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Environmental Assessment

South Leech Lake 2 Resource Management Project

Walker Ranger District
Chippewa National Forest
Cass County, Minnesota

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Abbreviations & Acronyms

ATV	All Terrain Vehicle (see OHV)
BA	Biological Assessment
# BA	Square feet of basal area per acre (for example, 85 BA)
BE	Biological Evaluation
BMP	Best Management Practice
CC #	Condition Class (referring to fire regime, CC II or CCIII)
CAA	Clean Air Act
CCF	100 cubic feet, a volume measurement
CEQ	Council on Environmental Quality
CNF or CPF	Chippewa National Forest
CFR	Code of Federal Regulations
DMP LE	Dry Mesic Pine Landscape Ecosystem (Forest Plan, pg. 2-62)
EA	Environmental Assessment
EO	Executive Order
ESA	Endangered Species Act
FEIS	Final Environmental Impact Statement for Forest Plan Revision
FEIS DN	Decision Notice for the 2004 FEIS
Forest Plan	Chippewa National Forest Land and Resource Management Plan, July 2004
FRCC	Fire Regime Condition Class
FSH	Forest Service Handbook
FSM	Forest Service Manual
FSR or FR	Forest System Road
GIA	Grant-in-Aid
GS	Group selection harvest
GTR	Green tree retention
HLV	Highway licensed vehicle
HUC	Hydrologic Unit Code, 5th HUC and 6th HUC
LE	Lanscape Ecosystem
LIC	Local Indian Council
LLBO	Leech Lake Band of Ojibwe
LLBO DRM	Leech Lake Band of Ojibwe Division of Resource Management
LLPC	Leech Lake Pine Collaborative
LRMA	Longer Rotation Management Area
LTA	Land Type Association
LT + #	Land Type (for example, LT 70 in Fuels Management)
MA	Management Area
MIH	Management Indicator Habitat
MIS	Management Indicator Species
MN DNR	Minnesota Department of Natural Resources
MRFC	Minnesota Forest Resources Council (v*oluntary site-level management guidelines)*
MUA	Mixed Use Analysis
MVUM or MVU	Motorized Vehicle Use Map
NCLC	North Central Landscape Committee
NCT	North Country National Scenic Trail
NCTA	North Country Trail Association

NFSR or FSR	National Forest System Road
NEPA	National Environmental Policy Act
NFMA	National Forest Management Act
NFS	National Forest System
NHPA	National Historic Preservation Act
NNIP EA	Nonnative Invasive Plants EA
NNIS	Nonnative invasive species
OHV	Off Highway Vehicle (interchangable with ATV in this document)
OML or ML	Operational Maintenance Level (rating of forest roads)
PARA	Potentially affected riparian area
PILT	Payment in lieu of taxes
PR	Project Record
Project	South Leech Lake 2 Resource Management Project
R9	USDA Forest Service, Chippewa National Forest, Eastern Region
RAC	Resource Advisory Committee
RAP	Roads Analysis Process
REA	Riparian Emphasis Area
RFSS	Regional Forester Sensitive Species
RMZ	Riparian Management Zone
RNV	Range of natural variability
SHPO	State Historic Preservation Officer (for state of Minnesota)
SIO	Scenic Integrity Objective
SLL2	South Leech Lake 2 Resource Management Project
SOPA	Schedule of Proposed Action (published quarterly, lists NEPA projects)
TES	Threatened, Endangered, or Sensitive species
TEUI	Terrestrial Ecological Unit Inventory
THPO	Tribal Historic Preservation Officer (for Leech Lake Band of Objiwe)
TTPP	Timber Theft Prevention Plan
USDA	United States Department of Agriculture
USFWS	US Fish and Wildlife Service
VDT	Variable density thinning

Errata

Project Acres and Project Volume

In Alternatives B and C one stand was counted twice. It totaled 27 acres. This error was due to a duplication in Group Selection query protocol.

Alternative B Group Selection is corrected from 749 acres to 722 acres (query error in 902 veg type). Original acres for Alternative B are incorrect in the EA. These are shown as 2545 acres. The Alternative B volume remains unchanged (27803 CCF).

Alternative B: correct project acres are 2519 and correct project volume is 27803 CCF.

Alternative C Group Selection acres corrected from 571 acres to 544 acres due to query error in 902 veg type. Alternative C Group Selection volume corrected volume from 26486 CCF to 26212 CCF due to query error in 805 veg type.

Alternative C: correct project acres are 2355 and correct project volume is 26212 CCF.

Chapter 1 Introduction, Purpose and Need, Public Involvement, and Issues

1.1 Document Structure

The Forest Service has prepared the Environmental Assessment (EA) South Leech Lake 2 (SLL2 or Project) Resource Management Project in compliance with the National Environmental Policy Act (NEPA), National Forest Management Act (NFMA), and Council on Environmental Quality (CEQ) regulations 40 CFR 1500-1508. This EA discloses direct, indirect, and cumulative environmental impacts resulting from the No Action Alternative and two Action Alternatives (Alternatives B and C). The document is organized into four parts:

Chapter 1 Introduction: Provides information on management direction, current conditions in the Project area, the Purpose of and Need for the Project, the agency's proposal for achieving that purpose and need, and key issues that drove alternative development. This chapter also details how the Forest Service informed the public of the Proposed Action and how the public responded.

Chapter 2 Alternatives: Provides a more detailed description of the No Action, Proposed Action (Alternative B), and Alternative C for achieving the stated purpose and mitigation measures. The Action Alternatives (Proposed Action and Alternative C) were developed based on issues raised by the public, Leech Lake Band of Ojibwe (LLBO), state agencies, organizations, and internal management concerns. Finally, this chapter provides a summary table of the environmental consequences associated with each alternative.

Chapter 3 Affected Environment and Environmental Consequences: Describes the environmental effects of implementing the Proposed Action (Alternative B) and Alternative C. These analyses are organized by resource area. Each Resource section describes the affected environment and environmental consequences under No Action, Proposed Action, and Alternative C. The Action Alternatives (B and C) are compared to the No Action (Alternative A) to establish a baseline for evaluation and comparison of alternative direct, indirect, and cumulative effects.

Chapter 4 Agencies and Persons Consulted: Provides a list of preparers and agencies consulted during the development of the EA.

Appendices provide detailed information to support the analyses presented in the EA. Appendix A contains the lists of stands proposed for management by alternative and associated maps: Vegetation Management maps for Alternatives B and C; Transportation Management map showing (1) forest system road changes (decommission, close, open or

temporary road) and (2) MVUM Travel Management showing changes in designated allowable uses. Appendix B shows Alternative B and C mitigation tables and Appendix C provides Forest Service responses to scoping comments. These documents are available upon request. All maps and documents may be accessed from the Chippewa National Forest website: http://fs.usda.gov/chippewa.

1.2 Background for Purpose and Need

1.2.1 Location

The SLL2 project area is in Cass County in T142N R28-31W and T142-145N R28-31W. The project area lies south of Leech Lake, bounded on the west by Ten Mile Lake and Pine Point Research Natural Area, and on the east by County Highway 125 and Longville. A portion of the project area is within the Leech Lake Band of Ojibwe Reservation boundary. The project area encompasses about 63,000 acres within the Walker Ranger District and includes the Onigum and Whipholt communities.

Land ownerships are mixed; the Forest Service manages about 45 percent (28,300 acres), private and Tribal lands comprise about 35 percent (22,100 acres), Cass County administers about 13 percent (7,850 acres), and the State of Minnesota 7 percent (4,600 acres). Proposed activities occur on National Forest System lands in the Dry Mesic Pine (DMP) Landscape Ecosystem. See Appendix A for Project maps.

Table1-1. SLL2 project area and ownership acres.

Ownership	NFS	State	Cass County	Tribal/Private
Acres	28,300	4,600	7,850	22,100
Source: Corporate database ownership coverage, acreage is further generalized from GIS layers and may result in some variation from actual acres.				

1.2.2 About the Project

The SLL2 EA is tiered to the 2004 Land and Resource Management Plan, Chippewa National Forest (Forest Plan) and the 2004 Forest Plan Revision Final EIS (FEIS)[1]. Forest Plan direction is outcome based, thus in planning a site-level project, such as the SLL2 EA, consideration is given to how management activities can contribute to short and long term 100-year goals and Forestwide objectives. The Project follows Forest Plan objectives, standards, and guidelines in blending management activities intended to help maintain and restore ecological processes and components, improve and protect

[1] The Land and Resource Management Plan (2004) and Forest Plan Revision Final EIS (2004) are on the Chippewa National Forest's website: http://fs.usda.gov

watershed conditions, and balance social and economic well-being. The sideboards for management activity proposals include the following:

The Forest Plan (page 2-37) delineates Areas of High Interest to the Leech Lake Band of Ojibwe (LLBO); a portion of the Project is within the Reservation boundary and contains Areas of High Interest to the LLBO. Under Forest Plan Tribal Rights and Interests standards and guidelines (S-TR-3, S-TR-4, page 2-36), 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 and, 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. In addition, Forest Plan Desired Conditions (D-TR-1, D-TR-2, D-TR-3, p.2-35) provide direction for (1) sustaining American Indians' way of life, cultural integrity, social cohesion, and economic well-being and (2) working within the context of a respectful government-to-government relationship.

The USDA Forest Service recognizes our special, unique relationship with the LLBO. We balance this trust relationship as directed by Congress with other Federal laws, our administrative authorities, and the needs of our broad client base—while meeting the desired conditions, objectives, standards, and guidelines of the Forest Plan.

Forest Plan objectives include maintaining, protecting, or improving habitat for threatened and endangered species (TES), and Regional Forester Sensitive Species (RFSS) (Forest Plan, O-WL-17, pg. 2-28). Forest Plan objectives contribute to the conservation and recovery of the Canada lynx and gray wolf (Forest Plan, D-WL-3, item c; pages 2-24 – 2-25), through a decrease in road densities in the project area. The project area contains habitat suitable for RFSS such as red-shouldered hawk, northern goshawk, goblin fern, gray wolf, and bald eagle.

1.3 Management Areas

Management Areas (MA) are portions of the landscape with similar multiple-use management objectives and prescriptions. The project area is mainly in the General Forest – Longer Rotation Management Area (LRMA) (Table 1-1). No management activities occur in the Research Natural Area (about 1,400 acres).

Table 1-1. National Forest System (NFS) management areas in SLL2 Project.

MA	Description	NFS Acres (% of Project Area)
General Forest – Longer Rotation (LR)	Compared to the General Forest MA, the Longer Rotation MA, while still having timber production as a key emphasis, will generally have longer rotations and more uneven-aged and partial cut harvests. Forests in this MA are largely a mosaic of tree groups of different heights and ages. 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. Some larger patch sizes would occur within this area. A full range of silvicultural practices is employed. When clearcutting is used in this management area, it is often done at longer rotation ages. 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.	46,565 (76%)
Recreation Use in a Scenic Landscape (RU)	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. Dispersed recreation facilities such as campsites and trails may be provided for public use.	9,804 (16%)
Riparian Emphasis (RE)	Riparian ecological functions are actively restored, protected and enhanced. Management activities mimic natural disturbances and result in structural diversity. Fuels are managed to retain a natural forest appearance and to reduce threat of wildfire damage to Forest resources.	2,759 (4%)
Research Natural Areas (RNA)	The focus is on preserving and maintaining areas for ecological research, observation, genetic conservation, monitoring, and educational activities. 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.	1,396 (2%)

1.4 Purpose of and Need for Action

The purpose of the SLL2 Environmental Assessment (EA) is to move existing resource conditions in the project area toward desired conditions identified in the Chippewa National Forest 2004 Land and Resource Management Plan (Forest Plan). The need for action is that some existing conditions do not show progress toward meeting the desired conditions identified in the Forest Plan. All forest management alternatives and activities would (1) maintain, protect, or improve habitat for threatened, endangered, or sensitive species and (2) incorporate tribal cultural resources, values, needs, interests, and expectations.

Management activities would restore ecological processes and components, improve or protect watershed conditions, and help maintain or improve social and economic well-being. Vegetation management activities would move existing vegetative conditions

towards identified Forest Plan objectives and desired conditions for vegetation composition, age class, structure, diversity, forest health, and wildlife habitat. The need for action is that some existing conditions are inconsistent with or moving away from Forest Plan desired conditions and objectives (Table 1-2).

All forest management activities and alternatives: (1) incorporate tribal cultural resources, values, needs, interests, and expectations (Forest Plan D-TR-1, S-TR-3, 4, 6, G-TR-3, G-TR-4, pages 2-35, 2-36) and (2) maintain, protect, or improve habitat for threatened, endangered, or sensitive species (Forest Plan O-WL-4, O-WL-17, pages 2-26, 2-28).

Management activities restore ecological processes and components, improve or protect watershed conditions, and help maintain or improve social and economic well-being.

> *Vegetation management activities*: move existing vegetative conditions towards identified Forest Plan objectives and desired conditions for vegetation composition, age class, structure, diversity; and wildlife habitat.
>
> *Travel management activities (MVUM, motorized vehicle use map)*: move the existing forest road system in the project area towards identified Forest Plan objectives and desired conditions[2]. This management activity affords opportunities for public comment and discloses pending changes to the MVUM. These changes would more consistently designate the type and timing of motorized use permitted on some forest system roads and, importantly, protect soil, aquatic, wildlife, and recreation resources in the project area.

Purpose and Need Statements

Proposed activities would occur in the Dry Mesic Pine (DMP) Landscape Ecosystem (LE). Please refer to Chapter 3, Vegetation section for analysis details.

1. Move current vegetation conditions toward long-term desired conditions for structure, age, spatial patterns, and long-term diversity. Vegetation management opportunities include: (Stands List table)
    - Increase amounts of multi-age forest vegetation communities.
    - Improve growth and vigor of plantation origin red pine, increase or maintain within stand species diversity, and begin to create more natural spacing and structure within plantation origin red pine stands.
    - Increase or maintain Oak Forest Type.

[2] The 2007 Decision Notice and Finding of No Significant Impact for the Off-Highway Vehicle Road Travel Access Project provides implementation direction under the 2004 Forest Plan and is on the Chippewa National Forest's website: http://fs.usda.gov.

- Decrease aspen and northern hardwoods.
- Contribute to the 0-9 age class through coppice and shelterwood with reserves and patch clearcut harvest treatments.
- Increase Upland Conifer Forest Types (white pine and spruce-fir).
- Maintain or increase the acres and numbers of mature or older upland forest in patches 300 acres or greater.

2. Provide commercial wood for mills in northern Minnesota.
3. Protect or improve watershed conditions through:
    - Maintenance or improvement of riparian health and function.
    - Decommission or closure of roads to all motorized uses.
4. Maintain, protect, or improve wildlife habitats.
    - Improve habitat conditions in the Goose Lake and Woodtick Fields prescribed burn units using low intensity surface fire.
    - Improve habitat conditions in natural and plantation origin pine stands.
    - Contribute to young early successional forest habitat.
5. Manage roads in the Forest Road system and propose changes in the uses of these roads.
    - Open roads to all motorized vehicle uses (follows 2007 Off Highway Vehicle Road Travel Access Decision)
    - Close roads to all motorized vehicle uses (follows 2007 Off Highway Vehicle Road Travel Access Decision)
    - Maintain access to other ownerships by adding roads to the system, then closing to motorized use
    - Manage access to recreation sites by adding roads to the system, then opening to motorized uses

Table 1-2 shows Purpose and Need statements, Forest Plan management direction, and potential indicators for the proposed action as presented in the January 19, 2011, Scoping packet. Management opportunities were derived from coarse filter screening in 2009 and fine filter screening in 2010. Minor changes in the Scoping Proposed Action are reflected in the environmental assessment's Proposed Action (Alternative B). These changes are presented in Chapter 2.2 and Table 2-5.

Table 1-2. Purpose and Need statements, Forest Plan management direction, and potential indicators for the proposed action.

P&N statement	Forest Plan Management Direction	Indicator
Increase amounts of multi-age forest vegetation communities.	O-VG-10, pg 2-22 O-VG-15, pg 2-23	Acres Individual Tree Selection and Group Selection harvests
Improve the growth and vigor of plantation origin red pine; increase or maintain within-stand species diversity and begin to create more natural spacing and structure within plantation origin red pine stands.	O-VG-9, pg 2-22 0-TM-1, pg 2-19	Acres commercial thinning
Increase or maintain Oak Forest Type	O-VG-2, pg 2-22 O-VG-1, pg 2-22	Acres converted to oak forest types
Decrease aspen and northern hardwoods.	O-VG-1, O-VG-2, pg 2-22 Table DMP-1, pg 2-62	Acres aspen converted Acres Northern Hardwood converted
Contribute to the 0-9 age class	O-VG-1, pg 2-22 Table DMP-2, pg 2-62	Acres 0-9 age class created through coppice, patch clearcut, and shelterwood harvest treatments
Provide commercial wood for mills in northern Minnesota.	O-TM-1, pg 2-19	Volume, acres by Forest Type
Increase Upland Conifer Forest Type.	O-VG-2, pg 2-22 Table DMP-1, pg 2-62	Acres converted to Upland Conifer forest types (white pine, spruce-fir) Acres diversity seeding and planting
Maintain or increase the acres and numbers of mature or older upland forest in patches 300 acres or greater.	O-VG-19, pg 2-23	Acres/number of patches
Protect or improve watershed conditions	O-WS-1, 3, 5, pg 2-12 D-WL-1, pg 2-24 D-ID-2, pg 2-18 G-TS-13, pg 2- 49	Acres of vegetation management in riparian areas to maintain or improve health and function Miles of road decommissioned or closed to all motorized uses
Improve habitat conditions in the Woodtick Fields prescribed burn unit using low intensity surface fire.	O-WL-3, pg 2-22 O-WL-40, pg 2-26	Acres of prescribed fire in the Woodtick Fields prescribed burn unit.
Improve habitat conditions in the Goose Lake Trail prescribed burn unit using low intensity surface fire and improve habitat conditions in natural origin pine stands	O-VG-8, pg 2-22 O-VG-11, pg 2-23 O-WL-1, O-WL-2, pg 2-26 O-WL-26, pg 2-30	Acres improved habitat conditions using prescription fire in natural origin pine stands
Improve habitat conditions in plantation origin pine stands	O-WL-2, pg 2-26 O-VG-9, pg 2-22 O-VG-10, pg 2-22	Acres of variable density thinning in plantation origin pine stands

P&N statement	Forest Plan Management Direction	Indicator
Contribute to young, early successional forest habitat	O-WL-2, pg 2-22 O-WL-40, pg 2-26	Acres of 0-9 age class created
Manage roads in the Forest Road system (2007 Off Highway Vehicle Road Travel Access Decision) and propose changes in the uses of these roads	D-TS-2; pg 2-47 O-TS-7, O-TS-8; pg 2- 48	Miles of Forest system roads open to motorized use Miles of Forest system roads closed to motorized use Miles of road added to system and closed to maintain access to other ownerships Miles of road added to system and opened to provide access to recreation sites

1.5 Proposed Action

The following proposed activities were shared with the public during scoping (January 19, 2011, Scoping packet). These activities would meet the Purpose and Need, and objectives identified by the deciding official and the interdisciplinary team. (Table 1-3)

Management activities include harvest and associated reforestation activities, wildlife habitat improvements, protecting watershed conditions, and road management. Vegetation management includes harvest and reforestation activities aimed at contributing to purpose and need statements #1, #2, #3.

Commercial harvest treatments are proposed on approximately 2,546 acres with an estimated volume of 28,800 CCF. Please refer to Appendix A: Vegetation Management map and Stands List table for detailed harvest information. Temporary roads would be built to access some treatment units. It is expected that new temporary road construction would total less than 5 miles and that most management activities would use existing forest roads. These roads would be closed upon completion of management activities.

Table 1-3. Summary of forest management activities (from Scoping Proposed Action, January 19, 2011).

Management Activity	Unit	Comment
Vegetation Management		P&N statements 1, 2, 3
Individual Tree Selection	363 acres	
Group Selection	749 acres	
Thinning	708 acres	
Coppice with Reserves[1]	346 acres	
Patch Clearcut[1]	21 acres	
Shelterwood with Reserves[1]	359 acres	
Total harvest treatment acres[2]	2,546 acres	
Temporary Roads	<5 miles	Associated with timber sales
Conversions (includes seeding, planting, natural regeneration)	413 acres	

Management Activity	Unit	Comment
Diversity seeding and planting	168 acres	
Watershed Management		P&N statement 3
Modified vegetation treatments in riparian areas	About 240 acres	
Miles of road decommissioned	About 6 miles	
Miles of road closed	About 11 miles	
Wildlife Management		P&N statement 4
Prescribed fire Woodtick fields	About 216 acres	
Prescribed fire Goose Lake trail	About 496 acres	
Transportation Management		P&N statement 5
Open forest system roads to all motorized use (miles)	About 18 miles	
Close forest system roads to all motorized use (miles)	----	See Watershed, miles of road closed
Add road segments to system that access Forest Service managed recreation sites	<.5 mile	
Miles of road added to system and closed (access to other ownership)	About 2 miles	

[1] Coppice with reserves, patch clearcut, and shelterwood with reserves are even-aged.
[2] Treatment acres can vary due to differences in GIS or other software application rounding protocols

Watershed management activities contribute to purpose and need statement 3. Modified vegetation treatments; for example, maintaining canopy closure or buffers in sensitive areas, for the purpose of riparian improvement would occur on about 240 acres (Table 1-3). About 9 miles of forest roads would be closed or decommissioned (Table 1-3). Appendix A Transportation table provides specific reasons for these road activities.

Wildlife management activities contribute to purpose and need statement 4. Low intensity surface fire would be applied in the Goose Lake Hunter Walking Trail and Woodtick Fields burn units to maintain, protect, or improve habitat conditions (Table 1-3). Prescribed fire would help to restore understory vegetation and produce compositional and structural features in natural and plantation origin pine stands. Harvest treatments that create a 0-9 age class would contribute to early successional forest habitat. Variable density thinning treatments would be applied in some plantation origin pine to improve habitat conditions. Appendix A, Stand List table identifies those compartments and stands with prescribed fire or other wildlife-related vegetation treatments.

Transportation management activities which focus on change in allowable use as shown on the MVUM (Motor Vehicle Use Map) contribute to purpose and need statement 5. Management activities include opening or closing roads to all motorized vehicle uses (follows 2007 Off Highway Vehicle Road Travel Access Decision), maintaining access to other ownerships, and managing access to recreation sites (Table 1-3). The Appendix A Transportation map and Transportation table provide specific reasons for these activities.

1.6 Decision Framework

1.6.1 Consistency with the Forest Plan and other relevant laws

The SLL2 EA is tiered to the 2004 Forest Plan and the 2004 FEIS and is within the scope of the Record of Decision (FEIS DN). The Endangered Species Act (ESA) requires consultation and review by the U.S. Fish and Wildlife Service (USFWS). The draft Biological Assessment (BA) for this Project will be sent for USFWS review and the final BA will be sent to USFWS for their concurrence determination on listed species as part of this EA prior to the decision. In addition, consultation is required with the LLBO THPO and the Minnesota State Historic Preservation Office (SHPO). Consultation will be completed as part of this EA prior to the decision.

National Forests are required to comply with several other environmental laws, including the National Historic Preservation Act (NHPA), Clean Air Act (CAA), National Environmental Policy Act (NEPA), and the National Forest Management Act (NFMA). Proposed management activities have used the best available science and are consistent with the Forest Plan as well as laws and policies applicable to natural resource management.

1.6.2 EA Disclosures and Decisions to be Made

This EA discloses the effects of the proposed alternatives; it is not the decision document. Based on the analyses in this document, the Walker District Ranger, Carolyn Upton, will decide whether or not to proceed with the No Action, Proposed Action, Alternative C, or a modified alternative within the range of the analyzed alternatives. The District Ranger will decide all MVUM travel management changes on the Walker Ranger District.

Grant-In-Aid Trail – A local ATV group is sponsoring a Grant-In-Aid ATV trail proposal within the SLL2 project area. The ATV group is following the trail designation process required by the State of Minnesota. A description of the process is found at: http://www.dnr.state.mn.us/grants/recreation/gia_atv.html.

Once the sponsor works through the State's required GIA process, the Walker District Ranger will be asked to sign an agreement that supports and allows this designation, associated uses, and maintenance on Forest Service roads. Public comments were received during scoping. Issues related to the GIA trail are addressed in the EA, Appendix C, Response to Comments. These public comments will be used to inform the District Ranger of any related issues.

A small adjustment to the GIA route shown in the Scoping packet was submitted to the Walker District the week of June 6, 2011. Consideration of this proposal is deferred at

this time. It may be considered in future analyses. It is possible that this change to the proposed route will require additional NEPA analysis.

Riparian Forestland Enhancement Project – The CNF submitted this project to the CNF Resource Advisory Committee for consideration in February 2011. The project was conditionally approved for partial funding in June 2011. The project will help to reestablish the conifer component of riparian forest ecosystems where white pine, white spruce, and balsam fir were historically common. In addition, the project would restore water quality.

This project is in the SLL2 project area. The project activities are included in the Proposed Action and Alternative C (Appendix A). This project continues ongoing partnerships with the North Central Landscape Committee (NCLC), Leech Lake Pines Collaborative (LLPC), and Minnesota Conservation Corps. Reforestation activities would occur on about 36 acres in the South Leech Lake 2 project area.

1.7 Public Involvement

Public participation helps the Forest Service identify concerns with possible effects and alternatives to its proposals. This information enables the responsible official to make decisions with an understanding of their environmental and social consequences. It also allows the Forest Service to publicly disclose the nature and consequences of actions on NFS lands. Opportunities for the public to provide comments regarding this proposed project were made available through the process outlined below:

- An early scoping effort for transportation/travel management issues was conducted beginning July 15, 2010, through September 3, 2010. Ten letters were received (Appendix C, Early Scoping letters).
- Project shape files were sent to DRM in December 2010. The District Ranger and Public Service staff met with DRM on January 7, 2011. A second meeting occurred with DRM on February 10, 2011, where the District Ranger and ID team discussed the Proposed Action with Project Lead and DRM staff.
- A legal advertisement was placed in *The Pilot-Independent* on January 19, 2011.
- This project was listed in the Chippewa National Forest NEPA Quarterly Schedule of Proposed Actions (SOPA) beginning with the January 2011 edition.
- The Scoping package was mailed to the Onigum, Kego-Smokey Hill, Sugar Point, and Bena LICs on January 19, 2011.
- Scoping letter placed on CNF website on January 19, 2011.

- The project was presented to the Kego-Smokey Hill LIC on February 2, 2011, and the Onigum LIC on February 15, 2011.

On January 19, 2011, a detailed Proposed Action, Purpose and Need statements, and project maps were included in a SLL2 Resource Management Project scoping package which was mailed to 80 individuals including residents living within the project area, organizations, industries operating in the project area, the LLBO DRM director and staff. Additional scoping packets were made available to people expressing concerns about road closures in the project area. Sixteen comments were received. (Appendix C, letters).

1.8 Key Issues and Indicators, Secondary Indicators, and Other Issues

Key Issues and Indicators

Key issues were defined as those directly or indirectly caused by implementing the Proposed Action. Key issues remained unresolved due to multiple ways of addressing the issue or wide range of opinion. These issues were used to formulate alternatives to the Proposed Action (Alternative B), prescribe design criteria or mitigation measures, if necessary, and analyze possible environmental effects.

Using scoping comments received from the public, other agencies, the LLBO DRM, Onigum and Kego-Smokey Hill LICs, and addressing internal management concerns, the interdisciplinary team identified three key issues. The original comments are available in the SLL2 Project File at the Walker Ranger District and a summary of the public's initial scoping comments and Forest Service's responses are in Appendix C of the EA.

Key Issue #1 (young forest): Increasing the amount of regeneration harvest acres contributes to increasing the percentage of DMP LE, 0-9 age class within the project and proportionately contributes to the DMP LE, 0-9 age class forestwide.

Indicators:

Acres 0-9 age class in 5 years

Percent 0-9 age class in Project DMP LE

Estimated 0-9 age class treated acres

Estimated volume from 0-9 age class (CCF)

Key Issue #2 (transportation / travel management): Opening or closing forest system roads to all motorized vehicles may affect recreation opportunities and natural resources. *Some roads shown on the 2011 MVUM travel management map are open only to highway licensed vehicles and closed to off-highway vehicles. The Walker Ranger*

District is working to eliminate these inconsistencies by designating most roads as open or closed to all motorized vehicles. Where appropriate some roads may be partially opened or closed to protect soil, water, or wildlife resources. Road management proposals are based on the Forest Road system as shown on the 2011 MVUM.

Indicators:

Miles of system roads opened to all motorized vehicles that are currently closed to one or more uses

Miles of system roads closed to all motorized vehicles or decommissioned that are currently open to one or more uses

Secondary Indicators

Secondary indicators show the scope of the analysis and, the direct and indirect effects on each resource. These indicators show how an alternative would help meet the Purpose and Need of the Project (as shown in the Scoping letter) and their effects on the resources. Resource secondary indicators are listed in order of appearance in Chapter 3.

3.1 Vegetation

- Acres of forest type conversion to upland conifer
- Acres of Northern Hardwoods treated by forest type through selection harvest
- Acres of individual tree and group selection harvests in hardwood forest types
- Acres sugar(hard) maple treated
- Acres of contribution toward forestwide DMP LE objectives
- Acres of conifer thinned to promote diversity

3.2 Transportation/Travel Management

- Number of motorized forest system roads crossing the North Country National Scenic Trail (NCT)
- Number of deadend FSR spurs closed to all motorized vehicles
- Miles of FR 2107 considered for opening to mixed use
- Number of motorized FSRs crossing the NCT
- Number of places where FR 2107 intersects with FSR not open to OHVs
- Number of forest system road loops opened to OHVs
- Generalized effects to soil and aquatic resources
- Generalized effects to habitat of three Management Indicator Species

3.3 Wildlife Management Indicators and Habitat Improvements

- Monitoring results and effects of proposed activities on MIS
- Acres of negative trends of MIH-1 through MIH-9
- Number and acreage in 300 acre and larger mature/older upland forest patches maintained (MIH-13)
- Acres of prescribed fire in the Woodtick Fields prescribed burn unit to improve wildlife habitat conditions
- Acres improved habitat conditions using prescription fire in Goose Lake Hunter Walking Trail natural origin pine stands
- Acres of variable density thinning in plantation origin pine stands
- Acres of 0-9 age class created

3.4 Threatened, Endangered, Sensitive Species

- Findings from the Biological Assessment (BA) for Canada lynx, gray wolf
- Findings from the Biological Evaluation (BE)
- Comparison of effects to Regional Forester Sensitive Species (RFSS)

3.5 Aquatics

- Acres of riparian area maintenance or improvement resulting from vegetation treatments
- Percentage of young forest and open area resulting from regeneration harvest treatments
- Miles of forest system roads closed or decommissioned

3.6 Soils

- Inherent soil disturbance risk from harvest and site preparation by stand acres
- Estimated acreage of soil reclamation resulting from road decommission

3.7 Hazardous Fuels

- Acres red pine plantation thinned

3.8 Tribal Interests

- Miles of forest system roads closed or decommissioned
- Miles of forest system roads opened to all motorized vehicles

- Acres of uneven-aged harvest treatments in hardwood stands
- Acres sugar (hard) maple /basswood treated

3.9 Environmental Justice

- Analysis of impacts to minority and low-income populations.

3.10 Economics

- Estimated volume of timber (CCF)
- Present value of timber harvested
- Present value costs of associated sale prep, administration, reforestation activities
- Present net value of timber harvested
- Benefit/Cost Ratio for timber
- Ten-year costs associated with road maintenance, closure, and decommission.

Other Issues

The Council for Environmental Quality (CEQ) regulations require this delineation in section 1501.7: "…identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review."

Other issues brought up by the public, other agencies, or the LLBO in scoping were identified as: (1) outside the scope of the Proposed Action, (2) already decided by law, regulation, Forest Plan, or other higher level decision, (3) irrelevant to the decision to be made, or (4) conjectural and not supported by scientific or factual evidence. These issues are addressed in the EA, Appendix C, Response to Comments.

Nonnative Invasive Species – The CNF continues to work with ATV clubs, NCT Association, private landowners, tribal, state, county, and municipal governments to educate people about transport of invasives. A Forestwide NNIP EA is expected this year (SOPA 2011). The focus of NNIP management is eradication of high priority invasive plant populations and prevention of further spread. Direct, indirect, and cumulative effects analysis would be conducted under the Forestwide NNIP EA (SOPA 2011).

