifers	90
Lowland Hardwoods	90
Red and White Pine	60
Oaks	60
Jack Pine	50
Spruce	50
Paper Birch	50
Balsam Fir	40
Aspen	40

* Age of culmination of mean annual increment.

Table G TM-7. Type of Timber Management Practices by Forest Type Group

	Even-aged	Clear cut	Shelter wood	Uneven-aged	Partial Cut
Jack Pine	X	X			X
Red Pine	X	X	X		X
White Pine	X		X	X	X
Spruce/ fir	X	X	X	X	X
Aspen	X	X			X
Aspen/ fir	X	X			X
Paper Birch	X	X	X		X
Northern Hardwds	X		X	X	X
Oak	X	X	X		X
Black Ash				X	X
Lowland Conifer	X	X			X

Vegetation Management (VG)

Desired Conditions

D-VG-1 Native vegetation communities are diverse, productive, healthy, and resilient.

D-VG-2 Vegetation conditions contribute to ecosystem sustainability and biological diversity. They address current and future generations' needs for and interests in the many aesthetic, spiritual, consumptive, commodity, recreational, and scientific uses and values of forests.

D-VG-3 Vegetation (live and dead) is present in amounts, distributions, and characteristics that are representative of the spectrum of environmental conditions that would have resulted from the natural cycles, processes, and disturbances under which current forest ecosystems and their accompanying biological diversity evolved. The ecosystem composition, structure, and process representation considers time frames, a variety of landscape scales, and current biological and physical environments. Resource conditions exist that minimize undesirable occurrences of non-native, invasive species.

D-VG-4 Tree vegetation is present in amounts, distributions, and characteristics that allow contribution to a sustained yield of timber and pulpwood products.

D-VG-5 Vegetation constantly changes through management activities and through naturally occurring disturbances and ecosystem recovery processes such as wind, fire, flooding, insects, disease, and vegetation succession. These fluctuations are within an ecologically and socially acceptable range of variability.

Vegetation Composition and Structure

D-VG-6 Vegetation conditions that have been degraded or greatly diminished in quality or extent on the landscape by past land use are restored to conditions more representative of native vegetation communities. These conditions, in ecologically and socially appropriate areas, result from gradually re-establishing:

a. Old forest and old-growth forest age classes and vegetative growth stages, while providing for a full array of forest age classes and vegetative growth stages.

b. Uneven-aged and multi-aged forests with a variety of tree ages and different vegetation layers (heights) within the same community, while also providing for even-aged forests.

c. The full range of successional stages in non-forested lands such as bogs, fens, grass, and shrublands.

d. Diverse mixes of trees, shrubs, herbs, mosses, lichens, and fungi species at site and landscape levels that are more representative of native vegetation communities. This includes an increase, in appropriate areas, of: rare and sensitive plants and native plant communities; white, red, and jack pine; yellow birch; white cedar; and upland tamarack; and in some areas, white and black spruce as components of native vegetation communities.

e. Diverse structure in native vegetation communities that have been harvested, salvaged, prescribe burned, or have undergone natural disturbance. Structural diversity components will be provided by small patches of forest (reserve islands), scattered or clumped standing, mature and older live trees; dead trees; and coarse woody debris (down logs and branches).

Vegetation Spatial Patterns

D-VG-7 The diversity of vegetation spatial landscape patterns that have been degraded or greatly diminished on the landscape by past land use are restored to conditions that more closely emulate the landscape scale patterns that would result from natural disturbances and other ecological processes. These conditions result from gradually re-establishing:

a. Spatial patterns that promote: well-

distributed habitats; restoration of ecosystem function or processes; connectivity between aquatic, terrestrial, and riparian ecosystems across the landscape; scenic landscapes; and economic efficiencies.

b. Diversity of size, shape, and distribution of patches of forest. This includes large patches of mature and older forest (300 to 1000s of acres) that provide interior forest habitat.

c. Diversity of size, shape, and distribution of temporary forest openings on the landscape. This includes opening sizes from 1 to 1,000 acres.

Ecological Processes and Vegetation

D-VG-8 The ecological processes of native vegetation communities are maintained, emulated, or restored at multiple landscape scales to provide representation of their natural range of distribution and variation within context of multiple-use goals and ecosystem sustainability. These include: processes such as disturbance from fire, wind, flooding, insects and disease; biological community and species interactions; nutrient cycling; and vegetation succession.

Objectives, Standards, and Guidelines

A key goal of this Plan for achieving integrated resource goals is to provide appropriate vegetation management direction at both landscape and site level scales. This Section below provides direction that broadly addresses both scales. Direction is generally applicable Forest-wide outside the BWCAW, unless otherwise noted for Spatial Zones or excepted by Management Area direction (Chapter 3). In addition, it is generally necessary and important to consider this direction in combination with the vegetation objectives and other guidance found in the Section on Landscape Ecosystems and current and future applicable ecological and social information.

O-VG-1 Move vegetation conditions from Year 2003 conditions toward the long-term desired composition, structure, age, spatial patterns, and within-stand diversity.

Vegetation Composition and Structure

O-VG-2 Increase acres of red, white, and jack pine, spruce/fir, and northern hardwood vegetation communities. Decrease acres of aspen vegetation communities.

O-VG-3 Maintain acres of lowland conifer and lowland hardwood vegetation communities.

O-VG-4 Maintain acres of non-forested wetlands.

O-VG-5 Decrease the acres of maintained permanent upland openings except for those needed for social reasons or if important ecological needs are not adequately met by amount, quality or distribution of temporary forest openings.

O-VG-6 Restore the diversity of tree species within stands to conditions more representative of native vegetation communities by increasing the component of white pine, red pine, paper birch, yellow birch, upland tamarack, white cedar, and in some areas, white spruce and black spruce.

O-VG-7 Restore the diversity of shrubs and herbs, including sensitive or rare shrubs and herbs, to conditions more representative of native vegetation communities.

O-VG-8 Restore structural diversity and ecosystem processes within stands when harvesting or burning by retaining: a diverse mix of trees, shrubs, and herbs; live and dead standing trees; earth and tree root mounds caused by uprooted trees; coarse woody debris from fallen trees; and patches of live trees.

O-VG-9 Increase the amount of multi-aged forest communities in a variety of vegetative growth stages, including stages dominated by young, mature, old, and old growth trees. To successfully achieve a diversity of healthy multi-aged stands, a variety of vegetation management practices that are ecologically appropriate to the forest community will be used. This will include an increase in the percentage of uneven-aged timber harvest practices used to manipulate vegetation, with a decrease in percentage of clearcutting.

O-VG-10 Increase amount of a variety of prescribed burning practices to restore the ecological process of fire and provide habitat for threatened and endangered species and other wildlife that benefit from or require burned vegetation.

O-VG-11 Retain an adequate representation of naturally disturbed forest that is not salvaged, such as burned, flooded, blowdown, or insect- or disease-killed areas. Maintain these in a variety of patch sizes and distributions on the landscape.

O-VG-12 Where natural disturbances, human influences, or stand age or composition have combined to perpetuate stands that are brush-dominated or have sparse tree canopy on sites that could otherwise provide productive timber management opportunities, and where there may be adequate ecological representation of these types of conditions, seek to re-establish adequately stocked stands to address timber management objectives.

Forest Vegetation Age

O-VG-13 Maintain a full range of age classes from young to old, including old growth and multi-aged growth stages, for the variety of forested vegetation communities within each Landscape Ecosystem.

O-VG-14 Increase acres of old forest, old-growth forest, and multi-aged upland forest vegetation communities.

O-VG-15 In forest managed to meet desired conditions and objectives for the old growth and multi-aged old growth forest vegetative growth stages, manage forest to promote old growth characteristics.

S-VG-1 When implementing projects under authority of the Healthy Forest Restoration Act [Section 102(e)(2)(3b)], fully maintain or contribute toward the restoration of the structure and composition of structurally complex old growth stands according to the pre-fire suppression old growth conditions characteristic of the forest type, while considering the contribution of the stand to landscape fire adaptation and watershed health, and retaining the large trees contributing to old growth structure.

O-VG-16 Increase acres of young lowland black spruce and tamarack forest communities. Increase acres of old-growth lowland black spruce and tamarack forest communities.

Forest Vegetation Spatial Patterns

Spatial objectives, standards, and guidelines for NFS land only outside the BWCAW were developed considering conditions of the BWCAW, where natural processes form the landscape patterns.

To provide appropriate landscape scale and context for interior forest and large patch management and to ensure well-distributed habitats, direction is provided for the following landscape scales:

- Forest-wide**:** Some landscape elements such as large patches of red and white pine are addressed Forest-wide because of their rarity.
- Zone 1 (Figure Veg-1) is physically distanced from the BWCAW and has more interspersed ownership patterns.
- Zone 2 (Figure Veg-1) is physically distanced from the BWCAW and is ecologically different.
- Zone 3 (Figure Veg-1) is proximate to the BWCAW and is ecologically similar. The BWCAW contributes to the ecological representation of desired landscape patterns.

Forest-wide

Upland Forest

O-VG-17 In mature or older upland forest types managed to maintain large patches (≥300 acres of all types) manage patches to maintain the characteristics of mature or older native upland forest vegetation communities and promote the maintenance or development of interior forest habitat conditions.

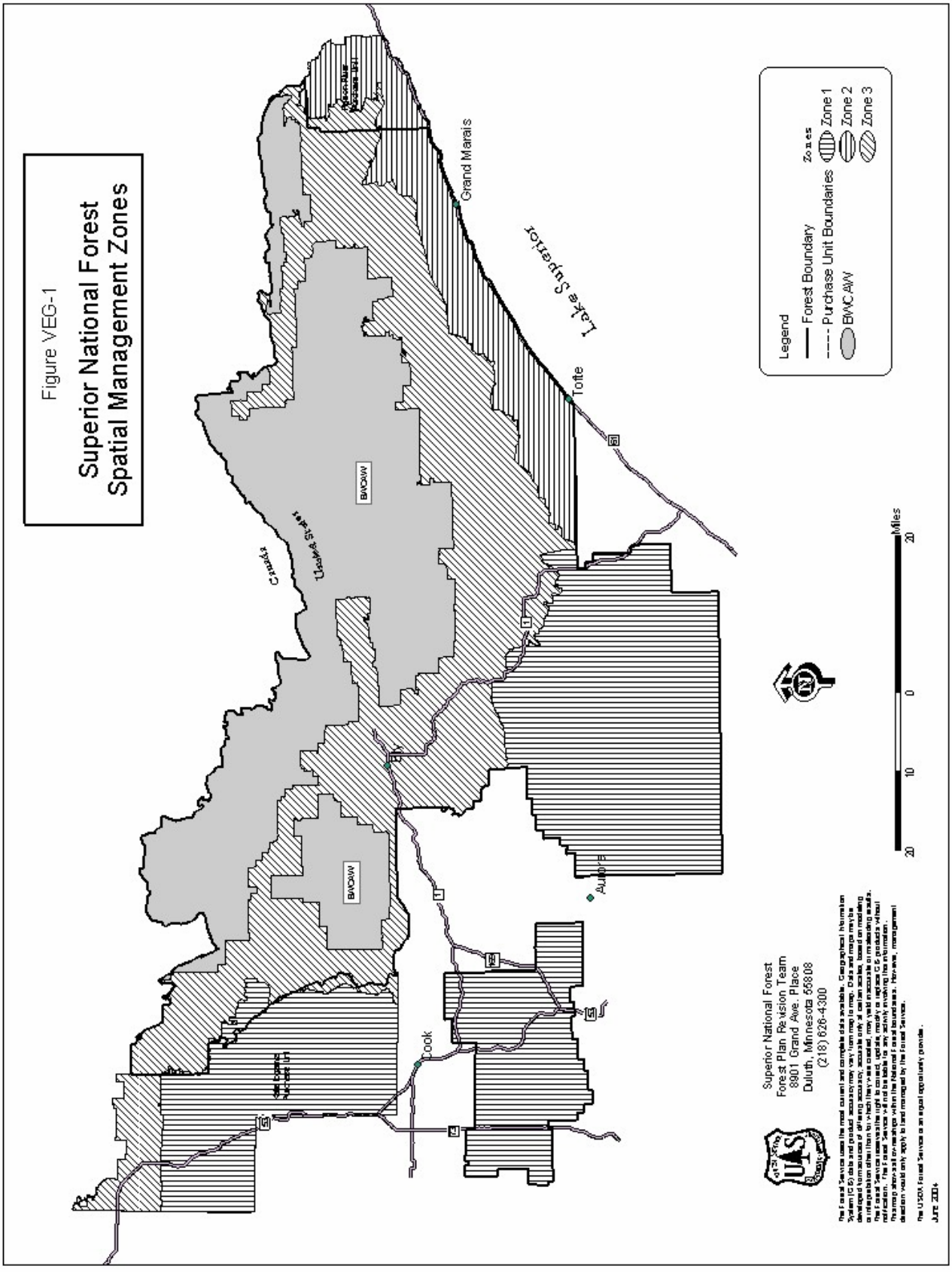
Figure VEG-1
Superior National Forest
Spatial Management Zones
Grand Marais
Lake Superior
Tofte
Ely
Cook
BWCAW
Legend
Forest Boundary
Purchase Unit Boundaries
BWCAW
Zones
Zone 1
Zone 2
Zone 3
Miles
20
10
0
20
Superior National Forest
Forest Plan Revision Team
8901 Grand Ave. Place
Duluth, Minnesota 55808
(218) 626-4300
JUNE 2004

Red and White Pine Forest

O-VG-18 In mature or older red and white pine forest types managed to maintain large patches (≥100 acres), manage patches to maintain the characteristics of mature or older native upland forest vegetation communities and promote the maintenance or development of interior forest habitat conditions.

300 acre minimum patches

G-VG-1 The number of patches ≥300 acres that are older red and white pine forest types will generally not be reduced below 8.

S-VG-2 Maintain a minimum of 4,700 acres of mature and older red and white pine forest types in patches ≥300 acres.

100 acre minimum patches

G-VG-2 Maintain a minimum of 88 patches of mature and older red and white pine forest types in patches ≥100 acres in size.

S-VG-3 Maintain a minimum of 17,300 acres of mature and older red and white pine forest types in patches ≥100 acres.

S-VG-4 In mature or older red and white pine forest types managed to maintain patch sizes of ≥100 acres, vegetation management treatments that maintain a 60% minimum canopy closure and maintain large diameter trees are allowable.

Lowland forest

O-VG-19 Maintain a representative array of large patches (≥300 acres) of mature or older lowland forest.

Temporary Openings

O-VG-20 Create large patch temporary openings up to 1000 acres through management activities.

O-VG-21 Increase average size of temporary forest openings. Reduce amount of forest edge created through vegetation management activities, while still retaining a range of small patches and edge habitat.

Spatial Zones 1 and 2

Interior Forest Conditions

O-VG-22 In Spatial Zones 1 and 2 maintain or increase amount of interior forest habitat. Provide interior habitat in a variety of upland and lowland vegetation communities.

Large Mature and Older Upland Patches

O-VG-23 In Spatial Zones 1 and 2 maintain or increase the acres and number of patches of mature or older upland forest in patches ≥300 acres. Large upland forest patches may cross Landscape Ecosystem or other ecological boundaries (such as watersheds, Landtype Associations). When determining which large upland mature patches will be retained, take into consideration the contribution of other unmanaged lands within the same ecological setting and proximity.

G-VG-3 In Spatial Zones 1 and 2, in mature and older upland forest types managed to maintain patch sizes of ≥300 acres, vegetation management treatments are allowable where they maintain a 50% (60% for red and white pine) minimum canopy closure at time of treatment and favor retention of larger and older trees characteristic of the patch.

10,000 acre minimum patches

G-VG-4 In Spatial Zone 2 maintain a minimum of one patches of mature and older upland forest in patches of ≥10,000.

S-VG-5 In Spatial Zone 2 maintain a minimum 11,700 acres of mature and older upland forest in patches of ≥10,000 acres.

1,000 acre minimum patches

G-VG-5 In Spatial Zone 1 maintain a minimum of 8 patches of mature or older upland forest in patches of ≥1,000 acres.

G-VG-6 In Spatial Zone 2 maintain a minimum of 14 patches of mature and older upland forest in patches of ≥1,000 acres.

300 acre minimum patches

S-VG-6 In Spatial Zone 1 maintain a minimum 44,700 acres of mature and older upland

forest in patches of ≥300 acres.

S-VG-7 In Spatial Zone 2 maintain a minimum 54,400 acres of mature and older upland forest in patches of ≥300 acres.

Spatial Zone 3

O-VG-24 In Spatial Zone 3 strive to minimize the decrease in acres and numbers of patches of mature or older upland forest in patches ≥300 acres. Age and composition objectives will be considered the primary drivers of forest condition in this Zone. When determining which large upland mature patches will be retained, take into consideration the contribution of BWCAW acres and other unmanaged lands within the same ecological setting and proximity.

O-VG-25 In Spatial Zone 3 strive to minimize the decrease in interior forest habitat in a variety of upland and lowland vegetation communities

Special Forest Products

G-VG-7 Permits will generally be required for commercial gathering of special forest products from trees (such as boughs, Christmas trees, birch bark, and firewood), or other vegetation (berries, clubmosses, lichens, fungi, and moss).

G-VG-8 Permits will specify allowable quantities and collection restrictions designed to protect or maintain ecological and cultural resource values.

G-VG-9 Gathering of tree products will generally be at least 50 feet from trails, roads, or waterbodies that have high scenic integrity objectives and at least 100 feet from a perennial waterbody.

G-VG-10 Gathering of special forest products for personal or scientific use will generally require a permit. Exception: Gathering of nuts, fruits, berries, and fungi for personal use will not generally require a permit.

G-VG-11 Commercial peat mining and sphagnum moss collection are generally prohibited.

Terrestrial & Aquatic Wildlife (WL)

Desired Conditions

D-WL-1 Aquatic and terrestrial wildlife habitats are diverse, healthy, productive, and resilient.

D-WL-2 Aquatic and terrestrial wildlife habitats on NFS land contribute to ecosystem sustainability and biological diversity of Northern Minnesota and, for wide-ranging species, larger landscape scales. Habitats contribute to supporting populations of wildlife that address peoples' current and future need for and interest in the many aesthetic, commercial, subsistence, recreational, cultural, wildlife watching, hunting, fishing, trapping, and scientific uses and values of wildlife.

D-WL-3 Aquatic and terrestrial wildlife habitats and species populations, while constantly changing due to both management activities and naturally occurring events, are present in amounts, quality, distributions, and patterns so that NFS lands:

a. Provide representation of the full spectrum of habitats and conditions that would have resulted from the natural cycles, processes, and disturbances under which the biological diversity of the National Forest evolved. Representation considers time frames, a variety of landscape scales, and current biological and physical communities and environments.

b. Maintain viable populations for all existing native and desired non-native species. Viable populations are those with the estimated numbers and distributions of reproductive individuals to insure their continued existence is well distributed within their range in the planning area.

c. Contribute to the conservation and recovery of federally-listed, proposed, or candidate threatened and endangered species and the habitats upon which these species depend.

d. Contribute to the conservation of sensitive species and the habitats upon which these species depend.

e. Provide for the desired quality and quantity of habitat for management indicator species and indicator habitats.

f. Support diverse species populations of all existing native and desired non-native species.

g. Provide ample opportunities for wildlife watching and quality opportunities for sustainable recreational, subsistence and commercial trapping and hunting, helping local communities realize the economic potential associated with these activities.

h. Provide structure, composition, connectivity, function, and spatial patterns of aquatic and terrestrial habitats that maintain or restore opportunities for species to interact, disperse, and migrate and to reduce negative impacts associated with forest habitat fragmentation.

i. Conserve the genetic variability of species.

D-WL-4 On NFS land, management activities, recreation, and other human uses occur at levels that support desired amounts and distribution of suitable habitats for aquatic and terrestrial wildlife.

D-WL-5 Roads and trails are managed to maintain native plants and animals, protect water quality, and to manage for compatible human uses and types of access.

D-WL-6 Increased emphasis on the health, quality, and ecological function of aquatic ecosystems provides improved habitat conditions for fish, mollusk, invertebrate, plant, and other aquatic species.

D-WL-7 Native fish and aquatic species' populations are viable and well distributed. They are not at risk of extirpation from watersheds within their native range.

D-WL-8 Fish populations are productive and support sustainable recreational, subsistence, and commercial fisheries while meeting the needs of fish-dependant threatened, endangered, or sensitive wildlife species.

D-WL-9 Native plants and animals dominate all terrestrial and aquatic ecosystems, with non-native plants and animals forming, at most, a minor component.

Objectives, Standards, and Guidelines

Desired conditions for wildlife are addressed both through wildlife management direction below and through direction for other physical and biological resources found in other sections of the Plan. This is because the amount, quality, distribution, and ecological function of terrestrial and aquatic habitats are largely dependent on the environmental conditions of: vegetation, watersheds and riparian areas, soil resources, natural disturbances, and other ecological processes.

The many human uses of these resources (such as timber management, recreational uses, transportation systems, Special Uses) also influence the condition and diversity of wildlife habitats and populations, and therefore management guidance in the Plan for these appropriate and desired uses will also substantively address wildlife.

This Section addresses aquatic and terrestrial wildlife habitat objectives for planning period with:

- General direction applicable to all species, and
- Specific direction for:
  - Threatened and endangered species
  - Regional Forester Sensitive Species
  - Management Indicator Species
  - Management Indicator Habitats
  - Non-native Invasive Species
  - Other Species of Interest
  - Aquatic communities

Direction provided in both these categories, together with other resource management direction, is intended to provide the guidance necessary to ensure management from Year 2003 conditions toward

desired conditions for all native and desired non-native species.

General

O-WL-1 Populations: Provide ecological conditions to sustain viable populations of native and desired non-native species and to achieve objectives for management indicator species and management indicator habitats.

O-WL-2 Habitats: Move terrestrial and aquatic habitats in the direction of desired conditions and objectives for all native and desired non-native wildlife.

O-WL-3 Human Use: Provide an adequate and representative array of habitat conditions for desired plant and animal species that supports acceptable and sustainable levels of human uses.

Objectives for Threatened and Endangered Species

O-WL-4 Maintain, protect, or improve habitat for all threatened and endangered species by emphasizing and working toward the goals and objectives of federal recovery plans and management direction in the Forest Plan.

O-WL-5 Seek opportunities to benefit threatened and endangered species by integrating habitat management objectives into plans for the full spectrum of management activities on NFS land.

O-WL-6 Reduce or eliminate adverse effects on threatened and endangered species from the spectrum of management activities on NFS land.

O-WL-7 Minimize building or upgrading of roads in areas that are important for threatened and endangered species habitat and for habitat connectivity.

Objectives for Lynx

See Lynx Appendix E for information related to lynx management.

O-WL-8 Promote the conservation and recovery of Canada lynx and its habitat.

O-WL-9 In LAUs on NFS land, manage vegetation to retain, improve, or develop habitat characteristics suitable for snowshoe hare and other important alternate prey in sufficient amounts and distributions so that availability of prey is not limiting lynx recovery.

O-WL-10 In LAUs on NFS land, manage vegetation to provide for foraging habitat in proximity to denning habitat in amounts sufficient to provide for lynx.

O-WL-11 Maintain and, where necessary and feasible, restore sufficient habitat connectivity to reduce mortality related to roads and to allow lynx to disperse within and between LAUs and between LAUs and Boundary Waters Canoe Area Refugium on NFS land.

O-WL-12 Through partnerships with other agencies and landowners, participate in cooperative efforts to identify, map, and maintain or restore, where feasible, linkage areas that provide habitat connectivity sufficient to allow lynx to disperse between disjunct blocks of lynx habitat at larger landscape scales (for example, among National Forests in the Great Lakes region).

O-WL-13 Maintain or improve the natural competitive advantage of Canada lynx in deep snow conditions. Snow compacting activities (such as snowmobiling, snowshoeing, skiing, dog sledding) are planned and accommodated in areas best suited to the activity while maintaining large, interconnected areas of habitat with little or no snow-compacting, recreational activities.

O-WL-14 Through coordination with other agencies, participate in cooperative efforts to reduce, to the extent possible, the potential for lynx mortality related to highways and other roads within the proclamation boundary of the National Forest.

O-WL-15 In the Boundary Waters Canoe Area Wilderness Refugium lynx habitat conditions will predominantly result from natural ecological processes such as fire, wind, insects, disease, and vegetation community succession. However, some active management, with methods

compatible with wilderness values, may be needed to restore or maintain desired vegetation characteristics. Lynx and its prey populations will fluctuate in response to changing environmental conditions.

Standards & Guidelines for Lynx

G-WL-1 Within LAUs on NFS land, moderate the timing, intensity, and extent of management activities, if necessary, to maintain required habitat components in lynx habitat, to reduce human influences on mortality risk and inter-specific competition, and to be responsive to current social and ecological constraints relevant to lynx habitat.

G-WL-2 Provide for the protection of known active den sites during denning season.

G-WL-3 Limit disturbance within each LAU on NFS land as follows: if more than 30% of the total lynx habitat (all ownerships) within an LAU is currently in unsuitable condition, no further reduction of suitable conditions should occur as a result of vegetation management activities by the National Forest.

LAUs 44 and 46 are excepted from this guideline. (Refer to Lynx Appendix E, Section 5 for information on exceptions.)

S-WL-1 Management activities on NFS land shall not change more than 15% of lynx habitat on NFS land within an LAU to an unsuitable condition within a 10-year period.

LAUs 44 and 46 are excepted from this guideline. (Refer to Lynx Appendix E, Section 5 for information on exceptions.)

G-WL-4 Within an LAU, maintain or promote well distributed denning habitat in patches generally larger than five acres, comprising at least 10% of lynx habitat.

Where less than 10% of forested lynx habitat within an LAU provides denning habitat, defer those management actions on NFS land that would delay achievement of denning habitat structure.

LAUs 44 and 46 are excepted from this guideline. (Refer to Lynx Appendix E, Section 5 for information on exceptions.)

G-WL-5 Following a disturbance on NFS land greater than 20 contiguous acres (such as a blowdown, fire, insect, or disease) that could contribute to lynx denning habitat, generally retain a minimum of 10% of the affected area on NFS land unless salvage or management-ignited fire is necessary to address human health and safety (such as in the Wildland Urban Interface) or scenic integrity.

LAUs 44 and 46 are excepted from this guideline. (Refer to Lynx Appendix E, Section 5 for information on exceptions.)

S-WL-2 In LAUs on NFS land allow no net increase in groomed or designated over-the-snow trail routes unless the designation effectively consolidates use and improves lynx habitat through a net reduction of compacted snow areas.

G-WL-6 Where a designated trail for snow-compacting activities is desired within LAUs, the proposed route should be planned to protect or improve the integrity of lynx habitat and minimize snow compaction in lynx habitat. The trail should be designed to:

- Move recreational use away from more sensitive or better quality lynx habitat,
- Concentrate use within existing developed areas rather than developing new recreational areas in lynx habitat, and/or
- Be located within the outer boundaries of a currently used road and trail system.

G-WL-7 For newly constructed snow-compacting trails, effectively close or restrict to public access those trails and OML 1, OML 2, temporary, and unclassified roads that intersect the new trails unless these trails or roads are being used for other management purposes.

G-WL-8 Within LAUs generally maintain road and snow-compacting trail densities below 2 miles per square mile to maintain the natural competitive advantage of lynx in

deep snow. Where total road and regularly-used snow-compacting trail densities are greater than 2 miles per square mile and coincide with lynx habitat, prioritize roads for seasonal restrictions or reclamation in those areas, where practical or feasible. In this guideline "roads" include all ownerships of classified and unclassified roads and "regularly-used trails" are those that are used most years for most of the snow-season.

G-WL-9 Dirt and gravel roads that are under the jurisdiction of the National Forest and that traverse lynx habitat on NFS land (particularly those roads that could become highways) should generally not be paved or otherwise upgraded in a manner that is likely to lead to significant increases to lynx mortality or substantially impedes movement and dispersal.

If the dirt and gravel roads described above are upgraded or paved in order to meet human health and safety or other environmental concerns and essential management needs, conduct a thorough analysis on effects to lynx and its habitat to determine minimum road design standards practical (including measures to minimize traffic speeds), to minimize or avoid foreseeably contributing to increases in human activity or adverse impacts to lynx and its habitat.

Objective and Standard for Bald Eagle (also a Management Indicator Species)

O-WL-16 Promote the conservation and recovery of the bald eagle. Population goal minimum: 85 occupied breeding territories.

S-WL-3 Management activities for the bald eagle will be governed by Northern Lakes States Bald Eagle Recovery Plan: 1983

Objective, Standard, and Guideline for Gray Wolf (also a Management Indicator Species)

O-WL-17 Promote the conservation and recovery of the gray wolf. Population goal minimum: contribution to Statewide goal of 1250-1400.

S-WL-4 Management activities for the gray wolf will be governed by Recovery Plan for Eastern Timber Wolf (1992).

G-WL-10 Provide for the protection of known active gray wolf den sites during denning season.

Objectives, Standards, and Guidelines for Regional Forester Sensitive Species

All Sensitive Species

O-WL-18 Maintain, protect, or improve habitat for all sensitive species.

Meeting this objective will involve two basic and complementary strategies that would be implemented based on species' habitat requirements and distribution, individual site conditions, expected management impacts, and other multiple use objectives. These strategies include:

a. Landscape level (or coarse filter) management strategies: Addressing species' needs through integrated resource management at large landscape scales including, but not limited to,: Landscape Ecosystem or Landtype Association scales for vegetation and management indicator habitat objectives; watersheds for aquatic and riparian condition objectives; and Management Areas for desired or acceptable levels of human uses.

b. Site-level (or fine filter) management strategies: Addressing species' needs by managing specifically for high quality potential habitat or known locations of sensitive species.

G-WL-11 Avoid or minimize negative impacts to known occurrences of sensitive species.

G-WL-12 Minimize negative impacts to known sensitive species from management activities that may disturb pairs in their breeding habitat during critical breeding season (varies by species).

Meeting G-WL-11 and -12 will involve diverse management approaches that depend on species' habitat requirements and distribution, individual site conditions, and expected management impacts. These include two basic and complementary

strategies:

a. Landscape level or coarse filter management strategies may allow negative modifications of some portions of sensitive species habitat as long as overall objectives for habitat amount, quality, and distributions are generally met.

b. Site level or fine filter management strategies may warrant protections of known individual sensitive species locations or high quality potential habitat.

S-WL-5 If negative impacts to sensitive species cannot be avoided, management activities must not result in a loss of species viability forest-wide or create significant trends toward federal listing.

Wood turtle

O-WL-19 In all known breeding locations maintain or restore high quality breeding habitat and protect nesting areas from predators and negative human impacts. High quality breeding habitat: open sandy areas for nesting adjacent to upland and lowland foraging habitats with shade and security cover wood. Aquatic riverine habitat features log jams, down logs, woody debris.

Boreal owl

O-WL-20 In known or good potential breeding habitat within the normal expected range of the boreal owl on NFS land, maintain or restore quality habitat conditions: suitable nesting habitat adjacent to or within ½ mile of foraging and roosting habitat.

Nesting habitat is generally provided by upland aspen and aspen-conifer mix forest >60 years old with large diameter (>12") trees suitable for nest cavities.

Foraging and roosting habitat is provided by lowland black spruce and tamarack forest predominantly >80 years old in stands >40 acres or where a complex of smaller lowland stands are within 1000 feet of one another and are >40 acres. Individual territories (640-2,400 acres) typically have a combined area of greater than 500 acres of lowland black spruce/tamarack forest.

S-WL-6 Prohibit management activities within 300 feet of known nest sites.

G-WL-13 Minimize activities that may disturb nesting pairs during critical nesting season (March 1-June 1).

Great gray owl

O-WL-21 In known or good potential breeding habitat, maintain or restore high quality habitat conditions: Mature (>50 years old), dense, upland forest nesting habitat within ½ to 1½ miles of areas with a sufficient network of lowland conifer forest, bog, and non-forest foraging habitat.

G-WL-14 Allow, to the extent practical, only activities that protect, maintain, or enhance site conditions within 660 feet of a known nest site.

G-WL-15 Minimize activities that may disturb nesting pairs during critical nesting season (March 1 - June 1).

Black tern

O-WL-22 In all known breeding locations maintain or restore high quality nesting habitat: marshes or shallow rivers or lakes with suitable balance of open water and emergent vegetation.

G-WL-16 Management activities, especially prescribed fire, that may negatively impact nesting habitat in the short term in order to restore future suitable habitat, should maintain adequate undisturbed nesting habitat.

Three-toed woodpecker

O-WL-23 Maintain or improve quality nesting and foraging habitat within the woodpecker's range, by managing toward the Landscape Ecosystem Vegetation Objectives for mature and older conifer forest. Consider the contribution of BWCAW to well-distributed habitat. Important characteristics within these older forests include trees large enough for nest cavities

and current or future habitat to provide dead and dying flaky-barked trees for forage.

In addition to tracts of mature and older conifer forest, retain large concentrations of flaky-barked conifer trees – (especially jack pine, white spruce, black spruce, and tamarack) that have been damaged or killed by fire, insects, disease, flooding or other disturbances. Where conflicts exist between retaining large concentrations of dead and dying trees and objectives that would reduce these concentrations (for example, due to fire risk or insect outbreaks), prioritize maintenance of woodpecker habitat in areas and concentrations where conflicts can be minimized.

O-WL-24 The amount and distribution of dead and dying trees should provide adequate representation of patterns and amounts that would result from natural disturbances (such as fire and flooding) and other ecological processes (such as insect and disease infestation and vegetation succession). If natural disturbances do not provide adequate habitat, it may be necessary to emulate natural disturbances through management ignited fire or other treatments.

G-WL-17 Protect known nest sites within a 200-foot radius surrounding nest sites until young have fledged.

G-WL-18 Where ecologically appropriate, retain 6-10 jack pine per acre in even-aged regeneration harvests in mixed conifer stands.

Olive-sided flycatcher

O-WL-25 Maintain, protect, or improve quality nesting and foraging habitat: variety of boreal forests (generally 10-20% canopy cover) including uplands, lowlands, edges, and beaver meadows with a preponderance of standing live or dead large trees used for perching and foraging, especially spruce or tamarack. High association with riparian and riverine areas.

Sensitive Butterflies

O-WL-26 In all known breeding locations, maintain or restore high quality habitat for:

Jutta arctic**:** moderately forested black spruce bogs with sedges, bog forest openings, and edges.

Freija's grizzled skipper: upland acid meadow.

Taiga alpine: semi-open to well-forested lowland black spruce- tamarack.

S-WL-7 Allow only those management activities that protect, maintain, or enhance known locations for: Jutta arctic, taiga alpine, Freija's grizzled skipper, and Nabokov's northern blue.

Nabokov's northern blue

O-WL-27 In eight known breeding locations, maintain or restore high quality habitat: well-drained sandy gravelly areas under fairly open coniferous forests, especially jack pine of the Vermilion Moraine. Associated with its exclusive larval host dwarf bilberry.

Sensitive Fish, Mollusks, Aquatic Insects

O-WL-28 In all known sites and breeding locations, enhance, or restore high quality habitat for these species primarily by implementing management direction that promotes desired conditions for healthy and functional watersheds, riparian areas, and vegetation.

O-WL-29 Additionally, during evaluation and restoration of one to two 5th level watersheds per year, known locations of the following sensitive aquatic species will provide priority areas for proactive management to improve habitats:

Lake Sturgeon

Shortjaw cisco

Northern brook lamprey

Creek heelsplitter

Fluted-shell mussel

Black sandshell

G-WL-19 Protect known sensitive mussel beds.

Sensitive Plants

O-WL-30 Enhance or restore high-quality habitat on a minimum of 20 (average of two sites per year) known sites of sensitive plants. Priority for habitat improvement will generally be for those species and habitats for which:

a. Proactive management (versus protection based on avoidance of any management activities) is needed to maintain species and

b. Coarse filter management does not provide adequate maintenance or restoration.

S-WL-8 Prohibit the harvesting of sensitive and State listed threatened and endangered plants. Exceptions may be made for scientific research purposes or in fulfillment of treaty rights.

Goblin Fern

S-WL-9 a) Activities that could disturb goblin ferns, their habitat, or microhabitat, should not occur within 250 feet of known goblin fern populations. The exception to this standard is for administrative studies or research that contributes to the conservation of the species.

b) In suitable habitat that is immediately adjacent and contiguous to existing populations beyond the 250-foot no-activity zone, site disturbing activities should occur only during frozen ground conditions (as evidenced by an absence of rutting, compaction, or breaking through the frost layer) and a minimum canopy closure of 70% should be maintained. (Single tree selection would generally meet desired conditions in this standard, but group selection harvest does not meet conditions desired in this standard because of the gaps created in proximity to occupied habitat.)

c) Minimize the likelihood of worm invasion in existing or potential habitat areas identified as having low potential for worm invasion. Such conditions exist where areas are void of roads and trails (or where densities can be minimized), developments, lakes and streams that support game fish, or are isolated due to wetlands or some other condition not conducive to worm colonization. Examples of actions to minimize worm invasion include limiting vehicle or OHV access, road building, or other activities that move soil into geologically isolated habitat.

G-WL-20 Avoid management activities that may change microclimate or microhabitat conditions in steep ravines or on cliffs and talus slopes that are known or are highly likely to harbor sensitive plants.

Sensitive Lichens:

Caloplaca parvula,Cetraria aurescens, and Sticta fulginosa, Menegazzia terebrata, Ramalina thrausta, and Usnea longissima

G-WL-21 Do not permit management activities within stands that have known locations of sensitive lichens unless activity maintains, protects or enhances habitat conditions for lichens (old growth black ash or lowland conifer with interior forest conditions).

Objectives, Standards, and Guidelines for Management Indicator Species

Bald Eagle – see above

Gray wolf – see above

Northern goshawk (also a sensitive species)

O-WL-31 Provide habitat to provide for population goal minimum: 20-30 breeding pairs.

S-WL-10 At northern goshawk nest sites with an existing nest structure, prohibit or minimize, to the extent practical, activities that may disturb nesting pairs in an area of 50 acres minimum (860 ft. radius) during critical nesting season (March 1 – August 30).

At northern goshawk nest sites in an area of 50 acres minimum (860 ft. radius), to the extent practical, allow only those activities that protect, maintain, or enhance high quality habitat conditions: 100% mature forest (>50 yrs old) with continuous forest canopy (>90% canopy closure) and large trees with large branches capable of supporting nests.

G-WL-22 Within northern goshawk post-fledging areas, minimize activities, to the extent practical, that may disturb nesting pairs during critical nesting season (March 1 – August 30) and, to the extent practical, within a 500 acre area encompassing all known nest areas within the territory:

Maintain suitable habitat conditions on a minimum of 60% of the upland forested acres in post-fledging areas. Suitable habitat: jack pine and spruce/fir forest types >25 years and all other forest types >50 years with semi-closed to closed canopy (>70%). Aspen and birch forest types 25-50 years may be considered suitable if field review verifies that foraging habitat trees average 50 feet tall and canopy closure is 50-70% or greater.

White pine

O-WL-32 Increase amount of white pine to amounts more representative of native plant communities by planting or naturally regenerating white pine trees in white pine forest types and in other upland deciduous, mixed, and conifer forest types. This objective matches white pine objectives shown in the Landscape Ecosystems Objectives section.

O-WL-33 Manage to improve white pine survival on planted sites and as many naturally regenerating sites as practical.

Objectives for Management Indicator Habitats

Definitions of the management indicator habitats (MIHs) are in Appendix C. The species most closely associated with MIHs (as identified during Plan revision) are found in the Final EIS, Appendix D.

All MIHs are compatible with and complementary to Landscape Ecosystem objectives for vegetation composition, structure, age, tree diversity, and social objectives and to management direction for other resources including vegetation, watershed health, and other wildlife resources.

By moving toward Decade 1 and 2 objectives for these resources the National Forest will move toward long-term desired conditions for desired amounts, quality and distribution of management indicator habitats and their associated species.

MIHs 1-9

Objectives for MIHs 1-9 are identified at the Landscape Ecosystem scale and can be found in the Landscape Ecosystem Objectives Section.

MIH 10: Riparian upland forest

O-WL-34 Provide a wide variety of vegetation conditions in the riparian zone to provide for the variety of species whose habitat includes riparian forest. Management will move conditions toward long-term desired conditions for vegetation composition, age, spatial distribution, within stand diversity, and ecological function described in sections on Watershed and Riparian management, Vegetation management, and Wildlife management.

MIH 11: Upland edge habitat (management-induced)

O-WL-35 Reduce amount of forest edge created through vegetation management activities, while still retaining a range of small patches and edge habitat.

MIH 12: Upland Interior forest habitat

Objectives for interior forest habitat are found in Vegetation Management direction section.

MIH 13: Large patches of upland mature forest

Objectives for large mature upland forest patches are found in Vegetation Management direction section.

MIH 14: Lake and stream habitat

O-WL-36 Maintain or improve lake and stream habitat quality. Objectives, standards, and guidelines are found primarily under Watershed and Riparian Management direction.

Objectives and Guidelines for Non-native Invasive Species

O-WL-37 Reduce the spread of terrestrial or aquatic non-native invasive species that pose a risk to native ecosystems.

O-WL-38 Use Integrated Pest Management to:

a. Eradicate any populations of new invaders

b. Contain or eradicate populations of recent invaders (*i.e.*, non-native invasive species that have only recently become established but are not widespread in the planning area)

c. Limit the spread of widespread, established invaders within the planning area

G-WL-23 During project implementation, reduce the spread of non-native invasive species.

Objectives, Standards, and Guidelines for Other Species of Interest

Game Species

O-WL-39 In coordination with the State, Tribes and other wildlife and fish management agencies, provide habitat for aquatic and terrestrial game populations. Quality, quantity, and distribution of habitats are guided at project level by the objectives for the management indicator habitats associated with the wide array of game species on the Forest.

Osprey

G-WL-24 Minimize activities that may disturb nesting pairs of osprey within 330 feet of the nest during critical nesting season (April 1 - August 15).

G-WL-25 From 330 to 660 feet from nest trees, allow only those management activities that maintain, protect, or enhance nesting area habitat.

Great Blue Heron

G-WL-26 Prohibit management activities within 330 feet of active heron colonies. Prohibit management activities from 330 to 660 feet from the heron colony from March 1 through August 31.

Common Loon

G-WL-27 Maintain high quality, secure nesting habitat. This may include construction of artificial nests.

G-WL-28 Minimize management activities and new developments or other uses near nest sites between May 15 and July 1. Minimize management activities or new developments near nest areas frequently used by people.

Standards & Guidelines for Aquatic Communities

G-WL-29 Minimize disturbance associated with management activities and maintain physical habitat characteristics associated with freshwater mussel beds.

S-WL-11 Minimize habitat degradation at Special Use Permit sites and developed and dispersed recreational sites where conditions contribute to riparian and fish habitat degradation.

S-WL-12 Where management activity is causing or may cause active bank erosion that is expected to contribute to a reduction in water quality and degradation of aquatic habitats, construct stabilization structures, plant vegetation, or otherwise manipulate vegetation to eliminate or minimize soil erosion while protecting and improving lakeshore or streamside environments and riparian habitats.

G-WL-30 Remove beaver dams where needed to maintain passage for sensitive aquatic organisms, meet objectives for fish habitat management or protect ecologically sensitive areas (for example, old growth forest, wild rice areas, trout streams, and northern white cedar forest) and capital improvements (for example, roads, recreation areas, and buildings) from flooding.

Social

Social and Economic Stability (SE)

Desired Condition

D-SE-1 The Forest provides commodity resources in an environmentally sustainable and acceptable manner to contribute to the social and economic sustainability and diversity of local communities.

D-SE-2 The Forest provides non-commodity opportunities in an environmentally sustainable and socially acceptable manner to contribute to social sustainability and vitality of local resident's way of life, cultural integrity, and social cohesion.

D-SE-3 The Forest continues to provide rare or unique benefits that may not be common on or available from other public or private lands, such as opportunities for experiencing solitude in remote settings, recreating where lakeshores are undeveloped, harvesting unique natural resources, and providing habitat for some Federal and/or State endangered, threatened, or sensitive species.

D-SE-4 The Forest continues to emphasize agency, tribal, and public involvement with increases in inter-governmental coordination with federal, state, county governments and agencies; a high level of communication and dialogue with a broad range of stakeholders; and successful dialogue between Tribal governments and Superior NF officials.

Objectives

O-SE-1 Contribute to local-scale social and economic vitality by promoting and/or protecting area cultural values, traditional employment, recreation opportunities, historical landscape features, commodity related natural resources, and aesthetic qualities of the forest.

O-SE-2 An annual and sustainable program of commercial timber sales and other products are offered and/or available.

O-SE-3 Increase accessibility of a diversity of people and members of underserved and low-income populations to the full range of uses, values, products, and services.

O-SE-4 Improve delivery of services to urban communities.

Tribal Rights and Interests (TR)

Desired Conditions

D-TR-1 Lands within the Forest serve to help sustain American Indians' way of life, cultural integrity, social cohesion, and economic well-being.

D-TR-2 The Forest Service continues to work within the context of a respectful government-to-government relationship with Tribes, especially in areas of treaty interest, rights, traditional and cultural resources, and ecosystem integrity. The Forests provide opportunities for traditional American Indian land uses and resources.

D-TR-3 Superior National Forest facilitates the exercise of the right to hunt, fish and gather as retained by Ojibwe whose homelands were subject to treaty in 1854 and 1866 (10 Stat. 1109 and 14 Stat. 765). Ongoing opportunities for such use and constraints necessary for resource protection are determined in consultation with the following Ojibwe Bands: Fond du Lac, Grand Portage, and Bois Forte.

Objectives

O-TR-1 Improve relationships with American Indian tribes in order to understand and incorporate tribal cultural resources, values, needs, interests, and expectations in forest management and develop and maintain cooperative partnership projects

where there are shared goals.

O-TR-2 Maintain a consistent and mutually acceptable approach to government-to-government consultation that provides for effective Tribal participation and facilitates the integration of tribal interests and concerns into the decision-making process.

O-TR-3 The Forest Service will work with the appropriate tribal governments to clarify questions regarding the use and protection of miscellaneous forest products with the objective of planning for and allowing the continued free personal use of these products by band members within the sustainable limits of the resources.

O-TR-4 Consult, as provided for by law, with Tribes in order to address tribal issues of interest and National Forest management activities and site-specific proposals.

O-TR-5 The Forest Service will administer projects and programs to address and be sensitive to traditional Native American religious beliefs and practices.

O-TR-6 Provide research, transfer of technology and technical assistance to Tribal governments.

Standards & Guidelines

S-TR-1 Affected Tribes will be consulted early in the planning process regarding proposed Forest land management activities in order to identify and address tribal interests.

S-TR-2 Affected Tribes will be consulted on land ownership disposal of Forest Service administered lands within reservation boundaries . This consultation should occur prior to any public scoping announcement and before any lands or parcels have been formally agreed upon for inclusion in a proposal or action.

S-TR-3 Forest management activities will be conducted in a manner to minimize impacts to the ability of Tribal members to hunt, fish, and gather plants and animals on Forest Service administered lands.

S-TR-4 Interests of the residents of local Indian communities will be addressed when planning and implementing vegetation and other resource management activities in close proximity to these communities.

S-TR-5 Affected Tribes will be consulted regarding opportunities for restoration, enhancement, and maintenance of native plant communities and wildlife species, including threatened, endangered, sensitive, or rare species that are of interest to tribes. Where tribal interest is indicated, cooperative programs for restoration and/or maintenance of these communities/species will be established.

S-TR-6 Environmental documents will disclose potential effects on cultural resources, traditional use areas and areas of special interest that include tribal cultural values, properties, and uses, and species of special concern.

S-TR-7 Decisions for environmental documents will demonstrate how tribal interests as identified in the environmental analysis were addressed.

G-TR-1 Interpretive programs may be designed to inform the public about American Indians, following consultation with the respective tribal government’s staff.

G-TR-2 Formal training of employees would emphasize relevant trust responsibilities, history, culture, and current issues.

G-TR-3 Plant and animal species of traditional use should be given consideration in any management project when desired and sought after by tribal members.

Heritage Resources (HR)

Desired Conditions

D-HR-1 Heritage resources are identified and managed to maintain and preserve the qualities for which they have been deemed significant, and for benefits that may include: research, education, historical perspectives in land management, and the general appreciation of American heritage.

Objectives

O-HR-1 Identify, evaluate, protect, monitor, and preserve heritage resources.

O-HR-2 Promote heritage values in public education and outreach.

O-HR-3 Contribute relevant historical and cultural perspectives to natural resource management.

Standards & Guidelines

S-HR-1 Heritage inventories meet current national guidance and professional standards. Heritage inventory and site data are current, accurate, and reside in the corporate automated database and mapping system (GIS).

S-HR-2 Properties are systematically evaluated against the National Register of Historic Places criteria of significance. Eligible heritage properties are nominated to the National Register of Historic Places. National Register eligible properties receive full consideration under the National Historic Preservation Act.

S-HR-3 Prehistoric and historic artifacts, investigation field records, and historic archival data are maintained to national curatorial and archival standards.

S-HR-4 Human remains, funerary objects, sacred objects, or objects of cultural patrimony are administered in accordance with Native American Graves Protection and Repatriation Act requirements.

S-HR-5 National Register listed and other designated historic properties are monitored in accordance with Forest land management plans, heritage preservation plans, site specific plans, and other inter-agency and tribal programmatic agreements.

S-HR-6 All heritage-related investigations are done under current valid authorizations.

S-HR-7 Human-caused damage, destruction, or removal of heritage structures and properties receives full consideration under the Archeological Resources Protection Act.

S-HR-8 Structural and non-structural stabilization, rehabilitation, restoration, and maintenance of historic properties is conducted in accordance with Forest level heritage protection plans and Forest land management plans, in consultation with the appropriate State and Tribal Historic Preservation Offices, the Advisory Council on Historic Preservation, and other interested parties; and in accordance with the Secretary of Interior's Standards and Guidelines for Historic Preservation, including National Park Service Technical Bulletins.

S-HR-9 Historic properties to be protected include protected areas ("buffers") beyond known site limits, determined on a case-by-case basis considering landform, vegetative cover, access, and planned project activities.

S-HR-10 For properties determined as not eligible to the National Register of Historic Places, management for heritage values is not required. Manage properties found to be eligible or potentially eligible (unevaluated) as if they were listed on the National Register. Reevaluate ineligible properties if additional evidence or information that may change that designation becomes available.

S-HR-11 Maintain appropriate heritage resource site confidentiality pursuant to Freedom of Information Act (exemption), Archeological Resources Protection Act, and National Historic Preservation Act.

G-HR-1 Paleo-environmental reconstruction, cultural-ecological, and ethno-historical data are applied where appropriate to unit management decisions, social assessments, environmental analyses, and other decision documents.

G-HR-2 Criteria for interpretive suitability include, but are not limited to: accessibility, property condition, confidentiality, and protective considerations, compatibility with other resource activities, and public interest or values.

Recreation (REC)

Desired Conditions

D-REC-1 The Forest provides a range of quality motorized and non-motorized recreation opportunities to satisfy diverse public interests while maintaining sustainable ecosystems

D-REC-2 The Forest emphasizes recreational activities and opportunities appropriate to remote natural settings. Remote natural settings have a predominantly natural appearance and have moderate evidence of human sights and sounds.

D-REC-3 The Forest provides developed sites, facilities, trails, water access sites, and other recreation opportunities within health and safety, resource protection, cost, and maintenance requirements.

D-REC-4 Universally accessible facilities that fit with site and program characteristics are offered. User convenience, visitor satisfaction, and anticipated visitor interactions are also considered when providing recreation opportunities.

D-REC-5 The Forest continues to administer a recreation special use permit program providing recreation opportunities at existing resorts, recreation residences, and camps. Existing permits would be reissued upon expiration provided they comply with their permit terms.

D-REC-6 In cooperation with other government agencies and private organizations, the Forest provides support for National Forest, State, and National Scenic Byways to enhance the byway's scenic resource, provide recreation and interpretive opportunities, address resource issues, and promote economic development.

D-REC-7 Recreation activities continue to occur with little or no disruption when forest management activities are near or adjacent to public use areas and facilities.

D-REC-8 Regulations, constraints, and supervision of recreation use are limited to those necessary for resource protection, visitor satisfaction, and safety.

D-REC-9 Foot travel throughout the Forest is welcome for the wide spectrum of recreation activities and opportunities such as hunting, orienteering, hiking, and bird watching as well as spiritual and cultural pursuits.

D-REC-10 In conjunction with State regulations, the Forest provides a range of quality hunting, trapping, and fishing opportunities.

D-REC-11 In cooperation with other agencies and groups, the Forests enhance existing and provide additional wildlife viewing opportunities.

Developed Recreation Sites

D-REC-12 The Forest provides developed recreation sites, such as campgrounds and picnic areas that accommodate the needs of a wide variety of visitors. Easy to access, safe, comfortable, and convenient facilities are provided in scenic environments. Most developed sites accommodate concentrated public use.

Dispersed Recreation

D-REC-13 The Forest provides dispersed recreation facilities such as campsites and picnic sites for small groups. Dispersed recreation opportunities emphasize a remote recreation experience, have few or no facilities, and are often near bodies of water or along roads and trails where public use is low.

Objectives

O-REC-1 Improve the capability of the Forest to provide diverse high quality outdoor recreation opportunities.

O-REC-2 Management activities will move toward the Recreation Opportunity Spectrum (ROS) class objectives in Table O-REC-1 and on Figure O-REC-1. Management activities may meet a less developed ROS class but cannot meet a higher developed class than the mapped ROS class objective for an area.

O-REC-3 Through project level planning, the Forest will consider management of some inventoried semi-primitive ROS areas for separate non-motorized or motorized

Table O-REC-1. Recreation Opportunity Spectrum (ROS) Class Objectives for the Superior NF (includes BWCAW)

ROS Class Objective	Percent of NFS Land
Primitive	5%
Semi-primitive Non-motorized	31%
Semi-primitive Motorized	7%
Roaded Natural	56%
Rural	1%

recreation uses.

O-REC-4 Maintenance of recreation facilities generally takes precedence over development of new facilities.

Standards and Guidelines

S-REC-1 Remove hazardous trees. Retain dead or dying trees not posing a hazard to people or facilities if they provide ecological benefits.

G-REC-1 Existing facilities, accesses, services, and use levels, which exceed the ROS class objective, will generally be permitted until they can be managed to meet the intended ROS class objective.

G-REC-2 Forest management activities will generally reflect recreation objectives while minimizing conflicts with recreation uses by:

a. Avoiding use of system trails for skidding logs
b. Minimizing crossing skid trails over system trails
c. Placing safety signing to warn recreationists of activities in an area
d. Piling slash and other logging debris out of view of recreation sites and system trails
e. Scheduling activities during low recreation use periods.

G-REC-3 User constructed improvements, such as campsite facilities and water accesses, will generally either be managed at the appropriate level or removed and the site rehabilitated.

Developed Recreation Sites

G-REC-4 Development of new campgrounds will generally not be considered.

G-REC-5 Vegetation will generally be managed to remove hazards, improve scenic quality, control insects or diseases, or meet other recreation purposes.

Dispersed Recreation

G-REC-6 Dispersed campsites will generally be located:

a. In areas not prone to erosion
b. With screening or other techniques to avoid being seen from the water or trail to mitigate potential visual impacts
c. With latrines a minimum of 150 feet from bodies of water
d. To meet surrounding ROS class objectives

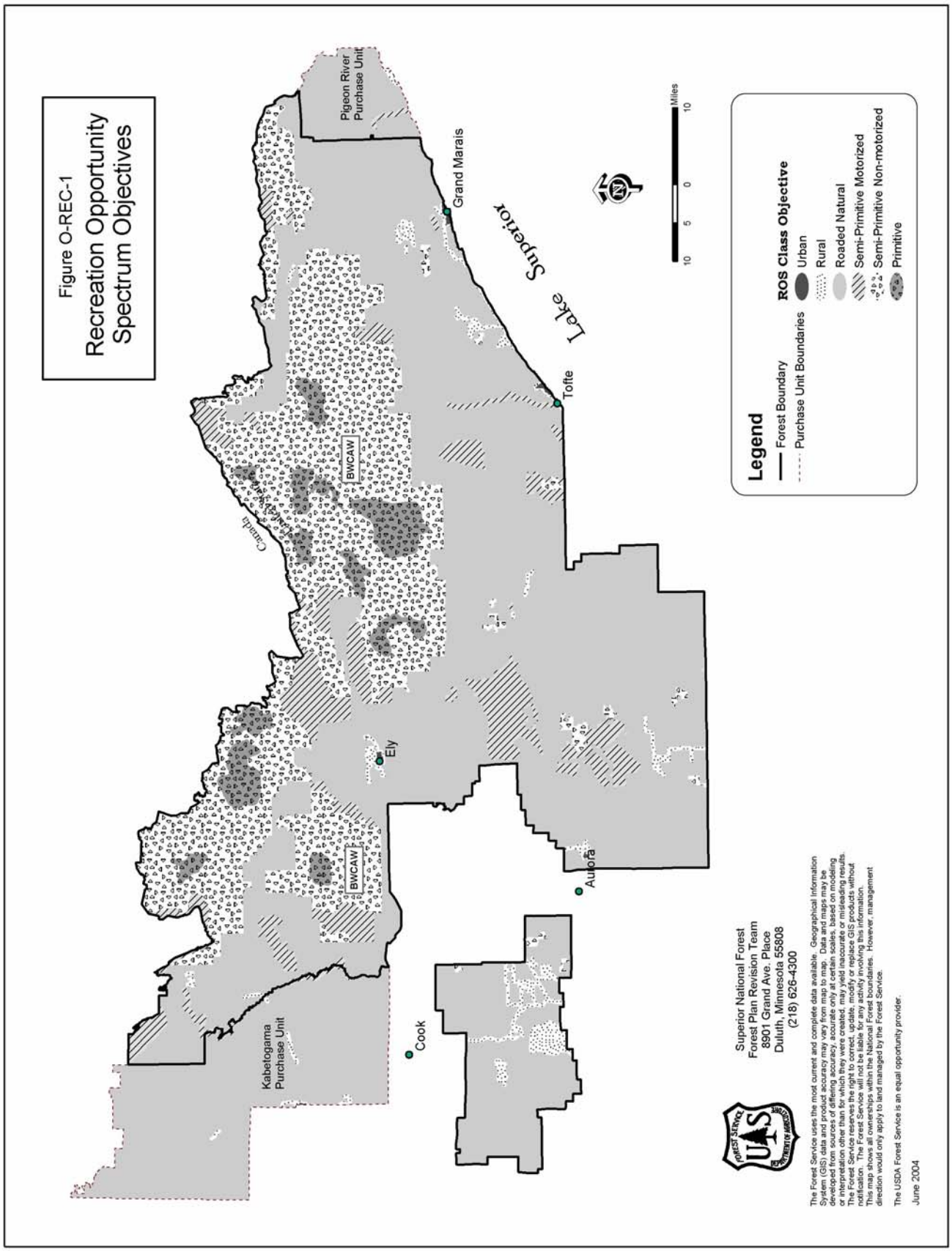
Figure O-REC-1
Recreation Opportunity Spectrum Objectives
Pigeon River Purchase Unit
Grand Marais
Lake Superior
Tofte
BWCAW
BWCAW
BWCAW
Ely
Aurora
Cook
Kabetogama Purchase Unit
Canada
Miles
10 5 0 10
Legend
Forest Boundary
Purchase Unit Boundaries
ROS Class Objective
Urban
Rural
Roaded Natural
Semi-Primitive Motorized
Semi-Primitive Non-motorized
Primitive
Superior National Forest
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The USDA Forest Service is an equal opportunity provider.
June 2004

Trails (RTL)

Desired Conditions

D-RTL-1 The Forest trail system provides a range of activities and experiences necessary to accommodate recreation uses while minimizing environmental and social impacts.

D-RTL-2 Trails are managed for their intended primary purpose and to avoid use conflicts

D-RTL-3 The Forest provides non-motorized trail opportunities in a variety of forest settings.

Objective

O-RTL-1 Proposed non-motorized trails that meet user demand and other forest management direction will generally be considered.

Standards & Guidelines

Also refer to direction in the Transportation Systems standards and guidelines.

S-RTL-1 For designated trails over ice:

a. All trails over ice will be signed providing notice of ice conditions.
b. The minimum ice depth for clear blue ice is listed below for trail use and grooming equipment. Ice that is soft, slushy, or cloudy needs additional thickness.
   - 4 inches: Foot travel, cross-country skiing
   - 5 inches: Snowmobiling, dog-sledding
   - 8 inches: 4000 pounds (e.g. Bombi groomer)
   - 12 inches: 7000 pounds (e.g. Passenger vehicles, pick-ups, larger trail groomers)
c. If a trail is located near hazardous ice or open water, the trail will be clearly marked with natural material defining the safe route.
d. Current trail condition information will be available at ranger stations and provided to media as appropriate.

G-RTL-1 Proposed new trails will generally be planned to avoid crossing ice. When practical, existing trails over ice (except those referenced in the BWCAW legislation) will generally be rerouted on to land.

G-RTL-2 User-constructed trails will generally either be removed and the trail rehabilitated, or incorporated into the National Forest Trail System and managed to standard.

G-RTL-3 During timber sale activities, combined use of roads or trails by logging trucks and motorized or non-motorized recreationists will generally be avoided when other routes are available.

G-RTL-4 National Forest System winter trails will generally not be located on plowed roads.

Recreational Motor Vehicles (RMV)

Desired Conditions

D-RMV-1 The Forest provides RMV road and trail riding opportunities with experiences in a variety of forest environments, while protecting natural resources.

D-RMV-2 Allowed, restricted, and prohibited RMV uses are clearly defined to the public. Where practical, RMV policies are consistent with adjacent public land management agencies.

D-RMV-3 On roads, trails, and in areas (cross-country) where RMV uses are prohibited, motorized access may be allowed for law enforcement, emergency, firefighting, maintenance, and other administrative purposes.

Objectives

O-RMV-1 A maximum of 90 additional ATV trail miles and 130 snowmobile trail miles with associated trail facilities (trailhead parking, signs, toilets, etc.) may be added to the designated National Forest Trail system.

Standards and Guidelines

Also refer to direction in the Wildlife and Transportation Systems standards and guidelines and to the glossary for RMV definitions

S-RMV-1 Motorized recreation use of designated National Forest System Trails is

prohibited unless the trail is designated open for specific motorized uses such as for ATVs, OHMs, and snowmobiles.

S-RMV-2 The Forest will not develop RMV challenge, mud hole, or scramble areas.

S-RMV-3 Cross-country OHV travel is prohibited. Standards and guidelines for cross-country snowmobile use are described in Chapter 3 because direction for that use varies by management area.

G-RMV-1 OHV use is generally prohibited on OML 3, 4, and 5 roads. OHV use may be allowed on specific segments of OML 3, 4, and 5 roads to provide connections to other roads and trails open to OHVs, if safety, resource, and other requirements can be addressed.

G-RMV-2 Snowmobile use is generally prohibited on plowed National Forest System roads.

G-RMV-3 Travel with OHVs is generally prohibited in ditches and on shoulders of National Forest System roads.

G-RMV-4 RMV use will generally be allowed on existing unclassified, OML 1, and OML 2 roads. (Except ORVs will generally be prohibited on OML 1 roads) Roads that are determined through site-specific analysis to have immitigable resource and social concerns and/or do not meet management objectives would be effectively closed. (See exceptions for Management Areas: wild segments of Eligible Wild, Scenic, and Recreational Rivers, Semi-primitive Non-motorized Recreation, Research Natural Areas, Candidate Research Natural Areas, and Unique Biological Areas.)

Water Access (RWA)

Desired Conditions

D-RWA-1 The Forest provides a range of water access sites with related recreation opportunities on lakes and river segments. Levels of facility development are appropriate to the lake and river classifications and ROS class objectives. Some lakes and river segments do not have any developed water access sites.

Objective

O-RWA-1 Associated recreational, subsistence, and commercial water uses at water access sites will enhance or maintain water quality, TES species, and viable populations of native species and desirable non-native species.

Standards and Guidelines

Refer to the glossary for lake and river classification definitions.

S-RWA-1 A maximum of ten new water accesses to bodies of water may be constructed. Reconstruction that would increase the capacity and type of use at a body of water is considered new access. Water access improvements that do not increase the capacity or type of use at user developed or managed sites would not be considered new access.

G-RWA-1 To ensure appropriate amount of use in relation to the size of a body of water, a maximum of one public ramp access for 10 – 15 river miles may be provided for Recreation and Forested River segments. Generally, a maximum of one access site may be provided for Natural Environment Lakes.

G-RWA-2 At lakes that are smaller than 150 acres, new ramp water accesses will generally not be constructed for use by vehicles or OHVs towing watercraft.

G-RWA-3 Parking lots at lakes or rivers with access facilities will generally be provided, but are not required. The maximum number of parking spaces provided will generally be:

a. One space per 20 acres on lakes up to 1,000 acres
b. One space per 30 acres on lakes 1,000 to 1500 acres
c. One space per 40 acres on lakes 1,500 to 5,000 acres

G-RWA-4 To maintain riparian resources and functions, lakes with less than 20 percent of the shoreline in public ownership will generally have low access development levels for facilities. (Also see G-RWA-9)

G-RWA-5 On lakes smaller than 250 acres in size and where sensitive aquatic species associated with aquatic vegetation occur; new ramp water accesses will generally not be constructed for use by vehicles or OHVs towing watercraft.

G-RWA-6 Lakes with no inlet or outlet will generally have low access development levels for facilities. (Also see G-RWA-9)

G-RWA-7 At new water access sites and existing developed ramps, educational signs will generally be installed to inform users of the potential to transfer exotic species between bodies of water, and the effects of exotic species introductions on aquatic habitats, on terrestrial habitats, and on native species

G-RWA-8 New recreational boat storage permits will generally not be allowed. Boat storage permits should be considered only for private access if there were no other reasonable alternatives per Alaska National Interest Lands Conservation Act (ANILCA).

G-RWA-9 Table G-RWA-9 indicates appropriate facility choices for new water access site development and maintenance. The table shows a gradation of potential facilities that are considered appropriate for low, moderate, or high development levels. The table does not imply that all facilities have to be constructed; rather it indicates the range of choices for facilities at each lake or river classification. Undesignated lakes or river segments will be treated as Natural Environment lakes until a coordinated classification is made with the State and county. During project-level analysis, if guidelines conflict with the ROS objective, the least development level will generally be selected. Water classification definitions are in the glossary. If a letter is not designated on the table, the facility is inappropriate at that water classification type.

Scenic Resources (SC)

Desired Condition

D-SC-1 The scenic environment within the Forest ranges from landscapes with high scenic quality, displaying little or no evidence of management activities, to landscapes with low scenic quality where evidence of management activities dominate. High scenic quality is protected or enhanced in landscapes with outstanding scenic value and in high public use recreation areas and corridors.

D-SC-2 In Moderate and High Scenic Integrity Objective (SIO) areas, vegetation management that is visible from travel ways, recreation sites, and lakes with access:

- Enhances views, creates vistas, and features natural openings,
- Retains canopies over travel routes,
- Encourages vegetative diversity and seasonal color contrast, and
- Enhances big-tree appearance.

D-SC-3 Permanent openings created through vegetative management will blend with the adjacent landscape and have a natural appearance that mimics natural openings.

Objectives

O-SC-1 Management activities will maintain the Forest's scenic resource values by meeting as a minimum the Scenic Integrity Objectives in Table O-SC-1 and on Figure O-SC-1. Higher SIOs may be managed for if deemed appropriate. Areas that do not currently meet SIOs will be considered for scenic enhancement and rehabilitation. (SIO boundaries lie at least one-quarter mile from the *actual location* of travel ways, recreation sites, and bodies of water with access.)

Table O-SC-1. Percent of Scenic Integrity Objectives for the Superior NF (Outside the BWCAW)	
Scenic Integrity Objectives	**Percent**
High	27%
Moderate	61%
Low	12%

Standards and Guidelines

S-SC-1 Management actions that result in the characterizations for an Unacceptably Low SIO are prohibited.

G-SC-1 Temporary openings should appear as follows:

High SIO Areas - Temporary openings will be similar in size, shape, and edge characteristics to natural openings in the landscape being viewed. Or, temporary

Table G-RWA-9. Guidelines for Facility Development Levels						
Water Access Facility Development Level Examples	**General Develop. Lake**	**Recreation Lake**	**Natural Environ. Lake**	**Recreational, Forested, & Remote River**	**Trout Stream**	**Tributary River**
Water-side trail	L	L	L	L	L	L
Carry –in access	L	L	L	L	L	
Backcountry latrine	L	L	L	L	L	
Portage	L	L	L	L	L	L
Fishing deck	M	M	M	M	M	
Dock large enough for single users and single activities	M	M	M	M	M	
Gravel or natural surfaced single lane ramp	M	M	M	M	M	
Small picnic area (1 – 3 tables)	M	M	M	M	M	
Toilet buildings (SST)	H	H	H			
Fishing pier	H	H				
Concrete surfaced single and double lane ramps	H	H				
Kiosk	H	H				
Picnic area (3 + tables)	H					
Dock large enough for multiple users and multiple activities	H					
Lighting and electricity	H					
Potable water	H					
Fish cleaning station	H					
Facility Development Levels: L = low, M = moderate, H = high						

openings will mimic a natural disturbance process typical for the area so that when ground cover has been established the opening appears to be a natural occurrence.

Moderate SIO Areas - Temporary openings may be more evident than in High SIO areas. Openings may be larger than those in the surrounding landscape, and after groundcover has become re-established openings may have the appearance of a management activity. Edge characteristics will be similar to those in the surrounding landscape and not dominate the surrounding landscape.

Low SIO Areas – Temporary openings may dominate the view. The shapes of openings reflect vegetation changes in natural openings. Openings also have visual effects and patterns of the shapes, sizes, and edges of natural openings in the surrounding landscape.

G-SC-2 The shape and arrangement of structures and improvements along shorelines, riparian areas, and within streams should appear natural and not impede the functional use of the structure.

G-SC-3 If fuel breaks are necessary, shaded fuel breaks are preferred. A shaded fuel break involves leaving some pruned standing trees and removing vegetation that could transmit fire from the ground to the tree's branches.

G-SC-4 Evidence of temporary activities (such as staking, paint, flagging, equipment maintenance, and staging areas) should be minimized, removed, or cleaned up immediately following project completion in High SIO areas.

G-SC-5 In Moderate and High SIO areas, log landings should be screened if they can be viewed from travel ways, recreation sites, and bodies of water with access. After project completion, log landings should be reforested or rehabilitated to mimic natural openings.

G-SC-6 In Moderate and High SIO areas, schedule mechanized activities during periods of low recreation use if the mechanized activities can be viewed from travel ways, recreation sites, and bodies of water with access.

G-SC-7 Furrows, trenches, fuel breaks, plantations, etc., should be located to reduce linear appearance if they can be viewed from travel ways, recreation sites, and bodies of water with access. Natural appearing edges rather than straight edges will generally be used.

G-SC-8 Utility lines should be buried.

G-SC-9 In Moderate and High SIO areas, minimize the negative visible impacts of overhead utilities or electronic sites if the utilities or electric sites can be seen from travel ways, recreation sites, and bodies of water with access.