Chapter 2 Alternatives, including the Proposed Action

2.1 Introduction

This chapter describes the alternatives considered, including mitigation measures, monitoring, and summarizes how these alternatives address the issues presented in Chapter 1. Alternatives considered but eliminated from detailed analysis are also described.

The comments and issues raised during scoping of the Proposed Action were reviewed by the interdisciplinary team. An action alternative (Alternative C) was developed to respond to the key issues described in Chapter 1. Alternatives considered in detail incorporate applicable laws, regulations and policies that govern land use on national forests; pertinent Forest Plan standards and guidelines designed to mitigate the potential adverse effects of the alternative treatments; and some or all of the purpose and need items identified in Chapter 1. The SLL2 EA alternatives evolved from the work of the interdisciplinary team using the best available science (See 40 CFR, 1502.9 (b), 1502.22, 1502.24).

All proposals, whether analyzed as an alternative or eliminated from further analysis, were reviewed in detail for meeting NFMA requirements, consistency with the Forest Plan and physical attributes such as access, basal area, stand size, and slope which affect harvest marketability.

Table 2-1 compares proposed harvest activities by alternative. Nonharvest activities are shown in Table 2-2. The location and amount (acres, miles) of a particular activity under any alternative is approximate, based on inventory and survey estimates. The size of a planned timber sale area may change slightly during on-the-ground preparations. Factors needing to be accounted for include such things as avoiding a specific site that is too small to show on display maps, small inclusions of inoperable terrain, nonuniform stand structure, or refinements in length of a temporary road.

Table 2-1. Timber harvest management activities by stand acres.

Management Activity	Alternative A	Alternative B	Alternative C
Harvest Activities	Acres	Acres	Acres
Coppice with Reserves	0	346	374
Shelterwood with Reserves	0	359	470
Patch Clearcut	0	21	21
Clearcut with Reserves	0	0	15
Individual Tree Selection	0	363	223
Group Selection	0	722	544
Thinning	0	708	708

Management Activity	Alternative A	Alternative B	Alternative C
Harvest Acres	0	2,519	2,355
Project Volume (CCF)	0	27,803	26,212
Temporary Roads (miles)	0	2.9	2.7
Defer riparian areas and legacy patches (about 10% of displayed acres) from harvest activities.			

Table 2-2. Post-harvest and nonharvest management activities.

Management Activity	Alternative A	Alternative B	Alternative C
Post-harvest Activities			
Mechanical site prep for seeding and planting	0	127	142
Mechanical site prep for natural regeneration	0	186	268
Seed or plant white pine	0	109	109
Seed or plant white spruce / fir	0	51	51
Nonharvest Activities			
Acres of riparian area maintenance or improvement resulting from vegetation treatments	0	About 231	About 224
Miles of system roads opened to all motorized vehicles that are currently closed to one or more uses	0	18	18
Miles of system roads closed to all motorized vehicles or decommissioned that are currently open to one or more uses	0	19	19
Acres wildlife habitat improvement using prescribed fire	0	712	712
Temporary roads (miles)	0	2.9	2.7

2.2 Modification of the Proposed Action from Scoping

Some of the modifications to the Proposed Action presented in the Scoping package (January 19, 2011) are due to errors found in the database or clarification purposes. These changes were made to the Scoping Proposed Action (January 2011) and incorporated into the EA Proposed Action (Alternative B). These modifications are not ground disturbing.

Errata – See the Errata in the Table of Contents for one minor acreage correction.

Reporting of output acres – Change over to corporate data storage and introduction of new Geographic Information tools that run only from the corporate database affected reported output acres. These changes were made to the Scoping Proposed Action (January 2011) and incorporated into the EA Proposed Action (Alternative B). This disclosure is for clarification purposes.

Modifications to meet road decommissioning concerns – The Proposed Action as stated in the scoping letter of January 19, 2011, was modified to address concerns about road

closures (Appendix C, letter 11-11). The decommission option was reviewed and adjusted from close to all vehicles to decommission on (FSR)forest system roads 2099, 2937, 2839, 2312A, and 2825A (totals 2.4 miles) (Appendix A Transportation table). These routes are not the sole access to non-Forest Service lands, and the Forest Service has neither construction investment in the roads nor a need for timber management access for several decades. No ground disturbing activities are associated with this change, rather, the roads are removed from future MVU maps. These changes were made to the Scoping Proposed Action (January 2011) and incorporated into the EA Proposed Action (Alternative B). The modification is within the scope of original proposal.

Reporting acres of thinning contributing to hazardous fuels reduction – Commercial thinning acres in plantation pines are counted toward acres of hazardous fuels reduction. This disclosure is for clarification purposes. This change was made to the Scoping Proposed Action (January 2011) and incorporated into the EA Proposed Action (Alternative B). This disclosure is for clarification purposes. The modification is within the scope of original proposal.

Reporting miles of temporary roads – During the scoping process temporary road miles represent a best guess. With alternative development the miles of temproary roads likely needed is honed to a more accurate number. The estimate of miles of temporary roads decreased from less than 5 miles to about 2.9 miles. This change was made to the Scoping Proposed Action (January 2011) and incorporated into the EA Proposed Action (Alternative B). This disclosure is for clarification purposes. The modification is within the scope of original proposal.

2.3 Alternatives

2.3.1 No Action Alternative

The No Action Alternative (Alternative A) through the effects analysis contrasts the impacts of the proposed action and any alternative(s) with the current condition and expected future condition if the proposed action were not implemented (36 CFR 220.7(b)(2)(ii)).

The No Action Alternative does not respond to all aspects of the defined Purpose and Need for addressing Forest Plan objectives.

Vegetation Objectives – Under the No Action Alternative none of the proposed timber harvest, reforestation, planting/seeding, or wildlife habitat improvement activities would occur on NFS lands within the Project. Natural processes such as aging of forest stands, forest succession, tree mortality, and management activities including ongoing harvest contracts, and recreation and custodial level road maintenance would continue.

Transportation /Travel Management Objectives – Under the No Action Alternative custodial management of system forest roads would continue and deferred maintenance would remain. The Forest would continue to print an annual MVUM map. The challenge remaining from the 2007 Off-Highway Vehicle Road Travel Access decision, which left some forest roads open to HLVs only and closed to OHVs would not be met. Management of dual purpose FSRs open in the winter as designated snowmobile trails would not change (PR 1.0.8). The No Action Alternative reflects 2011 MVUM forest road designations for motorized vehicles.

2.3.2 Proposed Action (Alternative B)

Alternative B was designed to meet the Project's Purpose and Need (EA, section 1.4). This alternative was developed as a response to known Project issues and Forest Plan vegetation objectives. Differences between Project current conditions and Forest Plan desired conditions and objectives helped focus its design.

Vegetation Objectives – The objectives of Alternative B are to move or maintain the existing vegetative conditions in the DMP LE toward Forest Plan objectives and desired conditions for forest vegetation, riparian areas, and wildlife habitat.

Transportation /Travel Management Objectives – The objectives of Alternative B are to maintain or improve existing forest system road conditions and work toward Forest Plan objectives and desired conditions. Some roads shown on the 2011 MVUM travel management map are open only to highway licensed vehicles and closed to off-highway vehicles. The Walker Ranger District is working to eliminate these inconsistencies by designating most roads as open or closed to all motorized vehicles. Where appropriate some roads may be partially opened or closed or completely closed to protect soil, water, or wildlife resources. Other forest roads may be opened to all motorized uses to afford connected routes. Road management proposals are based on the Forest Road system as shown on the 2011 MVUM.

Proposed Activities

A variety of resource management activities (Appendix A maps; Appendix B mitigation tables) would occur under Alternative B. The list of activities shown in Table 2-1 and Table 2-2 results in conditions that contribute to the Purpose and Need (Chapter 1.2.2, 1.4, table 1-2 and Purpose and Need Statements, and Chapter 3 resource discussions).

2.3.3 Alternative C

Alternative C responds to the two key issues (Chapter 1.8) and meets the Purpose and Need. This alternative was designed to address a number of comments (Appendix C letters 9, 10, 11, 12, 13, 15) related to management of hardwood forest types and how

management activities may affect forest conditions in terms of social, ecological, and economic indicators.

Alternative C would implement harvest activities that accomplish changes in forest type and make progress toward meeting decade 2 objectives for forest-wide composition in the DMP LE and addresses comments on specific forest roads.

Vegetation Objectives –Alternative C is designed to meet the issues and meet the Purpose and Need. Alternative C responds to requests for additional acres of regeneration harvests (0-9 age class), fewer acres of selection harvests in hardwood forest types, and maintaining a supply of pine for northern Minnesota timber mills; all other harvest activities are essentially the same (Table 2-4). Alternative C, like the Proposed Action, moves existing vegetative conditions toward Forest Plan objectives and desired conditions for forest vegetation, riparian areas, and wildlife habitat.

Transportation / Travel Management Objectives – Alternative C is identical to Alternative B.

Proposed Activities

A variety of resource management activities (Appendix A maps; Appendix B mitigation tables) would occur under Alternative C. The list of activities shown in Table 2-1 and Table 2-2 results in conditions that contribute to the Purpose and Need (Chapter 1.2.2, 1.4, table 1-2 and Purpose and Need Statements, and Chapter 3 resource discussions).

2.4 Activities Common to Action Alternatives

Activities listed in this section are common to the Action Alternatives, Alternatives B and C. Details are found in Chapter 3, Vegetation Post-Harvest Activities. Comments and issues expressed regarding these activities are discussed in Appendix C.

Harvest treatments common to both alternatives are: even-aged harvests (coppice with reserves, patch clearcuts, and shelterwood with reserves); uneven-aged harvests (group selection); and intermediate harvest (commercial thinning).

Even-aged regeneration harvests – Even-aged regeneration harvests create young forest (e.g., 0-9 years old) stands through natural or artificial regeneration methods. Depending on current stand conditions and desired forest type objectives, some stands would regenerate to the same forest type while other stands would be converted to other forest types.

Coppice with reserves would regenerate stands that are currently mature. Approximately 6-12 reserve trees per acre would be retained to provide multiple benefits (e.g., future snags, large woody debris, wildlife seed sources, or visual concerns).

Patch clearcuts would regenerate smaller areas to encourage young forest habitat for grouse and woodcock. The clearcut patches would be less than 1 acres and likely closer to one-half acre in size.

Shelterwood with reserves harvests would regenerate stands while retaining overstory basal area. Overstory trees would be retained after regeneration to meet multiple resource objectives (e.g., visual concerns, wildlife values, forest canopy around vernal pools, riparian filter strips). In some stands, existing natural regeneration (e.g., hardwoods, balsam fir) would be released via harvest operations.

The intent of shelterwood harvests in aspen stands would be conversion to other forest types. These proposed conversions would be accomplished by shifting the dominant species using existing non-aspen seed trees or planting or seeding.

Uneven-aged regeneration harvests – Uneven-aged regeneration harvests would not change the year of origin and would be used to establish or maintain a multi-aged structure. Group Selection harvest is common to Alternative B and C. The existing canopy would be reduced, but would maintain between 50-70% closure depending on the individual stand characteristics and associated resource needs. Forest patches would be maintained with this type of harvest.

Commercial thinning – Commercial thinning is an intermediate silvicultural treatment where individual trees would be removed throughout stands to provide improved growing conditions for the remaining trees, as well as provide forested communities with diversity of species, diameter, vertical structure, and spacing.

Reforestation

Reforestation would be carried out through site preparation, planting, or seeding.

> *Site preparation* – Site preparation prior to seedling establishment would be achieved via harvest operations and/or post-harvest mechanical treatments. The intent of site preparation would be to expose and scarify mineral soil in irregular patterns over approximately 80% of any given stand. Equipment would go around residual trees, stumps, and small inclusions (varying in size and shape) within stands. Post-harvest residual trees of merchantable size would not be removed unless considered to be safety hazards. Mechanical site preparation could include brush raking, disking, biomass harvest, or other means.
>
> In this project, biomass harvest would be allowed in certain stands with clearcut or shelterwood harvests where mechanical site prep for seeding or planting was identified. In these stands, biomass harvest would achieve objectives of slash removal, soil exposure, and soil scarification while retaining residual trees and inclusions as described above (e.g., results would be similar to other mechanical site preparation treatments). (see discussion in Chapter 3 Vegetation)

Planting – Planting in clearcuts and shelterwoods would be accomplished with about 900-1,000 trees per acre of mixed species. If stocking levels do not meet minimum standards within 3 years of harvest in stands treated with clearcut or shelterwood treatments, fill-in planting may be necessary.

Seeding – All seeding rates depend upon the objective (e.g., diversity or regeneration) and the species being sown. Species to be seeded include white pine and white spruce.

Natural regeneration – Natural regeneration with harvest would occur via suckering (aspen), sprouting (paper birch), and seeding from mature seed-producing trees (white pine, paper birch, balsam fir, northern hardwoods).

Tending

Tending is designed to enhance survival, growth, vigor and composition of each stand. This project includes the following treatments: release, animal damage control, pathological pruning.

Release – Release of desired seedlings/saplings from competing vegetation would involve the cutting of competing, nonconiferous stems. Aspen and hazel are the predominant species of competing vegetation.

Animal damage control – Animal damage control is needed to protect seedlings/saplings from deer browsing. This could include spraying repellant(s), bud capping, tubing, or other forms of control that become available.

Pathological pruning – Pathological pruning, in the case of white pine prevents white pine blister rust. It involves removing branches from the lower third of sapling stems after they reach at least 2 feet in height.

Forest Opening Maintenance using Prescribed Fire

Wildlife habitat prescribed fire would be used to maintain the openings in the Woodtick Fields and improve wildlife habitat in the Goose Lake trails system. Maintainance activities would be implemented through partnerships or collaboration with interested parties. Maintenance would be conducted by the Minnesota DNR or other interested partners on Forest Service lands. The focus of maintaining these openings is to provide wildlife habitat components for grouse, deer, and woodcock. These areas are also favored by hunters. Maintenance would be accomplished through prescribed fire to reduce the encroachment of woody species into grassy areas or improve habitat under natural origin pines in the Goose Lake Hunter Walking Trail system. When encountered, fruiting shrubs would be left within the openings.

Temporary Road Construction

Construction of short road segments would be needed to access some of the proposed harvest units. Temporary roads would be decommissioned and revegetated following harvest and reforestation activities.

Hazardous Fuels Reduction

Commercially thinning plantation conifer stands is identified as a fuel treatment. The project area is in a fire dependent landscape. The thinning would increase spacing between the pine trees (reduce crown density), reduce ladder fuels, and raise crown base heights. The proposed commercial thinning of 708 acres of red pine plantations would move the existing fuels Condition Class III towards the desired Condition Class II.

2.5 Other Alternatives Considered and Eliminated from Further Analysis

Final Harvest Proposal

The ID Team discussed scoping comments that focused on the range of alternatives (Appendix C, letter 12-1, 12-7 and letter 13). Comments were received containing an alternative which proposed final harvest of an additional 1,200 acres (resulting in an action alternative project size of about 3,750 acres). This proposal was reviewed in detail for meeting NFMA requirements, consistency with the Forest Plan, appropriateness of size, and other site specific attributes such as access, basal area, stand size, and slope. Of the 3,270 acres submitted (PR 4.0.5), 110 acres were added to Alternative C. The remainder of the stands did not meet final harvest criteria or other Forest Plan standards and guidelines. The management rational for not including these stand acres are summarized in Table 2-3.

Table 2-3. Team review of final harvest proposal (3,270 acres) in SLL2 Project.

Forest Type (number of stands)	Management Rationale	Acres[1]
Aspen (16), Paper Birch (28), White Spruce (1)	No current CSE	412
Red pine (89)	Natural origin pine	1,473
Aspen (39), Balsam Fir(1)	Legacy stands, merchantability	80
Aspen (5)	Within Pine Point RNA	147
Aspen (15), Balsam-Fir(1), Paper Birch (7)	Areas of high interest	448
Aspen (1), Paper Birch (3), Jack Pine (3)	Vegetative conditions	159
Aspen (3), White Spruce (1)	Not DMP LE	100
Aspen (2)	Steep slope	31
Aspen (2), Balsam Fir (1)	State High Biodiversity Area	141
Aspen (5), Paper Birch (5), Balsam Fir (1)	RFSS & riparian concerns	330
Aspen (1), Paper Birch (3)	Previous entry; cumulative effects	63
Paper Birch (1)	Leech Lake Pine Collaborative	4

[1] Stands with multiple impacts resulted in duplicate acres/stands. Team reviewed all stands submitted (PR 2.1.23): about 234 stands /3,270acres; of these stands, 110 acres were added to Alternative C.

2.6 Mitigation Measures and Management Requirements

Appendix B contains tables for Alternative B, the Proposed Action, and Alternative C. These tables identify mitigation measures and design features specific to each treatment stand and forest system roads. Incorporated by reference are applicable Forest Plan standards and guidelines, Voluntary Site-Level Forest Management Guidelines (MFRC 2005). Timber Sale Contract provisions would be implemented during harvest, post-harvest, recreation, and road construction/ reconstruction activities (this includes provisions for NNIP and NNIS control); these are incorporated by reference into the EA. Specific to this project are the North Country Trail Association's Timber Harvesting Policy guidelines (2003) mitigation measures that will be applied to stands in the vicinity of the North Country Trail (Chapter 3.11 Recreation and Scenic Resources).

2.7 Monitoring

The monitoring program is part of Forest Plan (2004) implementation. The NFMA and NEPA require monitoring application of Forest Plan standards. Implementation of the Forest Plan is monitored on a periodic basis for items such as presence of MIS, and types and amounts of harvest. This information is available to the public in the annual Chippewa National Forest Monitoring and Evaluation Report and has been incorporated by reference into this EA. Specific monitoring that would occur if the Project were implemented, subject to available funding, is discussed below.

Timber sale marking guides would include all appropriate mitigation measures. A certified silviculturist would approve marking guides. During sale preparation and administration activities, the standards outlined in the CNF Timber Theft Prevention Plan (TTPP), which supplements the Region 9 TTPP, would be implemented.

Commercial timber sale administration would ensure the protection and continued use of this area during harvest operations. Timber sale contract provisions would incorporate any applicable mitigation measures outlined in this environmental assessment. First and third year stocking surveys would be conducted in stands harvested using regeneration prescriptions to ensure compliance with the NFMA requirement to adequately restock lands within five years following harvest.

Temporary road decommissioning and obliteration would be monitored periodically to ensure effectiveness. Heritage resource sites would be monitored to ensure mitigation measures were implemented and effective. Sensitive species locations, both plant and animal, would be monitored to ensure project activities were implemented and effectively protecting the habitat.

2.8 Comparison of Alternatives

This section provides a summary of the effects of implementing each alternative. Information in (Table 2-4) is focused on activities and effects where different levels can be distinguished quantitatively or qualitatively among the alternatives.

Table 2-4. Comparison of key and secondary issues and their indicators by alternative and resource.

Key Issues and Indicators by Resource			
Issue #1 (Young forest): Increasing the amount of regeneration harvest acres contributes to increasing the percentage of DMP LE, 0-9 age class within the project and proportionately contributes to the DMP LE, 0-9 age class forestwide.			
3.1 Vegetation	**Alternative A**	**Alternative B**	**Alternative C**
Acres of young forest (Indicator #1)			
Acres 0-9 age class in 5 years	880	1,606	1,760
Percent 0-9 age class in Project DMP LE	4	7	8
Estimated 0-9 age class treated acres	0	726	880
Estimated volume from 0-9 age class (CCF)	0	10,910	12,529
Secondary Vegetation Indicators			
Acres of forest type conversion to upland conifer (Indicator #2)	0	192	328
Acres Northern Hardwoods treated by forest type through selection harvest (Indicator #3)			
Sugar Maple	0	286	0
Mixed Northern Hardwoods	0	184	151
Oak	0	391	391
Acres of individual tree and group selection harvests in hardwood forest types (Indicator #4)	0	861	542
Acres sugar (hard) maple treated (Indicator #5)	0	381	95
Acres of contribution toward forest-wide DMP LE objectives (Indicator #6 is reported as stand acres)	0	747	940
Acres of conifer thinned to promote diversity (Indicator #7)	0	708	708
Harvest Summary (treated acres)			
Coppice with reserve	0	346	374
Shelterwood with reserve (BA<50)	0	359	470
Patch clearcut	0	21	21
Clearcut with reserves	0	0	15
Acres Individual Tree Selection harvest in all forest types	0	363	223
Acres Group Selection harvest in all forest types	0	721	544
Acres commercially thinned	0	708	708
Project size (harvest acres)	0	2,519	2,355
Estimated Project volume (CCF)	0	27,803	26,486
Estimated miles of temporary roads	0	2.9	2.7

Issue #2 (transportation/ travel management): Opening or closing forest system roads to all motorized vehicles may affect recreation opportunites and natural resources.			
3.2 Transportation/Travel Management	**Alternative A**	**Alternative B and Alternative C**	
Miles of forest system roads opened to all motorized vehicles that are currently closed to one or more uses	0	18	
Miles of forest system roads closed to all motorized vehicles or decommissioned that are currently open to one or more uses	0	19	
Transportation/Travel Management Summary (miles)			
Miles of system roads or trails closed to all motorized use	0	9	
Miles of system roads or trails decommissioned	0	9	
Add to FSR and close to all motorized vehicles (access to other ownerships)	0	2	
Add to FSR and open to OHVs	0	0.3	
Add to FSR and open to all motorized vehicles	0	0.2	
Remove from FSR and decommission (grown in)	0	0.9	
Secondary Travel Management Indicators			
Number of motorized forest system roads crossing the North Country National Scenic Trail (NCT)	18	13	
Number of deadend FSR spurs closed to all motorized vehicles	0	9	
FR 2107 from FR 3759 to Moccasin Lake Indicators			
Miles of FR 2107 considered for opening to mixed use	0	Up to 9	
Number of motorized FSRs crossing the NCT	8	6	
Number of places where FR 2107 intersects with FSRs not open to OHVs	7	4	
Number of forest system road loops opened to OHVs	0	About 4	
Generalized effects to soil and aquatic resources	Existing conditions	Effects uncertain (section 3.2 FR 2107)	
Generalized effects to habitat of three Management Indicator Species	Existing conditions	Incremental increase in use and related effects (section 3.2 FR2107)	
Secondary Issues & Indicators by Resource			
3.3 Wildlife Management Indicators:	**Alternative A**	**Alternative B**	**Alternative C**
Monitoring results and effects of proposed activities on MIS	See table 3-24 for summary of effects and determinations on RFSS		
Acres of negative trends of MIH-1 through MIH-9	0	63	93
Number and acreage in 300 acre and larger mature/older upland forest patches maintained (MIH 13)	11/ 8,052	10/ 7,152	10/ 7,058
Acres wildlife habitat improvement using prescribed fire in Goose Lake Hunter Walking Trail natural origin pine stands	0	496	496
Acres wildlife habitat improvement using prescribed fire in Woodtick Fields	0	216	216
Acres wildlife habitat improvement using variable density thinning to increase diversity	0	Up to 516	Up to 516

2.8 Comparison of Alternatives

3.4 Threatened & Endangered Species	**Alternative A**	**Alternative B**	**Alternative C**
Canada lynx	Not likely to adversely affect	Not likely to adversely affect	Not likely to adversely affect
Gray wolf	Not likely to adversely affect	Not likely to adversely affect	Not likely to adversely affect
3.5 Aquatics:	**Alternative A**	**Alternative B**	**Alternative C**
Acres of riparian area maintenance or improvement resulting from vegetation treatments	0	About 231acres	About 224 acres
Percentage of young forest and open area resulting from regeneration harvest treatments	No HUC6 watersheds > 60%	No HUC6 watersheds > 60%	No HUC6 watersheds > 60%
Miles of forest system roads closed or decommissioned (total)	0	19.3	19.3
3.6 Soils:	**Alternative A**	**Alternative B**	**Alternative C**
Inherent soil disturbance risk from harvest and site preparation by stand acres	0	Roughly 2,760 acres ranging from low to high risk	Roughly 2,597 acres ranging from low to high risk
Compaction Risk (low/medium/high)	0	131/ 2,357/ 271	137/ 2,203/ 257
Erosion Risk (low/medium/high)	0	1,921/ 616/ 223	1,803/ 580/ 214
Nutrient Depletion Risk (low/medium/high)	0	2,357/ 402/ 0	2,203/ 395/ 0
Estimated acreage of soil reclamation resulting from road decommission	0	21	21
3.7 Hazardous Fuels	**Alternative A**	**Alternative B**	**Alternative C**
Acres red pine plantation thinned	0	708	708
3.8 Tribal Interests	**Alternative A**	**Alternative B**	**Alternative C**
Acres of uneven-aged harvest treatments in hardwood stands	0	861	542
Acres sugar (hard) maple /basswood treated	0	381	95
Miles of forest system roads closed or decommissioned	0	19	19
Miles of forest system roads opened to all motorized vehicles	0	18	18
3.9 Environmental Justice	**Alternative A**	**Alternative B**	**Alternative C**
Analysis of impacts to minority and low-income populations.	No effect	No effect	No effect
3.10 Economic Factors:	**Alternative A**	**Alternative B**	**Alternative C**
Estimated volume of timber (CCF)	0	27,803	26,486
Present value of timber harvested	0	$616,484	$601,516
Present value costs of assoc sale prep, admin, reforestation activities	0	-$781,114	-$750,449
Present net value of timber harvested	0	-$164,630	-$148,933
Benefit/Cost Ratio for timber	n/a	0.79	0.80
Ten-year costs associated with road maintenance, closure, and decommission.	$60,000	$50,000	$50,000

Chapter 3 Affected Environment and Environmental Consequences

This chapter is organized by resource (Vegetation, Transportation/Travel Management, Wildlife MIS and MIH, TES, Aquatics, Soils, Hazardous Fuels, Tribal Interests, Economics, Environmental Justice, and Other Disclosures). Scientific analyses are driven by the issues (Table 2-4), by how well alternatives comply with the Forest Plan (2004), and by how alternative impacts track with those anticipated in the FEIS (2004). Resource sections are organized by scope of analysis, affected environment, environmental consequences, direct and indirect effects, issue and indicators, and cumulative effects.

3.1 Vegetation

Scope of Analysis

Spatial Framework

The scope of the analysis focuses on NFS lands within the SLL2 Project area for direct and indirect effects. National Forest System lands correspond to available resource information used in determining stand treatments. The analysis of vegetation is scaled to the DMP LE and based on forest types and age classes, as defined in the 2004 Forest Plan.

The cumulative effects analysis includes past practices and proposed treatments, as well as the reasonably foreseeable future (projects expected to be implemented in the next 5 years). County and state lands are included in this section along with federal ownership. No data is available for private ownerships regarding existing vegetation, harvest history, or harvest plans.

Timeframe

The direct, indirect, and cumulative analyses consider activities that occurred in the past 10 years as well as activities projected to occur in the next 5 years. The past 10 years were used for past effects in order to be consistent with age class distributions and to allow adequate time for past regeneration harvests and reforestation activities to be completed. The duration of most Federal timber sales is usually about 3-5 years, plus potential extensions. For the purposes of this analysis we assume that all planned treatments would be implemented in the next 5 years; therefore, the 5-year future timeframe is the most reasonably foreseeable one.. This would result in the most impact with regard to effects. Conditions resulting from this current analysis (e.g., age class distribution) would be in effect until the next entry. Corporate Forest Service planning data indicates the next harvest entry in this project area would likely be in about 10 years.

Management Direction and Forest Plan Consistency

The vegetation management alternatives in this Project are driven by Forest Plan, Decade 2 DMP LE objectives. These objectives are considered alongside a range of other multiple use objectives (Table 1-2) and Forest Plan standards and guidelines. An LE objective alone may not be the primary driver for a particular management proposal. Pertinent objectives, standards, and guidelines from the Forest Plan, Timber and Vegetation Management sections (pages 2-19 - 2-24) are incorporated by reference. (Table 1-2, Purpose and Need statements, Forest Plan management direction, and potential indicators for the Proposed Action)

Appropriateness of Even-aged Management and Optimality of Clearcutting

The National Forest Management Act (NFMA) of 1976 requires that when timber is to be harvested using an even-aged management system, a determination be made that the system is appropriate to meet the objectives and requirements of the Forest Plan. Where clearcutting is to be utilized, it must be determined to be the optimum method. A regeneration prescription is prepared based primarily upon biological requirements of the stand, LE guidance, and MA direction. Even-aged systems are considered normal and appropriate for most forest types in the Forest Plan, excluding black ash. Aspen, paper birch, red pine, and jack pine occur within the project area as primarily even-aged stands, although often with assorted mixtures of ages and species of advanced regeneration in the understory. The future management of these stands often depends on a combination of the amount and quality of the advanced regeneration and the ability to get new seedlings and suckers established. In most cases the stands are best-suited for regeneration back to similar species naturally or by planting, but often with retention of selected advanced regeneration.

In most cases clearcutting /coppice can be the optimum method for regenerating aspen. However, studies in the Lake States have shown that the negative relationship between aspen regeneration stem densities and percent residual canopy predict an approximate decrease of only 210 aspen stems per hectare for every one percent increase in percent residual canopy cover (Huffman *et. al*.1999). Residual conifer and hardwood densities in aspen stands are not expected to exceed 20 square feet/acre of basal area and in most cases would be less than 10 square feet/acre. This amount of aspen sprouting would still produce overstocked stands, thereby resulting in fully stocked stands of aspen.

Clearcutting with reserves and coppice harvest with reserves (regeneration through suckering and sprouting) is proposed in Alternatives B and C for a number of aspen stands. These methods are considered to be the optimum regeneration methods for these stands because these best meet the biological requirements (adequate sunlight) for regeneration and growth of these species or the species associated with them; and provide habitats, and recreation opportunities which are the expected outputs of the Project.

Silvicultural prescriptions to meet composition and age class objectives in the Forest Plan

Prescriptions that set stand age to 0 years

Clearcut with Reserves – This prescription would remove all merchantable stems with the exception of reserve trees (9-12 per acre) to serve as green tree retention (GTR), a conifer seed source or future snags. This type of harvest would produce a fully exposed microclimate for the development of a new age class. All existing snags greater than 5 inches would be retained on-site unless they present a safety hazard. Legacy patches of 5 percent of the stand area (in units greater than 20 acres in size) would also be retained. Legacy patches would be concentrated in areas surrounding vernal pools, long-rotation conifer and along lakes, streams, or open water wetlands. All legacy patches would be maintained for the duration of one stand rotation (approximately 40 years in aspen stands). In stands where long-rotation conifer is not available for legacy patches, the potential longevity of reserved trees would be a consideration factor.

Patch Clearcutting is a variation of the clearcut with reserves method, in that patches or portions of the stand are cut with the clearcut method, while the remaining portion of the stand is left intact for harvest at another time.

Coppice with Reserves – A coppice harvest would result in the production of new stems through sprouting from the stump or suckering from the roots of a tree, following its harvest. This prescription would remove all merchantable stems with the exception of reserve trees (9-12 per acre) to serve as GTR, a conifer seed source or future snags. This type of harvest would produce a fully exposed microclimate for the development of a new age class. This method often creates a two-aged stand.

Shelterwood with Reserves – Shelterwood harvest would vary according to the Forest Type:

Conifer Type – In stands containing large residual conifer, the objective would be to regenerate the stand to long rotation conifer. These stands would be harvested leaving about 40 BA (square feet of basal area per acre) in residual trees, in order to provide enough shade to produce a new age class in a moderated microclimate for regeneration of white pine and white spruce. Leave trees would be large diameter pine. Site preparation would generally consist of summer mechanical scarification if mineral soil exposure is not achieved during harvest. Some stands would be planted with a mixture of white pine and white spruce if sufficient seeding does not occur naturally.

Hardwood Types – Stands of this type are generally composed of red oak, aspen, sugar maple, and basswood with a small number of large diameter trees scattered throughout the stand. These stands would be harvested leaving about 40 BA in residual trees, in order to provide enough shade to produce a new age class in a moderated microclimate.

Leave trees should favor white pine, red oak, basswood, and red pine. Site preparation would generally consist of summer mechanical scarification or prescription fire. Some stands would be underplanted with a mixture of white pine or red oak.

Reforestation activities may include site preparation, seeding or planting, release of seedlings or hardwood sprouts, animal control spraying and pathological pruning. The residual trees in the shelterwood with reserves and clearcut with reserves units would be deferred for the next rotation period of the stand.

Coppice with reserves, clearcut with reserves and shelterwood with reserves harvest methods set the age of the stand back to year 0. It is common on the CNF for some or all of the shelter trees, as described above, to be retained after regeneration has become established, to attain goals other than regeneration.

Intermediate Harvest Prescriptions: not setting stand age to 0 years

Individual Tree Selection – Individual trees of all size classes would be removed more or less uniformly throughout the stand, to promote the growth of remaining trees and to provide space for regeneration. Any white pine would be deferred (not cut) to provide a seed source. Openings would be created adjacent to these trees in an attempt to encourage white pine regeneration.

Individual tree selection would occur in mixed hardwood forest types. Selection in this type would reduce residual basal area to an average of approximately 80 BA. This target would be variable in its nature, with some areas of the stand having heavier residual basal areas and some portions having a little less than 80 BA. Trees would generally be thinned from below, saving the largest, most vigorous trees. However, some dominant and co-dominant trees would be removed from clumps in order to open the canopy and progress toward an uneven-aged distribution of residual trees. The overall objective of this harvest treatment is to maintain the existing forest type for the next rotation period, while at the same time introducing within-stand diversity and multi-aged forest communities into the ecosystem. Individual tree selection in aspen stands may be used as a tool to convert the stand to another forest type.

Group Selection – This activity is designed to create small forest openings while improving the health and vigor of residual trees. Residual trees would increase in size while providing seed, shelter, and improved forest visuals during this entry. The objective of this harvest method is to manage for uneven-aged hardwood stands and multi-aged conifer stands.

Group selection (GS) would be conducted in areas of wind damaged or root sprung trees, or adjacent to large conifers, to provide microenvironments suitable for regeneration. Openings should generally not exceed 1 acre with 0.5 acre as a desired objective. As much as 40

percent of the stand may be harvested with small group openings. Regeneration of the conifer component is a priority wherever suitable seed trees are present.

Individual tree selection would apply to the remainder of the treated stand, reducing residual basal area to an average of about 85 BA. Trees are generally cut from below, saving the largest, most vigorous trees. However, some dominant and co-dominant trees would be removed from clumps in order to achieve spacing objectives. Removal of competition on at least three sides of residuals is desirable. Hardwoods such as basswood or red oak would be favored for retention during this activity. White pine would be deferred (not cut) except in dense areas that would benefit from thinning of the species.

Thinning –The first harvest entry into a stand would be implemented using traditional thinning methods and would establish access corridors for future thinning entries. No more than 50 percent of the existing pine would be removed. Residual basal area would average 80 BA, and would be heavier in some portions and lighter in other portions of the stand.

Variable density thinning would take place on a site by site basis based on individual stand conditions. The long term objective with this type of thinning is to move the stand toward multi-aged pine by encouraging natural regeneration in the portions of the stand that are more heavily thinned, and move toward a more natural appearance.

Post-harvest Activities

Interest in biomass harvest opportunities continues to increase, driven by higher energy prices and state of Minnesota supported incentives to produce renewable energy. Biomass harvesting includes the process of removing woody biomass from forested areas. Biomass harvest in the Project would be accomplished in conjunction with proposed harvest activities on a site by site basis. Only the nonmerchantable portion of designated trees would be available for this type of activity.

Site preparation treatments may be used in some stands where mineral soil exposure is not achieved following harvest, to enhance the success of regeneration.

Following site preparation, stands would either regenerate naturally from an onsite seed source or be planted with a mixture of conifer species to meet DMP LE objectives.

Release treatments would be used in the years following regeneration to free young conifer trees from competing vegetation. In hardwood stands, regeneration originating from stump sprouting would be released by removing all but a few of the best sprouts per stump. Animal damage control would be implemented in some areas to protect seedlings from white-tailed deer browse, including either bud capping or the application of nonchemical sprays.

3.1.1 Affected Environment

Existing vegetation is the result of landforms, soils, plant succession, land ownership and disturbances that have occurred throughout time including those resulting from implementing the 1986 Chippewa Forest Plan.

Landforms and soils determine the potential vegetation that is able to occupy a site by influencing the amount of water, sunlight and nutrients available for plant growth. The Moon project area is dominated by the Itasca Moraine Land Type Association (LTA). The soils of this LTA tend to be either coarse-loamy glacial till or sandy and gravelly outwash or a combination of the two. The project area also contains small areas of Sugar Hills Moraine and Hill City Till Plain.

Succession (i.e., the change of species composition on a site over time) is influenced by the physical attributes of a site, disturbances that affect the site, available seed sources in the area, and vegetative propagation. Disturbances within forested stands have been predominantly human caused and are mostly associated with timber harvest and fire suppression. Natural disturbances such as insects and disease, fire and wind events have played a lesser role in recent decades. The 1986 Chippewa Forest Plan prescribed mainly clearcut harvests to manage aspen forest types on the Forest or thinning harvests to manage pine forest types. Other forest types (e.g., northern hardwoods) were managed to a much lesser degree or went unmanaged.

At the coarse landscape scale, current opportunities for forest management in the SLL2 project area are influenced by the mix of Management Areas (MA) and Landscape Ecosystems (LE). The project area is dominated by the General Forest – Longer Rotation (LR) MA coupled with the Dry Mesic Pine (DMP) LE. This combination of social and ecological drivers, along with others (see Chapter 1, Purpose and Need), resulted in the management proposals that emphasize more uneven-aged and multi-aged forests. 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.

Dry Mesic Pine Landscape Ecosystem

All management activities occur in the DMP LE (Table 3-1). Forest Plan vegetation composition and age class objectives for the DMP in the SLL2 Project are shown in Table 3-6 and Table 3-7.

The Dry Mesic Pine Landscape Ecosystem (DMP LE) represents 97% (21,655 acres) of the project area. This LE was historically represented by a jack pine, red pine, and white pine supercanopy either alone, or as mixed pines. The subcanopy consisted of deciduous trees such as aspen, birch, oak, and red maple. In the absence of pine the deciduous trees would

form a cover type. Beaked hazel is the common shrub species, and large-leaved aster the most commonly found forb.

Fire was the common natural disturbance factor on this LE, with a stand replacement return interval of 250-500 years. Surface fires were more common, aiding in the creation of multi-aged hardwood and pine stands by removing the thinner barked species. Pine species would regenerate in places where the fire burned hotter.

3.1.2 Environmental Consequences

Indicators demonstrate suitability of the Project's vegetation management activities and response to key and secondary issues and indicators. These are listed in sections 1.8 and 2.8.

Direct and Indirect Effects

Table 3-1. Activities and outputs by alternative.

Activity	Alternative A No Action	Alternative B Proposed Action	Alternative C
Harvest (treated acres)			
Coppice with Reserves	0	346	374
Shelterwood with Reserves (BA<50)	0	359	470
Patch Clearcut	0	21	21
Clearcut with Reserves	0	0	15
Individual Tree Selection	0	363	223
Group Selection	0	749	571
Thinning	0	708	708
Project size (harvest acres)	0	2,545	2,382
Estimated Project Volume (CCF)	0	27,803	26,486
Esitmated miles of temporary roads	0	2.9	2.7
Post-harvest (acres)			
Mechanical site prep for seeding and planting	0	127	142
Mechanical site prep for natural regeneration	0	186	268
Seed or plant white pine	0	141	141
Seed or plant spruce/fir	0	51	51
Harvesting would occur on approximately 90% of the displayed acres for harvest activities because portions of stands such as riparian areas and legacy patches would be deferred (not cut). See Errata in Table of Contents for minor acreage corrections.			

Table 3-1 lists activity acres and outputs by Alternative. Harvest methods were considered on a stand-by-stand basis. The most appropriate harvest method was selected based on overstory and understory conditions, DMP LE objectives, and other resource considerations.

Stands were deferred from harvest during this entry to maintain or move toward Forest Plan age class, and tree species diversity objectives; to address Threatened, Endangered, and Sensitive (TES) species, mature upland forest patch, riparian, high scenic integrity (SIO), and traditional gathering concerns; and because of isolated location, wet access, steep slope, submerchantable diameter, low volume/acre, and inability to regenerate cedar stands.

Stands less than 40 years old were not considered for regeneration harvest because these stands would not be at ecological rotation.

Issue #1 (young forest): Increasing the amount of regeneration harvest acres contributes to increasing the percentage of DMP LE, 0-9 age class within the project and proportionately contributes to the DMP LE, 0-9 age class forestwide.

Indicator #1 – Acres of young forest created in the project area:

- Acres of 0-9 age class in 5 years
- Percent 0-9 age class in Project DMP LE
- Estimated treated acres (total)
- Estimated 0-9 volume (CCF)

Table 3-2. SLL2 project area DMP LE, 0-9 age class conditions in 5 years.

Acres in 5 years	Alternative A	Alternative B	Alternative C
Acres 0-9 age class in 5 years	880	1,606	1,760
Percent 0-9 age class in Project DMP LE	4	7	8
Estimated treated acres	0	726	880
Estimated 0-9 age class volume (CCF)	0	10,910	12,529

Acres 0-9 age class and percent 0-9 age class

Forest Plan decade 2 objectives for the DMP LE identify a goal of 9% for the creation of 0-9 age class, forest-wide (Forest Plan, pg.2-62). The current existing condition for 0-9 age class on a forest-wide scale is 5%. This would translate into the need for a 4% increase in 0-9 age class across the Forest-wide DMP LE.

The SLL2 project area encompasses approximately one-quarter of the Forest's DMP LE. The Project's proporational contribution toward meeting the Forest Plan, decade 2 goal for 0-9 age class is at least 1%. Both alternatives increase the amount of the DMP LE, 0-9 age class within the project area by at least 1% and proportionally contribute toward reaching the decade 2 goal for the Forest.

Alternative A

No harvest activities would occur under Alternative A (No Action Alternative). Stands would not be regenerated and set back to the youngest age class. Mature aspen and paper birch stands would continue to experience mortality, with reduced levels of regeneration occurring due to dominance effects of standing trees. Currently there are 1,624 acres in the 0-9 age class in the project area. These stands would continue to grow and advance out of the 0-9 age class under Alternative A, resulting in a total of 880 acres of upland forest types and 0 acres of lowland forest types in 5 years. Forest succession and lack of disturbance, in a fire suppression environment, would continue to move the stand composition away from that which historically occurred on these units, toward longer lived species. Aspen and birch stands would start to succeed toward longer lived hardwood forest types. Overstocked hardwood stands would continue to stagnate, increasing risk of loss due to insects or disease. Mortality of larger-sized trees would result in decreased yield of forest products over time. Pine plantations would be at increased risk due to hazardous fuels buildup. (Table 3-2)

Alternative B

Alternative B (Proposed Action Alternative) management activities would regenerate 726 acres to the 0-9 age class, resulting in a total of 1,606 acres (7%) in upland forest types. When looked at from a forestwide perspective, Alternative B provides the second largest contribution toward achieving DMP LE, 0-9 age class goals. (Table 3-2)

This number (726 acres) represents the treated acres and may not include legacy areas or portions of stands that are not proposed for harvest. No additional acres would be added to the 0-9 age class in the lowland forest types. Regeneration acres are about 29 % of the treated acres.

Alternative C

Alternative C management activities would regenerate 880 acres to the 0-9 age class, for a total of 1,760 acres (8%) in the upland forest types. This alternative provides the largest contribution toward achieving DMP LE, 0-9 age class goals. (Table 3-2)

This number (880 acres) represents the treated acres and may not include legacy areas or portions of stands that are not proposed for harvest. No additional acres would be added to the 0-9 age class in lowland forest types. Regeneration acres are about 37 % of the treated acres.

Estimated Volume (total CCF)

Estimated treated acres and resulting volumes are shown in (Table 3-2). Timber volume is measured in CCF (100 cubic feet). Volume resulting from this project is projected to be sold

over a 3-5 year period. Volume estimates are generated from ongoing district averages for forest types and harvest methods (PR4.0.8).

Table 3-3. Comparison of 0-9 age class volume to Project volume by alternative.

	Alternative A	Alternative B	Alternative C
Regeneration Harvest Volume (%)	0	39%	47%
Total Estimated Project Volume	0	27,803 CCF	26,486 CCF

A further description of estimated volume by forest type and harvest method can be reviewed in Appendix C of the EA.

Alternative A

No harvesting would take place under Alternative A, and no associated volume would be sold over the next 3-5 year period (Table 3-3). Stands would continue to grow, but may have a decreased rate of growth in comparison to those that are managed. The No Action Alternative fails to meet P&N statement 1, move current vegetation conditions toward long-term desired conditions for structure, age, spatial patterns, and long-term diversity or P&N statement 2, provide commercial wood for mills in northern Minnesota.

Alternative B

Alternative B management activities would generate the largest volume, 27,803 CCF, through the implementation of all proposed harvest activities (Table 3-1). It would meet P&N statements #1 and #2. Of the total projected volume, 39% is from creation of 0-9 age class on 726 acres (Table 3-3).

Alternative C

Alternative C management activities would generate 26,486 CCF through the proposed harvest activities. The volume is slightly decreased due to removal of all individual tree selection harvest stands (Table 3-1). Alternative C meets P&N statements # 1 and #2. Of the total projected volume, 47% is from creation of 0-9 age class on 880 acres (Table 3-3).

Comparison of Alternative B and Alternative C

Alternative C would create an additional 151 acres in the 0-9 age class and better address Key Issue #1 by maintaining or increasing the percentage of DMP LE, 0-9 age class within the Project and proportionately contributing to the DMP LE, 0-9 age class forestwide.

Secondary Vegetation Indicators:

Indicator #2: Acres of forest type conversion to upland conifer.

Table 3-4. Acres of conversion to conifer by alternative.

	Alternative A	Alternative B	Alternative C
Acres converted to white pine	0	141	276
Acres converted to spruce /fir	0	51	51
Total acres converted to conifer	0	192	328

The Purpose and Need for Action contains vegetation management objectives that include increasing the amount of upland conifer forest type in the DMP LE by converting acres to white pine and spruce-fir (Forest Plan, O-VG-1, O-VG-2, pg 2-22). Table 3-4 compares the degree to which the alternatives meet this objective.

Alternative A

The No Action Alternative would not convert any acres to white pine or spruce-fir forest type during this analysis period. Stand ages would advance, and forest succession and disturbance, in a fire suppression environment, would continue to move the stand composition away from that which historically occurred on these units, toward longer lived species. Aspen and birch stands would start to succeed toward longer lived hardwood forest types, and would start to show an increase in the white pine diversity within the stands. Existing hardwood stands would continue to mature and develop a multi-age structure. Older trees would start to fade from the stand, forming small gaps, and be replaced by shade tolerant species such as sugar maple.

Alternative B

The Proposed Action, Alternative B, would convert a total of 141 acres of aspen, paper birch, and sugar maple to white pine (Forest Plan, O-VG-1, O-VG-2, pg 2-22). Seeding or planting would occur on 109 of these acres. A shift in the dominant species toward white pine would occur on the remaining 32 acres.

Mechanical scarification would take place following harvest to prepare a mineral seed bed and reduce competition from other species. Residual trees would be left on the site to provide some shade as the young pine become established.

Alternative B would convert 51 acres of existing aspen forest type to spruce /fir through seeding and planting. (Forest Plan, O-VG-2, pg 2-22)

Alternative C

Alternative C would convert 276 acres of aspen, paper birch, oak, and sugar maple to white pine (Forest Plan, O-VG-1, O-VG-2, pg 2-22). Seeding or planting would occur on 109 of

these acres. A shift in the dominant species toward white pine, along with natural regeneration would occur on the remaining 167 acres.

Mechanical scarification would take place following harvest to prepare a mineral seed bed and reduce competition from other species. Residual trees would be left on the site to provide some shade as the young pine become established.

Alternative C would convert 51 acres of existing aspen forest type to spruce/fir through seeding and planting. (Forest Plan, O-VG-2, pg 2-22).

Indicators 3, 4, and 5 analyze forest health and benefits associated with uneven-aged hardwood management. These are analyzed together.

Indicator #3 – Acres of northern hardwood treated by forest type through selection harvest

Indicator #4 – Acres of individual tree and group selection harvests in hardwood forest types

Indicator #5 – Acres of sugar (hard) maple treated

Table 3-5. Acres of uneven-aged harvest treatments in hardwood stands by forest type in DMP LE.

Forest Type	Alternative A	Alternative B	Alternative C
Sugar maple / Basswood	0	286	0
Mixed Northern Hardwoods	0	184	151
Oak	0	391	391
Total Acres	0	861	542

The ability of the forest to sustain itself ecologically and provide what society wants and needs forms the components of a healthy forest. Maintaining the balance between forest sustainability and production of goods and services is the challenge for forest managers.

Ecological components – A healthy forest maintains its unique species and processes, while maintaining its basic structure, composition, and function.

Social components – A healthy forest has the ability to accommodate current and future needs of people for values, products, and services.

These components are inextricably linked. Forests cannot meet social needs without having the sustained capacity to grow, reproduce, recycle nutrients, and carry out other ecological functions.

Change is fundamental to all ecosystems. Change can occur suddenly or over such a long period that no change is apparent in the short term. The process of vegetation change is called forest succession. Disturbances, notably fire, insects, disease, climate, and human activity influence the direction and rate of change. Without disturbance, forests change at different rates and direction.

Chippewa National Forest management direction recognizes that native insects and diseases are present and fulfilling their ecosystem functions. Epidemics, when they occur, do not last longer than would be expected in a healthy ecosystem (Forest Plan, D-ID-3, pg 2-18).

Further improvement of hardwood stands may delay or ward off mortality in stands, by increasing the amount of within-stand diversity and promoting growth and vigor.

Hardwood stands are typically very diverse. For example, a stand that is typed as sugar maple may contain several other hardwood species in addition to sugar maple. The forest type of a stand is determined by counting the number and type of trees found in several locations within the stand. The percentage and uniformity of the tree species is derived from these data—this is what determines the forest type of the stand. The mixed northern hardwood forest type contains more than one hardwood species at variable percentages and density, making for difficulty in identifying a dominant species.

Alternative A

Alternative A would provide no stand improvement activities in hardwood stands, associated with timber harvest. Hardwood stands would have higher densities and in many cases, less growing space for crown canopies. No multi-age forest vegetation communities would be created through uneven-aged harvests in hardwood stands (Forest Plan, O-VG-10, pg 2-22; O-VG-15, pg 2-23). Stand ages would advance, and forest succession and disturbance, in a fire suppression environment, would continue to move the stand composition toward longer lived species. Overstocked hardwood stands would continue to stagnate, increasing risk of loss due to insects or disease. Mortality of larger-sized trees would result in decreased yield of forest products over time. Some stands could be at increased risk due to fuels buildup, especially if adjacent to conifer dominated stands.

This alternative would maintain the current number of hardwood acres within the project area, as well as showing a potential increase in acres over time as forest succession moves stands toward longer-lived hardwood species. It would not treat any acres of hardwoods, with either individual tree or group selection harvest methods, and would not improve the growth and vigor of any acres of hardwoods. (Table 3-5)

Alternative B

Alternative B would implement 861 acres of individual and group selection in hardwood forest types. Trees of all size classes would be removed more or less uniformly throughout the stand, to promote the growth and health of remaining trees and to provide space for regeneration. This alternative would implement the most progress toward converting hardwood acres from even-aged to uneven-aged stands (Forest Plan, O-VG-10, pg 2-22; O-VG-15, pg 2-23) and have a positive impact on creating healthy hardwood stands.

Trees would generally be cut from below, saving the largest, most vigorous trees. However, some dominant and co-dominant trees would be removed from clumps in order to achieve residual basal area objectives and progress toward an uneven-aged distribution of residual trees. The overall objective is to maintain the existing hardwood forest type for the next rotation period, while at the same time introduce within-stand diversity and multi-aged forest communities into the ecosystem.

Stands typed as sugar maple would be managed with an emphasis placed on creating additional space for growth and development of the maple species. Other hardwood species within the stand would be prioritized for removal during the harvest. In cases where there is an overabundance of young pole sized maple in poor growing conditions, a portion of the poorer trees would be removed, leaving more room for the residuals to develop into superior trees. (Table 3-5)

Alternative C

Alternative C would implement 542 acres of individual and group selection in hardwood forest types. Trees of all size classes would be removed more or less uniformly throughout the stand, to promote the growth and health of remaining trees and to provide space for regeneration. This alternative would harvest the second largest amount of hardwoods, progressing towards the creation of uneven-aged stands (Forest Plan, O-VG-10, pg 2-22; O-VG-15, pg 2-23). This alternative would have the second largest, positive impact on creating healthy hardwood stands. (Table 3-5)

Trees would generally be cut from below, saving the largest, most vigorous trees. However, some dominant and co-dominant trees would be removed from clumps in order to achieve residual basal area objectives and progress toward an uneven-aged distribution of residual trees. The overall objective is to maintain the existing hardwood forest type for the next rotation period, while at the same time introduce within-stand diversity and multi-aged forest communities into the ecosystem.

This alternative would have no uneven-aged management in stands typed as sugar/hard maple. No improved growing conditions for residual maple would be created. These stands would continue to grow and succeed. Some trees would stagnate, die and create natural openings for regeneration of diverse hardwood species.

Indicator #6 – Acres of contribution toward forest-wide DMP LE objectives

Table 3-6 and Table 3-7 display the Forest Plan's Forest-wide objectives for upland vegetation composition and age classes, as well as information for the existing project-wide condition and proposed vegetation composition for each alternative in the SLL2 project area. Harvest treatments move vegetation composition towards Forest Plan objectives via forest type conversions as proposed in the action alternatives.

The Purpose and Need for the SLL2 project identified that the following Forest type and age class changes in this project area would help accomplish Forest Plan, decade 2 objectives forestwide.

1. Contribute to the 0-9 age class in the DMP LE. (0-9 age class acres reflect stand acres in Table 3-6 and Table 3-7)
2. Increase upland conifer forest type in the DMP LE by converting areas to white pine and spruce-fir.
3. Decrease aspen by converting it to other forest types.
4. Decrease northern hardwoods by converting it to other forest types.
5. Increase amounts of multi-age forest vegetation communities.
6. Increase or maintain oak forest type

Table 3-6. Vegetation Composition Objectives for Dry Mesic Pine (DMP) LE

Dry Mesic Pine LE_Forest Type	Forest Plan 2003	Forest 2010	Forest Plan 2003	Forest in 2010	Forest Plan Decade 2 Objective(2015)	SLL2 Project 2010	SLL2 Alt A 2015	SLL2 Alt B 2015	SLL2 Alt C 2015
Uplands	Acres	Acres	%	%	%	Acres	Acres	Acres	Acres
DMP Jack pine	1,200	761	1	1	1	122	122	122	122
DMP red pine	13,000	12,735	15	15	15	4207	4207	4207	4207
DMP white pine	800	1,209	1	1	4	531	531	672	807
DMP spruce-fir	4,000	3,416	5	4	8	442	442	494	494
DMP oak	5,100	3,128	6	4	6	1540	1540	1767	1678
DMP N. hdwds	12,300	17,358	15	21	15	5471	5471	5269	5305
DMP aspen	38,800	36,672	46	45	41	7788	7788	7604	7549
DMP paper birch	9,100	6/,909	11	8	10	1554	1554	1520	1493
TOTAL	84,300	82,229	100	100	100	21655	21655	21655	21655
Lowlands									
DMP black spruce	3,600	3,361	54	45	53	174	174	174	174
DMP tamarack	600	720	9	10	9	91	91	91	91
DMP lowland hardwoods	1,600	2,212	24	29	24	102	102	102	102
DMP white cedar	900	1,249	13	17	13	151	151	151	151
TOTAL	6,700	7,504	100	100	100	5069	5069	5069	5069

*Table includes data totals for Forest-wide current conditions, based on October 2010 queries
* Changes to the project area are displayed in acres in order to show the trend of increase or decrease. The use of percentages on such a small scale (when compared to the forest landscape) would show a small change of less than 1 percent and would not display the shift adequately.

Forest Plan Objectives for Upland Dry Mesic Pine LE

1. Contribute to the 0-9 Age Class (Forest Plan, O-VG-1, pg 2-22) – Alternative B creates 747 stand acres (726 treated acres) of 0-9 age class in DMP LE (7%). Alternative C creates 880 stand acres (880 treated acres) of 0-9 age class in DMP LE (8%)

2. Increase upland conifer forest type in DMP LE (Forest Plan, O-VG-2, pg 2-22) – by converting areas to white pine and spruce-fir. Alternative B converts 193 treated acres to upland conifer forest type and Alternative C converts 328 treated acres to upland conifer.

3. Increase amounts of multi-age forest (Forest Plan, O-VG-10, pg 2-22; O-VG-15, pg 2-23) – Multi-age forest maintains the year of origin of the oldest cohorts (dominant and co-dominant trees). Alternative B manages 1,112 treated acres for multi-aged hardwoods and Alternative C manages 794 treated acres.

4. Decrease aspen by converting it to other forest types (Forest Plan, O-VG-1, O-VG-2, pg 2-22) – Alternative B decreases 184 treated acres of aspen. Alternative C decreases 239 treated acres of aspen.

5. Decrease northern hardwoods by converting it to other forest types (Forest Plan, O-VG-1, O-VG-2, pg 2-22) – Alternative B converts 202 treated acres of hardwoods and Alternative C converts 166 treated acres to other forest types.

6. Increase or maintain oak forest type (Forest Plan, O-VG-1, O-VG-2, pg 2-22) – Alternative B creates 227 treated acres of oak and Alternative C creates 138 treated acres of oak forest type.

Table 3-7. Age Class Objectives for Dry Mesic Pine (DMP) LE

	Forest-wide 2010	Existing Condition 2010	Forest Plan Condition 2003	Forest Plan Objectives Decade 2 (2015)	SLL2 Existing (2010)	SLL2 Alt A(2015)	SLL2 Alt B (2015)	SLL2 Alt C (2015)
Age Class	Acres	Percent	Percent	Percent	Acres	Acres	Acres	Acres
DMP Uplands								
0-9	3898	5	6	9	1624	880	1627	1820
10-39	26232	32	33	40	6366	6519	6519	6519
40-79	25591	31	33	22	7387	5398	5159	5126
80-179	26347	32	28	29	6279	8858	8350	8190
180+	119	0	0	0	0	0	0	0
Total	82188	100	100	100	21655	21655	21655	21655
DMP Lowlands								
0-9	76	1	1	4	10	10	10	10
10-39	250	3	3	5	114	88	88	88
40-79	946	13	15	5	278	264	264	264
80-119	4,365	58	57	45	114	155	155	155
120-179	1,801	24	22	38	4	4	4	4
180+	102	1	1	2	0	0	0	0
Total	7,541	100	100	100	519	519	519	519

*Table includes data totals for current Forest-wide conditions, based on October 2010 queries
* Changes to the project area are displayed in acres in order to show the trend of increase or decrease. The use of percentages on such a small scale (when compared to the forest landscape) would show a small change of less than 1 percent and would not display the shift adequately.

Forest Plan Objectives for Upland Dry Mesic Pine LE

1.Contribute to the 0-9 Age Class (Forest Plan, O-VG-1, pg 2-22) – Alternatives B creates 747 stand acres (726 treated acres) of 0-9 age class in DMP LE (7%). Alternative C creates 880 stand acres (880 treated acres) of 0-9 age class in DMP LE (8%)

2.Increase upland conifer forest type in the DMP LE in DMP LE (Forest Plan, O-VG-2, pg 2-22) – by converting areas to white pine and spruce-fir. Alternative B converts 192 treated acres to upland conifer forest type and Alternative C converts 328 treated acres to upland conifer.

3.Increase amounts of multi-age forest (Forest Plan, O-VG-10, pg 2-22; O-VG-15, pg 2-23) – Multi-age forest maintains the year of origin of the oldest cohorts (dominant and co-dominant trees) Alternative B manages 1,112 treated acres for multi-aged hardwoods and Alternative C manages 794 treated acres.

4.Decrease aspen by converting it to other forest types (Forest Plan, O-VG-1, O-VG-2, pg 2-22) – Alternative B decreases 184 treated acres of aspen. Alternative C decreases 239 treated acres of aspen.

5.Decrease northern hardwoods by converting it to other forest types (Forest Plan, O-VG-1, O-VG-2, pg 2-22) – Alternative B converts 202 treated acres of hardwoods and Alternative C converts 166 treated acres to other forest types.

6.Increase or maintain oak forest type (Forest Plan, O-VG-1, O-VG-2, pg 2-22). Alternative B creates 227 treated acres of oak and Alternative C creates 138 treated acres of oak forest type.

Table 3-8. Summary of Alternative B and C changes in acres of Forest Type

Change in Forest Type	Alternative A (acres)	Alternative B (acres)	Alternative C (acres)
Jack pine	0	0	0
Red pine	0	0	0
White pine	0	+141	+276
Spruce-fir	0	+51	+51
Oak	0	+227	+138
N. hardwoods	0	-202	-166
Aspen	0	-184	-239
Paper birch	0	-34	-61

Alternative A

No harvest activities would occur under the No Action Alternative (Table 3-8). The existing acreage of forest types within the DMP LE would remain the same. The minimal amount of scattered natural regeneration that would occur in natural openings via seeding and sprouting/suckering would cause a negligible amount of change to species composition.

Stand ages would advance, and forest succession and disturbance, in a fire suppression environment, would continue to move the stand composition toward longer lived species. Aspen and birch stands would start to succeed toward longer lived hardwood forest types or mixed conifer stands including spruce, balsam fir, and white pine (FEIS 2004, Appendix G, p. G-19). Overstocked hardwood stands would continue to stagnate, increasing risk of loss due to insects or disease. Mortality of larger-sized trees would result in decreased yield of forest products over time. Some stands would be at increased risk due to fuels buildup.

Alternative B

Table 3-8 summarizes the changes in acres of forest type, in the DMP LE within the project area. Acres of change were chosen as a measure of progress in meeting Forest Plan, decade 2 objectives, due to the fact that a large change in acres on a project scale is needed in order to show a change in percentage on a forest-wide scale.

Harvest treatments proposed for Alternative B achieve a combination of forest type conversions that progress toward achieving decade 2, Forest Plan DMP LE and age class objectives. There is an increase in the upland conifer component (193 acres of white pine, spruce and fir) and oak (227 acres) that corresponds to a decrease in the aspen and northern hardwoods forest type. Conifer conversions will occur through a combination of seeding, planting and harvest manipulation. The shift following harvest occurs in some cases where there is a strong existing component of white pine that is deferred, and becomes the dominant species upon the completion of the harvest prescription.

The largest amount of forest type conversion is in the oak type. A total of 227 acres would be converted from other forest types such as aspen and mixed hardwoods. The SLL2 project

area contains 50% of the oak forest type that falls within the DMP LE. For this reason, conversion to, and maintenance of oak in this project area goes a long way toward reaching forest-wide objectives for decade 2.

The acres of commercial thinning are the same in Alternatives B and C. Both alternatives thin 708 acres for the purpose of improving stand health and vigor. Thinning does not change the dominant forest type, age class distribution, or forest type composition.

Alternative C

The largest amount of forest type conversions under Alternative C are in the white pine forest type (276 acres). An additional 52 acres of white spruce/fir would be added from existing aspen stands. Conifer conversions would occur through a combination of seeding, planting, and harvest manipulation. The shift following harvest occurs in some cases where there is a strong existing component of white pine that is deferred (not cut), and becomes the dominant species upon the completion of the harvest prescription. Conversions would also occur following regeneration harvests when seeding, planting, and natural regeneration takes place.

A smaller amount of oak conversion takes place under Alternative C (138 acres). These acres would come from existing aspen and mixed hardwood forest types. The SLL2 project area contains 50% of the oak forest type that falls within the DMP LE. For this reason, conversion to, and maintenance of oak in this project area goes a long way toward reaching forest-wide objectives for decade 2.

Alternative C would thin 708 acres for the purpose of improving stand health and vigor. Thinning does not change the dominant forest type, age class distribution, or forest type composition.

Indicator #7 – Acres of conifer thinned to promote diversity

Variable density thinning (VDT) may be used as a thinning method on a site by site basis based on the individual stand characteristics. This method removes trees in a manner such that portions of the stand would have a lighter residual basal area and portions would be left at a heavier residual basal area. The desired goal is to reduce the appearance of plantation origin pine and increase the opportunity for establishment of a second age class of conifer in open areas.

Conifer stands of plantation origin (1930+) would be thinned through both traditional and variable density thinning. The first harvest entry into a stand establishes access corridors for future thinning entries, and would not remove more than 50% of the existing pine. Residual basal area would average 80-90 square feet per acre.