G-SC-10 Minimize the negative visual impacts of new rights-of-way.

Transportation System (TS)

Desired Conditions

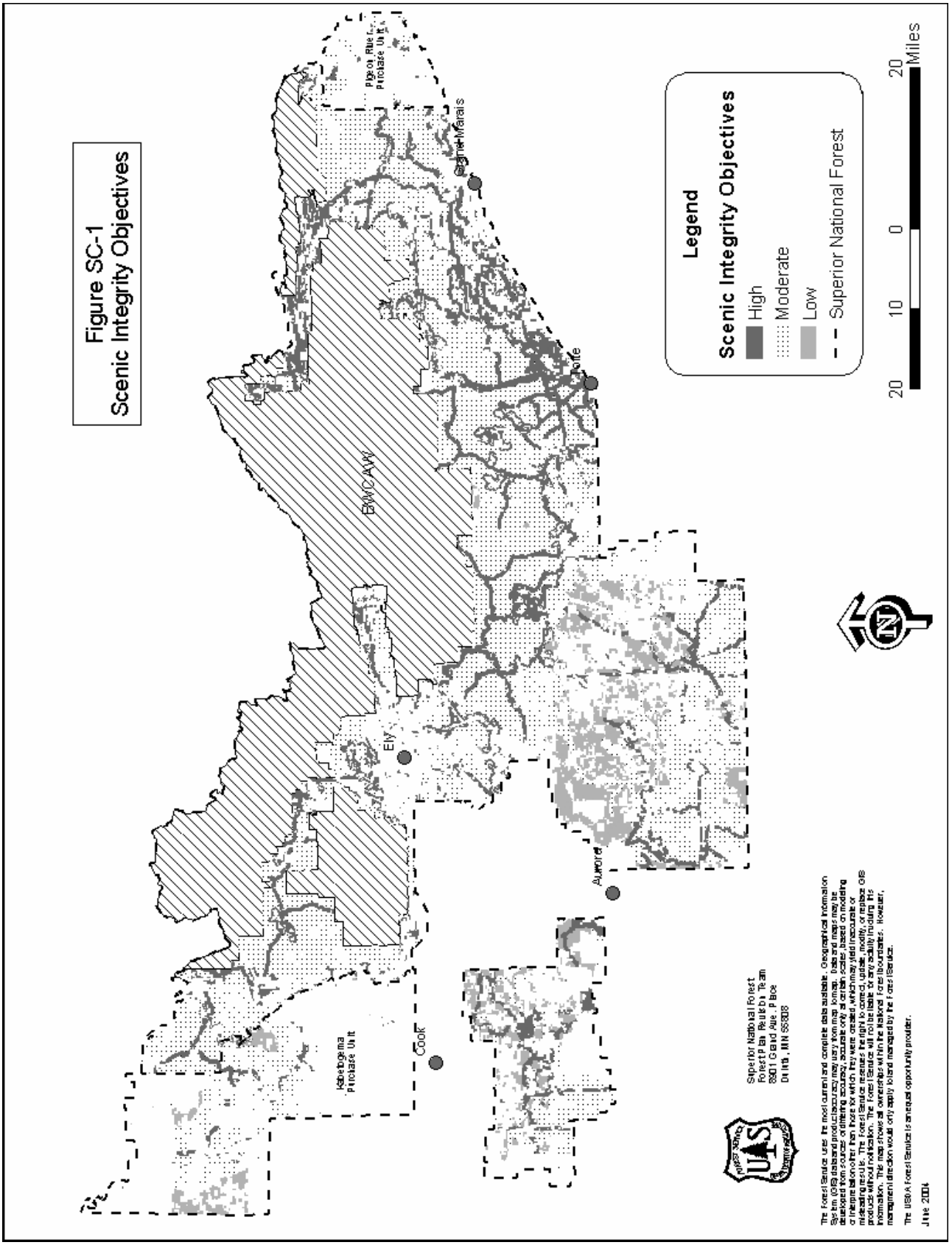
D-TS-1 The existing National Forest System roads that are suitable for passenger vehicles provide a safe and affordable system for administrative and public access to NFS land.

D-TS-2 The National Forest road system is the minimum needed to provide adequate access to both NFS and non-NFS land.

D-TS-3 The transportation system design considers environmental, social, and health concerns.

D-TS-4 The National Forest road system provides a "seamless" interface with the neighboring public road agencies based on coordinated use, function, and agency goals.

D-TS-5 Private and non-NFS landowners have reasonable access to their land.



SIO boundaries lie at least one-quarter mile from the actual location of travel ways, recreation sites, and bodies of water with access.

Objectives

O-TS-1 Improve the safety and economy of National Forest System roads and trails.

O-TS-2 Few new OML 3, 4, and 5 roads will be constructed.

O-TS-3 New roads built to access land for resource management will be primarily OML 1 or temporary and not intended for public motorized use. Temporary roads will be decommissioned after their use is completed. All newly constructed OML 1 roads will be effectively closed to motorized road and recreation vehicles following their use unless they are needed for other management objectives.

O-TS-4 Road and trail crossings of streams, wetlands, and riparian areas adjacent to lakes and streams will be minimized.

O-TS-5 Hydrologic and riparian functions will be maintained or improved when roads or trails are constructed across wetlands.

O-TS-6 Decisions will be made on Forest unclassified roads to designate them as a National Forest System road or trail or to decommission them.

O-TS-7 Unneeded roads will be decommissioned and closed to motorized vehicles. Roads that are not necessary for long-term resource management are considered "unneeded".

O-TS-8 The Forest will decommission approximately 80 miles of road.

Standards & Guidelines

Also refer to Wildlife, Watershed Health, RMV, and Trails standards and guidelines.

Road and Trail Construction, Reconstruction, and Maintenance

S-TS-1 Newly constructed or reconstructed road and trail crossings of streams will be designed and built to minimize erosion. Surfacing (such as gravel, crushed rock, or asphalt) will be used at all crossings where vegetative cover is either inappropriate or expected to be inadequate for effective long term erosion control. Solid surfaces will be used in the construction or reconstruction of bridge decks on unpaved roads.

S-TS-2 During non-frozen road surface conditions, close winter roads to all motor vehicle traffic.

G-TS-1 Generally use minimum road and trail design standards to meet the appropriate purpose of the road or trail and to fit the land characteristics (form, line, texture, TEUI units, etc.).

G-TS-2 Road or trail reconstruction will generally follow the existing corridor alignments.

G-TS-3 New roads and trails constructed in High and Moderate SIO areas will generally blend in with the surrounding landscape as much as practical.

G-TS-4 Roads and trails will generally be designed so that stream crossings are not located at the low point in the road grade (e.g. avoid bridge and culvert locations where sediment-laden runoff from the road approaches or ditches can collect and directly enter the stream).

G-TS-5 Clearing widths for roads and trails at riparian area crossings will generally be kept to the minimum needed to provide a safe and functional crossing.

G-TS-6 Where practical and beneficial, all stream crossing structures and associated road embankments in the flood-prone areas on OML 1 roads will generally be removed if the road will not be used again within five years.

G-TS-7 Construction or reconstruction of permanent roads or parking lots will generally be avoided within the 150 feet of perennial streams or lakes, except in the situations where:

a. Physical conditions preclude road locations at distances greater than 150 feet.
b. Roads are needed to approach a designated stream crossing or water access site.
c. Parking lots are needed to serve a designated water access site.

G-TS-8 Adjacent to roads and trails, generally manage erosion and sedimentation to maintain water flow to protect natural stream behavior and allow for natural aquatic species movement.

G-TS-9 Where roads and trails cross streams, generally use structures that permit passage for fish and aquatic life and properly distribute flood flow, bankfull flow, and sediment transport capacity. Generally favor bridges and arches (including temporary bridges where appropriate) rather than culverts.

G-TS-10 Where ditches are needed, generally use techniques to minimize subsurface flow interception and flow concentration.

G-TS-11 Restrictions on using National Forest System roads and trails may be required under certain circumstances, such as short-term closures during spring thaw.

G-TS-12 On existing OML 1 roads, an effective barrier will generally be installed as needed to prevent use by highway-licensed vehicles and ORVs. ATV and OHM use may continue to be allowed on some existing OML 1 roads.

Temporary Roads

S-TS-3 As soon as access use is completed, stabilize temporary roads and effectively close them to motorized traffic. Vegetation will be established within 10 years after the termination of the contract, lease, or permit.

G TS-13 Locate temporary roads in areas where they minimize resource damage.

G TS-14 Temporary roads are generally not intended for public use, but public use may be temporarily allowed if needed to meet management objectives.

Road Decommissioning

S-TS-4 Decommission unclassified roads that are not needed in the National Forest road and trail system and special use permitted roads that are no longer needed. Decommissioning will make the road unusable by motorized vehicles and stabilize the roadbed.

G-TS-15 In High and Moderate SIO areas, generally obliterate roads and trails that are decommissioned and restore to a natural appearance.

G-TS-16 Roads and trails designated for decommissioning will generally be subject to the following:

a. The road or trail will be rendered unusable by motorized vehicles but may remain accessible to foot travel.
b. Stream crossing structures will be removed.
c. Road and trail fills will be removed from flood prone and wetland areas to restore stream and wetland crossings to original contours.
d. Removed fill will be reused or disposed of in a way that will not restrict flow or contaminate surface water.
e. Exposed soil will be revegetated.

Wilderness

Desired Condition (from the BWCA Wilderness Plan)

The Forest Service will manage the BWCAW in a manner that perpetuates and protects its unique natural ecosystems, provides an enduring wilderness resource for future generations, and provides opportunities for a primitive and unconfined recreation experience.

Protect and Perpetuate Natural Ecosystems

Natural successional changes and those associated with natural phenomena, such as fire or windstorms, will be the dominant force in ecosystems.

Soil, air, water, vegetation, wildlife, and fish will be protected from human degradation.

Impacts from recreation and other uses will be within the limits of acceptable change, or the impacts will be prevented through maintenance or mitigated through rehabilitation.

Cumulative effects on soil, water, vegetation, wildlife, and fish will be mitigated by controlling party size and use levels.

An interdisciplinary team will be involved in planning

projects where major ground disturbance may occur, such as closing and/or rehabilitating campsites or building new campsites.

Provide an Enduring Resource of Wilderness for Future Generations

Facilities will be provided only where necessary for resource protection.

Campsite and portage work will be kept to the minimum necessary to protect the resource. Work will be completed in a manner that protects and perpetuates the wilderness character and appears to be a part of the environment and not an intrusion.

Vegetation will be managed only to protect wilderness values or adjacent property. Seeding or planting for rehabilitation will result in mixtures and arrangements similar to adjacent natural vegetation.

Heritage resources will be systematically inventoried, evaluated, and protected.

Provide for Unconfined Primitive Recreation Opportunities

An education program will increase the awareness and understanding of wilderness values.

Established use levels will ensure campsite availability in travel zones.

Opportunities for solitude will be enhanced by controls on party size, watercraft numbers, and reduced entry quotas.

The Primitive Wilderness Management Area provides an enhanced range of opportunities for solitude and challenge.

A high degree of challenge will be provided by minimal maintenance and signing.

Commercial operations may provide services that are in keeping with wilderness values. To ensure this, all commercial operations will be authorized by special use permit.

Objectives

Improve the capability of wilderness to sustain a desired range of benefits and values.

Land Adjustment (LA)

Desired Condition

D-LA-1 The amount and spatial arrangement of National Forest System land within the proclamation boundary of the Forest are sufficient to protect resource values and interests, improve management effectiveness, eliminate conflicts, and reduce the costs of administering landlines and managing resources.

Objectives

O-LA-1 Through various land adjustment procedures (e.g., purchase, donation, and exchange) and a landownership adjustment map, secure a land ownership pattern that supports and enhances total Forest Plan resource management objectives.

O-LA-2 The Land Adjustment Zone Map and descriptions of zones will be referenced by the Forest Plan. The map will be updated on an as needed basis.

O-LA-3 Mineral interest beneath National Forest System land will be acquired when opportunities arise to protect surface interests within the BWCAW, Research Natural Areas, Candidate Research Natural Areas, and Unique Biological Areas.

Standards & Guidelines

G-LA-1 Fee simple estate will generally be acquired, but less than fee simple interest may be acceptable.

G-LA-2 Land acquisitions will generally be guided by the following criteria:

Priority 1 (a, b, and c are not listed in order of importance)

1(a) Land needed for habitat for federally listed endangered, threatened, proposed, or candidate species or for Regional Forester sensitive species.

1(b) Land needed to protect significant historical and cultural resources, when these resources are threatened or when management may be enhanced by

public ownership.

1(c) Land needed to protect and manage administrative or Congressionally designated, unique, proposed, or recommended areas.

Priority 2 (a thru f are not listed in order of importance)

Key tracts that will promote more effective management and will meet specific needs for management, such as:

2 (a) Land that enhances recreation opportunities, public access, and aesthetic values.

2 (b) Land needed to enhance or promote watershed restoration or watershed improvements that affect the management of NFS land riparian areas.

2 (c) Environmentally sensitive and/or ecologically rare lands and habitats.

2 (d) Wetlands.

2 (e) Land and associated riparian ecosystems on water frontage such as lakes and major streams.

2 (f) Land needed to achieve ownership patterns that would lower resource management costs.

Priority 3

3 (a) All other land desirable for inclusion in the National Forest System.

G-LA-3 The following National Forest System land is generally not needed for other resource management objectives and is potentially available for conveyance through exchange or other means (not listed in order of importance).

(a) Land inside or adjacent to communities or intensively developed private land, and chiefly valuable for non-National Forest System purposes.

(b) Parcels that will serve a greater public need in State, county, city, or other federal agency ownership.

(c) Inaccessible parcels isolated from other National Forest System land and intermingled with private land.

(d) Parcels that would reduce the need for landline maintenance and corner monumentation, result in more logical and efficient management, and improve land ownership pattern.

(e) Tracts that are difficult or expensive to manage due to rights-of-way problems, complex special use permits, or tracts with significant property boundary issues.

(f) On a case-by-case basis land beneath or adjacent to resorts and summer home groups, currently under special use permits, may be considered for conveyance.

G-LA-4 National Forest water frontage land will generally be conveyed only in situations where land with significant water frontage resource values will be acquired and the exchange is clearly in the public interest.

G-LA-5 For land acquisitions within the BWCAW, all rights, title or interest will generally be acquired, when possible. State of Minnesota School Trust Lands and other State holdings will generally be acquired, if offered, through purchase or donation. Acquisitions of Minnesota School Trust Lands and other State holdings through land exchange will generally be limited and only considered if the public is well served.

Special Uses (SU)

Objectives

O-SU-1 Outside of the BWCAW, generally provide for utility transmission corridors and communication sites. Emphasize the use of common corridors and multiple use sites when granting appropriate right-of-ways.

O-SU-2 Attempt to meet demand for special use activities when consistent with the Forest Plan direction and when the proposed use cannot be accommodated on non-NFS

land.

O-SU-3 Continue to administer a recreation special use program providing for recreation uses associated with the existing resorts, residences, camps and other recreation special uses. Recreation special uses will continue where their use enhances the recreation potential of the area, meets an apparent public need, and is compatible with other multiple-use goals and objectives.

O-SU-4 Manage permits for recreation residences by providing for the continuation of existing permits and re-issuance of expiring permits. However, do not issue any new permits on existing undeveloped recreation residence lots.

O-SU-5 Permit existing organization camps to remain under special use permit as long as their operations and management continue to meet the stated purposes of the permit. Allow presently unused facilities, currently not under permit, to be placed under permit for a five-year term if there is a demonstrated need. Consider proposals for new camps to be constructed where the proposed use would meet a specific public demand that cannot be met on other ownership.

Standards & Guidelines

G-SU-1 Whenever feasible, utility lines will be buried within existing road rights-of-way.

Public Health and Hazardous Materials (PH)

Desired Conditions

D-PH-1 Public and employee health and safety is of primary consideration while managing the National Forest.

D-PH-2 Constructed and natural site-specific amenities designated as actively managed by the national forest are healthy and safe for the public to use.

D-PH-3 Hazardous materials:

a. Soil, water, and air resources on the Forest are not contaminated with hazardous materials.

b. Known sites of hazardous materials are managed and mitigated so that public health and natural resources are not negatively affected.

c. Hazardous material events are coordinated smoothly with other agencies involved in the situation and Forest interests are represented.

d. Stored hazardous materials pose the smallest possible threat to personnel and the environment.

D-PH-4 Water Supplies and Wastewater Treatments:

a. Federal sewage disposal and other developments do not adversely affect water resources.

b. Public and non-public water supplies are safe for use.

Objectives

O-PH-1 Public and non-public water and wastewater systems are updated, maintained, and managed to the standards set forth in the appropriate federal guidelines and applicable state standards during this plan period.

O-PH-2 Hazardous materials are appropriately stored in approved facilities, and are transported safely if necessary for forest management.

O-PH-3 Known abandoned wells will be grouted and unused wells will be capped and maintained to prevent groundwater contamination.

O-PH-4 Forest owned facilities and designated recreation sites and/or natural resource amenities are inspected and managed to ensure safe operation.

O-PH-5 Where possible, minimize use of hazardous materials. Make more frequent use of non-hazardous substitute materials; and safe use and storage of hazardous materials.

Standards & Guidelines

S-PH-1 Uncommon events such as windstorms and wildfires will be addressed in a manner appropriate to the situation and location in accordance with current standards and regulations

S-PH-2 All spills and contaminated soil sites will be quickly cleaned up in conformance with federal and State guidelines.

G-PH-1 Nonfederal sewage waste disposal on National Forest lands will generally not be permitted

G-PH-2 Equipment refueling will generally not be done in wetlands (Ecological Landtypes 2, 4, 5, or 6), other areas with poorly drained soil, filter strips, or riparian management zones. In those rare instances where refueling operations in such areas are necessary, operators will have ready access to a fuel spill kit consisting of items such as a shovel, sorbent pads, kitty litter and plastic sheeting. Store fuels in compliance with State regulations for above-ground and temporary storage tanks. .

S-PH-3 Treatment of hydrocarbons/contaminated soil (soil farming, composting, etc.) will only be permitted on ELTs 10, 13, 14 and 15 on the SNF. Treatment activities will conform to federal and state guidelines.

LANDSCAPE ECOSYSTEM OBJECTIVES - NORTHERN SUPERIOR UPLANDS

Overview

Vegetation Objectives Overview

This section provides more vegetation management direction to complement direction in Chapter 2 Forest-wide Management Direction and Chapter 3 Management Area Direction. The vegetation objectives displayed in this section will serve as the basis for identifying opportunities to begin moving vegetation from existing conditions (Year 2003) toward long-term desired conditions (Year 2103). These objectives are shown for each individual Landscape Ecosystem (LE) for:

- Vegetation composition by forest type (the first table of LE objectives, Table JPB-1 for instance)
- Vegetation age by age class (the second table of LE objectives, Table JPB-2 for instance)
- Tree species diversity or mix (the third table of LE objectives, Table JPB-3 for instance)
- Management Indicator Habitats 1-9 (the fourth table of LE objectives, Table JPB-4, for instance)

Vegetation objectives set the direction for changes the National Forest will strive to make within the next two decades to move the vegetation toward the long-term desired conditions. Limited short-term options exist to increase mid-aged sapling-pole sized tree growth stages to meet objectives, though in the long term these can be met. Objectives are stated as percentages because it is unlikely that acres objectives could be matched precisely. It will be important to monitor these objectives to both evaluate progress from our management activities and to address the possibility of changing inventoried vegetation conditions unrelated to our activities. These may include changes from natural disturbances or changes from the way forest type and ages are measured. In particular, evolving technologies for forest measurements are likely to provide more accurate inventories of type and age than exist currently.

Vegetation objectives are for National Forest System land only. The objectives are not for the Boundary Waters Canoe Area Wilderness. Objectives were developed considering the past, current, and future expected vegetative conditions of all land within the Northern Superior Uplands, including the Boundary Waters Canoe Area Wilderness and other land ownerships.

Landscape Ecosystems

Vegetation objectives were developed for the ecological scale and context of Landscape Ecosystems (LE). See Figure NSU-1.

LEs are ecological areas derived from a combination of individual or groupings of native plant communities, ecological systems, and Terrestrial Ecological Unit Inventories at the Landtype Association and Ecological Landtype scales. Each LE is characterized by its dominant vegetation communities and patterns, which are a product of local climate, glacial topography, dominant soils, and natural processes, such as succession, fire, wind, insects, and disease. The LEs of the Superior National Forest nest into the Northern Superior Upland Section of the National Ecological Hierarchy.

Detailed maps, land ownership, information on Landscape Ecosystem composition, structure and ecological processes, and information on the Aquatic and Terrestrial Ecological Unit Inventories are found in the planning record for the Final Environmental Impact Statement for forest plan revision. These resources, along with expected future developments of applicable scientific information, will help identify ecological capability, appropriate management practices, and management limitations important to achieve desired conditions and

objectives.

Social and Economic Context

After the LE objectives are presented, the social and economic context of the LE is shown. Management Areas provide the context within which to make implementation decisions for vegetation management considering other multiple-use objectives and resource desired conditions. The fifth table (Table JPB-5 for instance) presented for each LE, lists the percentage of each management area in the LE.

Key to Numbering

NSU	Northern Superior Uplands Section
JPB	Jack Pine/Black Spruce LE
DRW	Dry-mesic Red and White Pine LE
MRW	Mesic Red and White Pine LE
MBA	Mesic Birch/Aspen/Spruce-fir LE
SMA	Sugar Maple LE
LLC	Lowland Conifer LE

Printer: insert "Figure NSU-1" 11x17" color map, accordion fold, blank on the back side

back side of Figure NSU-1

Table NSU-1.shows how much of the Northern Superior Uplands Section is comprised of each Landscape Ecosystem and how lands are distributed between National Forest system lands (NF) and other ownerships. It is included here to provide context for the Landscape Ecosystem.

Tables NSU-2 and NSU-3 and NSU-4 provide Forest-wide summaries of Landscape Ecosystem objectives for upland forest types and forest age (how much of each forest type is desired by acre and percent) for the first ten and twenty years of Decades 1, and 2 of implementation of the Forest Plan (Decades 1 and 2). Lowland forest types are summarized in the section on Lowland Conifer LEs. For reference, the table also displays existing conditions (Year 2003) and long-term 100-year goals to show the differences between where conditions are today and where the long-term desired future conditions are.

The objectives are for National Forest System land only, outside the Boundary Waters Canoe Area Wilderness. *(Objectives were developed considering the conditions of the Boundary Water Canoe Area Wilderness and the conditions of other ownerships.)*

Table NSU-1. Landscape Ecosystems within the Northern Superior Uplands Section: acres and estimated percent by ownership.[1] (SNF) Superior National Forest; (Pvt) Private land

Landscape Ecosystem	Total Acres (all ownerships) and (%) of Section	SNF	State	County	Pvt	State Park
Jack Pine/Black Spruce	1,069,900 (21%)	83%	4%	2%	10%	0%
Dry-mesic Red and White Pine	706,700 (14%)	36%	15%	13%	33%	1%
Mesic Red and White Pine	757,000 (15%)	22%	9%	28%	38%	0%
Mesic Birch/Aspen/Spruce-Fir	1,075,300 (21%)	36%	17%	9%	33%	1%
Sugar Maple	290,700 (6%)	22%	18%	19%	36%	3%
Lowland Conifers (including Rich Swamp)	1,289,300(25%)	37%	22%	13%	28%	0%
Total	5,188,900					
Total % of NSU on NF lands		42%				

[1] Source: Estimates from Superior NF & Natural Resources Research Institute (2003)

Table NSU-2. Forest-wide Vegetative Composition Objectives for Upland Forested Land. Lowland vegetation objectives are to maintain the same acres and percent of existing forest types.

Forest Type	Existing 2003		Objectives		
			Decade 1	Decade 2	Long-term 100 Year Goal
	Acres	%	%	%	%
Jack Pine	103,000	11%	12%	13%	19%
Red Pine	76,600	8%	8%	8%	9%
White Pine	31,100	3%	4%	5%	6%
Spruce-fir	167,000	17%	19%	20%	21%
Oak	700	0%	0%	0%	0%
Northern Hardwoods	37,900	4%	4%	4%	4%
Aspen	439,300	46%	42%	39%	31%
Paper Birch	106,400	11%	10%	10%	10%
Total	962,000	100%	100%	100%	100%

Table NSU-3. Forest-wide Vegetative Age Class Objectives for Upland Forested Land.

Age Class	Existing 2003		Objectives		
			Decade 1	Decade 2	Long-term 100-Year Goal
	Acres	%	%	%	%
0-9	109,000	11%	10%	11%	9%
10-49	322,700	34%	43%	46%	34%
50-99	429,800	45%	35%	28%	37%
100-149	97,500	10%	11%	16%	8%
150+	3,000	0%	0%	1%	12%
Total	961,969	100%	100%	100%	100%

Table NSU-4. Forest-wide Vegetative Age Class Objectives for Lowland Forested Land.

Age Class	Existing 2003		Objectives		
			Decade 1	Decade 2	Long-term 100-Year Goal
	Acres	%	%	%	%
0-9	1,100	0%	3%	3%	4%
10-49	18,800	7%	6%	7%	16%
50-99	118,100	47%	39%	26%	19%
100-149	91,800	36%	40%	47%	19%
150+	23,300	9%	13%	17%	43%
Total	252,900	100%	100%	100%	100%

Jack Pine/Black Spruce Landscape Ecosystem

Vegetation Composition Objectives

Table JPB-1 shows forest types objectives (percent desired) for Decades 1 and 2. For reference, the table also displays existing conditions (Year 2003) and long-term goals (Decade 10) to show the differences between where conditions are today and where the long-term desired future conditions are. The objectives are for National Forest System land only, outside the Boundary Waters Canoe Area Wilderness. *(Objectives were developed considering the conditions of the Boundary Waters Canoe Area Wilderness and the conditions of other ownerships.)*

Table JPB-1. Vegetation Composition Objectives for Jack Pine/Black Spruce Landscape Ecosystem.

Upland Forest Type	Existing (2003)		Objectives		
			Decade 1	Decade 2	Long-term 100 Year Goal
	Acres	%	%	%	%
Jack Pine	64,900	24%	28%	32%	45%
Red Pine	25,700	10%	10%	10%	9%
White Pine	7,400	3%	3%	3%	2%
Spruce-fir	33,800	13%	15%	16%	6%
Oak	200	0%	0%	0%	0%
Northern Hardwoods	1,800	1%	0%	0%	0%
Aspen	119,500	45%	40%	35%	33%
Paper Birch	14,300	5%	5%	4%	5%
Total	267,600	100%	100%	100%	100%

Age Class Objectives

Table JPB-2 shows forest age class objectives (percent desired) for Decades 1 and 2. For reference, the table also displays existing conditions (Year 2003) and long-term goals (Decade 10) to show the differences between where conditions are today and where the long-term desired future conditions are. The objectives are for National Forest land only, outside the Boundary Waters Canoe Area Wilderness. (Objectives were developed considering the conditions of the Boundary Waters Canoe Area Wilderness and the conditions of other ownerships.)

Table JPB – 2. Vegetation Age Class Objectives for Jack Pine/Black Spruce Landscape Ecosystem.

Age Class	Existing (2003)		Objectives		
			Decade 1	Decade 2	Long-term 100 Year Goal
Uplands	Acres	%	%	%	%
0-9	26,000	10%	14%	14%	11%
10-39	100,400	38%	42%	44%	44%
40-79	63,900	24%	18%	18%	33%
80-179	66,300	25%	22%	17%	8%
180+	10,700	4%	5%	7%	1%
Total	267,600	100%	100%	100%	100%

Tree Species Diversity Objectives

Table JPB-3 below shows objectives for the direction of change in tree species in the Landscape Ecosystem. The objectives are based on the percentage of total number of individual trees by species. Objectives specify direction of change because exact percentages on National Forest land alone are not calculated. Managers must consider more detailed ecological information, together with other multiple use objectives and desired resource conditions, to make decisions about where, when, and how much to increase, decrease or maintain tree species diversity. Those decisions will support the overall objective to move the relative diversity of tree species composition to conditions that are more representative of native vegetation communities.

Tree species diversity objectives differ from the forest type objectives in Table JPB1 above in that they address the desired direction for total percentage of trees, not total acres of forest type. These objectives are complementary to the forest type objectives since tree species diversity objectives may be achieved in two ways:

- The percent of trees of a given tree species (relative to the percent of other tree species) may be modified by changing the forest type dominated by that tree species (for example, white pine may be increased by increasing acres of white pine forest type) or
- The percent of trees of a given tree species (relative to the percent of other tree species) may be modified by managing for forest types that are more mixed (for example, white pine may be increased by interplanting white pine in an aspen-spruce-fir forest type).

The objectives are for National Forest land only, outside the Boundary Waters Canoe Area. *(Objectives were developed considering the conditions of the BWCAW and the conditions of other ownerships.)*

Table JPB-3. Tree Species Diversity Objectives for Jack Pine/Black Spruce Landscape Ecosystem. Change from existing condition:
(+) = Increase (-) = Decrease (m) = Maintain

Species	Historical Condition[1]	Existing Condition[2]	Objective
	Percent	Percent	
Jack Pine	28	11	+
Paper Birch	15	14	+
Aspen	13	23	-
Black Spruce	13	17	m/-
Tamarack	7	1	+
Balsam Fir	8	18	-
Red Pine	5	4	m/+
White Spruce	5	2	+
White Pine	4	1	+
White Cedar	2	1	+
Red Maple	<1	6	-
Lowland Hardwoods	<1	2	m/-
Other	0	<1	m
Total [3]	100	100	

[1] Historical conditions are based on tree data analysis of bearing trees in the late 1800s to early 1900s in the Government Land Office land survey notes.
[2] Existing conditions are based on 1990 Forest Inventory and Assessment plot data estimates of stem density by species.
[3] Totals may not add up to 100% due to rounding up.

Table JPB-4. Management Indicator Habitat Objectives for Jack Pine-Black Spruce Landscape Ecosystem. Change from existing condition: (+) = Increase (-) = Decrease (m) = Maintain

#	Management Indicator Habitats	Young Seedling Open				Mature				Old/Old Growth and Multi-aged			
		Existing Ac (1000s)	Decade			Existing Ac (1000s)	Decade			Existing Ac (1000s)	Decade		
			1	2	10		1	2	10		1	2	10
1	Upland forest	29.2	+	+	+	75.8	-	-	-	67.7	-	-	-
2	Upland Deciduous	12.3	+	+	+	41.8	-	-	-	37.3	-	-	-
3	Northern Hardwoods	0.1	-	-	-	1.4	+	m	-	0	m	+	+
4	Aspen-Birch	12.2	+	+	+	40.3	-	-	-	37.3	-	-	-
5	Upland Conifer	16.9	+	+	-	34.0	+	+	+	30.4	+	+	+
6	Upland Spruce-Fir	5.7	-	-	-	12.4	-	-	+	6.7	+	+	+
7	Red and White Pine	4.3	-	-	+	12.0	+	+	-	1.5	+	+	+
8	Jack Pine	6.8	+	+	+	9.6	+	+	+	22.2	-	-	-

Management Indicator Habitat Objectives

Table JPB-4 below shows the objectives for the direction of change for management indicator habitats (MIHs) 1-10 in the Landscape Ecosystem for Decades 1 and 2. For reference, the table also displays existing conditions (Year 2003) and the long-term goals (Decade 10) to show the differences between where conditions are today and where long-term desired conditions are. The objectives are for NFS land only, outside the BWCAW. Though percent objectives are not specified for each MIH, each objective corresponds to and is compatible with the LE Vegetation Composition and Age Objectives.

Detailed descriptions of the forest types and ages that comprise MIHs are found in Appendix C. The species associated with each MIH are found in Appendix D of the Final EIS and the planning record.

Objectives for MIHs 10-14 are found in the Terrestrial and Aquatic Wildlife Forest-wide Management Direction Section.

Social and Economic Context: Management Areas

This Landscape Ecosystem is comprised of Management Areas shown in Table JPB-5. Management Areas provide the social and economic context within which to make implementation decisions for vegetation management considering other multiple use objectives and resource desired conditions. Management Area desired conditions, objectives, and standards and guidelines are found in Chapter 3.

Table JPB-5. Management Area allocation within Jack Pine-Black Spruce Landscape Ecosystem.

	Percent
General Forest	16
General Forest - Longer Rotation	11
Recreation Use in a Scenic Landscape	4
Eligible Candidate Wild, Scenic and Recreational Rivers	<1
Semi-primitive Motorized Recreation	2
Semi-primitive Non-motorized Recreation	<1
Unique Biological Areas	<1
Riparian Emphasis Areas	<1
Research Natural Areas	<1
Research Natural Areas	<1
Wilderness	66
TOTAL	100

Dry-mesic Red and White Pine Landscape Ecosystem

Vegetation Composition Objectives

Table DRW-1 shows forest types objectives (percent desired) for Decades 1 and 2. For reference, the table also displays existing conditions (Year 2003) and long-term goals (Decade 10) to show the differences between where conditions are today and where the long-term desired future conditions are. The objectives are for National Forest System land only, outside the Boundary Waters Canoe Area Wilderness. *(Objectives were developed considering the conditions of the Boundary Water Canoe Area Wilderness and the conditions of other ownerships.)*

Table DRW-1. Vegetation Composition Objectives for Dry Mesic Red and White Pine Landscape Ecosystem.

Upland Forest Type	Existing (2003)		Objectives		
			Decade 1	Decade 2	Long-term 100 Year Goal
	Acres	%	%	%	%
Jack Pine	16,400	9%	10%	10%	11%
Red Pine	23,700	13%	13%	13%	14%
White Pine	13,200	7%	9%	12%	14%
Spruce-fir	14,500	8%	11%	13%	25%
Oak	300	0%	0%	0%	0%
Northern	1,700	1%	1%	1%	1%
Aspen	95,900	52%	47%	43%	28%
Paper Birch	17,800	10%	9%	9%	7%
Total	183,500	100%	100%	100%	100%

Age Class Objectives

Table DRW-2 shows forest age class objectives (desired percent) for Decade 1 and 2. For reference, the table also displays existing conditions (Year 2003) and long-term goals (Decade 10) to show the differences between where conditions are today and where the long-term desired future conditions are. The objectives are for National Forest land only, outside the Boundary Waters Canoe Area Wilderness. *(Objectives were developed considering the conditions of the Boundary Water Canoe Area Wilderness and the conditions of other ownerships.)*

Table DRW-2. Vegetation Age Class Objectives for Dry Mesic Red and White Pine Landscape Ecosystem.

Age Class	Existing (2003)		Objectives		
			Decade 1	Decade 2	Long-term 100 Year Goal
Uplands	Acres	%	%	%	%
0-9	17,600	10%	10%	10%	7%
10-49	61,300	33%	44%	46%	26%
50-99	81,800	45%	32%	24%	33%
100-139	22,200	12%	14%	17%	7%
140+	600	0%	0%	2%	28%
Total	183,500	100%	100%	100%	100%

Tree Species Diversity Objectives

Table DRW-3 below shows objectives for the direction of change in tree species in the Landscape Ecosystem. The objectives are based on the percentage of total number of individual trees by species. Objectives specify direction of change because exact percentages on National Forest land alone are not calculated. Managers must consider more detailed ecological information, together with other multiple use objectives and desired resource conditions, to make decisions about where, when, and how much to increase, decrease or maintain tree species diversity. Those decisions will support the overall objective to move the relative diversity of tree species composition to conditions that are more representative of native vegetation communities.

Tree species diversity objectives differ from the forest type objectives in Table DRW-1 above in that they address the desired direction for total percentage of trees, not total acres of forest type. These objectives are complementary to the forest type objectives since tree species diversity objectives may be achieved in two ways:

- The percent of trees of a given tree species (relative to the percent of other tree species) may be modified by changing the forest type dominated by that tree species (for example, white pine may be increased by increasing acres of white pine forest type) or
- The percent of trees of a given tree species (relative to the percent of other tree species) may be modified by managing for forest types that are more mixed (for example, white pine may be increased by interplanting white pine in an aspen-spruce-fir forest type).

The objectives are for National Forest land only, outside the Boundary Waters Canoe Area Wilderness. *(Objectives were developed considering the conditions of the BWCAW and the conditions of other ownerships.)*

Table DRW-3. Tree Species Diversity Objectives for Dry-Mesic Red and White Pine Landscape Ecosystem. Change from existing condition:
(+) = Increase (-) = Decrease (m) = Maintain

Species	Historical Condition[1]	Existing Condition[2]	Objective
	Percent	Percent	
Aspen	14	29	-
White spruce	5	3	+
White cedar	4	3	+
Paper birch	17	20	m
Balsam fir	10	18	-
Sugar maple	<1	8	-
Black spruce	8	7	m
Jack pine	13	4	+
Red pine	10	3	+
Lowland hardwoods	1	3	m/-
White pine	11	2	+
Tamarack	5	<1	+
Other	<1	<1	m
Total [3]	98	100	

[1] Historical conditions are based on tree data analysis of bearing trees in the late 1800s to early 1900s in the Government Land Office land survey notes.
[2] Existing conditions are based on 1990 Forest Inventory and Assessment plot data estimates of stem density by species.
[3] Totals may not add up to 100% due to rounding up.

Table DRW-4. Management Indicator Habitat Objectives for Dry-Mesic Red and White Pine Landscape Ecosystem. Change from existing condition: (+) = Increase (-) = Decrease (m) = Maintain

#	Management Indicator Habitats	Young Seedling Open				Mature				Old/Old Growth and Multi-aged			
		Existing Ac (1000s)	Decade			Existing Ac (1000s)	Decade			Existing Ac (1000s)	Decade		
			1	2	10		1	2	10		1	2	10
1	Upland forest	21.4	-	-	-	52.1	-	-	-	51.4	+	+	+
2	Upland Deciduous	12.0	-	+	+	28.8	-	-	-	37.8	-	-	-
3	Northern Hardwoods	0.1	+	+	+	1.7	-	-	-	0	m	m	+
4	Aspen-Birch	11.9	-	+	+	27.1	-	-	-	37.8	-	-	-
5	Upland Conifer	9.5	-	-	-	23.2	-	-	+	13.7	+	+	+
6	Upland Spruce-Fir	3.1	-	-	-	6.1	-	-	+	1.7	+	+	+
7	Red and White Pine	5.3	-	-	-	16.2	-	-	+	3.3	+	+	+
8	Jack Pine	1.1	+	+	+	1.0	+	+	+	8.7	-	-	-

Management Indicator Habitat Objectives

Table DRW-4 below shows the objectives for the direction of change for management indicator habitats (MIHs) 1-10 in the Landscape Ecosystem for Decades 1 and 2. For reference, the table also displays existing conditions (Year 2003) and the long-term goals (Decade 10) to show the differences between where conditions are today and where long-term desired conditions are. The objectives are for NFS land only, outside the BWCAW. Though percent objectives are not specified for each MIH, each objective corresponds to and is compatible with the LE Vegetation Composition and Age Objectives.

Detailed descriptions of the forest types and ages that comprise MIHs are found in Appendix C. The species associated with each MIH are found in Appendix D of the Final EIS and the planning record.

Objectives for MIHs 10-14 are found in the Terrestrial and Aquatic Wildlife Forest-wide Management Direction Section.

Social and Economic Context: Management Areas

This Landscape Ecosystem is comprised of Management Areas shown in Table DRW-5. Management Areas provide the social and economic context within which to make implementation decisions for vegetation management considering other multiple use objectives and resource desired conditions. Management Area desired conditions, objectives, and standards and guidelines are found in Chapter 3.

Table DRW-5. Management Area allocation within Dry-Mesic Red and White Pine Landscape Ecosystem.

	Percent
General Forest	40
General Forest - Longer Rotation	21
Recreation Use in a Scenic Landscape	6
Eligible Candidate Wild, Scenic and Recreational Rivers	2
Semi-primitive Motorized Recreation	9
Semi-primitive Non-motorized Recreation	0
Unique Biological Areas	<1
Riparian Emphasis Areas	0
Research Natural Areas	0
Candidate Research Natural Areas	1
Wilderness	22
TOTAL	100

Mesic Red and White Pine Landscape Ecosystems

Vegetation Composition Objectives

Table MRW-1 shows forest types objectives (what percent of each forest type is desired) for Decade 1 and Decade 2. For reference, the table also displays existing conditions (Year 2003) and long-term goals (Decade 10) to show the differences between where conditions are today and where the long-term desired future conditions are. The objectives are for National Forest System land only, outside the Boundary Waters Canoe Area Wilderness. (Objectives were developed considering the conditions of the Boundary Water Canoe Area Wilderness and the conditions of other ownerships.)

Table MRW-1. Vegetation Composition Objectives for Mesic Red and White Pine LE.

Upland Forest Type	Existing (2003)		Objectives		
			Decade 1	Decade 2	Long-term 100 Year Goal
	Acres	%	%	%	%
Jack Pine	6,500	5%	6%	6%	8%
Red Pine	8,100	6%	7%	8%	10%
White Pine	4,400	3%	5%	7%	10%
Spruce-fir	20,300	16%	18%	19%	28%
Oak	100	0%	0%	0%	0%
Northern Hardwoods	3,100	2%	2%	2%	2%
Aspen	65,500	51%	47%	43%	30%
Paper Birch	19,700	15%	15%	15%	12%
Total	127,80	100%	100%	100%	100%

Age Class Objectives

Table MRW-2 shows forest age class objectives (percent desired) for Decades 1 and Decade 2. For reference, the table also displays existing conditions (Year 2003) and long-term goals (Decade 10) to show the differences between where conditions are today and where the long-term desired future conditions are. The objectives are for National Forest land only, outside the Boundary Waters Canoe Area Wilderness. *(Objectives were developed considering the conditions of the Boundary Water Canoe Area Wilderness and the conditions of other ownerships.)*

Table MRW-2. Vegetation Age Class Objectives for Mesic Red and White Pine Landscape Ecosystem.

Age Class	Existing (2003)		Objectives		
			Decade 1	Decade 2	Long-term 100 Year Goal
Uplands	Acres	%	%	%	%
0-9	19,500	15%	10%	10%	7%
10-49	38,400	30%	45%	49%	28%
50-79	36,900	29%	16%	10%	21%
80-99	21,700	17%	21%	16%	6%
100-119	8,200	6%	6%	11%	6%
120+	3,100	2%	2%	3%	32%
Total	127,800	100%	100%	100%	100%

Tree Species Diversity Objectives

Table MRW-3 below shows objectives for the direction of change in tree species in the Landscape Ecosystem. The objectives are based on the percentage of total number of individual trees by species. Objectives specify direction of change because exact percentages on National Forest land alone are not calculated. Managers must consider more detailed ecological information, together with other multiple use objectives and desired resource conditions, to make decisions about where, when, and how much to increase, decrease or maintain tree species diversity. Those decisions will support the overall objective to move the relative diversity of tree species composition to conditions that are more representative of native vegetation communities.

Tree species diversity objectives differ from the forest type objectives in Table MRW-1 above in that they address the desired direction for total percentage of trees, not total acres of forest type. These objectives are complementary to the forest type objectives since tree species diversity objectives may be achieved in two ways:

- The percent of trees of a given tree species (relative to the percent of other tree species) may be modified by changing the forest type dominated by that tree species (for example, white pine may be increased by increasing acres of white pine forest type) or
- The percent of trees of a given tree species (relative to the percent of other tree species) may be modified by managing for forest types that are more mixed (for example, white pine may be increased by interplanting white pine in an aspen-spruce-fir forest type).

The objectives are for National Forest land only, outside the Boundary Waters Canoe Area. *(Objectives were developed considering the conditions of the BWCAW and the conditions of other ownerships.)*

Table MRW-3. Tree Species Diversity Objectives for Mesic Red and White Pine Landscape Ecosystem. Change from existing condition:
(+) = Increase (-) = Decrease (m) = Maintain

Species	Historical Condition[1]	Existing Condition[2]	Objective
	Percent	Percent	
Birch	23	22	m
White pine	19	1	+
Balsam fir	9	22	-
Tamarack	9	<1	+
Aspen	9	27	-
Black spruce	6	5	+
White spruce	6	2	+
White cedar	6	4	+
Northern hardwoods	5	11	-
Red pine	4	1	+
Jack pine	4	1	+
Lowland hardwoods	1	4	m/-
Total	101	100	

[1] Historical conditions are based on tree data analysis of bearing trees in the late 1800s to early 1900s in the Government Land Office land survey notes.
[2] Existing conditions are based on 1990 Forest Inventory and Assessment plot data estimates of stem density by species.
[3] Totals may not add up to 100% due to rounding up.

Table MRW-4. Management Indicator Habitat Objectives for Mesic Red and White Pine Landscape Ecosystem. Change from existing condition: (+) = Increase (-) = Decrease (m) = Maintain

#	Management Indicator Habitats	Young Seedling Open				Mature				Old/Old Growth and Multi-aged			
		Existing Ac (1000s)	Decade			Existing Ac (1000s)	Decade			Existing Ac (1000s)	Decade		
			1	2	10		1	2	10		1	2	10
1	Upland forest	22.2	-	-	-	42.1	-	-	-	27.3	+	+	+
2	Upland Deciduous	11.6	-	-	-	30.7	-	-	-	23.0	+	+	-
3	Northern Hardwoods	0	m	m	m	1.9	-	-	-	1.0	+	+	+
4	Aspen-Birch	11.5	-	-	-	28.7	-	-	-	21.9	+	+	-
5	Upland Conifer	10.6	-	-	-	11.4	-	-	+	4.3	+	+	+
6	Upland Spruce-Fir	7.5	-	-	-	6.2	-	-	+	1.3	+	+	+
7	Red and White Pine	2.1	-	-	-	4.3	+	+	+	0.8	+	+	+
8	Jack Pine	1.0	m	m	-	0.9	-	+	+	2.2	-	-	-

Management Indicator Habitat Objectives

Table MRW-4 below shows the objectives for the direction of change for management indicator habitats (MIHs) 1-10 in the Landscape Ecosystem for Decades 1 and 2. For reference, the table also displays existing conditions (Year 2003) and the long-term goals (Decade 10) to show the differences between where conditions are today and where long-term desired conditions are. The objectives are for NFS land only, outside the BWCAW. Though percent objectives are not specified for each MIH, each objective corresponds to and is compatible with the LE Vegetation Composition and Age Objectives.

Detailed descriptions of the forest types and ages that comprise MIHs are found in Appendix C. The species associated with each MIH are found in Appendix D of the Final EIS and the planning record.

Objectives for MIHs 10-14 are found in the Terrestrial and Aquatic Wildlife Forest-wide Management Direction Section.

Social and Economic context: Management Areas

This Landscape Ecosystem is comprised of Management Areas shown in Table MRW-5. Management Areas provide the social and economic context within which to make implementation decisions for vegetation management considering other multiple use objectives and resource desired conditions. Management Area desired conditions, objectives, and standards and guidelines are found in Chapter 3.

Table MRW-5. Management Area Allocation within Mesic Red and White Pine Landscape Ecosystem.

	Percent
General Forest	47
General Forest - Longer Rotation	24
Recreation Use in a Scenic Landscape	8
Eligible Candidate Wild, Scenic and Recreational Rivers	3
Semi-primitive Motorized Recreation	4
Semi-primitive Non-motorized Recreation	<1
Unique Biological Areas	0
Riparian Emphasis Areas	1
Research Natural Areas	<1
Candidate Research Natural Areas	1
Wilderness	13
TOTAL	100

Mesic Birch/Aspen/Spruce-Fir Landscape Ecosystem

Vegetation Composition Objectives

Table MBA-1 shows forest types objectives (percent desired) for Decades 1 and 2. For reference, the table also displays existing conditions (Year 2003) and long-term goals (Decade 10) to show the differences between where conditions are today and where the long-term desired future conditions are. The objectives are for National Forest System land only, outside the Boundary Waters Canoe Area Wilderness. *(Objectives were developed considering the conditions of the Boundary Water Canoe Area Wilderness and the conditions of other ownerships.)*

Table MBA-1. Vegetation Composition Objectives for Mesic Birch/Aspen/Spruce/ Fir Landscape Ecosystem.

Upland Forest Type	Existing (2003)		Objectives		
			Decade 1	Decade 2	Long-term 100 Year Goal
	Acres	%	%	%	%
Jack Pine	9,300	3%	4%	4%	7%
Red Pine	14,500	5%	5%	5%	6%
White Pine	5,400	2%	3%	4%	4%
Spruce-fir	71,400	25%	26%	26%	31%
Oak	>100	0%	0%	0%	0%
Northern Hardwoods	12,500	4%	4%	4%	3%
Aspen	125,900	45%	43%	42%	35%
Paper Birch	42,100	15%	14%	14%	14%
Total	281,300	100	100%	100%	100%

Age Class Objectives

Table MBA-2 shows forest age class objectives (percent desired) for Decades 1 and 2. For reference, the table also displays existing conditions (Year 2003) and long-term goals (Decade 10) to show the differences between where conditions are today and where the long-term desired future conditions are. The objectives are for National Forest land only, outside the Boundary Waters Canoe Area Wilderness. (Objectives were developed considering the conditions of the Boundary Water Canoe Area Wilderness and the conditions of other ownerships.)

Table MBA-2. Vegetation Age Class Objectives for Mesic Birch/Aspen/Spruce/Fir Landscape Ecosystem.

Age Class	Existing (2003)		Objectives		
			Decade 1	Decade 2	Long-term 100 Year Goal
Uplands	Acres	%	%	%	%
0-9	35,700	13%	10%	11%	9%
10-49	93,500	33%	45%	48%	36%
50-79	77,900	28%	15%	10%	27%
80-99	52,600	19%	21%	17%	18%
100+	21,600	8%	9%	14%	10%
Total	281,300	100%	100%	100%	100%

Tree Species Diversity Objectives

Table MBA-3 below shows objectives for the direction of change in tree species in the Landscape Ecosystem. The objectives are based on the percentage of total number of individual trees by species. Objectives specify direction of change because exact percentages on National Forest land alone are not calculated. Managers must consider more detailed ecological information, together with other multiple use objectives and desired resource conditions, to make decisions about where, when, and how much to increase, decrease or maintain tree species diversity. Those decisions will support the overall objective to move the relative diversity of tree species composition to conditions that are more representative of native vegetation communities.

Tree species diversity objectives differ from the forest type objectives in Table MBA-1 above in that they address the desired direction for total percentage of trees, not total acres of forest type. These objectives are complementary to the forest type objectives since tree species diversity objectives may be achieved in two ways:

- The percent of trees of a given tree species (relative to the percent of other tree species) may be modified by changing the forest type dominated by that tree species (for example, white pine may be increased by increasing acres of white pine forest type) or
- The percent of trees of a given tree species (relative to the percent of other tree species) may be modified by managing for forest types that are more mixed (for example, white pine may be increased by interplanting white pine in an aspen-spruce-fir forest type).

The objectives are for National Forest land only, outside the Boundary Waters Canoe Area. (*Objectives were developed considering the conditions of the BWCAW and the conditions of other ownerships.)*

Table MBA-3. Tree Species Diversity Objectives for Mesic Birch/Aspen/Spruce/Fir Landscape Ecosystem. Change from existing condition:
(+) = Increase (-) = Decrease (m) = Maintain

Species	Historical Condition[1]	Existing Condition[2]	Objective
	Percent	Percent	
Paper birch	23	20	+
Balsam fir	18	23	-
Black spruce	10	9	m
White cedar	9	4	+
White spruce	9	3	+
White pine	9	<1	+
Aspen	8	27	-
Tamarack	7	<1	+
Northern hardwoods	3	7	-
Jack pine	2	1	m/-
Red pine	2	<1	+
Lowland hardwoods	2	4	m/-
Total	102	98	

[1] Historical conditions are based on tree data analysis of bearing trees in the late 1800s to early 1900s in the Government Land Office land survey notes.
[2] Existing conditions are based on 1990 Forest Inventory and Assessment plot data estimates of stem density by species.
[3] Totals may not add up to 100% due to rounding up.

Table MBA-4. Management Indicator Habitat Objectives for Mesic Birch-Aspen-Spruce-Fir Landscape Ecosystem. Change from existing condition: (+) = Increase (-) = Decrease (m) = Maintain

		Young Seedling Open				Mature				Old/Old Growth and Multi-aged			
#	Management Indicator Habitats	Existing Ac (1000s)	Decade			Existing Ac (1000s)	Decade			Existing Ac (1000s)	Decade		
			1	2	10		1	2	10		1	2	10
1	Upland forest	41.7	-	-	-	93.4	-	-	-	56.8	+	+	+
2	Upland Deciduous	20.2	+	+	-	69.4	-	-	-	46.9	+	+	-
3	Northern Hardwoods	0.2	+	+	+	9.5	-	-	-	2.0	+	+	+
4	Aspen-Birch	20.0	+	+	-	60.1	-	-	-	44.9	+	+	-
5	Upland Conifer	21.5	-	-	-	23.8	-	+	+	9.9	+	+	+
6	Upland Spruce-Fir	18.2	-	-	-	18.4	-	-	+	6.4	+	+	+
7	Red and White Pine	2.8	-	-	+	4.3	+	+	+	0.4	+	+	+
8	Jack Pine	0.5	+	+	+	1.2	-	+	+	3.1	-	-	-

Management Indicator Habitat Objectives

Table MBA-4 below shows the objectives for the direction of change for management indicator habitats (MIHs) 1-10 in the Landscape Ecosystem for Decades 1 and 2. For reference, the table also displays existing conditions (Year 2003) and the long-term goals (Decade 10) to show the differences between where conditions are today and where long-term desired conditions are. The objectives are for NFS land only, outside the BWCAW. Though percent objectives are not specified for each MIH, each objective corresponds to and is compatible with the LE Vegetation Composition and Age Objectives.

Detailed descriptions of the forest types and ages that comprise MIHs are found in Appendix C. The species associated with each MIH are found in Appendix D of the Final EIS and the planning record.

Objectives for MIHs 10-14 are found in the Terrestrial and Aquatic Wildlife Forest-wide Management Direction Section.

Social and Economic context: Management Areas

This Landscape Ecosystem is comprised of Management Areas shown in Table MBA-5. Management Areas provide the social and economic context within which to make implementation decisions for vegetation management considering other multiple use objectives and resource desired conditions. Management Area desired conditions, objectives, and standards and guidelines are found in Chapter 3.

Table MBA-5. Management Area Allocation within Mesic Aspen-Birch-Spruce-Fir Landscape Ecosystem.

General Forest	37
General Forest - Longer Rotation	30
Recreation Use in a Scenic Landscape	13
Eligible Candidate Wild, Scenic and Recreational Rivers	3
Semi-primitive Motorized Recreation	1
Semi-primitive Non-motorized Recreation	1
Unique Biological Areas	<1
Riparian Emphasis Areas	1
Research Natural Areas	<1
Candidate Research Natural Areas	1
Wilderness	13
TOTAL	100%

Sugar Maple Landscape Ecosystem

Vegetation Composition Objectives

Table SMA-1 shows forest types objectives (percent desired) for Decades 1 and 2. For reference, the table also displays existing conditions (Year 2003) and long-term goals (Decade 10) to show the differences between where conditions are today and where the long-term desired future conditions are. The objectives are for National Forest System land only, outside the Boundary Waters Canoe Area Wilderness. *(Objectives were developed considering the conditions of the Boundary Water Canoe Area Wilderness and the conditions of other ownerships.)*

Table SMA-1. Vegetation Composition Objectives for Sugar Maple Landscape Ecosystem.

Upland Forest Type	Existing (2003)		Objectives		
			Decade 1	Decade 2	Long-term 100 Year Goal
	Acres	%	%	%	%
Jack Pine	100	0%	0%	0%	0%
Red Pine	2,400	5%	5%	5%	2%
White Pine	300	1%	2%	2%	4%
Spruce-fir	7,500	15%	15%	15%	16%
Oak	0	0%	0%	0%	0%
Northern Hardwoods	18,300	36%	37%	38%	40%
Aspen	13,700	27%	25%	24%	20%
Paper Birch	8,700	17%	17%	16%	18%
Total	127,80	100	100%	100%	100%

Age Class Objectives

Table SMA-2 shows forest age class objectives (desired percent) for Decade 1 and Decade 2. For reference, the table also displays existing conditions (Year 2003) and long-term goals (Decade 10) to show the differences between where conditions are today and where the long-term desired future conditions are. The objectives are for National Forest land only, outside the Boundary Waters Canoe Area. *(Objectives were developed considering the conditions of the Boundary Water Canoe Area Wilderness and the conditions of other ownerships.)*

Table SMA-2. Vegetation Age Class Objectives for Sugar Maple Landscape Ecosystem.

Age Class	Existing (2003)		Objectives		
			Decade 1	Decade 2	Long-term 100 Year Goal
Uplands	Acres	%	%	%	%
0-9		6%	4%	4%	5%
10-49	14,000	27%	34%	33%	20%
50-99	23,000	45%	38%	27%	25%
100-149	10,500	21%	23%	33%	25%
150+	300	1%	2%	3%	25%
Total	50,900	100%	100%	100%	100%

Tree Species Diversity Objectives

Table SMA-3 below shows objectives for the direction of change in tree species in the Landscape Ecosystem. The objectives are based on the percentage of total number of individual trees by species. Objectives specify direction of change because exact percentages on National Forest land alone are not calculated. Managers must consider more detailed ecological information, together with other multiple use objectives and desired resource conditions, to make decisions about where, when, and how much to increase, decrease or maintain tree species diversity. Those decisions will support the overall objective to move the relative diversity of tree species composition to conditions that are more representative of native vegetation communities.

Tree species diversity objectives differ from the forest type objectives in Table SMA-1 above in that they address the desired direction for total percentage of trees, not total acres of forest type. These objectives are complementary to the forest type objectives since tree species diversity objectives may be achieved in two ways:

- The percent of trees of a given tree species (relative to the percent of other tree species) may be modified by changing the forest type dominated by that tree species (for example, white pine may be increased by increasing acres of white pine forest type) or
- The percent of trees of a given tree species (relative to the percent of other tree species) may be modified by managing for forest types that are more mixed (for example, white pine may be increased by interplanting white pine in an aspen-spruce-fir forest type.

The objectives are for National Forest land only, outside the Boundary Waters Canoe Area. *(Objectives were developed considering the conditions of the BWCAW and the conditions of other ownerships.)*

Table SMA-3. Tree Species Diversity Objectives for Sugar Maple Landscape Ecosystem. Change from existing condition:
(+) = Increase (-) = Decrease (m) = Maintain

Species	Historical Condition[1]	Existing Condition[2]	Objective
	Percent	Percent	
Paper birch	22	23	m
Balsam fir	16	12	+
White cedar	11	3	+
White pine	9	<1	+
Sugar maple	8	26	-
White spruce	8	2	+
Yellow birch	7	<1	+
Aspen	6	16	-
Black spruce	5	<1	+
Tamarack	4	2	+
Black ash	2	4	-
Basswood	1	2	m
Red pine	<1	1	m
Red maple	<1	7	-
Total	99	98	

[1] Historical conditions are based on tree data analysis of bearing trees in the late 1800s to early 1900s in the Government Land Office land survey notes.
[2] Existing conditions are based on 1990 Forest Inventory and Assessment plot data estimates of stem density by species.
[3] Totals may not add up to 100% due to rounding up.

Table SMA-4. Management Indicator Habitat Objectives for Sugar Maple Landscape Ecosystem. Change from existing condition: (+) = Increase (-) = Decrease (m) = Maintain

#	Management Indicator Habitats	Young Seedling Open				Mature				Old/Old Growth and Multi-aged			
		Existing Ac (1000s)	Decade			Existing Ac (1000s)	Decade			Existing Ac (1000s)	Decade		
			1	2	10		1	2	10		1	2	10
1	Upland forest	3.9	-	-	-	23.9	-	-	-	9.1	+	+	+
2	Upland Deciduous	2.0	-	-	-	22.0	-	-	-	8.4	+	+	+
3	Northern Hardwoods	0.1	-	-	-	14.9	-	-	-	2.7	+	+	+
4	Aspen-Birch	1.9	-	-	-	7.1	-	-	-	5.8	+	+	-
5	Upland Conifer	2.0	-	-	-	1.8	m	+	+	0.7	+	+	+
6	Upland Spruce-Fir	1.7	-	-	-	1.6	-	-	-	0.7	+	+	+
7	Red and White Pine	0.3	+	-	-	0.3	+	-	-	0	m	+	+
8	Jack Pine	0	m	m	m	0	+	+	m	0	m	m	m

Management Indicator Habitat Objectives

Table SMA-4 below shows the objectives for the direction of change for management indicator habitats (MIHs) 1-10 in the Landscape Ecosystem for Decades 1 and 2. For reference, the table also displays existing conditions (Year 2003) and the long-term goals (Decade 10) to show the differences between where conditions are today and where long-term desired conditions are. The objectives are for NFS land only, outside the BWCAW. Though percent objectives are not specified for each MIH, each objective corresponds to and is compatible with the LE Vegetation Composition and Age Objectives.

Detailed descriptions of the forest types and ages that comprise MIHs are found in Appendix C. The species associated with each MIH are found in Appendix D of the Final EIS and the planning record.

Objectives for MIHs 10-14 are found in the Terrestrial and Aquatic Wildlife Forest-wide Management Direction Section.

Social and Economic Context: Management Areas

This Landscape Ecosystem is comprised of Management Areas shown in Table SMA-5. Management Areas provide the social and economic context within which to make implementation decisions for vegetation management considering other multiple use objectives and resource desired conditions. Management Area desired conditions, objectives, and standards and guidelines are found in Chapter 3.

Table SMA-5. Management Area Allocation within Sugar Maple Landscape Ecosystem.

	Percent
General Forest	<1
General Forest - Longer Rotation	36
Recreation Use in a Scenic Landscape	57
Eligible Candidate Wild, Scenic and Recreational Rivers	<1
Semi-primitive Motorized Recreation	2
Semi-primitive Non-motorized Recreation	0
Unique Biological Areas	0
Riparian Emphasis Areas	0
Research Natural Areas	2
Candidate Research Natural Areas	3
Wilderness	0
TOTAL	100

Lowland Conifer Landscape Ecosystem

Vegetation Composition Objectives

See Table LLC-1.

Table LLC-1. Vegetation Composition Objectives for Lowland Conifer LEs.
Objectives for all decades are to maintain existing forest types.

Forest Type	Existing 2003 and 100 Year Goal	
	Acres	%
Black Spruce	201,000	79%
Tamarack	4,500	2%
Northern White Cedar	31,300	12%
Lowland Hardwoods	16,200	6%
Total	252,900	100%

Age Class Objectives

Tables LLC-2a through LLC2c show forest age class objectives (how much of each age class is desired by acre and percent) for Decade 1 and Decade 2. For reference, the table also displays existing conditions (Year 2003) and long-term goals (Decade 10) to show the differences between where conditions are today and where the long-term desired future conditions are. The objectives are for National Forest land only, outside the Boundary Waters Canoe Area Wilderness. *(Objectives were developed considering the conditions of the Boundary Water Canoe Area Wilderness and the conditions of other ownerships.)*

Table LLC-2a. Vegetation Age Class Objectives for LLC within (A) Jack Pine/Black Spruce and Dry-Mesic Red and White Pine landscape Ecosystems.

Age Class	Existing (2003)		Objectives		
			Decade 1	Decade 2	Long-term 100 Year Goal
Uplands	Acres	%	%	%	%
0-9	300	0%	3%	4%	5%
10-39	8,100	7%	5%	7%	14%
40-79	26,900	24%	18%	14%	18%
80-159	72,400	65%	69%	69%	33%
160+	3,000	3%	4%	7%	31%
Total	110,800	100%	100%	100%	100%

Table LLC-2b. Vegetative Age Class Objectives for LLC within (B) Mesic Red and White Pine and Mesic Birch/Aspen/Spruce/Fir Landscape Ecosystems.

Age Class	Existing (2003)		Objectives		
			Decade 1	Decade 2	Long-term 100 Year Goal
Uplands	Acres	%	%	%	%
0-9	800	1%	2%	3%	4%
10-39	5,300	4%	4%	5%	11%
40-79	32,200	25%	14%	7%	14%
80-159	79,800	62%	70%	71%	28%
160+	9,900	8%	10%	14%	44%
Total	127,900	100%	100%	100%	100%

Table LLC-2c. Vegetative Age Class Objectives for LLC within (C) Mesic Sugar Maple Landscape Ecosystem.					
Age Class	Existing (2003)		Objectives		
			Decade 1	Decade 2	Long-term 100 Year Goal
Uplands	Acres	%	%	%	%
0-9	0	0%	1%	1%	3%
10-39	300	2%	2%	3%	10%
40-79	3,500	25%	19%	15%	13%
80-159	6,900	49%	45%	39%	15%
160+	3,400	24%	33%	42%	60%
Total	14,200	100%	100%	100%	100%

Management Indicator Habitat Objectives

Table LLC-3 below shows the objectives for the direction of change for management indicator habitats (MIHs) 1-10 in the Landscape Ecosystem for Decades 1 and 2. For reference, the table also displays existing conditions (Year 2003) and the long-term goals (Decade 10) to show the differences between where conditions are today and where long-term desired conditions are. The objectives are for NFS land only, outside the BWCAW. Though percent objectives are not specified for each MIH, each objective corresponds to and is compatible with the LE Vegetation Composition and Age Objectives.

Detailed descriptions of the forest types and ages that comprise MIHs are found in Appendix C. The species associated with each MIH are found in Appendix D of the Final EIS and the planning record.

Objectives for MIHs 10-14 are found in the Terrestrial and Aquatic Wildlife Forest-wide Management Direction Section.

Table LLC-3. Management Indicator Habitat Objectives for all Lowland Conifer Landscape Ecosystems (LLC-A, LLC-B, LLC-C). Change from existing condition:(+) = Increase (-) = Decrease (m) = Maintain

		Young Seedling Open				Mature				Old/Old Growth and Multi-aged			
#	Management Indicator Habitats	Existing Ac (1000s)	Decade			Existing Ac (1000s)	Decade			Existing Ac (1000s)	Decade		
			1	2	10		1	2	10		1	2	10
9	Lowland Black Spruce-Tamarack	6.8	+	+	+	132.2	-	-	-	42.3	+	+	+

Social and Economic Context: Management Areas

These Landscape Ecosystems are comprised of Management Areas shown in Tables LLC-4a through LLC-4c. Management Areas provide the social and economic context within which to make implementation decisions for vegetation management considering other multiple use objectives and resource desired conditions. Management Area desired conditions, objectives, and standards and guidelines are found in Chapter 3.

Table LLC-4a. Management Area allocation in Lowland Forest within (A) Jack Pine/Black Spruce and Dry-Mesic Red and White Pine landscape Ecosystems.

	Percent
General Forest	36
General Forest - Longer Rotation	9
Recreation Use in a Scenic Landscape	6
Eligible Candidate Wild, Scenic and Recreational Rivers	<1
Semi-primitive Motorized Recreation	5
Semi-primitive Non-motorized Recreation	<1
Unique Biological Areas	<1
Riparian Emphasis Areas	1
Research Natural Areas	<1
Candidate Research Natural Areas	<1
Wilderness	42
TOTAL	100

Table LLC-4b. Management Area allocation in (B) Mesic Red and White Pine and Mesic Birch/Aspen/Spruce/Fir Landscape Ecosystems.

	Percent
General Forest	58
General Forest - Longer Rotation	21
Recreation Use in a Scenic Landscape	7
Eligible Candidate Wild, Scenic and Recreational Rivers	3
Semi-primitive Motorized Recreation	1
Semi-primitive Non-motorized Recreation	<1
Unique Biological Areas	0
Riparian Emphasis Areas	4
Research Natural Areas	<1
Candidate Research Natural Areas	2
Wilderness	4
TOTAL	100

Table LLC-4c. Management Area allocation in (C) Mesic Sugar Maple Landscape Ecosystem.

	Percent
General Forest	17
General Forest - Longer Rotation	39
Recreation Use in a Scenic Landscape	25
Eligible Candidate Wild, Scenic and Recreational Rivers	<1
Semi-primitive Motorized Recreation	<1
Semi-primitive Non-motorized Recreation	0
Unique Biological Areas	0
Riparian Emphasis Areas	2
Research Natural Areas	1
Candidate Research Natural Areas	16
Wilderness	0
TOTAL	100

Figure NSU-1

Northern Superior Uplands Landscape Ecosystems

Kabetogama Purchase Unit

Pigeon River Purchase Unit

Canada

United States

Koochiching County

Itasca County

St. Louis County

St. Louis County

Lake County

Cook County

Lake Superior

Miles
10 5 0 10

Legend

- Forest Boundary
- Purchase Unit Boundaries
- County Boundaries
- Lakes

Landscape Ecosystems

- Jack pine-black spruce
- Dry mesic white pine-red pine
- Jack pine-aspen-oak
- Lowland conifer
- Mesic aspen-birch-spruce-fir
- Mesic white pine-red pine
- Rich swamp
- Sugar Maple

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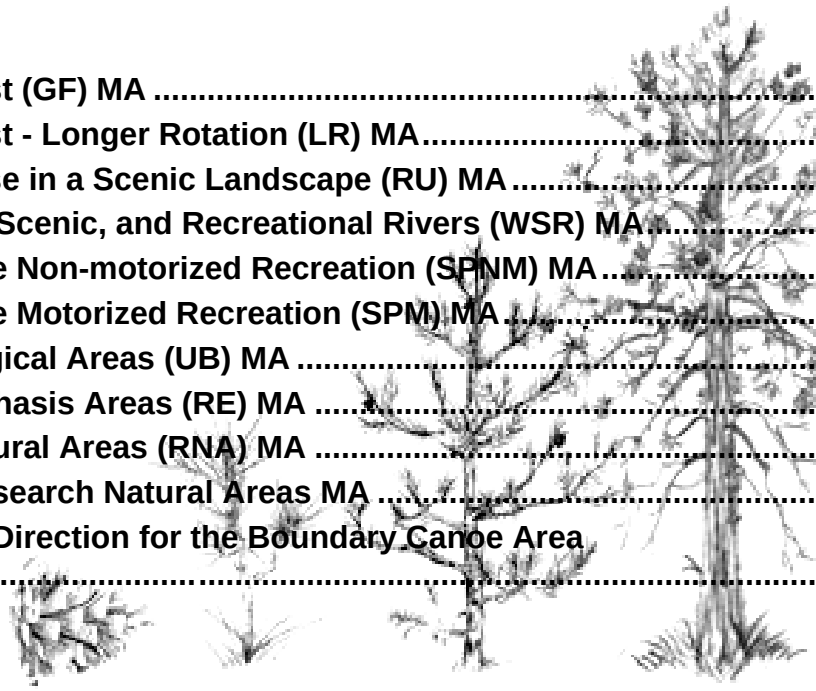
June 2004

Chapter 3 Management Area Direction



Introduction

Chapter 3 presents management direction for specific management areas (MA). Forest-wide management direction, found in Chapter 2, also applies to all MAs, unless more specific direction for the MA is in Chapter 3.

MA direction was developed to be appropriate for the variety of different uses and resources in the MAs.

All management practices may be used in the MAs that have suitable timber land.