Thinning in conifer plantations enhances the size of residual trees and increases the relative rate of stand growth. Thinning also serves to capture mortality that would otherwise be lost

through self-thinning as stands age and grow. Discussion of additional effects of thinning are found in 3.3 Wildlife Habitat; Biological Evaluation, pages 32-34; and 3.7 Hazardous Fuels.

Alternative A

No thinning would occur under Alternative A. In addition to improving stand health and vigor, thinning also serves to capture volume that is otherwise lost to mortality. By foregoing thinning at this time, stands would continue to grow and as they reach the upper limit of stocking would begin to self-thin. Alternative A would not capture this mortality.

Alternatives B and C

Alternatives B and C both would thin 708 acres of upland conifer for the purpose of improving stand health and vigor. Of these 708 acres, approximately 516 acres would be candidates for VDT. Variable density thinning would thin plantation pine to reduce the appearance of rows and increase within stand diversity (Forest Plan, O-VG-9, O-VG-10, pg 2-22). Portions of these stands would be thinned to a lower residual basal area, while other portions would be thinned less, leaving a higher residual basal area. Existing diversity would be maintained during harvest. Increased light to the forest floor may promote regeneration in portions of the stand, but no active reforestation activities would take place.

Cumulative Effects

Vegetation treatment effects are analyzed within the SLL2 Project on Federal, State, and Cass County lands. Other ownerships are not included due to a lack of data. The SLL2 Project was chosen as the spatial framework because vegetation treatments directly influence the treated stands that are within this boundary.

Analysis includes vegetation projects from the past 10 years, and future projects likely to occur in the next 5 years on NFS lands, State and County ownerships. Other ownerships (private and Tribal) are not included due to a lack of data. These timeframes cover the time periods where disturbance from past management activities are still quite visible and where we can reasonably foresee future activities without making too many assumptions.

Spatial analysis considered adjacent blocks of Federal, State, and County lands. Four blocks were found which effect vegetation proposals under Alternatives B and C, and one block was found which effects vegetation proposals under Alternative C. Table 3-9 illustrates the acres of 0-9 age class created in each block.

Consideration of past impacts is guided by the CEQ letter of June 24, 2005, that states that we can discuss past impacts as an aggregate rather than individually. About 5 percent of the public land base has been regenerated since 2000. The forest types regenerated and the harvest methods used have been similar across State, County, and Federal ownerships. On NFS lands, there has been a concerted effort to regenerate conifer in the past ten years.

The Forest Service, Cass County, State of Minnesota and Leech Lake Band of Ojibwe have partnered together in an effort to restore pine to the landscape within the SLL2 project area. Initial projects to increase conifer diversity across the landscape have occurred with grant funding, for planting on Cass County and Forest Service lands.

Table 3-9. Harvest acres in adjacent Federal, State, and County ownerships scheduled through about 2021.

Ownership	Block 1 (Alternatives B and C)	Block 2 (Alternative C)	Block 3 (Alternatives B and C)	Block 4 (Alternatives B and C)	Block 5 (Alternatives B and C)
Forest Service	139	30	13	47	28
State	0	0	236	0	0
Cass County	33	89	0	31	57
Total Acres	172	119	249	78	85

Regeneration harvests are found on approximately 196 acres (10%) of State and 165 acres (3%) of County lands (and a very limited amount on private lands) over the last decade. The timber sales on County and State ownerships have been mainly accomplished through clearcutting. Recently, there has been an increase in the number of reserve trees legacy patches as recommended in the Voluntary Site Level Forest Management Guidelines (MFRC 2005). Commercial thins have also occurred in the past ten years, but these do not affect age class or forest type and are not discussed further.

Regeneration cuts (1,639 acres) on NFS lands within the past 10 years are reflected in Table 3-7. These harvests were primarily shelterwoods and clearcuts with reserves, which were prescribed to regenerate the stands to a conifer forest type; associated reforestation activities are ongoing. The bulk of these stands are located in an area northwest of Longville, Minnesota, and range in size from 5 to 125 acres. Commercial thins and selection harvests have also occurred in the past 10 years on approximately 1,300 acres, but these did not affect the age class or forest type and are not discussed further.

Two Federal timber sales in the SLL2 project area result from a previous decision notice. Regeneration acres total 130 acres. The Pine Lake sale area has adjacent County, State, and Federal ownerships and is expected to remain open through 2013. The Broadwater sale area has a small amount of adjacent County land; it is expected to close in 2012.

The cumulative effects of regeneration harvests (creating 0-9 age class blocks) are minimal given the mixed ownership pattern and actual amount of regeneration acres within a block.

Future Impacts

Both Cass County and the State of Minnesota plan to harvest mature timber in the SLL2 project area over the next 5 to 10 year period. The State plans to harvest 785 acres through the use of regeneration cuts over 10 years in aspen, paper birch, and hardwoods. Cass

County plans to implement 709 acres of regeneration cuts in aspen, paper birch, and hardwoods over 5 years.

On a forest-wide basis, the acres of vegetation treatments in Alternatives B and C of the SLL2 EA do not change age-class distributions, other than in the 0-9 year age class. This is due in part to the in-growth and out-growth in the intermediate (10-39) age classes. Future sales would continue to move DMP LE age class objectives toward Forest Plan desired conditions. After the SLL2 Project, the Forest Service's next entry into the project area is in about 2021. Pine thinning would likely occur in the project area prior to 2021; however, this harvest method does not affect the age class.

3.2 Transportation / Travel Management

The effects of proposed changes in travel and transportation management direction are analyzed as Key Issue #2. Management actions are needed to move the existing condition of motorized vehicle use of forest system roads (FSR) towards Forest Plan goals, objectives, and desired conditions. Travel management indicators reflect social concerns such as changes in allowable use and access. These are shown on the Motorized Vehicle Use Map (MVUM). This map is updated annually as part of the 2007 OHV Decision (pg. 9) commitment to the public.

Travel management outreach activities include identifying and maintaining a forest road system that provides opportunities for people to access the Forest; provides a range of settings and opportunities; enhances social and economic benefits for individuals and communities; and contributes to efforts to sustain the American Indian way of life, cultural integrity, social cohesion, and economic well-being.

The Forest, with the cooperation of MN DNR, the Forest area County, Township, and City governments, and the Leech Lake Band of Ojibwe (LLBO), have been working with the general public to assess roaded, motorized recreation opportunities. Elements of the travel management analysis are to (1) address motorized vehicle use through active public engagement and (2) consistently designate forest system roads as either closed or open to motorized uses.

Transportation management indicators analyze the impact on physical resources resulting from changes in allowable uses. Aquatic (3.5), Soils (3.6), Wildlife MIS and MIH (3.3), and TES (3.4) analyses address changes in transportation management defined by opening, closing, or decommissioning FSRs. Sections 3.3 and 3.4 summarize the detailed analyses from the Biological Assessment (PR 5.6) and Biological Evaluation (PR 5.7). Appendix B contains mitigations for these resources.

Legal and illegal uses of forest system roads by OHVs would continue to be monitored through public contacts, law enforcement, and modifications based on changes to the road

system in the SLL2 EA and other environmental assessments, and the annual MVUM updates (M&E 2010, pgs 36-41).

Invasive species are widely recognized as one of the primary threats to achieving the goals of managing lands for outstanding outdoor recreation opportunities, abundant wildlife, clean water, and sustainable harvest of forest products. The risk of spreading NNIS is recognized as an ongoing forestwide challenge (M&E 2010, pgs 54-56; 2007 OHV Decision, pg 12).

Scope of Analysis

Spatial Framework and Timeframe

The spatial framework is defined as National Forest System Roads (FSRs) and nonmotorized trails, specifically, the North Country National Scenic Trail (NCT) in the SLL2 project area. Travel management mitigations appear in the Appendix B mitigation tables.

Transportation management affects soil, aquatic, and wildlife resources—the *physical* resources. This analysis focuses on travel management, meaning changes in allowable use—the *recreation* resource.

Changes to the MVU map occur annually. This analysis supports ongoing implementation of the 2007 OHV Decision.

Methodology

The South Leech Lake 2 Project travel management analysis follows the framework set out in the 2005 Motor Vehicle Route and Area Designation Guide. Two key components of this framework are (1) focus on the change from status quo and (2) engage other federal, state, local, and tribal governments and the public in discussion. Travel management changes in use are based on the MVUM 2011 travel management map, SLL2 Project's Roads Analysis Project report (PR 1.0.8), and site specific field reviews (PR 1.0.9, PR 1.1.5, PR 1.1.6, PR 1.1.7).

This section is presented in two parts: transportation / travel management effects that are projectwide and management effects that are specific to FR 2107 (Woodtick Trail).

Management Direction

Management direction is from the 2004 Forest Plan and the 2007 Off-Highway Vehicle Road Travel Access decision (2007 OHV Decision). Forest Plan desired conditions include clearly defining and providing road and trail riding opportunities while protecting natural resources (D-RMV-1, 2, pg. 2-42 and D-TS-1, 2, 3, 4, pg. 2-47). Forest Plan objectives and standards include the expectation that Forest roads will be identified as appropriate or inappropriate for OHV use (O-RMV-1, 2; G-RMV-4; S-RMV-1, 2, 4, pg 2-42; O-TS 1, 3, 6, 7, 8, pg. 2-48).

Excerpts from the 2007 OHV Decision, signed by Forest Supervisor Harper, provide context for this Project's travel management analysis.

On page 2: "One of the issues complicating management is that this decision will address only ORVs, not highway licensed vehicles."

On page 8: "I recognize that there is a difference in how ORVs[OHVs] and highway licensed vehicles[HLVs] are used and therefore, some roads may be open to highway licensed vehicles while closed to ORVs. Many of the roads that are closed to ORV use while remaining open to highway licensed vehicles will be considered in future project specific analysis to determine if they should be closed to all motorized use."

On page 4: Snowmobile use is outside the extent or scope of the project.

The SLL2 Project EA addresses this travel management inconsistency and confusion it causes by analyzing FSRs currently open to HLVs only (passenger cars, trucks, SUVs) and closed to OHV use; snowmobile use is not affected and outside the scope of the SLL2 EA. Travel management remains an ongoing process on the Walker Ranger District. The District recognizes that all MVUM inaccuracies or FSR use changes cannot be identified or implemented at one time in one project.

3.2.1 Affected Environment

Forest Service records show roughly 123 miles of FSRs located within the SLL2 Project (PR 1.0.8). Other road management is provided through local townships, State highways, DNR managed roads, County highways, County forest, municipal, Indian routes, and private roads. The total miles of roads under all jurisdictions, in the Project is 229 miles (Table 3-10).

The majority of the roads are maintenance level 2 (ML 2) roads, or roads built for access using high clearance vehicles. The ML1 roads by Forest policy are closed to public use (**Error! Reference source not found.**). Maintenance level 3 and 4 roads are designed for passenger car use. (PR 1.0.8).

The SLL2 project area contains nearly 60 miles of trail segments which include the NCT (22.8 miles, nonmotorized), Goose Lake hunter walking trail (12 miles, nonmotorized), Lake Erin interpretive trail (0.6 miles), and three designated snowmobile routes (19.1 miles). The SLL2 EA does not analyze or change existing snowmobile opportunities.

Table 3-10. Jurisdiction of SLL2 forest system roads.

NFS	State	DNR	County	Township	Other
Miles	Miles	Miles	Miles	Miles	Miles
123	14	6	46	4	36

Table 3-11. Summary of SLL2 forest system roads by maintenance level (ML).

	Maintenance Level 1	Maintenance Level 2	Maintenance Level 3	Maintenance Level 4
Miles	4	82	15	22

3.2.2 Environmental Consequences

Travel management direction under the Action Alternatives (Alternatives B and C) considers changing the current motorized vehicle use designation of forest roads as shown under the No Action Alternative and on the 2011 MVU map. The Action Alternatives reflect the direction from the 2007 OHV Decision to close or open road segments to all motorized vehicle use.

Appendix A contains a projectwide map showing the proposed transportation / travel management changes.

Other travel management documents may be found in Project File\References folder. These include the 2007 Off-Highway Decision and Specialist's reports (Pr 520-2 Hydrology and Soils, PR530-2 Environmental Justice, PR 540-2 Wildlife, PR 550-2 Recreation, PR560-2 Social and Economic). These reports are incorporated by reference. Hardcopies of these documents may be viewed at the Walker Ranger District Office, 201 Minnesota Ave E, Walker, Minnesota. MVU maps are available across the Chippewa National Forest.

Transportation management activity is undertaken for various reasons (PR 2.1.4). Roads may be closed or decommissioned (1) in the interest of protecting aquatic, soil, terrestrial wildlife resources, and recreation resources or (2) the road may have been determined to be in excess of the Forest's transportation needs. (PR 2.1.4, PR 4.0.2).

Travel management proposals would make changes in allowable use on forest system roads (PR 2.1.4 and PR 4.0.2). These proposed changes in allowable use are tiered to the 2007 OHV Decision direction, follow Forest Plan D-TR-1, and respond to scoping letters (Appendix C). An objective of travel management has been to consistently designate forest system roads as either open or closed to all motorized vehicles. None of the proposed travel management recommendations affect DNR-managed or Forest Service-designated lake access points.

This analysis focuses on travel management, meaning changes in allowable use—the *recreation* resource. Invasive species are widely recognized as one of the primary threats to achieving the goals of managing lands for outstanding outdoor recreation opportunities; these include proximity to nonmotorized trails (for example, NCT) and illegal cross-country motorized use. The risk of spreading NNIS is recognized as an ongoing forestwide challenge (M&E 2010, pgs 54-56; 2007 OHV Decision, pg 12).

Key Issue #2: Opening or closing forest system roads to all motorized vehicles may affect recreation opportunites and natural resources.

Indicators:

- Miles of system roads opened to all motorized vehicles that are currently closed to one or more uses
- Miles of system roads closed to all motorized vehicles or decommissioned that are currently open to one or more uses
- Number of motorized forest system roads crossing the North Country National Scenic Trail (NCT)
- Number of deadend FSR spurs closed to all motorized vehicles

Direct and Indirect Effects of All Changes Except FR 2107

Table 3-12. Recreation resource indicators for nonmotorized and motorized users.

Indicator	No Action Alternative	Action Alternatives
Miles of forest system roads opened to all motorized vehicles that are currently closed to one or more uses	0	18
Miles of forest system roads closed to all motorized vehicles or decommissioned that are currently open to one or more uses	0	19
Number of motorized forest system roads crossing the NCT	18	13
Number of dead end FSR spurs closed to all motorized vehicles	0	9

Alternative A

Recreation Resources – Under the No Action Alternative custodial management of system forest roads would continue and deferred maintenance would remain. The Forest would continue to print an annual MVUM map. The challenge remaining from the 2007 Off-Highway Vehicle Road Travel Access decision, which left some forest roads open to HLVs only and closed to OHVs would not be met. Management of dual purpose FSRs open in the winter as designated snowmobile trails would not change (PR 1.0.8).

The number of motorized FSRs that cross the NCT would remain unchanged (Table 3-12). The status quo would remain for motorize dead-end roads and opportunities for illegal motorized cross-country use (see Appendix A Transportation map). The No Action Alternative reflects 2011 MVUM forest road designations for motorized vehicles.

Alternatives B and C (Action Alternatives)

Progress would continue to be made on the challenge remaining from the 2007 Off-Highway Vehicle Road Travel Access decision, which left some forest roads open to HLVs only and closed to OHVs. The Action Alternatives follow this and Forest Plan direction. This means that many roads closed to OHVs under the 2007 OHV decision are now closed to all motorized vehicles. Under the Action Alternatives about 18 miles of forest system roads would be opened to all motorized vehicles and about 19 miles of forest system roads would be decommissioned or closed to all motorized vehicles (Table 2-4, Appendix A, Transportation map and table).

The direct effect of the Action Alternatives is longer, connected OHV riding opportunities, now and into the future. Nonmotorized recreation opportunities are directly affected by closure of roads to motorized uses. Motorized riding opportunities would be reduced as well when roads are closed. (Appendix C, letter 3, 6, 8)

The Action Alternatives would reduce the number of FSRs crossing the NCT from an existing condition of 18 crossings to 13 crossings (Table 3-12). These effects are a direct result of changing allowable uses from HLV only (for example, FR 2610) or open to all motorized vehicles (for example, FR 2312A) to close to all motorized vehicles (Appendix A Transportation table).

Legal and illegal uses of forest system roads by OHVs continue to be monitored through public contacts, law enforcement, and modifications based on changes to the road system in environmental assessments and the annual MVUM updates (M&E 2010, pgs 36-41). The Action Alternatives reduce opportunities for illegal cross-country motorized use from short road spurs. The change in allowable uses from open to all or OHVs only to closed to all motorized vehicles totals 3.4 miles on 9 roads (FR 2312A, FR 2881, FR 3726, FR 3737, FR 2327B, FR 2327C, FR 2658B, FR 3759D, FR 3759E).

Cumulative Effects

Cumulative effects include the FSR in the SLL2 Project. These changes in use would be in effect at a minimum until next entry into the project area. Changes in travel management direction may affect recreational patterns and timing of use on some existing forest roads over the long term. Consistent designation of forest roads as open/closed to all motorized vehicles will benefit public understanding and simplify interpretation of the annual motorized vehicle use map.

In some cases, existing or new resource damage may result in either temporary or permanent road closures. Changes in road designations to “fix and reopen” would be dependent upon Forest budget/staff limitations and capacity of potential partners (such as local OHV or snowmobile clubs, Resource Advisory Committees, or other Township or municipal government entities) to fund and accomplish needed work to reopen and monitor a road.

The time necessary for recovery from disturbance without any management intervention may range from as little as one growing season to several decades depending on the type and intensity of disturbance and characteristics of the affected resources.

Since the 2005 SLL2 EA, OHV use and associated issues have dramatically increased on public lands. Managing the Forest road system takes collaboration. Collaborative efforts across jurisdictional boundaries and formulation of long-term partnerships are needed to engage the public in travel management. If partnerships cannot be found, forest roads would likely continue to receive custodial maintenance. Partnerships will be critical to establishing a long term focus on forest roads: identifying changes from the status quo, meeting future needs—of nonmotorized and motorized users, monitoring road conditions, and maintaining the road for motorized and nonmotorized uses. (Appendix C, letters 3, 4, 8)

Partnerships are key to implementing and maintaining the forest road system (Appendix C, letter 11) and supporting use changes.

Future Impacts

Future impacts depend upon amount of motorized recreation use and ability to maintain the forest road system. Increases in OHV use are likely based upon nation-wide trends. Future road development on lands in other jurisdictions is unknown. However, collaborative activities among other land managers (Tribal, State, County, Township, Municipal) and private entities may help to identify roads, trails and other areas for consideration. Future collaborative partners will become increasingly important in funding and providing resources for road and trail maintenance.

FR2107 (Woodtick Trail)

The Woodtick Trail (FR 2107) crosses the entire length of the Project from west to east; it is 13.2 miles long, designated OML 4 (moderate degree of user comfort), and open to HLVs only (*in* 2007 OHV Decision). The road was built along an 1890's railroad grade used originally to haul logs to a Longville sawmill. As such, in places the road crosses through wetlands where there is no room to safely pull off the road. In other places ditches slope steeply away from the road. Sections of the road are straight while other sections have sharp, blind corners. The road surface is graveled.

Scope of Analysis (from FR 3759 to Moccasin Lake)

Spatial Framework and Timeframe

Direct, indirect, and cumulative effects to Soils and Aquatic resources would be specific to the segment of FR 2107 from FR 3759 to Moccasin Lake (about 9 miles). Cumulative effects consider the impacts of existing motorized use of FR2107 along with proposed ATV use.

Direct, indirect, and cumulative effects to TES and Wildlife MIS and MIH resources would be specific to the segment of FR 2107 from FR 3759 to Moccasin Lake (about 9 miles). Cumulative effects consider the impacts of existing motorized use of FR 2107 along with proposed ATV use.

The decision timeframe could last until the next entry into the Project. It is likely that the SLL2 EA analyses will be another step in an ongoing analysis process to fully consider management and mitigation needed on the Woodtick Trail to address safety, environmental, and public concerns.

Management Direction

Management direction is from the 2004 Forest Plan and Forest Service Handbook (FSH 7709.55 – Travel Planning Handbook, Chapter 30 – Engineering Analysis 7709.55-2009-3). Forest Plan, Amendment 1 Guideline G-ORV-1 changed the wording of G-ORV-1 (pg 2-43) to read "*ORV use is prohibited on OML 3, 4, and 5 roads, except where they have been designated as open for ORV use through site-specific analysis*." Forest Plan desired conditions include clearly defining and providing road and trail riding opportunities while protecting natural resources (D-RMV-1, 2, pg. 2-42 and D-TS-1, 2, 3, 4, pg. 2-47). Forest Plan objectives and standards and guidelines include the expectation that Forest roads will be identified as appropriate or inappropriate for OHV use (O-RMV-1, 2; G-RMV-4; S-RMV-1, 2, 4, pg 2-42; O-TS 1, 3, 6, 7, 8, pg. 2-48).

3.2 Transportation / Travel Management

A Motorized Mixed Use Engineering Report (MUA or engineering report) is required where the responsible official proposes to change current travel management direction by authorizing motorized mixed use on a FSR where it would otherwise be prohibited. The decisionmaker must be informed by an engineering analysis conducted by a qualified engineer. Engineering analysis should include a technical evaluation of road conditions and traffic, and an analysis of potential mitigation measures regarding motorized mixed use. Designations under 36 CFR Part 212, Subpart B, include class of vehicle and, if appropriate, time of year (PR 4.0.3). Requirements for operator qualifications and personal protective equipment are established by State law.

The engineering report evaluated the full length of FR 2107 (about 13.2 miles) through the CNF (PR 4.0.4a, PR 4.0.4b) and is part of the project record (PR 5.9). The engineering report considers the probability and severity of crashes involving highway-legal vehicles and nonhighway-legal vehicles and includes appropriate mitigation to reduce the risks involved. The Forest Engineer determined the specific factors to include in the report (PR 4.0.3).

Along with environmental analysis and public comment, this information will be used by the District Ranger to inform the decision. These sections are from FR 3759 to Cub Lake (MUA, pg 7) and from Cub Lake to Moccasin Lake (MUA, pgs 9-13).

Direct and Indirect Effects

The Forest Service received a range of public comments regarding FR 2107. Some comments requested changing allowable use on two segments of FR 2107 from HLV only to open to all motorized vehicles (Appendix C, letters 1, 4, 5, 8). Other public comments requested that FR 2107 remain closed to OHVs or that certain sections should not be opened to OHVs (Appendix C, letters 3, 6). This range of comments, Forest Plan direction, the engineering report, and effects to aquatic, soils, wildlife, and TES resources are considered in the analysis of direct, indirect, and cumulative effects.

Changing the allowable uses of FR 2107 from open to HLVs only to open to all motorized vehicles directly effects recreation and natural resources from FR 3759 to Moccasin Lake.

Indicators:

- Miles of FR 2107 considered for opening to mixed use
- Number of motorized FSRs crossing the NCT
- Number of places where FR 2107 intersects with FSR not open to OHVs
- Number of forest system road loops opened to OHVs
- Generalized effects to soil and aquatic resources
- Generalized effects to habitat of three Management Indicator Species

Table 3-13. Indicators on FR 2107 from FR 3759 to Moccasin Lake.

Indicator	No Action Alternative	Action Alternatives
Miles of FR 2107 considered for opening to mixed use (miles)	0	Up to 9
Number of motorized FSRs crossing the NCT	8	6
Number of places where FR 2107 intersects with FRs not open to OHVs	7	4
Number of FSR loops opened to OHVs	0	About 4
Generalized effects to soil and aquatic resources	Existing conditions	Effects uncertain
Generalized effects to habitat of three Management Indicator Species	Existing conditions	Incremental increase in use and related effects

No Action Alternative

The No Action Alternative follows Forest Plan direction and the designated motorized vehicle uses of FR 2107 would remain the same. FR 2107 would remain closed to OHVs; Table 3-13 shows the indicators used to analyze direct, indirect, and cumulative effects of the No Action Alternative. The No Action Alternative reflects 2011 MVUM forest road designations for motorized vehicles; specifically, FR 2107 would remain open to HLVs only. Management of dual purpose FSRs open in the winter as designated snowmobile trails would not change (PR 1.0.8).

Direct, indirect, and cumulative effects to soils, aquatic, and wildlife resources would remain the same under Alternative A.

The No Action Alternative considers the existing conditions; given public comments, it would likely lead to another site specific analysis beyond this planning period.

Action Alternatives

The Action Alternatives for FR 2107 address Forest Plan G-ORV-1 to conduct a site specific mixed use analysis on OML 3, 4, 5 roads (Forest Plan Amendment 1). Nonmotorized recreation opportunities would be directly affected where changes are made in designated use. Three forest roads that intersect FR 2107 would go from HLV only to open to all motorized vehicles (FR 2107C, FR 2843, and FR 2843A).

Under the Action Alternatives, motorized crossings of the NCT would decrease (Table 3-13). This number changes because two forest roads (FR 2687A and FR 3747) were closed to all motorized vehicles (Appendix A, Transportation map and table). In addition, the number of places where FR 2107 intersects with forest roads not open to OHVs is reduced to four crossings (Table 3-13). This number changes because three intersecting FSRs would be designated open to all motorized vehicles. These roads are FR 2107C, FR 2843, and FR 2843A.

3.2 Transportation / Travel Management

In the 2007 OHV Decision, some project area roads were designated closed to OHVs due to proximity to the NCT. Opening FR 2107 to all motorized vehicles could potentially afford motorized access to the NCT and the Goose Lake Hunter Walking Trail system (Table 3-13).

The direct effect of the Action Alternatives is to connect shorter designated motorized routes to afford longer, connected motorized routes and loop opportunities, now and into the future. Currently, loop routes from FR 2107 are open only to HLVs. Connected long distance routes and potentially four loop routes would be opened to OHVs if FR 2107 were opened to all motorized vehicles (Appendix C, letters 1, 8). However, local home owners and nonmotorized recreationists may not appreciate potential increases in noise levels, potential increased risk of NNIS spreading, or potential increases in the amount of seasonal traffic, for example, during the fall hunting season (Appendix C, letters 3, 6).

Construction of new parking areas was not considered (Appendix C, letter 8-6).

Soil and Aquatic Resources –The kinds of effects to soil and aquatic resources are addressed in Aquatics (3.5) and Soils (3.6) sections. Soil disturbances include rutting, compaction, and erosion. These can result in increased runoff and deposition of eroded material into lakes, streams, or wetlands (2007 OHV PR520-2, pg3) and impede water drainage.

In the 2007 OHV Decision, some project area roads were designated closed to OHVs because they have a native soil surface that does not support motorized use (e.g., wetlands or mineral soils with poor drainage or immediately adjacent to or cross waterbodies). Two forest roads directly off the Woodtick Trail were closed to motorized use, FR 3747 and FR 2837 (Appendix A Transportation map and table).

The effects of proposed motorized use changes on soils within the project area are likely to differ slightly from existing conditions. With physical barriers in place, soils and vegetation may recover along routes proposed for closure, but it would likely take several years to decades to do so naturally. Closures typically consist of berms, downed woody debris, boulders, or a combination thereof. Frequent future access to NFS and other ownerships would also set back any short term soil recovery.

The effects of opening roads that are currently closed to one or more motorized uses are uncertain. Some of the roads intersecting FR 2107 currently have physical barriers on the ground, so it is possible that motorized use patterns would change little by formally opening them. Without knowing the baseline use of these roads and having monitoring results from past changes in designations, it is difficult to say what, if any effect, opening roads would have on soils and aquatic resources.

Changes in designated motorized use from HLV only to all motorized vehicles on up to 9 miles of FR 2107 would be conditional to mitigations being in place. Mitigations would be required and critical to changing designated allowable use on any portion of FR 2107.

Use of forest system roads by motorized vehicles continue to be monitored through public contacts, law enforcement, partners, and modifications based on changes to the road system in environmental assessments and the annual MVUM updates (M&E 2010, pgs 36-41; Appendix C letters 4, 8).

Wildlife Resources – Effects to Wildlife Resources are assessed using a similar approach as used by Kot and Williamson (2007) for the forest-wide OHV DN (2007). Kot and Williamson (pg. 7) incorporated a number of assumptions into their analysis of effects to wildlife as a result of OHV use on forest roads within the Chippewa. Some of these assumptions are relevant at the scale of the FR 2107 proposal. These are:

- Roads that remain open to OHVs will show increased use, due to concentrated use and increased future demand.
- OHV travel on designated routes has the potential to disturb wildlife. This disturbance has its greatest impact to wildlife populations when it occurs during the critical breeding season.
- OHV travel on designated routes during hunting season may increase the potential for illegal killing or trapping of wildlife species.
- OHV travel on designated routes may lead to illegal off-route travel, which poses threats to rare plant populations through rutting, soil compaction, and trammeling.

These generalized effects are foreseeable for the FR 2107 corridor under Alternatives B and C. While this forest road is already open to HLVs, the addition of OHVs would cause an incremental increase in use and related effects. (Table 3-14)

Kot and Williamson examined species-specific impacts at the forest level including the gray wolf, red-shouldered hawk, and goblin fern. Effects to these species are examined here and indicators are adapted to the project level in this analysis. In this case, they are considered in the context of the FR 2107 corridor with the addition of OHV use. The gray wolf as a federally listed threatened species is also considered at the project level in the Biological Assessment in the SLL2 project record. The red-shouldered hawk and goblin fern are addressed in more detail at the project level in the Biological Evaluation for Regional Forester's Sensitive Species, also found in the SLL2 project record.

The gray wolf ranges throughout the SLL2 project area. Exact numbers are not known and sightings of wolves are reported. The primary affect that OHV use may have on gray wolf populations within the CNF is the increased potential for harassment and illegal killing of individuals. Alternatives B and C would result in up to a 9 mile increase of forest roads open to OHVs over the existing condition. (Table 3-14)

One red-shouldered hawk territory overlaps with the FR 2107 corridor. About one mile of forest roads within this territory would receive use by OHVs under Alternatives B and C as a result of opening FR 2107. OHV use could disturb the nesting pair of red-shouldered hawks

during the breeding season of April 1 to August 15. OHV use could also disturb adults as they feed their young in the post-fledging analysis area. The result could be reduced productivity or loss of the breeding territory. Other suitable habitat for this species exists along the FR 2107 corridor, including large blocks of mature deciduous forest with wetland and marsh inclusions. Other active territories may exist and could be directly or indirectly affected by OHV use. (Table 3-14)

The goblin fern is found in maple-basswood dominated forest in the SLL2 project area and within the FR 2107 corridor. Microhabitat characteristics include an infrequent fire regime, an open understory, a ground layer of few shrubs, an abundance of large woody debris, and deep leaf mold. The presence of symbiotic micorrhizal fungi helps fine root hairs to absorb moisture and nutrients. The Forest Plan established a 250-foot no activity buffer around any known goblin fern populations. (Table 3-14)

One goblin fern population exists within 250 feet of FR 2107 and could be affected by OHVs. Habitat exists elsewhere along the FR 2107 corridor and OHVs may indirectly affect the goblin fern. Site specific surveys for the goblin fern are not complete within habitat adjacent to FR 2107.

Table 3-14. Management Indicator Species generalized effects.

MIS	No Action Alternative (A)	Action Alternatives (B&C)
Red shouldered hawk	Existing conditions	Additional 1.1 miles of road within territory receive OHV use
Gray wolf	Existing conditions	Up to an additional 9 miles opened to OHV use
Goblin fern sites	Existing conditions	1 population within 250 feet of FR 2107

Changes in designated motorized use from HLV only to all motorized vehicles on up to 9 miles of FR 2107 would be conditional to mitigations being in place. These mitigations would be required and critical to changing designated use on any portion of FR 2107.

Cumulative Effects

The Travel Management Final Rule (M&E 2010, pg 36) provides expectations for OHV travel access management on the National Forests. The intent of the Travel Management Final Rule is to provide regulation of OHVs as a result of the tremendous increases in the number and power of OHVs; widespread environmental and social impacts from unmanaged recreation; while recognizing that motorized recreation is a legitimate use of National Forest system lands in the right places. Cumulative recreation effects of resulting from changing the allowable uses of FR 2107 remain uncertain. While motorized recreationists support opening the Woodtick Trail to OHVs, other segments of the public have not supported the idea (Appendix C letters).

Cumulative effects steming from changing the allowable uses of FR 2107 from "open to HLVs only" to "open to all motorized vehicles" would likely increase the amount and timing of uses. The size and types of OHVs varies now and would likely continue in the future. Registrations of OHVs have increased since 1994 as has demand for riding opportunities. Requests to open portions of the Woodtick Trail to all motorized vehicles will likely continue into the future.

Additional motorized pressure on soils and aquatic resources already affected by past motorized uses may occur; however, the location, magnitude or intensity of the effect cannot be determined due to lack of data. It is foreseeable that OHV use could extend into nonmotorized areas (M&E 2010).

Cumulative impacts to the gray wolf, red shouldered hawk, and goblin fern may incrementally increase from those predicted by Kot and Williamson's 2007 forestwide analysis for these species.

3.3 Wildlife MIS and MIH

Population trends for management indicator species (MIS) are monitored forest wide and relationships to habitat changes are determined to assess the effect of management on their populations(36 CFR 219.19). The rationale underlying the MIS concept is that by managing for and conserving the habitats in which MIS occur, other species that depend on these habitats would also be provided for. Management Indicator Habitats (MIH) were adopted in the 2004 Forest Plan to compliment MIS in assessing and providing for habitat and ensuring viability of species. The use of MIHs provides a simplified, practical, and reasonable approach to address a broad spectrum of species at the programmatic level.

Under Wildlife MIS and MIH resources, one secondary issue and three indicators were identified. There is a concern that wildlife MIS and MIH may be impacted by proposed activities.

Management Indicator Species

Scope of Analysis

Direct and indirect effects of Project alternatives on MIS were analyzed on the proposed treatment units. Cumulative effects were analyzed within the context of the entire CNF. Table 3-15 lists the four MIS on the CNF. Two species are listed as RFSS and MIS. One species is listed as federally Threatened and MIS.

Management Direction

Management Indicator Species are defined as species monitored over time to assess the effects of management activities on their populations and the populations of other species

with similar habitat needs. National Forest Management Act regulations (CFR 36, part 219.19, paragraph a-6) states, "Population trends of management indicator species will be monitored and relationships to habitat changes determined." This direction applies specifically to the Forest planning process, but has implications to project planning.

Management Indicator Species were identified in the 2004 FEIS. Species selected include the gray wolf, bald eagle, northern goshawk, and white pine (Table 3-15). The selection process is described in Appendix B of the FEIS (pgs B 25-28) for the Chippewa Forest Plan.

Table 3-15. Management indicator species found on the Chippewa National Forest.

Species	Common Name	Class	Designation
Canis lupus	Gray wolf	mammal	MIS and R9 Sensitive
Haliaeetus leucocephalus	Bald eagle	bird	MIS and R9 Sensitive
Accipiter gentilis	Northern goshawk	bird	MIS and R9 Sensitive
Pinus strobus	White pine	plant	MIS

Table 3-16 lists the reason for selection for each MIS, which usually dictates the type of management that would occur. The preferred habitat for all species is also listed.

Gray wolf and bald eagle were selected during the revision of the Forest Plan because of their then status as federally threatened. The bald eagle was taken off the list of federally listed threatened or endangered species, but it remains as R9 Sensitive (Forest Plan, pg 2-32). Other species federally listed (Canada lynx) have not been designated as MIS.

Table 3-16. Chippewa National Forest MIS selection habitat and known preferred habitat.

Common Name	Reason for Selection	Preferred Habitat
Gray wolf	Federally threatened	Broad spectrum of habitats with abundant ungulate prey
Bald eagle	Federally threatened (formerly)	Large trees adjacent to riparian areas with fish
Northern goshawk	RFSS and reflects landscape conditions	Mature deciduous or mixed deciduous/coniferous forest in contiguous blocks
White pine	High profile and reflects effects of forest management	Broad spectrum of soils, ecosystems and forest types

3.3.1 Affected Environment

The affected environment includes the four MIS and their habitats within the Project. These are the gray wolf, bald eagle, northern goshawk, and white pine. The affected environment for the gray wolf and bald eagle are discussed in detail and tiered to the BA for the wolf and to the BE for the eagle. The affected environment for the northern goshawk is discussed in the CNF FEIS (3.3.6, pgs. 1 - 2). These documents are included by reference and may be accessed from the Chippewa website. The affected environment for white pine is discussed in Vegetation (3.1) and is also discussed in the CNF FEIS (3.3.6, pgs. 16 - 17). The affected

environment for MIHs addressed here includes the forested habitats within the DMP LE. Forest cover is analyzed in Vegetation (3.1), Environmental Consequences.

3.3.2 Environmental Consequences

Issue: Proposed activities may impact Management Indicator Species (MIS) and Management Indicator Habitat (MIH).

Indicators:

- Monitoring results and effects of proposed activities on MIS
- Acre trends of MIH-1 through MIH-9
- Number and acreage in 300 acre and larger mature/older upland forest patches maintained (MIH-13).
- Acres prescribed fire for wildlife habitat improvement

Direct and Indirect Effects

Gray wolf – The biological assessment (BA) examines effects of this Project on the gray wolf. The wolf population in Minnesota has increased by approximately 50 percent since 1988. Proposed actions would not impact prey availability. Proposed activities would not negatively impact wildland habitat conditions for the gray wolf. The No Action alternative would have no effect. Proposed Action and Alternative C are not likely to adversely affect the gray wolf. Road density within the project may be decreased, benefiting this species, and prey and prey habitat would remain abundant. See the BA for a more complete discussion. The BA is available for review in the project file for the SLL2 EA at Walker Ranger District office.

Bald eagle – The biological evaluation (BE) examines effects of this Project on the bald eagle. Activity and productivity flights were conducted for bald eagle surveys in 2009. An emphasis was placed on resolving the status of many nests that had not been relocated over many years. Seventy (70) were found to be active in 2009: three were determined to have produced no chicks; 23 produced one chick; 13 produced two chicks; one produced three chicks; and 30 were found to be active but no determination of productivity was possible. In 2007 a total of 259 nests were surveyed. Of these, 113 nests were active, meaning that eggs were visible or an adult was observed incubating on the nest. Of these 113 active nests, 55 of them were successful in raising at least one chick to the fledgling stage. A total of 66 eagle chicks were observed during the productivity flights; 0.58 young fledged per active nest (44 nests with 1 chick, 11 nests with 2 chicks). For the period from 1987 thru 2004 (18 years), Chippewa bald eagle monitoring shows an average of: 151 (range, 88-189) active breeding pairs; 96 successful breeding pairs (range, 66-108); and 1.02 young fledged per active nest (range, 0.76-1.39). The total number of active eagle nests, the number of successful nests, and the number of fledged young per active nest are all below those recorded in the past.

3.3 Wildlife MIS and MIH

All alternatives are not likely to adversely affect bald eagle. Alternatives B and C cause no direct effects to the bald eagle. Alternatives B and C both increase habitat indicators over existing condition and would improve conditions for the eagle in the long term (Table 3-17). See the BE for a more complete discussion. The BE is available for review in the project file for the SLL2 EA at Walker Ranger District office.

Table 3-17. Eagle habitat indicators for the South Leech Lake 2 project area for existing condition and five years from present following implementation of alternatives.

	Existing	Alt A	Alt B	Alt C
Age 0-9 red and white pine	170	144	252	387
Total acres of red and white pine	4,765	4,765	4,910	5,042
Red and white pine >100 yrs old	1,492	1,543	1,543	1,543

Northern goshawk – The northern goshawk is uncommon in Minnesota and there are concerns about its population status. There were 35 known active nesting territories in Minnesota in 2010; 17 were located on the Chippewa. The population objective for the northern goshawk as an MIS on the Chippewa is between 20 and 30 breeding pairs. Based on 2010 monitoring data, the Chippewa has not yet met this population goal. Numbers change annually and trends are unclear. The Project area has no known goshawk territories. The project area was screened for suitable habitat and surveys were completed in 2010. Because no goshawk territories are known within the project area, an examination of impacts to nest areas and post-fledging habitat could not be completed. Instead, changes in amounts of mature upland forest, acreage of large patches of mature/older forest (Table 3-23), and the percentage of upland forest in mature or older age classes were examined as habitat indicators. Amounts and the configuration of mature/older upland forest are known to important indicators of habitat quality for the northern goshawk.

Table 3-18. Northern goshawk habitat indicators within the South Leech Lake 2 project area for existing condition and five years from present following implementation of alternatives.

	Existing	Alternative A	Alternative B	Alternative C
Mature or older upland forest (ac)	13,246	13,607	12,857	12,698
Acres of large mature/older upland forest patches	7,129	8,052	7,059	6,967
Percentage of upland forest in mature or older age classes	59%	61%	57%	57%

The No Action Alternative would be beneficial to goshawks. Amounts of mature forest and large patches would increase over existing conditions. Proposed Action and Alternative C may cause some indirect effects by harvesting stands that serve as potential foraging habitat project-wide. Alternatives B and C would reduce mature/older forest foraging habitat in 5 years; however, the percentage of mature or older upland forest compared to all upland forested acres indicates that adequate foraging habitat exists in the project area. Alternatives B and C would decrease the acres within large mature/older upland forest patches. The

effects of Alternative B on large patches would be fully mitigated by canopy retention, area reserves, and harvest design. All three alternatives would contribute to the Chippewa's ability to maintain existing numbers of breeding pairs and to meet Forest Plan objective O-WL-32 to provide habitat to provide for a population goal minimum of 20 to 30 breeding pairs.

White pine – White pine has declined more than 90 percent in Minnesota from historical levels. Factors responsible for the decline are over-harvest, mortality from white pine blister rust, and reproductive failure due to loss of suitable habitat conditions and over-browsing by white-tailed deer. The Project has about 533 acres of white pine forest, but probably thousands of acres support scattered white pine trees within other forest types. The Project proposals that involve timber harvest and reforestation activities such as planting and seeding, will likely improve habitat conditions for white pine. No white pine is proposed for harvest. White pine would be increased by 141 acres under Alternative B and by 276 acres under Alternative C. Although the success of these activities is uncertain, the proposed vegetation management activities all stand to improve habitat conditions for white pine. The No Action Alternative would have no direct impact on white pine. Proposed Action and Alternative C would benefit white pine.

Cumulative Effects

Forest Plan monitoring of MIS is a cumulative effects analysis of forest management activities on the species. Table 3-19 displays population trends for MIS. The gray wolf and the bald eagle were MIS in the 1986 Chippewa Forest Plan. They have been monitored prior to and since that time. As such, trends are readily available. The northern goshawk and white pine are not federally listed and have not been monitored as MIS previously, so trends are not well established.

Goshawk breeding territory information shown in Figure 7.2 of the FY2009 Monitoring and Evaluation Report (2010) for the Chippewa shows highly variable numbers for active breeding and successful breeding territories from 1996 through 2009. Prior to 1996 only one or two breeding records were known for the Chippewa. As of 2009 there were 17 active breeding territories on the Chippewa, with 9 producing at least one young. Forest Plan monitoring of MIS is a cumulative effects analysis of forest management activities on the species.

Table 3-19. Population trends of MIS at region/state and forest scales.

MIS	Region/State	Forest 1988-2004
Bald eagle	Increasing	Decreasing
Gray wolf	Decrease from '03/'04 to '07/08	Stable
Northern goshawk	Unclear[1]	Unclear and variable
White pine	Unknown[2]	Unknown

[1] Unclear indicates conflicting data from various sources as to the trend of the species.
[2] Unknown indicates no data is available.

Management Indicator Habitats

Scope of Analysis

The South Leech Lake 2 project area is dominated by one landscape ecosystem.

Proposed activities would occur primarily on the DMP LE. A complete description of this LE is provided in Appendix G of the FEIS for the Forest Plan (2004). Additionally, the analysis of forest composition and age in Chapter 3 of the SLL2 EA examines activities and their effect on this LE within the project area.

Refer to Chapters 1 and 2 and related maps in the EA, Appendix A for the location of the project and proposed activities.

The following summary was taken from descriptions in Appendix G of the Forest Plan FEIS:

The DMP LE had mature and older stands dominated by a supercanopy of red pine and white pine. The subcanopy is a mixed stand of red maple and paper birch. White spruce, balsam fir, aspen, northern red oak, bur oak and bigtooth aspen are also found in this mixed subcanopy in some of the stands at lower stocking levels. Jack pine, red pine and white pine can occasionally occur in pure stands. Almost one-half of the landscape was characterized as multi-aged, beyond 175 years old.

Species Associations with MIHs

Appendix D to the FEIS (2004) contains a comprehensive list of animal and plant species of concern to associated MIHs, including age groups within MIHs. In this way, MIHs serve as indicators of habitat conditions for many species within the Chippewa National Forest. Many animal species will meet their life needs by using multiple MIHs and age classes. A detailed analysis of species associations and MIHs can be found in the FEIS (2004) in Chapter 3.3.1.

Species associated with young-aged forest MIHs are gray wolf, lynx, moose, deer, ruffed grouse, American woodcock, gray catbird, indigo bunting, golden-winged warbler, rose-breasted grosbeak, chestnut-sided warbler, mourning warbler, song sparrow, and dark-eyed junco. All of these species will also utilize other age classes or habitats. For example, the American woodcock utilizes mature riparian forest, upland edge habitats, and a range of nonforest habitats irrespective of age. The golden-winged warbler has been associated with young forest but it occurs in a broader range of age groups within MIHs where micro-site habitat occurs or in unforested upland and lowland communities. The ruffed grouse is shown as an upland deciduous forest dwelling species and is associated with multiple age groups within upland deciduous forest MIHs.

Species associated with mature/old growth/multi-aged forest MIHs 1-9 include the northern goshawk, red-shouldered hawk, black-throated blue warbler, four-toed salamander, goblin fern, black-backed woodpecker, bay-breasted warbler, spruce grouse, and lynx.

Management Direction

The DMP LE vegetation and MIH objectives of the Forest Plan (pp 2-62 to 2-64, 2-68 to 2-70) set forest-wide objectives for forest vegetation composition, structure, age, and tree diversity. By moving toward these long-term desired vegetative conditions, the Forest will move towards desired conditions for amounts, quality, and distribution of important wildlife species and their habitats. Conservation objectives for threatened, endangered and sensitive (TES) species, other wildlife species, and their habitats are interwoven into the LE objectives. Project objectives are addressed in more detail in Chapter 1 of the South Leech Lake 2 EA and analyzed in the Vegetation analysis in Chapter 3.

The ability to achieve objectives for a variety of TES species and to provide for other wildlife species are directly related to moving towards these vegetative objectives.

In addition to composition and age objectives, the Forest Plan (pp. 2-23 to 2-24) provides guidance regarding spatial distribution of forest vegetation. Particularly important to a variety of TES species are objectives and guidance related to maintenance and development of large mature forest patches and providing opportunities for interior forest habitat conditions. These objectives for large, mature forest patches are of particularly high value to some TES species. Within the South Leech Lake 2 project area there are currently two large 1000+ acre patches and eight 301 to 1,000 acre patches.

Providing these long-term habitat opportunities through vegetation objectives and goals is part of a coarse-filter, or landscape-level approach intended to provide for the well being of TES species and other wildlife on the Chippewa. These objectives seek to address species' needs through integrated resource management at large landscape scales. Fine filter, or site-level management needs are addressed by managing specifically for high quality potential habitat or known locations of sensitive species (Forest Plan, pg. 2-28). It is important to employ both of these two strategies. Providing only for species needs at the site level, through meeting Forest Plan standards, but failing to enact important guidelines, goals and objectives, will result in a failure to fully redeem Forest Plan direction for conservation of TES species and other wildlife. Site level management cannot compensate for a failure to address landscape-level concerns.

Direct and Indirect Effects

An analysis of direct and indirect effects to MIHs was conducted on the South Leech Lake 2 project area comparing Decade 1 MIH objectives in Chapter 2 of the Forest Plan and examining the projected acreage in each MIH five years from now (2016). A negative trend analysis was used to quantitatively and objectively evaluate each alternative considered in the

South Leech Lake 2 EA. A negative trend was determined if proposed management actions moved existing conditions opposite from the Forest Plan objective for that MIH. The total acre departure is shown by alternative within the young/seedling/open age group (*in* Biological Evaluation, Table BE-1 and *in* EA, Table 3-20). The mature and old/old growth age groups show 0 acres departure from objectives (*in* Biological Evaluation, Table BE-2 and Table BE-3) and are not shown in the EA.

Prescribed fire in upland forested stands is discussed in the Biological Evaluation for the black-backed woodpecker, pg 32-34, and Table BBWP-1, pg 33. Prescribed burning activities (over 700 acres) in the Woodtick Fields and Goose Lake HWT areas would indirectly effect black-backed woodpecker habitat.

The total acre departure helps to place each alternative in perspective with regard to how well an alternative contributes to objectives in the Forest Plan and each alternative's relative impact to coarse filter wildlife habitats. A negative trend at this point in time, in itself, does not reflect an inconsistency with the Forest Plan or forest-wide objectives. Proposed changes may be minor and may not cause a percentage change in condition. Unique conditions and opportunities at the project level are also considerations in deciding appropriateness of management actions. Annual Forest Plan monitoring will gauge how well the Forest is meeting objectives.

Other MIH groups that are not specifically listed here are either unaffected or show positive trends.

Table 3-20. Negative trends of young/seedling/open MIH objectives resulting from management activities proposed in the SLL2 project area. (Biological Evaluation, Table BE-1)

LE	Management Indicator Habitat	Objective	Acres of negative trend		
			Alt A	Alt B	Alt C
DMP	Northern hardwood	decrease	0	63	93
	Total acre departure from objectives		0	63	93

Alternative A (No Action)

Alternative A shows no negative trends of MIHs as a result of active management activities. No harvest would occur to work towards age or forest type objectives. This alternative produces no young forest MIHs and contributes to forest-wide objectives to reduce amounts of young forest and increase mature or old forest.

No prescribed burning would occur in Alternative A and there would be no active improvement of habitat conditions in the project area (Biological Evaluation, pgs 32-34).

Alternative B and Alternative C

Alternatives B and C show 63 and 93 acres respectively of negative trends of MIHs as a result of active management activities in Northern Hardwood types. All the negative trends

occur in the young/seedling/open age class of this MIH. Young forest is being created in Northern Hardwood types through shelterwood harvests. While shelterwood harvest is considered a regeneration harvest method, an overstory of as much as 60 square feet of basal area is typically left on site to 'shelter' the young trees that are sprouting or seeding in to the site. The habitat value of a post-harvest shelterwood site would be quite a bit different than a clearcut with reserves, though both would contribute to the young/seedling/open age class.

Alternatives B and C have similar impacts. Alternatives B and C are the same in the amount of beneficial prescribed burning activities that would occur. Each would burn over 700 acres of forested upland areas in the Woodtick Fields and Goose Lake Trails areas. Actual burn acreages are expected to be less as logical burn blocks are established. (Biological Evaluation, pgs 32-34)

Cumulative Effects

For cumulative effects, the forest-wide analysis of MIH changes in the 2006 M&E report for the Forest were compared to proposed management activities in the SLL2 EA. The 2006 monitoring and evaluation report represents the most recent report where MIH changes were examined. Following are the forest-wide highlights of MIH changes and trends, with an assessment of the contribution of the SLL2 EA management activities to those changes. (http://www.fs.fed.us/)

Dry Mesic Pine LE

- The amount of young upland conifer has decreased (15%) rather than increased.
- The amount of old and older upland conifer, especially in the spruce-fir and jack pine types has decreased (17%) rather than increased.
- The amount of old and older jack pine has decreased (32%) rather than increased.
- The amount of young lowland conifer has decreased (64%) rather than increased.

In review and conclusion, the management activities in the South Leech Lake 2 EA when considered in a forest wide context would not contribute to the negative trends of MIHs 1-9 in any of the DMP LE. The amount of negative trends contributed by each alternative is nominal at the forest level.

Exceeding acreages in mature or old/old growth MIHs is comparatively easy to correct over the course of a decade of Forest Plan implementation through additional harvest management to create young forest. It takes at least four decades to grow mature forest and many more decades to create old growth. Creating more young forest than is called for in objectives would compound imbalances among forest types and age classes for four or more decades.

At the forest scale, alternatives in the South Leech Lake 2 project are the same in their effect to MIHs. The cumulative impact of other projects implemented across the forest will determine over time if objectives are met.

Spatial MIH 13: Large Mature Upland Forest Patches

Patch size, edge, and forest or habitat fragmentation are elements of spatial distribution which affect a variety of sensitive species and other wildlife. The FEIS (chapter 3.3.2) for the Forest Plan conducted a detailed programmatic analysis of forest spatial patterns that would likely result from implementation of the Forest Plan. This analysis showed that forestwide, the combination of vegetative treatments to meet DMP LE objectives could also result in an increase of number and acreage in 300 acre and larger mature/older upland forest patches.

Scope of the Analysis

The scope of the analysis is the Project and the mature/older forest patches that fall partially or wholly within the Project. For cumulative effects, the Chippewa National Forest was used.

Management Direction

Forest Plan MIH 13 provides forest-wide direction as a part of the coarse-filter approach to providing landscape-level conditions for rare species sensitive to patch size. Patch management also affects edge (MIH-11) and interior forest (MIH-12).

Forest Plan objective O-VG-19 compels management of the CNF to result in maintaining or increasing large mature forest patches:

O-VG-19 – Maintain or increase the acres and number of patches of mature or older upland forest in patches 300 acres or greater. Large upland forest patches may cross Landscape Ecosystem or other ecological boundaries (such as watersheds, Landtypes). 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.

Forest Plan standard S-VG-2 sets a minimum condition for total Forest-wide acreage to be maintained in mature/older upland forest in large patches:

S-VG-2 – Maintain a minimum of 85,000 acres of mature or older upland forest in patches 300 acres or greater.

Forest Plan standard S-VG-3 sets a minimum condition within upland forest managed to maintain large patches:

S-VG-3- In mature or older upland forest types managed to maintain patches of 300 acres or greater, vegetation management treatments that maintain a 50% minimum canopy closure and maintain large diameter trees are allowable.

Direct and Indirect Effects

A forest-wide assessment of large/mature forest patches was completed for the Chippewa Forest Plan in 2004. Since then, updates due to recent management actions, corrections of errors in forest stand data, and redelineation of forest stands have changed the base data used to calculate forest patches. Analysis methods have been adapted to better reflect patch parameters considered in the Forest Plan even though base forest stand data have changed.

Alternatives are analyzed for this indicator at 5 years, following implementation of the proposal.

No Action Alternative

The No Action alternative in the South Leech Lake 2 Project would increase the number and acreage in large mature/older upland forest patches over the existing condition. In five years following implementation of the No Action Alternative there would be 11 large mature/older forest patches totaling 8,052 acres (Table 3-23).

Under the existing condition the project area contains two mature/older forest patches greater than 1,000 acres. Patches this large are considered a rare landscape condition and are to be maintained per Forest Plan guideline G-VG-1 (Maintain a minimum of 19 patches of mature or older upland forest in patches of 1,000 acres or greater). Alternative A would maintain these patches and increase the acreage of mature/older forest within these patches.

Overall, Alternative A does the best at working towards the forest wide objective to maintain or increase the number and acres of large mature/older forest patches and results in improved spatial patterns of forest cover over existing conditions.

Proposed Action Alternative and Alternative C

Alternatives B and C would maintain the number of large mature/older upland forest patches. Each alternative would maintain 10 large mature/older patches in the project area compared to the existing condition. However, both alternatives would cause a decrease in the acres of mature/older forest within large forest patches (Table 3-23).

The impacts of Alternative B can be mitigated by adjusting the amount of harvest removal (basal area retention) or by accounting for stand level reserves (Table 3-21, Table 3-22). This would result in a 23 acre increase of patch acres over the existing condition.

After applying similar mitigations to Alternative C, this alternative would still result in 71 fewer acres within large mature/older patches than the existing condition. This is a small

amount when considered at the Forest level, but it helps to demonstrate that Alternative C has the greatest impact to the large mature/older upland patch resource of the alternatives considered in the SLL2 EA.

Alternative B would increase the number of patches greater than 1,000 acres to three and increase the total acreage within this patch class by 464 acres to a total of 3,610 acres project-wide. Of the action alternatives, Alternative B does the best job of increasing this relatively rare landscape element on the Chippewa.

Alternative C would maintain the number of patches greater than 1,000 acres at two. However, the total acreage within this patch class would be reduced by 581 acres to a total of 2,565 acres project-wide.

Without mitigations, both Action Alternatives fall short of at least maintaining the existing condition of larger mature/older upland forest patches. Of the action alternatives, Alternative B can be fully mitigated and would meet this objective at the project level. Alternative C would cause the greatest impact, and after mitigation, would fall short of meeting this objective at the project level.

Mitigation

In order to mitigate the loss of large patch acreage in Alternatives B and C to better meet Forest Plan objective O-VG-19 and to meet Forest Plan standard S-VG-3, the following mitigations are applied to specific forest stands in each Alternative:

LMP-1 – For the following locations, harvests in large mature/older upland forest patches will maintain a minimum of 60 square feet of basal area of dominant or co-dominant overstory trees to equate to 50% canopy closure.(Table 3-21)

LMP-2 - For the following locations, harvest area will be reduced for the specific area and reasons listed. (Table 3-22)

Table 3-21. Forest Stands where large mature upland patch mitigation LMP- 1 is applicable in the South Leech Lake 2 Project Area.

Comp	Stand	Stand acres	Alternative B area mitigated	Alternative C area mitigated	Notes
76	11	23.7	8	8	Apply to western 1/3 of stand (8 acres)
76	21	19.4	19.4	19.4	Apply to entire stand
76	67	11.9	(none needed)	11.9	Apply to entire stand
87	26	21.2	21.2	21.2	Apply to entire stand
87	103	18.9	18.9	18.9	Apply to entire stand
Total (ac)			67.5	79.4	

Table 3-22. Forest Stands where large mature upland patch mitigation LMP- 2 is applicable in the South Leech Lake 2 Project Area.

Comp	Stand	Stand acres	Alternative B area mitigated	Alternative C area mitigated	Notes
86	02	30.2	(not applicable)	7	Reduce harvest area by 7 acres for reserve areas
89	29	33.5	20	(not applicable)	Conduct shelterwood only in northern lobe, retain at least 60 BA in remainder
86	40	16.3	5	5	Defer harvest in high slope areas, retain higher BA around lake
Total (ac)			25	12	

Cumulative Effects

The area for cumulative effects analysis is Forestwide during the next 15 years of CNF Forest Plan implementation.

No Action Alternative

The addition of 923 acres in large mature/older patches in Alternatives A in the South Leech Lake 2 project would cumulatively result in a benefit to forest spatial patterns in the project area and contribute to the forest-wide objective to maintain or increase large mature forest patch acres. Patch numbers are also increased in this alternative.

Additions such as these would help to counter expected decreases in amounts and distribution of mature forest on National Forest land due to pipeline or power line development, on other ownerships (state and county lands), or loss of forest land due to development on private lands. These effects are outlined in the 2004 Final EIS for the Forest Plan in Chapter 3.3.2.

Proposed Action Alternative and Alternative C

Other recent projects on the Chippewa show variable trends towards meeting Forest Plan spatial objectives to “maintain or increase” acres and number of large mature/older upland forest patches. As examples, a subset of these include: on the Walker RD the Boy River 2 project, the Cuba Hill project, the Steamboat project, the Portage Lake project and the South Leech Lake project; the Southeast and the Mississippi Projects on the Deer River RD; and the Northwoods and the Round Island projects on the Blackduck RD. The Moon, Boy River 2, Cuba Hill, Steamboat, Portage Lake, and the 2005 South Leech Lake projects maintained existing conditions of upland mature forest patches and will result in increases of patch acres and numbers in five years. The Southeast and Mississippi projects would result in no reductions in large mature patches. The Big Fork project will result in a decrease of large

mature patch numbers and patch acres. The Northwoods and the Round Island projects result in no loss of patch numbers though the acres within large mature patches are decreased over existing condition. Forestwide in consideration of these planned projects, patch numbers and acres are modeled to increase over the course of the next 10 years.

Relative to Forest Plan standard S-VG-2, at the Forest level all Alternatives considered for the SLL2 project area maintain more than the minimum of 85,000 acres within large mature/older upland forest patches. Alternative A (at 113,117 acres) does the best job of increasing large mature/older patch acres over the existing condition forest wide, followed by Alternative B (110,947 acres) and Alternative C (110,794 acres).

Table 3-23. Mature/Older Forest Patches within the SLL2 Project: existing condition (2011), and by Alternatives A, B, and C five years from present. (Biological Evaluation, Table BE-6)

Patch Size Class	Existing Condition Number	Existing Condition (Acres)	Alternative A + 5 Years (Number)	Alternative A + 5 Years (Acres)	Alternative B + 5 Years (Number)	Alternative B + 5 Years (Acres)	Alternative C + 5 Years (Number)	Alternative C + 5 Years (Acres)
1-40	188	2,189	188	2,257	190	188	2,189	188
41-100	38	2,525	34	2,292	34	2,277	33	2,209
101-300	8	1,403	7	1,006	7	1,334	7	1,334
301-500	6	2,337	7	2,671	5	1,992	5	1,973
501-1000	2	1,646	2	1,660	2	1,457	3	2,429
1001-2500	2	3,146	2	3,721	3	3,610	2	2,565
2501-5000	0		0		0		0	
5001-10000	0		0		0		0	
Number / acreage of large mature forest patches	10	7,129	11	8,052	10	7,059	10	6,967
Patch acres mitigated (Table 3-21 Table 3-22)						93		91
Total patch acreage		7,129		8,052		7,152		7,058
Mature or older forest total	-	13,246	-	13,607	-	12,857	-	12,698

3.4 Threatened, Endangered, or Sensitive Species

National Forests are required to consult with the Fish and Wildlife Service on impacts of Federal actions to species listed as either Threatened or Endangered under the Endangered Species Act (ESA). To meet the requirements of consultation, a draft Biological Assessment has been submitted to the US Fish and Wildlife Service for review. A final BA will be submitted when a preferred alternative is determined for the decision by the District Ranger. A project decision will be made once concurrence from the Fish and Wildlife Service is gained on the BA or an opinion is issued by the Service.

Under the National Forest Management Act, the Forest Service is required to maintain the viability of species within each planning unit (i.e., each national forest or grassland) and not cause species to trend towards Federal listing under ESA. Along with federally listed species, Regional Forester's Sensitive Species (RFSS) are species with the greatest conservation need and at greatest risk to loss of viability on national forests. Impacts to RFSS are evaluated in Biological Evaluation.

Scope of the Analysis

Direct and indirect effects are evaluated at the project level. Cumulative effects analyses are conducted at various scales depending on the species.

Management Direction

Protection and management of threatened and endangered species are governed by the Endangered Species Act of 1973. The evaluation of activities for both threatened and endangered species, and RFSS, are required by agency direction (Forest Service Manual 2670). Management of these species is also mandated by the NFMA (36 CFR 219.19).

3.4.1 Affected Environment

The affected environment is the federally listed threatened or endangered species and the RFSS within the Project. This discussion is tiered to the BA for federally listed species and to the BE for RFSS. Detailed information can be found in the BA and BE. These documents are contained in the South Leech Lake 2 Project file.

3.4.2 Environmental Consequences

Project activities may impact federally listed or Forest Sensitive species.

Indicators:

- Findings of the Biological Assessment (BA)
- Findings of the Biological Evaluation (BE)
- Comparison of effects to Regional Forester Sensitive Species (RFSS or R9 sensitive species)

Direct and Indirect Effects

Table 3-24 and Table 3-25 summarize the determination of effects for listed threatened/endangered and sensitive species respectively. See the BA and BE for detailed analyses. There are identifiable negative effects predicted for 8 of the 47 sensitive species due to project action alternatives, primarily due to indirect effects to species' habitats. These are the red-shouldered hawk, black-backed woodpecker, lance-leaf grapefern, blunt-lobed grapefern, goblin fern, pale moonwort, ternate grapefern, and the least moonwort. There are beneficial effects to bald eagle habitat as a result of Alternatives B and C.

Alternatives B and C differ in the amounts of upland mature forest that would be harvested. Alternatives also differ in how they affect large mature/older upland patches. Alternative C causes the greatest impact to these habitats and would have the greatest impact on the red-shouldered hawk and the guild of Mesic Northern Hardwood sensitive plants. Mitigation measures for site specific species impacts are listed in the BA and BE and in Appendix B stand lists for the EA.

Mitigation measures for site specific species impacts are listed in the BE in Tables BE4, BE5, RSH 1, RSH 2, RSH 3 and in Appendix B stand lists for the EA.

Table 3-24. Determination of effects by alternative for federally listed threatened and endangered species in the SLL2 project area.