Relationship of Management Areas and Landscape Ecosystems

In designing projects that work toward reaching the desired conditions for an MA, managers will consider both MA direction and Landscape Ecosystem (LE) objectives. LE direction, in Chapter 2, provides vegetation objectives for forest type, forest age, and tree species diversity objectives. The LE objectives apply across an entire LE, whereas desired conditions and objectives for MAs describe what is desired socially and economically within a specific MA. This management direction provides a framework within which to manage vegetation by considering multiple-use and other resource desired conditions. In summary, proposed projects must reflect the blend of both MA and LE direction.

Abbreviations

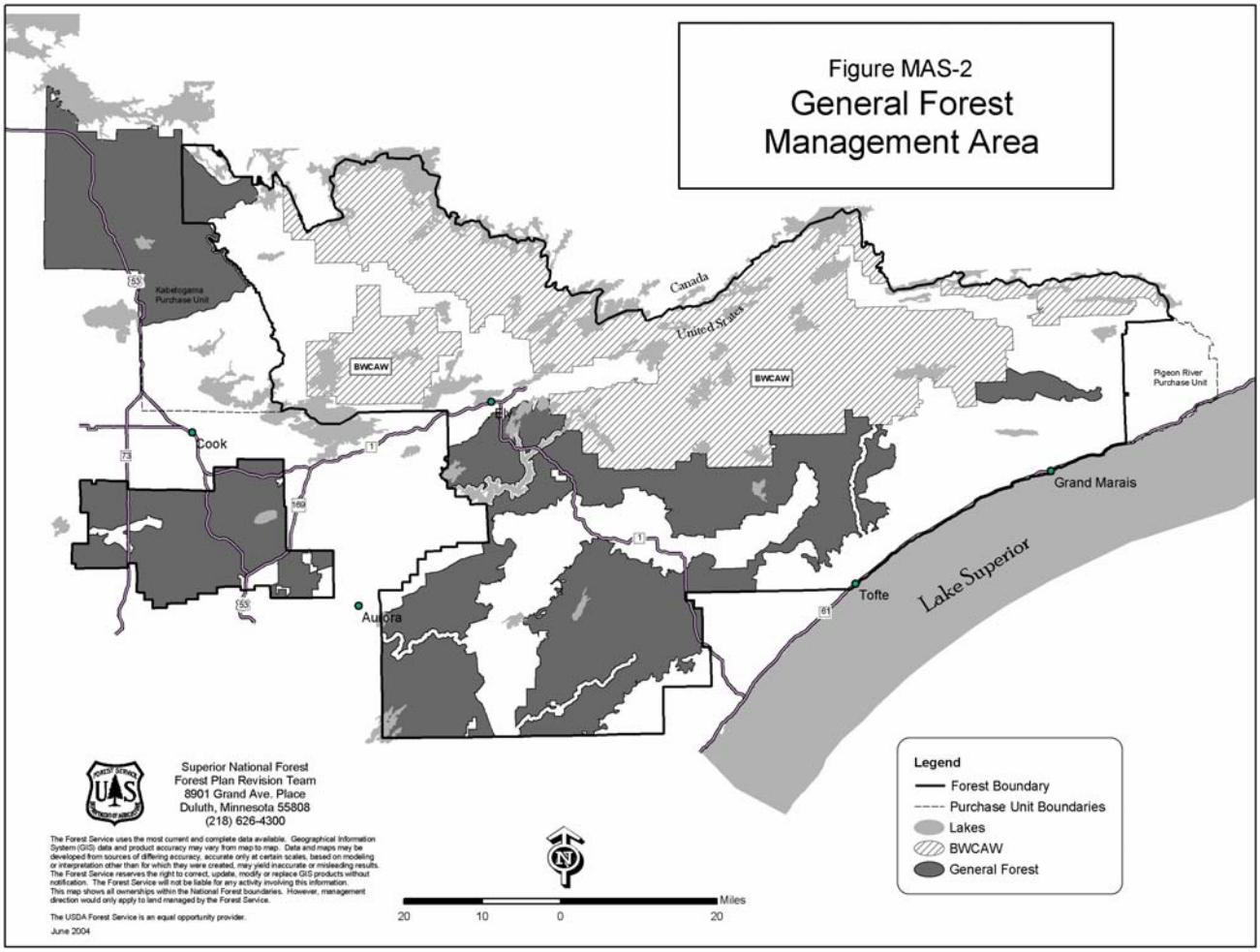
MA	Management Area
D	Desired Condition
O	Objectives
S	Standard
G	Guideline
GF	General Forest MA
LR	General Forest - Longer Rotation MA
RU	Recreation Use in a Scenic Landscape MA
WSR	Eligible Wild, Scenic, and Recreational Rivers MA
SPM	Semi-primitive Motorized Recreation MA
SPNM	Semi-primitive Non-motorized Recreation MA
UB	Unique Biological Areas MA
RE	Riparian Emphasis Areas MA
RNA	Research Natural Areas MA

Printer: Insert 11x17” Map MAS-1 here (pdf file), accordion fold, blank on back side

General Forest (GF) MA

Suitable Timber land in the General Forest MA	
	Acres
Total NFS land in the MA	640,443
NFS land suitable for timber management	476,892
NFS land not suitable for timber management	163,551

Landscape Ecosystems in the General Forest MA	
Landscape Ecosystem	Percent of MA
Dry Mesic Jack Pine/Black Spruce	22%
Dry Mesic Pine	16%
Lowland Conifer	26%
Mesic Aspen/Birch/Spruce-fir	22%
Mesic Pine	12%
Rich Swamp	2%
Sugar Maple	<1%
Total	100%



Theme

General Forest MAs emphasize land and resource conditions that provide a wide variety of goods, uses, and services. These include wood products, other commercial products, scenic quality, developed and dispersed recreation opportunities, and habitat for a diversity of terrestrial and aquatic wildlife and fish. Numerous roads open to public travel provide access to resources and roaded recreation opportunities. Non-motorized recreation opportunities also occur.

Compared to other management areas, the General Forest MA has the most amount of young-forest and the largest sized timber harvest units.

Setting

The General Forest MA is located throughout the Forest and applies to large acreages of the Forest.

Three-fourths of the General Forest MA is suitable for timber management. Three Landscape Ecosystems dominate this MA: Lowland Conifer, Jack Pine Black Spruce, and Mesic Aspen/Birch/Spruce-fir.

Desired Conditions

Vegetation Management

D-GF-1 Forests in this management area are largely a mosaic of tree groupings of different ages and heights. Areas disturbed through management activities are generally quickly revegetated. Some recently harvested areas still have a partial canopy of older trees. The boundaries of these cut areas appear to follow natural landscape patterns.

D-GF-2 Forest vegetation communities are managed with practices that mimic ecosystem processes, mainly stand replacement disturbance. A variety of stand sizes, shapes, crown closures, age structures, and interspersions occur. Larger patch sizes are emphasized, especially those patches associated with young, even-aged vegetative conditions. Aspen, red pine, spruce/fir, white pine, jack pine, lowland conifer, and a number of northern hardwood species occur in large amounts, depending upon the landscape ecosystem.

D-GF-3 A full range of silvicultural practices is used. However, compared to the General Forest - Longer Rotation MA, there is more even-aged management.

Forest Health and Disturbance Processes

D-GF-4 Stands in this management area are generally dominated by the young to mature vegetative growth stages of the landscape ecosystem within which they lie. Management activities generally create young, even-aged forests. A mosaic of young to mature (1-150 years) trees dominates these areas. Insect and disease outbreaks are evident, but are managed to be within historical, natural levels in terms of longevity and area impacted (fulfilling ecosystem function).

D-GF-5 Forest health is maintained and management investments are protected to sustain the productivity of the area. To maintain or restore vegetation communities, natural disturbances to the landscape are mimicked through management activities such as timber harvest and management-ignited fires. Fire is also used as a tool to prepare sites for regenerating new forests and to reduce woody fuel that could cause wildfires.

Scenic Resources

D-GF-6 The forest has a fairly continuous canopy and frequent openings of various sizes up to 1,000 acres. The openings' sizes, shapes, and habitat conditions, not necessarily their appearance, mimic the scale, pattern, and ecologic function of large-scale natural disturbances. In the most frequently visited and most scenically valued areas of this MA, the large-scale openings have a natural appearance. Other, less scenic areas of this MA will be actively managed for timber production with a lower relative emphasis on scenery compared to other resource concerns.

Recreation and Access

D-GF-7 Developed recreation sites such as campgrounds, picnic sites, boat landings, observation sites, trailheads, and swimming areas may be provided for public use. Facilities may be constructed to protect the environment and provide some comfort for users. Natural or natural-appearing materials give facilities a rustic appearance. Increased site modification that reduces the rustic natural appearance may occur at existing highly developed and heavily used sites.

D-GF-8 Dispersed recreation facilities such as campsites and trails (day use, backpacking, portaging, bicycling, horseback riding, hunter walking, snowmobile, ATV use, interpretive) may be provided for public use. Other dispersed recreation opportunities that may not be associated with facilities, such as orienteering, hunting, fishing, berry picking, bird watching, wildlife viewing, and trapping, would also occur.

D-GF-9 Recreation sites will generally be spaced so as to minimize contacts between users.

D-GF-10 Many people may use this area, mostly along waterways, roads, and trails. In these more highly used areas, it is common to encounter others engaged in a wide variety of activities. In the remainder of the management area contacts between users will generally be less frequent. Vehicles associated with timber harvesting may be encountered on roads and in the woods throughout the year.

Land Adjustments

D-GF-11 Land ownership patterns (federal, State, county, corporation, and private) are consolidated, promote efficient administration, and reduce the costs of managing resources.

Facilities

D-GF-12 Buildings and structures may be provided to support resource management objectives. There may be occasional resorts, utility corridors, towers, dams, and similar structures.

D-GF-13 Roads and bridges range from one-lane surfaced with native soil or gravel to two lanes and paved surfaces.

Objectives

O-GF-1 Over the course of the planning period, vegetation will be managed to generally represent young to mature (0 to 150 year old) vegetative growth stages.

O-GF-2 Land adjustment efforts will generally be based on consolidating ownership patterns as opportunities present themselves.

O-GF-3 Acquiring land along rivers and lakes will be encouraged where significant public ownership already exists.

O-GF-4 Land adjustment objectives:

a) Acquisitions – Priority 2 or 3

b) Conveyances – Allowed

(See the glossary for priority definitions.)

O-GF-5 The ROS class objective is primarily roaded natural, with small pockets of rural. Some areas that have roaded natural objectives would be managed to retain their remote character.

Standards and Guidelines

Recreation and Access

G-GF-1 Project level planning will generally use the Minnesota National Forest ROS inventory criteria (Appendix B). Inventoried semi-primitive motorized and non-motorized portions of the project areas will generally be managed to retain remote character. Management activities to retain remote character may include:

- Close some existing and all new roads to motorized vehicles. Construct only temporary and OML 1 roads.
- Emphasize semi-primitive recreation activities and opportunities.
- Manage forest settings using roaded

natural ROS criteria along with the Scenic Integrity Objectives.

G-GF-2 Cross-country snowmobile use is generally allowed unless prohibitions or restrictions are needed for resource protection to meet management objectives.

Special Uses

G-GF-3 Most special uses can be accommodated.

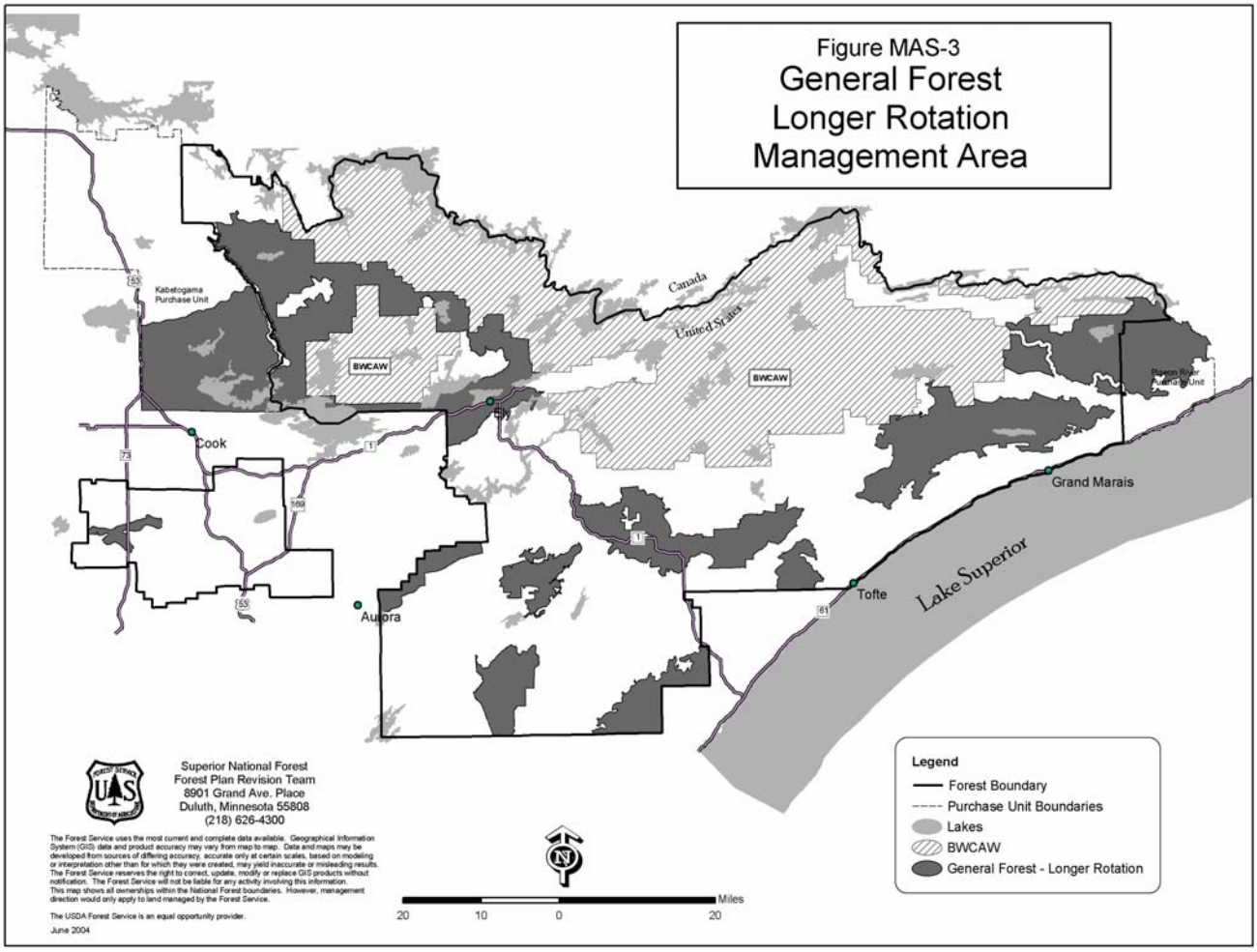
Land Adjustment

G-GF-4 Generally, on lakes with 80 percent or greater public ownership, NFS water frontage land will be retained or will only be conveyed to a public land management entity.

General Forest - Longer Rotation (LR) MA

Acreage in the General Forest - Longer Rotation MA	
	Acres
Total NFS land in the MA	415,478
NFS land suitable for timber management	297,148
NFS land not suitable for timber management	118,330

Landscape Ecosystems in the General Forest - Longer Rotation MA	
Landscape Ecosystem	Percent of MA
Dry Mesic Jack Pine/Black Spruce	24%
Dry Mesic Pine	14%
Lowland Conifer	20%
Mesic Aspen/Birch/Spruce-fir	27%
Mesic Pine	9%
Rich Swamp	1%
Sugar Maple	5%
Total	100%



Theme

The General Forest – Longer Rotation MA emphasizes land and resource conditions that provide a wide variety of goods, uses, and services. These include wood products, other commercial products, scenic quality, developed and dispersed recreation opportunities, and habitat for a diversity of terrestrial and aquatic wildlife and fish species. Numerous roads that are open to public travel provide access to resources and roaded recreation opportunities. Non-motorized recreation opportunities also occur.

Compared to the General Forest MA, this area, while still having timber production as a key emphasis, will generally have longer rotations and more uneven-aged and partial cut harvests.

Setting

The General Forest – Longer Rotation MA is located throughout the Forest where recreation use and/or lake density is high, or the potential for recreational use is high.

Nearly three-fourths of the General Forest - Longer Rotation MA is suitable for timber management. Three landscape ecosystems dominate this MA: Mesic Aspen/Birch/Spruce-fir, Dry Mesic Jack Pine/Black Spruce, and Lowland Conifer.

Desired Conditions

Forest Vegetation

D-LR-1 Forests in this MA are largely a mosaic of tree groups of different ages and heights. Many recently cut areas still have a partial canopy of older trees. Areas disturbed through management activities are generally quickly revegetated. The boundaries of cut areas appear to follow natural landscape patterns.

D-LR-2 Forest vegetation communities are generally managed with practices that mimic less severe stand maintenance disturbance, along with some management practices that mimic stand replacement disturbance. A variety of stand sizes, shapes, crown closures, age structures, and interspersions occur. Some larger patch sizes would occur within this area, although those associated with young, even-aged vegetative conditions would be less frequent than in the General Forest MA. Aspen, red pine, spruce/fir, white pine, jack pine, lowland conifer, and a number of northern hardwood species occur in large amounts, the mix of species depending upon the landscape ecosystem.

D-LR-3 A full range of silvicultural practices is employed. However, compared to the General Forest MA, there is more uneven aged and partial cut harvesting resulting in more uneven aged and multi-aged forests. This area will have less extensive even-aged harvests than the General Forest MA. When clearcutting is used in this management area, it is often done at longer rotation ages.

Forest Health and Disturbance Processes

D-LR-4 Stands in this MA are a mix of young, even-aged and older, multi-aged vegetative growth stages of the landscape ecosystem within which they lie. A mosaic of young to old (1-250 years) trees dominates these areas. Insect and disease outbreaks are evident, but are managed to be within historical, natural levels in terms of longevity and area impacted (fulfilling ecosystem function).

D-LR-5 Forest health is maintained and management investments are protected to sustain the productivity of the area. To maintain or restore vegetation communities, natural disturbances to the landscape are mimicked through the use of management activities such as timber harvest and management-ignited fires. Fire is also used as a tool to prepare sites for regenerating new forests and to reduce woody fuel that could cause wildfires.

Scenic Resources

D-LR-6 The forest in the General Forest - Longer Rotation MA differs from the General Forest MA in that a greater emphasis is placed on managing for older and larger trees. The openings' sizes, shapes, and habitat conditions, not necessarily their appearance, mimic the scale, pattern, and

ecologic function of large-scale natural disturbances. In the most frequently visited and most scenically valued areas of this MA, larger-scale openings have a natural appearance. Other, less scenic or frequently visited areas of this MA will be actively managed for timber production with a lower relative emphasis on scenery compared to other resource concerns.

Recreation and Access

D-LR-7 Developed recreation sites such as campgrounds, picnic sites, boat landings, observation sites, trailheads, and swimming areas may be provided for public use. Facilities may be constructed to protect the environment and provide some comfort for users. Natural or natural-appearing materials give facilities a rustic appearance. Increased site modification that reduces the rustic natural appearance may occur at existing highly developed and heavily used sites.

D-LR-8 Dispersed recreation facilities such as campsites and trails (day use, backpacking, portaging, bicycling, horseback riding, hunter walking, snowmobile, ATV use, interpretive) may be provided for public use. Other dispersed recreation opportunities that may not be associated with facilities, such as orienteering, hunting, fishing, berry picking, bird watching, wildlife viewing, and trapping, would also occur.

D-LR-9 Recreation sites will generally be spaced so as to minimize contacts between users.

D-LR-10 Many people may use this area, mostly along waterways, roads, and trails. In these more highly used areas it is common to encounter others engaged in a wide variety of activities. In the remainder of the MA, contacts between users will generally be less frequent. Vehicles associated with timber harvesting may be encountered on roads and in the woods throughout the year.

Land Adjustments

D-LR-11 Land ownership patterns (federal, State, county, corporation, and private) are consolidated, promote efficient administration, and reduce the costs of managing resources.

Facilities

D-LR-12 Buildings and structures may be provided to support resource management objectives. There may be occasional resorts, utility corridors, towers, dams, and similar structures.

D-LR-13 Roads and bridges range from one-lane surfaced with native soil or gravel to two lanes and paved surfaces.

Objectives

O-LR-1 Over the course of the planning period, vegetation will be managed to generally represent young to old (0 to 250 year old) vegetative growth stages.

O-LR-2 Land adjustment efforts will generally be based on consolidating ownership patterns as opportunities present themselves.

O-LR-3 Acquiring land along rivers and lakes will be encouraged where significant public ownership already exists.

O-LR-4 Land adjustment objectives:

c) Acquisitions – Priority 2 or 3

d) Conveyances – Allowed

(See the glossary for priority definitions.)

O-LR-5 The ROS class objective is primarily roaded natural, with small pockets of rural. Some areas that have roaded natural objectives would be managed to retain their remote character.

Standards and Guidelines

Recreation and Access

G-LR-1 Project level planning will generally use the Minnesota National Forest ROS inventory criteria (Appendix B). Inventoried semi-primitive motorized and non-motorized portions of the project areas will generally be managed to retain

remote character. Management activities to retain remote character may include:

- Close some existing and all new roads to motorized vehicles. Construct only temporary and OML 1 roads.
- Emphasize semi-primitive recreation activities and opportunities.
- Manage forest settings using roaded natural ROS criteria along with the Scenic Integrity Objectives.

G-LR-2 Cross-country snowmobile use is generally allowed unless prohibitions or restrictions are needed for resource protection to meet management objectives

Special Uses

G-LR-3 Most special uses can be accommodated.

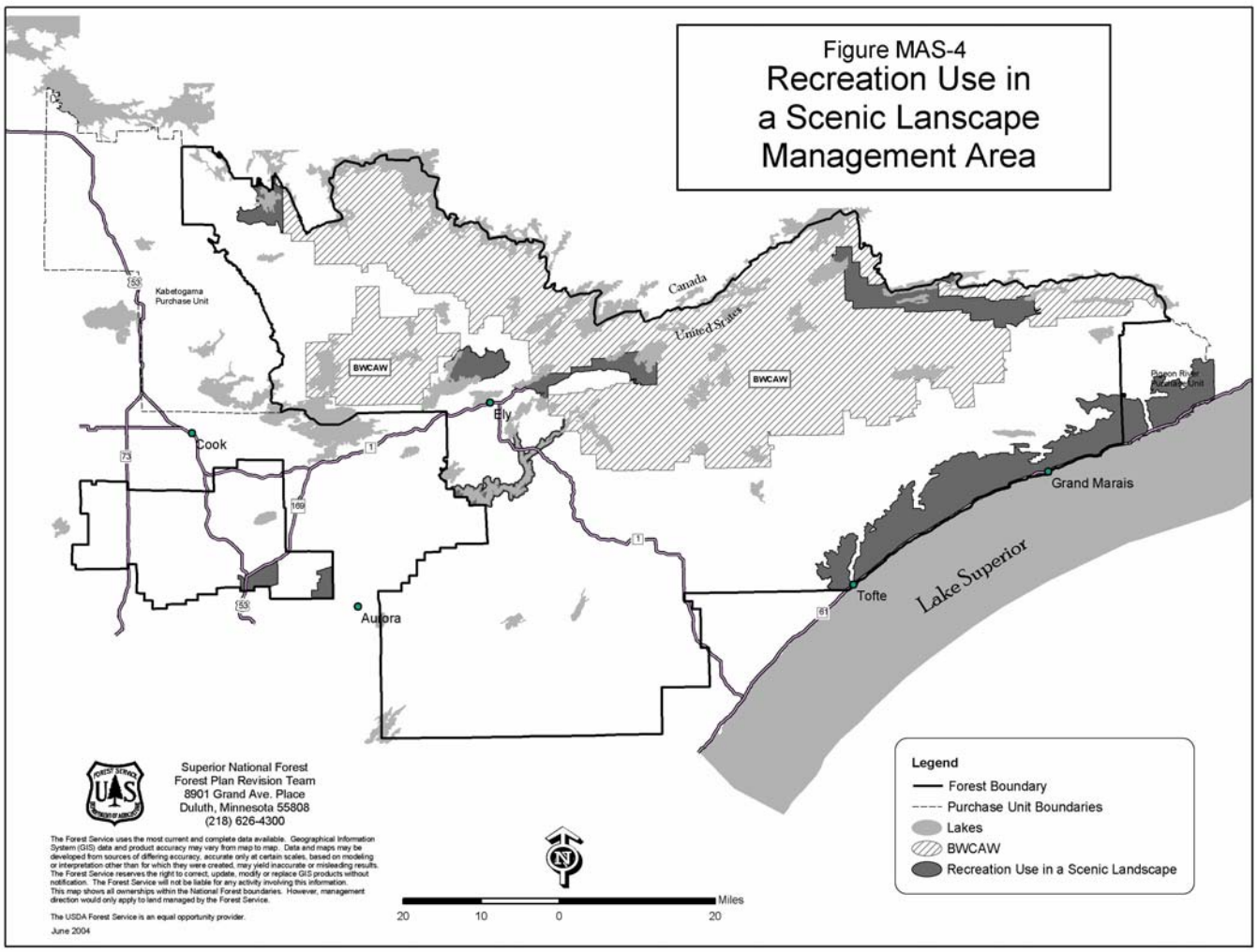
Land Adjustment

G-LR-4 Generally, on lakes with 80 percent or greater public ownership, NFS water frontage land will be retained or will only be conveyed to a public land management entity. National Forest System water frontage land on Lake Vermillion will be conveyed only to a public land management entity.

Recreation Use in a Scenic Landscape (RU) MA

Acreage in the Recreation Use in a Scenic Landscape MA	
	Acres
Total NFS land in the MA	155,412
NFS land suitable for timber management	91,890
NFS land not suitable for timber management	63,522

Landscape Ecosystems in the Recreation Use in a Scenic Landscape MA	
Landscape Ecosystem	Percent of MA
Dry Mesic Jack Pine/Black Spruce	20%
Dry Mesic Pine	10%
Jack Pine/Aspen/Oak	<1%
Lowland Conifer	8%
Mesic Aspen/Birch/Spruce-fir	32%
Mesic Pine	8%
Rich Swamp	2%
Sugar Maple	20%
Total	100%



Theme

The Recreation Use in a Scenic Landscape (RU) management area emphasizes land and resource conditions that provide a scenic landscape for recreational activities in natural-appearing surroundings. This management area also provides wildlife habitat to enhance recreational wildlife watching opportunities. Concentrated recreation use is common. Facilities and access may be highly developed, resulting in a high degree of user interaction. Low-density recreation is also offered in areas with remote character.

Setting

The RU management area is often near high standard roads where developed recreation activities may already be provided. This management area is usually able to meet the demand for recreation use because the areas are easily accessible and already developed.

Two-thirds of the RU management area is suitable for timber management. The Landscape Ecosystems are somewhat evenly divided in this management area.

Desired Conditions

Vegetation Management

D-RU-1 Ecosystems are managed to provide a predominantly natural-appearing landscape that may be slightly modified by forest management activities. This management area emphasizes a large tree and old forest character. Vegetation management generally maintains or enhances older vegetative growth stages.

D-RU-2 Management activities such as timber harvest and management-ignited fire may be used to achieve Landscape Ecosystem objectives. Recreation and scenic integrity objectives guide the appearance of timber harvest, management-ignited fire, tree planting, and other management techniques.

D-RU-3 Vegetation management activities also enhance wildlife habitat. Management activities that promote wildlife habitat for public observation may occur.

Scenic Resources

D-RU-4 Viewsheds are managed for scenic beauty and big-tree character. Generally, this management area offers natural-looking forest surroundings with some facility and trail development and roads for recreation. Forest management enhances recreation and scenic objectives and management activities may be noticeable to visitors. Visitors to the Forest may occasionally see management activities such as timber harvest, management-ignited fire, tree planting, and other resource management techniques.

Recreation and Access

D-RU-5 This management area provides a variety of recreation opportunities. Developed recreation sites such as campgrounds, picnic sites, boat landings, observation sites, trailheads, and swimming areas are provided for public use. Developed sites may have a high degree of modification. Facilities are generally designed for comfort and convenience of users.

D-RU-6 Dispersed recreation facilities such as campsites and trails (day use, backpacking, portaging, bicycling, horseback riding, hunter walking, snowmobile, ATV use, interpretive) may be provided for public use. Other dispersed recreation opportunities that may not be associated with facilities, such as orienteering, hunting, fishing, berry picking, bird watching, wildlife viewing, and trapping, would also occur.

D-RU-7 Depending on project-level recreation objectives, a broad range of access may be permitted. This includes non-motorized trails, motorized trails, gravel roads, and paved roads.

D-RU-8 Many people use this area along lakes and roads and at developed recreation sites. It is common to encounter others. Some people may use the more remote parts of these areas where less development opportunities are provided and consequently fewer people are encountered.

Facilities

D-RU-9 Buildings and structures may be provided to support resource management objectives. Structures include power lines, pipelines, and roads that serve recreational developments and private homesteads.

D-RU-10 Roads are common and range from one-lane roads with native soil or gravel surfaces to multiple-lane roads with paved surfaces.

Objectives

O-RU-1 The ROS class objective is primarily roaded natural, with small pockets of rural. Some areas that have roaded natural objectives would be managed to retain their remote character.

O-RU-2 Land adjustment objectives:

a) Acquisitions: Priority 2 or 3
b) Conveyances: Allowed
(See the glossary for priority definitions.)

Standards and Guidelines

Recreation and Scenic

G-RU-1 Project level planning will generally use the Minnesota National Forest ROS inventory criteria (Appendix B). Inventoried semi-primitive motorized and non-motorized portions of the project areas will generally be managed to retain remote character. Management activities to retain remote character may include:

- Close some existing and all new roads to motorized vehicles. Construct only temporary and OML 1 roads.
- Emphasize semi-primitive recreation activities and opportunities.
- Manage forest settings using roaded natural ROS criteria along with the Scenic Integrity Objectives.

G-RU-2 Cross-country snowmobile use is generally allowed unless prohibitions or restrictions are needed for resource protection to meet management objectives.

Special Uses

G-RU-3 A wide variety of special uses is generally permitted.

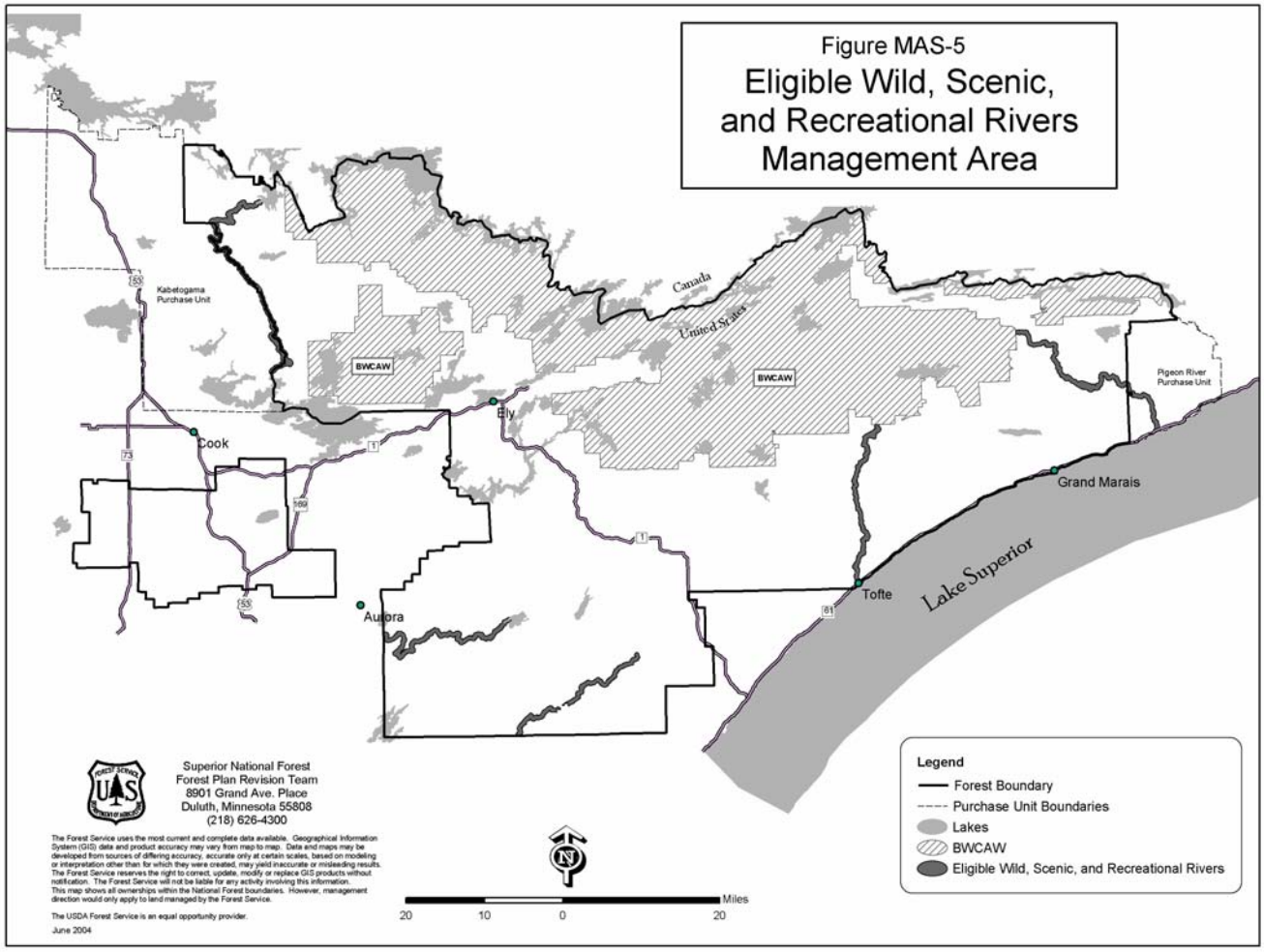
Land Adjustment

S-RU-1 To meet management, recreation, and scenic resource objectives, purchases, donations, and exchanges will be used to enhance and protect the landscape, viewshed, and character of the area. Conveyances will be permitted on a case-by-case basis, as long as management area objectives are not compromised.

Eligible Wild, Scenic, and Recreational Rivers (WSR) MA

Acreage in the Eligible Wild, Scenic, and Recreational Rivers MA	
	Acres
Total NFS land in the MA	31,834
NFS land suitable for timber management	18,332
NFS land not suitable for timber management	13,502

Landscape Ecosystems in the Eligible Wild, Scenic, and Recreation Rivers MA	
Landscape Ecosystem	Percent of MA
Dry Mesic Jack Pine/Black Spruce	5%
Dry Mesic Pine	14%
Lowland Conifer	25%
Mesic Aspen/Birch/Spruce-fir	38%
Mesic Pine	15%
Rich Swamp	3%
Sugar Maple	<1%
Total	100%



Theme

The Eligible Wild, Scenic, and Recreational River (WSR) management area emphasizes land and resource conditions that provide for interim protection of river corridors identified as wild, scenic, or recreational. The corridors involved meet the eligibility criteria specified in section 1(b) and 2(b) of the Wild and Scenic Rivers Act. Under the interim protection, management activities in the river corridors will protect the river's free-flowing condition, outstandingly remarkable values, and classification.

Setting

In the WSR management area, the settings range from primitive to developed recreation areas, depending on the classification of the eligible river.

Half of the land allocated to the Eligible Wild, Scenic, and Recreational Rivers MA is suitable for timber management. Mesic Aspen/Birch/Spruce-fir and Lowland Conifer Landscape Ecosystems cover more than half of this MA. The Dry Mesic Pine and Mesic Pine Landscape Ecosystems are also in this MA.

This management area applies to land one-quarter mile on each side of the following eligible rivers.

Brule River

The segment of river from its headwater to the BWCAW border is classified as wild. The segment extending downstream from the BWCAW boundary to a point about six miles inland from Lake Superior is classified as recreational. The southern most six-mile segment is classified as scenic.

Cloquet River

The segment of river within the Superior National Forest boundaries is classified as recreational.

Pigeon River

The segment of river within the Superior National Forest boundaries is classified as wild.

St. Louis River

The segment of river within the Superior National Forest boundaries is classified as recreational.

Temperance River

The segment of river within the BWCAW is classified as wild; the segment of river from the BWCAW boundary seven miles south to the juncture with Plouff Creek is classified as recreational; and the remaining segment of the river from Plouff Creek to Lake Superior is classified as scenic.

Vermilion River

The seven-mile mid-section of the river at Buyck is classified as recreational and the remainder of the river is classified as scenic.

Desired Conditions

Eligible Wild, Scenic, and Recreation Rivers

D-WSR-1 Eligible river ecosystems are managed to protect or enhance their outstandingly remarkable values, free-flowing character, and classification.

D-WSR-2 Management activities promote the river's outstandingly remarkable values and activities may occasionally be noticeable to visitors. Such management activities may include maintenance or development of recreation sites and vegetation management provided it maintains the river's eligibility.

Public use and enjoyment may be accommodated if these uses retain the river's natural values. Recreation activities may include viewing outstanding scenery, watching wildlife, hunting, fishing, and some activities related to recreational developments, such as camping, boating, swimming, hiking, mountain biking, and skiing.

Wild River Segments

D-WSR-3 Simple recreation facilities, well screened from the river may be provided to prevent site deterioration from current and expected public use. Substantial improvements to existing facilities are not permitted.

D-WSR-4 Dispersed recreation facilities such as campsites and trails (day use, backpacking, and portaging) may be provided for public use.

Scenic and Recreation River Segments

D-WSR-5 Developed recreation sites (screened from the river) such as campgrounds, picnic sites, water access sites, observation sites, and trailheads may be provided for public use.

D-WSR-6 Dispersed recreation facilities such as campsites and trails (day use, backpacking, portaging, bicycling, cross-country skiing, horseback riding, hunter walking, snowmobile, and ATV use) may be provided for public use.

D-WSR-7 Interpretation of cultural resources may be provided and if so, will be compatible with the natural character and recreation opportunities in the area.

Objectives

Eligible Wild, Scenic, and Recreation Rivers

O-WSR-1 The ROS class objectives for the potential classifications are listed below.

- Wild: semi-primitive non-motorized
- Scenic: semi-primitive motorized
- Recreation: roaded natural

O-WSR-2 Land adjustment objectives:

a) Acquisitions – Priority 2
b) Conveyances – Allowed

(See the glossary for priority definitions.)

O-WSR-3 Non-NFS land will be acquired as opportunities arise, except along the Pigeon River where existing NFS ownership is very limited, to protect the existing characteristics of the river corridors.

O-WSR-4 If NFS land is conveyed, it will only be transferred to another public land management entity.

Standards and Guidelines

S-WSR-1 Wild, Scenic and Recreation River Segments: The Forest will work with tribes, counties, State, and local governments in the development of river studies and plans.

Ecosystem Function

S-WSR-2 Wild River Segments**:** Outside designated wilderness, prescribed fire may be used to establish or maintain desired vegetative conditions. Heavy equipment will only be used with Forest Supervisor approval.

G-WSR-1 Wild, Scenic, and Recreational River Segments**:** Prescribed fire may be used to establish, maintain, or improve vegetation or scenic conditions. This may include creating wildlife openings, making type conversions, or improving visual quality.

G-WSR-2 Wild, Scenic, and Recreational River Segments: Herbicide or pesticide use will generally be allowed if environmental analysis shows it is the only means to control species causing severe problems.

S-WSR-3 Scenic and Recreation River Segments**:** During fire suppression, planned actions will be based on an analysis after considering fire intensities and risk to health and safety. Heavy equipment will only be used with Forest Supervisor approval.

Vegetation

S-WSR-4 Wild River Segments**:** Inside designated wilderness, forestry practices are not appropriate to these segments.

G-WSR-3 Wild River Segments**:** Outside designated wilderness, vegetation manipulation may be used to enhance and improve river values within the context of the purposes set for wild river segments.

S-WSR-5 Scenic River Segments: Vegetative management will enhance the recreation experience and will maintain the near natural environment of the river corridor.

G-WSR- 4 Scenic and Recreation Segments**:** A wide range of silvicultural practices are allowed provided that the methods used would

have no substantial adverse effect within the river corridor to the river's free flow, water quality, and outstandingly remarkable values. River corridors should be maintained in their near natural environment.

G-WSR-5 Scenic and Recreation River Segments**:** Vegetation management will generally be done to enhance the recreation experience and, to the extent practical, improve scenic values within the context of the purposes for scenic rivers.

G-WSR-6 Scenic and Recreation River Segments**:** Vegetation management practices will generally promote the retention of long-lived tree species, leading toward the development of a big-tree character throughout river corridors.

Wildlife Habitat

G-WSR-7 Scenic and Recreation River Segments**:** Habitat improvement will generally emphasize maintaining essential habitat for wildlife associated with late successional stages of vegetation. Habitat improvement that is natural appearing and enhances values of the scenic or recreation river experience will generally be permitted.

Heritage, Recreation, and Access

S-WSR-6 Wild, Scenic, and Recreation River Segments: Preservation of significant heritage resources will be emphasized.

S-WSR-7 Wild River Segments: On-site cultural resource interpretation will not occur.

S-WSR-8 Wild River Segments: All public motor use is prohibited on National Forest System classified and unclassified roads and trails and in cross-country travel.

S-WSR-9 Wild River Segments: No new road construction will be permitted within the river corridor.

G-WSR-8 Wild, Scenic and Recreation River Segments: The following activities are generally not permitted within 150 feet of subsurface heritage resource (buried) sites: grazing, heavy equipment and logging activity which can affect the integrity of the site and the construction of facilities other than those designed to interpret the site.

G-WSR-9 Scenic and Recreation Segments: Cross-country snowmobile use will generally be allowed unless prohibitions or restrictions are needed for resource protection.

G-WSR-10 Scenic River Segments**:** Roads may be retained at the maintenance level currently existing on the ground. Limited reconstruction of existing roads may occur when necessary to control road-caused erosion and sedimentation. Existing corridors and river access points should be used whenever possible. Proposals for river crossings may be approved where the crossing will not adversely impact the values, free flow, or change the potential classification for which the river is being managed.

G-WSR-11 Recreation River Segments**:** Limited construction or reconstruction may occur to increase or upgrade access or control road-caused erosion and sedimentation. Existing corridors and river access points should be used whenever possible. New river access may be developed to provide greater resource utilization than provided by existing access points. Proposals for river crossings may be approved where the crossing will not adversely impact the values or change the potential classification for which the river is being managed.

Scenic Quality

S-WSR-10 Wild River Segments: Substantial additions to existing improvements are prohibited.

G-WSR-12 Scenic and Recreation River Segments: Recreation facilities are screened from the river and fit the appropriate standards and guidelines for ROS and SIOs assigned to these river segments.

Minerals

S-WSR-11 Wild River Segments: No permit, lease, or other authorization will be issued for exploration or development of minerals owned by the United States. Exploration

and development of reserved and outstanding mineral rights will be negotiated to minimize adverse environmental effects.

S-WSR-12 Scenic and Recreation River Segments: Surface disturbance or occupancy for development and extraction of federally owned minerals excluding sand and gravel are generally not permitted. Where appropriate, sand and gravel may be removed by special permit issued by the Forest Supervisor. No sand and gravel may be removed from any area below the ordinary high water mark. Surface-disturbing exploration (including core drilling) may be permitted in areas where reserved and outstanding mineral rights exist. Exploration and development of reserved and outstanding mineral rights will be negotiated to minimize adverse environmental effects.

Watershed Management

S-WSR-13 Wild Segments**:** Where watershed improvement projects are undertaken, unobtrusive treatment will be prescribed. Only natural materials (rocks, logs, and native plants) will be used in restoration work. Flood control dams and levees are prohibited. The natural appearance and essentially primitive character of the river area will be maintained.

S-WSR-14 Wild Segments: Watershed improvement projects will be limited to correcting human-caused resource damage or resource damage from natural disasters, which threaten downstream health and safety.

S-WSR-15 Scenic Segments: Where watershed improvement projects are undertaken, unobtrusive treatment will be prescribed. Only natural materials (rocks, logs, and native plants) will be used in restoration work. Flood control dams and levees will be prohibited.

S-WSR-16 Recreation Segments: Existing flood control works such as low dams, diversion works, riprap, and other minor structures will be maintained provided the waterway remains generally natural in appearance. New flood control structures are prohibited.

Structures

S-WSR-17 Wild River Segments**:** New structures and improvement of old structures are prohibited if not in keeping with overall objectives for wild river segments. Simple facilities to protect the resource or environmental values are allowed when constructed in keeping with a semi-primitive setting.

G-WSR-13 Scenic River Segments**:** A limited number of buildings and structures may be provided to support resource management objectives that fit the semi-primitive motorized setting.

G-WSR-14 Recreation River Segments**:** Buildings and structures may be provided to support resource management objectives.

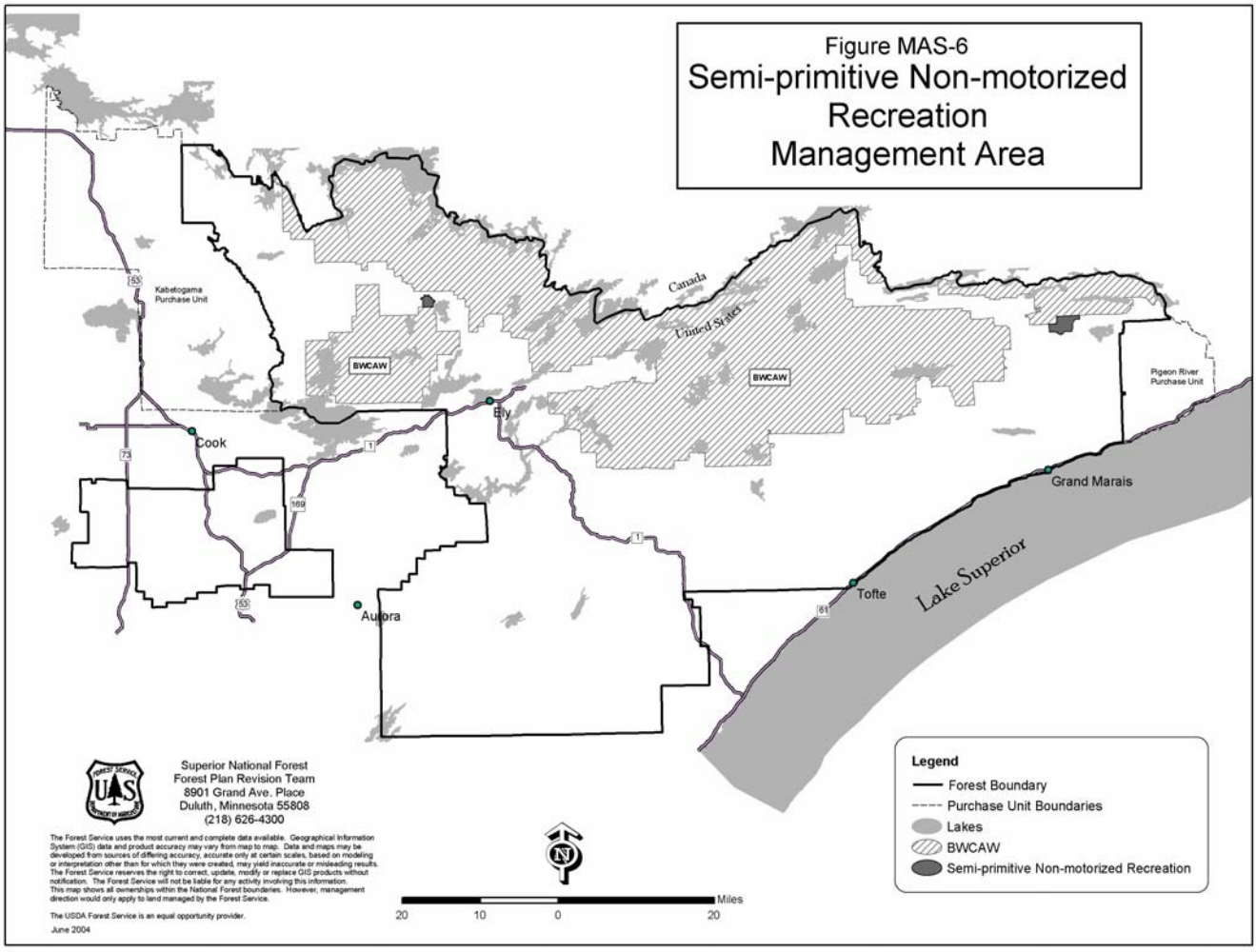
Special Uses

S-WSR-18 Wild, Scenic and Recreation River Segments: Existing special uses may be continued. New applications will be evaluated on their suitability relative to the river's values.

Semi-primitive Non-motorized Recreation (SPNM) MA

Acreage in the Semi-primitive Non-motorized Recreation MA	
Total NFS land in this MA	4,559
NFS land suitable for timber management	3,126
NFS land not suitable for timber management	1,433

Landscape Ecosystems in the Semi-primitive Non-motorized Recreation MA	
Landscape Ecosystem	Percent of MA
Dry Mesic Jack Pine/Black Spruce	21%
Lowland Conifer	12%
Mesic Aspen/Birch/Spruce-fir	64%
Mesic Pine	3%
Total	100%



Theme

The Semi-primitive Non-motorized (SPNM) management area emphasizes land and resource conditions that provide recreational opportunities in nearly primitive surroundings where motorized use is NOT permitted. Most of the non-motorized recreation use occurs on lakes, trails, portages, and low standard roads. Interaction among recreational users is low. Forest management enhances recreation and scenic objectives and may occasionally be noticeable to visitors.

Setting

The SPNM management area is located in parts of the Forest with few low-standard roads and trails. Management activities are not very noticeable. Visitors may occasionally see stands that have been regenerated, low-standard timber access roads, and non-motorized trails.

The majority of the SPNM management area is suitable for timber management. Two Landscape Ecosystems dominate this MA: Mesic Aspen/Birch/Spruce-fir and Dry Mesic Jack Pine/Black Spruce.

Desired Conditions

Vegetation Management

D-SPNM-1 Ecosystems are managed to provide a predominantly natural-appearing landscape, emphasizing large trees and older forest with a continuous forest canopy. Vegetation management generally maintains or enhances the older vegetative growth stages.

D-SPNM-2 Management activities in the SPNM management area enhance recreation and scenic objectives and may occasionally be noticeable to visitors. Such management activities may include developing primitive campsites, harvesting timber, using management-ignited fire, and planting trees.

D-SPNM-3 Management activities such as timber harvest and management-ignited fire may be used to achieve vegetation objectives. These activities are designed to maintain the natural appearance of the landscape. Scenic integrity and recreation objectives also guide the design and implementation of these activities.

Scenic Resources

D-SPNM-4 Recreational activities occur in natural-appearing environments that may be slightly modified by forest management activities. Evidence of management activities is relatively low, consisting of occasional stands that have been harvested, low standard roads that are used for timber access, and trails that are used for non-motorized recreation.

Recreation and Access

D-SPNM-5 Developed recreation sites such as water access sites and trailheads may be provided for public use. There is generally little site modification with rustic improvements designed primarily for protection of the environment rather than the comfort of users. Use of natural materials for improvements is emphasized.

D-SPNM-6 Dispersed recreation opportunities such as campsites and trails (day use, backpacking, portaging, cross-country skiing, horseback riding, and hunter walking) may be provided for public use. Other human-made structures are rare. Other dispersed recreation opportunities that may not be associated with facilities, such as orienteering, hunting, fishing, berry picking, bird watching, wildlife viewing, and trapping, would also occur.

D-SPNM-7 Within the interior of the management area, small primitive camping sites may be provided. Spacing of camping sites is generally designed to minimize contacts between users.

D-SPNM-8 Low-standard roads, with native soil or gravel surfaces, are permitted to accomplish forest management. However, roads would be closed to public motor vehicle use.

D-SPNM-9 Most recreation use occurs on lakes, trails, and portages. It is uncommon to

encounter others in the area.

Objectives

O-SPNM-1 The ROS class objective is semi-primitive non-motorized.

Standards and Guidelines

Recreation

S-SPNM-1 All public motor use is prohibited on all National Forest System classified and unclassified roads, trails, and in cross-country travel.

G-SPNM-1 If small, low development level, parking areas are provided, they are generally located at the perimeter of the management area.

S-SPNM-2 Developing new motorized recreation trails is prohibited.

G-SPNM-2 The road or trail access to and facilities at water access sites will generally meet development levels described for Natural Environment Lakes and Remote River segments. (See G-RWA-9 in Chapter 2 for development levels)

Special Uses

G-SPNM-3 Special uses are generally not permitted, except those uses that do not detract from the semi-primitive environment or uses needed to access or supply utilities to private land, recreational facilities, or administrative sites.

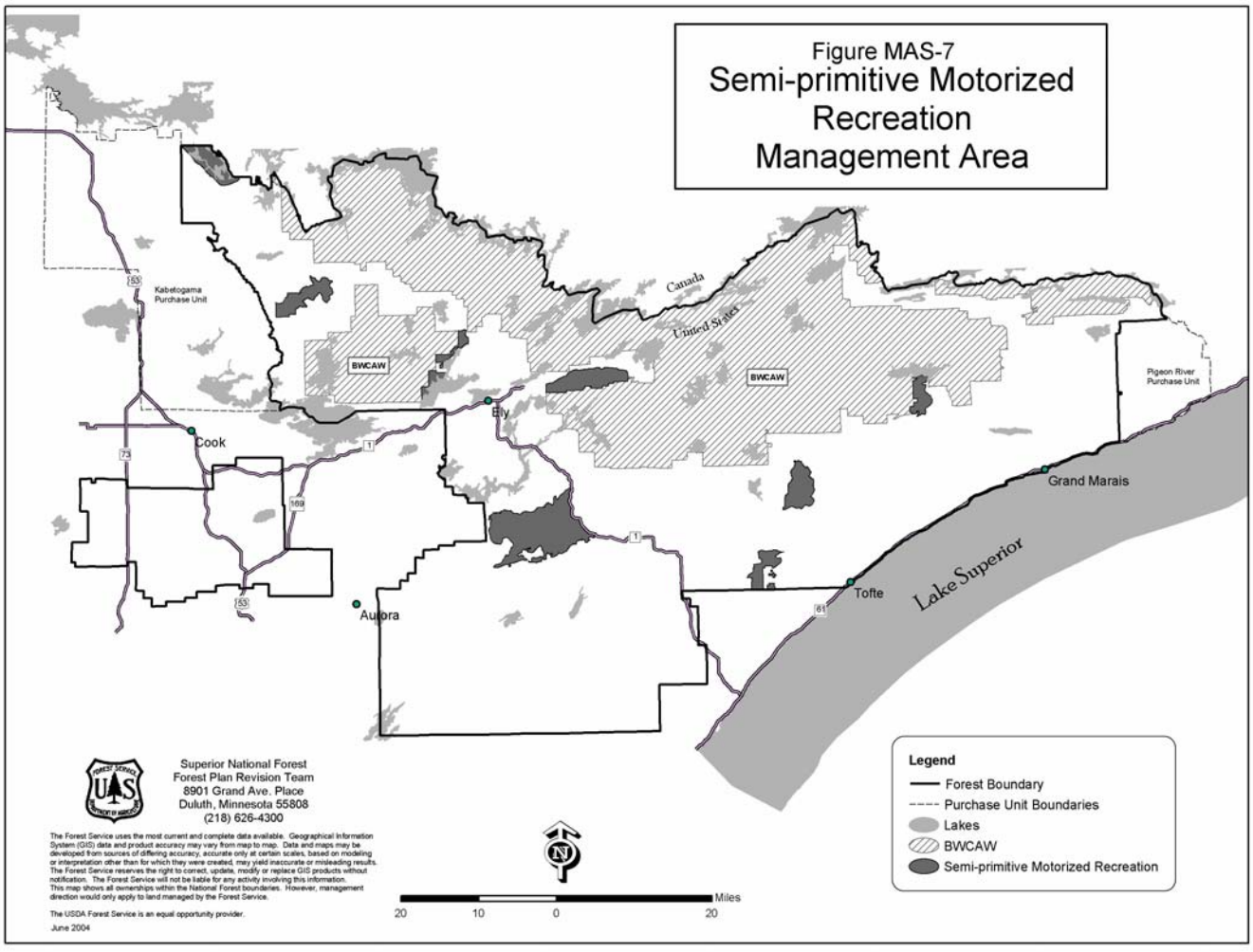
Land Adjustment

G-SPNM-4 Conveyances of NFS land will generally not be permitted. Acquisitions will generally be priority 2. (See the glossary for priority definitions.)

Semi-primitive Motorized Recreation (SPM) MA

Acreage in the Semi-primitive Motorized Recreation MA	
	Acres
Total NFS land in this MA	69,018
NFS land suitable for timber management	45,995
NFS land not suitable for timber management	23,023

Landscape Ecosystems in the Semi-primitive Motorized Recreation MA	
Landscape Ecosystem	Percent of MA
Dry Mesic Jack Pine/Black Spruce	29%
Dry Mesic Pine	33%
Lowland Conifer	18%
Mesic Aspen/Birch/Spruce-fir	7%
Mesic Pine	9%
Rich Swamp	2%
Sugar Maple	2%
Total	100%



Theme

The Semi-primitive Motorized (SPM) management area emphasizes land and resource conditions that provide recreational opportunities in nearly primitive surroundings where motorized use is allowed. Most recreation use occurs on lakes, trails, portages, and low standard roads. Interaction among recreational users is low. Forest management enhances recreation and scenic objectives and may occasionally be noticeable to visitors.

Setting

The SPM management area is located in parts of the Forest with few low standard roads and trails. Management activities are not very noticeable. Visitors may see occasional stands that have been regenerated, low-standard timber access roads, and motorized trails.

Two-thirds of the SPM management area is suitable for timber management. Dry Mesic Pine and Dry Mesic Jack Pine/Black Spruce Landscape Ecosystems cover more than half of this management area, with the Lowland Conifer Landscape Ecosystem also contributing to this management area.

Desired Conditions

Vegetation Management

D-SPM-1 Ecosystems are managed to provide a predominantly natural-appearing landscape, emphasizing large trees and older forest characteristics with a continuous forest canopy. Vegetation management generally maintains or enhances older vegetative growth stages.

D-SPM-2 Management activities such as timber harvest and management-ignited fire may be used to achieve Landscape Ecosystem objectives. These activities are designed to maintain the natural appearance of the landscape. Scenic integrity and recreation objectives guide the design and implementation of these activities.

Scenic Resources

D-SPM-3 Recreational activities occur in natural-appearing environments that may be slightly modified by forest management activities. Evidence of management activities is relatively low, consisting of occasional stands that have been regenerated, low standard roads that are used for timber access, development of primitive campsites, use of management ignited fire, and maintenance or use of motorized and non-motorized trails.

Recreation and Access

D-SPM-4 Developed recreation sites such as water access sites and trailheads may be provided for public use. Sites generally have little modification. When sites are developed or changed, improvements are mainly rustic and protect the environment rather than meet user comforts. Use of natural materials for improvements is emphasized.

D-SPM-5 Dispersed recreation facilities such as campsites and trails (day use, backpacking, portaging, bicycling, cross-country skiing, horseback riding, hunter walking, snowmobile, and ATV use) may be provided for public use. Other human-made structures are rare. Other dispersed recreation opportunities that may not be associated with facilities, such as orienteering, hunting, fishing, berry picking, bird watching, wildlife viewing, and trapping, would also occur.

D-SPM-6 Contacts between recreationists is minimal. Recreation sites are spaced so as to minimize contacts between users.

D-SPM-7 Low standard National Forest System roads, surfaced with native soil or local gravel, provide access for timber harvest activities and some public access.

Objectives

O-SPM-1 The ROS class objective is semi-primitive motorized.

Standards and Guidelines

Recreation

G-SPM-1 Cross-country snowmobile use is generally allowed unless prohibitions or restrictions are needed for resource protection to meet management objectives.

G-SPM-2 The road or trail access to and facilities at water access sites will generally meet development levels described for Natural Environment Lakes and Remote River segments. (See also G-RWA-9 in Chapter 2 for development levels.)

Special Uses

G-SPM-3 Special uses are generally not permitted, except those uses that do not detract from the semi-primitive environment or uses needed to access or supply utilities to private land, recreational facilities, or administrative sites.

Land Adjustment

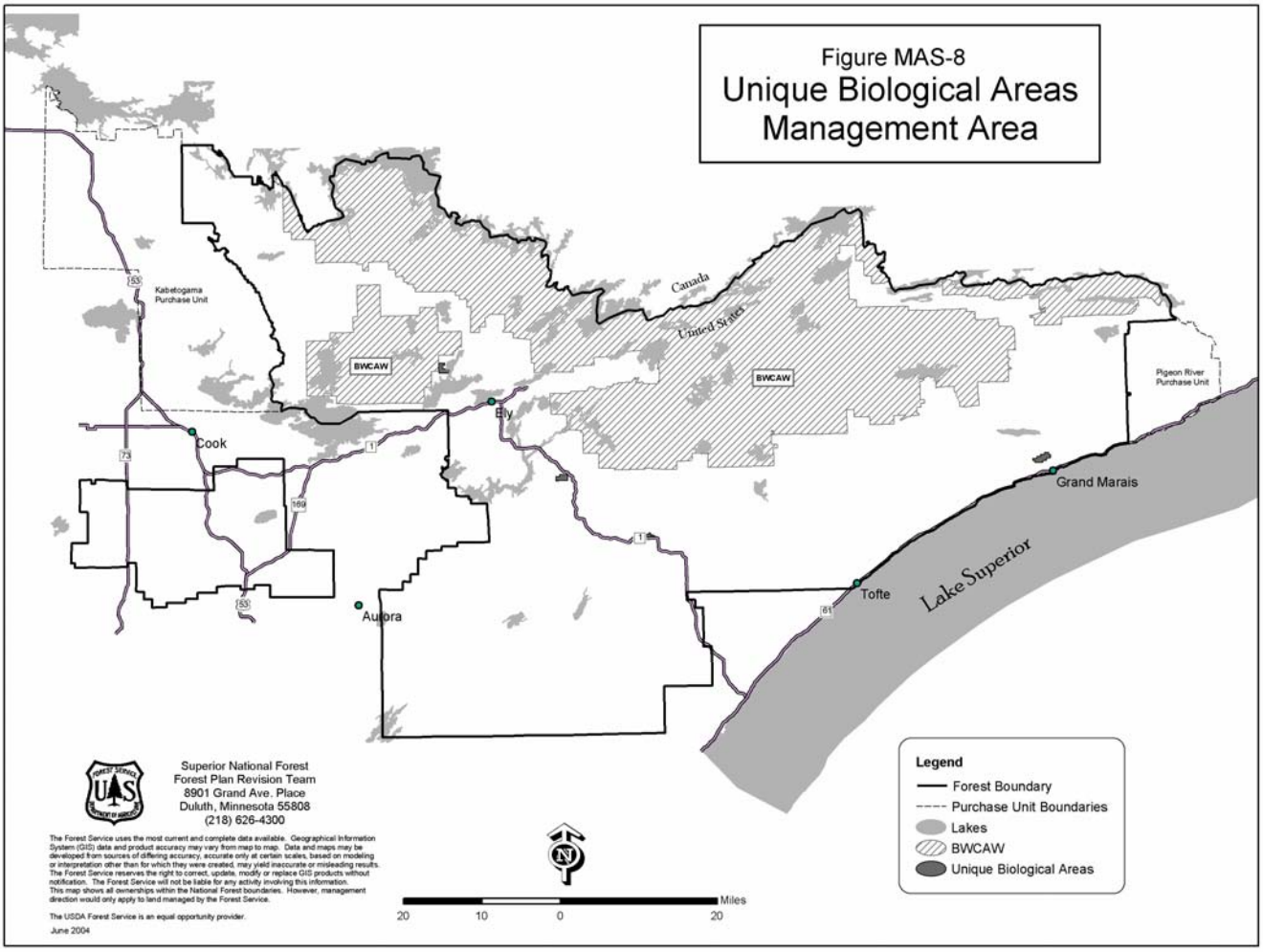
G-SPM-4 Conveyances of National Forest System land will generally not be permitted. Acquisitions will generally be priority 2.

(see glossary for priority definitions).

Unique Biological Areas (UB) MA

Acreage in Unique Biological Areas MA	
	Acres
Total NFS land in this MA	2,578
NFS land suitable for timber management	0
NFS land not suitable for timber management	2,578

Landscape Ecosystems in the Unique Biological Areas MA	
Landscape Ecosystem	Percent of MA
Dry Mesic Jack Pine/Black Spruce	42%
Dry Mesic Pine	11%
Lowland Conifer	31%
Mesic Aspen/Birch/Spruce-fir	14%
Sugar Maple	2%
Total	100%



Themes

The Unique Biological Areas (UB) management area has outstanding biological and other special values. Although this management area preserves these values, the UB areas are primarily managed for interpretive purposes.

Setting

None of the UB management area is suitable for timber management. The Dry Mesic Jack Pine/Black Spruce and Lowland Conifer Landscape Ecosystems dominate this MA.

UB management areas may be located in a number of places throughout the Forest. The environmental conditions in which they exist may differ from each other. The thread common to these areas is that they exhibit plant communities, associations, and/or individual species of particular interest.

The UB management area includes the following:

Fall River Patterned Fen - T 61 N, R 1 E, 988 acres

Little Isabella River – T 60 N, R 9 W, 338 acres

Birch Bay – T 63 N, R 13 W, 757 acres

Harris Lake Natural National Landmark – T 61 N, R 11 W, 514 acres

Desired Conditions

D-UB-1 Management emphasis is on conserving or enhancing areas of unique biological interest. Management practices that would alter important values associated with the UB management areas are not appropriate.

D-UB-2 UB management areas provide habitat for federally listed endangered, threatened, proposed, or candidate species or for Regional Forester sensitive species; and other elements of biological diversity. Vegetation, habitat, soil productivity, and water quality are affected little by present human use. Native plant communities are maintained, restored, or enhanced. The setting is usually rustic or natural.

D-UB-3 Dispersed recreation occurs but may be discouraged. Examples of dispersed recreation opportunities that may be available include bird watching, orienteering, fishing, hunting, berry picking, plant identification, and wildlife viewing.

Objectives

O-UB-1 The ROS class objective is semi-primitive motorized.

Standards and Guidelines

Ecosystem Process

S-UB-1 Existing old-growth or old forest will be managed in order to protect and maintain existing conditions. In some forest community types, this may require the periodic use of prescribed fire.

Watershed

G-UB-1 Modifying water levels is generally not permitted.

Vegetation

G-UB-2 Measures designed to protect old-growth or other values will generally be implemented when stands near and adjacent to the UB management areas are subject to vegetation management activity. Protective measures may include buffers against potential sun and wind damage, soil erosion control, and prescribed fire.

Fire

G-UB-3 Wildfire suppression activities are generally allowed to protect UB management area values, but kept to the minimum necessary to achieve control.

Recreation and Access

S-UB-2 UB management areas will be protected from actual or potential damage due to public use.

S-UB-3 RMV use on unclassified roads is

prohibited.

S-UB-4 Cross-country snowmobile travel is prohibited.

G-UB-4 Facilities are generally provided only when needed to protect the resource from human impacts.

G-UB-5 UB management areas will generally be closed to public use when needed to protect special attributes from disturbances. New roads are generally not permitted in these areas. New trails are generally not permitted, unless they are needed for interpretive or educational purposes or to correct resource damage currently occurring.

G-UB-6 New developed recreation sites will generally not be provided unless they facilitate public interpretation of a UB management area.

G-UB-7 Dispersed recreation sites are generally not appropriate in these areas. One-day hiking trails are appropriate and may be used if needed to accomplish research activities, provide access for public interpretation, or to protect the area by concentrating human use.

G-UB-8 Developing new motorized recreation trails is generally prohibited. Motorized use on existing National Forest System snowmobile trails is generally allowed.

G-UB-9 RMV use on OML 1 and OML 2 roads is generally prohibited.

Land Adjustment

S-UB-5 Conveyances of NFS land are not permitted in this management area. Acquisitions are priority 1. (See the glossary for priority definitions.)

Special Uses

G-UB-10 Renewable and extractive uses are generally restricted or prohibited.

G-UB-11 Authorizations that protect or enhance the UB management areas are generally allowed.

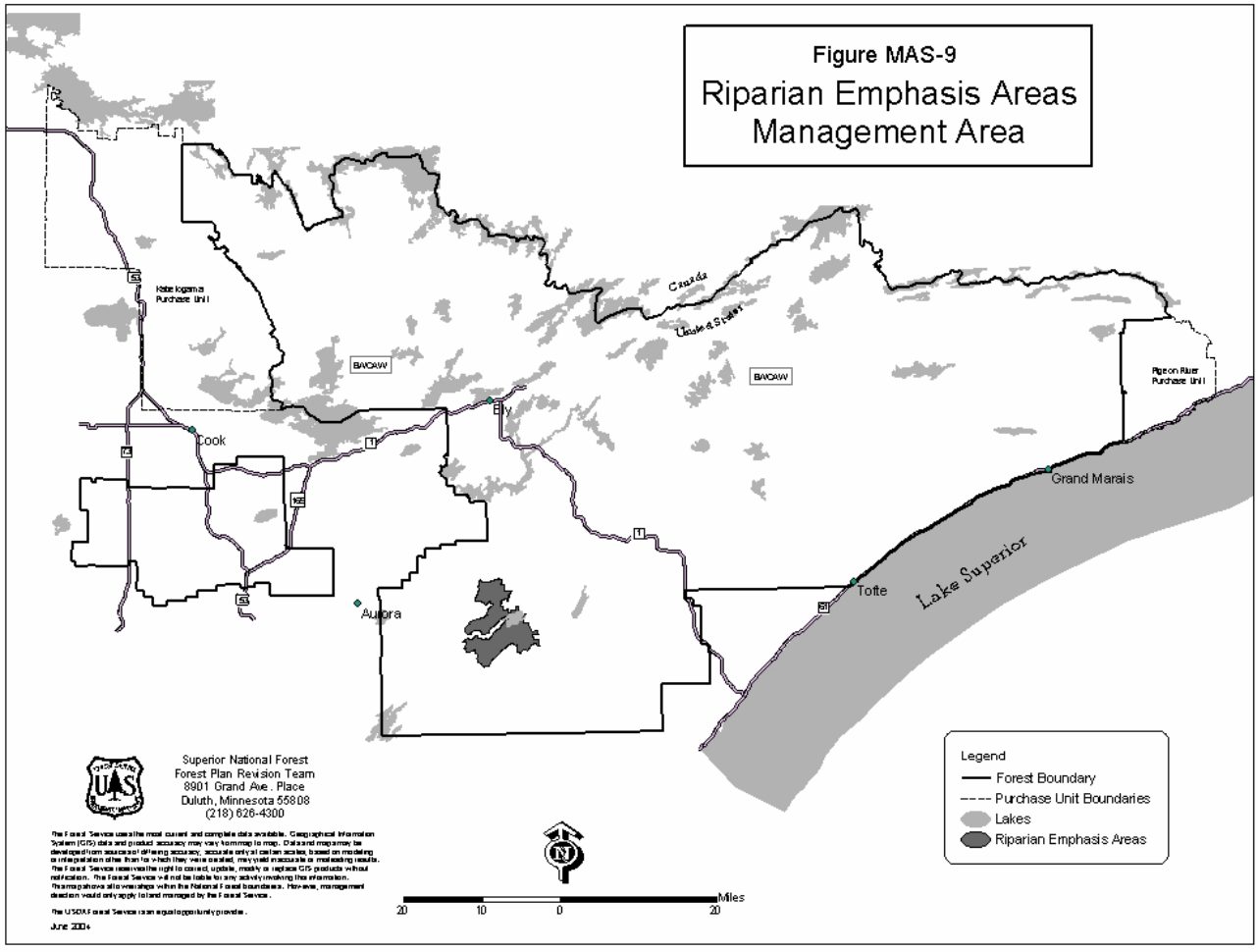
Minerals

S-UB-6 Federal mineral exploration and development activities that disturb the surface are not permitted.