Species	Common Name	Suitable habitat present?	Alternative	Determination
Lynx canadensis	Canada lynx	Yes	No Action, Proposed Action, Alternative C	Not likely to adversely affect
Canis lupus	Gray Wolf	Yes	No Action, Proposed Action, Alternative C	Not likely to adversely affect

Table 3-25. Summary of effects and determinations for CNF RFSS on the SLL2 Project.

Species	No Impact	May Impact but will not contribute to a trend to Federal listing or loss of viability to population or species	Action alternative that least impacts species, or most contributes to conservation of species	Action alternatives that most impacts species, or least contributes to conservation of species	Rationale
Bald Eagle	Alternative A	Alternatives B, C	Alternative C	Alternatives are similar	Alternative C causes the greatest improvement in habitat indicators, followed by Alternative B. No Direct impacts are anticipated.
Red-shouldered hawk	Alternative A	Alternative B, C	Alternative B	Alternative C	Alternative B has the greatest area where mitigation measures would be applied. Alternative C causes the greatest amount of indirect effects to this species Alternative C would cause the greatest decrease of large mature patch acres and cause the greatest reduction of spatial habitat quality.
Black-backed woodpecker	Alternative A	Alternative B, C	Alternatives B and C	Alternatives B and C	Alternatives B and C are the same in the amount of beneficial prescribed burning activities that would occur and the same in their potential to adversely affect the black-backed woodpecker.
Mesic northern hardwoods sensitive plants: lance-leaf grapefern, blunt-lobed grapefern, goblin fern, one-flowered broomrape, Goldie's wood fern	Alternative A	Alternatives B, C	Alternative B	Alternative C	Alternative C would cause a greater decrease of indicator acres than Alternative B and would have greater indirect effects to this guild of species.

Species	No Impact	May Impact but will not contribute to a trend to Federal listing or loss of viability to population or species	Action alternative that least impacts species, or most contributes to conservation of species	Action alternatives that most impacts species, or least contributes to conservation of species	Rationale
Upland disturbed sensitive plants: pale moonwort, ternate grapefern, least moonwort	Alternative A	Alternatives B,C	Alternatives are similar	Alternatives are similar	Both action alternatives propose the same amount of forest opening maintenance (72 acres) using fire and similar amounts of temporary road construction (2.9 miles in Alt. B and 2.7 miles in Alt. C). As a result, Alternatives B and C would have about equal impact on these species.

Other RFSS received no impact determinations for all alternatives. A complete list of species considered can be found in the BE (PR 5.0.7).

Cumulative Effects

Cumulative effects are considered in the determinations summarized above. The biological evaluations, Biological Assessment (PR 5.0.6) and Biological Evaluation (PR 5.0.7), contain detailed cumulative effects analyses.

3.5 Aquatics

Effects of proposed activities on aquatic resources are disclosed in this section as a secondary issue. Proposed activities may affect aquatic resources within Hydrologic Unit Code Level 6 (HUC6) watersheds that cross the project area.

Indicators:

- Percentage of young forest and open area resulting from regeneration harvest
- Acres of riparian area maintained or improved with vegetation treatments
- Miles of roads decommissioned

Scope of Analysis

Spatial Framework and Timeframe

Direct, indirect, and cumulative effects to aquatic resources were analyzed at the HUC6 watershed scale. Changes were assessed at the HUC6 scale because it is most relevant for analyzing the effects of forest management activities on aquatic resources within the CNF (Forest Plan 2004).

The time necessary for aquatic resources to recover from forest management related disturbance may range from as little as one growing season to several decades depending on the type and intensity of disturbance (Table 3-26).

Table 3-26. Range of recovery times for disturbances of greatest concern to aquatic resources within HUC6 watersheds that cross the project area (Verry 2000).

Disturbance	General Recovery Period
Creation of YoungForest	About 16 years
Road Closure & Decommission	One or more growing seasons
Riparian Area Treatment	One or more decades

Methodology

The primary source data used to address the secondary issues mentioned above included:

National Hydrography Dataset (NHD)

CNF, Minnesota Department of Natural Resources (MDNR), and county forest inventories

CNF roads and ownership inventories

National Wetlands Inventory (NWI)

2010 National Agriculture Imagery Program (NAIP) aerial photography

1996 satellite imagery produced by the Manitoba Remote Sensing Center

Management Direction and Forest Plan Consistency

The Forest Service follows all applicable laws, including the following:

National Environmental Policy Act (NEPA)

National Forest Management Act (NFMA)

Multiple-use Sustained Yield Act

Clean Water Act

Executive Orders 11988 and 11990

All activities proposed within the project area are consistent with national FSM policy of maintaining or improving watershed conditions (FSM 2520.2) through rehabilitation of roads (FSM 2522.11), management of riparian areas within the context of the surrounding landscape (FSM 2526.02), preservation and restoration of wetlands and floodplains (FSM 2527.02), and management of habitat for a full range of plant, fish, and wildlife species (FSM 2670.12).

All management activities in this project complied with relevant Forest Plan standards and guidelines for aquatic resources: G-FW-1; S-WS-1, 4, 6, 7, and 9 through 11; G-WS-1, 4, 5, and 11 through 14; G-TM-6; S-WL-12; S-TS-1; G-TS-6, 8, 9, 10, and 16 (Forest Plan 2004).

3.5.1 Affected Environment

There are six HUC6 watersheds partially or completely within the project area covering roughly 341,000 acres, over half of which consists of open water and wetlands. A table and map with information specific to these watersheds are in the project record (PR 5.1, PR 5.3).

The current percentage of young forest and open area, road density, and vegetative composition of riparian areas are of greatest concern to assessing the potential impacts of proposed activities within HUC6 watersheds that cross the project area (Table 3-27).

Table 3-27. Measures of greatest concern to aquatic resources within HUC6 watersheds crossing the SLL2 project area.

HUC6 Watershed	Existing Condition			
	Young Forest and Open Area (%)	Road Density (mi/mi^2)	FS Riparian Area	
			Species Longevity	Age Class Distribution
Tenmile Lake	21	3.2	Good	Fair
Man Lake	20	3.4	Good	Fair
Woman Lake	18	3.8	Fair	Fair
Inguadona Lake-Boy River	24	2.5	Fair	Fair
Urem Bay	19	2.2	Good	Fair
Leech Lake	9	3.2	Good	Fair

In watersheds that are predominantly forested, harvest rates that result in two-thirds or more of a watershed in young forest (0-15 yrs.) and open area (i.e. roads, farmland, and pastures) can nearly double the 1.5-year peak flow (the bankfull flow) in stream channels (Verry 2000). Doubling bankfull flow increases risk of flooding and stream channel erosion. No HUC6 watersheds currently exceed this threshold.

Roads alter natural hydrology by intercepting precipitation at the road surface or subsurface water moving down gradient across the road, which may concentrate flow or divert water from natural flowpaths (FEIS 2004). Watersheds with road densities greater than 2 mi/mi^2 may increase stream channel instability and negatively affect wildlife and aquatic organisms (Kolka 2006; FEIS 2004). All watersheds crossing the project area currently exceed 2 mi/mi^2.

The FEIS (2004) characterized riparian health in forested areas by tree species longevity and age. Favoring diversity and management of longer-lived, older tree species in forested riparian areas adequately provides for several ecological functions (Forest Plan 2004). Long-lived species dominate the forested riparian area in all but two of the watersheds crossing the project area. Age distribution is more heavily weighted toward the mature age class across most watersheds. Riparian forest longevity and age class by watershed can be found in the project record (PR 5.3).

3.5.2 Environmental Consequences

Direct and Indirect Effects

No Action Alternative

Aquatic resources would not be not be directly or indirectly affected by this alternative because no new activities would be proposed. Regardless of current designation, motorized use of roads and trails without physical barriers would continue to disturb native soils in some areas and impact water quality or aquatic habitat. Some forestland would age out and no longer contribute to young forest and open area calculations for

HUC6 watersheds. Some of the mature forest age class in riparian areas would age out into older growth stages.

Direct and Indirect Effects of the Road Management Alternative

See Soils, Environmental Consequences 3.6.3 for a discussion of prescribed fire and motorized use effects to aquatic resources.

About 9 miles of roads would be decommissioned under the Proposed Action. This would improve aquatic conditions in 5 of 6 HUC6 watersheds in crossing the project area. Decommission treatments and general recovery time for aquatic resources is discussed in Soils, Environmental Consequences 3.6.3

Direct and Indirect Effects of Vegetation Management Alternatives

Regeneration harvest treatments would not cause a HUC6 watershed to exceed the threshold of 60% young forest and open area under either alternative. Percent young forest and open area, by HUC6 watershed is in the project record (PR 5.1).

Short-term impacts to aquatic resources may occur as a result of soil disturbance immediately adjacent to waterbodies, but they should largely be addressed by meeting CNF Plan S & Gs and effective implementation of BMPs. MDNR monitoring of CNF harvests between 2004 and 2009 has shown that infrastructure was generally located outside of filter strips, the infiltration zone protecting nearby waterbodies. Where infrastructure has been found within filter strips, soil exposure remained below BMP recommendations on nearly all of the sites (Dahlman and Rossman 2009; Dahlman 2008).

Roughly 231 acres of riparian area would be treated in Alternative B and 224 acres in Alternative C. Treatments include a range of activities such as harvest, site preparation for seeding, and prescribed fire. In both alternatives, treatments would maintain or enhance riparian health and function over the long-term by restoring natural fire disturbance and reestablishing conifer in a landscape that historically had a much stronger component that what is present currently. Even after treatments are completed, it will likely take several decades for vegetation and adjacent aquatic habitat to reach desired conditions. Silvicultural prescriptions, by riparian treatment area, are listed in Appendix B.

Cumulative Effects

All previously planned and proposed regeneration on Forest Service, Cass County, and State lands over the next 15 years would not cause a HUC6 watershed to exceed 60% young forest and open area (percentages by watershed are listed in the project record, PR 5.1). Despite the lack of forest management information on tribal and private lands, it is

unlikely that planned harvest in these areas would contribute to exceeding the young forest and open area threshold. Tribal and private ownership covers a smaller percentage of total watershed area than the remaining public lands.

The forest management approach of tribal government, Cass County, and the State of Minnesota are consistent with some of the goals and objectives of the Forest Plan (Forest Plan 2004, Cass County 2003, and MDNR 2009). Although riparian management is not as explicitly defined as it is in the Forest Plan, implementation of BMPs and forest management within the context of the landscape and native plant communities would likely result in harvest prescriptions similar to those proposed in this assessment. Riparian health and function would be maintained or improved on these ownerships. Trends on private lands; however, are less clear due to lack of current data. Private lands have also been under represented in timber harvest monitoring (Dahlman 2008).

There are no other known road and trail projects within HUC6 watersheds that cross the project area beyond scheduled general maintenance. Maintenance activities would have little effect on aquatic resources beyond improving drainage and reducing incidents of road sediments reaching waterbodies.

3.6 Soils

No key issues related to soils were raised during public scoping of the SLL2 Project. Effects of proposed activities on soils are disclosed in this section as a secondary issue.

Indicators: Proposed activities may disturb soils within the project area.

- Acres of soil potentially disturbed by harvest and mechanical site preparation
- Acres of soil reclamation resulting from road decommissioning

Scope of Analysis

Spatial Framework and Timeframe

Impacts to soils are inherently site specific. Direct, indirect, and cumulative effects to soils were analyzed within proposed treatment areas.

The time necessary for soils to recover from disturbance may range from as little as one growing season to several decades depending on disturbance intensity and inherent soil characteristics (Table 3-28).

Table 3-28. Range of soil recovery times for disturbances of greatest concern within the project area (Grigal and Bates 1992, Grigal 2004, FEIS 2004, and Page-Dumroese, *et al.* 2006).

Disturbance	General Recovery Period[1]

Compaction or Nutrient Loss	One or more decades
Erosion or Displacement	One or more growing seasons

Methodology

Soils were mapped within the SLL2 project area as part of the Terrestrial Ecological Unit Inventory (Shaddis 1997a, Shaddis 1997b, USDA 1985, and Forest Plan 2004). Tables and maps with soils information specific to the project area are in the project record (PR 5.2).

The Terrestrial Ecological Unit Inventory (TEUI) is a national framework used to classify and map ecological units throughout NFS lands. Ecological units are associations of climate, physiography, surficial material, bedrock geology, soil, and vegetation (USDA 2005). Within this system, mapping units consist of provinces (thousands of square miles), which are divided into broad geographic areas called Landtype associations (LTAs). LTAs are divided further into ecological landtypes and ecological landtype phases (ELTs and ELTPs). ELTPs are mapping units at the finest scale. This system guided forest management activities proposed within the project area. The Cass County Soil Survey (NRCS 1997) and Field Guide to the Native Plant Communities of Minnesota (MDNR 2003) were also used to support ecological interpretations.

Management Direction and Forest Plan Consistency

The Forest service follows all applicable laws, including the following:

National Environmental Policy Act (NEPA)

National Forest Management Act (NFMA)

Multiple-use Sustained Yield Act

National Forest Service Manual (FSM) policy requires that soil quality is maintained or restored "to sustain ecological processes and function so that desired ecosystem services are provided in perpetuity" (FSM 2550.2). Guidelines for determining soil quality are currently in the process of revision. Until changes become official, detrimental soil conditions include but are not limited to compaction, erosion or displacement, and excessive nutrient loss. If detrimental soil conditions exceed 15% of a treatment area, the area is considered impaired and should be restored (FSH 2509.18).

The CNF is responsive to the Montreal Process's Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests, specifically the indicators describing maintenance of forest ecosystem health and vitality and conservation and maintenance of soil and water resources (MPWC 2005).

All management activities in this project comply with relevant Forest Plan standards and guidelines for soils: G-FW-1, G-WS-8 through 14, and S-WS-11 (Forest Plan 2004).

3.6.1 Affected Environment

Inherent soil characteristics such as texture, drainage, and nutrient status were key to assessing the potential impacts of proposed activities on soils within the project area. Presence of earthworms and vectors of earthworm expansion were also critical to this assessment.

About one-fifth of the landbase within the project area consists of fine-textured soils with poor drainage. These soils are most susceptible to compaction because they remain moist or saturated for much of the year. Past research has indicated that following timber harvest, compaction and its impact on site productivity is generally highest following multiple passes of heavy equipment on unfrozen, fine-textured soils (Berger *et al*. 2004; Powers *et al*. 2005; Han *et al*. 2009).

Steep terrain covers roughly 5% of the project area. The potential for accelerated erosion and soil displacement is primarily a function of topography, soil texture, ground cover, and precipitation (USDA 2010); therefore, soils in steep terrain with potential for exposure due to land use are most susceptible. Soil deposited in nearby waterbodies may detrimentally affect water quality and aquatic habitat.

About one-tenth of the landbase within the project area consists of excessively to somewhat excessively well-drained soils that are inherently low in nutrient content. Excessive biomass removal from these soils may exceed natural nutrient inputs and affect site productivity. Revisions to the Generic Environmental Impact Statement on Timber Harvesting and Forest Management in Minnesota (Grigal and Bates 1992), suggest that biomass removal under a typical Minnesota harvest would not exceed natural nutrient inputs in most Minnesota soils (Grigal 2004). Despite the current science, the CNF continues to require slash retention in these areas, as directed by the Forest Plan (2004), unless site conditions warrant otherwise.

The intensity and areal extent of soil disturbance currently on CNF lands within the project area is uncertain. Past monitoring of NFS harvests by both the CNF and the MDNR revealed that soil disturbance has occurred as a result of forest management activities, but it has generally been infrequent and has not appeared to affect overall site productivity (Morley 2011). Current research; however, has raised questions with the accuracy of such ocular assessments (Steber *et al*. 2007). Until more detailed, quantitative monitoring is completed in the future, visual assessments remain the best technique for determining forest management impacts on soils.

Earthworms found on the CNF are all exotic species. In their absence, decomposition of leaf litter in mixed northern hardwood forests is controlled by fungi and bacteria. In this situation, decomposition is slow and leaf litter accumulates to form a thick forest floor. A thick forest floor is where most nutrients are found and where most understory plants

and tree seedlings grow and germinate. When earthworms invade, they consume the forest floor and mix it into the upper mineral soil layer. Organisms that live in the forest floor lose habitat and food and either leave to find new suitable habitat or die trying. Without the forest floor as an insulator, the soil gets warmer in the summer and colder in the winter, making it difficult for understory plants adapted to more natural forest floor conditions to survive (GLWW 2011).

Nearly half of the landbase in the project area is currently mixed northern hardwood forest or consists of soils that support a mixed northern hardwood forest community. Although earthworm surveys are not yet available for much of this area, past observations elsewhere indicate a high likelihood of earthworm infestation in much of the mixed northern hardwood forest types and native plant communities across the CNF. A map of locations on the CNF where visual signs of earthworms were present at or near the soil surface is in the project record (PR 5.2).

3.6.2 Environmental Consequences

Direct and Indirect Effects

No Action Alternative

Soils would not be not be directly or indirectly affected by this alternative because no new activities would be proposed. Regardless of current designation, motorized use of roads and trails without physical barriers would continue to disturb native soils in some areas and impact site productivity. Preexisting soil disturbance from past vegetation management activities would also remain on the landscape for few years to several decades depending on disturbance intensity and inherent soil characteristics.

Direct and Indirect Effects Common to Action Alternatives

Prescribed fire proposed within the project area would have very little impact on soils and aquatic resources. Low intensity ground fire would creep across treatment areas, burning some portions and not others. This mosaic of burned and unburned area would be representative of conditions that would have followed natural fire disturbance. Burn plans would be designed to manage for low intensity fire, as well as reduce the impact of heavy equipment on the landscape. If burn restrictions are adhered to, it is not likely that the fire or fire operations would negatively affect soils and aquatic resources. A list of prescribed fire mitigations, by treatment unit, is in Appendix B.

The effects of proposed motorized use changes on soils within the project area are likely to differ slightly from existing conditions. With exception to roads that are decommissioned, all roads will remain on the landscape in perpetuity, effectively displacing productive mature, or older forestland. With physical barriers in place, soils and vegetation may recover along routes proposed for closure, but it would likely take

several years to decades to do so naturally. Frequent future access to NFS and other ownerships would also set back any short term soil recovery and maintain the corridor in a young forest or open area condition.

The effects of opening roads in the Proposed Action that are currently closed to one or more motorized uses are uncertain. None of these roads currently have a physical barrier on the ground, so it is possible that motorized use patterns would change little by formally opening them. Without knowing the baseline use of these roads and having monitoring results from past changes in designations, it is difficult to say what, if any effect, opening roads would have on soils and aquatic resources.

An estimated 21 acres of soils would be reclaimed as a result of proposed road decommissioning. Treatments to decommission a road, at a minimum, would consist of making the road impassible to motorized vehicles, removing fills and drainage control structures, and stabilizing exposed soils. Closures typically consist of berms, downed woody debris, boulders, or a combination thereof. Roads may be ripped to break up compaction or planted with native vegetation, if necessary. It may take one or more growing seasons for soils to revegetate and surrounding aquatic resources to recover depending on the magnitude of past disturbance and restoration that is implemented.

Direct and Indirect Effects of Vegetation Management Alternatives

A range of soil disturbance would occur as a result of proposed harvest and mechanical site preparation (Table 3-29).

Table 3-29. Acres of soil potentially disturbed by proposed harvest and mechanical site preparation. Alternatives are compared by the inherent risk of soils to compact, erode, or become nutrient depleted. Soils were ranked low, moderate, or high based on current literature (Grigal 2004) and Forest Plan (2004) guidelines.

Alternative	Compaction Risk			Erosion Risk			Nutrient Depletion Risk		
	Low	Mod	High	Low	Mod	High	Low	Mod	High
B	131	2,357	271	1,921	616	223	2,357	402	0
C	137	2,203	257	1,803	580	214	2,203	395	0

Overall, Alternative B has a higher potential to disturb soils than Alternative C because more acres may be treated. In addition, more acres occur on high risk soils under Alternative B. Despite the risks, it is unlikely that disturbance in either alternative would be detrimental to soils as long as Forest Plan S & Gs are met and BMPs are appropriately implemented. Results of Forest Plan implementation monitoring over the last five years help confirm this assessment (Morley 2011). Design features, BMPs, and mitigation assigned to each treatment area are in Appendix B. The effectiveness of some of the BMPs identified in that table is discussed below.

Soil compaction and erosion are likely to be greatest in portions of treatment areas devoted to infrastructure (e.g. temporary roads, skid trails, and log landings). Repeated

passes over the ground with heavy equipment increases risk of soil exposure and compaction. To reduce the spatial impact of infrastructure, the amount of area occupied by log landings and temporary roads generally should not exceed 3% of a treatment unit and skidding would be focused on existing skid trails. Past monitoring of NFS harvests by the MDNR has shown that infrastructure percentages remain below recommended guidelines. Skidding has generally been focused on preexisting trails or has been randomly distributed lightly over sites (Dahlman and Rossman 2009 and Dahlman 2008).

Seasonal operation restrictions effectively minimize soil compaction. Studies on the CNF and other national forests in R9 have shown that following winter harvest, soil compaction in untreated areas remained well below areas compacted to near growth-limiting levels prior to harvest (Page-Dumroese *et al*. 2006). Very little compaction, in the form of rutting or ponding, was found in NFS harvest areas monitored by the CNF and MDNR between 2004 and 2009. It was mainly in units harvested when soils were not frozen. Disturbance was small and isolated, having little observable effect on overall site productivity (Morley 2011).

None of the harvest treatments proposed are on soils shallow to bedrock or in poor nutrient conifer swamps, two soil types where excessive biomass removal may result in nutrient depletion. Even under harvest scenarios much higher than what is proposed in either alternative, it is unlikely that soils may become nutrient depleted (Grigal 2004). The CNF does; however, require slash retention on sandy, poor nutrient soils despite the current science (Forest Plan 2004).

The results of surface observations for signs of earthworms in the project area have not been made available for this project area. Absent this data, treatment areas with the highest likelihood of earthworm infestation were identified based on current science and past monitoring. If treatment areas met the following criteria, they were assigned mitigation to reduce the risk of earthworm spread (see Appendix B).

- The treatment would occur when soils were not frozen and there is potential for worm casings, if present, to be transported in soil-caked tires
- The treatment area occurs within an upland deciduous forest type
- The treatment area occurs within or immediately adjacent to mixed upland hardwoods or sugar/basswood forest types within the sugar maple/basswood ecological landtype phase

All heavy equipment operating in areas that meet the aforementioned criteria would be cleaned prior to leaving the treatment area. This would not eliminate the risk of earthworm spread, but would provide a reasonable amount of control until populations have been more accurately mapped on the CNF.

Cumulative Effects

Proposed vegetation treatment areas in this project have had little to no management in them for several decades. Although the extent to which soils have been disturbed in the past is uncertain, monitoring of NFS harvests over the last five years indicate that CNF management activities have had little impact on soil productivity outside of areas devoted to timbersale infrastructure (Morley 2011). It may take several decades for soils to recover at log landings, temporary roads, and skid trails (Grigal and Bates 1992), so present and future foreseeable effects associated with construction of new infrastructure would be cumulative with past impacts. It is unlikely; however, that those effects would result in a treatment area exceeding the areal threshold for detrimental soil disturbance, no greater than 15% of the treatment area. Past NFS harvest monitoring by MDNR has shown that the CNF has consistently managed its timbersale infrastructure below areal recommendations in BMPs, largely due to a high frequency of using preexisting infrastructure (Dahlman and Rossman 2009, Dahlman 2008).

No other road management activities have been proposed on forest system roads and trails within the project area beyond what is discussed here.

3.7 Hazardous Fuels

Scope of Analysis

Spatial Framework and Timeframe

The scope of the analysis focuses on red pine thinning within the project area. More specifically, it is the immediate vicinity of treatment units for direct, indirect, and cumulative effects on vegetation. (MNICS 2007, NWCG 2001).

The time frame spans 5 years prior and 5 years following the decision. Thinning treatment and effects are included in the analysis.

Methodology

Stand layers from two previous decisions (2005 SSL and 1999 Ivins) were compared to the current stand layer to identify if larger thinned areas had been created.

Management Direction

All fire and fuels management analysis in this Project is driven by Forest Plan Desired Conditions and Objectives. Pertinent desired conditions, objectives, standards, and guidelines from the Forest Plan, Insects, Diseases, and disturbance Processes section (Forest Plan, page 2-18).

Pertinent desired conditions (D-VG-6) and objectives (O-VG-1, O-VG-9) and standards and guidelines (G-ID-4) are included by reference (Forest Plan, pages 2-18, 2-21, 2-21).

Red pine thinning activities proposed in the project area are consistent with the Healthy Forests Initiative (HFI), which emphasizes the need for fuel treatment on NFS lands and describes the need for positive change in the condition class of stands on fire dependent/ tolerant land types

3.7.1 Affected Environment

The desired condition described in the 2004 Forest Plan is to restore or maintain the forest to a condition that minimizes the effects of a wildfire. The proposed commercial thinning of 708 acres of red pine plantations would move the existing Condition Class III towards the desired Condition Class II.

Commercial thinning acres in plantation red pines are counted toward acres of hazardous fuels reduction. All of the proposed red pine thinning falls within the LT-6, Fire Dependent Red Pine Forest. The thinning treatment increases spacing between the pine trees which reduces crown density, reduces ladder fuels, and raises crown base heights.

Nonconifer species such as northern hardwoods and aspen are not included in this hazardous fuels analysis because of the low frequency of fire occurrence and very low potential for crown fire development. Quaking aspen stands often act as natural fuel breaks during wildfires (FEIS, section 3.5-1, *Populus tremuloides*), and fires sometimes bypass quaking aspen stands surrounded by conifers.

Condition classes describe a departure from normal for the ecosystem in terms of historical fire occurrence and how this departure has altered the species composition, structural stage, stand age, and canopy closure. A Condition Class I indicates the fire regimes are within or near historic range, while Condition Class III means fire regimes have been extremely altered from their historic range. The Healthy Forests Initiative emphasizes the need for fuel treatment on NFS lands and describes the need to positively change the condition class of stands on fire dependent landtypes.

In the SLL2 project area, most fire dependent and fire tolerant lands are outside their normal fire frequency range. The vegetation established on these lands is typically conifer that primarily consists of white spruce, balsam fir, jack pine, red pine, and white pine. This has resulted in an existing forest condition two and sometimes three times removed from the condition than if fires were not actively suppressed and allowed to burn. The normal fire frequency would have allowed surface fuels and encroaching vegetation to be controlled at levels that would not allow catastrophic fire except in the severe drought year.

The desired future condition of these fire dependent and fire tolerant lands is to change them by at least one condition class, and two condition classes is preferred. Then surface fires occurring would not produce catastrophic effects, but would produce more beneficial effects to the forest ecosystems.

Human Values and Wildfire Risk

The risk of wildfire in wildland urban interface areas within the project area would increase substantially due to fuel loading in red pine plantations if these plantations were not regularly thinned. On average there are 53 wildfires annually on the Chippewa National Forest and within the Project there have been 92 wildfires over the past twenty years for a total of 106 acres burned. Numerous lakeshore homes/cabins, resorts, and recreational trails and roads are within the project area.

The optimum red pine plantation thinning interval is about ten years. Many of the red pine plantation stands in the project area have reached the 10-year interval. Wildfire behavior is impacted by reducing crown density, raising crown base heights, and removing ladder fuels. Thinning would likely result in a fire staying on the ground. This would allow for safe and cost effective suppression action by initial attack fire crews.

3.7.2 Environmental Consequences

The proposed thinning is focused in the areas categorized as Condition Class III and Fire Regime IV. The project area is a fire dependent red pine forest that was maintained by disturbance resulting from frequent low intensity surface fires and periodic crown fires. The Fire Regime of IV is located within this landtype and within the project area. This fire regime has been characterized by frequent, low intensity ground fires occurring about every 20 years, followed by severe crown fires every 100 to 500 years (MDNR 1993). Hazardous fuel loads can quickly build up in the absence of periodic surface fires. Additionally, red pine thinning occurs in wildland/urban interface areas with roads, private property, recreational residences, and public recreation facilities. The pine thinning offers the opportunity to mitigate the potential for catastrophic wildfire in high use areas.

Direct and Indirect Effects

Indicator:

Acres of red pine plantations thinned.

Alternative A (No Action Alternative)

Under the No Action Alternative, no management activity would allow the build-up of fuels, increase the continuity between hazardous fuel sources, and contribute to Condition

Class III. The potential of low intensity ground fires developing into crown fires and potentially catastrophic fires would increase with no thinning treatments.

There would be no accomplishment in terms of reducing fuel loads in Fire Adapted Priority Zones. In general, no management activity would result in the continued build up of hazardous fuels; therefore, increase the potential for catastrophic wildfire. Desired future conditions, objectives for the landscape, and guidelines set forth in the Forest Plan and Chippewa Fire Management Plan would not be met. With no management activities, the cost and complexity of wildfire containment around the wildland urban interface would increase.

Alternative B and Alternative C

The Proposed Action and Alternative C (Action Alternatives) are identical in terms of acres of red pine thinning. The amount of acres proposed for commercial thinning totals about 1 percent of the entire project area (all ownerships) or about 3 percent of NFS lands in the project area. Analysis of the Action Alternatives has shown that the proposed thinning would move from Condition Class from III towards Condition Class II in the DMP LE. This positive direction contributes to desired conditions for vegetation characteristics; fuel composition, and other associated disturbances.

The Action Alternatives treat red pine plantations in areas categorized as Fire Regime IV, Condition Class III. The frequency of wildfire is 35-100 years and High Severity (Stand Replacement). Thinning would occur within Moderate to Very High Landscape priority zones within the project area. Thus any disturbance would be beneficial to lowering the Condition Class.

Cumulative Effects

No thinning stands from previous decisions were found adjacent to currently proposed thinning stands. Therefore, due to no spatial or temporal overlap, there are no cumulative effects.

The State of Minnesota does not have any planned thinning treatments adjacent to the planned thin units. There are no adjacent past activities conducted by the State adjacent to the proposed thin units. Nor does the Leech Lake Band of Ojibwe have any planned or past thinning treatments in the immediate vicinity of the planned thinning units. All proposed thinning occurs outside the Reservation boundary.

Future Impacts

Over time some landscape level improvements may occur if thinning treatments continue to be implemented on NFS lands. However, given the mix of ownerships in the project

area (Table 1-1) collaborative efforts would be needed to continue moving towards a lower condition class across the landscape.

3.8 Tribal Interests

Scope of Analysis

The SLL2 project area is geographically broken into three separate areas which are based on the DMP LE: the upper Onigum Penninsula which includes Onigum and Pine Point RNA, a separate smaller area roughly near the base and west side of the peninsula, and the larger main body of the project area. No vegetation proposals are within the upper Onigum peninsula area or within the lower, smaller DMP LE area near the base and west side of the peninsula (Appendix A, Vegetation maps). The transportation/ travel management proposal includes several forest system roads in the lower Onigum peninsula area (Appendix A, Transportation/Travel Management map).

Spatial Framework and Timeframe

The affected environment is defined for spatial analysis as the project area. It is acknowledged that the CNF as a whole is important to members of the LLBO. Sites and larger areas that support specific vegetation, wildlife, and forest settings are important for a number of reasons including: cultural, spiritual, gathering and historical meanings associated with the area (FEIS 2004, pg 3.9-27). About half the project area is within the LLBO Reservation boundary; and, within the Reservation boundary and SLL2 project boundary are areas of high interest (Forest Plan 2004, pg. 2-37; FEIS 2004, pg 3.9-26-27).

The timeframe for analysis purposes is since the last entry into the project area (about 5 years ago under the SLL 2005 Decision) through the next entry into the project (about 10 years into the future). The CNF acknowledges that tribal interests have a long timeframe and traditional resource locations are fluid over time; however, this environmental assessment in considering a 15 year period, looks at minimizing, mitigating, or avoiding impacts within this window.

Methodology

The vegetation and transportation GIS layers were intersected with all traditional use polygon GIS layers. This information is considered privileged and is not subject to FOIA under Federal law; therefore, no specific locations are contained in this EA. Four indicators were identified. Transportation indicators involve access—miles of forest system roads opened to all motorized vehicles and miles of forest system roads closed or decommissioned. The number of roads opened, closed or decommissioned is used to generalize and describe the magnitude of these changes. Vegetation indicators involve

management in the hardwood forest type—acres of uneven-aged harvest and acres of sugar (hard) maple harvest. The amount of acres is used to generalize and describe the magnitude of these changes.