Riparian Emphasis Areas (RE) MA

Acreage in the Riparian Emphasis Areas MA	
	Acres
Total NFS land in this MA	17,444
NFS land suitable for timber management	11,552
NFS land not suitable for timber management	5,919

Landscape Ecosystems in the Riparian Emphasis Areas MA	
Landscape Ecosystem	Percent of MA
Dry Mesic Jack Pine/Black Spruce	17%
Dry Mesic Pine	0%
Lowland Conifer	49%
Mesic Aspen/Birch/Spruce-fir	25%
Mesic Pine	9%
Rich Swamp	0%
Sugar Maple	0%
Total	100%



Theme

Riparian ecological functions are actively restored, protected, and enhanced in areas where ecosystem processes are sensitive to degradation. This includes maintaining and restoring native vegetation communities; maintaining and restoring riparian/hydrologic functions such as shoreline stability, wildlife habitat, coarse woody debris recruitment to aquatic and riparian ecosystems, and temperature regulation; and controlling non-native invasive species. Restoration focuses on components of the ecosystem that are not functioning at or within the range of desired conditions. Those components that are functioning properly are protected.

These areas are also managed for recreational opportunities and visual quality adjacent to bodies of water.

Setting

Riparian Emphasis Areas are located along rivers and lakes that receive moderate to low levels of recreation use. Also included are selected large areas of relatively contiguous wetland. Development is of the type generally found in some of the more remote areas of the Forest.

Riparian Emphasis Management Area is assigned to the area in the vicinity of and encompassing Seven Beavers Lake. This is the headwaters area of the St. Louis River.

Two-thirds of the Riparian Emphasis Areas MA is suitable for timber management. Three landscape ecosystems dominate this MA: the Lowland Conifer, Mesic Aspen/Birch/Spruce-fir, and Dry Mesic Jack Pine/Black Spruce Landscape Ecosystems.

Desired Conditions

Watershed Health, Riparian Areas, and Soil Resources

D-RE-1 Management focuses on conserving or restoring special social or ecological features of the Forest, particularly those associated with riparian composition, structure, and function. Aquatic plant communities are diverse and productive.

Forest Health and Disturbance Processes

D-RE-2 Forest stands are dominated by the older vegetative growth stages of the landscape ecosystem they lie within. Management activities mimic natural disturbances and result in structural diversity. Insect and disease potential is reduced through vegetative management. Fuels are managed to retain a natural forest appearance and to reduce threat of wildfire damage to Forest resources.

Vegetation Management

D-RE-3 Many tree species are present. A mixture of young, but more frequently old, trees with multi-layered canopies are present as well as snags and downed wood. Large, red pine and white pine may appear in pockets. Aspen and other hardwoods grow in patches adjacent to water bodies. Floodplains consist of sedge meadow and shrub wetland communities. Where ecologically suited, floodplains accommodate lowland conifers such as black spruce, cedar, and tamarack.

D-RE-4 Vegetation is managed to provide for public safety and to improve forest health, as needed to maintain or improve conditions along water bodies and recreational settings.

Terrestrial and Aquatic Wildlife

D-RE-5 A wide variety of wildlife occurs, including multiple species of fish, birds, mammals, reptiles, and amphibians. Older vegetative growth stages associated with this management area provide habitat for cavity-nesting species. Coarse woody debris recruited to aquatic and riparian ecosystems enhances habitat for fish and amphibians. Wetlands that are adjacent to water bodies provide important nesting habitat for water fowl.

Recreation, Trails, and Water Access

D-RE-6 The lakes and rivers that lie at the center of this area are attractive to those seeking dispersed recreation experiences in semi-primitive settings. Dispersed recreation opportunities may include orienteering, hunting, fishing, trapping, berry picking, bird watching, and wildlife viewing.

D-RE-7 Dispersed recreation facilities such as campsites and trails (day use, backpacking, portaging, bicycling, horseback riding, hunter walking, snowmobiling, ATV use, and interpretive) may be provided. The area may include trails in natural-appearing surroundings that are somewhat modified by forest management activities.

D-RE-8 Developed recreation sites such as campgrounds, picnic sites, boat landings, observation sites, trailheads, and swimming areas may be provided. Current or future recreation sites experiencing high use may be hardened and additional restrictions may be enforced to protect sensitive natural resources. Hardened sites occur infrequently.

Scenic Resources

D-RE-9 The forests within this area appear natural.

D-RE-10 Management alterations may be evident, but are less evident and of shorter duration than on many other parts of the Forest. These alterations are harmonious with the scenic condition of the natural landscape. Landscapes are visually appealing and provide a diversity of vegetative species and size classes.

Objectives

O-RE-1 Maintain or increase stands and acres of red pine, white pine, and white spruce primarily through partial cutting prescriptions. Maintain existing stands and acres of lowland conifer and black ash. Maintain or increase species diversity and the number of wildlife viewing opportunities. Retain coarse woody debris.

O-RE-2 The ROS class objective is primarily semi-primitive motorized with roaded natural inclusions and small pockets of rural.

Standards and Guidelines

Recreation

G-RE-1 Cross-country snowmobile use is generally allowed unless prohibitions or restrictions are needed for resource protection to meet management objectives.

Special Uses

G-RE-2 Special uses that do not complement or are not compatible with the kind and development level of associated Forest Service facilities within the area are generally not permitted.

S-RE-1 New special uses that would degrade the long term ecological function of riparian areas are not permitted.

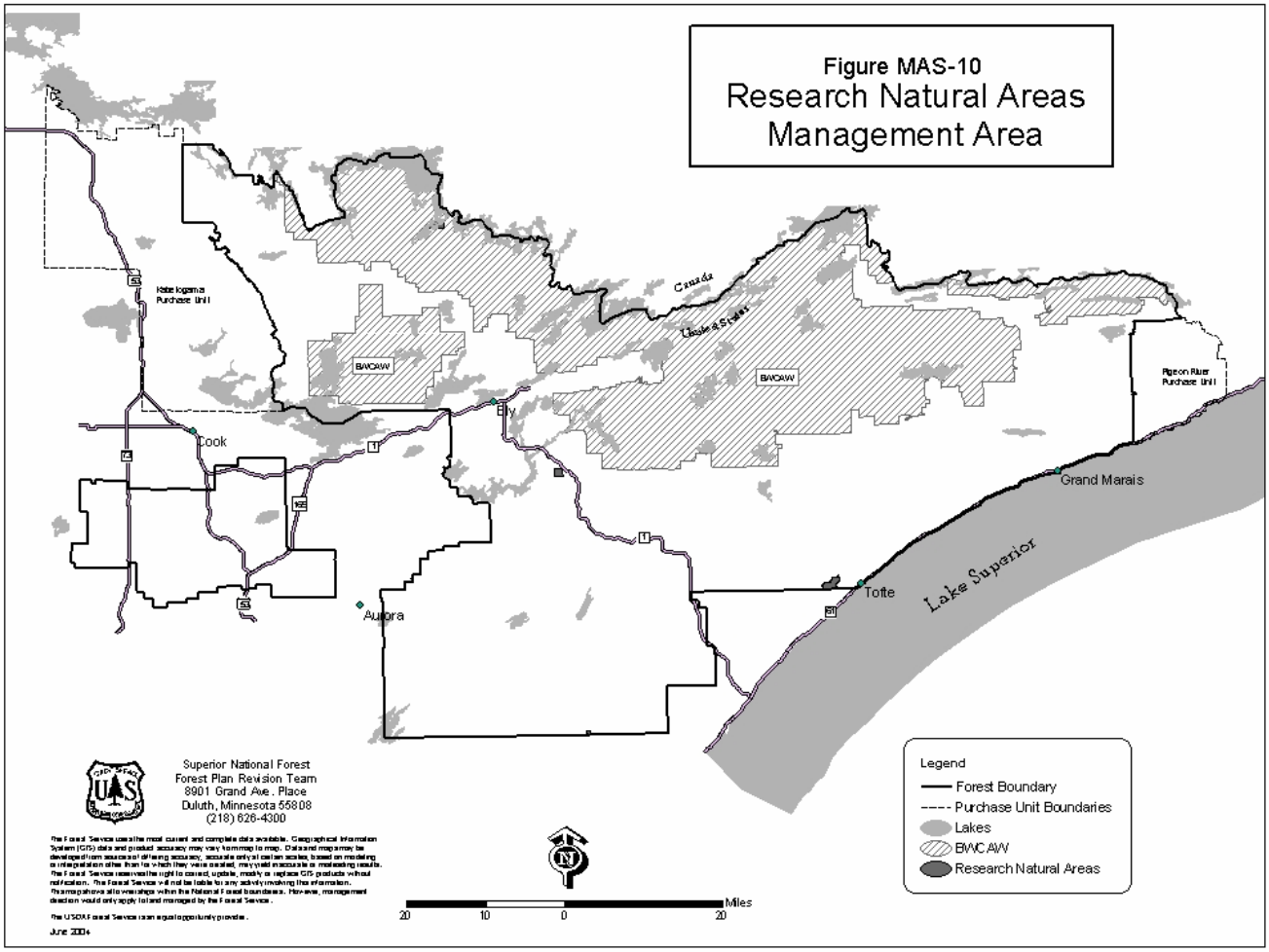
Land Adjustment

G-RE-3 Conveyances of NFS land are not permitted. Acquisitions are priority 2.

Research Natural Areas (RNA) MA

Acreage in the Research Natural Areas MA	
	Acres
Total NFS land in this MA	3,184
NFS land suitable for timber management	0
NFS land not suitable for timber management	3,184

Landscape Ecosystems in the Research Natural Areas MA	
Landscape Ecosystem	Percent of MA
Dry Mesic Jack Pine/Black Spruce	43%
Dry Mesic Pine	1%
Lowland Conifer	13%
Mesic Aspen/Birch/Spruce-fir	7%
Mesic Pine	2%
Rich Swamp	0%
Sugar Maple	34%
Total	100%



Theme

The focus is on preserving and maintaining areas for ecological research, observation, genetic conservation, monitoring, and educational activities. The role of these areas in ecological research and monitoring is in providing unique or high quality representative native plant community types. These areas often serve as baseline or reference areas for comparison to other similar ecosystems that are subject to a wider range of management activities. These areas are very suited to monitoring of succession and other long-term ecological changes.

Research Natural Areas (RNAs) also provide opportunities for low impact activities designed to educate people about ecological processes. No recreation facilities are provided. Dispersed recreation use occurs but is generally discouraged.

Setting

RNAs are located in a number of places throughout the Forest, including one that's inside the Boundary Waters Canoe Area Wilderness. The environmental conditions in which they exist may differ from each other, such as site-specific climatic conditions, soil types, and terrain; however the thread common to all RNAs is that they exhibit plant communities, associations, individual species, aquatic types, or geologic types of particular interest.

None of the Research Natural Areas MA is suitable for timber management. Three Landscape Ecosystems dominate this MA: Dry Mesic Jack Pine/Black Spruce, Sugar Maple, and Lowland Conifer.

Desired Conditions

Forest Health and Disturbance Processes

D-RNA-1 Ecological processes prevail with minimum human intervention. Land and resource conditions provide for maintenance of undisturbed ecosystems. These areas have unique land, aquatic, or rock formations or vegetative types that are worth studying in an undisturbed state. Management emphasizes conserving or enhancing these ecosystems, and where appropriate, interpreting these areas for public education.

D-RNA-2 Natural forces and site conditions are the primary factors that determine the size, shape, and composition of forest stands. In limited situations, deliberate manipulation (e.g. prescribed fire) may be used to maintain the ecosystem or unique features for which the RNA was established or to reestablish natural ecological processes. Non-native invasive species are controlled.

Vegetation Management

D-RNA-3 The forest is characterized by vegetation representative of the ecological capability of the area and is minimally affected by human activity.

Terrestrial and Aquatic Wildlife

D-RNA-4 As practicable, land and resource conditions provide habitat that reflects the natural condition. Habitat improvement projects are not normally undertaken but can be used where specifically needed to restore natural ecosystem conditions.

Recreation

D-RNA-5 The setting is usually natural but can vary from site to site. Recreational use is not a featured activity in these areas, but low impact educational and interpretation activities can be provided for. These areas may be closed to public use when needed to protect botanical or other attributes from disturbances.

Scenic Resources

D-RNA-6 Scenic conditions vary by area and are a by-product of the natural forces and site conditions that primarily determine the size, shape, and composition of forest stands.

Transportation Systems

D-RNA-7 The area may contain trails, one-lane roads surfaced with soil or aggregate, and small structures for gathering data, such as water monitoring stations, rain gauges, and instrument shelters.

Objectives

O-RNA-1 The ROS class objective is semi-primitive non-motorized in the BWCAW and semi-primitive motorized outside the BWCAW. Specific RNA plans, when developed, may determine other appropriate ROS objectives.

Standards and Guidelines

Ecosystem Function

S-RNA-1 Modifying water levels of lakes, streams, or wetlands is not permitted.

S-RNA-2 Dams and impoundments are not permitted.

S-RNA-3 Suppress fires that are destroying the uniqueness of the area, threatening persons or property, or that do not meet research goals.

G-RNA-1 Use of heavy equipment for fire suppression is generally not permitted. Snags, fire scarred trees, or other damage resulting from fire will generally not be cleaned up. Fire hazard reduction activities that are compatible with the ecosystem or unique features of the RNA or help to reestablish natural ecological processes, are generally allowed.

Vegetation

S-RNA-4 No timber management may occur within these areas.

Recreation and Access

S-RNA-5 Recreational use that threatens or interferes with the objectives or purposes of the RNA is prohibited.

S-RNA-6 Developed recreation sites are not provided.

G-RNA-2 Dispersed recreation sites are generally not allowed in these areas. One-day hiking trails are appropriate and may be used if needed to accomplish research activities or to protect the area by concentrating human use. Where possible, trails will avoid the area.

S-RNA-7 RMV use on unclassified roads is prohibited.

S-RNA-8 Developing new motorized recreation trails is prohibited. Motorized use on existing National Forest System snowmobile trails is generally allowed.

S-RNA-9 Cross-country snowmobile travel is prohibited.

G-RNA-3 The road or trail access to and facilities at, water access sites will generally meet development levels described for Natural Environment Lakes and Remote River segments. (See G-RWA-9 in Chapter 2 for development levels.)

G-RNA-4 RMV use on OML 1 and OML 2 roads is generally prohibited.

Special Uses

S-RNA-10 New special use permits are not permitted. Exceptions may be made for permits to meet research needs.

S-RNA-11 Buildings, structures, and other improvements are provided only if needed for research purposes.

Land Adjustment

G-RNA-5 Conveyances of NFS land are not permitted. Acquisitions and donations are priority 1.

Other

S-RNA-12 Gravel pits are not permitted.

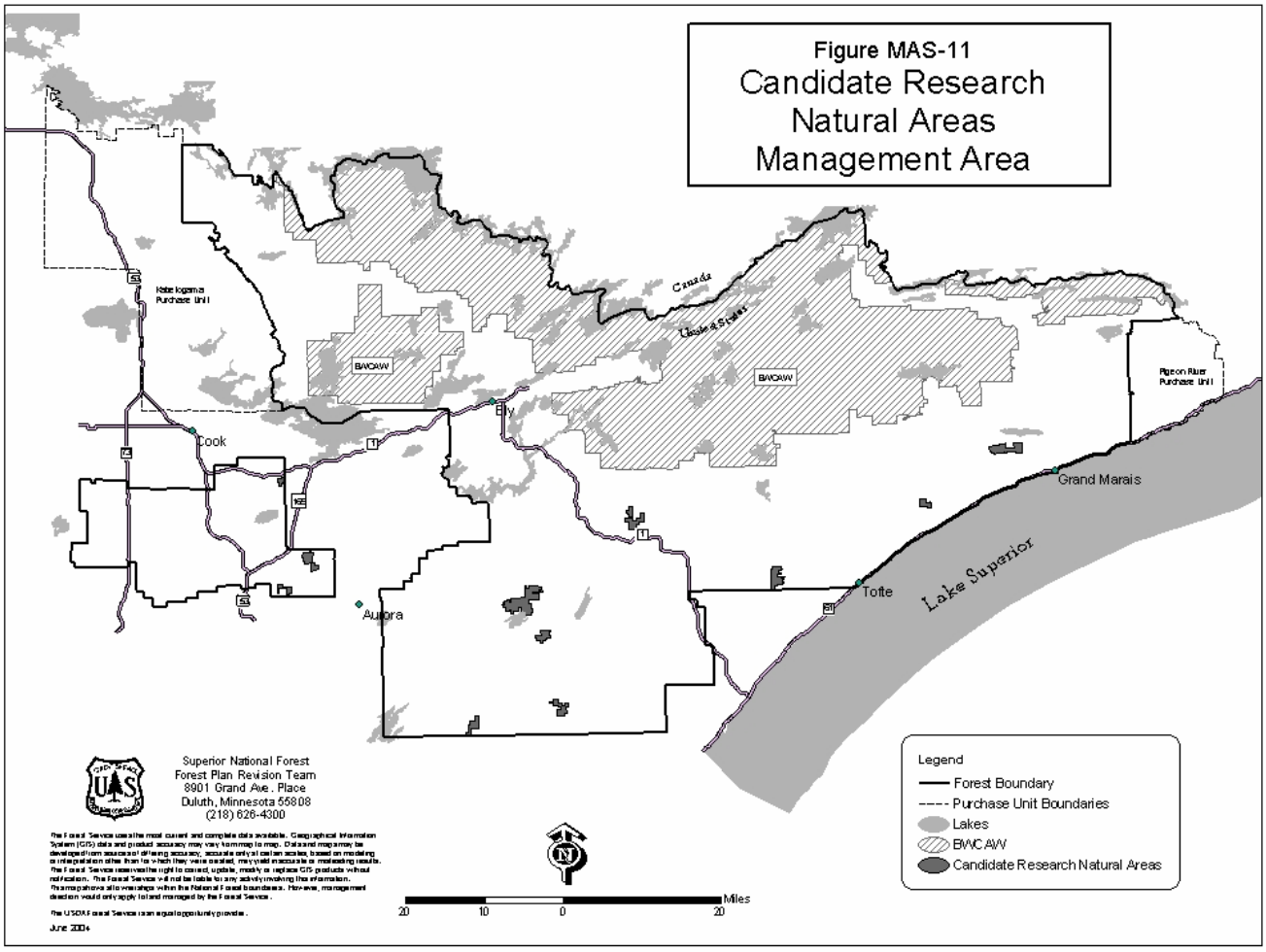
S-RNA-13 Federal mineral exploration and development activities that disturb the surface are not permitted.

S-RNA-14 Roads and trails are permitted only if needed to fulfill the purposes of the RNA.

Candidate Research Natural Areas MA

Acreage in the Candidate Research Natural Areas MA	
	Acres
Total NFS land in this MA	19,448
NFS land suitable for timber management	0
NFS land not suitable for timber management	19,448

Landscape Ecosystems in the Candidate Research Natural Areas MA	
Landscape Ecosystem	Percent of MA
Dry Mesic Jack Pine/Black Spruce	6%
Dry Mesic Pine	10%
Lowland Conifer	43%
Mesic Aspen/Birch/Spruce-fir	16%
Mesic Pine	10%
Rich Swamp	2%
Sugar Maple	13%
Total	100%



These are areas identified as Candidate Research Natural Areas (CRNAs). The formal process to make them part of the national RNA network is part of Forest Plan implementation. Until these areas are formally designated as part of the RNA network, they will be managed in the same manner as existing Research Natural Areas, with one exception. The one exception is that the interim Recreation Opportunity Spectrum (ROS) class objective in CRNAs is semi-primitive non-motorized. This interim ROS designation may change if the formal designation process for specific RNAs shows a different long term ROS class objective is more appropriate.

The Candidate Research Natural Areas are not suitable for timber management. The Lowland Conifer Landscape Ecosystem contributes almost half to the composition of this MA, with five other Landscape Ecosystems contributing smaller amounts.

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Please note:

Modifying the management direction for the Boundary Waters Canoe Area Wilderness is not a part of the proposed action for Forest Plan revision. Therefore, management direction for the BWCAW was not changed in the 2004 Forest Plan revision process. However, during the revision process, errors were corrected and out-dated information was updated. The direction was also reformatted and is presented differently in the revised Forest Plan than in the amended 1986 Forest Plan.

MANAGEMENT DIRECTION FOR THE BWCAW

Introduction

Wilderness

The existence of wildlands has been valued by humans for many years. A tangible sign of this value was the passage of the Wilderness Act in 1964. The Act established, for the American people, the National Wilderness Preservation System, which consists of over 90 million acres of public land. When Congress passed this legislation, they recognized the growing concern over the increasing amount of development and diminishing wildlands.

Wildernesses are recognized for their many natural and ecological values. They provide a land heritage that is uniquely American.

For present and future generations, wilderness:

- Provides protection of watersheds upon which many cities and rural communities depend for pure water
- Provides critical habitat for wildlife threatened by extinction
- Maintains gene pools to provide a diversity of plant and animal life
- Serves as an unique and irreplaceable "living laboratory" for medical and scientific research
- Provides protection for geological resources
- Serves as a haven of solitude and freedom from the pressures of our fast-paced, industrialized society
- Provides a unique repository for cultural resources

Management in Wilderness

Management of the wilderness resource involves more than simply setting aside land and leaving it alone. To retain its enduring value, the Forest Service manages wilderness and its various uses and activities to be compatible with wilderness character.

To achieve the objectives for management of the BWCAW, the Wilderness has been divided into four management areas. The desired future conditions of both the physical and social aspects of the resources differ slightly between management areas. This establishes a framework for managers that allow them to provide a range of wilderness opportunities for the public while maintaining the overall goals of preserving the natural ecosystem and protecting the integrity of the Wilderness for future generations.

Management direction for the Wilderness management areas did not change from the amended 1986 Forest Plan. Errors have been corrected and out-dated information has been updated.

How the Management Direction is Presented

This section first presents the desired conditions of the management areas in the Wilderness. Standards and guidelines for managing the Wilderness MAs, including management direction that is unique to each management area follows.

Quotas for entry points and motorboat use follow the narrative description of the management direction for Wilderness management areas. Further management area direction and BWCAW quotas are summarized in the following tables at the end of the Wilderness management area sections:

- Table BWC-1. Limits of Acceptable Change Standards – Management area descriptions and desired future conditions. Also provides the LAC indicators and standards for each management area.
- Table BWC-2. Maintenance Standards – Summarizes the major standards for maintenance of trails, portages, and campsites.
- Table BWC-3. Water Access Entry Points and Quotas
- Table BWC-4. Overnight Motor Quotas
- Table BWC-5. Day Use Motor Quotas
- Table BWC-6. Action Plan for Structures Currently Located in the BWCAW

Prescribed Burning in the BWCAW

In July 1998, the Forest Supervisor amended the 1986 Forest Plan to authorize prescribed burning activities in the BWCAW (Amendment 5). The amendment allows management ignition of prescribed fire along

the Kawishiwi River (about 239 acres) and Snowbank Lake (about 35 acres).

In June 2000, the Forest Supervisor amended the 1986 Forest Plan to authorize prescribed burning in the BWCAW (Amendment 7). The amendment allows management ignition of prescribed fire in three locations covering about 167 acres in the Brule Lake North polygon 55.1, Brule Lake South polygon 57.1 and Caribou Rock polygon 185.4.

In May 2001, the Forest Supervisor amended the 1986 Forest Plan to authorize prescribed burning activities in the BWCAW (Amendment 9). Amendment 9 allows the following four activities in 79 treatment units that were analyzed in the BWCAW Fuel Treatment EIS and its amendments:

1. Management-ignited prescribed burning in the BWCAW
2. Prescribed burning in areas with Ecological Landtype 9 or 18
3. Temporary helispots to be constructed in the BWCAW
4. Prescribed burning activities from August 15 to February 14 within 1,320 feet from active bald eagle nests

When the Forest Plan was revised, the prescribed burning was not yet completed; therefore, amendments 5, 7, and 9 are carried forward to the revised Forest Plan.

Desired Conditions & Locations

This section describes the desired conditions and locations of the four management areas in the BWCAW.

Pristine Wilderness MA

Acreage in the Pristine Wilderness MA	
Total NFS land in this MA	113,700
NFS land suitable for timber management	0
NFS land not suitable for timber management	113,700

Landscape Ecosystems in the Pristine Wilderness MA	
Landscape Ecosystem	Percent of MA
Dry Mesic Jack Pine/Black Spruce	83%
Dry Mesic Pine	1%
Lowland Conifer	15%
Mesic Aspen/Birch/Spruce-fir	0%
Mesic Pine	0%
Rich Swamp	<1%
Sugar Maple	0%
Total	100%

This management area provides a non-motorized pristine wilderness experience where human presence is almost nonexistent. Trails, portages, and campsites are not constructed or maintained. Leave no trace camping and travel techniques are stressed. Visitors will experience a high degree of freedom, challenge, and risk.

Desired Resource Conditions

Natural forces such as fire, climate, insects, wildlife, and diseases affect composition of the terrestrial, riparian, and aquatic ecosystems. Ecological processes are not measurably affected by the actions of visitors. Impacts to the environment by humans are minimal, restricted to small losses of vegetation in some areas where camping occurs, and along some portages. The areas that are used typically recover in a short time and impacts are not obvious to visitors.

Desired Social Conditions

This area provides an outstanding opportunity for isolation and solitude, relatively free from the evidence of contemporary human activities. Frequency of encounters with other visitors is rare. Opportunities exist for a very high degree of risk, challenge, and self-reliance.

Land Stewardship

There is a strong emphasis on sustaining the natural ecosystem. A very high degree of freedom, with few regulations for campsite occupancy and travel, is emphasized. Direct on-site management of visitors will rarely occur. Frequency of patrols by Forest Service personnel is very low.

There will be no contemporary structures or facilities, including signs.

To prevent impacts to the resource, ranger district personnel will work one-on-one with visitors to ensure they have a clear understanding of leave no trace camping techniques.

Campsites, portages, and trails will not be constructed or maintained. This will provide for a high degree of challenge and risk for visitors.

Primitive Wilderness MA

Acreage in the Primitive Wilderness MA	
Total NFS land in this MA	299,760
NFS land suitable for timber management	0
NFS land not suitable for timber management	299,760

Landscape Ecosystems in the Primitive Wilderness MA	
Landscape Ecosystem	Percent of MA
Dry Mesic Jack Pine/Black Spruce	79%
Dry Mesic Pine	6%
Lowland Conifer	14%
Mesic Aspen/Birch/Spruce-fir	<1%
Mesic Pine	<1%
Rich Swamp	<1%
Sugar Maple	0%
Total	100%

This management area provides visitors with a primitive non-motorized wilderness experience in an unmodified environment. These areas are generally off main travel routes and are for those who are seeking a high degree of solitude and challenge, but do not wish to or are not capable of traveling into a Pristine Wilderness Management Area.

Desired Resource Conditions

Natural forces such as fire, climate, insects, wildlife, and diseases affect composition of the terrestrial, riparian, and aquatic ecosystems. Ecological and natural processes on some sites are slightly affected by the actions of visitors. Environmental impacts are restricted to moderate loss of vegetation where camping occurs, and along some portages. Impacts in a few areas persist from year to year, and are apparent to a moderate number of visitors.

Desired Social Conditions

This area provides an excellent opportunity for isolation and solitude, relatively free from the sights and sounds of humans. The frequency of encountering others is low. Opportunities exist for a high degree of challenge and self-reliance through the application of primitive outdoor skills.

Land Stewardship

Management actions strongly emphasize maintaining natural ecosystems.

The opportunity for freedom is high with minimal rules, regulations, and facilities.

Frequency of patrols by Forest Service personnel will be low.

Sites will be designated by latrines and firegrates.

Signing may be allowed as necessary for safety.

Portages and trails will be maintained to accommodate light to moderate use. There will be no canoe rests along portages.

Semi-primitive Non-motorized Wilderness MA

Acreage in the Semi-primitive Non-motorized Wilderness MA	
Total NFS land in this MA	345,233
NFS land suitable for timber management	0
NFS land not suitable for timber management	345,233

Landscape Ecosystems in the Semi-primitive Non-motorized Wilderness MA	
Landscape Ecosystem	Percent of MA
Dry Mesic Jack Pine/Black Spruce	61%
Dry Mesic Pine	5%
Lowland Conifer	13%
Mesic Aspen/Birch/Spruce-fir	13%
Mesic Pine	7%
Rich Swamp	0%
Sugar Maple	0%
Total	100%

Semi-primitive Non-motorized Wilderness MAs provide visitors with a semi-primitive wilderness experience in a predominantly unmodified natural environment. They are generally located along the main travel routes, where a visitor expects to encounter others more frequently, and solitude is not one of their highest priorities. A lesser degree of challenge, risk and freedom is provided here.

Desired Resource Conditions

Natural forces such as fire, climate, insects, wildlife, and diseases affect composition of the terrestrial, riparian, and aquatic ecosystems. Natural conditions in some locations may be moderately affected by the action of visitors. The effects of visitors are relatively noticeable along major travel routes and portages, and near major entry points. Impacts often persist from year to year. There may be moderate vegetation loss and soil disturbance at some sites. Impacts are apparent to most visitors.

Desired Social Conditions

Opportunities for experiencing isolation and solitude are moderate to low. The frequency of encountering others in the area is moderate. The challenge and risk associated with recreational opportunities is moderate to low.

Land Stewardship

Management activities strongly emphasize maintaining natural ecosystems.

There is a moderate degree of freedom. Patrols by Forest Service personnel are moderately frequent.

Campsites will be designated by a latrine and firegrate.

Signs may be allowed as necessary for safety.

Trails and portages will be constructed and maintained to accommodate moderate to heavy use. There will be no canoe rests along portages.

Semi-primitive Motorized Wilderness MA

Acreage in the Semi-primitive Motorized Wilderness MA	
Total NFS land in this MA	51,916
NFS land suitable for timber management	0
NFS land not suitable for timber management	51,916

Landscape Ecosystems in the Semi-primitive Motorized Wilderness MA	
Landscape Ecosystem	Percent of MA
Dry Mesic Jack Pine/Black Spruce	41%
Dry Mesic Pine	24%
Lowland Conifer	10%
Mesic Aspen/Birch/Spruce-fir	13%
Mesic Pine	11%
Rich Swamp	1%
Sugar Maple	0%
Total	100%

This management area provides visitors with a semi-primitive motorized experience in a slightly modified natural environment. Motor lakes were designated in the 1978 BWCA Wilderness legislation. Though not all travel in this area is by motorboat, visitors should expect to see a high number of boats with motors. These are generally lakes located on the periphery of the Wilderness, with little portaging involved. Visitors will experience considerably less solitude, freedom, and challenge than found in other management areas.

Desired Resource Conditions

Natural forces such as fire, climate, insects, wildlife, and diseases affect composition of the terrestrial, riparian, and aquatic ecosystems. Natural conditions in many locations may be substantially affected by the action of visitors. Impacts often persist from year to year. There may be moderate vegetation loss and soil disturbance at some sites. Impacts are readily apparent to most visitors.

Desired Social Conditions

Opportunities for experiencing solitude and isolation are low. Motorized watercrafts are permitted and will be noticeable along major travel routes and portages and near major entry points. The frequency of encountering others is moderate to high while traveling and moderate on campsites.

The challenge and risk associated with recreational opportunities is moderate to low.

Land Stewardship

Management activities strongly emphasize maintaining the natural ecosystems.

There is a low degree of freedom in the area. Formal rules and regulations will be apparent. These rules may relate to motorized use, quotas, and camping restrictions.

Patrols by Forest Service personnel occur frequently.

Campsites are designated by a firegrate and latrine.

Signing is limited to the minimum needed for safety and to notify visitors of transition from a motor to non-motor area when it is not apparent.

Trails and portages will be constructed and maintained to accommodate moderate to heavy use. There will be no canoe rests along portages.

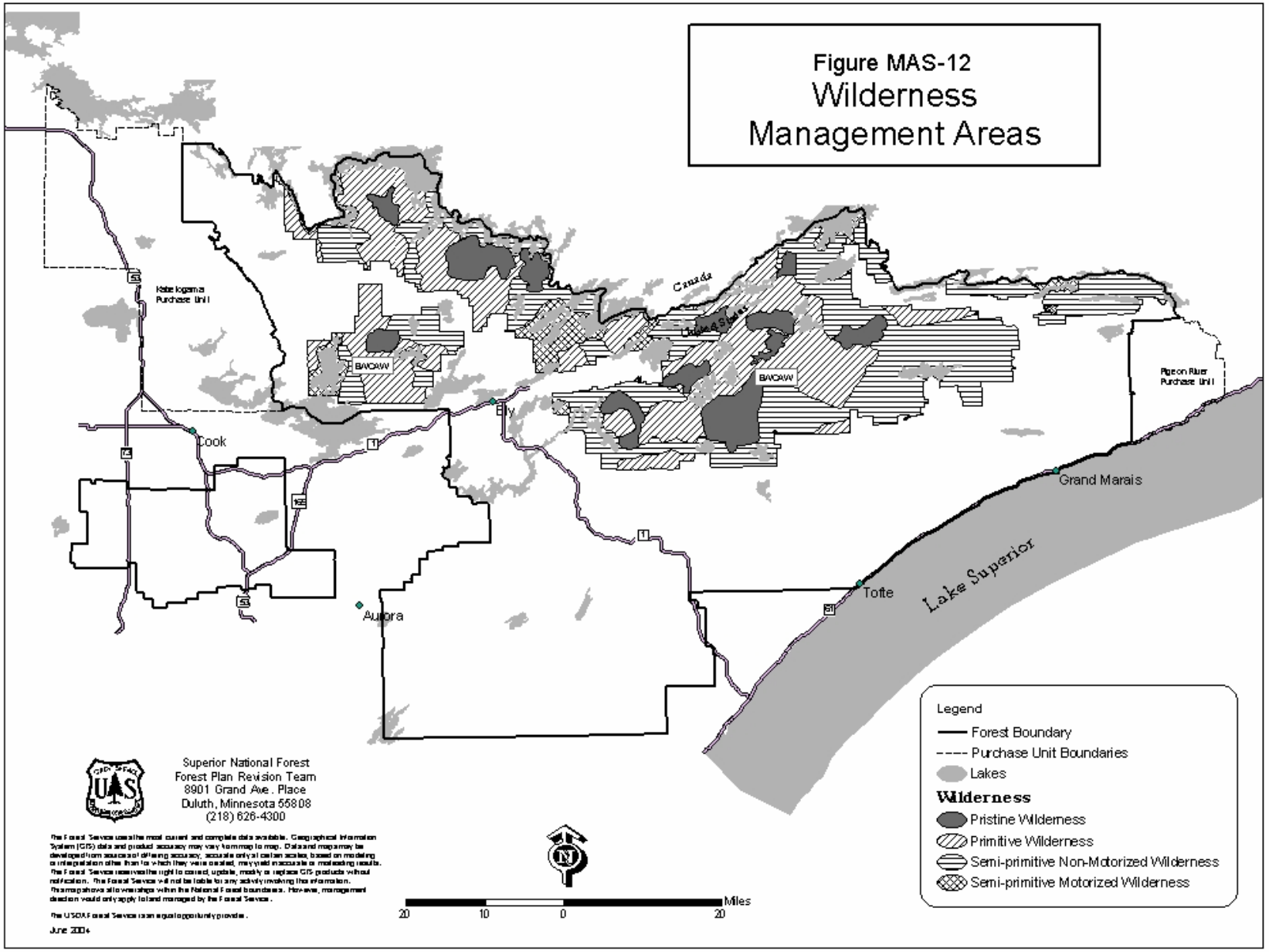
Figure MAS-12
Wilderness
Management Areas
Kabetogama
Purchase Unit
BWCAW
Canada
United States
BWCAW
Pigeon River
Purchase Unit
Ely
Cook
Grand Marais
Aurora
Tofte
Lake Superior
Legend
Forest Boundary
Purchase Unit Boundaries
Lakes
Wilderness
Pristine Wilderness
Primitive Wilderness
Semi-primitive Non-Motorized Wilderness
Semi-primitive Motorized Wilderness
Superior National Forest
Forest Plan Revision Team
8901 Grand Ave. Place
Duluth, Minnesota 55808
(218) 626-4300
Miles
20 10 0 20
June 2004

Standards & Guidelines for the BWCAW

The following are standards and guidelines for managing the BWCAW. Unless otherwise noted, direction is for all the management areas.

Improvements and Non-conforming Facilities and Activities

All competitive events are prohibited.

Appropriate commercial activities will only be permitted under the terms of special use permits.

Buildings and other contemporary structures are generally inappropriate. A determination of the future use and historic significance of Forest Service administrative structures will be completed in fiscal year 1993. The disposition of these structures will be in accordance with the findings from the future use determination. The State of Minnesota will be encouraged to also do a determination of future use for their administrative structures (Table BWC-6).

Private structures exist in the Wilderness, either on private inholdings or on National Forest land. Their status is discussed in (Table BWC-6).

Aircraft must maintain an altitude of more than 4,000 feet above sea level over prohibited areas, P-204, P-205, and P-206

Semi-primitive Non-motorized and Semi-primitive Motorized MAs

The Forest Service will continue to cooperate with the International Joint Commission in monitoring water levels on Basswood Lake or finding suitable alternative water level measurement locations.

Semi-primitive Motorized MA

Construction of new dams is not permitted.

Maintenance of the dam sites at Fall Lake and Prairie Portage is permitted in order to protect wilderness values.

The Forest Service will cooperate with the Ontario Ministry of Natural Resources and private landowners in maintaining South Fowl Lake Dam to protect public safety and welfare. South Fowl Lake Dam is located on the International Boundary and on private land outside the BWCAW but controls water levels on lakes inside the wilderness.

Roads will not be constructed or maintained.

Resort owners and summer homeowners and their guests are allowed to possess cans and bottles through the Saganaga Lake Corridor while enroute to their property in Canada. Cans and bottles must be transported in coolers, packs, boxes, or other containers and not visible. This exception to the cans and bottles rule applies only to the Saganaga Corridor.

Campsites

Also see Table BWC-2 for campsite maintenance standards.

Pristine MA

Campsites will not be constructed. Maintenance will occur on user-built sites only when necessary to protect the biophysical resource.

User-built campsites will be monitored on a rotation basis, every five years, for compliance with the standards for limits of acceptable change indicators. A more detailed plan to monitor resource impacts will be completed by an interdisciplinary team before the 1995 field season.

If, through monitoring, impacts exceed limits of acceptable change standards, sites will be rehabilitated.

Currently there are three indicators that are considered critical to the health of the resource. They are erosion level, amount of exposed mineral soil, and number of trees with roots exposed. The standards are:

- Allowable amount of mineral soil exposed - 0

to 250 square feet
- Number of trees on site with exposed roots - none to 25%
- Erosion level - none to erosion level 2 (erosion either on the campsite, access trails, or at the shoreline resulting in the loss of soil which is not pronounced, gravel on site, or obvious loss of soil at the landing or along the shoreline.)

These standards apply only to those sites that were previously designated and are still used. No degradation will be allowed on new user-developed sites.

Primitive, Semi-primitive Non-motorized, and Semi-primitive Motorized MAs

Campsites will be monitored on a rotation basis, every five years, for compliance with the standards for limits of acceptable change indicators. If ongoing monitoring shows that limits of acceptable change standards are being exceeded, the appropriate management action will be implemented, i.e.: education, rehabilitation, closure, quota adjustments.

Summer Camping Sites

Campers, other than hikers, must camp at a site designated by a firegrate and latrine. Hikers are encouraged to camp on designated sites, if one is available. If not, they must select a site that is at least 150 feet from the hiking trail, 150 feet from other campsites and 150 feet from the water's edge.

Campers are encouraged to gather down, dead firewood well away from campsites, portages, and beaver dams and lodges.

New Campsite Construction

An interdisciplinary team will conduct an environmental analysis prior to new campsite construction to ensure that all resource concerns are met.

The Forest Service will locate campsites in a manner that minimizes visual and biophysical impacts, maximizes solitude, and does not exceed the level of social encounters expected for the area. Water quality use capacity will be considered in determining the numbers of sites on individual lakes.

New campsites should not be located within ¼-mile of existing bald eagle or peregrine falcon nests. Where there is a direct line of sight from a nest to a proposed campsite this buffer may be up to ½-mile. Protection of potential nesting habitat for bald eagle and peregrine falcon may also be warranted.

To ensure solitude, campsites should not be located less than ¼-mile from another campsite or a portage. If the geography of the land or location of the proposed site provides the necessary buffer, the ¼-mile standard need not apply.

Prior to new campsite construction, sites will be evaluated for their ability to support a latrine. A preferable latrine site is at least 150 feet from the shoreline, has at least a three-foot separation between the bottom of the pit and bedrock or a saturation zone, and a proper filtration area for bacterial breakdown between the latrine and water. Ecological Land Types (ELTs) 13 and 14 are preferred. Any variances will require interdisciplinary team review.

Preferred campsites are located on well-drained sites that are resistant to erosion. Bedrock access with a gentle slope gradient is preferred and erodible soil materials should be avoided.

Heritage resources and threatened, endangered, and sensitive (TES) plants and animals will be assessed prior to new campsite selection.

Lay out facilities in a manner that minimizes the overall use area and impacts on vegetation.

Resistance of existing vegetation to soil compaction and abuse must be considered. Preference should be given to tree species that are resistant to use impacts.
- Most resistant: red pine, white pine, white cedar
- Moderately resistant: trembling aspen, spruce, balsam fir, jack pine
- Least resistant: paper birch

To reduce compaction and potential erosion, organic material (leaves, small debris) will only be removed to fireproof the firegrate area.

Campsite Maintenance/ Rehabilitation

Campsites will be maintained according to the level of use they receive. Sites in Semi-primitive Motorized MAs will likely be visited more than once a year. Sites in the less heavily used areas may not be visited every year.

Maintenance may simply involve cleaning the firegrate and picking up litter. Whenever necessary the latrine will be moved and user-built structures dismantled.

When rehabilitation/closure plans are written, an interdisciplinary team will be used.

Rehabilitation or closure of a campsite will occur when it is determined that the site has exceeded the limits of acceptable change standards. The site will be restored to an acceptable condition.

Currently, there are three indicators that are considered critical to the health of the campsite. They are erosion level, amount of exposed mineral soil and number of trees with exposed roots. The standards are:

- Allowable amount of mineral soil exposed - 800 square feet.
- Number of trees on site with exposed roots - 50% of total trees.
- Erosion level 2 - campsites with erosion either on the campsite, access trail(s), or at the shoreline resulting in the loss of soils that is not pronounced, gravel on the site, or obvious loss of soil at the landing or along the shoreline.

Other indicators are monitored. See Table BWC-1 for a complete list of limits of acceptable change standards.

Heritage resources and TES species will be assessed prior to ground-disturbing activities.

Latrines will be closed by removing the structure and covering the waste in the pit with at least one foot of soil. Follow new construction standards for relocation.

To reduce compaction and potential erosion, raking or removal of organic matter, (leaves, small debris) is not allowed except to fireproof the firegrate area.

Planting/reintroduction of vegetation species should reflect what naturally occurs on a specific ecological land type phase.

Excessive erosion will be stabilized. Such techniques (water bars, rip rap, etc.) will use native materials and will be visually unobtrusive.

Indigenous seed sources will be used to revegetate sites in the ecosystem. Transplanting vegetation from adjacent sites as is acceptable.

Facilities may be rearranged to minimize the use area.

Compacted soil should be tilled to develop an acceptable seedbed for vegetation in areas determined unnecessary for use.

Excessive trails and tent sties will be closed and obliterated.

Campsite Closure

A campsite will be closed or rehabilitated when resource damage or social encounter levels exceed established standards. Refer to standards in Table BWC-1 and prior narration in New Campsites Construction.

If closure of a campsite would affect the occupancy rate and quota for the area (travel zone or entry point), it will be replaced within that travel area if possible. If it is not possible or desirable to replace the campsite, the quota will be adjusted.

An interdisciplinary team will be used when closure/rehabilitation plans are written.

Heritage resources and TES plants and animals will be assessed prior to any ground-disturbing activities.

When closing a campsite, the objective is to return the area to a natural-appearance.

Excessive erosion will be stabilized. Such techniques (water bars, rip rap, etc.) will use native materials and be visually unobtrusive.

Compacted soil should be tilled to develop an acceptable seedbed for vegetation in areas determined unnecessary for use.

Latrines will be closed by removing the structure and covering the waste in the pit with at least one foot of soil. Remove firegrates and naturalize the area.

Native materials will be used to obstruct the access points to the area being closed.

Winter Camping Sites

There will be no sites developed for winter camping. Sled dogs must be staked or tethered on the ice or away from the shoreline in a manner that will not cause damage to the vegetation. If camping on a designated summer site, fires should be built in the firegrate. Dog and human waste must be collected from campsites or tether sites and either packed out or scattered at least 150 feet from sites or shoreline.

To protect bald eagles during their most critical nesting period (March 1 to May 15), ft is not permissible to camp off designated sites within ½ mile of trees containing bald eagle nests.

The use of straw, hay, or any other material that could introduce non-indigenous plants is not permissible for bedding sled dogs.

Campers are encouraged to gather down, dead wood away from campsites, portages, and beaver dams and lodges.

Transportation System - Portages, Ski Trails, Hiking Trails

Also see Table BWC-2 for maintenance standards for portages and trails.

Portages

Pristine MA

No portages will be constructed. Resource damage will be corrected to a natural-appearing condition.

Primitive, Semi-primitive Non-motorized, and Semi-primitive Motorized MAs

Portages will be constructed and maintained to the minimum standard necessary to protect the resource and provide a safe crossing in hazardous situations. Work will be completed in a way that protects and perpetuates the ecological wilderness character, so that portages appear to be a part of the environment and not an intrusion.

Management decisions regarding portage maintenance and construction must be based on protection of wilderness values, not on economy, convenience, commercial value, or comfort.

Borrow sites must be small, inconspicuous, located well away from portage or campsite and rehabilitated after completion of use. Before digging a borrow pit, an assessment for heritage resources and threatened, endangered, and sensitive species must be completed.

Construction and maintenance will be completed with non-mechanized equipment. Any variation from this requires Regional Forester's approval.

Watercraft landings will blend with the surrounding shoreline to the extent possible.

There will be no canoe rests. Existing canoe rests will be removed by September 30, 1995.

Primitive MA

Portages will be maintained minimally and likely not every year. Rocks, beaver dams, or other natural features should be used for water crossings. Rustic, unobtrusive crossings may be constructed for resource protection if natural features are not available. Water bars may be used to prevent erosion.

Clearing width for portages will be only that which is necessary to allow passage, generally not more than four feet total or two feet from centerline. Additional width on turns or steep slopes may be necessary.

Tread width should be less than 1½ feet or the minimum necessary for walking. Loose gravel, rocks, roots, holes, deadfalls, and other obstacles remain as long as they do not cause a new path to be created.

Semi-primitive Non-Motorized MA

Portages will be maintained at a minimum level, likely once a year.

Minor grading or lift/fill of wet spots is permitted. Rocks, roots, and wet spots are allowed as long as there is no serious hazard or resource degradation.

Clearing width for portages will be between six and eight feet total.

Tread width should be less than 1½ feet. Remove deadfalls and large rocks. Water bars may be used to divert water. Rustic bridges or walkways may be used to prevent resource damage. Where possible, reroute the portage instead of building structures.

Semi-primitive Motorized MA

Maintenance frequency will be related to levels of use, but at least once a year.

Signs will be limited to the minimum needed for safety and to notify users of transitions from a motor to a non-motor area when it is not apparent. Water bars may be used to divert water. Rustic bridges may be installed to minimize resource damage or in hazardous situations. Where possible, consider rerouting the portage rather than the building structures.

Clearing and tread width for portages will be to the specifications necessary for the passage of motorized watercraft and portage wheels on the following portages: Fall-Newton-Pipestone, Prairie Portage, Back Bay Basswood, and Trout Lake. Loon Lake and Beatty Portages will continue to be maintained as motor portages per PL 95-495.

Summer Trails

Pristine MA

No trails will be constructed or maintained.

Primitive, Semi-primitive Non-motorized, and Semi-primitive Motorized MAs

The following are designated hiking trails: Herriman, Devil's Cascade, Norway, Big Moose Lake, Snowbank/Old Pine, Kekekabic, Border Route, South Lake, Caribou/Split Rock, Eagle Mountain, North Arm, Angleworm, Banadad, Farm Lake, and the west loop of the Pow Wow Trail. Abandoned trails may be returned to the system with District Ranger approval, based upon an environmental analysis that as a minimum considers demand and maintenance ability. Following analysis, the Brule Mountain Trail was added to the trail system in 1998 and the Sioux-Hustler Trail in 1993.

No new trails will be constructed.

Standards for hiking trails in the Wilderness will be the same regardless of management area, with the exception of the Pristine MA, where trails are not constructed or maintained.

Tread width of trails generally will be no greater than 1½ feet. The treadway may be clear of obstructions such as deadfalls and boulders.

Trails will be maintained in a manner as to appear part of the environment and not an intrusion.

The clearing width will generally be between four and six feet total.

Hiking trails may be maintained to Forest Service specifications under a partnership or memorandum of understanding with interested organizations.

Some campsites occur along the trail. The facilities at these campsites may include a firegrate and wilderness latrine.

Camping is not restricted to designated sites, but is also permitted anywhere along the trail, as long as the campsite is 150 feet from the trail, lake, streams, portages, or other campsites. To avoid disturbing nesting bald eagles and peregrine falcons, camp at least ¼ mile from nests.

No shelters will be provided along hiking trails.

Frequency of maintenance will be directly related to use by the public; high use trails will be maintained more frequently than low use trails.

Maintenance of trails may be contracted where appropriate and feasible.

Heritage resources and TES plants and animals will be assessed prior to ground-disturbing activities.

Use of pack or riding stock on hiking trails is not permitted. Horseback riding is an appropriate use in wilderness and can occur off designated trails and portages.

Ski Trails

Pristine MA

No ski trails will be constructed or maintained.

Primitive, Semi-primitive Non-motorized, and Semi-primitive Motorized MAs

The following trails are designated as winter trails: Banadad, East Bearskin/Flour Lake, North Arm, and Farm Lake. No new trails will be constructed.

Ski trails may be maintained to Forest Service specification under a partnership or memorandum of understanding with interested organization.

Ski trails will be maintained in a manner as to appear a part of the environment and not an intrusion.

All ski trails will be maintained to the same standards and guidelines regardless of management area.

Effective September 30, 1994, brushing of all trails will be done with non-motorized equipment.

Mechanized grooming is not permitted with the following exception: portions of the Banadad and Bearskin/Flour Lake Trail. If these trails are not mechanically groomed for two consecutive seasons, they will revert to being maintained by non-mechanized means (see glossary for definition of grooming).

There will be no permanent facilities constructed along ski trails.

Maintenance of trails may be contracted where appropriate and feasible.

Sled Dogs

Sled dog teams can use existing corridor passages (portages, trails, old roadbeds) as long as they do not change the character of that corridor.

Snowmobile Trails

Semi-primitive Motorized MA

Snowmobiles are permitted on the overland portages from Crane Lake to Little Vermillion Lake in Canada, and from Seagull River along the eastern portion of Saganaga Lake to Canada. Snowmobiles are not permitted anywhere else in the BWCAW.

Mechanized Portages

Semi-primitive Motorized MA

Beatty and Loon Lake Portages will continue to be motorized as per BWCAW legislation (see Table BWC-6).

If no party seeks to operate the Beatty Portage under special use permit that portage will be closed to motorized use. The Forest Service will neither operate nor subsidize the operation of Beatty or Loon Lake Portages.

Either motorized or non-motorized portage operations may be authorized at Prairie and Trout Portages. An operator could be authorized to perform a specific service, as outlined in a permit or contract. If no one is interested in providing the portage operation, no service would be provided. The Forest Service will neither operate nor directly subsidize the operation.

Outfitter and Guide Operations and Special Uses

By October 1, 1995, all outfitter and guide operations that meet the requirements in FS Manual 2700, will be required to have a special use permit. These include day and overnight operations.

The following types of commercial uses are approved in the BWCAW: guided canoe trips, fishing and hunting guides, guided photography, dog sledding, cross-country skiing, and snow shoeing. Applications will be reviewed on a case-by-case basis. New uses are subject to an assessment.

Pristine MA

Special uses are generally unacceptable.

Tent Camps

Temporary tent camps may be permitted under special use permit in all management areas except the Pristine MA.

A tent camp is a temporary camp that is delivered and set up by a special use permittee when the client enters the Widerness, then taken down and removed from the Wilderness at the conclusion of the client's trip. Dropping off supplies or provisions throughout the trip is not permitted.

Permanent campsites or caches are not permitted. All equipment associated with the tent camp must be brought in and taken out with the client.

Towboats

Semi-primitive Motorized MA

A towboat operation is a commercial enterprise that takes people and equipment from a starting point to a drop-off point.

Beginning in 1995, all towboat operations must be authorized by a special use permit.

Towboat use will be limited to the 1992 levels for numbers of boats, trips, current operators, and specific lakes. Growth will not be permitted beyond these limits. If an operator terminates his/her special use permit, an assessment will be completed to determine if a permit should be issued to another individual or business.

Visitor Management

There may be no more than nine people in a party with a maximum of four watercraft.

Visitor use in any travel zone must not produce changes beyond the social limits of acceptable change. These limits of acceptable change standards are displayed in the Table BWC-1 of this document. If ongoing monitoring shows that the standards for the limits of acceptable change are being exceeded, the appropriate management action will be implemented, i.e.: education, length of stay limitations for particular lakes, and quota adjustments.

A user fee, when legislatively authorized, may be charged.

Length of stay may not be more than 14 days on any one campsite.

Storage of boats or equipment is not allowed, except for those items used in conjunction with a current visit.

Watercraft or sailboards designed for propulsion by wind are not permissible. Watercraft with types of rowing devices that were in regular use m the BWCAW, prior to the 1979 BWCAW Act, are permitted.

Pets must be under voice or leash control at all times.

Pristine, Primitive, and Semi-primitive Non-motorized MAs

The use of portage wheels is not permitted except on the International Boundary.

Semi-primitive Motorized MA

Use of excursion boats or watercraft designed or used for floating living quarters is prohibited.

Boats may be transported on wheels only on portages on the International Boundary and on Fall/Newton/Pipestone, Fourmile Portage, Prairie Portage, Back Bay Basswood, Trout Lake, and Loon Falls-Beatty Portage.

Entry Points

The management of entry points will provide: visitor education; adequate parking and launch facilities commensurate with types of uses and use levels; and information regarding regulations and current resource conditions.

Quota System

The purpose of quotas is to distribute visitors and use in a manner that protects the natural resources and wilderness values, and limits the social encounters to

that which is appropriate for each management area (see Tables BWC-3, BWC-4, and BWC-5).

The Forest Service reserves the right to make immediate quota changes if necessary to meet changed conditions.

Quotas for Overnight use

All quotas will be allocated on a daily basis.

Permits are issued by group.

All quotas will be reserved on a first-come, first-serve basis.

All members of a party must camp on the same site except in the Pristine MA.

There will be no overbooking.

A copy of the permit or other form of identification will be issued for each watercraft in a party. This allows members of a party to enter at different times on the same day. A party entering on a different day to meet with another party must have a separate permit. It is permissible for a member of the group to exit early without a separate permit.

Quotas for Non-motorized Day Use

There is currently no quota on non-motorized day use. The use will be monitored, and if it becomes necessary, a quota may be implemented.

Quotas for Motorized Use: Day and Overnight

Semi-primitive Motorized MA

There will be a weekly quota established. The weekly quota will be determined by seasons that have distinguishable periods of similar use, thereby leveling the use over the entire summer season.

Permits are issued by group.

All quotas will be reserved on a first-come, first-serve basis.

All members of a party must camp on the same site.

No-shows will not be put back into the system.

Overbooking will be based on annual monitoring.

A copy of the permit or other form of identification will be issued for each watercraft in a party. This allows members of a party to enter at different times on the same day. A party entering on a different day to meet with another party must have a separate permit. It is permissible for a member of the group to exit early without a separate permit.

An overnight motor permit is required for a group when any portion of the trip involves the use of a motor, and the motor remains in the Wilderness.

Permit System

Permits will be issued either by the Forest Service or one of its cooperators.

The purpose of issuing permits is to limit use, monitor visitor travel patterns, and provide a means for visitor education.

Effective on October 1, 1995, a permit will be required year round for anyone entering the wilderness for a day or overnight visit.

A permit may be picked up 24 hours prior to or on the same day as the start of the trip.

Personal identification is required to pick up the permit.

Semi-primitive Motorized MA

Through PL 95-495, lake home owners and their guests, and resort owners and their guests have day use access to the lake on which they reside; and their entry will not be counted in determining quotas for that lake (see glossary for a definition of guest). Any commercial use, e.g. towboats, must be authorized by a special use permit.

Reservation System

There will be a toll-free line in operation between May 1 and September 30, for the purpose of issuing permits by cooperators and Forest Service offices.

Under Forest Service administration written reservations for all overnight permits and motorized

day use for entry from May 1 through September 30 will be taken by FAX, mail, or walk-in, from January 15 through September 30. Phone reservations will be accepted from February 1 until September 30.

Reservations will be processed daily from January 15 through March 31, by random selection.

All reservations must be in the name of the party leader (client) and not more than two alternate leaders. Reservations may not be made in the name of a guide.

The cost of the reservation will be determined yearly, prior to each season.

When it becomes feasible and advantageous to both the Forest Service and the public, the reservation system may be contracted.

Permits cancelled more than 24 hours prior to the trip will become available for reissue.

Wilderness Education Programs

The goal of the education program is, in a balanced and equitable way, to affect public awareness of the purpose, values and appropriate uses of wilderness, the functioning of natural ecosystems, and to promote the preservation of wilderness resources.

Wilderness education will be emphasized to reduce law enforcement needs and promote leave no trace camping.

Emphasis will be placed on educating visitors, particularly through pre-trip information.

The Forest Service natural resource managers, cooperators, and educators will work together to ensure a quality program, which reaches schools and other organizations, focusing on wilderness and land stewardship.

To heighten awareness on the importance of maintaining the naturalness of wilderness, information will be provided on prevention of introduction of exotics (such as zebra mussels) and diseases, which may have serious effects on the Wilderness ecosystem.

Where possible, feasible, and advantageous to both the public and the Forest Service, a consortium consisting of representatives of concerned and interested organizations will work with the Forest Service to identify, create, and implement education needs.

Law Enforcement

The goal of law enforcement in the Wilderness is the prevention of violation of laws and regulations to insure protection of wilderness values and visitors.

The Forest Service will cooperate with all law enforcement agencies that have jurisdiction in the Wilderness, including the MNDNR division of enforcement, and Cook, Lake and St. Louis county sheriffs. MNDNR has lead responsibility for enforcement of fish and game laws. Further direction is provided in the memorandum of understanding with the MNDNR.

Law enforcement contacts will emphasize education, safety, and compliance with laws and regulations.

The amount and frequency of visitor contact by patrols will vary with use levels, and consequently, by management areas:

- Pristine MA – very low
- Primitive MA - low
- Semi-primitive Non-motorized MA - moderately frequent
- Semi-primitive Motorized MA - frequent

Emergency Search and Rescue

The county sheriffs in Cook, Lake, and St. Louis Counties have lead responsibility for search and rescues. The Forest Service may provide assistance.

In all life threatening situations, the most appropriate motorized vehicles/equipment may be used. District Ranger or forest officers may authorize motorized use in situations where immediate services of a doctor or hospital are required to save a life, or prevent permanent damage or injury.

Low-level aircraft flights (below 4,000 ft.) that do not involve life-threatening situations must be approved by the Forest Supervisor.

Visitor Safety and Health

Safety is the responsibility of the visitor. When traveling and staying in wilderness, the visitor accepts the risks associated with wilderness travel.

To the extent possible, the Forest Service will attempt to inform visitors of potential health or safety risks, such as giardia, bears, mercury contamination and fires.

Environmental Protection

All management activities will meet a visual quality objective of preservation, which allows only natural ecological changes, except for those impacts caused by recreation use and management.

Drinking water sources will not be developed.

Solid waste disposal sties are not permitted. The carry-in/carry-out method of disposal is required.

Cans and bottles are not allowed. Containers of fuel, insect repellent, medicines, personal toilet articles, and other items that are not foods or beverages are the only cans and bottles permitted.

Disposable plastic containers are permitted but must be packed out.

Campfires are permitted. Use of camp stoves is strongly encouraged.

The use of portable bear-proof canisters is encouraged. Bear poles or boxes will not be provided or maintained.

Pristine MA

Campfires are permitted. Use of camp stoves is strongly encouraged. Firegrates are not provided. Use no trace camping techniques when building a fire ring and disperse all evidence when you break camp.

Latrines are not provided. To dispose of human waste, dig a hole 5 to 6 inches deep at least 150 feet from water sources. Cover with soil and naturalize the area when complete.

Special Interest Areas

The following areas have been identified as potential botanical special interest areas designated to protect sensitive plants the forest may designate or recommend designation of these areas or any others as special area areas under the authority in 36 CFR 294.1. No new development, including campsites, trails and portages will be allowed in these areas. Existing developments may remain.

Name	Location	Purpose
Royal River	W½NE, S3, T64N, R3E	Protection of Forest candidate sensitive or Regional sensitive plants.
Mountain/ Moose Lake	SW¼, S13, T65N, R2E	Same as above
Portage, Clear Water Lake	SE¼, S14, T65N, R2E	Same as above
Back Bay-Basswood Lake	NW¼, S7, T64N, R10W	Same as above

Wild and Scenic Rivers

There are currently two rivers located partially within the BWCAW that are candidates for nomination as wild and scenic rivers. They are the Temperance River on the Tofte Ranger District and the Brule River on the Gunflint Ranger District.

Research Natural Areas

The Lac LaCroix Research Natural Area is located in the BWCAW. This area provides for non-manipulative research, observation, and study of undisturbed ecosystems. Management practices will not change the natural surroundings or interfere with natural processes.

Range Management

Range management is not permitted in the BWCAW.

Wildlife Management

The Memorandum of Understanding (MOU) between the Forest Service and the MNDNR will guide wildlife management activities in the Wilderness. The MOU will be reviewed and updated every five years.

Wildlife habitat composition will be the result of natural ecological processes such as fire, wind, insects, disease, and plant community succession. Wildlife populations will fluctuate in response to changing habitat conditions. Manipulation of wildlife habitat is permitted only in rare instances if necessary to alleviate adverse impacts on wildlife caused by humans.

Objectives for the management of wildlife habitat are normally compatible with the objectives for maintaining wilderness values. Where incompatible, the requirements for maintenance of wilderness values take precedence.

Wildlife habitat and populations surveys, monitoring, and ecological studies are recognized as appropriate activities in the Wilderness. They must be conducted in a manner compatible with preservation of wilderness values.

Aerial surveys for bald eagles, gray wolves, moose, and beaver populations will be allowed to continue in accordance with current agreements between the Forest Service and the MNDNR and U.S. Fish and Wildlife Service.

A biological assessment and biological evaluation will be conducted to determine whether any proposed activities or projects will affect a proposed, threatened, endangered, or sensitive species.

The conservation and recovery of threatened and endangered species and their habitat, with methods compatible with wilderness values, is a high priority in wilderness management. The recovery plans for the threatened bald eagle and gray wolf will guide management activities that may affect them. Lynx management will be guided by relevant direction found in Chapter 2 Forest-wide Management Section for Threatened and Endangered Species: Lynx. Forest Plan standards will be implemented where applicable for conservation and management of sensitive species and species of concern.

The Forest Service will coordinate and cooperate with the MNDNR, U.S. Fish and Wildlife Service, and others to support and assist in reintroducing extirpated species such as woodland caribou and wolverine where environmental assessments indicate that reintroduction is advisable. All reintroduction or supplemental transplants of terrestrial wildlife species by the state will occur under mutual written agreement. Forest service assistance will be subject to availability of funding and other contingencies.

Hunting and trapping of wildlife are permitted in the Wilderness under applicable state and federal laws and regulations.

Control of problem animals may be permissible based on a case-by-case evaluation, and if the action is within the limits of state and federal law.

Fisheries Management

The Memorandum of Understanding between the Forest Service and the MNDNR will guide the fisheries management activities in the Wilderness. The MOU will be reviewed and updated every five years.

Fisheries management of easily accessible waters should be given preference over remote locations.

The Forest Service and the MNDNR will review project proposals annually.

All projects will be coordinated through an interdisciplinary and interagency team.

Stocking Programs

Fish stocking may be conducted by the MNDNR in coordination with the Forest Service to reestablish or maintain an indigenous species adversely affected by human influence or to perpetuate or recover a threatened or endangered species.

Exotic species will not be stocked.

Species traditionally stocked before the 1964 Wilderness legislation may be considered indigenous if the species is likely to survive.

Aerial stocking of fish is permitted for those waters where this was an established practice before wilderness designation or where other practical means are not available. A specific need must be demonstrated to use aircraft for stocking on other lakes. This must be approved by the Forest Supervisor.

Barren lakes and streams may be considered for stocking, if there is mutual agreement that no appreciable loss of scientific values or adverse affects on wilderness values will occur.

Pristine and Primitive MAs

The Forest Service and the MNDNR will evaluate an indigenous-only fish stocking policy in the Pristine and Primitive wilderness MAs.

Inventory of Waters

Lake and stream surveys that include the scientific sampling of fish populations and their habitats are recognized as an appropriate procedure in the protection of natural populations in the Wilderness and in determining concentrations of contaminants in fish. Procedures must be conducted in a manner compatible with the preservation of wilderness values.

Fishing Activities

Fish locators and depth finders are permitted.

Fish remains will be disposed of by burying them at least 150 from the lakeshore or cutting them into small pieces and placing them on a rock away from camp for wildlife consumption. If the remains are not consumed by wildlife at the time camp is broken, they must be buried.

The Forest Service and MNDNR will evaluate the effects of an exemption from statutes prohibiting the placement of fish remains in lake waters.

Manipulation of Fish Habitat

In rare instances, facility development and habitat alteration may be necessary to alleviate adverse impacts caused by humans. (See current MOU with MNDNR for guidelines.)

Chemical Treatment

Chemical treatment may, in rare instances, be necessary to prepare waters for the reestablishment of indigenous fish. Regional Forester approval is necessary.

Pristine and Primitive MAs

The Forest Service and MNDNR will evaluate the elimination of chemical treatment in the Pristine and Primitive Wilderness MAs.

Spawn Collection

The collection of fish spawn by MNDNR is permitted when alternative sources outside the Wilderness do not exist or are unreliable or where management utilizes a unique genetic strain or species.

Research

Research is recognized as an appropriate activity in the Wilderness. Any approved research project must be conducted in a manner compatible with the preservation of wilderness values.

Research proposals will be reviewed on a case-by-case basis by an interdisciplinary team.

Decisions may be based on, but not limited to, the following factors: 1) is the research necessary to meet wilderness objectives; 2) is this research wilderness-dependent; 3) what is the proposed mode of travel; what alternatives are there to proposed motorized or mechanized equipment; and 4) what are the effects on wilderness values and the magnitude of the effects.

Management of Soil and Water Resources

Human caused soil erosion must be kept to a minimum. The allowable soil loss determined for each ecological land type phase will be used as a standard to identify unacceptable soil loss.

The Forest Service will continue to coordinate with the MNDNR in planning and implementation of activities that impact protected waters in the BWCAW.

Water quality will be monitored to detect trends such as eutrophication, acidification, and mercury concentrations. Specific monitoring action items are presented in Chapter 4 of the Forest Plan. Procedures must be conducted in a manner compatible with the preservation of wilderness values. Administrative use of mechanized equipment for monitoring will follow current policy.

Sediment contribution to water, erosion, soil displacement, and loss of soil productivity will be monitored for changes that may be approaching unacceptable limits. Such monitoring will be based on the concept of limits of acceptable change, using the criteria specified in Table BWC-1 for campsites, portages, and hiking trails.

Watershed rehabilitation projects may be undertaken, but will be limited to correcting human-caused resource damage or resource damage from natural disasters, which threaten downstream health and safety.

Watershed rehabilitation protects will be unobtrusive in visual appearance and employ only native materials (rocks, logs, and indigenous plants).

Heritage resources and threatened, endangered, and sensitive plants and animals will be assessed prior to any rehabilitation projects.

Fuelwood

The cutting and gathering of down, dead wood is permitted. Campers are encouraged to use camp stoves.

Vegetation Management

Vegetation will be managed only to protect wilderness values or to protect adjacent property from fire or pests. Vegetative management objectives are:

- Preservation of the natural ecosystem, including the protection of rare, endangered and threatened plant and animal habitats.
- Restoration of natural vegetation to areas where it has been destroyed or removed.
- Reintroduction of extirpated plant species.
- Preservation of the natural ecosystem through prescribed fire.
- Work toward the removal of non-indigenous species.

In rehabilitation work, methods that allow the sites to revegetate naturally are preferred. If planting is necessary, species used will be indigenous to the BWCAW.

Use unobtrusive techniques to restore indigenous vegetation to locations where concentrated use has destroyed them.

Seeding and planting techniques should produce species mixtures and arrangements similar to adjacent natural vegetation.

Harvesting of timber and other timber management activities are not allowed.

Some exotic species, such as fruit trees, ornamental shrubs and flowers, may be considered part of a historic site. These exotics will be retained until eligibility of the historic property for the national register of historic places is determined and appropriate treatment strategy for the site has been developed. However, some exotic species may be eradicated to prevent their uncontrolled spread.

Pristine MA

Vegetation may only be cut for fire suppression.

Primitive, Semi-primitive Non-motorized, and Semi-primitive Motorized MAs

Vegetation may be cut for construction and maintenance of campsites, trails, portages, and for fire suppression (see also Table BWC-2).

Management of Air Resources

The need to establish additional air quality-related values (AQRVs) will be periodically evaluated.

Monitoring will be conducted or supported as needed to identify baseline conditions and detect long-term trends in status of identified AQRVs and air pollutants of concern. Specific monitoring action items are presented in Chapter 4 of the Forest Plan.

Research or administrative studies designed to advance knowledge on how to best protect AQRVs will be supported.

When inventory, monitoring, or research related to air resources requires in-field work, locations outside the Wilderness will be preferred. Any approved activities must be conducted in a manner compatible with the preservation of wilderness values.