Management Direction per Forest Plan

All management activities incorporate consideration of tribal interests as required by Forest Plan direction. These considerations may result in mitigations, design criteria, the range of alternatives considered, or other applicable direction. This information is based on consultation with the Leech Lake Band of Ojibwe, the LLBO Tribal Historic Preservation Officer, Department of Resource Management (DRM) and with Local Indian Councils. In this way, Forest Plan direction (D-TR-1, O-TR-1) "Contribute to American Indian way of life, cultural integrity, social cohesion and economic well being" and "incorporate tribal cultural resources, values, needs, interests, and expectations in forest management" is met (Forest Plan, O-TR-1, pg 2-35).

The 2004 Forest Plan, Tribal Rights and Interests, in particular, Desired Conditions (D-TR-1, D-TR-2, D-TR-3, pg 2-35), Objectives (O-TR-1, O-TR-3, pgs 2-35, 2-36), and Standards & Guidelines (S-TR-1, S-TR-3, S-TR-4, S-TR-6, S-TR-7, G-TR-3, pg 2-36) are incorporated by reference.

3.8.1 Affected Environment

Past studies (McAvoy and Shirilla 2003), Forest Service meetings with LICs (Appendix C), and information related to traditional gathering of natural resources by Great Lakes Ojibwe (Densmore 1979; Meeker, Elias, and Heim 1993) suggests that more traditional resources are likely being gathered by LLBO tribal members within the Project, as well as on lands outside and adjacent to the Project.

The Affected Environment includes the project area. Traditional resource impacts were addressed under Section 106 Consultation process with THPO. Potential impacts to traditional resources have been considered from the beginning of the project (PR 1.0.3a, PR 3.0.1, PR 3.0.2, PR 3.0.1).

3.8.2 Environmental Consequences

The Chippewa National Forest has a unique Government-to-Government relationship with Tribal Governments as directed and mandated by Congress (see National Preservation Act, Section 106 and www.fs.fed.us/spf/tribalrelations). The Forest's trust responsibilities are fulfilled by following the laws, regulations, and the Forest Plan (FEIS 2004, pg. 3.9-28).

Indicators:

- Miles of forest system roads closed or decommissioned
- Miles of forest system roads opened
- Acres of uneven-aged harvest treatments in hardwood stands
- Acres sugar (hard) maple /basswood treated

Direct and Indirect Effects

Proposed management actions encompass a suite of activities designed to meet Forest Plan desired condition D-TR-1(pg. 2-35) to sustain American Indians' way of life, cultural integrity, social cohesion, and economic well-being. Forest system roads are used to access areas of traditional, spiritual, or cultural importance (FEIS 2004, pg. 3.9-42). The Walker Ranger District consulted with LLBO DRM and the Onigum and Kego-Smokey Hill LICs (EA, section 1.7, pgs. 10 and 11).

Transportation / Travel Management

The SLL2 project area is densely roaded and more highly impacted by roads than other areas of the Forest. Road and trail density is about 3.1 miles per square mile (PR 1.0.8). The Forestwide road density on NFS land averages 2.4 miles per square mile; within the project road density on NFS land averages 2.8 miles per square mile.

Water quality and hydrology are effected by road crossings over drainages. Eroded stream crossings are a source of sediment that impacts water quality. Perched drains/culverts block fish passage to spawning beds and reduce water flows. The SLL2 RAP(2011) contains specific information that describes effects of road density on aquatic, soil, and terrestrial wildlife resources.

Forest system road proposals that involve closure or decommissioning are based on review of impacts to soil, aquatic, and wildlife resources. Leech Lake DRM has stated support for such road closures or decommissioning based on preserving water quality, wetlands, illegal dumping, and invasive species (PR 3.1.5).

All forest system roads proposed for closure or decommissioning were field checked. These notes were part of the January 2011 Scoping packet and are included in Appendix A. In addition, Forest Service staff conducted a second multi-resource review of roads based on scoping comment letters (PR 4.0.2). Roads accessing stands typed as sugar (hard) maple were checked for past or ongoing syrup collection and ability to access in early spring (PR 3.1.10a, PR 3.1.11). A summary of reasons for closing or decommissioning forest system roads is shown in **Error! Reference source not found.**. The detailed transportation table is in Appendix A.

Table 3-30. Reasons for closing or decommissioning forest system roads.

Reasons for closing or decommissioning	Forest System Road
Protect wetlands and poorly drained soils:	2099, 2839, 2677, 2849, 2858, 2881, 3737, 3747, 2327B, 2327C, 3759A, 3779B, 2312A, 2891, 2317, 2687A, 2610, 2891, 3726, 2108A, 2658B, 2658C, 3746A, 3779B
Short route that doesn't go anywhere; protect the NCT; reduces road density in watershed	2837, 2312A, 2677, 2891, 2107D, 2108C, 2327C, 2461A, 2611A, 3746A, 3746B, 3793A, 2858, 3747
Other roads nearby accessing the same area	2825A, 2317, 2610, 2658B,
Protects NCT	2837, 2687, 2849, 3747, 2687A
Protects TES	2858
Reduces road density in the watershed	2837, 2825A, 2687, 2891, 2107D, 2108A, 2108C, 2461A, 2611A, 3746A, 3746B, 3759A, 3777B, 3779B, 3779C

Vegetation

Vegetation management activities give consideration to plant and animal species of traditional use (Forest Plan 2004, G-TR-3, pg 2-36). In particular, any traditional resources occuring in treatment stands would be addressed on a stand by stand basis (PR 3.1.10, PR 3.1.10a). Table 2-4 shows proposed acres of each harvest method and Appendix A lists the stands under each alternative.

The project area encompasses the General Forest – Longer Rotation Management Area (Table 1-1). Vegetation prescriptions in support of the LRMA include shelterwood with reserves, conversions to upland conifer, selection harvests in hardwood forest types, diversity seeding and planting, and variable density thinning to improve wildlife habitat and improve the appearance of conifer plantations.

Conversions to upland conifer – By removing the dominant species, a shift in forest type may occur following harvest. (Table 2-4, Vegetation indicator #2 and Table 3-4). All other conversions would be through seeding, planting or in the case of shelterwood harvest, natural regeneration. Selection harvest methods (uneven-aged) maintain the stand's age and, in some cases, would be used to convert the stand from one forest type to another forest type. All proposed conversion activities undertaken within the SLL2 project meet the overall objectives of the Leech Lake Pine Collaborative to increase upland conifer in this area.

Hardwood forest type – Forest health benefits derive from uneven-aged harvest treatments (Vegetation indicators #3, 4, 5 and Table 3-5). The ability to produce forest products and provide services are essential to meeting current and future needs of people. Uneven-age harvest treatments in hardwood stands maintain healthy forest conditions (Forest Plan, D-TR-2, pg 2-35). Healthy resilent forests are better able to ward off insect and disease infestations; thus affording future opportunities for traditional hunting and gathering or traditional land uses. Single tree and group selection harvests (uneven-aged

harvests) maintain the mature tree canopy; provide habitat for RFSS and TES, and help maintain a healthy forest. Forest patches would be maintained (Table 2-4).

Diversity seeding and planting – The SLL2 project contains a number of acres of diversity planting/seeding (Appendix A, stand lists tables). Some of these activities would take place in the Three Island area, prioritized by the Leech Lake Pine Collaborative (LLPC) in 2009. All of the proposed diversity planting undertaken within the SLL2 project meets the overall objectives of the LLPC to increase upland conifer.

Thinning red pine plantations – About 516 acres are candidates for variable density thinning (VDT). However, before treating, each stand would be looked at to determine if VDT is appropriate. This harvest method creates a more natural appearance by removing more trees (thinned heavier) in some areas and leaving more trees (thinned lighter) in other parts. This harvest method breaks up the "rows of trees" look. For the most part, existing diversity is maintained during harvest. Increased light to the forest floor may promote regeneration in portions of the stand, but no active reforestation activities would take place.

Wildlife

Maintenance of the Woodtick Fields forest openings (216 acres) through low intensity prescribed fire would provide habitat for traditional edible plants, fruiting trees, and wildlife. Some upland game birds prefer small openings. Patch clearcuts create small openings and would help maintain or improve bird hunting opportunities. Regeneration harvests would create young, early successional habitat for deer and grouse.

Large mature/older upland forest patches would be maintained and contribute to minimizing or avoiding potential effects to traditional land uses and resources (Forest Plan 2004, D-TR-2, pg 2-35). Single tree and group selection harvests (uneven-aged harvests) would maintain the mature tree canopy and provide habitat for RFSS and TES.

Aquatics

Aquatic resources or the ability to access these resources would not be directly or indirectly affected by changes in allowable use on forest system roads. There would be no change in the number of lake accesses, nor would transportation management proposals affect roads leading to lake access locations.

Healthy riparian forested areas are characterized by tree species longevity and age. Treatments include a range of activities such as harvest, site preparation for seeding, and prescribed fire. Treatments would maintain or enhance riparian health and function over the long-term by restoring natural fire disturbance and reestablishing conifer in a landscape that historically had a much stronger component (Table 2-4).

Soils

Soil resources are protected by closing or decommissioning roads. Activities may include placing physical barriers at the start of the road or removing fill and drainage control structures. Over time the road bed would revert to a more natural condition as vegetation fills in. The road would still be accessible for walking. The reasons for closing or decommissioning forest system roads are based on physical impacts to aquatic or soil resources (PR 2.1.4). Closing and decommissioning forest roads are consistent with Forest Plan standards and guidelines; BMPs and the MFRC Gold Book (M&E 2010, pg 86). The list of forest roads and management rational is in Appendix A.

None of the forest system roads proposed for closing or decommissioning affect lake access points; therefore, there are no direct, indirect, or cumulative effects.

Management Activities Common to Alternative B and Alternative C

Transportation/Travel Management – Transportation management outreach activities include identifying and maintaining a forest road system that contributes to efforts to sustain the American Indian way of life, cultural integrity, social cohesion, and economic well-being, is the minimum needed to provide adequate access to both NFS and non-NFS land (D-TS-2, pg 2-47), and consistently designate forest system roads as either closed or open to motorized uses (from the 2007 OHV Decision).

Alternatives B and C follow the 2007 Off-Highway Vehicle Road Travel Access direction on forest roads. This means that many roads closed to OHVs under the 2007 OHV decision are now closed to all motorized vehicles. Under the Action Alternatives about 18 miles of forest system roads would be opened to all motorized vehicles and about 19 miles of forest system roads would be decommissioned or closed to all motorized vehicles (Table 2-4).

Forest Service recommendations for closing or decommissioning a road are based on impacts to soil, aquatic, and wildlife resources. Leech Lake DRM has stated support for such road closures or decommissioning based on preserving water quality, wetlands, illegal dumping, and invasive species (PR 3.1.5).

Vegetation Management – Alternatives B and C would convert 95 acres of sugar maple to upland conifer (Forest Plan, O-VG-1, O-VG-2, pg 2-22). This harvest prescription meets the overall goal of the LLPC to work towards increasing upland conifer in the project area
(PR 0.0.0, 2009 Base Data folder).

Under Alternatives B and C, the Woodtick Fields (about 216 acres) would be maintained and wildlife habitat improved through the use of prescribed fire (Appendix A). In the

Goose Lake Hunter Walking Trail area, low intensity prescribed fire would be run through natural origin pine stands for wildlife habitat improvement (about 496 acres). Goose Lake burn units under the 2005 SLL Decision would be managed as part of the Goose Lake burn unit
(PR 1.0.7; Appendix A).

Under Alternative B and C, the same amount of plantation red pine (708 acres) would be commercially thinned. Of these acres, about 516 acres of plantation conifer would be considered for variable density thinning harvest. This harvest method improves the natural appearance of the stand, leaves existing diversity in place, and creates gaps in tree crowns through which light may penetrate to the ground.

The 708 acres of thinning also count towards hazardous fuel reduction. The amount of acres proposed for commercial thinning totals about 1 percent of the entire project area (all ownerships) or about 3 percent of NFS lands in the project area. The proposed thinning would move from Condition Class from III towards Condition Class II in the DMP LE (see Hazardous Fuels 3.7). This positive direction contributes to desired conditions for vegetation characteristics; fuel composition, and other associated disturbances. Thinning in red pine plantations would prevent the build-up of hazardous fuels, decrease the continuity between hazardous fuel sources, and reduce the potential for catastrophic wildfire.

No Action Alternative

Transportation/Travel Management – Lack of transportation management would likely result in custodial-level maintenance of forest system roads (for example, road wash outs, grading, brushing). Forest system roads open to HLVs could deteriorate to a point where they would no longer provide access to HLVs. Funding/staffing could limit maintenance to connecting routes that provide access to private and non-Forest lands (Forest Plan D-TS-5, pg 2-47) and serve as an interface with county roads. (Forest Plan, D-TS-4, pg.2-47).

Under Alternative A, lack of road management activities would not likely adversely affect TES species; however, with no forest road closure or decommissioning, road density and habitat fragmentation would continue. From an aquatic or soils resource perspective, roads dead ending in wetlands would remain and no soil reclamation would occur. In addition, ten year maintenance costs are highest under the No Action Alternative (Table 2-4).

No temporary roads would be reopened or constructed for forest management activities. This would contribute to less fragmentation of the landscape which would benefit certain TES and RFSS species and other native plant communities.

Vegetation Management – From a traditional resource and land use perspective, the No Action Alternative does the best job of maintaining the number and acreage of larger mature/older upland forest patches and best addresses traditional land use concerns. Threatened and endangered species (gray wolf, lynx) and RFSS (goshawk, red-shouldered hawk, black-backed woodpecker, and other migratory birds) would benefit as would other wildlife such as black bear.

With fewer acres of young forest created through regeneration harvest, long standing Tribal concerns about clearcutting would be addressed. Sugar maple trees, a traditional resource, would not be harvested. However, regeneration harvest methods benefit some traditional resource plant and animal species. Deer, grouse, and other game species are commonly found at forest edges and in young forest vegetation. Even-aged regeneration methods create openings for fruiting shrubs and trees to take hold.

Past harvest methods have created even-aged vegetation communities in northern hardwoods (sugar maple, mixed northern hardwoods, oak). Selection harvests are a key means of redeveloping characteristics of multi-age vegetation communities (tree groupings of various ages, heights, and small gaps) from these even-aged communities. Under the No Action, over the next 5-10 years, forest stands would progress toward multi-age vegetation communities through successional processes and small forest openings would be created through natural events such as storms.

No thinning in red pine plantations would maintain the plantation appearance and allow the build-up of hazardous fuels. The risk of wildfire would increase.

Under the No Action, prescribed fire would not be applied to the Woodtick Fields or Goose Lake Trail areas to improve wildlife habitat conditions in natural origin pine stands. Over the next 10 years, shrubs would encroach into open meadows and replace desirable wildlife habitat.

Alternative B

Transportation/Travel Management – Closing or decommissioning roads is a concern to LLBO tribal members because they feel their access to traditional resources is being limited (PR 2.1.26). Forest Service recommendations for closing or decommissioning forest system roads are based on impacts to soil, aquatic, and wildlife resources. Leech Lake DRM has stated support for such road closures or decommissioning based on preserving water quality, wetlands, illegal dumping, and invasive species (PR 3.1.5). A summary of reasons for closing or decommissioning forest system roads is shown in Table 3-30.

All forest system road proposals were field checked and compared with traditional use polygons. In addition, Forest Service staff conducted a second multi-resource review of roads based on scoping comment letters (PR 4.0.2). Roads accessing stands typed as

sugar (hard) maple were checked for past or ongoing syrup collection and ability to access in early spring (PR 3.1.10a, PR 3.1.11). None of the proposed transportation management recommendations affect DNR-managed or Forest Service designated lake access points.

Vegetation Management – Vegetation management activities may effect some traditional resources. Habitat for wildlife would be improved through prescribed fire in the Woodtick Fields and Goose Lake Hunter Walking Trail areas; regeneration harvests would create young early successional forest habitat for deer and grouse. Larger older, mature forest patches would be maintained; these provide habitat for goshawk and red-shouldered hawk and other migratory birds. Table 2-4 summarizes these management activities. Lake access would not be affected.

Past harvest methods created even-aged vegetation communities in northern hardwoods (sugar maple, mixed northern hardwoods, oak). The proposed selection harvests would begin to create tree groups of differing heights and ages, that is multi-aged vegetation communities. About 861 acres in hardwood forest types (Vegetation, indicator #4) would be harvested; this includes 381 acres of sugar maple treated through selection (286 acres) and shelterwood with reserves harvests (95 acres).

Selection harvest methods (uneven-aged) maintain the stand's age and, in some cases, would be used to convert the stand from one forest type to another forest type. All proposed conversion activities, for example, shelterwood harvest of sugar maples, meet the overall goal of the Leech Lake Pine Collaborative to increase upland conifer in this area.

Alternative C

Transportation management is identical to Alternative B.

Vegetation management activities may effect some traditional resources. Habitat for wildlife would be improved through prescribed fire in the Woodtick Fields and Goose Lake Hunter Walking Trail areas; regeneration harvests would create young early successional forest habitat for deer and grouse. Larger older, mature forest patches would be maintained; these provide habitat for goshawk and red-shouldered hawk and other migratory birds. Table 2-4 summarizes these management activities. Lake access would not be affected.

Past harvest methods created even-aged vegetation communities in northern hardwoods (sugar maple, mixed northern hardwoods, oak). The proposed selection harvests would begin to create tree groups of differing heights and ages, that is multi-aged vegetation communities. About 541 acres in hardwood forest types (Vegetation, indicator #4) would be harvested—all sugar maple selection harvest acres were deferred.

Shelterwood with reserves harvests (95 acres) in sugar maple forest type remain because these contribute to Vegetation indicator #2, *conversion to upland conifer*, and contribute to Leech Lake Pine Collaborative objectives to reestablish white pine on the landscape (see Appendix A). Selection harvest methods (uneven-aged) maintain the stand's age and, in some cases, would be used to convert the stand from one forest type to another forest type. All proposed conversion activities, for example, shelter wood harvest of sugar maples, meet the overall goal of the Leech Lake Pine Collaborative to increase upland conifer in this area.

Clearcut harvests yield young forest which deer and grouse seem to prefer; thus, hunting opportunities may be enhanced in and near these areas. Alternative C would increase young forest by 880 treated acres. (Table 2-4)

Cumulative Effects

Road systems on public lands often evolved from traditional routes that followed the most accessible path. Forest Service roads followed many of these routes and incorporated them into the present day system of inventoried roads. Forest Service general road maintenance budgets and staff have declined. This has resulted in road closures and decommissioning. This trend of declining budgets and staffing is likely to continue.

Road closure and decommissioning remains an ongoing access issue that the Forest Service and LLBO are consulting on. The Forest Service has and will continue to provide DRM staff with reasons for forest road closure such as preserving water quality/wetlands, illegal dumping, and NNIS. Future road closures would consider the context of the road within the forest setting as related to traditional resources. The Forest will continue to annually update and publish the MVUM.

There are no vegetation related cumulative effects in the Onigum area because no commercial timber harvests have occurred in the past 10 years. In other areas of the project, commercial timber harvests have occurred using even-aged and selection harvests and row thinning in red pine plantations. The proposed activities in SLL2 EA would begin to create tree groups of differing heights and ages, that is multi-aged vegetation communities. Proposed activities in red pine plantations favor variable density thinning to create more a natural appearance when possible. Future vegetation management activities will continue to restore the conifer component in this project area.

3.9 Environmental Justice

Executive Order 12898 requiring Federal Actions to address environmental justice in minority populations and low-income populations was approved on February 11, 1994.

The responsible official must consider demographic, geographic, economic, and human health risk factors when conducting and documenting an environmental analysis.

Under Executive Order Number 12898–*Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations*, when low-income or minority populations of the affected area or the county are greater than twice the state percentage for low-income or minority populations, an assessment must be conducted. In Minnesota, twice the state percentage is 15.8 percent for low-income and 21.0 percent for minority populations (US Census 2000, PR 4.0.7). The project area lies within Cass County. Percentages for the county are 13.6 percent for low-income and 13.5 percent for minority populations. Both are less than twice the state percentages; consequently a detailed analysis was not conducted (Table 3-31).

Table 3-31. Summary showing percentages of State, Cass County, and Leech Lake Reservation low-income and minority populations.

	State of Minnesota	Cass County	Leech Lake Reservation*
Total Population	4,919,479	27,150	10,205
Low-Income or Below Poverty Level (2000)			
Individuals - numbers	380,476	3,649	2,168 (1999)
Percent of total	7.9 %	13.6 %	21.2 %
Minority Population (2000)			
Number	519,195	3,660	4,850
Percent of total	10.5 %	13.5 %	47.5 %

However, according to information contained in Indians, Indian Tribes, and State Government, (January 2007), Leech Lake Reservation has a population of 10,205 of which 4,850 (47.5%) are Native American. The (1999) estimate of individuals in poverty status is 2,168 or 21.2% of the reservation population. Census data for 2010 has not been released to date; therefore, no update was made to the information.

The Project is partially within the LLBO Reservation. The minority population in the vicinity of the Project is predominately Ojibwe Indian. The Onigum LIC and Kego-Smokey Point LIC are the closest Native American communities associated with the Project. This EA incorporates an analysis of issues, concerns, and effects that may be specific to environmental justice in the following ways:

We scoped Ojibwe tribal communities through news releases, letters, emails, and we met with the Onigum and Kego-Smokey Point LICs (Chapter 1.7 Public Involvement and PR 3.0.4, PR 3.1.2, PR 3.1.3, PR 3.1.6, PR 3.1.11). We met with the Leech Lake DRM (Chapter 1.7 Public Involvement and PR 3.0.1, PR 3.0.3b, PR 3.1.5), we requested comments from LL DRM (PR 3.1.7, PR 3.1.8, PR 3.1.9), and received LL DRM comments (PR 3.1.12) which we included in Appendix C, letter 15 (PR 2.1.26).

The generalized effects of management activities are considered in the EA, Chapter 3.8, Tribal Interests; specific information is considered privileged under Federal law. All forest management alternatives and activities (1) incorporate tribal cultural resources, values, needs, interests, and expectations and (2) maintain, protect, or improve habitat for threatened, endangered, or sensitive species (EA, section 1.2.2, section 1.4).

The Forest Archaeologist followed 106 Consultation process with Leech Lake THPO concerning archaeological and traditional cultural property surveys (in SLL2 Project File: Privileged Information).

The proposed activities are consistent with activities that have been taking place on the National Forest for decades and their environmental effects are predictable. The activities proposed would not result in demographic changes such as displacement of minorities, geographic changes such as land use, or economic hardship such as an increase in taxes. The action alternatives would not have negative effects on public health and may have beneficial effects such as increased opportunities for wildlife or berries. None of the alternatives would impose a hardship on minorities, low-income people, or local communities and would not produce hazardous waste or conditions that might adversely effect local populations.

There are no direct, indirect, or cumulative effects associated with environmental justice.

3.10 Economics

The National Environmental Policy Act regulations 40 CFR 1508.8(b) require that all analyses consider economic factors. Forest Service Manual 1970.6 provides nonbinding guidance as to the scope of economic analysis. It states "the responsible line officer determines the scope, appropriate level, and complexity of economic and social evaluations to meet overall objectives and policy." NEPA does not require a quantitative, monetary analysis of noncommodity resources.

According to NFMA (16 USC 1604 (g)), management prescriptions that involve vegetative manipulation of tree cover will not be chosen primarily because they will give the greatest dollar return or the greatest output of timber, although these factors shall be considered.

This document is tiered to the FEIS (2004) and FEIS (2004) Appendix J, Response to Public Comments, pages 426-450. An economic analysis was included in the FEIS for the Forest.

Quick Silver Analysis

The Quick Silver Forestry Investment Analysis Program was used to evaluate commercial timber harvest and related projects. The program allows for a relative

comparison of the alternatives. The program incorporates the projected revenue from stumpage as well as costs associated with sale preparation, sale administration, site preparation, reforestation, and other activities. Other than stumpage, there are no requirements to monetize nonmarket benefits and a lack of widely accepted standards for doing so. The project record contains detailed information about this economic analysis.

The results generated with the Quick Silver program for all proposed actions (except transportation) are shown in Table 3-32. These numbers reflect the benefits and costs associated with timber harvest, reforestation, and habitat improvement.

Table 3-32. Summary of economic factors for all activities (except transportation) over an eight year period.

Factor	No Action	Alternative B	Alternative C
Estimated volume of timber harvested (CCF)	0	27,803	26,486
Present Value of timber harvested	0	$616,484	$601,516
Present Value Costs of associated sale preparation, administration, reforestation activities	0	-$781,114	-$750,449
Present Net Value	0	-$164,630	-$148,933
Benefit/Cost Ratio	NA	0.79	0.80

Under Alternative A, none of the dollar cost or benefits associated with the action alternatives are found in the No Action alternative, therefore there is no economic analysis. It is known that there are costs (and benefits) associated with not actively managing the land, e.g., fire protection, but these are not part of this economic analysis. There are no economic benefits to local workers from jobs created by treatments, e.g. logging, tree planting.

Alternative B has a lower benefit/cost ratio compared to Alternative C. Alternative C cuts fewer acres and increases the amount of clearcutting which reflects in a higher benefit cost ratio. Both alternatives will bring economic benefits to local workers created by the harvest treatments.

When comparing sale preparation, sale administration and reforestation activities against the value of the timber, both alternatives display a negative Present Net Value. Alternative C has a higher benefit/cost ratio due to less acres being treated and increased clearcutting requiring less reforestation activities. Both alternatives are relatively similar and benefit/cost ratio is negligible.

It must be recognized that there are many non-monetary benefits associated with these projects including ecosystem restoration, providing traditional gathering resources, and improved wildlife habitats.

Alternatives B and C implement portions of the Forest Plan and incrementally contribute to the economic factors listed in the analysis in the EIS. Alternative A does not

implement the economic factors for the EIS and does not incrementally add monetary values to the local economy.

Timber Volumes

It is recognized that wood products industry plays an important role in our local economies with regard to providing jobs, sources of income, and sustaining mills. This was discussed in the Forest Plan (FEIS, section 3.9) and still holds true today. Because of the regional nature of the wood products supply and demand, the time to prep and sell sales, and the length of timber sale contracts, it is difficult to analyze the effects of a specific project on the local economy in terms of jobs and the effects on local mills. However, Table 3-33 provides some context in terms of the volume offered and sold, volume harvested, and uncut volume under contract for the Chippewa National Forest.

Table 3-33. Timber target, volume offered and sold, volume harvested, and uncut volume under contract, and acres offered by Fiscal Year (FY)

	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Timber target	27,000 MBF	28,900 MBF	37,163 MBF	37,095 MBF	37,110 MBF
Volume offered & sold[1]	27,184 MBF	28,929 MBF	37,557 MBF	35,497 MBF	35,414 MBF
Volume harvested	26.8 MMBF	20.6 MMBF	21.4 MMBF	19.6 MMBF	25.6 MMBF
Uncut volume under contract	43.2 MMBF	53.1 MMBF	68.8 MMBF	84.7 MMBF	94.5 MMBF
from Draft FY 2010 Monitoring and Evaluation Report, Chippewa National Forest					

The volume sold in FY 2009 was a little over 35,000 MBF and is comparable to the volume sold in FY 2008. The volume harvested declined from FY 2005 to FY 2008 and then increased in FY 2009, but it is still less than that harvested in FY 2005. The uncut volume under contract has steadily increased since FY 2005 and at the end of FY 2009 was more than double that for FY 2005.

In response to industries' request for more wood on the market, the forest is expecting to increase the sell to about 43,000-45,000 MBF in the next few years. This project and others the forest is currently working on will contribute to that volume. It may take a year or more before the harvest treatments planned are prepared for sale and finally offered. Realistically, the resulting sales will be part of the FY2011, FY2012 or out year timber sale programs.

Payment to the Counties

The Federal Government makes payments to states to cover some of the cost of local government services on tax-exempt National Forest System lands. The states pass those payments on to the counties in which national forests are located. Payments in Lieu of Taxes (PILT) payments are calculated and made by the Department of the Interior,

Bureau of Land Management (Table 3-34). These payments are appropriated annually by Congress based on available funding and formulas that take into account the population in the affected counties, the number of acres of Federal land in those counties, and other payments received by the counties based on federal land payments.

Payments are also made to states amounting to 25 percent of gross receipts from activities on national forests, such as timber sales, mining, special uses and recreation. Congress passed the Secure Rural Schools and Community Self-Determination Act (SRS) in 2000, which allowed counties to choose a level payment based on the high-three year average of 25 percent payments, or to continue to receive 25 percent of the current year's receipts. In October 2008 the SRS was amended and reauthorized under P.L. 110-343 which allowed the counties to choose a transition payment through fiscal year 2011 or a payment based upon a seven year rolling average of the 25 percent payments. All three counties have elected to receive their payments as shares of the state transition payment through FY 2011 and have formed Resource Advisory Committees (RACs) to identify proposed projects for the Title II portion of their payments. (Table 3-35)

Table 3-34. Payments to counties for 2009.

FY 2008		25 Percent Fund (SRS share of state payment)	Payment in Lieu of Taxes (PILT)	Grand total
County	Acres	Total	Total	Total
Beltrami	64,722	$149,119	$116,625	$265,744
Cass	290,696	$548,886	$351,449	$900,335
Itasca	311,123	$692,596	$381,964	$1,074,560
Total	666,541	$1,390,601	$850,038	$2,240,639

Table 3-35. Summary of total payments to counties from FY 2006 – FY 2009.

		FY 2009	FY 2008	FY 2007	FY 2006
County	Acres	Total	Total	Total	Total
Beltrami	64,722	265,744	$281,334	$130,322	$123,881
Cass	290,696	900,335	$922,201	$754,937	$754,284
Itasca	311,123	1,074,560	$1,116,367	$811,411	$811,197
Total	666,541	2,240,639	$2,319,902	$1,696,670	$1,689,362

Road and Trail Management

The costs associated with forest system road decommissioning, closure, and opening are displayed in Table 3-36. The costs associated with Alternative B reflect the costs of implementation and deferred maintenance, over 10 years. Alternative B, over 10-years would result in about $10,000 cost savings.

Table 3-36. Summary of Alternative B or C showing costs associated with decommissioning, closure, and opening forest system roads.

Costs	Miles	Implementation Cost	Deferred Maintenance Costs	Cost Savings
Open to one or more uses	18.4	$25,000	$30,000	$5,000
Close to one or more uses	10.6	$10,000	$10,000	$0
Decommission	8.8	$15,000	$20,000	$5,000

The cost tables have built in some assumptions for minimum maintenance and defined costs:

- Brushing and mowing cost of $250/mi once every 5 years
- Grading cost of $100/mi 2-3 times per year
- Spot gravelling costs $1,500/mi once per year
- Road surfacing costs $6,000/mi plus spot gravel, brushing, and grading twice per year
- Closure or decommission cost $500 minimum/site
- Emergency road maintenance is expected

Under Alternative A there would be no changes to the transportation system. No roads would be closed and no temporary roads would be constructed.

3.11 Other Disclosures

In the context of all applicable laws, Action Alternatives being considered for the Project are deemed to present minimal to no change from No Action (baseline) conditions for Air Quality, Cultural Resources, and Recreation. Absent any reasonably foreseeable direct or indirect effects, cumulative effects analysis is not required by law.

3.11.1 Grant-In-Aid ATV Trail Proposal

One of the purposes of the SLL2 Project is to manage roads in the Chippewa National Forest (CNF) road system and propose changes in the uses of these roads. A local ATV group is sponsoring a Grant-In-Aid ATV trail proposal within the SLL2 project area. The ATV group is following the trail designation process required by the State of Minnesota. A description of the process is found at: http://www.dnr.state.mn.us/grants/recreation/gia_atv.html.

Once the sponsor works through the State's required GIA process, the Walker District Ranger will be asked to sign an agreement that supports and allows this designation, associated uses, and maintenance on Forest Service roads. The GIA trail proposal is in this section of the EA for this reason. Public comments were received during scoping

(Appendix C). These comments will be used to inform the District Ranger of any related issues.

The sections of the proposed route crossing NFS lands are part of the Scoping documents. The GIA Trail map may be accessed at: http://www.fs.usda.gov. Proposed GIA trail sections are on Forest system roads where ATV use is currently an approved activity. There would not be any changes in road management to accommodate the GIA proposal. The GIA proposal primarily follows GIA snowmobile routes on the same roads. The portion of the GIA ATV trail that crosses the CNF can be described as follows:

The proposed GIA starts near Hackensack, and comes onto the Chippewa National Forest at the Cub Lake Road (FR 3776) where it crosses the Woodtick Trail (FR 2107) onto FR 2687.