The Federal Clean Air Act specifies a role for the Forest Service in assuring that projected emissions from major new or modified existing pollution sources will not harm AQRVs of the BWCAW. This role will be fulfilled by providing input to the Minnesota Pollution Control Agency (MPCA) prevention of significant deterioration (PSD) permit process, based on anticipated effects of air pollutants (including atmospheric deposition) on AQRVs.

Guidelines for determining limits of acceptable change in the water and terrestrial (vegetation and wildlife) AQRVs have been developed through scientific consensus for three air pollutants (nitrogen, sulphur, and ozone) and will be applied through use of the document entitled *Screening Procedure to Evaluate Effects of Air Pollution on Eastern Region Wildernesses cited as Class 1 air quality areas* (Northeastern Forest Experiment Station General Report NE-151)

Permit denial or mitigation of effects will be recommended to the MPCA (the permit authority) when pollutant levels or impacts on AQRVs are projected to be in the "red zone" as defined by the screening document. Collection or further analysis of additional information will be recommended to MPCA when projections fall between the green (no significant impact) and red (significant impact) zones.

Efforts to expand the screening procedure to pollutants or AQRVs not currently will be supported.

In situations where AQRVs are threatened by emissions beyond the purview of the PSD process, the forest will take all available steps to prevent such emissions or lessen their impact, including, when appropriate, proposing or supporting regulatory legislation.

Management of Minerals and Mineral Materials

The BWCAW Act of 1978 (PL 95-495) and the Forest Plan standards and guidelines set direction for management of mineral resources within the Wilderness and the adjacent Mining Protection Area.

- Federal minerals: basically no permit, lease, or other authorization will be issued for the exploration or mining of minerals owned by the United States within the Wilderness. Peat and marl deposits are managed similarly. Sand and gravel deposits are to be used for administrative purposes only.
- Non-federal minerals: exploration and development of non-federal minerals is allowed, but occupancy and use of federal property is limited to activities, which do not preclude protection of wilderness values and navigable waters.

The following conditions must be met before authorization will be given for use of national forest land in conjunction with mining of non-federal minerals.

- An approved plan must be completed that details how mining will be done and how the area will be restored afterward.
- A performance bond adequate to cover the proposed reclamation work must be in effect.
- It must be determined that the proposed actions will not render the area incapable of reverting to its original condition or to a substantially equivalent condition.
- The applicant must comply with all state of Minnesota natural resource requirements.

Gravel pits are not permitted. Sand and gravel may be used for administrative purposes only. Borrow sites must be small, inconspicuous, located well away from portage or campsite and rehabilitated after completion of use. Before digging a borrow pit, an assessment for heritage resources and threatened, endangered and sensitive species must be completed.

Mineral Acquisition

Acquisition of additional private mineral rights (without regard to surface ownership) will be sought through donation or purchase as funding allows.

Management of Heritage Program Resources

The Forest will undertake a systematic program of heritage resource inventory, evaluation, and preservation aimed at the enhancement and protection of significant heritage resource values.

Inventory

The Forest will inventory heritage resources on all BWCAW lands, giving priority to areas with high potential for disturbance and areas with high potential for significant historic and prehistoric sites. Include inventory of lands for which no specific earth-disturbing activity is planned, consistent with 36 CFR 800.

Conduct heritage resource inventories on areas proposed for earth disturbing activity, or other activity, which could have an undesirable effect on heritage resources. The Forest Service will expedite future inventory needs by including areas adjacent to the scheduled undertaking, when appropriate. Inventory projects should be scheduled well in advance of the planned undertaking in order to provide adequate data for use in decision making during the NEPA process.

Consult with Native Americans or other ethnic groups in a manner consistent with the advisory council on historic preservation *Guidelines for Consideration of Traditional Cultural Values in Historic Preservation Review*.

Evaluation

Identified heritage resources will be evaluated in relation to published advisory council on historic preservation criteria for eligibility to the national register of historic places (see National Historic Preservation Act of 1966, amendments, and regulations.)

Schedule and conduct evaluations if a project will have any effect on a heritage resource potentially eligible for the national register of historic places. Schedule and conduct evaluations if the responsible official and state historic preservation officer disagrees on whether a cultural resource is potentially eligible for the National Register of Historic Places (NRHP). Prioritize and schedule the annual evaluation of known heritage resources to reduce the backlog of potentially eligible heritage resources.

Schedule evaluations in a timely manner before the project proceeds when a project cannot be delayed or relocated, if properties are deteriorating and have not been evaluated, or if visitor use may adversely affect a NRHP eligible property (re: 36 CFR 800).

All historic structures within the BWCAW will be evaluated to determine NRHP eligibility and appropriate treatment strategies will be developed and implemented for those structures, which are determined eligible. A future use determination will be completed for Forest Service administrative sties.

When appropriate, conduct evaluations on a thematic basis to improve cultural resource management efficiency.

Protection

A determination of effect must be carried out in the event that a heritage resource determined eligible for or included on the National Register of Historic Places will be affected (either beneficially or adversely) by a proposed undertaking.

Design projects to avoid or mitigate adverse effects on potentially significant heritage resources. In-place protection of inventoried potentially eligible properties is the minimum requirement until site significance is determined.

Assess the nature and degree of damage to heritage resources due to vandalism, visitor use, and natural deterioration. Identify and implement protective measures.

Prevent or mitigate deterioration that affects the significant qualities of heritage resources that are eligible for the national register of historic places. Deteriorating properties, which have not been evaluated, will be given priority for evaluation.

Develop protection and mitigation measures on a case-by-case basis.

During fire suppression, earth-disturbing activities (such as fire line construction) will not occur on known heritage resource sites or within a specified distance of the established boundary of a known heritage resource site; alternate methods such as water must be used.

Monitor the implementation and effectiveness of protective and mitigative measures prescribed for heritage resources.

Allow excavation or removal of artifacts from heritage resource sites by non-forest personnel only under authority of a heritage resource permit issued by the Forest Supervisor or under Forest Service contract. Issue heritage resource permits following guidelines and procedures outlined in federal regulations.

Possession and use of metal detectors is prohibited unless specifically authorized under special use permit. They may be used for law enforcement activities in coordination with the Forest Archaeologist.

In-place preservation is the preferred method for protection of human remains. Burial sites will be left undisturbed, except when there is an urgent need due to accidental or other unforeseen disinterment. Region 9 policies on the treatment of human remains will be followed, including consultation with Native American groups, the archeological community, and other interested groups in accordance with the Native American Graves Protection and Repatriation Act of 1990 and the Superior National Forest Treatment Plan.

The Forest will comply with the new curation standards set forth in the Secretary of Interior's guidelines for curation (38 CFR 79) and may assist other agencies in compliance, as requested.

Enhancement

In compliance with the Archeological Resources Protection Act of 1979, as amended, identify opportunities for off-site interpretation of heritage resources to improve public understanding of our heritage and to raise awareness of the fragile and irreplaceable nature of heritage resources.

Management of Insects and Diseases

Allow indigenous insect and plant diseases to play their natural ecological role within the Wilderness. Control insect and plant disease outbreaks only when it is necessary to prevent unacceptable damage to resources on adjacent lands or an unnatural loss to the Wilderness resource due to exotic pests.

Use pesticides in a designated wilderness only when necessary to prevent significant losses to wilderness resource values on private or public lands bordering the Wilderness. An environmental impact statement and Regional Forester approval are required for all pesticide applications in the Wilderness.

When control of insects or disease is necessary, it should be implemented by measures that have the least adverse affect on the Wilderness resource and are compatible with wilderness management objectives. Special care must be taken with the use of chemicals inside wilderness because of possible effects on the total biological complex. Consider other alternatives to chemical use in the environmental analysis.

Fire Management

Also see the Introduction to BWCAW Management Plan direction for a summary of amendments.

Role in Ecosystem Management

Since fire is an important factor in the Wilderness ecosystem and can reduce fuels buildup, lightning fires will be allowed to play a more natural role. The *BWCAW Fire Management Plan* lists specific objectives, standards, and conditions for application of prescribed fire.

The Forest Service will analyze and assess planned ignitions in the Wilderness.

Suppression

Suppression activities in the BWCAW will be implemented in a manner that minimizes impacts. Of primary importance is to impart a "light hand on the land" policy (choosing methods and equipment which least alter the landscape or the wilderness resource).

The objective is to protect the integrity of the Wilderness without relaxing safety standards.

Use of heavy equipment is generally unsuitable but may be used with Regional Forester's approval. If heavy equipment is used, rehabilitation of the affected area will be completed.

When deemed necessary by the Incident Commander, following existing preset management guidelines and/or Delegation of Authority, chemical retardants (including foam) may be used during fire emergencies. Both ground and aerial application of retardants is permitted when high to extreme fire danger indices exist. Fire danger thresholds and retardant (foam) use guidelines, pre-approved by the Forest Supervisor, are documented in the Forest Fire Management Plan within the BWCAW matrix.

The Forest Supervisor must approve use of fire line explosives.

Fires that do not meet prescribed fire criteria will be suppressed.

During fire suppression, earth-disturbing activities, such as fire line construction, will not occur on known heritage resource sites or within 66 feet of the established boundary of a known heritage resource site; alternate methods such as water should be used.

Administration

Wilderness Boundaries

To protect the Wilderness from illegal encroachments, no resource activity will be initiated adjacent to the Wilderness boundary until the boundary is established and identified on-the-ground by a land survey. Surveys will be conducted in a manner that is compatible with wilderness values and causes the least effect on the resource.

Administrative Sites

There are currently three Forest Service administrative sites in the Wilderness. A determination of future use will be done for each site.

Landing Sites for Aircraft

Airfields, helispots, and heliports are generally inappropriate for the Wilderness and will only be constructed in emergency situations with Forest Supervisor approval.

Communication Structures

Communication structures, such as towers, are inappropriate for the Wilderness.

Other Agency Structures

The MNDNR has two cabins in the Wilderness. These cabins are located on lake Insula and Little Saganaga Lake. (See Table BWC-6).

Signs

Signs may be provided for safety in all management areas except the Pristine MA, and to indicate the transition from a motor to non-motor area if it is not apparent.

Non-federal Lands within Wilderness

Disposal of National Forest System land is not permitted.

Less than total ownership of lands or interest in lands owned by the State of Minnesota within the BWCAW is acceptable, providing these lands are not used in conflict with wilderness values.

Acquisition of private property and county-administered lands within the BWCAW is high priority. All acquisitions (purchase, donation, land exchange) will be on a willing landowner basis, unless the property is being used in a manner that conflicts with wilderness values.

Acquisition of certain lands within the Wilderness will continue as specified in PL 95-495 and the *BWCAW Act Implementation Plan.*

Use of Motorized Equipment

Pristine, Primitive, and Semi-primitive Non-motorized MA

Use of mechanized or motorized equipment by the public is not permitted in these areas. Motors may not be in possession. Portage wheels are permitted on the International Boundary.

Semi-primitive Motorized MA

Public use of motors is limited to motorboats on lakes, streams, and trails listed in PL 95-495 and the one-quarter mile portion of Sand Point Lake that lies within the BWCAW.

The portion of Seagull Lake that is west of Threemile Island will become non-motorized as specified in PL 95-495. This change will occur on January 1, 1999.

The use of a trolling motor or "kicker" has been authorized for use in those lakes where motorized boats are allowed.

On lakes listed in 4(c)(l) and (4) of the 1978 BWCAW Act, a trolling motor of up to 10 horsepower is permitted in addition to the 25 horsepower limit cited in the Act, provided that the total horsepower being used at any one time does not exceed 25 horsepower. No other motors are to be in possession in the areas designated under the 25 horsepower. EXCEPTION: Motors of any size may be in possession in the Saganaga Corridor along the east shore of Saganaga Lake, provided that not more than 25 horsepower are in use.

On lakes listed in 4(c)(2) and (3) of the Act, a trolling motor of up to 6 horsepower is permitted in addition to the 10 horsepower limit cited in the Act, provided that the total horsepower being used at one time does not exceed 10 horsepower. No other motors are to be in possession in the areas designated under the 10 horsepower limit.

Upon authorization from the District Ranger, property owners on North and South Fowl Lakes are allowed possession, but not use of, a motor through the most direct route to their property via the Royal River.

Portage wheels are permitted on the following portages: Fall-Newton-Pipestone, Prairie Portage, Back Bay Basswood, and Trout Lake. Loon Lake and Beatty Portages will continue to be maintained as motor portages per PL 95-495. The disposition of Fourmile Portage will be determined through a separate analysis.

Section 1212, 105-178 of the 1998 Transportation Equity Act amended the 1978 Act (PL 95-495) and removed Canoe and Alder Lakes in Cook County from the list of lakes where motorized use is allowed.

Administrative Use of Motors

Use will conform, as nearly as possible, to the restrictions placed on the public.

The MNDNR and the counties may be authorized use of mechanized equipment for law enforcement and other emergencies.

For the control of wildfires, the use of aircraft, motorized pumps, chainsaws, generators and other small equipment, may be authorized if they are the minimum tools necessary to meet objectives. The Regional Forester must approve the use of bulldozers.

Authorization for any use of mechanized or motorized equipment, other than for law enforcement or emergencies, must come from either the Forest Supervisor or the Regional Forester. The use of these tools and conveyances, when approved, will be scheduled for times when they will be least disruptive to other users of the Wilderness.

Tables for BWCAW Management Direction

Table BWC-1. Limits of Acceptable Change (LAC) Standards

LAC Standards: Desired future condition and standards for campsite conditions

DESIRED FUTURE CONDITION	MANAGEMENT AREA			
	5.1 Pristine	**5.2A Primitive**	**5.2B Semi-Primitive Non-Motorized**	**5.3 Semi-Primitive Motorized**
1. General Description	Unmodified natural environment	Unmodified natural environment	Predominately unmodified natural environment	Slightly modified natural environment.
2. Ecological Conditions	Not measurably affected by visitors. Natural processes prevail.	Some areas slightly affected by visitors	Some areas may be substantially affected by visitors.	May be moderately affected by visitors.
3. Prevalence and duration of impact	Minimal, recovery in a short period	Moderate, impacts to a few areas persists from year to year	Moderate vegetation loss affected. Impacts remain from year to year.	Many locations substantially affected and impacts remain from year to year.
4. Visibility of impacts	Not obvious to visitors	Apparent to a moderate number of visitors.	Apparent to most visitors	Readily apparent to most visitors.
5. Social Conditions	Outstanding opportunity for isolation and solitude	High opportunity for isolation and solitude	Moderate to low opportunity for isolation and solitude	Low opportunity to experience isolation and solitude
STANDARDS FOR CAMPSITE CONDITIONS	**MANAGEMENT AREA**			
	5.1 Pristine	**5.2A Primitive**	**5.2B Semi-Primitive Non-Motorized**	**5.3 Semi-Primitive Motorized**
1. Mineral Soil Exposed	None to 250 Sq. Ft. *	No more than 800 sq. ft.	No more than 800 sq. ft.	No more than 800 sq. ft.
2. Tree roots exposed	None to 25%	Less than 50% of trees on-site	Less than 50% of trees on-site	Less than 50% of trees on-site
3. Erosion level	Non to level 2	Campsites with little erosion on campsite or access trails(s) or at shoreline which is not pronounced (Level 2)	Campsites with erosion on campsite or access trail(s) or at shoreline that is not pronounced (Level 2).	Campsites with erosion on campsite or access trail(s) or at shoreline that is not pronounced (Level2).

*Formerly designated sites may still exist and be used. If these sites begin to approach the LAC standard, appropriate management action will be implemented. For areas that have not been prior designated sites, no degradation is allowed.

LAC Standards: Standards for social conditions and land stewardship

STANDARDS FOR SOCIAL CONDITIONS	MANAGEMENT AREA			
	5.1 Pristine	**5.2A Primitive**	**5.2B Semi-Primitive Non-Motorized**	**5.3 Semi-Primitive Motorized**
1. Frequency of encounters	Rare (0-4/day)	Low (3-6/day)	Moderate (5-10/day)	Moderate to high. (6-12/day)
2. Degree of challenge and risk	Very high	High	Moderate to low	Moderate to low
3. Degree of freedom	Very high	High	Moderate	Low
4. Frequency of contacts with other parties while traveling	Rare (0-2/day)	Low (3-5/day)	Moderate (5-8/day)	Relatively high (6-10/day)
5. Frequency of contact with other parties while camping	Rare to nonexistent (0-1/day)	Low (1-2/day)	Moderate (2-3/day)	Moderately frequent (2-4/day)
LAND STEWARDSHIP	**MANAGEMENT AREA**			
	5.1 Pristine	**5.2A Primitive**	**5.2B Semi-Primitive Non-Motorized**	**5.3 Semi-Primitive Motorized**
1. Facilities	None	Designated campsites; latrines; firegrates	Designated campsites; latrines; firegrates	Designated campsites; latrines; firegrates
2. Signs	None	Minimum needed for safety.	Minimum needed for safety.	Minimum needed for safety and to inform visitors of transition from motor to non-motor area if not readily apparent.
3. Maintenance of portages	Monitor to insure no resource damage is occurring.	Constructed and maintained to accommodate light to moderate use.	Constructed and maintained to accommodate moderate use the majority of the season.	Constructed and maintained to accommodate heavy use most of the season
4. Management presence	Very low	Low	Relatively Frequent	Frequent

Table BWC-2. Maintenance Standards

MAINTENANCE STANDARDS	MANAGEMENT AREA				
	5.1 Pristine		**5.2A Primitive**	**5.2B Semi-Primitive Non-Motorized**	**5.3 Semi-Primitive Motorized**
TRAIL/PORTAGE MTCE LEVEL	N/A		1	2	3
VISITOR USE LEVEL	Very light		Light	Medium	Heavy
GENERAL DESCRIPTION	No constructed or maintained trails or portages. People using this area will be seeking a very challenging experience.		Portages off main travel routes in "paddle only" areas. People using these portages will be seeking a more challenging experience.	Portages on main travel routes in "paddle only" areas, and in non-motorized areas where portage wheels are permitted. (International Boundaries). Also, long distance or day-use hiking trails in all Management Areas. People in this MA are seeking an experience with moderate to low degree of challenge.	Portages between motor lakes where portage wheels are permitted. People using these portages are seeking an experience with a low degree of challenge.
FREQUENCY OF MTCE	As needed to protect resource.		Not every year	Once per year as a minimum	Once per year as a minimum
TREAD MINIMUM	Portages	N/A	1-½ feet walking width.	1-½ feet walking width.	3-½ feet dry tread to accommodate portage wheels.
	Hiking Trails	N/A	No greater than 1-½ feet.	No greater than 1-½ feet.	No greater than 1-½ feet.
CLEARING WIDTH (BRUSHING)	Portages	N/A	Only that necessary for passage, generally not more than 4 feet total.	6 to 8 feet total.	Maximum of 10 feet.
	Hiking Trails	N/A	Generally between 4 to 6 feet.	Generally between 4 to 6 feet	Generally between 4 to 6 feet
GRADING	N/A		No cuts or fills. No grading.	Minor grading, or lift/fill of wet spots is allowed.	Grade only where required. A few minor wet spots are allowed.
STRUCTURES/ FACILITIES	None		Utilize rocks, beaver dams, or other natural features for water crossings. Bridges and walkways are less desirable, but may be necessary for resource protection.	Only as necessary for safety in the very hazardous situations, and for resource protection.	Only as necessary to prevent erosion and maintain a dry tread.

MAINTENANCE STANDARDS	MANAGEMENT AREA			
	5.1 Pristine	**5.2A Primitive**	**5.2B Semi-Primitive Non-Motorized**	**5.3 Semi-Primitive Motorized**
DRAINAGE	Resource damage will be corrected to a natural condition.	Existing drainage patterns or water bars if absolutely necessary.	Cross ditch, open culvert & waterbars may be constructed to protect resource.	Cross ditch, open culvert & waterbars may be constructed to protect resource.
REVEGETATION	Methods that allow for natural revegetation are preferred. If planting is done, use vegetation that is indigenous to the BWCAW.	Methods that allow for natural revegetation are preferred. If planting is done, use vegetation that is indigenous to the BWCAW.	Methods that allow for natural revegetation are preferred. If planting is done, use vegetation that is indigenous to the BWCAW.	Methods that allow for natural revegetation are preferred. If planting is done, use vegetation that is indigenous to the BWCAW.
CAMPSITE MAINTENANCE	Will occur on user-built sites only when necessary to protect the biophysical resource.	Sites in this MA may not be maintained each year, depending upon amount of use. Firegrate will be cleaned, litter picked up & user-built structures dismantled and latrines moved as needed.	Sites in this MA will likely be maintained each year and maybe more than once depending upon amount of use. Firegrate will be cleaned, litter picked up & user-built structures dismantled and latrines moved as needed.	Sites in this MA will likely be maintained each year and maybe more than once depending upon amount of use. Firegrate will be cleaned, litter picked up & user-built structures dismantled and latrines moved as needed.

Table BWC-3. Water Access Entry Points and Overnight Quotas

Entry Point Number and Name	Entry Point Quota for Overnight Camping
1 Trout Lake	14
4 Crab & Cummings	4
6 Slim Lake	2
7 From Big Lake	2
8 Moose River-South	1
9 Indian Sioux-South	0.5
12 Little Vermilion	6 + 8(A)
14 Indian Sioux-North	6
16 Moose/Portage Riv. N.	7
19 Stuart River	1
20 Angleworm Lake	2
23 Mudro	6 + 2(B)
24 Fall Lake	14
25 Moose Lake	27
26 Wood Lake	2
27 Snowbank Lake	8 + 1(C)
29 North Kawishiwi River	1
30 Lake One	18
31 Farm Lake	3
32 South Kawishiwi River	2
33 Little Gabbro Lake	2
34 Island River	3
35 Isabella Lake	3
36 Hog Creek	5
37 Kawishiwi Lake	9
38 Sawbill Lake	14
39 Baker Lake	3
40 Homer Lake	2
41 Brule Lake	7 + 3(D)
43 Bower Trout Lake	1
44 Ram Lake	1
45 Morgan Lake	1
47 Lizz/Swamp	4
48 Meeds Lakes	3
49 Skipper/Portage Lakes	2
50 Cross Bay-From Ham	3
51 Missing Link Lake	5
52 Brandt Lake	4
54A Seagull Lake	11 + 2(E)
55A Saganaga Lake	17 + 3(F)
57 Magnetic Lake	3
58 South Lake	3
60 Duncan Lake	4
61 Daniels Lake	1
62 Clearwater Lake	4
64 East Bearskin Lake	5
66 Crocodile River	1
67 Bog Lake	2
68 Pine Lake	1
69 John Lake	1
70 North Fowl Lake	2
71 From Canada	3
75 Little Isabella River	1
77 South Hegman	2
80 Larch Creek	1
84 Snake River	1
Total Overnight Quota	**280.5**

Notes:

A = LAC LACROIX ONLY
B = NO CAMP ON HORSE LAKE
C = SNOWBANK ONLY
D = BRULE ONLY
E = SEAGULL ONLY
F = SAGANAGA ONLY

Table BWC-4. Overnight Motor Quotas

Week	1	24	25	27	31	54	55	62	64
May 1 to Sept. 30 *	Trout Lake	Fall Lake	Moose Lake	Snow-bank Lake	Farm Lake	Sea-gull Lake	Saga-naga Lake	Clear-water Lake	East Bear-skin Lake
1	1	4	3	0	0	0	3	0	0
2	60	40	36	4	1	3	26	5	2
3	60	22	35	4	1	2	18	6	2
4	60	22	35	4	1	4	33	4	2
5	60	21	35	4	0	4	31	3	1
6	60	10	26	2	1	1	20	1	1
7	60	12	26	2	0	1	12	1	1
8	45	12	26	3	1	1	12	1	1
9	45	9	26	3	0	1	12	1	1
10	32	9	26	3	1	1	12	1	1
11	28	9	22	3	0	1	12	1	1
12	28	9	22	3	1	1	12	1	1
13	28	9	19	3	0	1	12	1	1
14	28	9	19	3	1	1	11	1	1
15	26	9	18	3	0	1	11	1	1
16	23	9	18	3	1	1	9	1	1
17	17	9	18	3	0	1	8	1	1
18	19	12	20	4	1	1	11	2	2
19	19	7	15	3	0	1	5	1	1
20	9	6	13	3	0	1	5	1	1
21	8	6	9	3	0	1	5	1	1
22	5	4	7	2	0	1	4	0	1
TOTAL	**721**	**259**	**474**	**65**	**10**	**30**	**284**	**35**	**25**

* Quotas may be slightly different each year due changes in the calendar (for instance, due to variation in the dates for the opening week of Minnesota fishing opener).

Table BWC-5. Day Use Motor Quotas

Week	A	C	D	E	F	G	H	I	J	K	L	M
May 1 to Sept. 30 *	Trout Lake	Fall Lake Only	Fall Lake, Newton, Pipe-stone & Beyond	Moose Lake Only	Moose Lake to New-Found & Sucker Lakes	Moose Lake to Prairie Portage to Basswood	Snowbank Lake	South Farm Lake	Saganaga Lake	Seagull Lake	Clearwater Lake	East Bearskin Lake
1	1	3	5	1	16	8	7	15	6	0	3	1
2	19	26	32	12	159	34	23	56	91	4	8	4
3	30	30	62	15	191	43	30	81	164	8	15	8
4	38	56	62	15	191	75	30	70	220	8	15	11
5	30	56	62	15	191	75	23	75	260	8	16	9
6	30	60	62	12	158	75	23	81	151	6	10	12
7	34	60	62	11	151	80	22	81	151	6	9	11
8	38	60	55	11	151	80	22	81	151	6	9	8
9	52	60	55	11	151	80	22	81	151	6	9	8
10	52	60	55	11	151	80	22	81	141	6	9	8
11	38	64	55	10	129	80	22	70	127	6	9	11
12	34	64	55	10	129	80	22	70	127	6	9	11
13	30	64	55	10	129	80	30	70	114	6	9	11
14	30	64	55	10	129	80	30	70	114	5	9	11
15	22	64	55	9	124	78	23	70	114	5	9	11
16	22	64	55	6	75	78	23	70	80	5	9	11
17	22	64	39	6	75	50	23	56	80	4	7	9
18	26	56	50	11	151	56	23	60	141	4	9	9
19	15	49	27	7	94	50	18	30	101	2	7	6
20	12	49	27	5	59	36	15	30	76	2	6	4
21	9	49	16	4	57	36	15	26	61	1	4	2
22	4	29	16	2	30	24	10	20	32	1	2	1
TOTAL	**588**	**1,151**	**1,017**	**204**	**2,691**	**1,358**	**478**	**1,344**	**2,653**	**105**	**192**	**177**

* Quotas may be slightly different each year due changes in the calendar (for instance, due to variation in the dates for the opening week of Minnesota fishing opener).

Table BWC-6. Action Plan for Structures Currently Located in the BWCAW

	Location	Legal Description	Landowner	Disposition
Dams	Prairie Portage	T64N, R9W, Sec. 2	US/Canada	Maintain as needed.
	Fall Lake	T63N, R11W, Sec. 4	MN	
Administrative Cabins	Lac LaCroix	T67N, R13W, Sec. 33	USFS	Future use determinations (FUDs) completed. Primary structures generally maintained. Individual FUDs include more information.
	Crooked Lake	T65N, R11W, Sec. 14	USFS	
	Kekekabic Lake	T64N, R7W, Sec. 2	USFS	
	Lake Insula	T63N, R8, Sec. 36	MN	Recommend MNDNR complete future use determination for all administrative cabins owned by MN.
	Little Saganaga Lake	T64N, R5W, Sec. 18	MN	
Cabins on County Land	Louis Lake	T64N, R12W, Sec. 12	St. Louis County	Two cabins on leased land. Encourage St. Louis County to terminate lease.
Cabins with Rights Reserved by Former Owner	Basswood Lake	T64N, R10W, Sec.9	US	Remove cabins and rehabilitate site upon death of the named reserved right holders.
	Range River 1	T64N, R11W, Sec. 18	US	
	Range River 2	T64N, R11W, Sec. 7	US	
Cabins on Private Land Within the BWCAW	LaCroix District	BWCAW	Private	Two cabins far from lakes and public travel routes. Pursue purchase or exchange.
Structures on Motor Portages	Prairie Portage	T64N, R9W, Sec. 2	US	The Forest Service will neither operate nor subsidize the operations of these portages. Discontinue when operation ceases to be viable under special use permit.
	Trout Lake Portage	T64N, R16W, Sec. 24	US	
	Beatty Portage	T67N, R15W, Sec. 20	US/MN	Continue operation and retain cabins, railroad, and support facilities as long as there is demand. The Forest Service will neither operate nor subsidize the operations of these portages.
	Loon Lake	T66N, R15W, Sec. 6 T66N, R16W, Sec. 1	MN	
Miscellaneous Structures	USGS Water Gauge – Jackfish Bay	T65N, R8W, Sec. 35	US	Allow USGS to continue use of the site. Minimize motorized access.

BWCAW Appendix A

BWCAW Appendix A. Limits of Acceptable Change Indicator Descriptions

Shoreline Disturbance

Compare the campsite shoreline to the adjacent shoreline. Define the shoreline disturbance as the amount of shoreline in contrast with similar natural shoreline in that area. In areas where the lakeshore is dominated by heavy vegetation and the campsite shoreline is in contrast due to the loss of vegetation, that area would be measured. Conversely, in areas such as open pine stands, which are not dominated by vegetation, measure the length of shoreline, which is altered due to the loss of grasses, forbs, and soils.

Measure in lineal feet the amount of shoreline impacted by recreational use. Do not include ledgerock landings in this measurement, as it is unlikely they have been impacted by use and actually reduce shoreline impacts by providing a stable landing.

On campsites, which have shoreline disturbance in more than one area, measure each and record the total on the rating form. Use the remarks column to note the existence of ledgerock, which provides a safe landing or highly impacted shoreline, which should be stabilized.

Campsite Area

Measure in square feet the total area impacted by recreational use. Measure the length and width of a rectangular campsite or the diameter of a circular site to compute the area. Irregular shaped campsites are more easily measured by dividing them into sections.

Define the perimeter of the site by determining the point at which the density and species composition of the vegetation become equal to that of the surrounding area. Particular attention to the density of herbaceous vegetation will help determine the perimeter of impacted areas. Although more difficult on open pine campsites due to the lack of vegetation, the rater can define the perimeter by locating the point at which impact to the organic duff layer ceases.

Exclude from this management the islands of undisturbed vegetation and ledgerock within the campsite area. Because these areas are not impacted by use, they should not affect the campsite ratings. The amount of ledgerock in the campsite area should be recorded in the remarks column so the total campsite area can be determined when reviewing ratings.

Areas of impact beyond the original perimeter such as satellite tent pad and firewood cutting areas should be measured and included in the total. Record the total of the areas measured on the rating form.

Record unusual conditions that can be related to historical uses (logging camps, resorts, etc.) in the remarks column.

Non-vegetated Area

Loss of ground cover is one of the most pronounced changes that occur on campsites. It is a prominent, early indicator of campsite conditions. Measure the campsite area that is devoid of ground vegetation due to use of the sites. Areas where recreation impacts have caused a total loss of grasses, forbs, and shrubs should be included in this measurement.

Determine if the lack of ground vegetation is a recreation impact by comparing vegetative conditions on the campsite with natural conditions adjacent to the site. Do no include areas, which are non-vegetated due to natural conditions such as open pine stands or exposed ledgerock.

Record the total of the area(s) measured on the rating form.

Exposed Mineral Soil

How much of the non-vegetated area is bare soil?

Measure in square feet the area(s) where soil is bare, or with little or no litter cover. Include in this measurement all areas of exposed soil within the campsite area identified in Parameter #3. Do not include ledge rock outcroppings of areas that have a substantial duff layer covering them.

Record the total of the area(s) measured on the rating form.

Tree Damage

Count the trees with a DBH of 2" or larger that have been damaged by recreation impacts. Include trees within the campsite and associated use areas that have obvious user impacts such as chopping, felling, or girdling/peeling. Do not include dead or damaged trees on which the cause of the impact cannot be attributed to recreation use.

Record on the rating form both the total number of trees and the number of damaged trees within the campsite and associated use areas. On sites with extensive tree damage, note the type of damage and the area of the site where it occurred in the remarks column, ie: 10 Balsam felled near shoreline, 12 Birch peeled, etc.

Root Exposure

Count the trees with exposed roots resulting from recreation impact. It is important to distinguish between naturally occurring root exposure and that which occurs from user trampling. Compare the degree of root exposure on the campsite with natural conditions off-site. Count only the trees with roots that are exposed more that what is natural for the area.

Record the number of trees tallied on the rating form.

Trails

Count the access and social trails leading to or away from the campsite. Record the number of trails on the rating form.

Erosion

The most severe erosion on BWCAW campsites occurs at boat and canoe landings and on access trails from the landing to the site. The degree of erosion must be categorized without the use of complicated equipment and techniques. The three levels of erosion are as follows:

Campsites that have no erosion at the shoreline and negligible erosion on the campsite and access trail(s) are categorized level one.

Campsites with erosion either on the campsite, access trail(s), or at the shoreline resulting in the loss of soils which is not pronounced are categorized level two.

Erosion which has become pronounced, resulting in access trails becoming gullied; the exposure of lighter colored subsurface soils or gravel on the site; or obvious loss of soil at the landing or along the shoreline is categorized level three.

The amount of land area affected by erosion is not taken into consideration when rating the campsite. Assign the applicable level where any amount of a condition described above exists. Use the remarks column to note the area extent of the erosion and its location on the campsite; i.e.: steep access trail rutted, canoe landing eroded, etc.

BWCAW Appendix B

BWCAW Appendix B. Research Needs

The Forest Service research program provides the scientific basis for the management, protection, and use of the nation's national forests, including wilderness. Research needs appropriate to management of the Boundary Waters Canoe Area Wilderness are identified below.

The program developed for research reflects a commitment to develop and disperse technical knowledge in the effort to resolve problems associated with the wilderness. It will also provide a better understanding of the ecosystems that make up the wilderness. If the character of the wilderness is to remain, an active, long-term, publicly-supported research program is essential.

Research projects within the BWCAW must meet wilderness objectives, must be wilderness dependent, and must be accomplished in a manner that is compatible with the wilderness resource.

Following are research needs appropriate to management of the BWCAW:

Ecological

Cultural Resources

Develop quantitative methods of measuring erosion rates and new elements (such as Ecological Land Type Phase (ELT) and soil compaction) that need to be included in Limits of Acceptable Change indicators. This will aid in performing cultural resource site monitoring.

In addition, a method of monitoring using permanent camera points to visually record site effects should be developed.

Soil, Air and Water Resources

Assess Level 3 erosion loss code used in the Limits of Acceptable Change review and its correlation to the level of allowable soil loss on each ELT.

Assess whether added nutrients and potential pollutants that accumulate over time near campsites have significant impact on water quality or site conditions.

Develop a method for simplified environmental monitoring to detect presence/absence or concentration of giardia cysts in BWCAW surface waters.

Develop refined methods of assessing significance of impacts from existing and proposed air pollutant emission sources on air quality related values of the wilderness.

Fire

Monitor fires to better predict fire behavior of wildfires and prescribed fires.

Monitor post-fire effects to the BWCAW ecosystem in order to insure that the objectives of the prescribed fire program are being met.

Determine the social reaction to and acceptance of the prescribed fire program both during and after a fire.

Develop models that would address high fuel load areas and prescribed fire effects on plant communities.

Wildlife and Fish

Determine the impacts on eagles, loons, and other wildlife from fish remains being left on rocks by anglers.

Monitor contaminant levels in fish and fish-eating wildlife.

Determine whether angler harvest affects natural lake trout populations.

Determine bear population dynamics in the BWCAW, including movement of bears to and from Ontario and adjacent areas of Minnesota.

Develop techniques for minimizing bear/human conflicts in the BWCAW.

Develop an ecological classification system for lakes.

Plant Community

Determine what role insect and disease, fire and wind storms play in the natural ecosystem of the BWCAW/Superior National Forest/Quetico. For example: what type of fire (intensity and frequency) influenced natural vegetation?

Develop wilderness baseline vegetative studies.

Establish a list of plants native to the wilderness and northeast Minnesota that would be suitable for revegetating campsites and can be grown in a nursery setting.

Develop a list of indigenous plants that are resistant to high use situations and that match ELT conditions.

Continue to refine the ecological vegetation communities (using ecological classification) that exist in the BWCAW.

Determine how the BWCAW fulfills neotropical migrant bird species habitat.

Determine old growth distribution on the Superior National Forest and how it links to the old growth distribution in the BWCAW.

Determine distribution, abundance, and habitat associations of sensitive animal species occurring in the BWCAW.

Determine if animal use patterns and corridors link to 'outside BWCAW' areas and if it is adequate.

Social

Assess impacts of visitor use of the BWCAW and further define 'crowding' and how that affects visitor attitudes about seeing other visitors and how it affects their wilderness experience.

Refine education messages and methods to insure protection of the resource by evaluating wilderness education and face-to-face wilderness education.

Develop a reliable method to monitor off-season (Oct. 1 - April 30) use and use patterns.

Determine visitor trends and how they are likely to change. Determine whether 'destination' type trips will continue to increase and if so, what are the likely consequences on travel zones?

Determine if visitors are being displaced from the BWCAW to Quetico and if so, why and how often.

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Figure MAS-1
Superior National Forest Management Areas

Kabetogama Purchase Unit

Pigeon River Purchase Unit

Canada

United States

Ely

Cook

Aurora

Tofte

Grand Marais

Lake Superior

Miles
10 5 0 10

Superior National Forest
Forest Plan Revision Team
8901 Grand Ave. Place
Duluth, Minnesota 55808
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June 2004

Legend

- Forest Boundary
- Purchase Unit Boundaries
- Lakes

Management Areas

- General Forest
- General Forest - Longer Rotation
- Recreation Use in a Scenic Landscape
- Eligible Wild, Scenic, and Recreational River
- Semi-primitive Motorized Recreation
- Semi-primitive Non-motorized Recreation
- Unique Biological Areas
- Riparian Emphasis Areas
- Research Natural Areas
- Candidate Research Natural Areas
- Pristine Wilderness
- Primitive Wilderness
- Semi-primitive Non-motorized Wilderness
- Semi-primitive Motorized Wilderness

Chapter 4 Monitoring and Evaluation

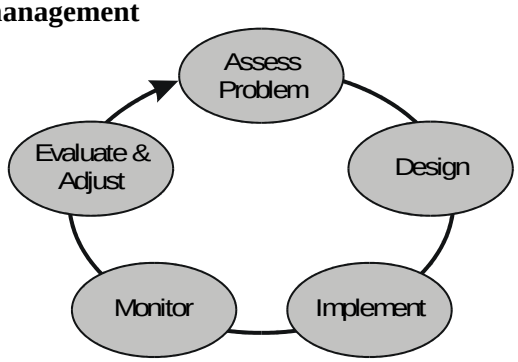
INTRODUCTION

Monitoring and evaluation (M and E) are separate, sequential activities required by NFMA regulations. Monitoring involves collecting data by observation or measurement. Evaluation involves analyzing and interpreting monitoring data. The information gained from M and E is used to determine how well the desired conditions, goals, objectives, and outcomes of the forest plan have been met. Monitoring and evaluation keep the forest plan up-do-date and responsive to changing conditions and issues, which provides the feedback mechanism for adaptive management (Fig. MON1). The results are used to identify if and when changes are needed to either the forest plan itself or the way it is implemented.

Figure MON 1

Monitoring and Adaptive Management

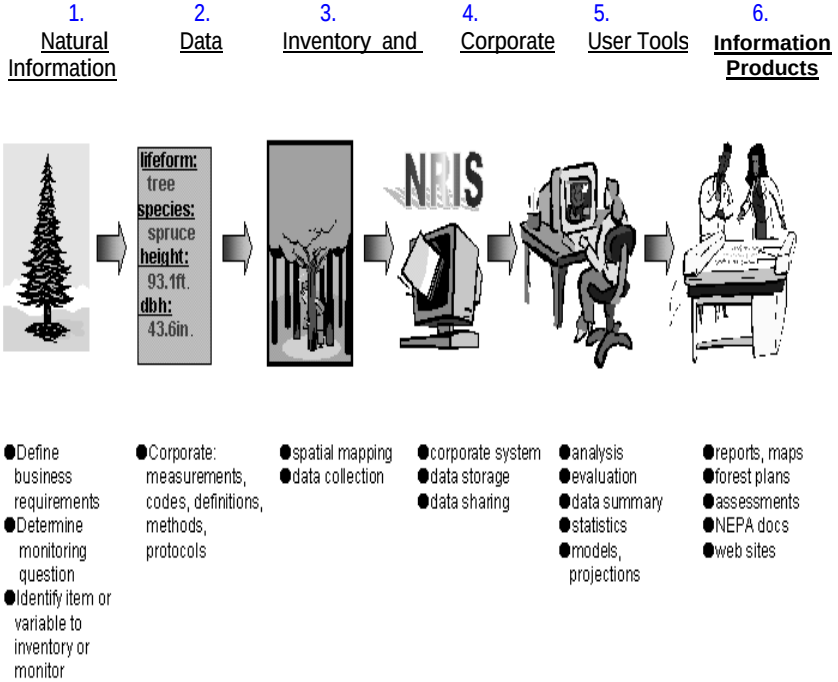
Evaluation and monitoring provide the feedback mechanism for adaptive forest management



Monitoring and evaluation involve more than just collecting and interpreting data. Data must be converted to useful information and stored in a form that is accessible to others. A plan for managing monitoring information over time is critical to a successful program and should be developed early in the planning process. (See Figure MON 2).

Data will be designed and collected according to appropriate data standards and entered into corporate databases such as Automated Lands Program (ALP), Natural Resource Inventory System (NRIS), or Geographic Information System (GIS). The information can then be accessed and analyzed to produce information products such as monitoring reports (Steps 5 and 6) that would be available for internal and external review.

Figure MON 2: Elements of Information Management



Legal and Regulatory Requirements

The forest plan addresses several types of monitoring as required in the 1982 regulations. These requirements fall into four broad categories:

- Category 1: Required monitoring items (36 CFR 219.12(k) and 219.19(a)(6),
- Category 2: Attainment of goals and objectives (36 CFR 219.12(k)),
- Category 3: Implementation of standards and guidelines (36 CFR 219.12(k)), and
- Category 4: Effects of prescriptions, management practices, and off-road vehicles (36 CFR 219.11(d), 219.12(k)(2), and 219.21(g)

Required Category 1 monitoring items (Table MON-1) are mandatory components of every forest plan, whereas Category (2) through (4) monitoring items are more flexible and are tailored to address issues raised through public scoping and interdisciplinary team review. A more complete description of Category 1 through 4 monitoring items is shown in the Monitoring Matrix section.

Table MON-1. Monitoring Regulatory Requirements

Monitoring Description	Annual Posting of Results?	Five-Year Evaluation Report?
A program of monitoring and evaluation shall be conducted that includes consideration of the effects of National Forest Management on land, resources, and communities adjacent to or near the National Forest being planned and the effects upon National Forest management from activities on nearby lands managed by other Federal or other government agencies or under the jurisdiction of local governments. (36 CFR 219.7(f)		X
The Forest Supervisor shall review the conditions on the land covered by the plan at least every 5 years to determine whether conditions or demands of the public have changed significantly. (36 CFR 219.10(g)		X
Monitoring and evaluation requirements will provide a basis for a periodic determination of the effects of management practices. 36 CFR 219.11(d)		
At intervals established in the plan, implementation shall be evaluated on a sample basis to determine how well objectives have been met and how closely management standards and guidelines have been applied. Based upon this evaluation, the interdisciplinary team shall recommend to the Forest Supervisor such changes in management direction, revision, or amendments to the forest plan as are deemed necessary. (36 CFR 219.12(k)		X
Monitoring requirements identified in the forest plan shall provide for—(36 CFR 219.12(k) [1] A quantitative estimate of performance comparing outputs and services with those projected by the forest plan;	X	
[2]Documentation of the measured prescriptions and effects, including significant changes in productivity of the land; and		X
[3]Documentation of costs associated with carrying out the planned management prescriptions as compared with costs estimated in the forest plan.	X	
[5] A determination of compliance with the following standards: [i] Lands are adequately restocked as specified in the forest plan;		X

Table MON-1. Monitoring Regulatory Requirements		
Monitoring Description	**Annual Posting of Results?**	**Five-Year Evaluation Report?**
[ii] Lands identified as not suited for timber production are examined at least every 10 years to determine if the have become suited; and that, if determined suited, such lands are returned to timber production; {Note: See also 219.14(d): …Designation in the plan of lands not suited for timber production shall be reviewed at least every 10 years. ..}		X
[iii] Maximum size limits for harvest areas are evaluated to determine whether such size limits should be continued; and		X
[iv] Destructive insects and disease organisms do not increase to potentially damaging levels following management activities.		X
(36 CFR 219.19(a)[6]. Population trends of the management indicator species will be monitored and relationships to habitat changes determined. This monitoring will be done in cooperation with state fish and wildlife agencies, to the extent practicable.	X	
36 CFR 219.21[g]. Forest planning shall evaluate the potential effects of vehicle use off roads and, on the basis of the requirements of 36 CFR 295 part of this chapter, classify areas and trails of National Forest System lands as to whether or not off-road vehicle use may be permitted.	X	

Monitoring Guidelines and Components

Monitoring Framework

Many approaches to Forest Plan monitoring are currently being used throughout the agency. However, each monitoring chapter must: 1) meet the legal requirements of the planning regulations, 2) be consistent with corporate data standards and protocols, and 3) be developed by an interdisciplinary team that addresses the ecological, social and economic dimensions of forest management in an integrated manner.

To meet these objectives, the Superior National Forest's monitoring framework has four components:

1) Forest Plan (Chapter 4) Direction that provides broad, strategic guidance.
2) A Monitoring and Evaluation Implementation Guide that provides specific, technical guidance.
3) An Annual Monitoring Schedule that outlines specific tasks for the current year.
4) An Annual Monitoring Evaluation Review that provides a forum to review current year findings and identify specific modifications if necessary.
The relationship between each is shown in Table Mon-2.

Monitoring Prioritization

Within any agency or institution, necessary or desirable work demands often exceed available funding. Forest Plan monitoring is no exception. Consequently a prioritization process for Chapter 4 and the Monitoring Guide items will be developed to ensure efficient use of limited time, money and personnel. Following is a list of potential criteria that may be used in the screening process:
-Is monitoring of a particular question or resource mandated by regulation or court order?
-Is there a high degree of uncertainty associated with management assumptions? (Management Significance).
-Is there a high degree of disparity between existing and desired conditions?
-Are proposed management activities likely to affect resources of concern? (Ecological Significance).
-How do monitoring items fit into National and Regional priorities?
-How well do monitoring items fit with Public Comments?
-What are the consequences of not knowing resource conditions?
-Will monitoring respond to a key issue?

Monitoring priorities will be established each year utilizing the above criteria, information gained during the past year, and budgets. The prioritization process will be elaborated within the Monitoring Guide.

Table Mon-2. Monitoring Framework

Forest Plan Monitoring (Chapter 4)	Monitoring and Evaluation Implementation Guide	Annual Monitoring Schedule	Annual Monitoring Evaluation Review
Broad and Strategic. Provides the monitoring requirements in the forest plan itself. It focuses on what is needed to monitor the forest plan. It provides the overall monitoring strategy including specific questions that need to be answered, what will be monitored, timetables for reporting, and other information.	Focused and Technical; Describes how, where, and when to accomplish the monitoring prescribed in the forest plan. It provides the specific methods, protocols and analytical procedures. The Guide is intended to be flexible and could be modified in response to new information, updated procedures, emerging issues, and budgetary considerations without amending the forest plan.	Specific, Technical, and Prescriptive. Identifies precisely what will be monitored, where, when, and by whom for the current or upcoming year. The Annual Monitoring Schedule will be tied to the forest plan and monitoring guide.	Specific, Technical, and Prescriptive. The Forest interdisciplinary team will review the current year's monitoring and evaluation results at the end of each calendar year. Based on these findings they will recommend to the Forest Leadership Team necessary changes (if any) to the Forest Plan, Monitoring Guide, or Forest Service Manual or Handbook. .

Information Management

There will be a tremendous amount of monitoring information collected over time. If this information is not documented so it can easily be retrieved, shared with the public and other stakeholders, or used by agency managers to foster better decisions, it is of limited value. Information management will consist of: (1) Management of the collection and storage of data (2) Evaluation and interpretation of data (3) Sharing of information internally and externally

Manage the Collection and Storage of Data

The interdisciplinary team review will work with Forest Service employees and cooperators to see that data is collected using standard methods found in the Monitoring Guide and is entered into the appropriate databases.

Evaluation and Interpretation of Data

Evaluation is the process of transforming data into information. It is a process of synthesis that brings together value, judgment and reason with monitoring information to answer selected monitoring questions. Successful adaptive management depends on this information in moving the Forest toward desired conditions.

The Forest interdisciplinary team will review the current year's monitoring and evaluation results at the end of each calendar year. Based on these findings they will recommend to the Forest Leadership Team necessary changes (if any) to the Forest Plan, Monitoring Guide, or Forest Service Manual or Handbook.

Sharing of Monitoring Information and Findings Information gathered through monitoring will be summarized in various reports (most notably the annual Monitoring and Evaluation Report) and publications and shared internally and externally with cooperating agencies and organizations, interest groups, policy makers, and the general public.

Annual Monitoring and Evaluation Report

The annual monitoring and evaluation report (M and E) provides an opportunity to track progress towards the implementation of revised forest plan decisions and the effectiveness of specific management practices. The focus of the evaluation is in providing short and long term guidance to ongoing management. The M and E report should include components such as:
(1) Forest accomplishments toward desired conditions and outputs of goods and services.
(2) Forest Plan Amendment Status.
(3)Status of other agency/institution cooperative monitoring.
(4) Summary of available information on MIS or comparable species.
(5) Summary of large scale or significant projects or programs (ie Storm Recovery).
(6) Update of research needs
(7) Public participation/disclosure plan

Public Involvement

The Forest Service mission "Caring for the Land and Serving the People" will not be realized without public trust in our decision making process. Even though agency decisions will not consistently please everyone, using an open process for making decisions should foster public understanding of the rationale for individual decisions. The same principle applies to monitoring. Moreover, since our approach incorporates an adaptive strategy, frequent public feedback is necessary to facilitate monitoring activity prioritization, protocols, evaluation, and ultimately better informed decisions Subsequently a strategy for involving the public and other agencies in Forest monitoring planning, execution, and evaluation will be attempted each year. Partnerships with interest groups, volunteer groups, other federal, state and local agencies, and universities will be part of that strategy. Monitoring information trips for the public will be encouraged to review monitoring findings and methods and address subsequent management implications. Other avenues of public involvement such as news releases, the internet, brochures, and public reports will also be used.

MONITORING MATRIX

Category #1 (Required), #2 (Desired Conditions, and Objectives) and #4 (effects of prescriptions, management practices, and off-road vehicles) are outlined in the matrix. The more prescriptive Standards and Guides (Category #3) will be addressed in the Monitoring Guide. The focal point for each monitoring item will be the Monitoring Question. Each Monitoring Question is derived from one or more Monitoring Drivers (Legal Requirements, Desired Conditions or objectives etc. See table MON-2 for definitions). Not all monitoring drivers will be monitored each year. Annually drivers that best answer the monitoring question for each resource area will be identified through the Annual Monitoring Schedule process.

As previously mentioned, public involvement with Forest Plan monitoring (beyond comments received on Draft Forest Plan) will be sought. The intent is to continue public participation beginning with development of the Monitoring Guide.

Modifying direction for the BWCAW was not part of the Plan revision process. Therefore, the monitoring items below appear as they did in the 1993 BWCAW Management Plan and Implementation Schedule.

Table MON-3. Definitions of Components in the Monitoring Matrix

COMPONENT	DEFINITION
Resource Area	A quantitative or qualitative parameter that can be assessed.
Monitoring Question	Specific monitoring question(s) developed to ensure that monitoring and evaluation addresses information essential to measuring the Forest Plan. These questions relate to the different purposes and rationales for monitoring. There may be more than one monitoring question per resource area.
Monitoring Driver	Monitoring drivers identifies the reason or why we are monitoring a particular monitoring item. Following is a list of monitoring drivers: (1) Legal and regulatory requirements and Forest Service Manual direction and (2) Forest Plan desired conditions, goals, objectives standards and guidelines (S and G's). (3) Validation of assumptions and predictions, (4) Court rulings. Legal and regulatory drivers are described whereas desired conditions, goals, objective, and S and G's are referenced. Refer to chapters 2 and 3 for full description of these drivers.
Measurement Frequency	Describes how often monitoring information is collected.
Evaluation and Reporting Frequency.	Describes how often monitoring information is evaluated and reported.
Precision and Reliability	Two categories of precision and reliability are appropriate at the forest plan scale: Class A: Methods appropriate for modeling or quantitative measurement. Results have a high degree of repeatability, reliability, accuracy and precision. Class B: Methods based on project records, personal communications, ocular estimates, pace transects, informal visitor surveys and similar types of assessments. The degree of repeatability, reliability, accuracy and precision are not as high as Class A methods, but they still provide valuable information.

Table MON-4. Chapter 4 Monitoring Matrix

REQUIRED MONITORING ITEMS

Resource Area	Monitoring Question(s)	Driver (Applicable CFR's, FP Desired Conditions, and FP Objectives)	Measurement Frequency	Evaluation/ Reporting Frequency	Precision and Reliability
All	How close are projected outputs and services to actual?	(36 CFR 219.12(k)[1]. A quantitative estimate of performance comparing outputs and services with those projected by the forest plan;	Annual	Annual	A
All	How close are projected costs with actual costs?	(36 CFR 219.12(k) [3]. Documentation of costs associated with carrying out the planned management prescriptions as compared with costs estimated in the forest plan.	Annual	Annual	A
Insects & Disease	Are insects and diseases populations compatible with objectives for restoring or maintaining healthy forest conditions?	(36 CFR 219.12(k)[5][iv]. Destructive insects and disease organisms do not increase to potentially damaging levels following management activities. D-ID-3, O-ID-1, D-VG-5, D-VG-8, O-VG-10-12	Annual	Annual	A/B
Insects, Diseases and Disturbance Processes	To what extent is Forest management managing undesirable occurrences of fire, insect and disease outbreaks?	(36 CFR 219.12(k)[5][iv]. Destructive insects and disease organisms do not increase to potentially damaging levels following management activities. D-ID-1-2, O-ID-1	1-5 years	1-5 years	A/B
Recreation Motor Vehicles	To what extent is the Forest providing RMV opportunities; what are the effects of RMV's on the physical and social environment; and how effective are forest management practices in managing RMV use?	36 CFR 219.21[g]. Off-road vehicle use shall be planned and implemented to protect land and other resources, promote public safety, and minimize conflicts with other uses of the National Forest System lands. Forest planning shall evaluate the potential effects of vehicle use off roads and, on the basis of the requirements of 36 CFR 295 part of this chapter, classify areas and trails of National Forest System lands as to whether or not off-road vehicle use may be permitted. D-RMV-1, 2. O-RMV-1.	Annual	1-5 years	A, B

Resource Area	Monitoring Question(s)	Driver (Applicable CFR's, FP Desired Conditions, and FP Objectives)	Measurement Frequency	Evaluation/ Reporting Frequency	Precision and Reliability
Social & Economic Stability	To what extent do output levels and location of timber harvest and mix of saw timber and pulpwood compare to those levels projected ?	CFR 219.19.12(k)[1]. A quantitative estimate of performance comparing outputs and services with those projected by the forest plan;. 36CFR 219.7(f).A program of monitoring and evaluation shall be conducted that includes consideration of the effects of National Forest Management on land, resources, and communities adjacent to or near the National Forest being planned and the effects upon National Forest management from activities on nearby lands managed by other Federal or other government agencies or under the jurisdiction of local governments. D-TM-1, O-TM-1	Annual	Annual	A, B
Soils	Are the effects of Forest management, including prescriptions, resulting in significant changes to productivity of the land?	36 CFR 219.12 (k) [2], Documentation of the measured prescriptions and effects, including significant changes in productivity of the land; D-WS-3, D-WS-12, O-WS-9, O-WS-10	1-5 years	1-5 years	A/B
Timber	Are harvested lands adequately restocked after five years?	(36 CFR 219.12(k)[5][i]. Lands are adequately restocked as specified in the forest plan	Annual	Annual	A
Timber	To what extent is timber management occurring on lands suitable for such production?	(36 CFR 219.12(k)[5][ii]. Lands identified as not suited for timber production are examined at least every 10 years to determine if the have become suited; and that, if determined suited, such lands are returned to timber production;	10 years	10 years	A
Timber	How much even-aged management (especially clear cutting) should be used, and in what forest types should it be used?	(36 CFR 219.12(k)[5][iii]. Maximum size limits for harvest areas are evaluated to determine whether such size limits should be continued.	Years 5 and 10	Years 5 and 10	B
Wildlife: Management Indicator Species	What are the population trends of management indicator species?	36 CFR 219.19(a)(6). Population trends of the management indicator species will be monitored and relationships to habitat changes determined. This monitoring will be done in cooperation with state fish and wildlife agencies, to the extent practicable. O-WL-1, O-WL-16, O-WL-17, O-WL-31, and O-WL-32.	Annual	1-5 years	A/B

DESIRED CONDITION and OBJECTIVE MONITORING ITEMS

Resource Area	Monitoring Question(s)	Driver (Applicable CFR's, FP Desired Conditions, and FP Objectives)	Measurement Frequency	Evaluation/ Reporting Frequency	Precision and Reliability
Air Quality	To what extent is Forest management contributing or responding to air quality effects on ecosystems, human health or human enjoyment?	D-AQ-1, D-AQ-2, D-WS-4, D-WS-5, D-REC-3, D-SC-1 and O-AQ-1.	1-5 years	1-5 years	A/B
Air Quality	Are air quality related values of the Boundary Waters Canoe Area Wilderness being maintained?	D-AQ-1, D-AQ-2, D-WS-4, D-WS-5, D-REC-3, D-SC-1 and O-AQ-1.	1-5 years	1-5 years	A/B
Cooperation	To what extent does the Forest emphasize agency, tribal, and public involvement and inter-governmental coordination with federal, state, county governments and agencies?	D-CM-1. D-SE-4, D-REC-6.	5 Years	5 Years	A/B
Fire	What level of wildland fire on the landscape is appropriate and desirable and , to what extent is unwanted wildland fire on the landscape suppressed?	D-ID-6	1-5 years	1-5 years	A/B
Fire	How, where, and to what extent will prescribed fire be used to maintain desired fuel levels, and/or mimic natural processes, and/or maintain/ improve vegetation conditions, and/or restore natural processes and functions to ecosystems?	D-ID-4-5, O-ID-2-4	1-5 years	1-5 years	A/B
Heritage Resources	1) Are avoidance or mitigation measures effective and being followed as recommended in project designs? 2) Are heritage resources being affected in non-project areas?	O-HR-1 and O-HR-2.	5 Years	5 Years	A
Land Adjustment	How successful is the Forest's land adjustment program in support and enhancement of Forest Plan desired conditions and objectives and contributing to efficient and effective stewardship?	D-LA-1, O-LA-1, O-LA-2, and O-LA-3	2 years	2-5 years	A
Landscape Ecosystems	To what extent is the Forest meeting vegetation composition and age class objectives for each of the Landscape Ecosystems?	Composition and Age Class objectives by LE	5 Years	5 Years	A
Minerals	Are mineral exploration, development and production avoidance or mitigation measures effective and being followed as recommended in project designs?	D-MN-1 and D-MN-2	1-5 years	1-5 years	A/B

Resource Area	Monitoring Question(s)	Driver (Applicable CFR's, FP Desired Conditions, and FP Objectives)	Measurement Frequency	Evaluation/ Reporting Frequency	Precision and Reliability
Public Health and Hazardous Materials	Does water in Forest-provided drinking water sources and swimming beaches meet standards of quality protective of human health and aesthetics?	O-PH-1.	5 Years	5 Years	A
Public Health and Hazardous Materials	Does hazardous material storage on NF meet standards of quality protective of human health?	O-PH-2.	5 Years	5 Years	A
Public Health and Hazardous Materials	Are Forest facilities and recreation sites safe for employee and public use and enjoyment?	O-PH-4.	5 Years	5 Years	A
Resource Area	Monitoring Question(s)	Driver (Applicable CFR's, FP Desired Conditions, and FP Objectives)	Measurement Frequency	Evaluation/Reporting Frequency	Precision and Reliability
Recreation	To what extent is the Forest providing a range of motorized and non-motorized recreation opportunities that incorporate diverse public interests yet achieve applicable MA and LE objectives.	D-REC-1, 7, 9, 10, 11, 12, 13. O-REC-1. D-RTL-1,3. O-RTL-1. D-RWA-1, O-RWA-1.	1-5 years	1-5 years	A/B
Recreation	To what extent are Forest management activities within the Recreation Opportunity Spectrum Objectives (ROS)?	D-REC-2. O-REC-2, 3.	1-5 years	1-5 years	A/B
Recreation	To what extent do Forest recreation facilities and opportunities meet accessibility, health, safety, cost, and maintenance requirements and achieve resource and social objectives?	D-REC-3, 4, 8. O-REC-4. D-RTL-2.	1-5 years	1-5 years	A
Scenic Resources	Are forest management activities providing scenic quality as defined by the Scenic Integrity Objectives (SIO)?	D-SC-1, 2, 3. O-SC-1.	1-5 years	1-5 years	B
Social & Economic Stability	To what extent does the Forest provide commodity resources and non commodity opportunities in an environmentally acceptable manner that contribute to the social and economic sustainability and diversity of local communities?	D-SE-1 and 2. . O-SE-1.O-SE-3. O-SE-4.O-SU-2.O-SU-3. O-SU-4. O-SU-5.	5 Years	5 Years	A, B
Social & Economic Stability	Are forest management activities maintaining the desired characteristics of the areas and species of interest (traditionally and culturally) as identified in research and/or by interested communities and individuals?	D-SE-3.	1-5 years	1-5 years	A, B

Resource Area	Monitoring Question(s)	Driver (Applicable CFR's, FP Desired Conditions, and FP Objectives)	Measurement Frequency	Evaluation/ Reporting Frequency	Precision and Reliability
Special Uses	Does Forest management of forest product, recreation/wilderness, and other special use permits meet Forest Plan and agency direction?	D-REC-5. O-SU-1, 2, 3, 4, 5. D-TS-5.	1-5 years	1-5 years	A/B
Transportation System	To what extent is the Forest, in coordination with other public road agencies, providing safe, cost effective, minimum necessary road systems for administrative and public use.	D-TS-1, 2, 3, 4. O-TS-1, 2, 6, 7, 8.	1-5 years	1-5 years	A
Tribal Rights and Interests	Is Forest management helping to sustain American Indians' way of life, cultural integrity, social cohesion, and economic well being?	D-TR-1. O-TR-1. O-TR-3.	Throughout the year	Annual	B
Tribal Rights and Interests	Are government to government relationships functional?	D-TR-2. O-TR-2. O-TR-4.	Throughout the year	Annual	B
Tribal Rights and Interests	Is the Forest facilitating the right of the Tribes to hunt, fish, and gather as retained via treaty?	D-TR-3.	Throughout the year	Annual	B
Vegetation	To what extent is the Forest providing a full range of vegetative communities that address diverse public interests and needs while contributing to ecosystem sustainability and biological diversity?	D-VG-1, -2,-3, -4	1-5 years	1-5 years	A/B
Vegetation Composition & Structure	To what extent are Forest management, natural disturbances, and subsequent recovery processes changing vegetation composition and structure? To what extent are conditions moving toward short-term (1-20 years) and long-term (100 years) objectives at Landscape Ecosystem, Management Area, and other appropriate landscape scales?	D-VG-1-6. O-VG-1-16.	1-5 years	1-5 years	A/B
Vegetation Ecological Processes	To what extent is Forest management maintaining or restoring conditions that result from or emulate natural ecological processes of fire, wind, flooding, and insects and disease outbreaks.	D-VG-8, O-VG-6-11, 36 CFR 219.12(k)[5](iii).	5 Years	5 Years	A/B
Vegetation Spatial Patterns	To what extent are Forest management, natural disturbances, and subsequent recovery restoring vegetation spatial landscape patterns and moving conditions toward both short-term (1-20 years) and long-term (100 years) objectives at Landscape Ecosystem, Spatial Zone (SNF), Management Area, and other appropriate landscape scales?	D-VG-1-5, O-VG-17-25.	5 Years	5 Years	A/B

Resource Area	Monitoring Question(s)	Driver (Applicable CFR's, FP Desired Conditions, and FP Objectives)	Measurement Frequency	Evaluation/ Reporting Frequency	Precision and Reliability
Watershed Health & Riparian-	To what extent is Forest management affecting water quality, quantity, flow timing and the physical features of aquatic, riparian, or wetland ecosystems?	All WS Desired Conditions and Objectives with the possible exception of D-WS-14, plus O-RWA-1 D-PH-3, D-PH-4, O-PH-3, O-TS-4 and O-TS-5	1-5 years	1-5 years	A/B
Wildlife	To what extent is Forest management providing ecological conditions to maintain viable populations of native and desired non-native species.	D-WL-3b, O-WL-1, O-WL-2, CFR 219.19 (6).	1-5 years	1-5 years	A/B
Wildlife: Non-native Invasive Species	To what extent is Forest management contributing or responding to populations of terrestrial or aquatic non-native species that threaten native ecosystems?	D-WL-9. O-WL-37 and 38.	1-5 years	1-5 years	A/B
Wildlife: Sensitive Species	To what extent is Forest management contributing to the conservation of sensitive species and moving toward short term (10-20 years) and long-term (100 years) objectives for their habitat conditions?	D-WL-1-9, O-WL-1-3. O-WL-18-31.	1-5 years	1-5 years	A/B
Wildlife: Management Indicator Species	To what extent is Forest management moving toward short term (10-20 years) and long-term (100 years) objectives for habitat conditions for management indicator species and species associated with management indicator habitats?	D-WL-1-9, O-WL-1-3, O-WL-16,17, 31, 32, 34, 35, 36, and LE MIH objectives 1-9.	1-5 years	1-5 years	A/B
Wildlife: Threatened and Endangered Species	To what extent is Forest management contributing to the conservation of threatened and endangered species and moving toward short term (10-20 years) and long-term (100 years) objectives for their habitat conditions and population trends?	D-WL-1-8, O-WL-4-17.	1-5 years	1-5 years	A/B
Wildlife: Threatened and Endangered Species	To what extent are road and trails closures effective in prohibiting unauthorized motor vehicle use?	G-WL-7, G-RMV-4, O-TS-3, O-TS-7, S-TS-3, S-TS-7, and G-TS-12 , G-TS-16	1-5 years	1-5 years	A/B
Wildlife: Threatened and Endangered Species	To what extent is the Forest maintaining no net increase in groomed or designated over-the-snow trail routes unless the designation effectively consolidates use and improves lynx habitat through a net reduction of compacted snow areas?	S-WL-2	1-4 years	1-4 years	A/B

1993 BWCA WILDERNESS MANAGEMENT PLAN MONITORING ITEMS

Resource Area	Monitoring Question(s)	Driver (Applicable CFR's, FP Desired Conditions, and FP Objectives)	Measurement Frequency	Evaluation/Reporting Frequency	Precision and Reliability
SOCIAL 1964 Wilderness Act	Visitor use -Use Levels -Travel Patterns -Use levels by time of year -Average party size -Origin of party	Use levels Wilderness experience	Various	Annual	High
	Compliance with rules, regulations reserving/issuing permits -Cancellations -Party leader names -Alternates -Entrance date -Entrance point -Mode of travel	Integrity of permit and reservation system	Various	Ongoing	Moderate/high
	No show rate for overnight and day use motor permits.	Permit check - percent (%) no show built into system.	% no show	Various	Moderate
	Social encounters - Levels of crowding	Use levels Wilderness experience	Visitor satisfaction	Various	Moderate
ECOSYSTEM Bald Eagle Recovery Act & Endangered Species Act	Eagle population levels and reproduction trends	Bald Eagle	Number of birds	Annual	Moderate/high
Endangered Species Act	Wolf density and population levels	Gray Wolf	Wolves/sq. mi.	Annual	Moderate
Threatened & Endangered Plants	Population trends - prevent habitat loss	Plant communities; Campsites, Trail mtce and construction	Population trends	As needed	Moderate/high
Fisheries	Cooperate with State on inventories and assessments	Fish	Various	Ongoing	High
Air & Water Quality Resources	Effectiveness of State and federal laws related to air and water pollution	Concentration of pollutants in air and precipitation	Various	Continuous	High
	Acid deposition impacts to lakes	Loss of acid neutralizing capacity	Various	Three times a year	High

Resource Area	Monitoring Question(s)	Driver (Applicable CFR's, FP Desired Conditions, and FP Objectives)	Measurement Frequency	Evaluation/Reporting Frequency	Precision and Reliability
	Mercury concentration in fish	Basis for recommending limits for human consumption	ppm Hg	Annual	High
	Mercury concentration in water and zooplankton	Mercury bioaccumulation	ppm Hg	Three times a year	High
Resource Area	Monitoring Question(s)	Driver (Applicable CFR's, FP Desired Conditions, and FP Objectives)	Measurement Frequency	Evaluation/Reporting Frequency	Precision and Reliability
SOCIAL 1964 Wilderness Act	Visitor use -Use Levels -Travel Patterns -Use levels by time of year -Average party size -Origin of party	Use levels Wilderness experience	Various	Annual	High
	Compliance with rules, regulations reserving/issuing permits -Cancellations -Party leader names -Alternates -Entrance date -Entrance point -Mode of travel	Integrity of permit and reservation system	Various	Ongoing	Moderate/high
	No show rate for overnight and day use motor permits.	Permit check - percent (%) no show built into system.	% no show	Various	Moderate
	Social encounters - Levels of crowding	Use levels Wilderness experience	Visitor satisfaction	Various	Moderate
ECOSYSTEM Bald Eagle Recovery Act & Endangered Species Act	Eagle population levels and reproduction trends	Bald Eagle	Number of birds	Annual	Moderate/high
Endangered Species Act	Wolf density and population levels	Gray Wolf	Wolves/sq. mi.	Annual	Moderate
Threatened & Endangered Plants	Population trends - prevent habitat loss	Plant communities; Campsites, Trail mtce and construction	Population trends	As needed	Moderate/high
Fisheries	Cooperate with State on inventories and assessments	Fish	Various	Ongoing	High

Resource Area	Monitoring Question(s)	Driver (Applicable CFR's, FP Desired Conditions, and FP Objectives)	Measurement Frequency	Evaluation/Reporting Frequency	Precision and Reliability
Air & Water Quality Resources	Effectiveness of State and federal laws related to air and water pollution	Concentration of pollutants in air and precipitation	Various	Continuous	High
	Acid deposition impacts to lakes	Loss of acid neutralizing capacity	Various	Three times a year	High
	Mercury concentration in fish	Basis for recommending limits for human consumption	ppm Hg	Annual	High
	Mercury concentration in water and zooplankton	Mercury bioaccumulation	ppm Hg	Three times a year	High
	Passive monitoring for ozone, sulphur dioxide and fluoride	Air pollution effects to vegetation	Various	Continuous	Moderate
	Mercury concentrations in select animals, including loons and eagles	Mercury bioaccumulation	ppm Hg	Ongoing	High
	Plant plots with known sensitivity to ozone, sulphur dioxide and fluoride to measure air pollutant-caused damage	Air pollution effects to vegetation	Visual symptoms, laboratory measured concentrations	Weekly	High
	Nutrient impacts on lakes	Human induced eutrophication	Various	Representative lakes, variable intervals	Moderate
Forest Plan (NFMA)	Implementation of the Forest Plan as it pertains to the Wilderness	ID Team; Campsites and trails; Prescribed natural fires	Reports	Annual	High
Forest Plan/LAC Standards	Campsite, trail and lakeshore condition	Inventory and monitor changes	Vegetation loss; Erosion levels	Ten years	Moderate
National Historic Preservation Act	Loss of site integrity thru disturbance of physical characteristics	Visitor use, new construction, management activity, natural deterioration	NRHP eligibility	Ongoing	High
	Monitoring of unevaluated sites assessed as Priority #1	Visitor use, management activities, natural deterioration	NRHP eligibility	Every 5 years	High
	Assessment of identified sites	Visitor use, management activities, natural deterioration	NRHP eligibility	Ongoing	High
Identify Research Needs	Determine research implementation progress and opportunities. Revise needs and priorities of research.	Research needs identified in Plan	Report	Every 5 years	Moderate

APPENDIX A. SUMMARY OF THE ANALYSIS OF THE MANAGEMENT SITUATION – CHIPPEWA AND SUPERIOR NATIONAL FORESTS

The regulations to implement the National Forest Management Act require, as part of the planning process, an analysis of the management situation (AMS). The purpose of the AMS is to identify the need for change (if any) from the direction in the current Forest Plan. The AMS is also the determination of the ability of the planning area to supply goods and services in response to society's demands. Detailed Analysis of the Management Situation papers were prepared for the following topics: Fire Management, Fish Habitat Management, Old Growth, Rare Natural Resources, Recreation, Riparian Management, Timber Management, and Wildlife for both the Chippewa and Superior National Forests. These documents are detailed and contain much additional information compared to those included in the following summaries. The complete AMS and other resource assessment documents are included in the official planning record.

This section of the appendix provides a summary of the AMS for each of the above topics. The AMS was developed for both the Chippewa and Superior National Forests in the joint Forest Plan revision process. The intent of the summary is to give an overview of each resource, anticipated demands for the resource, and a discussion of the change needed in a revised plan. The format of the AMS summary is generally as follows:

1. Introduction
2. Projection of Demand – Assessment of the Demand from the Forest, and Assessment of ability to produce Goods and Services
3. The Need for Change – Problems with the Existing Direction, Assessment of the Need and Opportunity to Change Management Direction

Additional information not contained in the summary (but contained in the planning record) includes:

- National Direction
- Direction from the 1986 Forest Plans
  - Goals, standards, and guidelines
  - Projected outputs and activities
  - Future activities projected under current management
  - Expected future conditions if current management were to continue.

Wildlife Habitat Management

Introduction

Wildlife is generally defined as all wild plants and animals (Hunter 1990). This definition reflects an evolution over the last century in the public's perception that 'wildlife' is more than game animals and other vertebrates, and includes all the plant and animal species that are part of an area's ecosystems.

Wildlife habitat is defined as a place where the physical and biological elements of ecosystems provide a suitable environment for the food, cover and space resources needed for plant and animal livelihood (FSM, 2605).

Although these definitions include fish and threatened, endangered, and sensitive plants, animals, and communities, these are addressed in separate sections of the *Analysis of the Management Situation.*

The overarching wildlife resources issue is the desire the public and Forest Service has to reevaluate and reconsider current direction to determine 1) whether Forest Plans adequately address national law and policy for protecting, restoring and managing to maintain wildlife diversity and 2) whether the plans provide appropriate wildlife resources goals and objectives. Appropriate management should be determined by evaluating 1) the important factors related to the broad, changing, and sometimes contradictory, social and economic demands and desires that the public has for wildlife populations and habitats, and 2) factors related to the range of ecological capabilities and potential of the land as understood by documented ecological information or educated guesses about conditions.

Projection of Demand

Assessment of Demand for Goods and Services from the Forests

As with most of the demands for other goods and services from the national forests, the public's demand for wildlife habitat includes a very wide range of desires. Within this range, habitat demands may complement or directly conflict with each other. Therefore, the starting points for identifying what the public demands are those national and regional demands that have been incorporated into the laws and policy that guide Forest Service management. These requirements include:

- Manage National Forests for outdoor recreation, range, timber, watershed, and fish and wildlife and give equal consideration to the value of all the renewable resources, including wildlife, when managing forests (Multiple Use Sustained Yield Act of 1960).
- Manage forest lands to maintain or improve biological diversity at the genetic, species, and ecosystem levels, maintain viable populations of existing native and desired non-native vertebrate species, and protect and enhance the diversity of plant and animal communities (National Forest Management Act of 1976).
- Cooperate with the State in wildlife conservation programs (Sikes Act of 1960).
- Move away from commodity or single species management toward sustainable development and ecosystem health (Draft 1995 Resource Planning Act).
- Serve the American public by maintaining diverse and productive wildlife, fish, and sensitive plant habitats as an integral part of managing National Forest ecosystems (Forest Service Manual 2603).
- Provide diverse opportunities for esthetic, consumptive, and scientific uses of wildlife, fish, and sensitive

plant resources in accordance with National, regional, State, and local demands (Forest service Manual 2603).

On the State and local levels the public is in general agreement with these goals and objectives and demands healthy sustainable wildlife populations. But for most wildlife species, particularly animals, it is difficult to very precisely assess, quantify or put economic values on those demands. In Minnesota the MN DNR's *Status of Wildlife Populations, Fall 1996 and 1983-1995 Hunting and Trapping Harvest Statistics* (Dexter, compiler 1996) provides a picture of some of the economic and social values associated with game species: over one million licenses and permits were sold in 1996. The U.S. Fish and Wildlife survey identified two million people in Minnesota who either feed birds or are active bird watchers (US Fish and Wildlife Service 1993). Green (1995) writes: ``According to a recent study prepared for a technical paper for the Generic Environmental Impact Statement on Timber Harvesting in Minnesota [Southwick Associates 1991] the economic gain from wildlife photography, nature observation, and related travel in Minnesota is now about equal to that from more traditional hunting pursuits." Clearly, demands for wildlife include all wildlife.

The many demands for wildlife habitat on the Minnesota National Forests, including the overall legal and policy ``demands" shown above, are documented in the *Wildlife Habitat Management* (USFS 1997a) and *Habitat Fragmentation* (USFS 1996a) Forest Plan Revision reference papers and their addenda.

Similarities in present demands and those from the last planning period include continuing to place an emphasis on managing areas of the Forests for popular game species white-tailed deer, moose, ruffed grouse, some species of concern, and other species associated (for some habitat requirements) with young forest, aspen forest, edge habitats and small forest patch sizes.

The greatest difference in demands since the last planning period is that there is now explicitly a greater demand for habitat for species associated with: older forest; old large trees; large contiguous forest patches with less edge; conifer forest; areas with low road or trail density; within stand compositional and structural diversity; and un-fragmented forests.

Other changes include greater demands for the Forests to: work cooperatively with other landowners and manage at larger landscape scales; focus on ecosystems rather than just individual species; and use a more scientifically valid method for monitoring indicator species.

The Forests' Ability to Supply Goods and Services, i.e., Wildlife Habitat or Populations

The physical and biological composition, structure, and ecological function of every acre of National Forest land provide the ``goods and services" of wildlife habitat. Through forest management the National Forests, in general, have a good ability to supply a wide array of habitats. Management choices include maintaining, restoring, or altering (either decreasing or increasing) both the amounts, quality, and distribution of habitats and the rates and direction of habitat change. These choices are neither *good* nor *bad* for wildlife as a whole: depending upon the species a management scenario may benefit, negatively affect or have no impact on an individual species.

This ability, however, varies by issue (desired habitats) and by scale.

On the smaller scales–such as stands or microhabitats within stands or lakes and streams - the Forests generally have a very good ability to provide desired habitat conditions. In fact, these are the scales at which many species habitat requirements are best understood. Examples of habitats at this scale that the Forests have a good ability to supply include: woody debris; reserve areas and wildlife trees; stand horizontal and vertical structural diversity; protection of spawning areas, nests, dens, or large old trees; diversity of tree species within stands; buffer zones between habitats; and an array of age classes of stands. These conditions can be addressed by selecting and implementing a variety of management activities or ``tools" such as protecting sites from any manipulation,

harvesting trees using a variety of techniques, planting trees, or using prescribed fire.

On larger landscape scales - from ecological subsection to land type association to Management Area - the Forests also have a very good ability to address many of the issues. This is because the patterns of land owned by National Forests include large blocks of relatively contiguous land. Examples include: providing regenerating young forests adjacent to mature forests; managing to maintain a variety of patch sizes; and providing habitat linkages or corridors; and providing a mix of forest cover types within the forest matrix. The challenge is understanding what configuration of patch sizes and distributions of forest types and ecosystem processes wildlife species require - there is less research at the larger landscape scales.

On the largest landscape scales, from international to ecological section the ability of the Forests to provide desired habitats may diminish for some habitats, but still be very good for others. For example, the National Forests may not have enough habitats to meet the all the needs of a species - or the Forests may have a significant amount of habitats that are lacking outside the Forests.

The ability to supply these services is also dependent on scale of time for which the public has a demand for those populations or habitats. For example, the Forests' ability to provide a large amount of white pine old growth forest habitat in the next ten years is limited, but across a 100 year planning horizon, the ability increases.

The Need for Change

Known Problems with Existing Direction

Management Area Direction

Wildlife objectives are identified, but not reflected in timber management outputs

With some exceptions, notably the aspen habitat conditions for deer and young forest for moose on the Superior, generally wildlife objectives are not explicit or measurable in the Forest Plan.

The wildlife direction favors popular game species such as deer, grouse, moose, and woodcock in the specific Management Area direction. Recent interest in ecosystem management and management for all species would call for a more balanced wildlife direction

.

No specific objectives exist to reforest areas to supply some distribution of all age classes of all forest types, yet this need is implied within the wildlife goals and objectives for both Forests. Protecting minimum viable populations is directed by wildlife indicator species.

The Chippewa's current Forest Plan does not identify specific habitat objectives related to older forests.

Direction to manage within the 40 acres limitation, unless a 60-day public review period is used, has resulted in small stand size that is not characteristic of the natural disturbance regimes that have driven the evolution of species native to the area.

In general the wildlife objectives do not address ecosystem-based management principles of promoting the natural structure, pattern, and connectivity of habitats or of looking at wildlife resources at landscape scales larger than the National Forests.

The variety of management tools (such as the variety of silvicultural methods) available to achieve wildlife objectives is limited.

Wildlife Management Activities

Construction and maintenance of the number of openings identified in the management practices for both Forests is now recognized as unrealistic. We do not have the ability to maintain this number of openings with the limited budgets available. Creating and maintaining openings may not be a cost-efficient or necessary practice while clearcutting continues to provide a shifting supply of temporary openings. There may be exceptions perhaps along the north shore of Lake Superior. This area is considered critical for migrating birds that do not fly across the lake and use openings for foraging.

The construction and maintenance of nest boxes is recognized as a replacement for cavity trees in decadent trees or snags. An ecosystem management approach would suggest we manage to replace these cavity trees in the future and limit our structures to the time periods and locations where we have not yet succeeded in replacing the cavity trees.

The need for the level of impoundments stated in the management practices for the Chippewa is no longer thought to be appropriate.

Management Indicator Species and Standards and Guidelines

Management direction in the existing Forest Plans is not always related to the ecological differences that are present on the landscape. For example, guidelines for some MIS on the Superior directs planting of tree species on sites that historically have not supported such tree species. Ecologically, these tree species are not adapted to locations MIS would indicate should have that type of habitat.

Ecological information has improved substantially since 1986 when the current Plans were approved and needs to be incorporated.

The two Forests used different criteria to select indicators. The Superior identified 34 indicator species and the Chippewa identified 14. Standards and guidelines vary between the two Forests when addressing similar wildlife needs in similar habitats. While there is an ecological basis for some of these differences, there is also an ecological basis for much closer coordination and consistency.

Need and Opportunities for the Forests to Establish or Change Management Direction

It is apparent that there is a need to change management direction to: more clearly define ecosystem management objectives for wildlife; emphasize communities and ecosystems not just individual species; manage wildlife habitat with consideration for wildlife's needs across landscapes larger than the National Forests; and to incorporate increased scientific understanding of wildlife; and address the changed variety of public demands for wildlife habitat.

Because every acre of the National Forests is wildlife habitat and therefore is affected by any forest management, Forest Plan revision provides the most appropriate context within which to address wildlife resource issues.

Assessment of Ability to Resolve Issues and Concerns Through Planning Process

The ability of the National Forests to resolve issues and concerns through the planning process varies by the issue and by the scale and time for which the public may have a concern over the issue. As long as biological diversity is maintained or enhanced through Forest management activities, determining the balance of desired wildlife habitats and populations is based on what the public wants. Because there are conflicting desires for habitat conditions the planning process is unlikely to resolve everyone's issue and concern. But the process does provide a systematic means to garner and consider the wide range of views in the formulation of new or revised

management direction. It also offers the chance to resolve, or at least reduce the intensity of, some wildlife related issues.

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Timber Management

Introduction

Allowable sale quantity (ASQ) is defined as the maximum amount of chargeable timber volume that can be sold from a plan area over a ten-year planning period. "Chargeable" pertains to the timber volume that has been included in the growth and yield projections on suitable timberland used for the calculation of the ASQ. A "plan area" is the forest. Each forest plan that provides for a timber sale program must establish an ASQ. ASQ is a ceiling for a ten-year planning period that may not be exceeded. It is not a future sale level projection nor target, and does not reflect all of the factors that may influence future sale levels.

Opinions vary greatly on what the ASQ should be for any given forest, or how it should be determined. The range includes setting the ASQ at the maximum sustainable harvest level calculated at biological potential to no timber harvest on national forest lands, or an ASQ of zero. Although ASQ is defined as a ceiling, it has often been perceived as a firm target to be met, even at the expense of other resources.

Forest Plan ASQs were calculated from on-the-ground inventories of standing trees using FORPLAN, a linear programming model, and timber growth and yield models. Total volume is then estimated by multiplying acres by predicted yield per acre in units of cubic feet and converted to millions of board feet.

The National Forest Management Act requires that ASQ be calculated as a non-declining flow of timber over time, unless a conscious decision is made by the Regional Forester to select a departure schedule with higher volumes in early years, and decreasing volumes over time. Some believe the Forest Service should shift its ASQ focus from volume harvested to acres managed/sold.

National Forests in Minnesota have been unable to offer timber for sale at the forest plan projected ASQ levels over the past few years. However, between 1986 and 1991, forests provided local communities with greater than average ASQ (Chippewa & Superior National Forest Plan Five-year Reviews). Timber industry expansion in Minnesota, increasing demand for standing wood, and increasing stumpage prices have surpassed what was projected when the 1986 forest plans were prepared. ASQ levels need to be recalculated to reflect those new conditions - forest plan standards and guidelines, national direction on ecosystem management, and other stewardship responsibilities of national forest land managers.

This issue is appropriately addressed during revision because there is potential for significant changes to ASQ on each forest. USDA Forest Service regulations 36 Code of Federal Regulation 219 require either a significant amendment or revision if there is a proposal to make changes that are significant (36 Code of Federal Registration 219).

In addition, ASQ is directly affected by age class distributions and silvicultural management activities. A balanced age class of each forest type that is scheduled for harvesting will provide an even flow of forest products. Harvest volumes are related to the silvicultural method used, with even-aged methods providing more volume than uneven-aged methods on the same amount of acres.

Projection of Demand

Assessment of Forests' Ability to Supply Goods and Services

The following table depicts updated information for the Chippewa and Superior. The acreages not appropriate for timber management will vary by alternative identified for the revision of the Forest Plan, thus identifying the amount of suitable lands is not possible at this time. The figures shown for items 1 through 4 will generally not vary, regardless of alternative.

APP-A1 Current Land Status Acres on the Chippewa National Forest

	Chippewa National Forest	1986	*1998	Change () Indicates reductions
	Gross Acres		1,599,660	
1	Total Land Area (net)	661,161	666,166	5,005
2	Non-forest land and water	65,300	69,812	(4,512)
3	Legally withdrawn from timber production	9,514	8,731	(783)
4	Lands not physically suited (low site prod.,regen. limitations,etc)	34,089	78,808	44,719
5	Lands not cost efficient for timber production and managed for other emphasis: campgrounds, summer homes, admin. sites, TES species	73,226	27,606	(45,620)
6	Suitable for timber management	479,032		
	Tentatively Suitable for timber management		481,209	2,177

APP-A2 Current Land Status Acres on the Superior National Forest

	Superior National Forest	1986	*1998	Change () indicates reductions
	Gross Acres		4,218,442	
1	Total Land Area (net)	2,134,992	2,171,326	36,334
2	Non-forest land and water	31,630	74,337	42,707
3	Legally withdrawn from timber production	**750,183	856,503	106,320
4	Lands not physically suited (Low site prod.,regen. limitations,etc)	142,447	163,523	21,076
5	Lands not cost efficient for timber production and managed for other emphasis: campgrounds, summer homes, admin. sites, TES species	565,697	116,390	(449,307)
8	Suitable for timber management	645,035		

APP-A2 Current Land Status Acres on the Superior National Forest				
	Superior National Forest	**1986**	***1998**	**Change () indicates reductions**
	Tentatively Suitable for timber management		960,573	315,538
* 1998 figures reflect more accurate acre determination using GIS ** This figure was incorrect in 1986 and should have included approximately 50,000 acres more of Wilderness				

An Assessment of the Demand for Goods and Services from the Forest

The following information is from *Timber Demand Analysis, Final Report*, prepared by Laurence H. Reeves on October 21, 1997. Several macro trends influence timber demand: robust economic growth, population growth, and recycling programs. The economy of the mid-1990s has been one of fairly robust growth, and is expected to increase at a rate of 2 to 3 percent for the next 50 years.

In addition, population growth, including net immigration, is increasing at roughly 1 percent annually. Combining these two factors, along with housing trends that include larger homes, it seems likely lumber and panel demand will continue to increase into the 21st century to build new homes and repair older homes. This does not include other uses for lumber, such as manufacturing and shipping. The popularity of community recycling programs, however, has in part contributed to a slower growth in pulpwood demand than what was predicted in the 1989 Resource Planning Act (RPA) Timber Assessment.

According to the 1993 Resource Planning Act Timber Assessment Update, lumber consumption and production will increase into 2040. In the North-central region, hardwood lumber production is expected to decrease slightly, and softwood lumber production is expected to double between 1990 and 2000, and then remain at 2000 levels through 2040, with wastepaper becoming an increasingly important source of wood fiber, up from 27 percent of total wood fiber used in 1991 to an estimated 44 percent in 2040.

In Minnesota, the pulpwood sector of the timber industry will have the most impact on future timber demand since over three-quarters of the timber harvested in Minnesota is for pulpwood. For pulpwood, statewide production and receipts have decreased slightly since peaking in 1994, but there is nothing to indicate this trend will continue. Pulpwood production and demand are expected to stay constant at roughly three million cords annually through this decade. Mill expansions may increase demand by up to 15 percent starting into 2000.

Sawtimber receipts between 1988 and 1990 have decreased, based on the DNR sawtimber survey. However, this data is old and the data points close together, and the national trend indicates an increase demand for lumber. Thus, the best guess is that demand will stay constant or increase. If an increase does occur, there is no indication that it will be drastic.

It should be noted that the predictions given in the 1993 *Resource Planning Act Timber Assessment Update* for lumber do not seem to represent the scenario in Minnesota. In Minnesota, demand for hardwood sawtimber will be greater than the demand for softwood sawtimber through 2000.

Under these scenarios, the State's total timber demand should stay between 3.8 (current level) and 4.3 million cords through the year 2000, possibly through 2005, baring any major shifts in pulpmill technology. Fuelwood demand is likely to continue declining at a slow pace through 2000, but should eventually level off.

Pulpwood and sawtimber prices have generally stabilized or decreased slightly since peaking in 1995. While prices will not fall to pre-1993 levels, it seems likely pulpwood prices will not exceed 1995 levels until 2000. The

exception to this is hardwood sawtimber prices, which have continued to increase into 1996, although at a slower rate than during the 1993-1995 price surge. Overall, sawtimber prices should continue to slowly increase (hardwood more than softwood) into 2000.

The Need for Change

Known Problems with Existing Direction

Both forests are experiencing difficulty achieving the desired sell levels. The Land and Resource Management Plan standards and guidelines direct the size and adjacency requirements of harvest blocks. This factor, coupled with the standards and guidelines direction for wildlife habitat, were not analyzed with the FORPLAN linear program used to set the ASQ. Lower than projected volumes per acre have further contributed to an inability to achieve the ASQ. These lower volumes are thought to be related to the natural senescence of older stands, mortality from insect epidemics (forest tent caterpillar and eastern spruce budworm), and wind events.

Clearcutting has been an issue for years. Current direction in the "Draft 1995 Resource Planning Act Program" indicates the amount of clearcutting will be reduced. Both existing forest plans scheduled clearcutting and other even-aged management practices. Two-aged and uneven-aged management were not selected for scheduling when calculating the amount of volume to be harvested.

Direction was given in 1992 (Chief Robertson memo) to manage natural resources using an ecological approach to create diverse, healthy, productive, and sustainable ecosystems. There is a need to change to incorporate this direction in revised Forest Plans

There is a need to address the problems with timber sale outputs and to re-look at harvest methods.
The land suitability classification is required to be reviewed and if changes in classification occur, it will directly relate to changes in ASQ.

New computer analysis technologies are available to address management using spatial considerations and advances have been made in calculating growth and yield information. The Washington Office Service Center in Ft. Collins, Colorado recommends using the Forest Vegetation Simulator (FVS) for developing growth and yield figures for planning.

Spatial models are available that will disaggregate the analysis areas into mapped polygons in Geographic Information Systems. Other modeling alternatives exist that include spatial concerns in the analysis phase that handles scheduling, goal attainment and economics. These new technologies should improve the calculations of ASQ and allow ties to the existing inventory that will assist land managers in implementing the management plans.

Assessment of the Ability to Resolve Issues and Concerns Through the Planning Process

The issue for ASQ is tied to how much timber volume is harvested from these two national forests. Actual annual timber sell volumes are determined through the Federal budget process at the national level. The dollars required to prepare timber sales are divided between the various Regions of the Forest Service along with the target sell volumes. The Regions allocate their dollars and volume targets to each Forest limited by the ASQ values determined for each forest.

ASQ is not a target. The sell volume target is determined each year for each forest through the budget process. Normally, the budget is proposed by the Executive branch and approved by Congress. Occasionally, the Judicial branch has also been involved with setting timber sell levels for given years.

Another issue is the silvicultural method used to harvest the timber. Clearcutting, and to some extent the other even-aged harvest methods, are controversial. Economics vary by harvest method/objective (generally favoring clearcutting and aspen management) and add to the controversy. The issues of Forest age-class distribution, uneven-aged versus even-aged prescriptions, and timber supply will be analyzed in the draft environmental assessment that will be prepared for the Forest Plans.

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Fire Management

Introduction

Fire management is defined as all activities required for the protection of wildland values from fire, and the use of fire to meet land management goals and objectives (US Forest Service Manual 5100). The three components of fire management are: 1) Fire prevention (elimination or reduction of unwanted human caused fires); 2) Wildfire suppression (confinement, containment or control of unwanted fires); and 3) Prescribed fire (fire used for specific resource objectives) (Prescribed Fire and Fire Effects Working Group of the National Wildfire Coordinating Group, 1996).

Past emphasis on fire prevention and vigorous fire suppression at all costs has limited the use of fire as a management tool; and it is now time to define the appropriate role of fire as an ecological process and agent of change. Arriving at such a policy requires an understanding of historic fire frequency; intensity and severity of fires (known collectively as "fire regimes"); size and patterns of fires; and the relationship of fire to other natural disturbances such as floods, wind, insects and disease. Implementing a policy, which would increase the acreage treated with prescribed fire substantially, requires protective measures for public safety, facilities and property, air and water quality, and soil productivity. A part of the analysis for such a program would compare the costs and risks to ecosystem health, and the public welfare of not implementing the policy.

In Minnesota, the short interval fire-adapted species like red and white pine had an average fire return interval of 22 years in Itasca State Park (Frissell, 1971). In the Boundary Waters Canoe Area Wilderness, a natural fire rotation of 50-100 years was documented by Heinselman, with more frequent, low intensity surface fires in the red and white pine (25 years), and less frequent, high intensity surface and crown fires occurring in jack pine and spruce-fir types (50-80 years) (Heinselman, 1973).

Changes in the historical fire regimes in these ecosystems today have produced live and dead fuel buildups in the understory of the red and white pine. In addition, little natural regeneration is occurring in these stands due to lack of disturbance. Jack pine in the Boundary Waters Canoe Area Wilderness is expected to decline as well without fire. At the same time, increases in the spruce-fir type has led to increased frequency of spruce budworm epidemics which, in turn, produces an increased fuel hazard from the bug-killed trees (Stocks, 1985). Effects of lack of fire on wildlife are also of concern. Probably one of the most dramatic examples is the decline of sharptail grouse as a result of fire exclusion from the grassland-brushland ecosystems of the Minnesota, as documented by Berg (1979).

The northern and eastern part of the Superior, including the Boundary Waters Canoe Area Wilderness, tend to be more droughty due to the shallow soils, and can have a significant summer fire problem if rainfall is below normal. Vegetation in this area tends to be more boreal with a higher component of spruce-fir. Re-occurring spruce budworm outbreaks help create large amounts of dead woody fuel, which is compounded by windthrow from thunderstorm microbursts on a regular basis. This fuel complex has helped produce several large, high intensity wildfires in the last few years (Superior National Forest, 1996).

Timber harvest, followed by post sale prescribed burning, has been useful in treating this fuel complex outside the Boundary Waters Canoe Area Wilderness. Within the Boundary Waters Canoe Area Wilderness, prescribed natural fire is just beginning to help breakup the somewhat homogenous age class and vegetation types which have been conducive to spruce budworm outbreaks.

The net effect of the alteration of historic fire return intervals has increased fuel accumulations above historic

levels over large, continuous areas. The possible consequences include:

- Increased risk of large, severe fires
- Increased risk of losing key components that define ecosystems
- Increased risk of serious injury or loss of life to firefighters and the general public
- Increased risk of health effects due to smoke and visibility impairment
- Increased risk of property loss and damage to landscapes that have economic value to people
- Increased fire suppression costs

Fire Management is an appropriate issue for revision because changes in national fire management policy, based on advances in the field of ecology, directs that "fire, as a critical natural process, will be integrated in land and resource management plans and activities on a landscape scale" (USDA and USDI 1995).

Projection of Demand

Assessment of the Demands for Goods and Services from the Forests

Timber harvest creates disturbance and affects fuel loading. However, there are indications, such as increased fuel loading, that more disturbance or fuel treatment can or should occur. Large catastrophic fires nationally have highlighted the need for fuel reduction.

The wildland urban interface, as well as fuel loading, has increased. These two factors combined have increased the demand for fire suppression and fuel treatment. They have also increased risk levels, increased complexity of suppression, and increased the need for interagency coordination and cooperation.

Assessment of the Forests' Capacity to Supply (Produce) Goods and Services

Fire suppression resources are shrinking but still provide needed services. Nationally, a shift is starting and expected to continue into the future, that more resources are invested up-front in fuel treatment, resulting in less suppression resources needed in the future. In addition, fire fighter safety has received number one priority.

Forest Service knowledge of fire regimes and effects of fire exclusion has increased. This has prompted national direction and policy to reduce fuels and to incorporate fire into ecosystem management. Public comments indicate a desire for more prescribed fire and alternative silvicultural practices to clearcutting.

Need for Change

The 1986 Forest Plans were not formulated with the knowledge and understanding of fire's role as a critical ecosystem process. The process used to define an appropriate and achievable Desired Future Condition for the two Forests must be based on an understanding of fire's role, patterns of spatial and temporal distribution, and effects on other ecosystem processes and components.

For example, large acreages on both Forests are not suitable for timber harvest so no management activities occur. Currently, with the exception of the riverine sedge meadow wetland restoration projects on the Chippewa, these areas have not been addressed to determine if fire was an important ecosystem process, and if it should be reintroduced. Forests could increase the use of prescribed fire during the next planning period to accomplish fuel hazard reduction and ecosystem management resource objectives

Known Problems with Existing Forest Plan Direction

Prescribed fire/fuels and wildfire suppression are not adequately addressed by the plans. Fire suppression activities and techniques are similar for both. The following addresses wildfire and prescribed fire/fuel separately but there is considerable overlap. The intent is that both sections mesh. General Forest-wide direction for fire needs to be developed and then be more specific for wildfire and prescribed fire/fuels fuels, where appropriate.

Wildfire Suppression

The Plans need to be updated to reflect current National Policy:

a) The protection of human life is the highest priority. This is a change from former policy that states, "Lives and property will have priority". Implementation of the new policy would require the development of strategies for the protection of property and natural/cultural resources.

b) Fuels need to be managed to reduce the potential (and cost) of large wildfires. Since the Forests were formed, fire suppression has reduced the acreage that would have burned naturally. Fire exclusion has resulted in unnatural fuels buildups that may lead to large high intensity fires. The plans do not provide direction on how to assess and manage fuel hazard.

c) There needs to be a stronger link between the Forest Plans and fire planning. Forest Plans do not adequately incorporate wildfire management issues so there is little or no direction for development of Fire Management Action Plans and Wildland Fire Situation Analysis.

d) Fire suppression costs ideally should not exceed the value of the resources to be protected.

The direction in the Forest Plans varies. The amount of detail varies. Standards and guidelines are lacking or are not adequate. One example concerns standards for fire line construction. Soil and visual impacts and cleanup standards are not addressed. A consistent approach is needed to encourage understanding by the public and from a tactical Minnesota Incident Command System perspective.

Fire protection strategies for urban interface are not addressed. During the last 10 years, there has been significant development of residential and seasonal dwellings in the forests. Should these areas be identified? What should be considered interface? What is the appropriate response in these areas? What responsibility do residents have who build in these areas?

Management direction for individual or groupings of management areas needs to be improved. Depending on historic fire frequency, forest types, and site factors, there is potential for developing specific management area strategies. In addition, direction needs to be provided for old growth, Research Natural Areas, urban/interface, etc.

Prescribed Fire/Fuels Management

The plans need to reflect current national policy:

a) Mimic natural fire regimes
b) Reduce fuels to avoid catastrophic fires
c) Identify fire dependant ecosystems
d) Be proactive versus reactive.

The role of fire in the ecosystem is not addressed, and management areas do not reflect ecological boundaries/fire regimes. The goals/objectives/outputs for fire are not based on ecology. The application of silvicultural treatments does not consider disturbance regimes such as fire. Adequate monitoring of the effects of prescribed

fire on the ecosystem has not occurred.

Prescribed natural fire is only allowed in the wilderness but may be appropriate in other areas. For example, prescribed natural fire may be needed in areas that do not receive other types of treatment or along the periphery of the wilderness.

Standards and guidelines are absent; they need to be improved or may be not be appropriate. Clarification of the policy that states that activities will not adversely affect soil productivity is needed. The Superior Plan excludes fire from specific ecological land types when used as a silvicultural tool. How is this interpreted in the context of fire in the ecosystem? Natural fire burned these sites and impacted site productivity. Should sites be protected from adverse fire impacts?

Assessment of Need and Opportunity to Change Management Direction

As described under "Known problems with existing direction", there is a well-documented need for the forests to change current management direction. The need for change is particularly evident if the Forests are to accomplish the following: 1) ecosystem management that includes natural disturbance or fire regimes, 2) implementation of standards and guidelines that make desired changes happen and 3) meet national direction to incorporate fire into forest planning.

An Assessment of the Ability to Resolve Issues and Concerns through the Planning Process

Issues about the role of fire and natural disturbance regimes are broad in scope and best addressed at a forest level. Allocation of resources and determination of outputs such as fuel reduction acres, are also best decided through the forest plan. The issues relating to fire are intertwined with other resources and issues and so cannot be addressed separately.

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Fish Habitat Management

Introduction

Fish habitat management is defined by the USDA Forest Service as managing habitat to maintain, at the least, viable populations of all existing native and desired non-native fish species. Habitat goals for fish species are to be established and implemented through the Forest planning process (Forest Service Manual 2601.2.)

Programmatic goals for managing fish habitat were not defined, and very few habitat protection measures were included in the Forests' 1986 Forest Land and Resource Management Plans (Forest Plans). Both Forests deferred fish habitat management until professional expertise could be added for program development.

The 36 Code of Federal Regulations (CFR) governing management of the National Forests direct the agency to maintain diverse and productive fish and wildlife habitats as an integral part of managing National Forest ecosystems. At the National Forest level, aquatic systems are managed in partnership with state natural resource agencies and Native American tribes. States manage fish and other aquatic organisms and regulate their harvest, while National Forests manage aquatic habitats and provide public access to lakes and streams on National Forest lands.

Without clearly defined goals and objectives in Forest Plans, fish habitat may not receive adequate consideration in the planning and implementation of forest management activities. These activities include road construction and maintenance, timber harvest, recreation management and water access, and wildlife impoundment construction and maintenance.

Fish habitat goals and objectives are also needed to provide direction for restoring and improving fish habitats degraded by past land management activities, especially historic logging activities, which often resulted in damming and clearing of logs, limbs and rocks from streams for log-driving activities. These activities are believed to have resulted in a great simplification of aquatic habitats. Many streams on the Chippewa and Superior National Forests were used for log driving, and many display characteristics of habitat simplification.

The Minnesota National Forests are especially water-rich, providing over 32 percent of the total water found within the National Forest System. Lakes, streams, and wetlands within the Chippewa and Superior National Forests provide habitat for 66 species of fish. Recreational fishing opportunities abound on the Chippewa and Superior National Forests, and provide the impetus for thousands of visitors annually.

This issue is important for Forest Plan revision because of:

- The magnitude of the resource – over 347,000 acres of lakes and 923 miles of streams on the Chippewa National Forest, and over 411,000 acres of lakes and 2,250 miles of streams on the Superior
- Providing and protecting fish habitat is closely tied to the issues of biodiversity, road management, riparian area management, silviculture techniques and allowable sale quantity (ASQ)
- The degree of public interest in providing and protecting fish habitat, as highlighted by a number of national policies and directives, which are discussed below

Projection of Demand

Assessment of the Demand for Goods and Services from the Forests

The current demand for fish habitat-related goods and services from both National Forests is high and is expected to increase. This is well exemplified by trends in recreational fishing. The number of anglers in the U.S. rose by 20 percent during the decade from 1980 to 1990 (USFWS, 1993). Over 14 percent of all freshwater fishing in the 50 states that took place in 1991 occurred in the three states of Minnesota, Michigan and Wisconsin. Minnesota has about 1.5 million resident anglers (38 percent of the states' population) and about 734,000 non-resident anglers. Anglers' expenditures in Minnesota totaled about 457 million dollars in 1991. In terms of both quantity and quality, the Chippewa National Forests' 1,321 lakes and 924 miles of streams and the Superior National Forests' 1,977 lakes and 2,250+ miles of streams are an extremely significant source of fishing opportunities in Minnesota. In combination, the two National Forests encompass over 50 percent of the total miles of trout stream in Minnesota.

Assessment of the Forests' Capacity to Supply (Produce) Goods and Services

Vast acreages of lakes, streams, and wetlands cover both the Chippewa and Superior National Forests. On the Chippewa, there are over 347,000 acres of fishable lakes and 923 miles of streams. The Superior encompasses over 411,000 acres of fishable lakes and 2,250 miles of streams. Combined, the two National Forests provide over 32 percent of the total water found within the National Forest System. Thirty-percent of all Minnesota lakes over 10 acres in size and 50 percent of all Minnesota trout streams are found within the boundaries of these forests.

Sixty-six species of fish can be found within the waters of the Minnesota National Forests. On the Chippewa, these waters range from eutrophic to oligotrophic, and provide habitat for a variety of warm- and cool-water fish species, including panfish, black basses, walleye, northern pike, and muskellunge. Three of the State's largest lakes are found within the Chippewa National Forest, providing exceptional walleye and muskellunge fishing (Chippewa National Forest Final Environmental Impact Statement, 1986). Past and present stocking programs have increased the distribution and enhanced populations of game fish species in many lakes. However, unlike the Superior, the geology and hydrology of the Chippewa is not conducive to cold-water species, and less than one percent of the lakes and streams are stocked and managed for trout species.

Waters of the Superior National Forest tend to be soft, chemically infertile, and biologically less productive than the Chippewa's. Lakes and streams with low alkalinity and soft water have lower buffering capacity and an increased susceptibility to changes in pH. In these soft water lakes, acid rain and its effects on aquatic biota are of concern to land managers. Atmospheric deposition of mercury in lakes and rivers, and its accumulation in fish tissues, are also of concern on both the Chippewa and Superior National Forests. Fish consumption advisories, which are issued by the Minnesota Department of Health, are in place for many Forest lakes.

Nearly 12 percent of the Superior National Forest is covered by lakes and streams, which provide quality-fishing opportunities for warm- and cool-water species. In fact, the Forest contains the largest group of quality lake trout waters in the contiguous United States (Superior National Forest Final Environmental Impact Statement, 1986). In addition, 32 percent of the lake acres and 46 percent of the stream miles within the Superior National Forest are managed for inland trout species. Stocking above barrier falls has increased the distribution of brook trout in many streams along the North Shore of Lake Superior; and those streams that provide marginal trout habitat have been stocked with brown trout. In addition, some larger tributaries to Lake Superior have been stocked with steelhead and chinook salmon (DNR 1989).

Need for Change

Known Problems with the Existing Direction or Situation

The Chippewa and Superior National Forest Plans lack goals and objectives for managing fish habitat. Goals and objectives are needed in order to fulfill the earlier described national directives and as a basis for prescribing habitat manipulation (improvement). While fish habitat improvement projects under current Plans have improved fish habitats at specific locations, a long-term vision and strategies for fish habitat improvement are warranted for both National Forests.

The setting of goals and objectives for fish habitat should be founded in our understanding of the natural capabilities and limitations of aquatic ecosystems. Aquatic habitat inventory data and associated classification of aquatic systems on the two Forests is inadequate to fully characterize these capabilities. However, where available, limited knowledge of historical conditions (such as whether or not streams ever supported native trout) or influences (such as the impacts of turn-of-the-century log drives on streams) can be used to help set reasonable goals.

Goals for managing fish habitat are also needed as a basis for establishing a clear working relationship with our fish resource management partners (DNR and Tribal). Current Forest Plans do not adequately recognize Tribal involvement in cooperatively managing fish resources, including their authority to regulate Tribal member commercial and subsistence fishing harvest, or their role in fish population assessments, enforcement activities, and water quality monitoring.

Current Forest Plans do not provide adequate direction for integrating the protection and improvement of fish habitat with other resources. An assessment of fish resources in a whole watershed context is needed to meet the Forest Service Natural Resource Agenda. Because of the critical link between riparian area condition and the quality of fish habitat, problems with current riparian area direction (inconsistent definition and management direction) need to be addressed.

While current Forest Plan standards and guidelines, including State of Minnesota Best Management Practices, are important in protecting the quality of water in which fish reside, they do not provide enough direction for proactive management, or protection, of fish habitat. For example, while filter strips along lakes and streams limit the amount of mineral soil exposed along water bodies, they do not limit vegetation removal. Vegetation is crucial to providing in-stream and in-lake structure (or large woody debris), shade, decomposing leaf litter, and bank stability.

Monitoring of fish habitat, more specifically the selection of management indicators for fish/fish Management Indicator Species, needs to be re-examined on both Forests. Specific data regarding the status and abundance of Management Indicator Species are difficult to obtain, and doubt exists whether the indicator species selected in current Forest Plans ("commonly fished" species) are representative of all aquatic communities or are adequate indicators of effects of management activities on aquatic habitat. There is need to consider the utility of other indicators (especially invertebrate species) in addition to, or in lieu of, existing Management Indicator Species. Tracking of aquatic community status may be needed in revised Plans to effectively monitor whether aquatic resources goals are being achieved.

As mentioned above, Forest Plans of the two Minnesota National Forests are not consistent in their management goals pertaining to fish and wildlife population viability. There is no logical reason for the differences.

Current Plans fail to clearly state that Threatened or Endangered fish species have not been found on either Forest, or that R9 Sensitive species such as Pugnose Shiner (at four known locations on Chippewa National Forest; unknown on Superior National Forest) and Lake Sturgeon (possibly on Superior National Forest) have been

found. Current Plans also fail to address other aquatic communities or species of concern, such as native lake trout populations on the Superior.

There is need to re-think the current management guideline which excludes habitat management for beaver along all State Designated Trout Streams within the Superior National Forest. Recognizing that many "designated" reaches do not in fact support trout, there may be opportunities to refine this guideline, where actual supporting site level steam data is available, to allow management on some reaches for beaver or other resources that have in the past been viewed as incompatible with trout.

Current Forest Plans do not identify, or direct how to manage in response to, exotic aquatic species (i.e. purple loosestrife & rusty crayfish - here now; and Eurasian Water Milfoil & Zebra Mussel - potential threats).

Current Forest Plans do not identify or take into account effects of Forest Service or non-Forest Service shoreline development or in-lake (or in-stream) recreational uses on fish habitat. Considering these effects may result in changes in guidelines on National Forest land for three related resource areas:

- Land Adjustment - Better understanding of these effects may lead to direction designed to maintain or improve the National Forest role in providing undeveloped shoreline.
- Management of shoreline special uses - Improved direction may be needed on monitoring and administering FS shoreline special use permit sites to address threats to fish habitat such as leaky fuel tanks, inadequate septic systems, and inappropriate removal of shoreline vegetation.
- Providing lake and stream access - Improved understanding of aquatic system capabilities (e.g., fish productivity or sensitivity to changes in water quality) on individual lakes and streams contributes to re-evaluation of the types and distribution of Forest Service-provided water access across both National Forests.

Current Forest Plans do not identify research questions that need to be addressed to more fully understand aquatic resources. Potential aquatic research topics may include: groundwater protection (i.e. springs, seeps) and its importance to aquatic resources and the effects of watershed condition on aquatic resources.

The current Chippewa Forest Plan allows for stabilization of eroding National Forest shoreline on artificially regulated lakes only in cases where National Forest or private developments are threatened by lakeshore or stream bank recession. This severely hampers protection of fish habitat, particularly on the large Mississippi Headwaters reservoirs (Cass, Winnibigosish and Leech Lakes) where shoreline erosion measured in units of miles continues to degrade fish habitat through sediment deposition. The current guideline needs to be changed to encourage, rather than restrict, shoreline stabilization wherever doing so will protect or enhance fish habitat.

Assessment of Need and Opportunity to Change Management Direction and the Ability to Resolve Issues and Concerns through the Planning Process

Forest Plan revision presents a prime opportunity to integrate goals and objectives to meet the demands placed on fish habitats with demands placed on other resources in the National Forests of Minnesota. Recently improved (though still very limited) understanding of natural capabilities of, and historical influences on, aquatic ecosystems can be used as a basis for developing goals and objectives that are ecologically sustainable and reasonably achievable.

- *Riparian management* - Riparian areas provide habitat components which are essential for fish production and protection (for example large woody debris, bank stability, leaf litter inputs and shade)
- *Road management* - Road construction and maintenance can have lasting impacts on fish habitat. Stream crossings have the potential to degrade fish habitat through increased sedimentation and blockage of fish passage to preferred habitats.
- *Biodiversity* - This is of concern to aquatic, as well as terrestrial, communities. Across the nation, the

diversity of aquatic species is diminishing in lakes and streams, as degraded habitats support an increasingly limited number of species.

The strong public involvement component associated with Plan revision presents a particularly good opportunity for the Minnesota National Forests and its principal partners in fish resource management (DNR and Tribal) to help identify and clarify their respective roles, and develop fish habitat management goals and objectives for the National Forests that are reasonably well supported.

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Old Growth

Introduction

Old growth is generally defined as a forest that developed relatively free from catastrophic (stand replacement) disturbances over a long period. A variety of specific definitions of old growth exists, incorporating differing emphases on various old growth values, species, ages, and disturbance regimes. Part of the issue pertains to selection of a definition of old growth appropriate for Forest Plan revision, and associated values and management activities.

Values of old growth forests include scientific and educational values, as well as aesthetic, recreational, spiritual, economic, and cultural values. Old growth forests provide opportunities to develop baseline knowledge for monitoring and ecological study, and provide a major contribution to biological diversity. Old growth forests provide special habitats for native plants, and important habitat features for wildlife (Green 1995, Juday 1988, Rusterholz 1989, Vora, 1994; USDA Forest Service, 1995).

Old growth forests are a part of a range of forest seral stages and successional processes. Very little old growth forest remains in Minnesota and the Lake States region. There is currently about 1.1% as much primary forests (those that have never been logged) in the Lakes States as there were prior to European settlement (Frelich and Reich, 1996).

Much of the northern coniferous forest is in transition from its pre-settlement status. Marked changes in the species composition and age structure of forest communities have occurred (Tester, 1995). While some people advocate providing existing and future old growth forest communities, others are concerned for reductions in timber production that may result from old growth designation, development, and management.

Old growth is an appropriate issue for revision because allocating how much of a resource is needed and where and how it should be managed, is a primary purpose of Forest Plans. In addition, the social and ecological issue of defining and designating old growth is closely related to other Forest Plan revision issues, including biodiversity, habitat fragmentation, age class distribution, allowable sale quantity and fire management.

Current Management

National Direction

The National Forest Management Act (NFMA) and forest planning regulations, on which the Forest Plans were based, provide no specific direction concerning old growth forest management. Forest Plans that incorporate old growth planning do so primarily in response to the need to fulfill NFMA, and planning regulation requirements to provide habitat contributing to plant and animal diversity (Tyrrell 1996).

Many definitions for old growth exist, incorporating a variety of viewpoints and treatment of associated issues. At a national level, the USDA Forest Service is utilizing a broad definition for old growth: "Old growth forests are ecosystems distinguished by old trees and related structural attributes. Old growth encompasses the later stages of stand development that typically differ from earlier stages in a variety of characteristics, which may include tree size; accumulations of large, dead, woody material; a number of canopy layers; species composition; and ecosystem function" (Delfs 1993). Under this definition, some maturing second growth forests could be included, if allowed to approach old growth conditions through appropriate management direction (USDA Forest

Service 1995).

Current Forest Plan Direction

Chippewa National Forest

The 1986 Chippewa National Forest Plan (USDA Forest Service 1986) defines old growth as any forested stand that is beyond Forest Plan rotation age. Under this plan, forest stands may be harvested after they attain old growth rotation age, which is generally about 1-1/2 times normal Forest Plan rotation length. Old growth designated in the Opportunity Area planning process, an implementation phase of the 1986 Forest Plan, resulted in designation of a variety of forest types, including both early and late successional species, mostly distributed as small, isolated stands. A total of 25,000 acres (4% of forested land base) were designated as old growth.

Two reports were authored by an interdisciplinary team, with limited public involvement: "Old Growth" (USDA Forest Service, 1991), and "Old Growth Report No. 2: Candidate Old Growth Complexes" (USDA Forest Service, 1993). Recommendations from these reports included conducting an inventory of stands potentially and currently exhibiting ecological old growth conditions, using MN DNR methodology (Rusterholz, 1996). This inventory was completed for red pine, white pine, lowland hardwoods, and upland northern hardwoods. The analysis for this inventory was completed in November 1995. Thirty-five hundred (3,500) acres (83 stands) are now numerically ranked and awaiting decision regarding future management status.

The reports recommend revising the 1986 Forest Plan old growth definition to focus on long-lived species, and exclude timber commodity production. The reports developed the old growth "complex" concept, intended to provide larger patches of old growth distributed on a landscape scale. Over 70 complexes were proposed, ranging in size from 100-6,000 acres. A total of approximately 36,000 acres (6.5% of forested land base) were proposed. The intent, while these reports were being developed, was to amend the Forest Plan. Full public involvement on the issue was postponed, pending the Forest Plan revision process.

Superior National Forest

With the exception of fire management, the BWCAW is not a topic of Forest Plan revision efforts, although the associated environmental analysis will likely include consideration of the area's contribution towards old growth values. Outside the BWCAW, the 1986 Superior National Forest Plan (USDA Forest Service, 1986) provides old growth values through a focus on standards/guidelines for plant and animal indicator species that use mature and old-aged forests. Indicator species are plants and animals selected to represent community and habitat conditions that USDA Forest Service management activities may affect. The indicator species concept is based on the premise that population levels of selected species serve as an indication of change in availability of a habitat type or condition.

The 1986 Forest Plan generally defined mature and old-aged forests as those exceeding 40-years old (Final Environmental Impact Statement, Superior National Forest, 1986; p. B-22). Application of the cumulative standards/guidelines for indicator species results in direction that about 186,000 acres occur in a "mature" condition (approximately 16% of forested land base), and includes all forest types (early and late successional species). Harvest activities are permitted within old-age/mature forests under the 1986 Forest Plan. Distribution or location of mature forests, as well as quantity, is a feature in some indicator species' standards/guidelines.

In 1992, the Superior convened an old growth team to review this issue on the Forest. The team developed definitions for three categories of mature forests (USDA Forest Service, 1992):

> *Old Growth*: Ecosystems consisting of long-lived or late successional species with old growth characteristics (i.e., large snags, coarse woody debris, canopy layers, gaps, tree sizes). Minimum age for most forest types was set as 100 years; white/red pine was 120 years.

Old Forest: Ecosystems consisting of short-lived or early successional species grown to an old age on an extended rotation with old growth characteristics. Minimum ages varied from 55 years for aspen to 60 years for jack pine, balsam fir, and paper birch.

Future Old Growth: Comprised of long-lived species grown to eventually replace current old growth, or provide old growth where it does not currently exist. These stands are developing many old growth characteristics, and have minimum ages ranging from 50 years for upland black spruce, to 70 years for white/red pine.

The current Forest Plan does not provide for old growth as newly defined by the 1992 Old Growth Report, except as it occurs in wilderness, Research Natural Areas, and selected river corridors and lakeside riparian zones. For all forest types external to BWCAW, the team reviewed how existing forest conditions might provide for the new definitions. Approximately 100,000 acres (9% of forested land base) would meet the minimum age criteria for old growth; about 75% of this occurs in lowland types. Approximately 460,000 acres (39% of forested land base) would meet the minimum age criteria for old forest; about 200,000 acres (17% of forested land base) would meet minimum age criteria for future old growth. This assessment of forest conditions was independent of location; hence, distribution of old growth/old forest on a forest-wide basis is not indicated.

Somewhat similar to the Chippewa, an inventory of stands potentially currently exhibiting old growth characteristics is underway, using MN DNR methodology. Only red/white pine is being inventoried, amounting to approximately 28,000 acres. This inventory is about 50% completed. No harvest will occur until old growth is comprehensively considered through the Forest Plan revision.

Expected Future Conditions under Current Management

In applying 1986 Forest Plan standards for indicator species to the 1992 old growth definitions, it is apparent that ample old growth and old forest acres are present to meet current Forest Plan quantitative standards, with the exception of red and white pine, and white spruce types. This shortcoming was to be addressed on an individual project basis, as projects are developed. In general terms, this has resulted in no harvest of red/white pine or white spruce qualifying for old growth age criteria, until the Forest Plan revision comprehensively considers the old growth issue.

Many of the stands meeting existing old growth criteria, and others that have high potential for meeting these criteria in the not too distant future, would be available for timber management activities. Therefore, the pool of stands with old growth potential could be reduced, perhaps substantially.

Need for Change

Known Problems with the Existing Direction or Situation

Neither Forest Plan addresses old growth issues as they are defined today. The Chippewa Forest Plan addresses old growth as any designated stand beyond Forest Plan rotation age. Once reaching the designated age, these stands can be harvested (USDA Forest Service, 1986). The Superior Forest Plan jointly addresses old forest and mature ages in managing large blocks to benefit wildlife indicator species (USDA Forest Service, 1986).

The Chippewa and Superior National Forest old growth reports have provided interim management direction while awaiting Forest Plan revision. Application of this interim direction is variable, as administrative decisions derived without NEPA analyses are not considered to have the weight of those decisions incorporating full public involvement. The response of local administrative unit managers to stand condition and natural disturbance (i.e.,

wind, beaver flooding) within designated or proposed old growth stands is not consistent; and there appears to be confusion over the direction and intent of interim management guidelines. In addition, a decision regarding management direction for inventoried potential old growth stands has not yet been made, pending Forest Plan revision.

Assessment of the Ability to Resolve Issues and Concerns through the Planning Process

While some of the old growth issues can be considered more emotional than scientific, other issues such as definition, allocation and distribution can be resolved through planning. Defining and designating old growth is closely related to other Forest Plan revision issues, including biodiversity, habitat fragmentation, age class distribution, allowable sale quantity, and fire management.

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Rare Natural Resources

Introduction

Rare natural resources are plants, animals, and natural communities that are defined as threatened, endangered, sensitive, special concern, or very uncommon. Definitions and criteria for listing species and managing these species or communities come from law and policy at federal, tribal, state, and national forest levels.

Rare natural resources have been identified as a forest plan revision based on: increasing public concern over their management; increasing national emphasis on ecosystem management to balance existing single-species management emphasis; and availability of new inventories and scientific information on many of the National Forests' rare species and communities.

The issue for rare natural resources is how Minnesota National Forests should be managed so that rare species and natural communities will continue over time to exist in geographically well-distributed populations and patterns. This issue encompasses concerns about the adequacy and consistency of management direction in the current forest plans: are the national forests managed to a) restore, protect, and enhance rare natural resources while providing for other sustainable multiple uses of the forests and to b) prevent any need for listing species as federally threatened or endangered?

This issue is divided into three broad components:

1. Sensitive species identification
2. Rare species management
3. Rare natural communities

Specific concerns that apply to each of the three areas include:

- How to define and identify rare natural resources
- How to prioritize management
- How to determine appropriate levels of inventory, research, monitoring, and evaluation
- How to determine the role national forests should play in conservation of rare natural resources at different landscape scales
- How to improve collaborative management with other agencies and land owners
- What conservation management strategies to adopt; and whether a holistic ecosystem management approach could diminish the need to manage for individual species or rare natural communities

Projection of Demand

Public demand for the protection of rare natural resources is voiced at the national to local scale through many federal and state laws and national to local management policies.

At the national level, threatened and endangered species continue to be an important issue. The Endangered Species Act of 1973, currently up for reauthorization by Congress, is the subject of intense national debate over whether or how to reauthorize it. The draft 1995 Resource Planning Act (RPA) program highlights threatened and endangered species as a potentially serious resource situation. The official federal list of threatened and endangered plant and animal species continues to grow. Continuing declines in species populations will require significant measures to maintain unique species and their habitats, including reducing access to lands where

human activities are inconsistent with species recovery. It is also noted that these measures will greatly increase the costs of responsible land and resource management (USDA 1995a, Draft RPA Program).

Protecting biodiversity, including increasing efforts to protect sensitive species, is a priority management action for protecting ecosystems on the National Forests. Cooperative conservation strategies are emphasized through interagency, multi-species, and natural community approaches (USDA 1995a, Draft RPA Program). These actions will help to reduce the need for federal listing of species found on National Forest System lands.

On the regional level (roughly the northeast quarter of the United States), threatened, endangered, and sensitive species and communities continue to be an important issue.

In the Lake States (those bordering the Great Lakes), rare species and communities are a component of the biodiversity issue. The Northwoods Broad-scale Issue Identification Project (USDA 1995b) outlined some of the concerns. They are of special concern because of their inherent scarcity across the Lake States. A number of these species and communities are protected through a variety of special land or species designations. Many rare species and communities, however, are potentially at risk due to incomplete inventories. Frequently, information is unavailable on the range, location, life history, and ecological associations of these species and communities. This creates challenges when lands are under consideration for some form of management activity.

In Minnesota, rare natural resources and their management are important issues on at least four levels where the Minnesota National Forests share rare natural resources and there are opportunities for cooperative management: State of Minnesota; American Indian Tribes; Counties; and Canada.

State of Minnesota

Through laws, regulations, and policy the State of Minnesota has established priorities and strategies for protecting the State's biological diversity including rare natural resources. Among these are:

- More effectively integrate management of endangered species, native plant species, and natural communities with the resource management priorities among different departments within the MN Department of Natural Resources (MN DNR) and other units of government.
- Promote a philosophy of natural resource management that considers actions from an ecosystem perspective.
- Continue to inventory and research to promote recovery of endangered species and threatened natural communities.
- Expand activities to include protection and management of common native plants and natural communities before they become endangered.

To help promote protection of biodiversity, the State's Endangered Species Statute (MN Statutes 84.0895) gives legal clout to protection to of threatened and endangered species and mandated the establishment of an official State list of threatened, endangered, and special concern species. In addition to identifying rare species, the State also provides for protection rare natural communities. Scientific and Natural Areas may be designated to preserve both rare communities and high quality natural communities before they become rare.

The obligations of a federal agency are clearly defined with regard to federally listed species, but less well defined with regard to State listed species. However, there is general national direction to coordinate with State agencies to inventory, protect, manage, and plan for threatened, endangered, and sensitive species (Forest Service Manual 2670.32,.44-.46; 2671.1). In addition, the Forest Service is directed, when considering what species to place on the Region 9 sensitive species list, to examine State lists of endangered, rare, endemic, unique, or vanishing species, especially those listed as threatened under State law (2672.5). Except for federally listed species and migratory birds, the State of Minnesota has responsibility on National Forest lands for species populations, while

the National Forests have responsibility for habitat management on forest system lands.

The Minnesota National Forests have had a good working relationship with the State. Examples of coordination include:

- An ongoing Memorandum of Understanding (1/3/88) and Supplemental Agreements for cooperative wildlife management
- Cooperation between the Chippewa and the State in conducting "County Biological Survey" (the systematic survey of whole counties for the rare features they contain) on National Forest lands in Cass County
- Free interchange of information on rare features through the MN DNR Natural Heritage database
- State assistance in identifying appropriate methods of rare plant inventory
- National Forests' inclusion of State listed species during field inventory
- Jointly funded rare species and natural communities research programs on the Forests

Nevertheless, there is an opportunity to improve coordination. Given the similar ecosystem management goals and objectives of the State and National Forests, how can cooperative natural resource management be more fully integrated at the State landscape level to assure maintenance of biological diversity? Should the National Forests place a priority on managing for State species or for maintaining the natural range of variation in habitats across the land without emphasizing species?

American Indian Tribes

American Indian tribes, governments, and resource management agencies have direct interest in the management of National Forest lands. A number of partnerships and Memoranda of Understanding between tribes and the National Forests of Minnesota have been or are in the process of being developed. These provide opportunities to improve cooperative management between the tribes and the National Forests, including the management of rare natural resources

Through this coordination, certain plant and animal species of traditional importance and sensitivity may be identified and become the basis of a new listing of "species of concern," differing from those previously mentioned.

Counties

Federal law addressing threatened and endangered species and Minnesota law addressing State endangered and threatened species guide management on county land. The Minnesota National Forests share both their physical boundaries and rare species and natural communities with counties. There may be opportunities to enhance coordination for the benefit of rare natural resources.

Canada

The Superior National Forest shares its northern border with Canada. Though the Chippewa National Forest does not, both Forests share some rare natural resources such as bald eagles and gray wolves. Management decisions by Canadian Wildlife Service, the Ontario Ministry of Natural Resources, or the Minnesota National Forests may affect the resources of both Canada and Minnesota.

Currently there are a number of both formal and informal partnerships between Canada and the Superior National Forest coordinating rare natural resource management, but there may be opportunities to increase the level of coordination. Canada is in the process of developing its National Endangered Species Act and listing. That list may also lead to cooperative management efforts, as our federal listing recognizes species under threat in other sovereign nations. The Forest Plans currently do not address the Binational Scientific Agreement and should

possibly do so.

In addition to the above laws and policies, ongoing scoping on the Minnesota National Forests has shown increasing public concern over rare species and the management of rare communities. Some public want to see an increased priority and management emphasis placed on rare natural resources. There is a perception that the national forests do only the minimum amount need to maintain the viability of many species. They want that to change to greater than minimum management. Other public are concerned that increasing emphasis on rare species and rare natural communities would constrain other management activities such as timber harvest. There is a feeling that a decrease in timber harvest would adversely impact local timber-based economies unnecessarily.

Need for Change

The overriding need for change comes from the increased public and agency concern over how rare natural resources are managed and the adequacy of current Forest Plans. The new scientific information on many of the National Forests' rare species and communities and a desire for more consistency of management approach between the Forests also increases the need for change. Responding to these concerns, the National Forests believe there is a need to change the forest plans for the following reasons.

Threatened and Endangered Species

- Goals for both wolf and bald eagle populations/breeding areas have been greatly exceeded: forest plan goals are outdated.
- The current plans do not include management guidance on the lynx. Because of its status and the high public interest in this species, the forest plans should address this species.

Identification of Sensitive Species

- The Chippewa and Superior National Forests, the State of Minnesota, and Minnesota's American Indian bands use different definitions for rare species (other than standard definitions for federally listed threatened and endangered species). The lack of consistency had led to confusion for both the public and land managers about what species are - or are not - at risk.
- Region 9 species lists in the current plans are outdated and do not include criteria for keeping lists up-to-date.
- The Chippewa "forest sensitive species" list is outdated since the publication of the State 1996 list.
- The Superior "candidates" are obsolete and the "species of concern" list is outdated since the publication of the State 1996 list.

Sensitive Species Management and Rare Natural Communities

Adequacy and consistency between the Minnesota Forests in developing strategies to maintain the viability of sensitive species on the Forests, Minnesota, the Lakes States, and Region 9 are a concern.

- The Minnesota Forests take different approaches to some areas of sensitive species management, but in general, both take a single-species approach. For most species this approach, especially for plants, is reactive to other management activities. For example, guidelines and standards are applied to protectively buffer known individuals or habitats against activities such as timber harvest or road building. With this approach, rare species management is often seen as a constraint to accomplishing those activities. In addition, the effectiveness of this approach in ensuring long-term viability of species is uncertain.
- Forest plans do not address or emphasize cooperative management between the two forests or among other landowners in conserving rare species or communities at a variety of large landscape scales.

- Generally, sensitive species management on the forests is a single-species or single-community approach. This is generally reactive to other forest management activities and is seen as a constraint to other activities. The effectiveness of emphasizing this approach, rather encompassing a broader ecosystem management approach, is uncertain
- Specific measurable management goals, objectives, standards, and guidelines are lacking for many aspects of management such as:
    - How to determine what species, habitats, or communities should receive highest priority for management
    - Appropriate levels and methods of inventory, research, monitoring, and evaluation of rare natural resources
    - Development of conservation management strategies
    - Whether to restore species that were formally native to the Forests, but no longer occur here.
- Forest plans do not specifically define or address management of rare natural communities except with regard to Research Natural Areas (Chippewa) and Special Interest Areas (Superior). These areas can be managed to provide for their special or unique biotic, aquatic, or geologic values or rare plants and animals. Since the Forest Plans were adopted in 1986 national and Region 9 policy has evolved to direct Forests to develop strategies to ensure appropriate management of "communities of genuine concern."

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Riparian Management

Introduction

The Forest Service defines riparian areas as "geographically delineable areas with distinctive resource values and characteristics that are comprised of the aquatic and riparian ecosystems". Aquatic ecosystems are further defined as "the stream channel, lake...bed, water, biotic communities and the habitat features that occur therein" and riparian ecosystems as "a transition area between the aquatic ecosystem and the adjacent terrestrial ecosystem; identified by soil characteristics or distinctive vegetation communities that require free or unbound water". (Forest Service Manual 2526.05, Washington Office Amendment 2500-94-4).

The issue of riparian management on the Chippewa and Superior National Forests has two principle components:

- Definition of riparian areas
- Management of riparian areas

Definition of riparian areas is a source of conflict due to lack of clarity about what specific portions of the forest landscape are being referred to by the term "riparian". For example there are divergent points of view on whether or not streams which lack year round flow are to be considered part of the aquatic ecosystem, and thus a riparian area. Some are concerned that the above definition fails to recognize the important role in energy transfer and potential aquatic and terrestrial habitat recruitment that can be played by streamside or lakeshore vegetation not requiring free or unbound water.

Management of riparian areas is an issue because some people feel the way the Minnesota National Forests have been managed has been focused too much on mitigating impacts of activities such as timber harvest, roads, trails, or recreation site development. These people generally feel this reactive approach to management needs to be replaced or supplemented by a more proactive approach, such as by establishing specific goals and objectives for riparian areas. Such goals and objectives would define a desired future condition designed to maintain key ecological functions of riparian areas. These key functions include regulating the flows of materials and energy, and controlling productivity, both within and between the aquatic and terrestrial environments. More specifically these functions regulate water quality, forest productivity, landscape connectivity, water flow, terrestrial and aquatic nutrient cycles, seed dispersal, gene flow, and fish and wildlife habitat.

Other people are concerned that any change in the way riparian areas are managed will mean increased constraints on established management activities, primarily those related to silviculture and timber harvest. Further, since most recreation and rural development is water based, rural economies likewise may be influenced by changed riparian management policies. These concerns are heightened by the above-discussed lack of clarity in definition and the resulting uncertainty about the possible magnitude or breadth of impact that changes in riparian policy may have on established activities such as commercial timber production.

The topic of riparian management appears to be important in Plan Revision due to:

- *The magnitude of riparian resources on both National Forests.* In combination, wetlands, lakes, streams, and the transition zone along perennial streams comprise more than 505,000 acres on Chippewa National Forest and more than 1,090,000 acres on Superior National Forest. This represents 32% and 28%, respectively, of the total area within the boundaries of the Chippewa and Superior National Forests. The Chippewa contains 1,321 lakes and 923 miles of streams. The Superior contains 1,977 lakes and more than 2250 miles of streams. Wetlands alone represent 29% and 26%, respectively, of lands under federal management on the Chippewa and Superior National Forests.

- *The effect that alternative riparian management approaches may have on at least three of the principle decisions made in Forest Plans.* These principle decisions are: development of desired future conditions (36 Code of Federal Regulations 219.11(b)), establishment of management area prescriptions (36 Code of Federal Regulations 219.11) , and establishment of salable timber sale quantity (36 Code of Federal Regulations 219.16).
- *The degree of public interest in riparian forest management.* This interest has been heightened by a number of national, State, and local initiatives as discussed elsewhere in this Analysis of the Management Situation and in other Plan revision documents.

Projection of Demand

Due to the sheer magnitude of riparian resources (water and areas influenced by proximity to water bodies) on both National Forests, the ability of both Forests to supply riparian-related goods and services on a quantitative basis is large. In combination, wetlands, lakes, streams and the transition zone along perennial streams comprise more than 505,000 acres on Chippewa NF and more than 1,090,000 acres on Superior NF. This represents 32 percent and 28 percent respectively, of the total area within the boundaries of the Chippewa and Superior National Forests. The Chippewa contains 1,321 lakes and 923 miles of streams. The Superior contains 1,977 lakes and more than 2,250 miles of streams. Wetlands alone represent 29 percent and 26 percent, respectively, of the lands under federal management on the Chippewa and Superior National Forests.

National Forest lands may be nearly exclusive sources of some riparian conditions (e.g. large blocks of undeveloped lake and stream shoreline in public ownership).

A challenge arises from the reality that not all goods and services capable of being produced by/in riparian areas are compatible. For this reason choices must sometimes be made between the types of goods and services to be provided by specific riparian areas. The challenge then becomes how to distribute the possible goals for riparian areas across the Forest-wide landscape so as to best meet the many and varied (and sometimes conflicting) needs of the Forests' stakeholders.

The current demand for riparian-related goods and services from both National Forests is high and is expected to increase. This is well exemplified by trends in recreational fishing. The number of anglers in the U.S. rose by 20 percent during the decade from 1980 to 1990 (USFWS, 1993). Over 14 percent of all freshwater fishing in the 50 states that took place in 1991 occurred in the three states of Minnesota, Michigan and Wisconsin. Minnesota has about 1.5 million resident anglers (38 percent of the states' population) and about 734,000 non-resident anglers. Anglers expenditures in Minnesota totaled about 457 million dollars in 1991. In terms of both quantity and quality, the Chippewa NFs' 1,321 lakes and 924 miles of streams and the Superior NFs' 1,977 lakes and 2,250+ miles of streams are an extremely significant source of fishing opportunities in Minnesota. In combination, the two National Forests encompass over 50 percent of the total miles of trout stream in Minnesota.

Need for Change

Known Problems with the Existing Direction or Situation

As mentioned in the Introduction to this Analysis of the Management Situation (AMS) on Riparian Management, the problem with existing direction in the Forest Plans of both the Chippewa and Superior National Forests has two principle components: definition and management.

The Definition Component

The Chippewa Plan defines "riparian areas" as "land adjacent to perennial streams, lakes and reservoirs and including other well developed riparian vegetation (primarily intermediate streams). This land is specifically delineated by the transition between the aquatic ecosystem and the adjacent terrestrial ecosystem and defined by soil characteristics and distinctive vegetation communities that require free and unbound water". (Chippewa NF Plan Page C-13).

The Superior Plan Environmental Impact Statement (EIS) defines "riparian" as "an area of land or water which includes stream channels, lakes, adjacent riparian ecosystems, floodplains, and wetlands" (Superior NF, EIS Page G-18).

Clearly there is lack of continuity between the two Forests regarding the specific position on the landscape being referred to when the term "riparian" is used. This mirrors the wide range of opinions within the overall scientific community about the meaning of this term and the exact locations on the land it is intended to describe (Laursen, 1996). Those interested in riparian management on the National Forests in Minnesota express divergent points of view on whether or not streams which lack year round flow are to be considered part of the aquatic ecosystem, and thus a riparian area. Views also diverge on the relative importance of "dry ground" streamside or lakeshore vegetation in providing large woody debris to adjacent stream or lakes or to the riparian area itself.

Lack of agreement on definitions makes it exceedingly difficult to communicate with stakeholders having interests in both Minnesota National Forests, to determine geographic scope of riparian management practices, or to predict or quantify the impacts these practices might have on other resources or outputs.

The Management Component

From the earlier discussion of standards and guidelines, it's apparent that the two National Forests in Minnesota are not entirely consistent in the way riparian management guidance is provided in current Plans. Both Forest Plans provide riparian direction using a somewhat disjointed or piecemeal approach. Neither Forest Plan comprehensively addresses the protection or enhancement of riparian ecological functions. In combination, this leads to confusion on the part of stakeholders who deal with both Forests and view both Forests as having similar aquatic or riparian resources.

Some people are concerned that current management of riparian areas on the Minnesota National Forests focuses too much on mitigating impacts of activities such as timber harvest, roads, trails, or recreation site development. A more proactive approach to management, such as establishing specific goals and objectives for riparian areas, should possibly be considered. Such goals and objectives would define a desired future condition designed to maintain key ecological functions of riparian areas. These key functions include regulating the flows of materials and energy, and controlling productivity, both within and between the aquatic and terrestrial environments. More specifically these functions regulate water quality, forest productivity, landscape connectivity, water flow, terrestrial and aquatic nutrient cycles, seed dispersal, and fish and wildlife habitat.

Current riparian management direction on both Forests (i.e., filter strips, shade strips, Best Management Practices) (BMP) was principally developed to protect water quality. Scientific findings make it clear that the functional benefits of areas near water can, as discussed above, far exceed those related to water quality protection (Laursen, 1996). Guidance for protecting or enhancing these other benefits (i.e., providing controlled inputs of organic litter and large woody debris, or providing habitat or travel corridors for wildlife) is not addressed in current Forest Plans.

Increased or changed riparian management direction might affect management activities (primarily commercial timber production and recreation developments) that have come to be relatively commonplace in Minnesota's National Forests. A common conceptual approach to management of riparian resources in forests is to designate

zones or corridors along water, primarily streams (Laursen, 1996). Standards and guidelines designed to protect or enhance riparian resources are then implemented within those zones. In applying this approach to Minnesota Forest s, questions abound as to how wide these zones should be, what activities are appropriate within their boundaries, or whether management direction should be the same for all riparian areas. There is a need to better understand and articulate the tradeoffs involved in changing management direction for these zones. Tradeoffs are probably inevitable between commodity and non-commodity uses, between competing non-commodity uses and between competing commodity uses.

Some people feel that current approaches to riparian management on the Chippewa and Superior, including use of water quality-based Best Management Practices (BMPs), are adequate, and that no change in direction is needed. There also appears to be a misunderstanding among some people about the overall role and responsibility of the Forest Service in management and protection of riparian resources.

Assessment of the Need and Opportunity to Change Mgmt Direction, and the Ability to Resolve Issues and Concerns through the Planning Process

There is a need to agree on definitions and to provide management direction to protect, enhance, or possibly restore a wide range of (or all) riparian ecological functions. Plan Revision represents a unique opportunity to establish the elements of this new direction that are needed at an above-project scale. The new direction would need to have full public recognition of the resulting tradeoffs in outputs of goods and services that may result.

Because views of riparian management are so divergent and polarized, and because human demands on riparian areas continue to increase, it is unrealistic to expect the planning process (or any other process) will completely resolve all related issues and concerns. The planning process does, however, provide a systematic means to garner and consider this wide range of views in the formulation of new or revised management direction. The process does offer the chance to resolve, or at least reduce the intensity of, some riparian-related issues, and concerns.

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Recreation

Introduction

The Forest Service suggests in the *Strategy for Recreation, Version 3, April 1999*, that protection and maintenance of the essential character of the national forests and grasslands will enhance the recreation setting and experiences while establishing a Forest Service brand of recreation. Utilizing landscape or broad scale planning enhances the planning process by allowing consideration of an area's site-specific characteristics, while allowing for analysis of the relationships between different uses and biological processes.

The Chippewa and Superior National Forests' Plan revision process offers opportunities to further refine recreation management on each Forest in the context of new Forest Plans. People have identified a variety of issues related to recreation throughout the plan revision process. Many of these issues have been outside the scope of this plan revision. Two issues that will be addressed through the revision process are the forest recreation settings and off-road vehicles.

There are two issues identified within the scope of this plan revision and pertinent to recreation:

1. Forest settings
2. Recreational motor vehicle access

Forest settings can be described in the context of social interpretation–people's perceptions of environment. Vegetation, distance from developments including roads, and whether motorized vehicles are allowed, all combine to create a picture of potential experiences, opportunities, and benefits a visitor may have.

A forest setting is the condition of an area of land and/or water as interpreted by visitors. Multiple factors influence a forest setting, including, but not limited to: vegetation, access to the area, aesthetics, types of recreational activities, and amount of solitude. The issue of forest settings is that many people feel the range of recreation-related forest settings are skewed or limited to one form of recreation over another.

The topic of forest settings is important in Plan revision due to:

- The degree of public interest in quality recreation experiences that range from experiences of remoteness and solitude to highly developed facilities and numerous encounters with other visitors
- The degree of public interest in accessing the Forest

Terminology for motorized recreational vehicles that are used primarily off roads has changed since the 1986 Forest Plans when we identified all types of these vehicles as "Off Highway Vehicles (OHV)." To be consistent with Minnesota Department of Natural Resources, we now define these vehicles as recreational motor vehicles–RMVs. Recreational motor vehicles is a broad category consisting of: all terrain vehicles; motorized, off-highway motorcycles; off-road vehicles; and snowmobiles..

> *Motorized, off-highway motorcycles–OHMs*–are vehicles traveling on two wheels that have a seat or saddle designed to be straddled by the operator and have handlebars for steering control. Motorcycles may be legal for highway use and still considered OHMs if used for off-highway operation on trails or natural terrain.
>
> *Off-road vehicles–ORVs*–are motorized, recreational vehicles capable of cross-country travel on natural terrain, such as four-wheel-drive trucks.

All terrain vehicles–ATVs–are motorized, flotation-tired vehicles with at least three, but no more than six, low pressure tires, with an engine displacement of less than 800 cubic centimeters and total dry weight of less than 800 pounds. ATVs with a total dry weight of more than 800 pounds are classified as ORVs.

The use of the Chippewa and Superior National Forests by recreational motor vehicles (RMVs) will be addressed in terms of compatibility with the unique settings and resources of the National Forests. The issue is defining the role of the Forests in providing access to recreational motor vehicles and becoming consistent in user policies across federal and state lands.

The topic of RMV access is important in Plan revision because it provides an opportunity to:

- Address the management of RMV trail systems, including the amount of development;
- Provide consistency of access policies between state and federally owned land;
- Provide opportunities for motorized trails to reflect increased demand;
- Determine effects it may have on providing non-motorized opportunities.

Projection of Demand

National Trends

America's national forests and grasslands offer the single largest source of outdoor recreation opportunities in the United States. Over the next 50 years, we expect demand to increase from 800 million to 1.2 billion visits to the national forests per year. In addition, people are asking for a broader spectrum of benefits and services to enrich their experiences. (Natural Resource Agenda, 1998). The Forest Service currently receives over one-third more visitors than any other federal agency.

The following information is taken from *"Outdoor Recreation in American Life: A National Assessment of Demand and Supply Trends",* H. Ken Cordell, Principal Investigator.

Across American communities and groups within society, outdoor recreation has remained enormously popular over the years. Although new forms of participation have appeared, an underlying, basic motivation for outdoor recreation participation still is to have the opportunity to experience nature by viewing it, traveling through it, and for a short time at least, living it.

Traditional land, water, snow, and ice settings are very much in demand to satisfy the growing appetite both for traditional outdoor recreational activities as well as to serve demand for a growing list of new activities driven by better access and by rapidly evolving technology and information availability.

Both long-term and short-term trends point to continued growth in outdoor recreation across all segments of the population, some more than others. Growth seems particularly strong in viewing and learning activities and in "new" activities like snowboarding. If these trends continue, pressures for places to recreate and for recreation infrastructure to support recreation seekers will continue to build. There is evidence particularly of growing pressures on the public lands and the recreation opportunities those lands represent. Growing pressure is likely to take many forms and will require a variety of management responses. Level to decreasing public funding for outdoor recreation access, service, and facility development and maintenance will represent major challenges in the near as well as long-term future.

The biggest changes taking place in factors influencing recreation behavior over the next half century relate to increases in population and real income. It has also been established that supply factors such as proximity and availability of recreation resources are important in determining whether and to what degree individuals recreate. Given this information, the following table contains Northern regional trends for numbers of visitors and

percentages of increase/decrease over the next 20 years within recreation opportunities the national forests of Minnesota provide.

APP-A3 Percent Change in Participation Levels Over Time By Activity

Activity	1995*	2000	2010	2020
	Millions of Recreation Visitor Days (RVDs)	% change from 1995	% change from 1995	% change from 1995
Sight-seeing	52.30	+2	+11	+23
Cross Country Skiing	4.40	+3	+15	+23
Non-consumptive wildlife activities	56.00	+1	+10	+21
Visiting historic places	40.80	+2	+13	+20
Horseback Riding	5.60	+1	+7	+18
Visiting a beach or waterside	57.70	+1	+9	+17
Biking	27.90	+1	+10	+17
Non-pool swimming	38.40	+1	+8	+16
Family Gathering	58.10	+2	+9	+16
Walking	62.60	+1	+7	+15
Picnicking	47.00	+1	+8	+15
Downhill Skiing	8.40	0	+6	+13
Motorboating	22.00	+1	+6	+13
Canoeing	8.00	0	+6	+13
Fishing	25.60	0	+5	+12
Hiking	20.60	-1	+4	+11
Off-road driving	11.20	-1	-1	+6
Snowmobiling	4.90	-2	0	+5
Developed Camping	18.00	-20	+11	+4
Rafting/Floating	6.90	-3	-6	+1
Backpacking	6.00	-4	-7	-1
Hunting	8.40	-2	-3	-2
Primitive Camping	10.90	-4	-8	-2

* Current Participation Levels in Millions, Northern Region**.** The Northern Region includes: Minnesota, Iowa, Wisconsin, West Virginia, Vermont, Rhode Island, Pennsylvania, Ohio, New Hampshire, New Jersey, New York, Missouri, Michigan, Massachusetts, Maryland, Maine, Indiana, Illinois, Delaware, and Connecticut.

APP-A4. Change in Participation Levels

Activity	1995: Current Participation Levels in Millions of RVDs, Northern Region	2020: Projected Participation Levels in Millions of RVDs, Northern Region
Walking	62.6	72.0
Non-consumptive wildlife activities	56.0	67.8
Visiting a beach or waterside	57.7	67.5
Family Gathering	58.1	67.4
Sight-seeing	52.3	64.3
Picnicking	47.0	54.0

APP-A4. Change in Participation Levels		
Activity	**1995: Current Participation Levels in Millions of RVDs, Northern Region**	**2020: Projected Participation Levels in Millions of RVDs, Northern Region**
Visiting historic places	40.8	50.0
Non-pool swimming	38.4	44.5
Biking	27.9	32.6
Fishing	25.6	28.7
Motor boating	22.0	24.9
Hiking	20.6	22.9
Developed Camping	18.0	18.7
Off-road driving	11.2	11.9
Primitive Camping	10.9	10.7
Downhill Skiing	8.4	9.5
Canoeing	8.0	9.0
Hunting	8.4	8.2
Rafting/Floating	6.9	7.0
Horseback Riding	5.6	6.6
Backpacking	6.0	5.9
Cross Country Skiing	4.4	5.4
Snowmobiling	4.9	5.1

Minnesota Trend Information

Demographics

Minnesota's population will surpass 5 million by the year 2020 (State Demographer), growing by five percent over the next two decades. The Minnesota's aging white population will grow by only six percent between 1990 and 2020, with births barely exceeding deaths between 2015 and 2020. The state's younger minority population, with higher birth rates and substantial immigration, will nearly triple (175% increase) between 1990 and 2020. The number of persons age 45 and older is projected to increase nearly 70 percent. Growth in the state's elderly population and the aging of the *Baby Boom* generation will push Minnesota's median age from 32.5 in 1990 to age 40 by 2020. Persons age 65 and older will out-number children in most Minnesota counties. Statewide, the number of children under age five is projected to decline by 11 percent by 2020. Aging will be especially pronounced outside of the emerging St. Could - Twin Cities - Rochester corridor. Recreation participation generally declines sharply with age. (MN DNR, SCORP 1995-1999).

Recreation Participation

Boomers soon will enter their most productive, highest earning years. Many two-career families may enjoy more discretionary income, but less leisure time. Such households must plan their time, even leisure time, very carefully. Boomers have tended to vacation more frequently, but closer to home and for shorter periods of time than their predecessors (three days or less). Travel is becoming more destination-oriented than in the past with pleasure travel dependent on time–not money. There is a growing demand for eco-tourism and outdoor experiences to contrast work involvement (computers, technology). With strong competition for free time and dollars, recreation providers will need to provide a quality experience that matches consumer expectations. Management will be even more critical than marketing.

In terms of outdoor recreation participation, residents are likely to participate in more activities than non-

residents. A resident is more likely to swim, hike, fish, sightsee, be involved in guided or unguided nature observation, boat, sunbathe, canoe, and visit historic sites than a non-resident. A non-resident is more likely to visit friends or relatives, eat in a restaurant, shop for non-food items, and golf.

The MNDNR was able to provide 1986 through 1998 recreation information in terms of activities related to Revision/Recreation issues of forest setting and OHV use. That statistical information is included in the following table.

APP-A5. MNDNR Number of Licenses, Registrations, and State Forest Camper Nights

Activity License or Boat Registration	1986	1998	% Change
Hunting Licenses	757,125	855,793	+6%
Fishing Licenses	1,503,882	1,205,299	-11%
Recreational Motor Vehicle Registrations*	23,738	93,612	+60%
Snowmobile Registrations*	180,782	277,650	+21%
Boat Registrations Motorized **	500,077	598,021	+9%
Boat Registrations: Non-motorized **	155,202	182,076	+8%
Camper Nights	55,729	97,903	+27%

* This figure includes three expiration classes: the present year, and each of the two succeeding years.

** Includes all boats except non-motorized boats nine feet or less, duck boats during the duck season, rice boats during the wild rice harvest season, and seaplanes.

Recreation Economics

Outdoor recreation is a major component of the Minnesota economy. Hunters, anglers, snowmobilers, and registered boat owners are among those who contribute nearly $3 billion annually to the state's economy. Outdoor recreation provides income and employment for thousands of state residents, and an economic boost for local economies. (MN DNR, SCORP 1995-1999).

Chippewa and Superior National Forests Trends and Interpretation

Given the national survey that reflected regional information gathered and interpreted by Ken Cordell et al and MNDNR use information, we can begin to infer demand changes for the Minnesota National Forests. Activities can be grouped to enable analysis in terms of the issues of recreation setting and recreational motor vehicles.

We know that the Chippewa and Superior National Forests provide many of the same recreational opportunities; however, the emphasis of visitors on each Forest varies. The Superior, outside the BWCAW, receives a lot of use focused on trails and rustic camping in campgrounds and more primitive camping opportunities in the summer, while winter brings snowmobiles and dogsleds to the trails. The Chippewa's summer use is concentrated primarily in water-related recreation including fishing and campgrounds associated with lakes. Winter use focuses on trails, including snowmobile and cross-country skiing.

National–Regional survey information indicates demand will increase for most developed and undeveloped recreation opportunities. Activities related to water all show increases of at least 12 percent over the next 20 years. Corresponding visitor demand on the Minnesota National Forests should reflect that trend toward

increased motor boating, visiting a beach, canoeing, and fishing. Other activities associated with trails also show gains in participation, such as cross-country skiing, walking, biking, snowmobiling, and off-road driving. Camping related activities show a more stable outlook, at times decreasing then increasing. Developed camping participation was expected to increase, while more primitive camping participation was expected to slightly decrease. This may be the result of an aging population developing an increased liking for more developed amenities such as RV camping. Undeveloped activities, such as hunting and backpacking will remain approximately level with a slight decrease in participation. Off-road driving will remain level with a slight increase in participation.

Minnesota registrations and licenses purchase information comparing 1986 through 1998 show growth in outdoor activities that utilize boats, snowmobiles, and recreational motor vehicles. The 21 percent and 60 percent increase of snowmobile and recreational motor vehicle registrations, respectively, have resulted in a steady demand for increasing the numbers of appropriate trails on the Chippewa and Superior NF. Camping increases in state managed campgrounds has also been reflected in the Chippewa NF campground use increases. Motorized and nonmotorized boat registrations are up, perhaps reflected in continuing construction of boat accesses and an increase in BWCAW permits (where people are required to use nonmotorized watercraft).

Use of the National Forests has been measured in recreational visitor days (RVD). An RVD indicates any cumulative 12-hour block of time spent in the Forest, and is included in the following table (APP-A6). During the last planning period, visitor use data has been limited in terms of statistical accuracy. During the years 2000 and 2001, both the Chippewa and Superior researched recreation use by total number of visitors. The result was statistically sound information on how many visitors we have and what they do while visiting National Forest System land.

Visitor use as measured using the National Visitor Use Monitoring Results for each Forest is also shown in App-A6. Results of the National Visitor Use Monitoring on the Chippewa National Forest were 2.1 million national forest visits or 5.5 million RVDs. Results for the Superior National Forest were 4.0 million national forest visits or 9.3 million RVDs. Of the total for the Superior, the BWCAW accounts for 0.3 million visits or 1.3 million RVDs.

APP-A6. Recreational Visitor Days by Forest

National Forest	1986 RVD*	1997 RVD	2000 RVD
Superior	1,725,000	2,510,000	9,276,293
Chippewa	1,588,600	1,707,300	5,493,596

* Use of the forest is measured in recreation visitor days (RVD), indicating any cumulative 12-hour block of time spent in the Forest

Given statistical and empirical data, demand for a variety of forest settings and recreational motor vehicle access to the Chippewa and Superior National Forests will both continue and increase.

The overall recreation supply on the Forests can be described in terms of "practical maximum capacity". Practical maximum capacity is defined as the level of use that would not degrade the physical capabilities and natural resources of the Forests. Table APP-A8 depicts the maximum practical capacity for each Forest by ROS class.

Potential future recreation demand is addressed in Cordell's *Projections of Outdoor Recreation Participation to 2050*. According to that report, days spent and numbers of participants in winter, water-based, and developed land activities will, in general, grow faster than the population. These activities generally occur in roaded natural and semi-primitive motorized ROS classes. Hunting and fishing, along with other dispersed land activities, are not expected to increase in activity days or participation numbers as fast as the population is growing. Non-consumptive wildlife activity is an exception to this trend; however, it is not limited to dispersed settings. That is, non-consumptive wildlife activities would occur in all ROS classes.

It appears for the most part that the existing ROS classes with associated maximum practical capacity can meet the existing use and potential recreation demand. However, the Chippewa National Forest has little inventoried Semi-primitive Non-motorized ROS acres and associated capacity to address potential increases in the non-consumptive wildlife activities.

Table APP-A7: Minnesota National Forests ROS Inventory (percent)

ROS Inventory Class	Chippewa NF	Superior NF
Primitive	0	22
Semi-primitive Non-motorized	1	19
Semi-primitive Motorized	34	44
Roaded Natural	62	14
Rural	3	1
TOTAL	100	100

Source: Percents of National Forest land derived from Minnesota National Forest inventory criteria and GIS mapping, project file. Water acres are not included. BWCAW acres are included on the Superior National Forest.

Table APP-A8: Minnesota National Forests Maximum Practical Capacity (RVD's per year)

ROS	Chippewa NF	Superior NF
Primitive	0	519,913
Semi-primitive Non-motorized	51,054	2,175,895
Semi-primitive Motorized	1,685,083	5,612,512
Roaded Natural	7,551,995	5,227,268
Rural	1,204,700	1,681,680
TOTAL	10,492,832	15,216,668

Source: Project files summarize how capacities were determined.

Need for Change

Based on information presented in this document, there is an indication of a need to change the 1986 LRMP. The following is a summary.

The Chippewa and Superior National Forests each represent a variety of recreational opportunities in Minnesota with many similarities and some differences between Forests. Revising the Forest Plans creates an opportunity to ensure our standards, goals, objectives, and policies are similar when appropriate to enhance our visitor's and stakeholder's recreation opportunities and experiences. Opportunity exists to discuss, explore, and define the role of the National Forests in Minnesota as recreation providers in terms of Forest settings. What is the National Forest niche amongst other recreation providers? What is our ability to provide for that niche?
Demand is expected to increase for all forest settings, including recreational motor vehicle access opportunities. Trail construction has not matched planned construction. Opportunity exists to define consistent RMV access policies between Minnesota National Forests and other adjacent public landowners such as the MNDNR and

counties. Through Plan revision, we can also begin to address the issues of Forest Setting and Recreational Motor Vehicle access over the next decade. We will be able to look at current conditions and move toward our defined goal as providers of quality recreational benefits and experiences.

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APPENDIX B. MINNESOTA NATIONAL FORESTS ROS MAPPING CRITERIA

Introduction

The Forest Service uses a nationally recognized classification system called the Recreation Opportunity Spectrum (ROS) to help describe different recreation settings, opportunities, and experiences. 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 which offer more facilities, better access, and opportunities to interact with other recreationists. The glossary describes the characterizations of each ROS class. Further ROS information and direction can be found in Forest Service Handbooks and Manuals and in particular the United States Department of Agriculture, Forest Service *ROS Users Guide* (August 1982).

Inventory Criteria

The 1986 Forest Plans used national inventory mapping criteria that resulted in classification of a high percentage of the roaded natural Recreation Opportunity Spectrum (ROS) Class within the National Forest boundaries. Since that time the Chippewa and Superior National Forests have modified the national inventory criteria to reflect northern Minnesota forest's unique landscapes in providing recreation opportunities. The modified criteria are called the Minnesota National Forests ROS mapping criteria.

This appendix identifies the criteria necessary to inventory areas for project-level planning as referenced in the guidelines relating to retention of remote character in General Forest, Longer Rotation, and Recreation in a Scenic Landscape Management Areas. The criteria will also be useful for comparison of the 2002 ROS inventory prepared for the Forest Plans with the overall amounts of each ROS class throughout the Forests in the future.

Table BFP-1 summarizes the principal inventory mapping criteria: distance from roads and size. All lands within the National Forest boundaries are mapped. Areas up to two miles outside the boundaries need to be included in order to apply results of the criteria within the National Forest boundaries. The features used in the "distance from" criteria are further defined below.

Paved roads	Generally meets the definition of OML 5 roads
Gravel roads	Generally meets the definition of OML 3 and 4 roads
Native soil roads	Generally meets the definition of OML 1 and 2 roads
Motorized lakes	Lakes with a drive down ramp access.
Motorized trails	Designated snowmobile and ATV trails.

In addition, the following statements clarify how Rural and Urban areas were mapped.

1. Districts identified Urban areas using the ROS handbook descriptions. They either mapped the city limits or drew ¼ miles buffers around population centers.
2. Districts identified Rural areas using the ROS handbook descriptions.
   SNF: Rural was also mapped ¼ mile around Urban areas.
3. Railroads and utilities were mapped Rural ¼ mile on each side.
4. Mines were mapped Rural.
5. Portions of major highways as identified by Districts were mapped Rural ¼ miles on each side.

BFP-1. Minnesota National Forests ROS Mapping Criteria – Distance from roads, trails, or lakes and Size

Criteria	Units	ROS Class			
		Primitive	Semi-primitive Non-motorized	Semi-primitive Motorized	Roaded Natural
Distance					
Paved Road	miles	> 2	> 0.50	> 0.50	< 0.50
Gravel Road	miles	> 2	> 0.50	> 0.25	< 0.25
Native Soil Road	miles	> 2	> 0.50	No buffer	No buffer
Motorized Lakes	miles	> 2	> 0.25	< 0.25	N/A
Motorized Trails	miles	> 2	> 0.50	< 0.25	< 0.25*
Size	acres	> 2,500	> 1,500	> 1,500	No minimum

Source: Project file.
* Most SNF snowmobile trail corridors were mapped SPM ¼ miles each side. Therefore, a total ½ miles wide SPM corridor was mapped for most snowmobile trails.

APPENDIX C. MANAGEMENT INDICATOR HABITATS

This appendix provides more detailed description of Management Indicator Habitats (MIH).

Table APP-C1 describes MIHs in terms of forest types.

APP-C1. Management Indicator Habitats: forest types.

#	Management Indicator Habitat	Description and Forest types (Code in Forest Service Data Base)
1	Upland forest	All upland forest types: jack pine (01), red pine (02), white pine (03), balsam fir-aspen-birch (11), spruce-fir (16), black spruce-jack pine (17), northern hardwoods, including oak and maple (50s, 80s), aspen (91), paper birch (92), bigtooth aspen (93), balsam poplar (94), 95 (aspen-spruce-fir)
2	Upland deciduous forest	All upland deciduous and deciduous-dominated mixed forest types: (50s, 80s, 91, 92, 93, 94, 95)
3	Northern hardwood and oak forest	All northern hardwood and oak forest types: (50s, 80s)
4	Aspen-birch and mixed aspen-conifer forest	All aspen, birch, and aspen-dominated aspen-birch-conifer mixed forest types: (91, 92, 93, 94, 95)
5	Upland conifer forest	All upland conifer and conifer-dominated mixed forest types: (01, 02, 03, 11,16, 17)
6	Upland spruce-fir forest	All spruce-fir and spruce-fir-dominated mixed forest types: (11,16, 17)
7	Red and white pine forest	Both red and white pine forest types: (02, 03)
8	Jack pine forest	Jack pine forest type: (01)
9	Lowland black spruce-tamarack forest	All lowland conifer and lowland mixed conifer types dominated by black spruce or tamarack: (12, 15, 18)
10	Upland mature riparian forest	All upland mature or old forest types in Riparian areas; inner zone 0-100 feet and outer zone 100-200 feet: (01, 02, 03, 11,16, 17, 50s, 80s, 91, 92, 93, 94, 95)
11	Management-induced Edge Density Upland forest & Lowland forest	Edge density (miles/sq mile) of young upland (management indicator habitat 1) or lowland forest (management indicator habitat 9). This indicator does not include or measure inherent edge such as edges between forested lands and lakes, streams, non-forested lands.
12	Upland Interior forest habitat	Acres of forest interior in all mature and older upland forest patches of any size (see management indicator habitat 1 for forest types in upland forest). All forest patches were buffered inwardly with100 meter buffer.
13	Large patches of upland mature/old forest	Large (>300 acres) upland mature/old forest patches acres. (See management indicator habitat 1 for forest types in upland forest).
14	Aquatic habitats	These represent the wide variety of lakes, rivers, streams, pond, marshes or pools (permanent, intermittent, or seasonal) that provide habitat to wildlife.

Management indicator habitats are based on groupings of forest types in different age groupings. The age groupings are surrogates for ecological successional or vegetative growth stages. Because of the ecology of the different forest types, age grouping depends on forest type and was selected to best typify vegetative growth stages.

Table APP-C2 shows how each forest type is grouped.

APP-C2. Management Indicator Habitats: Age groupings for forest types.

Forest Types and (codes)	Young (Seedling-open)	Sapling/ pole	Mature/ Old	Old/Old Growth	Old Growth Multi-aged
Jack pine (01)	0-9	10-39	40-59	60-79	80+
Red pine (02)	0-9	10-49	50-119	120-149	150+
White pine (03)	0-9	10-49	50-119	120-149	150+
Lowland black spruce-tamarack dominated conifers (12, 15, 18)	0-19	20-59	60-119	120-149	150+
White cedar (14, 19)	0-19	20-59	60-119	120-149	150+
Spruce/fir (11, 16, 17)	0-9	10-49	50-89	90-149	150+
Upland northern hardwoods (50s & 80s Sup)	0-9	10-59	60-119	120-149	150+
Upland northern hardwoods (80s Chip)	0-9	10-59	60-119	120-149	150+
Oak (50s Chip)	0-9	10-59	60-99	100-149	150+
Lowland northern hardwoods (70s)	0-19	20-59	60-119	120-149	150+
Aspen-birch and aspen-birch-conifer (91,92,93,94, 95)	0-9	10-49	50-79	80+	80+

APPENDIX D. PROPOSED AND PROBABLE PRACTICES, GOODS PRODUCED, AND OTHER INFORMATION

The purpose of this appendix is to display an estimate of the goods and services provided, the proposed (decade 1) and probable (decade 2) management practices expected, and other information including land classification.

The outputs and proposed and probable practices listed are projections based on available inventory data and some are based on computer modeling. **NOTE: The outputs and amounts listed below are estimates only and are subject to annual budgets for funding the various resource programs on the forest. Actual amounts may vary from these and will be monitored on an annual basis.**

Land Classification

Land identified as suitable for timber management include producing timber as part of multiple use direction. These are lands that contribute to the timber sale program on a regularly scheduled basis. Table APP-D1 shows how acres of these lands compare to the total acreage of National Forest System land.

APP-D1: Classification of National Forest Land for Timber Production

Classification	Acres
Total National Forest System land	2,170,007
Non-forest and water	79,390
Legally withdrawn (Wilderness, Shipstead-Newton-Nolan,RNA)	867,875
Land not physically suited for timber production (low site index, regeneration not assured, etc)	170,929
Land not appropriate for timber production due to other resource Management (riparian areas, campgrounds, unique areas, etc)	106,905
Land suitable for timber management	944,908

Allowable Sale Quantity (ASQ)

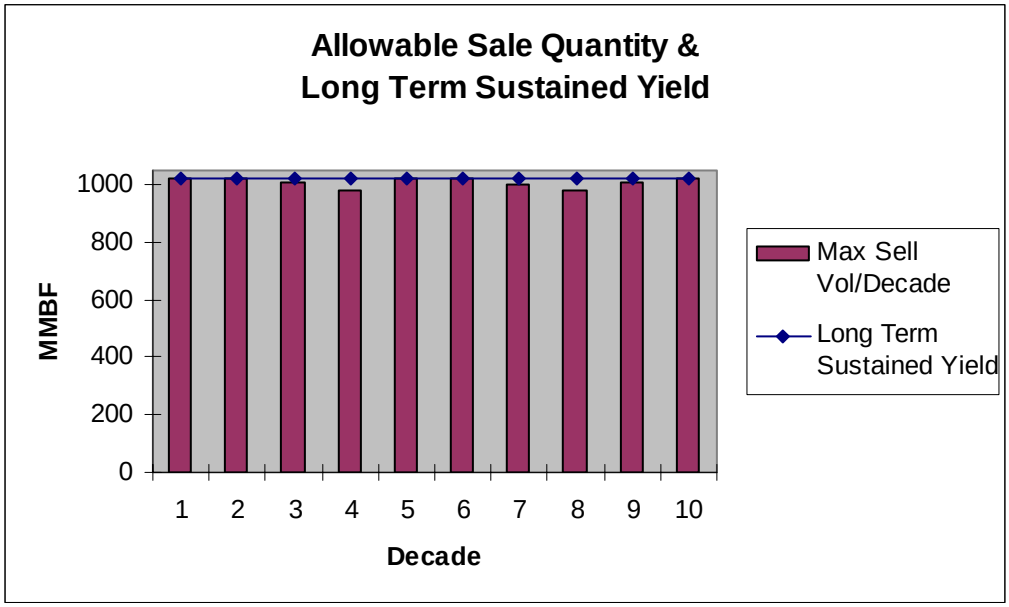
The allowable sale quantity of timber (ASQ) is the maximum amount of volume that may be offered and sold during a given decade of Forest Plan implementation from land identified as suitable for timber management.

During Decade 1 (the first ten years of plan implementation) the ASQ is 1.021 billion board feet (1.652 billion cubic feet). The amount of timber that may be sold annually may exceed 102 million board feet as long as the decadal ASQ is not exceeded.

During Decade 2, the ASQ is 1.022 billion board feet (1.653 billion cubic feet). The amount of timber that may be sold annually may exceed 102 million board feet as long as the decadal ASQ is not exceeded.

Figure APP-D1 shows the volumes that can be harvested in each decade on a long term, sustained yield capacity. Decadal volumes vary by less than five percent and differences are considered to be negligible because of the accuracy of data and yield estimates.

Figure APP-D1:



Proposed (Decade 1) and Probable (Decade 2) Management Practices

Tables APP-D2 and APP-D3 list the proposed and probable silvicultural practices that would be used to work toward the vegetative and other multiple-use desired conditions and objectives of the Forest Plan. The table displays the amount of each harvest treatment for the first two decades of plan implementation based upon modeling. Actual treatments during plan implementation may vary from these modeled outputs. "Clearcutting" and "Partial Cut 30" treatments set the tree stand back to age zero, meeting the 0-9 year old age class objective for each landscape ecosystem. Both "Uneven-aged" treatments are intended to create and maintain an uneven-aged condition. "Uneven-aged aspen-aspen/fir" is used to regenerate aspen-dominated stands to white pine, spruce-fir, or northern hardwoods.

APP-D2: Estimate of Acres of Timber Harvest by Treatment Method (Forest-wide)

Treatment Method	Decade 1 (Proposed)		Decade 2 (Probable)	
	Acres	Percent	Acres	Percent
Thinning	11,212	8%	13,026	10%
Clearcutting	83,692	63%	89,397	68%
Shelterwood & partial cut 30	23,000	17%	21,435	16%
Uneven-aged (red pine, white pine, spruce fir, northern hardwood, oak, black ash)	2,907	2%	5,410	4%
Uneven-aged (aspen-aspen/fir)	11,101	8%	3,148	2%
Totals	131,912	98*%	132,416	100%

*Total does not equal 100% due to rounding to whole numbers

APP-D3: Proposed and Probable Harvest Treatments in Acres by Management Area and Treatment Type in Decades 1 and 2

Management Area	Thin		Clear cut		Shelterwood & partial cut. 30BA		Uneven-aged rp-wp-sf-nh-ba		Uneven-aged asp-asp/fir		Total for Decade	
Decade	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**2**
General Forest	7,450	8,259	56,044	62,710	9,925	8,645	650	971	4,785	1,123	78,854	81,708
Longer Rotation	3,561	4,767	25,390	24,406	8,083	6,008	729	2,489	2,489	514	40,252	36,905
Recreation Use in Scenic Landscape	0	0	2,254	2,281	3,019	3,641	1,338	3,050	489	172	7,100	9,144
Pot. Candidate Wild, Scenic, and Recreational Rivers	0	0	0	0	1,101	1,135	74	0	439	69	1,614	1,204
Semi-Primitive Motorized Recreation	0	0	0	0	710	1,203	95	170	2,229	1,027	3,034	2,400
Semi-Primitive Non-motorized Recreation	0	0	0	0	0	0	0	0	66	185	66	185
Riparian Emphasis Areas	0	0	0	0	363	803	20	9	605	58	988	870
Total for Decade 1	11,011		83,688		23,201		2,906		11,102		131,908	
Total for Decade 2		13,026		89,397		21,435		5,410		3,148		132,416

Table APP-D4 lists other forest management activities that are proposed to work toward the desired conditions and objectives during the first 10 years of Plan implementation.

APP-D4: Proposed Practices (Forest-wide)

Activity or Practice	Unit of Measure	Estimated Amount for the first decade
Stream Channel Reconstruction [1]	miles	5 to 30
Sensitive Plant Habitat Restoration[2]	projects	20
Wildlife Habitat Restoration[2]	projects	40 to 50
New ATV trail designated (maximum amount listed)	miles	90
New Snowmobile trail designated (maximum amount listed)	miles	130
New Water Access Sites (maximum amount listed)	sites	10
Roads Constructed [3] OML –1 Winter use only	miles	82
Roads Constructed [3]OML –1 Summer use	miles	167
Roads decommissioned	miles	84

Notes:
1. Miles of reconstruction will be measured in terms of the total miles of improved stream conditions resulting from channel reconstruction, rather than the number of stream miles to which reconstruction projects are directly applied.
2. These may include a wide variety of projects such as wildlife species' restoration, vegetation restoration, control of non-native invasive species, and habitat restoration structures. Project level planning will determine the need, type, and location of habitat restorations.
3. About 50 percent of the new OML-1 roads will involve reconstructing old historic road routes and current unclassified roads.

APPENDIX E. CANADA LYNX

This appendix provides information related to Canada lynx management:

1. Implementation of Forest Plan: Promoting Lynx Conservation on National Forest System Land
2. Basis of Forest Plan direction (conservation measures) for lynx recovery
3. Endangered Species Act Section 7 Conferencing and Consultation and Coordination with Fish and Wildlife Service
4. New information: how Forest Plan lynx conservation approach will be adapted or updated
5. Scales of Analysis: Geographic Areas, Lynx Analysis Units, and Boundary Waters Canoe Area Refugium
6. Lynx Conservation Assessment and Strategy: Recommended Procedures
7. Lynx Habitat Definitions and Descriptions
8. References

1. Implementation of Forest Plan: Promoting Lynx Conservation on National Forest System Land

The Forest Plan desired conditions, objectives, standards, and guidelines for Canada lynx, together with the integrated management direction for other Forest resources, have been developed to meet the Forest Service objective and intent of promoting a consistent and effective approach to conservation and recovery of Canada lynx on National Forest System land.

Plan direction addresses risk factors affecting lynx: productivity; mortality; movement; and other large landscape scale factors such as habitat degradation by non-native invasive species. These risk factors are addressed at applicable landscape scales, including: range-wide, Great Lakes geographic area, National Forest, and home range.

Projects and activities that implement the Forest Plan are generally not expected to have adverse effects on lynx and implementation is expected to lead, at relevant scales, to conservation of the species.

Because it is impossible to provide management direction at the programmatic or Plan level that will address all possible actions in all locations that may affect lynx, project specific analysis and design will be completed for all actions that have the potential to affect lynx. Circumstances unique to individual projects or actions and their locations may still result in adverse effects on lynx. In these cases, additional or modified mitigating measures may be necessary to avoid or minimize adverse effects.

The Forest Plan conservation approach is intended to provide guidance that retains future options, provides management consistency, offers necessary flexibility, and ultimately will accomplish the objective of conserving the lynx.

2. Basis of Forest Plan Direction (conservation measures) for Lynx Recovery

As per the Canada Lynx Conservation Agreement between Forest Service and Fish and Wildlife Service (USDA FS 2000), for all NFS lands identified as having lynx habitat, measures considered necessary to conserve lynx are incorporated into the Plan. They are based on consideration of the scientific information, guiding principles, and recommended conservation measures of:

- Lynx Conservation Assessment and Strategy (Ruediger *et al.* 2000) and its official modifications (August 2000, April 2002)
- Lynx Science Report (Ruggiero *et al.* 2000)
- Relevant information from local sources (federal, State, tribal)
- Fish and Wildlife Service's final listing decision document (USDI Fish and Wildlife Service 2000)
- Fish and Wildlife Service's notice of remanded determination status for lynx (USDI Fish and Wildlife Service 2003)

The above information acknowledges that little research has been conducted on the lynx in the contiguous United States and thus there is a lack of conclusive or specific knowledge about lynx. Until conclusive information concerning lynx management becomes available from research, scientific assessments, lynx surveys, and effectiveness monitoring, Forest Plan conservation measures are intended to fulfill the purpose of a useful, proactive plan. The Plan is intended to err on the side of maintaining and restoring lynx habitat for lynx and their prey.

Forest Plan direction is consistent with existing applicable authorities and federal laws including, but not limited to, Endangered Species Act of 1973, Fish and Wildlife Coordination Act, National Forest Management Act and its regulations (36 CFR 219.19), and National Environmental Policy Act. It is also consistent with Forest Service policy, including Forest Service Manual 2670.

3. Endangered Species Act Section 7 - Conferencing and Consultation and Coordination with Fish and Wildlife Service

The Plan provides a basis for reviewing the adequacy of Forest Service management with regard to lynx conservation and to facilitate Section 7 conferencing and consultation with the Fish and Wildlife Service at the programmatic and project-levels.

Direction specific to interagency coordination, consultation, and conferencing is described in more detail in the Endangered Species Consultation Handbook (NMFS/USFWS, March 1998) with further guidance from national interagency Memorandum of Understanding (MOU) (94-SMU-058) and Forest Service Manual (2670).

4. New Information: How Forest Plan Lynx Conservation Approach Will Be Updated

Future lynx recovery plan: When a lynx recovery plan is developed by the Fish and Wildlife Service, the Forest Service would manage the National Forest to meet the goals and applicable objectives of the recovery plan.

Population goals for the planning area: A federal recovery plan for threatened and endangered species generally, though not always, includes criteria for the long-term survival of species based on population goals. After a recovery plan is developed for the lynx, the Forest Service, in consultation with the Fish and Wildlife

Service, may consider establishing population goals specific to the planning area in support of the recovery plan's population goals.

Designation of critical habitat: When critical habitat is designated by the US Fish and Wildlife Service, the Forest Service would manage NFS land to assure that critical habitat is conserved to support lynx recovery.

New and relevant scientific information: Forest conservation management for lynx will be adaptive. Knowledge and scientific certainty about lynx and its habitat and effectiveness of management are expected to increase in the future based on:

- Experience implementing conservation measures,
- Research, inventory, monitoring and evaluation, and
- Other local information relevant to lynx

The National Forest, in coordination with the Fish and Wildlife Service, will consider, and where appropriate, incorporate new and relevant information into lynx conservation management. This may be accomplished within the context of the current Plan and project-level planning, or, if needed, through amendment to the Forest Plan.

Update of the Lynx Conservation Assessment and Strategy (LCAS): Given the limited information currently available regarding lynx distribution and ecology, interagency review may be conducted periodically to assess and adjust the LCAS to reflect new scientific information and experience implementing conservation measures (Ruediger *et al.* 2000, p. 4-Introduction). The Forest will consider any adjustments as new information and will document how these are addressed by the Plan or, if necessary, will amend the Plan to incorporate changes.

5. Scales of Analysis: Geographic Areas, Lynx Analysis Units, and Boundary Waters Canoe Area Refugium (SNF)

Potential risk factors (programs, practices, and activities that may influence lynx or lynx habitat) may affect lynx productivity, mortality, and movement, and may need to be addressed during analysis and consultation. Risk factors may interact, and their relative importance may vary in different areas and at different spatial scales. Based on the scale of a project, analysis of effects may consider applicable risk factors at the appropriate analysis scale.

Geographic Areas

Geographic areas are large land areas identified for purposes of analysis and development of conservation measures for lynx. Geographic areas do not represent distinct lynx populations or isolated sub-populations, or even currently occupied habitat. Each area has uniquely different forest ecosystems, management histories, and current lynx population status.

The National Forests of Minnesota fall into the Great Lakes Geographic Area. This area encompasses northeastern and north-central Minnesota, northern Wisconsin, and the Upper Peninsula and northern portions of Michigan. An important biological feature of the Great Lakes Geographic Area is its adjacency and interrelationship to lynx habitat and lynx populations in Canada.

To evaluate and monitor effects of management actions, lynx population status, habitat conditions, and risk factors for lynx on the National Forest will generally be addressed at the Lynx Analysis Unit scale on National Forest System land (see below). However, population connectivity and some risk factors (such as features of habitat connectivity or fragmentation, incidental or illegal shooting, mortality due to vehicle collisions) may be best addressed at the geographic area scale. At the geographic scale, lynx conservation generally must be considered in coordination with other landowners and management agencies, including those in Canada.

Lynx Analysis Units

Definitions

Lynx Analysis Units (LAUs) are the smallest landscape scale analysis units upon which direct, indirect, and cumulative effects analyses for lynx will be performed. LAUs encompass lynx habitat (on all ownerships) within the administrative unit that has been mapped (in coordination with adjacent management agencies and Fish and Wildlife Service) using specific criteria to identify appropriate vegetation and environmental conditions. In addition, LAUs are intended to provide the fundamental scale with which to begin monitoring and evaluation of effects of management actions on lynx habitat.

LAUs encompass land that may or may not provide habitat or environmental conditions considered necessary to support lynx reproduction and survival. Land within the LAU falls into two categories (see 7. Habitat Definitions and Descriptions in this Appendix for more detailed description):

1. **Lynx habitat includes:** Habitat that is currently in condition suitable to provide for denning, foraging, or other habitats considered necessary to support lynx reproduction and survival, and
   Habitat that is not currently in condition suitable to provide for lynx denning, foraging, or other habitats considered necessary to support lynx reproduction and survival, but is expected with time to develop those necessary conditions.

2. **Lynx non-habitat:** (termed "unsuitable areas" in LCAS): These are areas that are not considered to be capable of providing lynx habitat, such as lakes or human developments.

Management and analysis scale

Within LAUs

Objectives, standards, and guidelines (conservation measures) generally apply only to lynx habitat on National Forest System land within LAUs.

Management at LAU scale allows blocks of quality lynx habitat to be maintained within each LAU, thereby maintaining a good distribution of lynx habitat at scales appropriate for lynx conservation.

Exceptions

Exceptions to management and analysis at the LAU scale may be warranted for some projects if it is determined that an individual LAU does not provide a large enough analysis area within which to manage for lynx or address direct, indirect, and cumulative effects of particular actions. In some cases, project impacts should be assessed within the context of two or more LAUs. Certain projects may also entail consideration of landscape patterns across large areas, including NFS land outside of LAUs (for example, promoting habitat connectivity, management-ignited fire). Additionally, naturally occurring events such as fire or blowdown may impose changes across many LAUs.

The Forest Plan identifies specific exceptions to some management standards and guidelines for two LAUs: 44 and 46. These exceptions are made because of the existing social and environmental landscape context in those areas of the Forest. Within both excepted LAUs all Forest Plan objectives for promoting lynx conservation are applicable, however management emphasis in these areas is intended to focus on maintaining or improving connectivity to adjacent LAUs or the Boundary Waters Canoe Area Refugium (BWCAW).

LAU 44:

This LAU encompasses the narrow corridor between two portions of the Boundary Waters Canoe Area along the Upper Gunflint Trail. LAU 44 is excepted from certain standards and guidelines because this landscape configuration results in distinct social and ecological opportunities or concerns:

Social concerns over the threat of wildfire (described in USDA FS 1999, Section 1.1.2) have been identified. This LAU has high recreational use and many recreational and residential facilities, such as homes, cabins, resorts, camps, boat landings and wilderness entry points. Due to current vegetation conditions resulting from the July 4, 1999 windstorm, wildfires that start in the BWCAW have the potential to threaten life, property, and natural resources within in this LAU.

LAU 44 is not representative of a typical lynx home range because of its long linear shape. Ecologically lynx foraging and denning habitat, while very valuable in LAU 44, is amply provided in the adjacent BWCAW lynx refugium. The Landscape Ecosystems which predominate this LAU (primarily Jack Pine/Black Spruce and Dry-mesic Red and White Pine) are well represented in the adjacent BWCAW and thus foraging or denning habitat is likely to be adequately representative of the native habitats required by lynx. Management to promote lynx habitat in this LAU is appropriate and desired, however a key value and emphasis for this LAU is to provide appropriate landscape connectivity between two areas of the BWCAW lynx refugium.

LAU 46

LAU 46 is located in the Virginia Unit between two other LAUs: 45 and 47. LAU 46 is excepted from certain standards and guidelines because its landscape configuration results in distinct opportunities or concerns. The existing conditions within this LAU currently provides marginal habitat for the lynx. Lynx habitat is fragmented by mixed private landownership, roads, trails, homes, campgrounds, subdivisions, mining areas, and other human developments and lynx non-habitat. In spite of its marginal habitat, LAU 46 provides an important linkage between other LAUs, presenting a valuable opportunity to work towards lynx recovery in this portion of the Forest.

Outside LAUs

Pursuant to the Endangered Species Act of 1973 as amended (section 7(a)(2), exceptions to management and analysis at the LAU scale may also be warranted for some projects where it is determined that lynx may occur in areas outside of mapped LAUs and projects may affect the lynx..

Refining LAU boundaries

LAU boundaries will not be adjusted for individual projects. They will remain constant to facilitate planning and allow effective monitoring of habitat changes over time. However, as locally specific information from national lynx surveys, lynx research, and other sources (including State and Tribal) becomes available, LAUs may be refined. Refinements would be coordinated with Fish and Wildlife Service, and, where appropriate, with adjacent management agencies.

If minor adjustments to LAUs are made within currently mapped LAUs, the changes will usually be made administratively. If significant LAU adjustments or revisions are made, including adding land previously outside of LAUs, this would be proposed in accordance with the National Forest Management Act, including National Environmental Policy Act disclosure and public participation.

Refugium – Boundary Waters Canoe Area Wilderness

The Boundary Waters Canoe Area Wilderness (BWCAW) is recognized for its importance and contribution to lynx conservation and recovery in the Great Lakes Geographic Area(Ruedigger *et al.* 2000) For this reason the BWCAW is identified as refugium habitat for the Canada lynx.

Refugia are large, continuous areas encompassing the full array of seasonal habitats, in which lynx are present or occurred historically, and where natural ecological processes predominate. Refugia must be relatively secure from human exploitation, habitat degradation, and substantial winter access; however it is recognized that some active management may be needed to maintain or restore desired vegetation characteristics. Refugia should be sufficiently well-connected to permit genetic interchange within and between geographic areas

The Boundary Waters Canoe Area Wilderness, together with Voyageurs National Park (VNP) and Quetico Provincial Park, provides, perhaps, the best lynx habitat in the Great Lakes Area (Ruediger *et al.* 2000). The combination of snow depth and lack of trails and roads may allow lynx to retain a competitive advantage against bobcats (Ruediger *et al.* 2000). Wilderness management goals and objectives complement those of refugia. According to the BWCAW Management Plan, wildlife habitat composition will be the result of natural ecological processes such as fire, wind, insects, disease, and plant community succession (USDA FS 1992). Vegetation management objectives for the BWCAW include the preservation of natural ecosystems, including the protection of rare, endangered, and threatened animal habitats.

6. Lynx Conservation Assessment and Strategy: Procedural Guidance

The LCAS recommends both substantive and procedural guidance for lynx conservation management. Applicable LCAS substantive guidance (such as requiring that certain amounts of habitat always be maintained) has been incorporated into the Forest Plan. Most of the LCAS procedural guidance (such as recommendations for conducting certain analyses, mapping, and inventory aimed at both programmatic and project level scales of decision-making) is not specifically incorporated into the Plan. This is because much of the procedural guidance identified in the LCAS is found in the Forest Service Directive System and other applicable laws and authorities that are part of Forest Plan management direction.

However, some of specific procedural guidance from the LCAS is reprinted below because:
The LCAS suggests that following these procedural guides may facilitate accomplishing the substantive direction of the Plan and,they are not specifically found elsewhere in the Forest Service Directive System or other laws or authorities.

Including this procedural guidance below does not constitute Forest Plan management direction or supplant the need to conduct other required analyses. It provides potential considerations identified by the Lynx Biology Team for supporting lynx conservation management (Ruedigger *et al.* 2000).

Procedural Guidance to Address Mortality Risk Factors

Shooting, Trapping (legal and non-target)
Trapping, shooting, and predator control is generally regulated by the Fish and Wildlife Service, the State of Minnesota, and the Tribes. However, the National Forest does have some ability to coordinate with other agencies to reduce these mortality risks.

Federal agencies should work cooperatively with States and Tribes to reduce incidental take of lynx related to trapping. (Lynx may be more vulnerable to trapping near open roads [Koehler and Aubry 1994, Bailey et al. 1986].)

Initiate interagency information and education efforts throughout the range of lynx in the contiguous states. Utilize public education such as: trailhead posters, magazine articles, news releases, state hunting and trapping regulation booklets, trapper guidance, etc., to inform the public of the possible presence of lynx, field identification, and their status.

Highway Crossings

Direct mortality from vehicular collisions may be detrimental to lynx populations in the lower 48 states. Mortality levels can drastically increase with relatively small increases in traffic volumes and speed.

Within lynx habitat, identify linkage areas and potential highway crossing areas.

Where needed, develop measures such as wildlife fencing and associated underpasses or overpasses to reduce mortality risk.

Procedural Guidance to Address Movement and Dispersal Risk Factors

It is essential to provide landscape connectivity so that all or most habitat has the potential of being occupied, and populations remain connected. At the southern periphery and eastern portions of lynx range, habitat occurs in narrow fragmented bands (man-made or naturally-occurring), or has been fragmented by human developments. Connected forested habitats allow lynx, and other large and medium size carnivores, to easily move long distances in search of food, cover and mates. Highways and private land that are subdivided for commercial or residential developments or have high human use patterns can interrupt existing habitat connectivity and further fragment lynx habitat, reducing the potential for population interchange. In some areas, particularly the eastern United States, habitat connectivity may be difficult to achieve because of mixed ownerships. Land exchanges and cooperative management with private landowners may be the only options available to provide landscape connectivity.

Identify linkage areas that may be important in providing landscape connectivity within and between geographic areas, across all ownerships.

Develop and implement a plan to protect linkage areas on federal land from activities that would create barriers to movement. Barriers could result from an accumulation of incremental projects, as opposed to any one project.

Where feasible, maintain or enhance native plant communities and patterns, and habitat for potential lynx prey, within identified linkage areas. Pursue opportunities for cooperative management with other landowners.

Highways

Highways impact lynx and other carnivores by fragmenting habitat and impeding movements. As traffic lanes, volume, speeds, and right-of-way width increase, the effects on lynx and other carnivores are magnified. As human demographics change, highways tend to increase in size and traffic density. Special concern must be given to the development of new highways (gravel roads being paved), and changes in highway design, such as additions in the number of traffic lanes, widening of rights-of-way, or other modifications to increase highway capacity or speed. Within linkage areas, highway crossing structures should be employed to reduce effects on wildlife. Information from Canada (Trans-Canada Highway) suggests crossings should generally be at ½-mile intervals and not farther than 1 mile apart, depending on topographic and vegetation features.

Federal land management agencies will work cooperatively with the Federal Highway Administration and State Departments of Transportation to address the following within lynx geographic areas:
Identify land corridors necessary to maintain connectivity of lynx habitat.
Map the location of linkage areas where highway crossings may be needed to provide habitat connectivity and reduce mortality of lynx (and other wildlife).

Evaluate whether land ownership and management practices are compatible with maintaining lynx highway crossings in linkage areas. On public lands, management practices will be compatible with providing habitat connectivity. On private lands, agencies will strive to work with landowners to develop conservation easements, exchanges, or other solutions.

Identify, map, and prioritize site-specific locations, using topographic and vegetation features, to determine where highway crossings are needed to reduce highway impacts on lynx.

Land Ownership

Lynx exemplify the need for landscape-level ecosystem management. Contiguous tracts of land in public ownership (national forests, national parks, wildlife refuges, and BLM lands) provide an opportunity for management that can maintain lynx habitat connectivity. Throughout most of the lynx range in the lower 48 states, connectivity with habitats and populations in Canada is critical for maintaining populations in the U.S.

Identify linkage areas by management jurisdiction(s) in management plans and prescriptions.

In land adjustment programs, identify linkage areas. Work towards unified management direction via habitat conservation plans, conservation easements or agreements, and land acquisition.

Evaluate proposed land exchanges, land sales, and special use permits for effects on linkage areas.

7. Lynx Habitat Definitions and Descriptions

Definitions below are based on LCAS definitions but may have been modified or expanded to provide clarification or to better reflect conditions on the National Forest. These definitions may change based on new scientific information.

The planning records for implementation of the Forest Plan at the project level will provide information on the quantifiable and spatial parameters used to model and analyze lynx habitat, lynx non-habitat, and management activities(such as roads and trails) that affect lynx.

1. Lynx Habitat – In the Great Lakes states lynx occur in mesic coniferous forests that have cold, snowy winters and provide a prey base of snowshoe hare. Most lynx occurrences fell within the Mixed Deciduous/Conifer Forest province (McKelvey *et al.* 2000). Lynx habitat includes boreal, coniferous, and mixed coniferous/deciduous vegetation types dominated by pine, balsam fir, black and white spruce, northern white cedar, tamarack, aspen, paper birch, conifer bogs and shrub swamps.

Lynx habitat includes vegetation that is considered necessary or contributes to support lynx reproduction and survival. Lynx habitat includes a) habitat that may currently be in condition suitable to provide for denning, foraging, diurnal security, dispersal and movement or other life history requirements or b) habitat that is expected to develop with time those necessary conditions.

For management purposes, lynx habitat may be subdivided into categories based on their role in supporting lynx reproduction and survival. The key categories for which management direction is found in the Forest Plan include:

A. Foraging habitat:
    1) snowshoe hare (primary prey)
    2) red squirrel (important secondary prey)
B. Unsuitable habitat
C. Denning habitat
D. Linkage areas and connectivity habitat

Definitions for other habitats that contribute to support lynx reproduction and survival, such as other alternate prey species habitat or diurnal security habitat, are not included here. If applicable, those habitats may be defined and analyzed at project level.

A. Foraging Habitat

Habitat that supports primary prey (snowshoe hare) and/or important alternate prey (especially red squirrels) that are available to lynx.

A.1 Snowshoe hare:

The highest quality snowshoe hare habitats are those that provide food, security from predators, and thermal protection during extreme weather (Wolfe et al. 1982; Pietz and Tester 1983; Fuller and Heisey 1986; Monthey 1986; Koehler and Aubrey 1994; Wirsing et al. 2002): forest that supports a high density of young trees or shrubs (> 4,500 stems or branches per acre), tall enough to protrude above the snow (1-3 meters) (Hodges 2000, Parker, 1986).

In northern Minnesota these conditions may occur in a wide variety of habitats, including: lowland conifer bogs and forests; early successional forest typically 3-12 years following disturbances such as fire, insect infestations, catastrophic wind events, disease outbreaks, and timber harvest; older forests with a substantial understory of shrubs and young conifer trees; and willow/alder swamps (Jaakko Pöyry 1992, Kilgore and Heinselman 1990, Koehler 1990, 1991, Krenz 1988, Fuller and Heisey 1986, Pietz and Tester 1983).

In addition, coarse woody debris or brush piles, especially in early successional stages (created by harvest regeneration or management-ignited fire or natural disturbances such as fires or blowdown); provide important cover for snowshoe hares and other prey.

Other research shows that landscape pattern and habitat juxtaposition are important in identifying hare habitat (Pietz and Tester 1983, Conroy et. al. 1979, Kernz 1988). Clearcut edges with good understory cover were heavily used while open clearcuts were poorly used and acted as barriers to movement and habitat use (Conroy et. al. 1979). In addition, high hare densities were found on the edge between lowland conifer and upland deciduous stands, concluding that hare densities were positively correlated with coniferous cover, especially if clumped with interspersed deciduous cover (Kernz 1988).

A.2 Red squirrel:

Red squirrels are an important alternate prey species. They are found in a variety of habitat types, but their densities tend to be highest in mature cone-bearing forests with substantial quantities of coarse woody debris (Ruediger *et al.* 2000). Red squirrels prefer mature conifer forests because of their forage preference for conifer seeds , but also may also be found in hardwood or younger forests that provide mast forage such as oak and hazel, fruits, mushrooms, and other seeds. (Jaako-Poyry 1992).

B. Unsuitable habitat

Areas of lynx habitat within LAUs that are in initial stages of forest growth (early successional) where vegetation has not developed sufficiently to support snowshoe hare populations during all seasons. Unsuitable habitat results from either natural disturbances such as fire, flooding, blowdown, or insect and disease outbreaks or from human management activities. Management activities that create openings that are unsuitable for hare generally include clearcut and seed tree harvest, and might include management-ignited fire, mechanical site preparation, salvage harvest, and shelterwood and commercially-thinning harvest, depending on unit size and remaining stand composition and structure.

C. Denning Habitat

Habitat used during parturition and rearing of young until they are mobile. The common component appears to be large amounts of coarse woody debris, with down logs or root wads, in sufficient amounts to provide escape and thermal cover for kittens. Denning habitat may be found in a variety of forested habitats, especially older mature forest of conifer or mixed conifer/deciduous types or regenerating stands (>20 years since disturbance). Forest disturbed by blowdown, fire, insect, or disease also may provide denning habitat. Denning habitat should be well distributed within the LAU. Foraging and denning habitat must be located within daily travel for breeding

females. Denning generally occurs from birth of kittens in late May to early July until kittens are mobile six to eight weeks later in late July or August.

D. Linkage Areas/Landscape Connectivity Habitat

Habitat that provides landscape connectivity between blocks of lynx habitat. Such habitat is provided by cover (vegetation) in sufficient quantity and arrangement to allow for the movement of lynx. Linkage areas occur both within and between geographic areas where blocks of lynx habitat are separated by intervening areas of non-lynx habitat such as agricultural lands, developed land, or where lynx habitat naturally narrows between blocks. Connectivity provided by linkage areas can be degraded or severed by human infrastructure such as highways, subdivisions, or other developments.

2. Lynx non-habitat - (termed "unsuitable areas" in LCAS): Areas such as lakes and human developments, that do not support snowshoe hare populations and are not considered capable of providing lynx habitat.

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Glossary

Access	The opportunity to approach, enter, and make use of public or private land.
Accuracy	The closeness of computations or estimates to the true (i.e., exact) standard, or accepted values – note accuracy refers to quality of; the degree of obtaining the correct value, especially when the measure is repeated .
Acid Deposition	Precipitation, as in rain or snow, whose increased acidity is caused by environmental factors: i.e., atmospheric pollutants.
Acquisition	Land coming into federal ownership.
Activity	A measure, course of action, or treatment that is undertaken to directly or indirectly produce, enhance, or maintain forest and rangeland outputs or achieve administrative or environmental quality objectives.
Activity Fuels	Tree tops, branches, boles, and other woody debris that are created by timber sale activities.
Adaptive Management	A type of natural resource management in which decision making is 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.
Administrative Motor Use	Authorized use of motorized equipment in wilderness. Examples of when administrative motor use may be authorized are search and rescue, wildfire, and law enforcement, or when a situation involves inescapable urgency and temporary need for speed beyond that available by primitive means.
Aesthetics	Generally, the study, science, or philosophy dealing with beauty and with judgments concerning beauty. In scenery management, it describes landscapes that give visual and sensory pleasure. (SMS Handbook Number 701)
Age Class	Grouping of trees originating from a single natural event or regeneration activity. Age classes are grouped by an interval of 10 or 20 years, for example 1-10 years, 11-20 years, 21-30 years, etc.
Air Quality	The composition of air with respect to quantities of pollution therein; used most frequently in connection with 'standards' of maximum acceptable pollution concentrations. Air quality classes (I, II, or III) are designations for the level of protection given to geographic areas of the country. This classification denotes the increment above which deterioration of air quality would be regarded as significant and consequently not allowed. Class I allows the least deterioration, for example National Parks, Monuments, and Wilderness Areas. Class II is much less restrictive than Class I and includes most of Minnesota. Class III is the least restrictive.
Allocations	An assigned portion of land, acreage, production, etc., for a specified purpose in a forest plan.
Allowable Sale Quantity (ASQ)	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 allowable sale quantity (ASQ) is usually expressed on an annual basis as the "average annual allowable sale quantity" (FSM 1900). For timber resource planning purposes, the allowable sale quantity applies to each decade over the planning horizon and includes only chargeable volume. Consistent with the definition of timber production, do not include fuelwood or other non-industrial wood in the allowable sale quantity.

Allowed (to describe RMV use)	RMV use on roads and trails, as well as cross-country, is generally allowed. However, these uses may be restricted by season, type of vehicle, vehicle equipment, or type of activity specified in permits or Forest Supervisor orders.
All-terrain Vehicle (ATV)	All-terrain vehicles (ATVs) are motorized flotation-tired vehicles with at least three, but no more than six low pressure tires, with an engine displacement of less than 800 cubic centimeters and total dry weight less than 900 pounds. ATVs with a total try weight of more than 900 pounds are classified as ORVs. (State of Minnesota Off-highway Vehicle Regulations 2003-04)
Ambient Air	That air, external to buildings, encompassing or surrounding a specific region.
Ambient Air Quality Standard	The prescribed level of pollutants in the outside air that cannot be exceeded legally during a specified time in a specified geographical area.
Analysis	Methods used to determine or separate inventory and resource mapping information into important components and examine them critically (Webster).
Analysis of the Management Situation (AMS)	Forest plan have a brief summary of the analysis of the management situation, including demand and supply conditions for resource commodities and services, production potentials, and use and development opportunities. (36 CFR 219.11(a))
Appropriate Management Response	Specific actions taken in response to a wildland fire to implement protection *and* fire use objectives. (The concepts of confine, contain, and control should still be considered as viable TACTICS applied to suppressing unwanted wildland fires. Those terms, however, should not be confused for, or referenced to wildland fire management STRATEGY.)
Aquatic	Growing, living in, or frequenting water.
Aquatic Ecosystem	Stream channels, lakebeds, water, biotic communities, and the habitat features that occur therein. This includes streams and lakes that are permanently, intermittently, semi-permanently and seasonally flooded, as defined by the US Fish and Wildlife Service.
Bankfull Stage	The elevation at which waters in a stream fills its channel to the tops of its banks where the water begins to overflow into a floodplain.
Barrel Scarification	A very large barrel with prongs towed behind a tractor. The prongs clear a patch of land for tree planting.
Basal Area	The cross-sectional area of all stems in a stand measured at 4.5 feet above the ground and expressed per unit of land area. Basal area is a way to measure how much of a site is occupied by trees
Benefit (Value)	Inclusive term used to quantify the results of a proposed activity, project, or program expressed in monetary or non-monetary terms.
Best Management Practices (BMP)	Practices (individual or in combination) that prevent non-point source of pollution or ensure that the amount is kept to a level compatible with state water quality and wetland protection goals.
Big Game	Certain wildlife that may be hunted for sport under state laws and regulations, including deer, bear, and moose.
Biodiversity	Variety of life and its ecological processes; the variety of organisms considered at all levels, from genetic variants belonging to the same species, through arrays of genera, families, and still higher taxonomic levels. Includes the variety of ecosystems, which comprise both the communities of organisms within particular habitats, and the physical conditions under which they live. The Forest Service Manual has direction on habitat planning and evaluation, including specific forest planning direction for meeting biological diversity requirements: A forest plan must address biological diversity through consideration of the distribution and abundance of plant and animal

	species and communities to meet overall multiple-use objectives (FSM 2622.01).
Biome	An area of land with a characteristic combination of plants and animals that pass through a sequence of stages in development and that trends to reach a point of approximate equilibrium with its environment that differs from the equilibrium reach in another biome.
Biota	Pertaining to any aspect of life, especially to characteristics of entire populations of organisms, including animals, plants, fungi, and micro-organisms, found in a given ecosystem.
Blowdown	Downed trees and slash from a windstorm.
Board Foot	The amount of wood contained in an unfinished board one inch thick, 12 inches long, and 12 inches wide.
Bog	Wetland ecosystems made up of accumulations of peat derived from decomposed sedges and mosses. Bog water is acidic and vegetation includes mostly shrubs, sedges, and mosses, stunted black spruce, tamarack, balsam fir and cedar.
Boreal Forest	A forest type consisting primarily of black spruce and white spruce with balsam fir, birch, and aspen. It is the most extensive forest type in the world.
Boundary Waters Canoe Area Wilderness (BWCAW)	The BWCAW is a wilderness area located within the Superior National Forest in northeastern Minnesota.
Boundary Waters Canoe Area Wilderness Refugium Lynx Habitat	Refugia are defined as large, continuous areas encompassing the full array of seasonal habitats, in which lynx are present or occurred historically, and where natural ecological processes predominate. Refugia must be relatively secure from human exploitation, habitat degradation, and substantial winter access. (see Appendix E for more discussion).
Brush Raking	Using a pronged attachment on a tractor to gather loose material on the land in preparation for planting.
Buffer	An 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 unwanted. Buffers may be set aside wildlife habitat to reduce abrupt change to the habitat.
Build Up Index (BUI)	Part of Fire Weather Index (a sub-portion of the Canadian Forest Fire Danger Rating System). The FWI is composed of six components—three fuel moisture codes and three fire behavior codes. The BUI is one of the fire behavior codes and represents the Build Up Index. It is a combination of the Duff Moisture Code (DMC) and the Drought Code (DC). The BUI, based on DMC and DC, represents a measure of the total fuel available for consumption. The BUI reflects forest floor fuel moisture effects, and is a useful tool in understanding the severity of burns and the potential residence time of the burn in relationship to the duff moisture. Canadian fire researchers use it to predict about possible duff reduction for prescribed burns and for management decisions in implementing wildland fire use.
C.F.R.	Code of Federal Regulations
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.
Carry-in Water Access	An unloading area within close proximity of the water with adjacent parking that provides for water access of boats by off loading a boat and carrying it to the waters edge. (Also can be referred to as carry-down or car top access.)
Cavity	A hole in a tree often used by wildlife species, usually birds, for nesting, roosting, and reproduction.

Channel	A waterway of perceptible extent that periodically or continuously contains moving water. It has definite bed and banks which serve to confine the water.
Channel Morphology	The stream morphology of a section of flowing water and associated flood plain.
Channel Stability	A section of flowing water that maintains a dimension, pattern, and profile without aggrading or degrading in the current climate.
Classified Road	Roads wholly or partially within or adjacent to National Forest System lands that are determined to be needed for long-term motor vehicle access, including Forest system roads, state roads, county and township roads, and other roads authorized by the Forest Service.
Clearcutting	Removal of all or almost all trees in the stand in a single cutting.
Closure	An administrative order prohibiting or restricting either the location, timing, or type of use in a specific area.
Coarse Filter Management	Land management that addresses the needs of all species, communities, environments, and ecological processes in a land area (compare to *fine filter management*). It is the concept of managing an array of representative ecosystems across the landscape, assuming that such representation will provide habitat for the majority of species.
Coarse Woody Debris	Stumps and fallen trunks and limbs of more than six-inch diameter at the large end.
Cold-water Fish	Cold-water fish have preferences for summer water temperatures that are less than approximately 65° F.
Collaborative Planning	USDA Forest Service employees working with the public, state and local agencies, tribal governments, regulatory agencies, other federal agencies and others to assure the most efficient and effective conservation and sustainable multiple use management possible.
Commodity Resources	Market driven resources such as timber, boughs, wildlife fish and game that can be bought and sold.
Community (ecological)	Recurring assemblages of plants and animals, having a consistent composition, structure, and habitat. An ecological community is quite similar to the ecosystem, though with much greater emphasis on living elements and their respective interconnections. Groups of organisms common to a given community are understood to be functionally linked through the influences they directly or indirectly have on one another. Communities exist at many scales, there are communities within communities. The very expansive boreal forest or tall grass prairie could be thought of as communities, much in the same respect as the smaller group of organisms living together in a backyard pond. Biotic communities are multiple species groupings of biota, such as assemblages of both plants and animals. Ecological communities attribute various patterns of community distribution to underlying physical factors (e.g., soil and water), attempting to better integrate some non-living features into their definitions. Natural or native communities focus on communities shaped by primarily non-human factors.
Community (human)	People with common interests living in a particular area and the area itself.
Composition	As used in ecology, the mix of species present on a site or landscape or population and the species' relative abundance.
Condition Class	A classification of the amount of departure from the natural fire regime
Conifer	A wide range of the tree species within the order Gymnospermae, typically evergreen, bearing cones, and having needle or scale-like leaves, such as pine and spruce.

Connectivity	The linkage of similar but separated vegetation stands by patches, corridors, or “stepping stones” of like vegetation. The linkage of similar but separated vegetation stands by patches, corridors, or "stepping stones" of like vegetation. This term can also refer to the degree to which similar habitats are linked.
Conservation (of species)	The terms “conserve,” “conserving” and “conservation” mean to use and the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to [the] Act are no longer necessary. [ESA § 3(3)]
Consultation (with US Fish and Wildlife Service)	(1) An active, affirmative process that (a) identifies issues and seeks input from appropriate American Indian governments, community groups and individuals; and (b) considers their interests as a necessary and integral part of the BLM and Forest Service decision-making process. (2) The federal government has a legal obligation to consult with American Indian tribes. This legal obligation is based on such laws as Native American Graves Protection and Repatriation Act, the American Indian Religious Freedom Act and numerous other executive orders and statutes. The legal responsibility is, through consultation, to consider Indian interests and account for those interests in the decision. (3) Consultation also refers to a requirement under Section 7 of the Endangered Species Act for federal agencies to consult with the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service with regard to federal actions that may affect listed threatened or endangered species or critical habitat.
Consultation/ Consulting Parties (heritage resources	A portion of the review process under Section 106 of the National Historic Preservation Act during which consulting parties consider ways to resolve adverse effects on historic properties. The consulting parties include, at a minimum, the responsible Federal agency and the State Historic Preservation Officer (SHPO). Other interested parties, such as the Advisory Council on Historic Preservation (ACHP), Indian tribes, and local governments, may also be invited to consult.
Conveyance	Transferring lands from federal ownership.
Cool-water Fish	Cool-water fish have preferences for summer water temperatures that are between approximately 65° and 75° F.
Corridor (transportation)	A linear strip of land defined for the present or future location of transportation or utility rights-of-way within its boundaries.
Corridor (wildlife)	A defined tract of land connecting two or more areas of similar habitat type through which wildlife species can travel.
Cover Type (Forest Cover Type)	Stands of particular vegetation type that are composed of similar species.
Cross-country ATV and Snowmobile travel	Travel by ATV or snowmobile off of a designated trail, classified road, or unclassified road.
Crown	The part of a tree or woody plant bearing live branches and foliage.
Cubic Foot	A unit of true volume that measures 1 x 1 x 1 foot.
Culmination of Mean Annual Increment	The age at which the average annual growth is greatest for a stand of trees. Mean annual increment is expressed in cubic feet measure, and is based on expected growth according to the management intensities and utilization standards assumed in accordance with 36 CFR 219.16(a)(2)(i) and (ii). Culmination of mean annual increment (CMAI) includes regeneration harvest yields and any additional yields from planned intermediate harvests.

Cultural Resources	A building, site, structure, object, or historical district that possesses historical significance (see also heritage resources).
Designated Uses	Specific uses identified for all water bodies in the state, both surface and ground water. Waters of the state are protected for multiple uses and water quality standards exist to protect those uses. Examples of designated uses are drinking water; aquatic life and recreation; agriculture; wildlife; industrial consumption; aesthetic enjoyment; and navigation.
Desired Condition (DC)	Description of land and resource conditions if all long-term goals are achieved.
Desired Non-native Species	Those species of plants or animals that are not indigenous to an area but wanted for their contribution to high social, economic, or cultural value.
Developed Ramp	A constructed and maintained concrete or surfaced ramp with adjacent parking that provides for water access of boats by backing a boat trailer directly into the water.
Developed Recreation	Recreation that requires facilities that result in concentrated use of the area. For example, parking lots, roads, and campgrounds.
Developed Recreation Sites	Relatively small, distinctly defined areas where facilities are provided for concentrated public use, such as campgrounds, picnic areas and swimming beaches.
Discharge	Flow in a stream, usually measured in cubic feet per second (CFS).
Discing	Using a plow-like attachment on a tractor to plow shallow furrows in preparation for planting.
Dispersed Campsite	An individual/family-sized campsite that has a general size of approximately 600-750 square feet. It includes a hardened area around a fire pit, a barren area, and/or user-constructed facilities.
Dispersed Recreation	Recreation that does not occur in a developed recreation site, such as hunting, backpacking, and scenic driving. Dispersed recreation activities may require facilities for safeguarding visitors, protecting resources, and enhancing the quality of visitor experiences.
Displacement	The mechanical movement or removal of the top mineral or organic layers of the soil. Detrimental displacement is excessive removal sufficient to reduce the long-term productivity and biodiversity of soil dependent flora and fauna. Mixing of mineral and organic soil materials is not considered detrimental displacement (such as mixing by discing, etc.)
Disturbance	Any event, either natural or human induced, that alter the structure, composition, or functions of an ecosystem. Examples include forest fires, insect infestations, and timber harvesting.
Diversity	The distribution and abundance of different plant and animal communities and species within the area covered by a land and resource management plan (36 CFR 219.3). See also *biodiversity*.
Donation	Receiving land as a gift from a non-federal party for federal ownership.
Duff	Soil layer consisting of partly and well decomposed plant organic matter; includes the humus layer. Most often this is a surface layer. See also forest floor, surface ‘o’ layer.
Early Successional Forest	The forest community that develops immediately following a removal or destruction of vegetation in an area. For instance, grasses may be the first plants to grow in an area that was burned.
Eastern Region	The portion of the USDA Forest Service, also referred to as Region Nine, that includes the National Forests and Grasslands in New England, the Mid Atlantic, the Mid-west, and the Lake States.
Ecological Approach	An approach to natural resource management that considers the relationships among all organisms, including humans, and their environment.

Ecological Integrity	In general, ecological integrity refers to the degree to which the elements of biodiversity and the processes that link them together and sustain the entire system are complete and capable of performing desired functions. Exact definitions of integrity are relative and may differ depending on the type of ecosystem being described.
Ecological Landtype (ELT)	An ecological map unit which is a subdivision of landtype associations or groupings of landtype phases that are areas of land with a distinct combination of natural, physical, chemical and biological properties that cause it to respond in a predictable and relatively uniform manner to the application of given management practices. In a relatively undisturbed state and/or a given stage of plant succession, an ELT is usually occupied by a predictable and relatively uniform plant community.
Ecological Landtypes on the Superior NF	1 - Lowland, moist loamy soils with plant communities that are transitional between uplands & lowlands. Somewhat poorly drained soils are susceptible to rutting and compaction when saturated. 2 - Lowland, wet loamy and clayey soils with plant communities typical of wetlands. Can be forested or wetland shrub. Soils are susceptible to rutting and compaction due to continuous saturated conditions. 3 - Lowland, moist silty clay loam and clay soils with plant communities transitional between uplands & lowlands. Somewhat poorly drained soils are susceptible to rutting & compaction when saturated. 4 - Lowland, wet clay loam, silty clay and clay soils with plant communities typical of clayey wetlands. Soils are susceptible to rutting and compaction due to continuous saturated conditions. 5 - Lowland, acidic, poorly- decomposed organic soils composed mainly of sphagnum and hypnum mosses with bog plant communities adapted to permanently wet soils. Soils are susceptible to rutting and compaction due to continuous saturated conditions. 6 - Lowland, acidic to neutral organic soils composed of decaying woody plants and forbs with plant communities adapted to permanently wet soils. Soils are susceptible to rutting and compaction due to continuous saturated conditions. 7 - Upland, moderately well-drained sand and gravel soils with plant communities adapted to a fluctuating water table in a sandy root zone. Soils are susceptible to nutrient loss due to thinner surface organic layer and coarse textured soils. 8 - Upland, well-drained sand and gravel soils with a water table at an estimated depth of 5 to 8 feet and with plant communities having both upland and lowland species. Soils are susceptible to nutrient loss due to thinner surface organic layer and coarse textured soils. 9 - Upland, droughty gravel and sand soils with plant communities adapted to droughty conditions and a root zone dominated by gravels. Soils are susceptible to nutrient loss due to thinner surface organic layer and coarse textured soils. 10 - Upland, moderately well- drained silty clay loam and clay soils with upland plant communities. Silty soils will retain water long enough to create temporarily saturated soil in wet conditions and be more susceptible to rutting and compaction. 11 - Upland, well-drained sandy loam & loamy sand soils. Gravelly subsurface; plant communities adapted to dry site. Soils susceptible to nutrient loss due to thin surface organic layer & coarse textured soils. 12 - Upland, poor to well-drained, bouldery, loamy soil. The ground is also covered with boulders. Plant communities have adapted to these site conditions. On some sites, the ground may be covered with boulders with very little vegetation. Soils are susceptible to nutrient loss due to lack of surface organic layer or organic layer underlain with boulders. 13 - Upland, well-drained sandy loam & loamy sand soils with a gravelly subsurface and plant communities representative of dry uplands.

	14 - Upland, moderately well-drained, sandy loam to silt loam soils with a subsurface layer of dense soil that retains water for longer periods of time in some locations, and plant communities that have relatively high requirements for nutrients & moisture. Subsurface layer of dense soil will retain water long enough to create temporarily saturated soil in wet conditions and be more susceptible to rutting & compaction. 15 - Upland, well-drained to moderately well-drained loam, clay loam & silt loam soils, and plant communities with a high requirement for nutrients and moisture. Silt & clay soils will retain water long enough to create temporarily saturated soil in wet conditions, more susceptible to rutting & compaction. 16 - Upland, well-drained sandy loam or loam soils, 20 to 40 inches deep over bedrock. Plant communities have adapted to dry conditions and shallow soils depths to bedrock. Soils susceptible to nutrient loss due to the thinner surface organic layer and shallow soil depth. 17 - Upland, well-drained sandy loam soils, 8-20" deep over bedrock. Plant communities have adapted to droughty conditions and shallow soils depths to bedrock. Soils are susceptible to nutrient loss due to the thinner surface organic layer and shallow soil depth. 18 - Upland, droughty loam, and sandy loam soils, less than 8" deep over bedrock, with bedrock outcrops occurring on 5 to 30 percent of the ground surface. Plant communities have adapted to very dry conditions. Mosses commonly cover the ground. Soils are susceptible to nutrient loss due to the thinner surface organic layer and shallow soil depth.
Ecological Units	Delimit areas of different biological and physical potentials.
Ecology	The interrelationships of living things to one another and to their environment, or the study of these interrelationships.
Ecosystem	A community of living plants, animals, and other organisms interacting with each other and with their physical environment.
Ecosystem Management	An ecological approach to natural resource management to assure productive, healthy ecosystems by blending social, economic, physical, and biological needs and values
Edge	The margin where two or more vegetation patches meet, such as a meadow opening next to a mature forest stand, a red pine stand next to an aspen stand, or a clearcut stand next to a well-stocked stand.
Emergent vegetation	Herbaceous plants that grow in water or saturated soil, with portions that stand up out of the water.
Endangered Species	Official designation by U.S. Fish & Wildlife Service applied to any species that is in danger of extinction throughout all or a significant portion of its range.
Endemic	Indigenous or confined to a certain area or region, having a comparatively restricted distribution.
Enhance	To improve, reinforce, enrich or strengthen the existing condition, value or beauty of a resource.
Entry Point	The area designated as a drop-off point for entrance into the BWCAW.
Entry Point Quota	See Quota.
Environmental Analysis	The process associated with preparing documents such as environmental assessments and environmental impact statements and the decision whether to prepare an environmental impact statement. It is an analysis of alternative actions and their predictable short-term and long-term effects, which include physical, biological economic, and social factors and their interactions.

Erosion	The wearing away of the land's surface by running water, wind, ice, and other geological agents. It includes detachment and movement of soil or rock fragments by water, wind, ice, or gravity. Rills, gullies, pedestals and soil deposition are indicators of accelerated surface soil erosion, which are considered detrimental erosion.
Eutrophication	The process by which a body of water becomes, either naturally or by pollution, rich in dissolved nutrients such as phosphorus.
Evaluation	The analysis of monitoring data that produces information needed to answer specific monitoring questions.
Even-aged	A term usually used as "even-aged stand" or "even-aged management", which identifies a stand containing a single age class in which the range of tree ages is usually less than 20% of the normal rotation or life span. Timber management actions that result in the creation of stands of trees in which the trees are essentially the same age. Clearcut, shelterwood, or seed-tree harvest methods produce even-aged stands.
Excursion Boat	Watercraft involved in pleasure/touring trips.
Exempt Use (in the BWCAW)	Homeowners and their guests, and resort owners and their guests on particular lakes shall have access to that particular lake, and their entry shall not be counted against the day use quota.
Exotic Species	See Non-native Invasive Species
Experimental Forest	A forest area set aside for research, administered by the Research branch of the Forest Service.
Extended Rotation	Management at rotation ages that are a minimum of 1.5 times the Culmination of Mean Annual Increment (CMAI).
Extirpated Species	Species that formerly occurred regularly in an area but have disappeared and are not expected to recur without human assistance.
Facility	Structures needed to support the management, protection, and utilization of the National Forests including buildings, utility systems, bridges, dams, communication system components, and other constructed features.
Fifth and Sixth-level Watersheds	Watersheds delineated using the USGS Hydrologic Unit Code (HUC) delineation system. Fifth-level watersheds are larger than sixth-level watersheds. (Also referred to as "10-digit HUC" or "12-digit HUC" watersheds.)
Filter Strip	An area of land adjacent to a water body that acts to trap and filter out suspended sediment and chemicals attached to sediment before it reaches the surface water. Unless specific management direction in the Forest Plan indicates otherwise, harvesting and other forest management activities are permitted in a filter strip as long as the integrity of the filter strip is maintained and mineral soil exposure is kept to a minimum.
Fine Filter	The concept of managing individual species through individual conservation measures. Individual nests, colonies, and habitats are emphasized. Management that focuses on the welfare of a single or only a few species rather than the broader habitat or ecosystem (compare to *coarse filter management*).
Fine Sediment	Small sediment fractions that will pass through a 0.85 mm mesh sieve.
Fire Management Plan	A strategic plan that defines a program to manage wildland and prescribed fires and documents the fire management program.
Fire Regime	A generalized description of the role fire plays in an ecosystem. It is characterized by fire frequency, seasonality, intensity, duration and scale (patch size), as well as regularity or variability.
Fire Rotation	The interval of time between wildland fire occurrences in a specific geographic area.
Fire Use	The combination of Wildland Fire Use and prescribed fire application to meet resource objectives.

Fiscal Year	The fiscal year is the government's accounting period. It begins on October 1, and ends on September 30, and is designated by the calendar year in which it ends. Before 1976, the fiscal year began on July 1, and ended on June 30.
Floodplain	Lowland and relatively flat areas joining inland waters, including flood-prone areas of islands. The minimum area included is that subject to a one percent (100-year recurrence) or greater chance of flooding in any given year.
Floodprone Area	Land and water which lies below the elevation equivalent to two times the maximum depth at bankfull stage of a stream.
Forb	Any herbaceous plant other than grass or grass-like plants.
Forest Cover Type (Forest Type)	See cover type.
Forest Floor	Distinctive feature of forest soils that designates all organic matter, including litter and decomposing organic layers resting on the mineral soil surfaces but not mixed with mineral soil material. There are layers to the forest floor: "litter layer" of unaltered dead remains of plants and animals; a layer of fragmented partly decomposed organic materials still discernible to the naked eye, and a layer of well decomposed organic material. The forest floor provides food to micro-fauna and micro-flora, provides a fund of nutrients for higher plants, insulates the surface from extremes in temperature and moisture, and improves water infiltration (see surface "o" layer, see "duff").
Forest Health	A forest condition that has overall structure, function, and characteristics that enable it to be resilient to disturbance, meet human needs, and to maintain normal rates of change commensurate with its stage of development.
Forest Plan	A forest plan (land and resource management plan) guides all natural resource management activity and establishes management standards and guidelines for a National Forest, embodying the provisions of the National Forest Management Act of 1976. The revised *Forest Plans* are the preferred alternative applied to a forest plan.
Forest Plan Revision	A formal modification of an existing forest plan to address changes in the natural, social, and economic environment, new information about resources on and off National Forests, and new scientific knowledge 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. Federal planning regulations require the Forest Service to revise a forest plan every 10 to 15 years.
Forest Products	Goods and services resulting from use of the forest. These may include timber, wildlife, water, forage, recreation, and minerals. Also included, are recreational experiences, scenic and spiritual values, etc.
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.
Forested River Segments	Forested River segments are located in areas with mixed land ownership. Generally, these segments are sparsely to moderately populated areas with some roads. Moderate recreational use of these rivers and adjacent lands is common. Visitors may encounter other recreationists at accesses or on the water. This class holds potential for additional development and recreational use due to land suitability and proximity to roads. Examples: CNF: Boy River; SNF: Pelican River, remainder of the Vermilion River.
Forest-wide	Applying to all areas or acres within a National Forest.
Fragmentation	Splitting or isolating of patches of similar habitat, typically forest cover, but including other types of habitat. These patches can differ from the original habitat in either composition or structure. Habitat can be fragmented naturally or from forest management activities, such as clearcut logging. Breaking-up of contiguous forested

	areas into progressively smaller patches of different ages and/or forest types with an increasing degree of isolation from each other.
Fee Simple Estate	Absolute ownership unencumbered by any other interest or estate.
FSH	Forest Service Handbook
FSM	Forest Service Manual
Fuel Treatment	The manipulation of wildland fuel, such as lopping, chipping, crushing, piling and burning, or removal for the purpose of reducing its flammability or resistance to control.
Fuelbreak	Any natural or constructed barrier used to segregate, stop, and control the spread of fire or to provide a control line from which to work.
Fuels	Plants and woody vegetation, both living and dead, that are capable of burning.
Fuels Management	The practice of evaluating, planning, and treating wildland fuel to reduce flammability and to reduce its resistance to control through mechanical, chemical, biological, or manual means, including prescribed fire and wildland fire use in support of land management objectives.
Full Fee	Full fee ownership is all rights, title and interest to property.
Function	A term in ecology referring to the interactions and influences between plant and animal species within an area (how each species uses its environment), and to natural processes of change or disturbance (such as wind or aging).
Functional Riparian Areas	The area along, and generally paralleling, the shorelines of lakes, open water wetlands and streams, where the functional interaction between the aquatic ecosystem and adjacent wetlands or riparian ecosystems is most pronounced. For application to management, the functional riparian area: Will be implemented along all lakes, open water wetlands, and streams that are shown on maps or otherwise identified at the project level; and is subdivided into one or both of two riparian management zones, the "near bank" zone and the "remainder" zone.
Game Species	Those wildlife species that are commonly hunted, trapped, or fished.
General Development Lake	These lakes are used extensively for recreation. The ownership is mixed public and private. There is usually extensive shoreline development. Generally, the lakes are large (1,000 acres plus) and of a variety of shapes and depths. Examples: CNF: Winnie, Leech; SNF: Vermilion, Birch.
Goal	A concise statement that describes a desired future condition normally expressed in broad, general terms that are timeless, in that there is no specific date by which the goal is to be achieved.
Goods and Services	Outputs, including on-site uses, produced by forest and rangeland resources.
Government-to-Government Consultation	Consultation between the head of an agency of the U.S. Government and the head of a federally recognized Indian tribe. Within the Forest Service, for example, government-to-government consultation might be initiated between the Forest Supervisor and the Tribal Chair. The level of diplomacy at which consultation takes place recognizes the sovereign status of federally recognized tribes.
Grooming	Preparation of snow for skiing, i.e., packing, tracking, and tilling.
Groundwater	Water within the earth that supplies wells and springs. Specifically, water in the zone of saturation where all openings in soils and rocks are filled; the upper surface level forms the water table.
Group Selection Harvest	A cutting method in which trees are removed periodically in small groups. This silvicultural treatment results in small openings that form mosaics of age-class groups and leads to the formation of an uneven-aged stand.

Group Size	In the BWCAW, the maximum number of persons authorized to travel together under one visitor permit (same as party size).
Guest	In terms of BWCAW permits and quotas, a person receiving overnight lodging at a home or resort and who lodges with the consent of a keeper or owner. Customers, i.e., those who purchase a meal, rent a boat, or pay for parking, are not considered guests.
Guidelines	Guidelines are preferable limits to management actions that may be followed to achieve desired conditions. Guidelines are generally expected to be carried out. They help the Forest to reach the desired conditions and objectives in a way that permits operational flexibility to respond to variations over time. Deviations from guidelines must be analyzed during project-level analysis and documented in a project decision document, but deviations do not require a Forest Plan amendment.
Habitat	The natural environment of a plant or animal. In wildlife management, the major components of habitat are considered to be food, water, cover, and living space. Breeding habitat: The habitat type or types upon which a wildlife species depends for reproduction. Foraging habitat: The habitat type or types within which a wildlife species finds the food it needs. Wintering habitat: Areas where migratory, and particularly airborne (e.g., birds, bats) species find shelter or warmer weather during the winter or non-breeding season.
Heritage Resources	The remains of sites, structures, or objects used by people in the past; this can be historical or pre-historic (also see cultural resources).
Hydrologic Characteristics	Features of a watershed relating to the flow of water, such as infiltration, evapotranspiration, runoff, water yield, peak flows, and normal annual peak flow.
Hydrologic Connectivity	Water-mediated transfer of matter, energy and/or organisms within or between elements of the hydrologic cycle.
Hydrologic Discharge	The flow of water, over time, past a particular point on the land.
Implementation	Those activities necessary to initiate the actions in the approved land and resource management plan.
Indigenous (Species)	Any species of wildlife native to a given land or water area by natural occurrence.
Individual Tree Selection Harvest	A cutting method where individual trees are removed from certain size and age classes over an entire stand area. Regeneration is usually natural, and an uneven-aged stand is maintained.
Infiltration	The rate of movement of water from the atmosphere into the soil; that portion of rainfall or surface runoff that moves downward into the subsurface rock and soil; the entry of water from precipitation, irrigation, or runoff into the soil profile.
Integrated Pest Management (IPM)	An ecologically based process for selecting strategies to regulate forest pests to achieve resource management objectives. It is the planned and systematic use of detection, evaluation, and monitoring techniques; and all appropriate silvicultural, biological, chemical, genetic, and mechanical tactics needed to prevent or reduce pest-caused damage and losses to levels that are economically, environmentally, and aesthetically acceptable. (FSH 2109.14-94-1)
Integration	The blending or merging of disparate or complementary inventory or monitoring efforts during data collection, storage, or analytical steps of information management (Powell 2000).
Integrity (heritage resources)	In terms of heritage resources, it is evidence of the authenticity of a property's historical character, as indicated by the survival of physical characteristics that existed during the property's historical or pre-historical period of use (see also ecological integrity).
Interdisciplinary	The combination of two or more academic disciplines or fields of study.

Interdisciplinary Team
A group of individuals with different training assembled to perform a task. The team is assembled out of recognition that no one scientific discipline is sufficiently broad enough to adequately solve the problem.

Interior Forest
A large contiguous forest with a closed or partially open canopy of relatively mature trees.

Intermittent Stream
A stream that flows only at certain times of the year when it receives water from rainfall or run-off from some surface source, such as melting snow.

Invasive Species
See non-native invasive species (NNIS)

Land Allocation
The decision to use land for various resource management objectives to best satisfy the issues, concerns and opportunities.

Land and Resource Management Plan
See Forest Plan.

Land Exchange
Conveying federal land and acquiring non-federal land.

Land Exchange
A discretionary, voluntary transaction involving mutual transfers of land or interests in land between the Secretary of Agriculture acting by or through the Forest Service and a non-federal entity.

Landscape
A relatively 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 Ecosystem
The land and vegetation systems that occur naturally on the landscape. Landscape Ecosystems are one or more Landtype Associations grouped together. Landscape Ecosystem units were specifically developed for assessing and analyzing ecosystems in northern Minnesota for Forest Plan revision on the Chippewa and Superior National Forests.

Landscape Ecosystem Objective Forest Cover Types	2004 Inventory Codes
Jack Pine	01
Red Pine	02
White Pine	03
Spruce/fir	11,16,17
Lowland Spruce	12,18
Tamarack	15
Northern White Cedar	14,19
Lowland Hardwoods	71,76,79
Oak	54,55
Northern Hardwoods	81 - 89
Aspen	91,93,94,95
Paper Birch	92
Note: Lowland Spruce and Tamarack are combined on Superior NF as Lowland Conifer; Oak and Northern Hardwoods are combined on Superior NF as Northern Hardwoods.	

Landscape Scale
Forest or area-wide planning, and watershed analysis scale; polygons representing 1,000's to 10,000's of acres. 1:250,000 to 1:60,000 range scale. Land unit scale – project and management area planning and analysis scale; polygons representing 10's to 1,000's of acres. 1:24,000 to 1:60,000 range scale. Legacy Data: Data (tabular or spatial) in which the Forest Service has already invested considerable time and money, but which has not yet been migrated into a corporate database.

Landtype Association (LTA)
An ecological unit based on similar geologic landform, soils, climate, and vegetation that is part of the "National Hierarchical Framework of Ecological Units". Landtype associations are smaller than subsections and larger than landtypes.

Large Woody Debris	Large pieces of wood in stream channels or on the ground, includes logs, pieces of logs, and large chucks of wood; provides streambed stability and/or habitat complexity. Also called coarse woody debris or down woody debris.
Late Successional Forest	The stage of forest succession in which most of the trees are mature or overmature.
Limits of Acceptable Change (LAC)	The amount of change to be allowed, measured by means of quantitative standards. Appropriate management actions are identified and procedures for monitoring and evaluating management performance are established.
Linkage areas	Habitat that provides landscape connectivity between blocks of lynx habitat. Such habitat is provided by cover (vegetation) in sufficient quantity and arrangement to allow for the movement of lynx. (For further discussion see Appendix E)
Litter (Forest Litter)	The freshly fallen or only slightly decomposed plant material on the forest floor, including foliage, bark fragments, twigs, flowers, and fruit.
Long-lived Tree Species	Trees species, including red pine, white pine, white spruce, black spruce, oak, balsam fir, tamarack, northern white cedar, northern hardwoods and lowland hardwoods.
LRMP	Land and Resource Management Plan (e.g. Forest Plan)
Lynx Analysis Unit (LAU)	Lynx Analysis Units (LAUs) are the smallest landscape scale analysis units upon which direct, indirect, and cumulative effects analyses for lynx will be performed. LAUs encompass lynx habitat (on all ownerships) within the administrative unit that has been mapped (in coordination with adjacent management agencies and Fish and Wildlife Service) using specific criteria to identify appropriate vegetation and environmental conditions. In addition, LAUs are intended to provide the fundamental scale with which to begin monitoring and evaluation of effects of management actions on lynx habitat. (Refer to Appendix E for more discussion)
Lynx habitat	Lynx habitat includes vegetation that is considered necessary or contributes to support lynx reproduction and survival. Lynx habitat includes a) habitat that may currently be in condition suitable to provide for denning, foraging, diurnal security, dispersal and movement or other life history requirements or b) habitat that is expected to develop with time those necessary conditions. (see appendix E for further discussion on lynx habitat including foraging habitat= squirrel habitat, and denning habitat)
Maintenance	The upkeep of land, property, or equipment.
Management Area (MA)	A portion of a landscape with similar management objectives and a common management prescription. An area of common direction that differs from neighboring areas. The entire Forest is divided into management areas. Specific direction for each management area is described through desired conditions, objectives, standards, and guidelines.
Management Direction	A statement of multiple-use and other goals, the associated objectives, the associated management prescriptions, and standards and guidelines for attaining the objectives and desired conditions.
Management Indicator Species (MIS) and Habitats (MIH)	Management indicator species (MIS) and habitats (MIH) are "…plant and animal species, communities, or special habitats selected for their emphasis in planning, and which are monitored during forest plan implementation in order to assess the effects of management activities on their populations and the populations of other species with similar habitat needs which they may represent" (FSM 2620.5, WO amendment 2600-91-5). Management indicators provide a means of monitoring and evaluating the effects of actions on biotic resources, including specific species, communities, habitats, and interrelationships among organisms. As part of the planning process, the Forest Service is directed to "….select management indicators that best represent the issues, concerns, and opportunities to support recovery of Federally-listed species, provide continued viability of sensitive

	species, and enhance management of wildlife and fish for commercial, recreational, scientific, subsistence, or aesthetic values or uses. Management indicators representing overall objectives for wildlife, fish, and plants may include species, groups of species with similar habitat relationships, or habitats that are of high concern." (FSM 2621.1) Management indicators are also selected to meet planning regulations 36 CFR Sec. 219.19 (a)(1) that require the Forest Service to consider the use of management indicator species. See Appendix B of the EIS for more information.
Management Practices	A specific activity, course of action, or treatment that is designed to move the forest toward desired conditions.
Map	A spatial representation, usually graphic on a flat surface, of spatial phenomena.
Marshes	Wetlands dominated by grasses and grass-like plants, including sedges and rushes.
Mature Tree or Stand	A tree or stand that has attained full development, particularly in height, and is in full seed production.
Mean Annual Increment of Growth	The total increase in size or volume of individual trees; or, it can refer to the increase in size and volume of a stand of trees at a particular age, divided by that age in years (also see culmination mean annual increment).
Memorandum of Understanding	The instrument used for a written plan between the Forest Service and other parties for carrying out their separate activities in a coordinated and mutually beneficial manner and for documenting a framework for cooperation.
Mineral Material	Mineral materials include the common varieties of sand, gravel, stone, and similar materials.
Mineral Soil	Soil that consists mainly of inorganic material, such as weathered rock, rather than organic matter.
Minimum Tool	Applying only a minimum impact policy, device, force, regulation, instruments, or procedure to bring about a desired result. A management requirement in the BWCAW.
Mitigation	Action taken for the purpose of eliminating, reducing, or minimizing negative impacts of management activities on the environment.
Model	A representation of a thing; sometimes a facsimile. An abstraction from reality, an attempt to present some of the important features of a real thing (system) in a simplified way to aid understanding. Some models use words, pictures, diagrams, and/or mathematical equations to present an idealized representation of reality for purposed of describing, analyzing, understanding, and predicting the behavior of some aspect of it. Applicable to a broad class of representations, ranging from a relatively simple qualitative description of a system or organization, to a physical model, to a highly abstract set of mathematical equations or computer program.
Monitoring	A systematic process of collecting information to evaluate changes in actions, conditions, and relationships over time and space relative to a pre-determined standard or expected norm.
Monitoring and Evaluation (Forest Plan)	The periodic evaluation of Forest Plan management activities to determine how well objectives are met, and how closely management standards and guidelines have been applied.
Mosaic	Areas with a variety of plant communities over a landscape, such as areas with trees and areas without trees occurring over a landscape.
Motor Vehicles	Any vehicle that is powered by a motor.
Motorboat	A boat propelled by gas or electric motor with a propeller below the water line. Does not include hovercraft.

Motorized/ Mechanized Portage Trail	A trail established between two bodies of water, which is used to get persons, equipment and watercraft from one body of water to the other, but with transportation done by motorized or mechanized means. These trails in the BWCAW are authorized by legislation.
Multiple-use Management	The management of all renewable surface resources of National Forest land for a variety of purposes such as recreation, range, timber, wildlife, and fish habitat, and watershed.
National Environmental Policy Act (NEPA)	Public law that outlines specific procedures for integrating environmental considerations into agency planning. 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 land. The Act requires a statement of possible environmental effects to be released to the public and other agencies for review and comment.
National Forest Management Act (NFMA)	Public Law of 1976 that provides for planning and management of National Forests, and requires the preparation of forest plans.
National Forest System	All of the management units, national forests and national grasslands, that the USDA Forest Service manages.
National Forest System (NFS) Land	Federal lands that have been designated by Executive order or statute as National Forests, National Grasslands, National Tallgrass Prairie, or other lands under the administration of the Forest Service.
National Forest System Road	Classified forest roads under Forest Service jurisdiction being wholly or partly, or adjacent to, and serving the National Forest System and necessary for the protection, administration, and use of the National Forest System and the use and development of its resources. The term "National Forest System Road" is synonymous with the term "forest development road."
National Forest Visit	The entry of one person upon a National Forest to participate in recreation activities for an unspecified period of time. A National Forest visit can be composed of multiple site visits.
National Forests in Minnesota	An umbrella term referring to the Chippewa and Superior National Forests together.
National Wild and Scenic River System	Rivers with outstanding scenic, recreational, geological, fish and wildlife, historic, cultural, or other similar values designated by Congress under the Wild and Scenic Rivers Act for preservation of their free-flowing condition (also see Wild, Scenic, and Recreational Rivers Act).
National Wilderness Preservation System	All lands covered by the Wilderness Act and subsequent wilderness designations, irrespective of the department or agency having jurisdiction.
Native Species	With respect to a particular ecosystem, a species that historically occurred in that ecosystem. Native species do not include species introduced by humans.
Natural Disturbance	Disruption of existing conditions by wind, fire, flooding, drought, insects, and disease at a scale from one tree to hundreds of thousands of acres.
Natural Environment Lake	Recreation use levels are low. The ownership is primarily public, with low development. These lakes often have limited capacities for assimilating the impacts of development and recreational use. Generally, these lakes are 10 to 100 acres, and of a variety of shapes and depths. Examples: CNF: Bluewater SNF: Pfeiffer, Kimball, Big Rice

Natural Processes/ Conditions	Plant and animal communities where people have not directly impacted either of those communities or their soils by such activities as logging, fire suppression, grazing, or cultivation.
Natural Opening	Area of forest whose vegetation is predominantly contained in the ground-layer or mid-layer, e.g. grasses, forbs, shrubs, or saplings, with minor representation in the canopy-layer, e.g. mature trees. Such areas typically are the product of natural stand-replacing disturbance processes, e.g. fire, wind, or ice storms, and typically will return to a forested state dominated by canopy-layer and shrub-layer vegetation. Depending upon eco-type, natural openings can vary in size from less than one acre to hundreds or thousands of acres.
Natural-appearing	The existing natural character of the landscape is integrated into management activities, such as harvesting. The landscape shows few signs of forest management activities; however, the effects of naturally-occurring disturbances (fire or windstorm) may be noticeable.
Near Bank Zone	The functional riparian area is subdivided into two management zones: the "near bank" zone and the "remainder" zone. The "near bank" zone is identified as the area that is within: • 100 feet of lakes, open water wetlands and streams five feet or more in width • 50 feet of the known locations of any perennial stream less than five feet wide or any intermittent stream less than five feet wide, but more than three feet wide
Non-indigenous Species	A species that is not naturally present in an ecosystem within its historical range or naturally expanded from its historical range, in the state (also see non-native invasive species).
Non-native Invasive Species (NNIS)	Non-native species are any species that occupy an ecosystem outside its historical range. Invasive species are any non-native species whose introduction does or is likely to cause economic or environmental harm or harm to human health. Invasive species are those species that spread from their original native habitat, to one that is not their native habitat. NNIS explode in population because they are not in their original ecosystem where they were kept in check by many factors, such as parasites and predation. Frequently these species are aggressive and difficult to manage. NNIS differ from noxious weeds in that NNIS can be animals or plants, and they are strictly non-native species.
Non-point Source (NPS) Water Pollutants	Pollutants contributed to runoff and seepage from land areas, often resulting from multiple, difficult to define, points of origin. Agricultural and urban runoff, runoff from construction activities and runoff from forestry practices are example sources of non-point pollutants. The following forest management activities are potential nonpoint sources of pollution: prescribed burning, pest and fire control, surface drainage, and road construction and maintenance from which there is natural runoff. Best Management Practices (BMPs) are recognized as control mechanisms for nonpoint source pollution.
Nutrient Cycling	Circulation or exchange of elements such as nitrogen and carbon between non-living and living portions of the environment. Includes all mineral and nutrient cycles involving mammals and vegetation.
Objective	A concise, time-specific statement of measurable and planned results that respond to pre-established desired condition. 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 desired conditions. Objectives are action oriented and specifically describe measurable results.
Objective Maintenance Level (OML) for	OML 1: Assigned to intermittent service roads when they are closed to street legal motorized vehicular traffic. The closure period must exceed one year. Roads receiving OML 1 maintenance would generally be managed at OML 2 during the time they are

classified roads (FSM 7709-58)	open for traffic. 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. Emphasis is normally given to maintaining drainage facilities and runoff patterns. OML 2: Assigned to roads operated 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 (such as log haul), dispersed recreation, or other specialized uses. Log haul may occur at this level. OML 3: Assigned to roads open and maintained for travel by a prudent driver in a passenger car. User comfort and convenience are not considered priorities. Roads are typically low speed, single lane with turnouts and have only spot surfacing. OML 4: Assigned to roads that provide a moderate degree of user comfort and convenience at moderate travel speeds. Most roads are double lane and aggregate surfaced. OML 5: Assigned to roads that provide a high degree of user comfort and convenience. The roads are normally double lane, paved facilities.
Obliteration	The act of eliminating the functional characteristics of a travelway and the reestablishment of natural resource production capability. The intent is to make the corridor unusable as a road or a trail, and stabilize it against soil loss.
Off-highway Motorcycles (OHMs)	Off Highway Motorcycles (OHMs) are motorized, off-highway vehicles traveling on two wheels. OHMs have a seat or saddle designed to be straddles by the operator and have handlebars for steering control. Motorcycles may be legal for highway use and still considered to be OHMs if used for off-highway operation on trails or natural terrain. (State of Minnesota Off-highway Vehicle Regulations 2003-04)
Off-highway vehicle (OHV)	An Off Highway Vehicle is any motorized vehicle which is not registered or lawful for use on all State, county or municipal roads and highways in the State in accordance with State law, except tracked vehicles that are specifically designed for use over snow. The term off-highway vehicle generally includes all-terrain vehicles, off-highway motorcycles, and off-road vehicles.
Off-road Vehicle (ORV)	Off-road vehicles (ORVs) are motorized, recreational vehicles capable of cross-country travel on natural terrain, such as four-wheel-drive trucks and ATVs that have an engine displacement of more than 800 cubic centimeters and total dry weight of more than 900 pounds. Vehicles not considered ORVs include snowmobiles, all-terrain vehicles, motorcycles, watercraft, or aircraft. Farm, logging, military, emergency, law enforcement, utility, trail-grooming and construction vehicles are not considered to be ORVs when used for their intended purpose. (State of Minnesota Off-highway Vehicle Regulations 2003-04)
Old Forest	An age class older than the mature age class.
Old Growth	Old growth forests are forests that have developed relatively free of stand replacement disturbances over a long period. Old growth consists of late successional stages of naturally occurring forests dominated by long lived species, containing large trees and tree fall gaps, and having multiple canopy layers, high levels of structural diversity and high frequency of snags and downed logs of various sizes and stages of decay. Minimum age for old growth is 120 years for all species except white spruce (90 years) and black spruce (80 years).
Organic matter	Plant and animal residues, or substances made by living organisms. All are based upon carbon.
Organization Camp	This designation includes camps of a public or semipublic nature that are developed by the special use authorization holder, by the Federal Government, or jointly by both. Normally, only nonprofit organizations or governmental agencies qualify for special use authorizations in this category. (FSM 2721.13)

Outcomes	The impact on a resource or landscape of program activities, for example water quality changes and improved habitat condition.
Outfitter/Guide	A special-use permittee that provides all commercial outfitting operations involving services for accommodating guests, transporting persons, and providing equipment, supplies, and materials. The permittee also provides guiding activities wherein the guide furnishes personal services or serves as a leader or teacher.
Outputs	The goods, end products, or services that are purchased, consumed, or used directly by people.
Outstandingly Remarkable Values	In the Wild and Scenic Rivers Act, river values identified include scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values. The Act does not further define outstandingly remarkable values. Agency resource professionals develop and interpret criteria in evaluating river values (unique, rare, or exemplary) based on professional judgment on a regional, physiographic, or geographic comparative basis.
Overstory	The upper canopy layer; the plants below comprise the understory.
Partial Cut/Harvest	A harvesting system that leaves at least 30 ft^2 basal area and up to 80 ft^2 basal area. This harvest method facilitates reaching a desired stand conditions in terms of structure and age while at the same time producing timber volume. Partial cuts with a smaller retention are like shelterwood systems, while partial cuts with more retention are considered multiple-aged management. Partial cuts can be used with all forest types.
Party Size	Same as group size.
Patch Size	A group of forest stands of similar aged forests that may be made up of different forest cover types.
Perennial Stream	A stream that maintains water in its channel throughout the year.
Permit	A special-use authorization that provides permission, without conveying an interest in land, to occupy and use National Forest System lands or facilities for specific purposes, and which is both revocable and terminable.
Pests	Insects, diseases, or animals that interfere with objectives for management of forests.
Planning Area	The area of the National Forest System controlled by a decision document.
Planning Horizon	In the planning process, the overall time period that spans all activities covered in the analysis or plan, and all future conditions and effects of proposed actions that would influence the planning decisions (FSM 1900).
Plant Communities	An assemblage of plants that, in general, occur together on similar site conditions.
Pole	A tree of a size between a sapling and a mature tree.
Portage Trail	A trail established between two bodies of water that is used to get persons, equipment, and watercraft from one body of water to the other.
Precision	Degree of accuracy; generally refers to the number of significant digits of information to the right of the decimal point. Statistical, the degree of variation about the mean.
Prescribed Fire/Prescribed Burning/Manage-ment Ignited Fire	The intentional use of fire to accomplish specific resource objectives under prescribed conditions and circumstances. Prescribed fire is used to accomplish specific resource objectives such as preparing sites for natural regeneration of trees, reducing fuels, or controlling unwanted vegetation.
Prescription (Fire or Silvicultural)	A planned series of treatments designed to change current stand structure to one that meets management goals.
Pre-settlement	The time period before European settlement, approximately mid to late 1800s.

Primitive ROS Class	Part of the Recreation Opportunity Spectrum. Area is characterized by an essentially unmodified natural environment of fairly large size. Interaction between users is very low and evidence of other users is minimal. The area is managed to be essentially free from evidence of human-induced restrictions and controls. Motorized use within the area is not permitted.
Priority Definitions for Land Adjustment	Priority 1: Land with the highest need for the Forest to acquire for resource protection and are usually mandated by laws and regulations. Priority 2: Land that will enhance and protect areas identified for special designation or significantly improve management effectiveness. Priority 3: Land that would be desirable additions to the Forest and are in the public interest. Also see Chapter 2 Forest-wide Land Adjustment Standards and Guidelines.
Prohibited (to describe RMV use)	RMV use of roads and trails, as well as cross-country, is not allowed, except by permit or for law enforcement, emergency, firefighting, and other administrative purposes.
Project	An organized effort to achieve an objective identified by location, activities, outputs, effects, and time period and responsibilities for execution.
Puddling	A severe alteration of soil structure that greatly reduces gas exchange and infiltration of water into the soil. Associated with fine-textured soils with high water content. Puddling may or may not result in an increase in soil density and with rutting, compaction often occurs. Puddling may occur at the bottom of a rut. (Minnesota GEIS, Jaakko Poyry, 1992). Detrimental puddling results from an alteration of soil structure severe enough to reduce the permeability and infiltration of the soil and are caused by depressions in the soil surface caused by an animal, foot or mechanical traffic.
Pulpwood	Trees that yield logs of suitable size and quality for production of pulp.
Purchase	Buying non-federal land for federal ownership.
Quota	The limit of overnight or day use permits issued for each entry point each day (weekly for motor quotas).
Ramp Water Access	A concrete or surfaced ramp with adjacent parking that provides for water access of boats by backing a boat trailer directly into the water. (Also can be referred to as trailered access.)
Range of Natural Variability (RNV)	The variation of physical and biological conditions within an area due to natural processes with all of the elements present and functioning.
Rare Natural Resources	These are plants, animals, and natural communities that are defined as threatened, endangered, sensitive, special concern, or very uncommon.
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.
Recovery (of federally listed species)	Improvement in the status of listed species to the point at which listing is no longer appropriate under the criteria set out in the Endangered Species act.
Recreation Development Lake	Recreation use levels are moderate. The ownership is mixed public and private, with moderate development. Development mainly consists of seasonal and year-round residences and recreationally oriented commercial uses. Generally, recreation lakes are medium sized of 100 to 1,000 acres, and varying shapes and depths. Examples: CNF: Bowstring, Big; SNF: Dumbell, Devil Track, Whiteface Reservoir.
Recreation Motor Vehicle (RMV)	This term is used to describe all-terrain vehicles, off-highway motorcycles, off-road vehicles, and snowmobiles.

Recreation Opportunity Spectrum (ROS)	A formal Forest Service process designed to delineate, define, and integrate outdoor recreation opportunities in land and resource management planning. ROS classes are used to describe all recreation opportunity areas; from natural, undisturbed, and undeveloped to heavily used, modified and developed. ROS designations attempt to describe the kind of recreation experience one may have in a given part of the National Forest.
Recreation Residence	Cabins on National Forest System land that normally were established in tracts and built for recreation purposes, with agency approval and supervision. These cabins are authorized by special-use permit and are not the primary residences of the owners.
Recreation River Segments	Recreation River segments are located in sparsely to moderately populated areas with moderate to high road densities. Land ownership is mixed with seasonal residence and some year round residence. Moderate to high recreation use of these rivers and adjacent lands is common. Recreationists can expect a high degree of visitor encounters on these segments of river and accesses. This class of river has substantial potential for additional development and recreation use. Examples: CNF: Leech Lake River; SNF: Vermilion, five miles each side of Buyck.
Recreation Visitor Day (RVD)	Recreational use of National Forest System land, which aggregates 12 hours. It may consist of one person for 12 hours, two people for six hours, or any combination that totals 12 hours.
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.
Release	Removal of competing vegetation to allow desired tree species to grow.
Remainder Zone	The functional riparian area is subdivided into two management zones: the "near bank" zone and the "remainder" zone. The "remainder" zone is identified as the area, if any, that lies between the near bank zone and the landward limit of the functional riparian area.
Remote River Segments	Remote river segments are primarily located in unroaded, isolated tracts of undeveloped land that are sparsely populated. Typically, recreation use is low on remote river segments; however, moderate to high use can be experienced on sections that are more desirable. This class has the potential for visitors to experience solitude, remoteness, and natural conditions. There is relatively low potential for increased recreation development due to land suitability and road access constraints. Examples: CNF: Bowstring; SNF: Dumbell.
Representative Array	Having a representative array means maintaining a variety of ecosystems or habitats for plants and animals.
Research Natural Areas (RNAs)	Areas within National Forests that the Forest Service has designated to be permanently protected and maintained in a natural condition.
Reservation System	The system that manages entry and distribution of visitors into the BWCAW.
Resilient, Resiliency	The ability of a system to respond to disturbances. Resiliency is one of the properties that enable the system to persist in many different states of successional stages. In human communities, refers to the ability of a community to respond to externally induced changes such as larger economic or social forces.
Resort	Any building or structure of a permanent nature located on property riparian to any lake stream defined in Section 5(a) of the 1978 BWCA Wilderness Act, utilized for commercial profit purposes of providing convenient access thereto, kept, used, maintained or advertised as, or held out to the public to be a building or structure for sleeping accommodations furnished to the public, and primarily to those seeking recreation, for periods of one day or more, and having for rent five or more cottages or rooms.

Resource Mapping	Activities associated with development of a spatial data layer using a geographic information system; development of a spatial map and attributes meeting agency standards.
Responsible Official	The Forest Service employee who has been delegated the authority to carry out a specific planning action.
Restoration (of ecosystems)	Actions taken to modify an ecosystem to achieve a healthy and functioning condition.
Revegetation	The re-establishment and development of a plant cover by either natural or artificial means.
Right-of-way	Land authorized to be used or occupied for the construction, operation, maintenance and termination of a project or facility passing over, upon, under or through such land
Riparian Areas	Riparian areas include aquatic ecosystems, riparian ecosystems, and wetlands. They are three-dimensional: Longitudinal (extending up and down streams and along the shores); lateral (to the estimated boundary of land with direct land-water interactions); and vertical (from below the water table to above the canopy.
Riparian Ecosystems	Areas that are adjacent to aquatic ecosystems and extend away from the bank or shore to include lands with direct land-water interactions. Interactions may affect abiotic and biotic structure, function, and composition. As a minimum, this will include all lands that are adjacent to surface water and which have hydric soils or distinctive vegetative communities that require free or unbound water
Riparian Management Zone	A site-specific area with boundaries established to define limits of management activities, and associated standards and guidelines, within riparian areas. Size and placement of riparian management zones will be determined by management objectives for riparian areas and may not include all of the riparian area.
Road	A motor vehicle travelway over 50 inches wide, unless designated or managed as a trail. A road may be classified, unclassified, or temporary.
Road Classification (functional)	Forest system roads are defined on the National Forests by three functional classifications to describe their function within the transportation system: Arterial: Provides service to large land areas, and connects with other arterial routes or public highways. These are usually through-routes. Collector: Serves smaller land areas than arterials, and connects arterials to local roads or terminal facilities. Local: Serves as a single purpose road, and connects terminal facilities with collectors or arterials.
Road Decommissioning	Activities that result in the stabilization and restoration of unneeded roads to a more natural state.
Road Obliteration	A road decommissioning technique used to eliminate the functional characteristics of a travelway and re-establish the natural resource production capability. The intent is to make the corridor unusable as a road or a trail and stabilize it against soil loss, which can involve re-contouring and restoring natural slopes.
Roaded Natural ROS Class	Part of the Recreation Opportunity Spectrum. Area is characterized by predominantly natural-appearing environments with moderate evidence of the sights and sounds of man. Such evidence usually harmonizes with the natural environment. Interactions between users may be moderate to high, with evidence of other users prevalent. Resource modification and utilization practices are evident, but harmonize with the natural environment. Conventional motorized use is allowed and incorporated into construction standards and design of facilities.
Roadless Area	An area inventoried in a National Forest that meets specific criteria. Some of the criteria include (1) is approximately 2500 acres, or if smaller, is contiguous to a designated wilderness or primitive area, or lies east of the 100th Meridian, and therefore, under the jurisdiction of the Eastern Wilderness Act; and (2) can include up to ½ miles of improved Forest Service road per 1000 acres; and (3) has been inventoried for further study as a possible inclusion in the Wilderness Preservation

	System.
Rotation	The number of years required to establish and grow timber crops, to a specified condition of maturity.
Rural ROS Class	Part of the Recreation Opportunity Spectrum. An area that is characterized by a natural environment, which has been substantially modified by development of structures, vegetative manipulation or pastoral agricultural development. Resource modification and utilization practices may be used to enhance specific recreation activities and maintain vegetative cover and soil. 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. Facilities are often provided for special activities. Moderate user densities are present away from developed sites. Facilities for intensified motorized use and parking are available.
Rutting	Severe rutting is an extreme form of detrimental puddling. Often associated with clay and organic soils. The ruts are molded and typically have well defined berms. They severely disrupt soil structure and porosity, can adversely alter local groundwater hydrology and wetland function and provide conduits for runoff.
Salvage	The removal of dead trees or trees being damaged or dying due to injurious agents other than competition, to recover value that would otherwise be lost.
Sapling	A young tree more than a few feet tall and an inch or so in diameter that is typically growing vigorously. A young tree larger than a seedling, but smaller than a pole.
Sawtimber	Any tree capable of yielding logs of a size and quality suitable for lumber production.
Scale	1. The degree of resolution at which ecosystems are observed and measured. 2. The relation between the size of an object on a map and its size in the real world. A large scale represents drawing closer to real world, while a small scale represents a larger unit of measure allowing viewing of more surface/area. Geographic extent; for example, region, sub-regional, or landscape.
Scale, Spatial	The size of area at which different ecological processes occur; for example, photosynthesis occurs at a cellular scale, measured in microns, while tornadoes occur at a landscape scale, measured in tens to thousands of square miles.
Scenery	General appearance of a place or landscape, and a natural resource of the Forests and composed of existing natural features including vegetation, water, landforms, and geology.
Scenery Management System (SMS)	Classified landscapes and sets goals and objectives for maintaining, enhancing, restoring, and monitoring scenic integrity in forest plans.
Scenery Management System (SMS)	Tool incorporated into Forest Plans to determine the relative value and importance of scenery on National Forest System lands. The process involves classifying landscapes, and setting goals and objectives for maintaining, enhancing, restoring, and monitoring scenic integrity.
Scenic Class	Scenic classes are the measure of the value of scenery in a National Forest. Scenic classes are determined and mapped by combining scenic attractiveness classes with distance zones and concern levels of landscape visibility. Scenic classes are a product of the inventory process that is used for analysis and planning purposes. Generally, scenic classes 1 and 2 have high public value, classes 3 through 5 have moderate value, and classes 6 and 7 have low value.
Scenic Integrity	The state of naturalness, or conversely, the state of disturbance created by human activities or alteration. It is a measure of the degree to which a landscape is usually perceived to be “complete”. The degrees of deviation are used to describe the existing scenic integrity, proposed scenic integrity levels, and scenic integrity objectives.

Scenic Integrity Objectives	Scenic Integrity Objectives (SIOs) guide the amount, degree, intensity, and distribution of management activities needed to achieve desired scenic conditions. • Very High: Landscapes where the valued landscape character is intact with only minute, if any, deviations. The existing landscape character and sense of place is expressed at the highest possible level. • High: Landscapes where the valued landscape character appears intact. Deviations may be present, but must repeat the form, line, color, texture, and pattern common to the landscape character, so completely and at such a scale that they are not noticeable. • Moderate: Landscapes where the valued landscape character appears slightly altered. Noticeable deviations must remain visually subordinate to the landscape character being viewed. • Low: Landscapes where the valued landscape character appears moderately altered. Deviations begin to dominate the valued landscape character being viewed, but they have similar valued attributes to the outside of the landscape being viewed, such as size, shape, edge effect and pattern of natural openings, vegetative type changes, or architectural styles. • Very Low: Landscapes where the valued landscape character "appears heavily altered". Deviations may strongly dominate the valued landscape character. However, deviations must be shaped and blended with the natural terrain (landforms) so that elements such as unnatural edges, roads, landings, and structures do not dominate the composition. • Unacceptably Low: Landscapes where the valued landscape character being viewed appears extremely altered. Deviations are extremely dominant and borrow little if any form, line, color, texture, pattern or scale from the landscape character. Landscapes at this level of integrity need rehabilitation. This level is not used as a management objective.
Scenic River	Wild and Scenic Rivers Act Usage – The rivers or sections of rivers that are free of impoundments, where shorelines or watersheds are still largely primitive and shorelines largely undeveloped, but accessible by road at places.
Section	Term used to describe an ecological unit. Sections are defined by glacial deposits, topography, distribution of plants and regional climate.
Sediment	Solid material, both mineral and organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water, gravity, or ice and has come to rest on the earth's surface.
Seed Tree Harvest	A cutting method in which the mature timber crop is removed from an area in one cut, except for a certain number of widely-dispersed seed bearers.
Semi-primitive Motorized ROS Class	Part of the Recreation Opportunity Spectrum. Area is characterized by a predominantly natural or natural-appearing environment of moderate to large size. Concentration of users is low, but there is often evidence of other users. The area is managed in such a way that minimum on-site controls and restrictions may be present, but would be subtle. Use of local, primitive, or collector roads with predominantly natural surfaces and trails suitable for motorbikes is permitted.
Semi-primitive Non-motorized ROS Class	Part of the Recreation Opportunity Spectrum. Area is characterized by a predominantly natural or natural-appearing environment of moderate to large size. Interaction between users is low, but there is often evidence of other users. The area is managed in such a way that minimum on-site controls and restrictions may be present, but would be subtle. Motorized recreation use is not permitted, but local roads used for other resource management may be present on a limited basis. Use of such roads is restricted to minimize impacts on recreational experience opportunities.

Sensitive Species	Plant and animal species designated by a Regional Forester for which population viability is a concern.
Seral Stage	The stage of succession of a plant or animal community that is transitional. If left alone, the seral stage will give way to another plant or animal community that represents a further stage of succession (climax).
Severely Burned Conditions (also known as detrimentally burned soil)	Entire forest floor is consumed or reduced to charred material. Also, fine roots and organic matter are charred in the upper ½ inch of mineral soil. Hydrophobic soil conditions may develop if vaporized substances condense and form a water repellent layer.
Shearing	Using a bladed tractor to clear all vegetation from the land in preparation for planting.
Shelterwood Harvest	Method of regenerating an even-aged stand in which trees are removed to establish a new age class beneath the shelter of residual trees.
Shipstead-Newton-Nolan Law	A law to conserve the natural beauty of shorelines in northern Minnesota for recreational use.
Short-lived Tree Species	Tree species, including aspen, paper birch, jack pine.
Silvicultural Prescriptions or Treatment or Practices	Activities prescribed for tending, harvesting, and re-establishing a stand of trees.
Silviculture	The art and science of controlling the establishment, growth, composition, health, and quality of forests and woodlands to meet the diverse needs and values of society on a sustainable basis.
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 data base. 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).
Skidding	Hauling logs by sliding from stump to a collection point.
Slash	The residue left on the ground after timber cutting or after a storm, fire, or other event. Slash includes unused logs, uprooted stumps, broken or uprooted stems, branches, bark, etc.
Snag	A standing dead tree.
Snowmobile	Any self-propelled vehicle designed for travel on snow or ice and steered by skis or runners (Minnesota Statutes).
Social Analysis	An analysis of the social (as distinct from the economic and environmental) effects of a given plan or proposal for action. Social analysis includes identification and evaluation of all pertinent desirable and undesirable consequences to all segments of society, stated in some comparable quantitative terms, such as persons or percent of population in each affected social segment. It also includes a subjective analysis of social factors not expressible in quantitative terms.
Soil Compaction	A physical change in soil properties that results in a decrease in porosity and an increase in soil-bulk density and strength. Detrimental compaction is the condition with increased soil density and strength that hampers root growth, reduces aeration and inhibits soil water movement.
Soil Hydrology	Movement of water into and through the soil.

Soil Nutrient Drain (or Loss)	A process in which more nutrients are removed from an area than are replaced by natural nutrient inputs. The nutrient removal can be natural or human-caused.
Soil Productivity	Soil potential to produce biomass that depends on the interaction of physical, chemical and climatic characteristics of the site.
Soil Quality	The inherent capacity of a specific soil, as determined by its inherent physical, chemical and biological characteristics, to perform its biologic, hydrologic, and ecological functions (FSH 2509.18, 2002).
Special-use Permit	See permit.
Species Viability	A viable species consists of self-sustaining and interacting populations that are well distributed through the species' range. Self-sustaining populations are those that are sufficiently abundant and have sufficient diversity to display the array of life history strategies and forms to provide for their long-term persistence and adaptability over time. The implementing regulations for the 1982 National Forest Management Act provides specific direction concerning viability: Fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area. For planning purposes, a viable population shall be regarded as one that has the estimated numbers and distribution of reproductive individuals to insure its continued existence is well distributed in the planning area. In order to insure that viable populations will be maintained, habitat must be provided to support at least, a minimum number of reproductive individuals, and that habitat must be well distributed so that those individuals can interact with other in the planning area (36 CFR 219.19).
Stand (of trees)	A community of trees or other vegetation sufficiently uniform in composition, constitution, age, spatial arrangement, or condition to be distinguishable from adjacent communities and so form a silvicultural or management entity.
Stand Replacement Disturbance	A disturbance that kills or removes trees and creates a new age class of trees, usually fire, wind, insects, or harvesting.
Standards	Requirements found in a forest plan, which impose limits on natural resource management activities, generally for environmental protection. Standards are required limits to activities. These limitations allow the Forest to reach the desired conditions and objectives. Standards also ensure compliance with laws, regulations, executive orders, and policy direction. Deviations from standards must be analyzed and documented in Forest Plan amendments.
Stocking Level	The number of tree in an area as compared to the desirable number of trees for best results, such as maximum wood production.
Stream Geomorphology	The study of water and earth forces that form stream channels, drainage patterns, floodplains, and explain erosion, transportation, and deposition of sediments moved by water.
Stream Riffle	A shallow area extending across a streambed and causing a "break" in the water surface, usually in the form of a succession of small waves.
Stream Stability	The tendency of streams to persist relatively unchanged through time. Stable streams have a pattern and profile such that, over time, channel features are maintained and the stream system neither aggrades nor degrades.
Structural Diversity	Variation of vegetation at the landscape or site level. At the landscape scale, this might include non-forest and forest areas. At the site level, this refers to the different vegetation heights and characteristics.

Structure	How the parts of ecosystems are arranged, both horizontally and vertically. Structure might reveal a pattern, or mosaic, or total randomness of vegetation.
Stumpage Price	The value of standing timber.
Subsection	Term used to describe an ecological unit. Subsections are defined by glacial forming processes, bedrock formations, local climate, topography, soil groups and the distribution of plants.
Succession	The natural replacement, in time, of one plant community with another. It includes changes in species, structure, and community processes. Succession is reasonably predictable.
Successional Stage	A stage of development of a plant community as it moves from bare ground to climax. In the plan revision process, these are generally referred to as early, mid, and late successional stages.
Suitable Forest Land	Land to be managed for timber production on a regulated basis.
Suitable Timber Lands	Lands that include timber harvesting as an identified and scheduled management practice.
Surface "O" Layer	Technical soil term describing the organic layer above the surface mineral layer or directly on bedrock surfaces. The "O" layer consists of all or some of the unaltered, partly decomposed or well decomposed organic matter resting on the mineral soil/bedrock interface (see "forest floor", see "duff").
Surface Fire	A fire that burns surface litter, debris, and small vegetation.
Survey	An exercise in which a set of qualitative or quantitative observations are made, usually by means of a standardized procedure and within a restricted period of time, but without any preconception of what the findings ought to be.
Sustainable (ecological)	The ability of an ecosystem to maintain ecological processes and functions, biological diversity, and productivity over time.
Sustainable (human)	Each generation acts in a manner allowing every future generation the option of being as well-off as its predecessors.
Sustained Yield	The yield that a renewable resource can produce continuously at a given intensity of management.
Swamps	Wetlands dominated by woody plants, including trees and shrubs.
System Roads	See National Forest System roads.
Targets	A National Forest's annual goals for accomplishment for natural resource programs. Targets represent the commitment the Forest Service has with Congress to accomplish the work Congress has funded. Targets are often used as a measure of the agency's performance. Targets are not the same as objectives.
Temporary Openings	Areas of grass/forbs and shrubs usually resulting from timber harvest that will be replaced by tree saplings over a period of a few years: in contrast to permanent non-forested openings.
Temporary Roads	Roads authorized by contract, permit, lease, other written authorization, or emergency operation that are not intended to be a part of the forest transportation system, and not necessary for long-term resource management. These roads are not included on the National Forest System road inventory and are decommissioned after use.
Tentatively Suitable Forest Land	Forest land that is producing or is capable of producing crops of industrial wood; and a) has not been withdrawn by Congress, the Secretary, or the Chief; b) existing technology and knowledge is available to ensure timber production without irreversible damage to soils productivity, or watershed conditions; c) existing technology and knowledge, as reflected in current research and experience, provides reasonable assurance that it is possible to restock adequately within five years after final harvest; and d) adequate information is available to project responses to timber

	management activities.
Terrestrial Ecological Unit Inventory (TEUI)	An inventory of the national hierarchical classification system based on biotic and environmental factors. At the Ecoregion scale, ecological map units are domain—division—province (global or national); at the Subregional scale, map units are sections and subsections (statewide, multi-forest, multi agency); at the Landscape scale, map units are landtype associations (Forest or area-wide); and at the Land unit scale, map units are (ecological) landtypes, and landtype phases (project and management area).
Thermal Cover	Vegetative cover used by animals against weather.
Thinning	Silvicultural treatment where trees are removed to provide improved growing conditions for remaining trees. This method is used in immature stands to reduce stand density of trees primarily to improve growth and/or form, enhance forest health, or recover potential mortality.
Threatened Species	Official designation by USFWS applied to any species which is likely to become endangered throughout all or a significant portion of its range within the foreseeable future.
Timber Production	The purposeful growing, tending, harvesting, and regeneration of regulated crops of trees for cutting into logs, bolts, or other round sections for industrial or consumer use. For purposes of forest planning, timber production does not include fuelwood or harvests from unsuitable lands (FSM 1900).
Total Maximum Daily Load (TMDL)	The maximum amount of a pollutant that a water body can receive and still meet water quality standards. Also refers to the process of allocating pollutant loadings among point and non-point sources. Also refers to a written plan and analysis of an impaired water body established to ensure that the water quality standards will be attained and maintained throughout the water body in the event of reasonably foreseeable increases in pollutant loads.
Towboat	Motor-propelled watercraft in commercial operation designed to transport, on the boat itself or by towing behind, additional canoes, boats, camping supplies, and associated equipment and persons.
Tractor Scarification	A general term for mechanical site preparation for reforestation activities.
Traditional	The beliefs, acts, practice, objects, or sites for the perpetuation of an Indian culture originating from or historically located at a specific area. This may include traditional cultural practices that are so interrelated with spiritual activities that they cannot be separated from the land location.
Trailhead	The parking, signing, or other facilities available at the beginning of a trail.
Trails	A commonly used term denoting a pathway for purposes of travel by foot, stock, or trail vehicles. (FSM 2353.05)
Trails - National Forest System Trails	As defined in 36 CFR 212.1 and 261.2, 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. These trails are part of the National Forest Trail Systems and are included in the corporate level Infrastructure databases.
Travel ways	Travel ways represent linear concentrations of public-viewing, including but not limited to highways, OML 3, 4, and 5 roads, trails, and waterways.
Travel Zone	An area of land within the BWCAW that has been established to accurately monitor visitor travel patterns within the BWCAW.
Treatment (Vegetation)	Any activities undertaken to modify or maintain the existing condition of the vegetation (Vegetative management).

Treaty Rights	Rights related to hunting, gathering, and fishing retained by Native American Tribal members.
Tree Species Suitable for the Site	Tree species that a given site is capable of growing based on natural conditions of soil, microclimate and topography. For application to management on the Chippewa and Superior National Forests, also refers to cover types or tree components that are characteristic of one or more vegetative growth stages of the landscape ecosystem of the site in question.
Tribal Sovereignty	The inherent governmental power from which all specific political powers are derived. Indian governmental powers, with some exceptions, are not powers granted by Congress, but are inherent powers of a limited sovereignty that have never been extinguished. Congress has the authority to limit or abolish tribal powers. However, without congressional action, a tribe retains the inherent right to self-government and no state may impose its laws on a reservation.
Tribe	Term used to designate a federally recognized group of American Indians and their governing body. Tribes may comprise more than one band.
Tributary River Segments	Tributary River segments include unclassified rivers and streams. These segments are not navigable by watercraft and hold low potential for recreation development. Land ownership is mixed with seasonal residence and some year round residence. Typically, these segments flow into larger creeks, rivers, or lakes. Generally, these segments are not named
Trout Stream Segments	Trout Steam segments are generally located along the north shore of Lake Superior, but do occur in other areas of the forests. The Minnesota Department of Natural Resources manages designated trout streams. They do so with an emphasis on recreational fishing. Examples: CNF: none; SNF: Temperance.
Trust Responsibility	This term has never been defined by the U.S. Congress, any President, or any Cabinet official. Generally, it is a set of principles and concepts outlining the responsibilities of the U.S. government to act as the trustee of Indian people and Indian-owned assets. The U.S. government, through the President, has certain responsibilities to protect Indian property and rights, Indian lands and resources. The trust responsibility may involve a fiduciary obligation in which the President, through the Secretary of the Interior, acts as the trustee of Indian assets. Fulfilling or redeeming a trust responsibility can best be reflected or demonstrated as a matter of action—a stream that was protected, a site that was maintained intact, a property right that has been left unaffected by a federal action. The writing of an environmental document is not an example of fulfillment of a trust duty.
Unclassified Roads	Roads on National Forest System land 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; and those roads that were once under permit or other authorization and were not decommissioned upon the termination of the authorization.
Understory	All forest vegetation growing beneath the overstory.
Uneven-aged	A term usually used as "uneven-aged stand" or "uneven-aged management", which identifies a stand containing three or more age classes of trees. A planned sequence of treatments designed to maintain and regenerate a stand with three or more age classes. Examples are individual tree and group selection harvest.
Unsuitable Lands or non-suitable for timber production	National Forest System land that is not managed for timber production, because of policy, ecology, technology, silviculture, or economics.
Upland	Any area that's not a wetland. (See Wetlands)

Urban ROS Class	Part of the Recreation Opportunity Spectrum. Area is characterized by a substantially urbanized environment, although the background may have natural-appearing elements. Renewable resource modification and utilization practices are often used to enhance specific recreation activities. Vegetation cover is often exotic and manicured. Sights and sounds of humans are predominant on site. Large numbers of users can be expected, both on site and in nearby areas. Facilities for highly intensified motor use and parking are available with forms of mass transit often available to carry people throughout the site.
User Developed Recreation Facilities	Trails, campsites, water access sites, or other facilities that have been developed by users or through use and are not maintained as recreation facilities by the Forest Service or other public/private entity.
Utility Rights-of-Way	A tract of land of varying width forming a passageway across the Forest through which various commodities such as oil, gas, and electricity are transported.
Vegetation	The plant cover of an area or region.
Vegetative Community	A grouping of forest types from the forest inventory that is commonly associated in similar environments. This grouping is used to identify Management Areas with common goals, objectives and direction.
Vegetative Growth Stages (VGS)	The combination of successional and developmental stages used to describe a stand (e.g., 80 to 100 years old, multiple-age, aspen-fir).
Viable Populations	The number of individuals of a species sufficient to ensure the long-term existence of the species in natural, self-sustaining populations that are adequately distributed throughout their range.
Viewshed	Total visible area from a single observer's position or the total visible area from multiple observer positions. Viewsheds are accumulated seen areas from highways, trails, campgrounds, towns, cities, or other view locations. Examples are corridors, feature or basin viewsheds.
Visual Resource	A part of the landscape important forest scenic quality. It may include a composite of terrain, geologic features, or vegetation.
Warm-water Fish	Warm-water fish have preferences for summer water temperatures that are greater than approximately 75° F.
Watershed	The area from which all surface water drains to a common point, commonly thought of as the area that drains water into a given lake or stream.
Watershed Health	The expression of ecological composition, structure and function at the scale of the watershed. Same as watershed integrity.
Wetlands	Wetlands are areas that are inundated or saturated by surface or ground water at a frequency sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas and have been identified as palustrine areas by the US Fish and Wildlife Service.
Wheelchair	A device designed solely for use by a mobility impaired person for locomotion, that is suitable for in an indoor pedestrian area. American with Disabilities Act Title V Section 507c and Forest Service Manual 2353.05
Whole Tree Logging	Felling and transporting the whole tree with its crown, and sometimes even its roots, for trimming and cross-cutting at a landing or mill.

Wild, Scenic and Recreational Rivers Act	Rivers or sections of rivers designated by Congressional actions under the 1968 Wild and Scenic Rivers Act as wild, scenic or recreational by an act of the legislature of the state or states through which they flow. Rivers may be classified and administered under one or more of the following categories: Wild River: River or section of river that is free of impoundments with watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads. Scenic River: River or section of river that is free of impoundments, with watersheds still largely undeveloped, but accessible in places by roads. Recreational River: River or section of river that is readily accessible by road or railroad that may have some development along its shoreline and that may have undergone some impoundment or diversion in the past.
Wilderness	The National Wilderness Preservation Act of 1964 defined a wilderness as an area of undeveloped federal land designated by Congress that has the following characteristics: 1) It is affected primarily by the forces of nature, where people are visitors who do not remain. It may contain ecological, geological, or other features of scientific, educational, scenic, or historical value. 2) It possesses outstanding opportunities for solitude, or a primitive and unconfined type of recreation. 3) It is an area large enough so that continued use will not change its unspoiled natural condition. When capitalized by itself, it refers to the BWCAW.
Wilderness Permit	Authorization in writing by a Forest Officer to enter and be in wilderness.
Wildfire	Any wildland fire not designated or managed as a prescribed fire within an approved prescription.
Wildland Fire Use	Prescribed natural fire is a fire burning under specified conditions, to accomplish certain planned objectives; the fire may result from either planned or unplanned ignitions. A prescribed natural fire plan is one that permits certain fires to burn in a manner that duplicates natural conditions as much as possible. The policy allows for fire ignited by lightning to burn under pre-planned, specific conditions and objectives.
Wildland Urban Interface	The line, area or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels.
Windthrow	Trees uprooted by wind.
Winter Road	Roads only used during frozen roadbed conditions and closed in other seasons. They usually are constructed to reduce ground disturbance, often without removal of existing topsoil and utilizing snow and ice as part of the road surface. They are typically OML 1 roads when not maintained for winter use, and move up to an OML 2 road when used.
Woody Debris	Dead, natural woody material greater than 10 cm in diameter and longer than one meter, usually composed of boles and large branches. Various terms, such as large woody debris (LWD), coarse woody debris (CWD), and large organic debris (LOD), have been used to describe this material.

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