FR 2687 turns into FR 2687C past Diamond Lake spur and turns into FR 3793A as it passes to the west of Hovde Lake.

FR 3793A turns into FR 3790B as it turns east and then turns into FR 3790A for a stretch going east. The route then turns south on FR 2110B and FR 2110 as it goes by Twin Lakes.

It then turns into FR 2108 as it heads back north.

The route turns east again on Chippewa C (FR 2312) until it runs into FR 2100. FR 2100 ends on County 5 and then the GIA proposal runs off the Chippewa National Forest, continuing to Longville.

3.11.2 NNIS

The CNF continues to work with ATV Clubs, NCT Association, private landowners, Tribal, State, County, and municipal governments to educate people about transport of invasives. A Forestwide NNIP EA is expected this year (SOPA 2011). The focus of NNIP management is eradication of high priority invasive plant populations and prevention of further spread. Direct, indirect, and cumulative effects analysis would be conducted under the Forestwide NNIP EA.

In the context of all applicable laws, the Action Alternatives being considered for the SLL2 Project are deemed to present minimal change from No Action (baseline) conditions. Since NNIP are a known problem, projects on NFS lands would continue to be designed to prevent their spread (Forest Plan G-WL-25). The Forest Service follows all applicable laws, including the Forest Plan O-WS-1, 3, 5, D-WL-1, G-TS-13, D-ID-2 (pgs 2-12, 2-24, 2-49, 2-18) and tiering to the National NNIS Strategy and R9 NNIS

Framework. These strategies are very comprehensive and are incorporated by reference into the SLL2 EA.

Invasive species are widely recognized as one of the primary threats to achieving the goals of managing lands for outstanding outdoor recreation opportunities, abundant wildlife, clean water and sustainable harvest of forest products. (FY2009 M&E, pg 54)

The desired condition of native species dominating the landscape is valid and appropriate in that most people would agree that invasive species are a problem and reducing their numbers is desirable (Appendix C). Forest Plan objectives of using integrated pest management to eliminate new invasive species while limiting the spread of widespread invasives are realistic and achievable. At this point the CNF does not have enough of a baseline to establish if progress is being made in achieving these objectives, even in a qualitative way. More data would be needed to paint an accurate picture of the current distribution and abundance of invasive species in order to articulate quantifiable objectives. (FY2009 M&E, pg 54)

The Forest maintains a list of exotic plant species and has established priorities for detection and management around particularly aggressive species, buckthorn, garlic mustard, spotted knapweed, leafy spurge, and purple loosestrife. These aggressive species out-compete native species and many times are less valuable to wildlife species. Invasive plants along roadways can be spread by vehicle traffic that transport seeds further along the roadway, or to other areas. Mowing and other road maintenance functions contribute to the spread of invasive plants, but can also be effective means to control the spread. This can be accomplished by mowing before flowering of the plants occurs.

Over the very long-term, past actions influenced the composition and distribution of NNIP in the cumulative effects analysis area. For example, development of a transportation system (i.e., roads and early logging railroads) provided corridors for the introduction and spread of nonnative invasive species on all ownerships across the analysis area. Cumulatively, these past actions influence the present composition and distribution of invasive plants.

Ground disturbing activities (timber harvest, minerals extraction, motorized use) have occurred on NFS, state, and county administered lands and on other ownerships over the last 10 years. Weed infestations have been found in old slash piles, gravel pits, along old roads, and in log landings.

There would continue to be ground disturbing activities on NFS lands and on other ownerships periodically in the future. Future harvest on private land is unknown and difficult to predict; it is expected to be similar to the past. Harvest activities would likely create disturbed upland habitat that could serve as new sites for NNIP. Since NNIP are a

known problem, projects on NFS lands would continue to be designed to prevent their spread. The Forest Service follows all applicable laws, including the Forest Plan O-WS-1, 3, 5, D-WL-1, G-TS-13, D-ID-2 (pgs 2-12, 2-24, 2-49, 2-18) and tiering to the National NNIS Strategy and R9 NNIS Framework. These strategies are very comprehensive and are incorporated by reference into the SLL2 EA. More information is found on the Forest Service's website.

NNIP would continue to spread in the analysis area under all alternatives as a result of present and reasonably foreseeable actions on NFS and non-NFS lands; although Alternative A would spread them the least since it has no new ground disturbing activities. Alternatives B and C would add small incremental amounts to the past areas of activities, where NNIP are likely to become established. They would continue to be concentrated in developed areas (e.g., roadsides, gravel pits). There are no known future road projects within the analysis area other than the construction of temporary roads to access timber stands.

Ongoing land uses in the analysis area, such as recreation and timber harvest on NFS and other ownership lands would contribute to the spread of many NNIP. The cumulative effects of the proposed project on NNIP spread could actually be minor because of contractural design features intended to minimize NNIP spread, ongoing NNIP education, and eradication efforts on the CNF.

The OHV Decision (2007) determined beneficial effects in reducing the threat of spreading nonnative invasive species through road closures. Road obliteration and closure would help to isolate known sites and reduce the risk of transporting NNIP to other locations (see Aquatics 3.2.3). These transportation management activities would have a beneficial affect in controlling the spread of nonnative and invasive species and help to make future eradication efforts more effective.

Invasives inventories on state, county, and tribal ownerships have been mapped to various levels and abatement efforts vary. Cass County manages private ownerships along county roads; however, no information is available about infestations on privately owned land. Cass County works cooperatively with township and private organizations to manage noxious weed infestations with chemical, mechanical, or biological controls. The county and the state periodically treat purple loosestrife infestations using primarily biological control methods and mow roadsides.

3.11.3 Cultural Resources

The National Historic Preservation Act establishes a requirement for consideration of potential impacts to historic properties. Field surveys were completed in the spring of 2011. Stated results of the surveys require concurrence from the Minnesota SHPO and LLBO THPO. In the event a cultural resource site is located in or adjacent to a proposed

harvest unit or temporary road, the proposed activity would be dropped or the area of activity would be relocated to avoid any effects.

Information concerning the locations and nature of cultural resource sites is protected from public disclosure by the National Historic Preservation Act, the Archeological Resources Protection Act, and is exempt from information requests under the Freedom of Information Act.

3.11.4 Recreation and Scenic Resources

Under the all of the alternatives custodial management of recreation and scenic resources would continue.

There are no developed campgrounds in SLL2 project area. There are about 13 dispersed sites managed by the Forest Service; these include primitive camping areas and lake accesses. Other public recreation sites exist managed by Cass County and the MDNR. None of these are affected by any of the Action Alternatives.

Other than previously discussed NCT and Goose Lake Hunter Walking Trail, there are Chippewa C trail and GIA snowmobile trail. Specific to this project are the North Country Trail Association's Timber Harvesting Policy guidelines (2003) mitigation measures that will be applied to stands in the vicinity of the NCT. The transportation / travel management and vegetation Action Alternatives would not affect these recreation resources. Forest settings in terms of the Recreation Opportunity Spectrum and recreational motor vehicle access are disclosed in the Forest Plan, Appendix A, pg A-36.

Moderate to high Scenic Integrity Objectives (SIO) classes are shown on Forest Plan map, Figure SC-1, pg 2-46. Management of scenic resources and within the project area would be coordinated with District resource staff prior to implementation of Action Alternatives. These areas generally include major travel routes such as State Highways, County Roads, and Forest System Roads. The moderate SIO is prevalent in the project area. The Action Alternatives would not affect scenic integrity objectives.

3.11.5 Air Quality

The 2004 FEIS air quality standards and guidelines were developed to be consistent with the Clean Air Act. Forest Plan Standard AQ-1 requires compliance with the Minnesota Smoke Management Plan when conducting prescribed burns. Air quality impacts measured on the CNF are dominated by sources outside the CNF. Northern Minnesota is currently meeting EPA standards for those air pollutants that have standards (M&E 2010).

The CPF is in a Class II Airshed, which allows some temporary air quality impairment. The Project area is currently subject to air pollutants from mobile sources such as

vehicles, snowmobiles, outboard motors, and chain saws as well as stationary sources such as wood processing plants located west of the CPF boundary and within the Forest boundary that produce emissions. They are directly regulated and monitored by the Minnesota Pollution Control Agency. These regulations require mills to maintain emissions at very low levels. Due to wind dispersion, pollutants from these sources typically do not reach high enough concentrations to result in degradation of sensitive resources.

There are no known air quality problems in the Project area. Air quality and visibility in the analysis area are good to excellent.

Dust is associated with use of roads and construction or maintenance activities. This impact would be short-term (usually just a few minutes each time) in a given location and seldom drift more than 100 feet, so effects are mainly to the roadside vegetation. Due to the low density of permanent residences in the project area, few people would be potentially affected by dust.

Chapter 4 List of Preparers, Contributors, and Others Consulted

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Bibliography

As Cited in EA

(Berger et al 2004)	Berger, Al, K.J. Puettmann, and G.E. Host. 2004. Harvesting impacts on soil and understory vegetation: The influence of season of harvest and within-site disturbance patterns on clearcut aspen stands in Minnesota. Can. J. For. Res. 34:2159-2168.
(Cass County 2003)	Cass County. 2003. Cass County Forest Resource Management Plan. Draft report. [cited 2011 Apr 14]. http://www.co.cass.mn.us/land/frm_plan.html.
(Dahlman and Rossman 2009)	Dahlman, Richard and Dick Rossman. 2009. Timber harvesting and Forest Management Guidelines on Public and Private Forest land in Minnesota: Monitoring for Implementation 2009. Minnesota Department of Natural Resources. St. Paul, MN. 44 pp.
(Dahlman 2008)	Dahlman, Richard. 2008. Timber Harvesting and Forest Management Guidelines on Public and Private Forest Land in Minnesota: Monitoring for Implementation 2004, 2005, 2006 Results compared to Baseline. Minnesota Dept. of Natural Resources. St. Paul, MN. pp.1, 19, 23-24, & 31
(Densmore 1979)	Densmore, Frances. 1979. Chippewa Customs. Minnesota Historical Society Press.
(GLWW 2011)	GLWW. 2011. Great Lakes Worm Watch. University of Minnesota, Natural Resources Research Institute. Duluth, MN. Cited on 3/23/2011. http://www.nrri.umn.edu/worms/default.htm.
(Grigal 2004)	Grigal, David F. 2004. An Update of Forest soils. A Technical Paper for a Generic Environmental Impact Statement on Timber Harvesting and Forest Management in Minnesota. Forestry/Soils Consulting. Roseville, MN. Unpublished report. 32 pp.
(Grigal and Bates 1992)	Grigal D.F. and P.C. Bates. 1992. Forest Soils: A technical paper for a Generic Environmental Impact Statement on Timber Harvesting and Forest Management in Minnesota. Jaakko Poyry Consulting, Inc. Tarrytown, NY. pp.42-43 & 56-57.
(Han et al. 2009)	Han, Sang-Kyun, Han-Sup Han, et al. 2009. Soil compaction associated with cut-to-length and whole-tree harvesting of a coniferous forest. Canadian Journal of Forest Research. Vol. 39: pp. 976-989.
(Kolka 2006)	Kolka, Randall. 2006. Email communication.
(Huffman et. al.1999)	Huffman, R.D., et al. 1999. “Effects of Residual Overstory on Aspen Development in Minnesota.” Canadian Journal of Forestry Resources 29:384-289
(McAvoy and Shirilla 2003)	McAvoy, Leo & Shirilla, Paul. 2003. American Indian Uses of National Forests: The Case of the Leech Lake Band of Ojibwe. Paul, University of Minnesota Research Project.
(MDNR 2009)	MDNR. February 2009. Final Chippewa Plains – Pine Moraines and Outwash Plains Subsection Forest Resource Management Plan. Minnesota Department of Natural Resources. [cited 2011 Apr 14]. http://www.dnr.state.mn.us/forestry/subsection/cp_pmop/plan.html.
(MDNR 2003)	MDNR. 2003. Field Guide to the Native Plant Communties of Minnesota: the Laurentian Mixed Forest Province. Ecological Land Classification Program, Minnesota County Biological Survey, and Natural Heritage and Nongame Research Program. Minnesota Dept. of Natural Resources. St. Paul, MN.

(MDNR 1993) MDNR, Natural Heritage Program. 1993. Minnesota native vegetation: A key to natural communities, version 1.5 Biological Report No. 20. Minnesota. 111p.

(Meeker, Elias, and Heim 1993) Meeker, James E., Elias, Joan E., & Heim, John A. 1993. Plants Used By the Great Lakes Ojibwa. Great Lakes Indian Fish and Wildlife Commission.

(MFRC 2005) Minnesota Forest Resources Council. 2005. Sustaining Minnesota Forest Resources:Voluntary Site Level Forest Management Guidelines for Landowners, Loggers and Resource Managers., St Paul MN. access @ www.frc.state.mn.us

(MNICS 2007) Minnesota Incident Command System. 2007. Minnesota Smoke Management Plan. prescribed fire/fuels working team. USDA, and others. 40p. (see PR 5.8)

(Morley 2011) Morley, David. 2011. Draft 5-yr Forest Plan Monitoring Report: Soils. USDA, Forest Service, Chippewa National Forest, Walker Ranger District. Walker, MN. Draft unpublished report.

(MPWC 2005) MPWC. 2005. The Montreal Process. Montreal Process Working Group. [cited 2011 Mar 22] Available from: http://www.rinya.maff.go.jp/mpci/home_e.html.

(NRCS 1997) USDA. 1997. Cass County Soil Survey. U.S. Dept. of Agriculture, Natural Resource Conservation Service and Forest Service; and Minnesota Agricultural Experiment Station. 300 pp.

(NWCG 2001) National Wildlife Coordination Group. 2001. Smoke management guide for prescribed and wildlland fire 2001 edition, compiled by Hardy, Colin C.; et al. PMS 420-2/NFES 1279. 226p. (see PR 5.8)

(Page-Dumroese, et al. 2006) Page-Dumroese, Deborah S. et al. 2006. Soil Physical Property Changes at the North American Long-Term Soil Productivity Study Sites: 1 and 5 Years after Compaction. Can. J. For. Res 36. pp.552-555.

(Powers et al. 2005) Powers, Robert F., D. Andrew Scott, et al. 2005. The North American long-term soil productivity experiment: Findings from the first decade of research. Forest Ecology and Management. Vol. 220: pp. 31-50.

(Shaddis 1997a) Shadis, David. 1997a. Chippewa National Forest's Landtypes. U.S. Dept. of Agriculture, Forest Service, Chippewa National Forest. Draft unpublished report. Cass Lake, MN. 24 pp.

(Shaddis 1997b) Shadis, David. 1997b. Chippewa National Forest Landtype Associations. U.S. Dept. of Agriculture, Forest Service, Chippewa National Forest. Draft unpublished report. Cass Lake, MN.

(Steber et al. 2007) Steber, Aaron, Ken Brooks, et al. 2007. Surface Compaction Estimates and Soil Sensitivity in Aspen Stands of the Great Lakes. Northern Journal of Applied Forestry. Vol. 4. No. 4. pp.276-281.

(Verry 2000) Verry, Elon S. 2000. Water Flow in Soils and Streams: Sustaining Hydrologic Function In Elon Verry, James W. Hornbeck, and C. Andrew Dolloff, editors. Riparian Management in Forests of the Continental Eastern United States. Washington (DC): Lewis Publishers. p. 99-124.

(US Census 2000) http://www.census.gov/ accessed 2011-04-29. (See PR 4.0.7)

(USDA 2010) USDA. April 21, 2010. Revised Universal Soil Loss Equation 2 – How RUSLE2 Computes Rill and Interill Erosion. United States Department of Agriculture. Cited on 3/23/2011. http://www.ars.usda.gov/Research/docs.htm?docid=6014.

(USDA 2005) USDA. 2005. Terrestrial Ecological Unit Inventory Guide: Landscape and Land Unit Scales. General Technical Report WO-68. U.S. Dept. of Agriculture, Forest service. p.3

(USDA 1985) USDA. 1985. Ecological Classification System Handbook. Cass Lake (MN): USDA Forest Service Chippewa National Forest. Draft unpublished report.

USDA Forest Service references available from CNF website: http://www.fs.usda.gov/chippewa/

(M&E 2010)	FY 2009 Monitoring and Evaluation Report. 2010. Chippewa National Forest, Land and Resource Management Plan. 133 pages.
(M&E 2009)	FY 2008 Monitoring and Evaluation Report. 2009. Chippewa National Forest, Land and Resource Management Plan.
(SOPA 2011)	Chippewa National Forest Quarterly, Schedule of Proposed Actions
(Forest Plan 2004)	Chippewa National Forest Land and Resource Management Plan.
(FEIS 2004)	Final Environmental Impact Statement for Forest Plan Revision
(Amendment 1)	Chippewa National Forest Land and Resource Management Plan. 2007. Amendment 1 Guideline G-ORV-1.
(SIR 2007)	Supplemental Information Report to the Chippewa National Forest FEIS for Forest Plan Revision and the 2004 Chippewa National Forest Land and Resource Management Plan.
(2007 OHV Decision)	Decision Notice, Off Highway Vehicle Road Travel Access Project, Chippewa National Forest, 28 pages.

Glossary

Source: Forest Plan Revision Glossary-1 Final EIS, Chippewa & Superior National Forests[abbreviated]

Access	The opportunity to approach, enter, and make use of public or private land.
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. See 3.7 Hazardous Fuels.
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, DMP LE Uplands use 0-9 years, 10-39 years, 40-79 years, 80-179 years, and 180+ years. See 3.1 Vegetation, Table 3-7.
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 nonindustrial wood in the allowable sale quantity.
All-Season Roads	Roads constructed for year-round use and normally aggregate surfaced, with use only restricted during normal spring load restrictions. These are typically OML 3, 4, and 5 roads, and are suitable for passenger car travel.
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 OHVs. (State of Minnesota Off-highway Vehicle Regulations 2003-04)
Aquatic Ecosystem	Aquatic ecosystems are 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.
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 nonmonetary 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. See Minnesota Forest Resources Council handbook or MFRC 2005.

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).
Biological Assessment (BA)	Information prepared by, or under the direction of, a Federal agency to determine whether a proposed action is likely to: (1)adversely affect listed species or designated critical habitat; (2) jeopardize the continued existence of species that are proposed for listing; or (3) adversely modify proposed critical habitat. The outcome of this biological assessment determines whether formal consultation or a conference is necessary.
Biological Evaluation (BE)	It is Forest Service policy to review all Forest Service planned, funded, executed, or permitted programs and activities for possible effect on endangered, threatened, proposed or sensitive species. A Biological Evaluation is a means for conducting the review and documenting the findings.
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.
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.
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.
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. See 3.2 Transportation / Travel Management.
Clearcutting	Removal of all or almost all trees in the stand in a single cutting.
Clearcutting with Reserves	A variation of clearcutting where varying numbers of trees are not harvested to attain goals other than regeneration.
Closure (road)	Closures typically consist of berms, downed woody debris, boulders, or a combination thereof. Closing forest system roads would involve placing barriers at the entrance; however, foot travel would not be affected.
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 (CWD)	Stumps and fallen trunks and limbs of more than six-inch diameter at the large end (MFRC Guide).
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.
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.
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.
Consultation	(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 onHistoric Preservation (ACHP), Indian tribes, and local governments, may also be invited to consult.
Coppice with Reserves	A coppice harvest would result in the production of new stems through sprouting from the stump or suckering from the roots of a tree, following its harvest. This prescription would remove all merchantable stems with the exception of reserve trees (9-12 per acre) to serve as GTR, a conifer seed source or future snags. This type of harvest would produce a fully exposed microclimate for the development of a new age class. This method often creates a two-aged stand.
Cost Efficiency	The usefulness of specified inputs (costs) to produce specified outputs (benefits). In measuring cost-efficiency, some outputs (such as environmental,economic, or social impact) are not assigned monetary values but are achieved at specified levels in a least cost manner.

Cover Type (Forest Cover Type)	Stands of particular vegetation type that are composed of similar species.
Crown	The part of a tree or woody plant bearing live branches and foliage.
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).
Cultural Resources	A building, site, structure, object, or historical district that possesses historical significance (see also heritage resources).
Decommission (road)	Treatments to decommission a road, at a minimum, consist of making the road impassible to motorized vehicles, removing fills and drainage control structures, and stabilizing exposed soils. Decommissioning forest system roads would involve placing barriers at the entrance; however, foot travel would not be affected.
Decisionmaker	In the use of Federal land management, the person authorized to make land management decisions.
Desired Condition	Description of land and resource conditions if all long-term goals are achieved.
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.
Direct Effects	Results of an action occurring when and where that action takes place. Direct effects occur on NFS lands.
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 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 (soil)	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).
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).
Duff	Soil layer consisting of partly and well decomposed plant organic matter; includes the humus layer. Most often this is a surface 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.
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 Landtype (ELT) Groups & Landtype (LT) Phase Groups (CPF only)	Mapping units of the Terrestrial Ecological Classification System. Changes in the developing System include a new LT layer. The LTs were developed at a broader scale above the ELT level.
Ecosystem	A community of living plants, animals, and other organisms interacting with each other and with their physical environment.
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 (USFWS) applied to any species that is in danger of extinction throughout all or a significant portion of its range.
Environmental Analysis	The process associated with preparing documents such as environmental assessments 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.
Environmental Justice (EJ)	The fair treatment and meaningful involvement of all people in the development, implementation, and enforcement of environmental laws regardless of race, color, national origin, or income.
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.
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, coppice, shelterwood, or seed-tree harvest methods produce even-aged stands.
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 (MFRC Guide).
Fine Filter	The concept of managing at the site level, for example, managing individual species through individual conservation measures.

	Individual nests, colonies, and habitats are emphasized.
Fine Fuels	Fuels that are less than one-quarter inch in diameter such as grass, leaves, pine needles, and some kinds of slash which when dry ignite readily and are consumed.
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.
Floodplain	Lowland and relatively flat areas joining inland waters, including floodprone areas of islands. The minimum area included is that subject to a 1 percent (100-year recurrence) or greater chance of flooding in any given year.
Flora	The plant life of an area.
Forb	Any herbaceous plant other than grass or grass-like plants.
Foreground	A term used in managing visual resources or scenery. It refers to part of the scene or landscape that is nearest to the viewer, generally ¼ mile away.
Forest Road (FR###)	A forest road under the jurisdiction of the Forest Service. Total mileages of forest roads are used for reporting to Congress. These roads are synonymous with the term National Forest System road. See RAP (see Road Analysis Process report, PR 1.0.8)
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 tomicro-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.
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 Inventory Assessment (FIA)	Data collected to monitor the change in absolute abundance, growth and merchantability.
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 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.
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.
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.
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.
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 (Riparian Task Team Report).
Geographical Information Systems (GIS)	Computerized method used for inventory and analysis, which can overlay large volumes of spatial data to identify how features interrelate.
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.
Ground Fire	A fire that burns along the forest floor and does not affect trees with thick bark or high crowns.
Group Selection Harvest	A cutting method in which trees are removed periodically in small groups. Thissilvicultural treatment results in small openings that form mosaics of age-class groups and leads to the formation of an uneven-aged stand.
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.
Hazard tree	Trees that have an imminent chance of failure and that could fall where public use is concentrated.
Heritage Resources	The remains of sites, structures, or objects used by people in the past; this can be historical or prehistoric (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.
Indicator	In effects analysis, a way for measuring effects from management alternatives on a particular resource or issue.
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
Integrity	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.
Interdisciplinary Team (IDT)	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.
Intermediate Harvest	Prior to final harvest, removal of some trees to enhance the growth, quality, vigor, and composition of the stand after establishment. Thinning is considered an intermediate harvest.
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.
Issue	A subject or question of wide-spread public or internal discussion or interest regarding management of National Forest System land.t
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 (LE)	Landscape Ecosystems are the land and vegetation systems that occur naturally on the landscape. Vegetation objectives are based on LEs. Differences between the existing condition and the desired condition for any given LE are the basis for the Purpose and Need for vegetation management. This is a change from the 1986 Plan where

	vegetation objectives were based on Management Areas. The description and objectives of each LE are found in Chapter 2 of the 2004 Forest Plan.
Landtype	An ecological map unit which is a subdivision of landtype associations or groupings of landtype phases based on similarities in soils, landform, rock type, geomorphic process, and plant associations.
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.
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 Rotation	The time needed from regeneration of a crop of trees through to harvestable timber. Long rotation trees are defined as harvestable after 100 years and include species such as oak, maple, red and white pine.
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.
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.
Management Area (MA)	Management Areas are portions of the landscape with similar management objectives and prescriptions. Management Area directions provide the “rules and tools” for meeting Forest Plan objectives. Look in the 2004 Forest Plan, chapter 3, to find MA descriptions and directions for each identified resource.
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.
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.
Median household income	The value in an ordered set of household income values below and above which there is an equal number of values. Half of the households in the set earn more and half earn less than the median value.
Mineral Soil	Soil that consists mainly of inorganic material, such as weathered rock, rather than organic matter.
Mitigation	Action taken for the purpose of eliminating, reducing, or minimizing negative impacts of management activities on the environment.
Mixed Stand	A stand consisting of two or more tree species.
MMBF	Million board feet (see board foot).
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.
Monitoring	A systematic process of collecting information to evaluate changes in actions, conditions, and relationships over time and space relative to a predetermined standard or expected norm.
Monitoring and Evaluation	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. See CNF *FY2009 Monitoring & Evaluation Report* 2010 cited as M&E 2010.
Mosaic	Areas with a variety of plant communities over a landscape, such as areas with trees and areas without trees occurring over a landscape.
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 (NFS)	All of the management units, national forests and national grasslands, that the USDA Forest Service manages.
National Forest System Road (FSR)	Classified forest roads under Forest Service jurisdiction being wholly or partly, or adjacent to, and serving the NFS and necessary for the protection, administration, and use of the NFS and the use and development of its resources.
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.
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 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 shrublayer vegetation. Depending upon eco-type, natural openings can vary in size from less than one acre to hundreds or thousands of acres.
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 5 feet or more in width; 50 feet of the known locations of any perennial stream less than 5 feet wide or any intermittent stream less than 5 feet wide, but more than 3 feet wide.
Neotropical migratory birds	Species that breed mainly in the temperate region of North America and winter from Central Mexico to South America.
No Action (Alternative)	The most likely condition expected to exist if the current management practices continue unchanged. The analysis of this alternative is required for Federal actions under NEPA.
Nonindigenous 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 NNIS).
Nonnative Invasive Species (NNIS)	Non-native species are any species that occupy an ecosystem outside its historical range. Invasive species are any nonnative 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 areaggressive and difficult to manage. NNIS differ from noxious weeds in that NNIS can be animals or plants, and they are

	strictly nonnative species.
Nutrient Cycling	Circulation or exchange of elements such as nitrogen and carbon between nonliving and living portions of the environment. Includes all mineral and nutrientcycles involving mammals and vegetation.
Objective	A concise, time-specific statement of measurable and planned results that respond to preestablished 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 identify quantities of items within the 15-year forest plan time frame. Objectives are action oriented and specifically describe measurable results.
OML or ML (roads)	Objective Maintenance Level. See 3.2 Transportation / Travel Management.
Obliteration (roads)	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 and stabilize it against soil loss.
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 (ATV), off-highway motorcycles, and off-road vehicles.
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).
Overmature tree or stand	A tree or even-aged stand that has attained full development, particularly in height, and is declining in vigor, health, and soundness.
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.
Partial Retention	A visual quality objective in which management activities may be evident but must remain subordinate to the characteristic landscape.
Patch Clearcutting	A variation of the clearcut with reserves method, in that patches or portions of the stand are cut with the clearcut method, while the remaining portion of the stand is left intact for harvest at another time.
Patch Size	A group of forest stands of similar aged forests that may be made up of different forest cover types.
Payments in Lieu of Taxes	Payments to local or state governments based on ownership of

(PILT)	federal land and not directly dependent upon production of outputs or receipt sharing. Specifically, they include payments made under the Payments in Lieu of Taxes Act of 1976.
Perennial Stream	A stream that maintains water in its channel throughout the year.
Prescribed 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.
Presettlement	The time period before European settlement, approximately mid to late 1800s.
Project	An organized effort to achieve an objective identified by location, activities, outputs, effects, and time period and responsibilities for execution.
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.
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 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.
Reforestation	The restocking of an area with forest trees, by either natural or artificial means. Activities may include site preparation, seeding or planting, release of seedlings or hardwood sprouts, animal control spraying and pathological pruning.
Regeneration	The renewal of a tree crop by either natural or artificial means (setting the stand age back to 0). The term is also used to refer to the young crop itself.
Regional Forester Sensitive Species (RFSS)	Those species of highest viability concern on the National Forests.
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.
Residual Stand	The trees remaining standing after an event such as harvesting.
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. (see Forest Health)
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 reestablishment and development of a plant cover by either natural or artificial means.
ROW	Right-of-way
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 landwater 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 (RMZ)	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 (system road), unclassified (user-developed), or temporary (constructed for Forest Management purposes at an OML1 level).
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.
Rotation	The number of years required to establish and grow timber crops, to a specified condition of maturity.
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.
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.
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 (SIO)	Scenic Integrity Objectives guide the amount, degree, intensity, and distribution of management activities needed to achieve desired scenic conditions.
Scoping	The ongoing process to determine public opinion, receive comments and suggestions, and determine issues during the environmental analysis process. It may involve public meetings, telephone conversations, or letters.
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.
Shelterwood with Reserves in Conifer Type	In stands containing large residual conifer, the objective would be to regenerate the stand to long rotation conifer. These stands would be harvested leaving about 40 BA (square feet of basal area per acre) in residual trees, in order to provide enough shade to produce a new age class in a moderated microclimate for regeneration of white pine and white spruce. Leave trees would be large diameter pine.
Shelterwood with Reserves in Hardwood Type	Stands of this type are generally composed of red oak, aspen, sugar maple, and basswood with a small number of large diameter trees scattered throughout the stand. These stands would be harvested leaving about 40 BA in residual trees, in order to provide enough shade to produce a new age class in a moderated microclimate. Leave trees should favor white pine, red oak, basswood, and red pine.
Short Rotation	The time needs from regeneration of a crop of trees through to harvestable timber. Short rotation trees are defined as harvestable within 40-45 years. Short rotation trees species include balsam fir and aspen.
Short-lived tree species	Tree species, including aspen, paper birch, jack pine.
Silvicultural Prescriptions or Treatment	Activities prescribed for tending, harvesting, and reestablishing 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 5 inches in diameter); pole timber (5 to 7 inches in diameter); sawtimber (greater than 7 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 otherevent. Slash includes unused logs, uprooted stumps, broken or uprooted stems, branches, and bark.
Snag	A standing dead tree.
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 Productivity	Soil potential to produce biomass that depends on the interaction of

	physical, chemical and climatic characteristics of the site.
Sovereignty	For Indian tribes that have Federal recognition, this is 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. A tribe retains the inherent right to self-government and no state may impose its laws on a reservation.
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 nonnativevertebrate 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 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 nonforest 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.
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 Fire	A fire that burns surface litter, debris, and small vegetation.
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 NFS road inventory and are decommissioned after use.
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).
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.
Total Maximum Daily Load (TMDL)	The maximum amount of a pollutant that a water body can receive and still meet water quality standards.
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 Stand Improvement (TSI)	Actions to improve growing conditions for trees in a stand by elimination or suppression of the less desirable vegetation. Methods include thinning, pruning, prescribed fire, and release cutting.
Traditional Resources	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.
Treaty Rights	Rights related to hunting, gathering, and fishing retained by Native American Tribal members.
Tribe	Term used to designate a federally recognized group of American Indians and their governing body. Tribes may comprise more than one band.
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 (U-roads)	Roads on NFS land that are not managed as part of the forest transportation system, such as unplanned roads, abandoned travelways, and offroad 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.
Underburn	A prescribed fire that consumes surface fuels but not trees and shrubs.
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 selection and group selection harvest.
Unsuitable Lands	National Forest System land that is not managed for timber production, because of policy, ecology, technology, silviculture, or economics.
Visual Resource	A part of the landscape important forest scenic quality. It may include a composite of terrain, geologic features, or vegetation.
Watershed	The area that drains water into a lake or stream. Fifth and sixth-field watersheds are delineated using the USGS Hydrologic Unit Code (HUC).
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.
Wildfire	Any wildland fire not designated as a prescribed fire within an approved prescription.
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.
Woody Debris	Dead, natural woody material greater than 10 cm in diameter and longer than 3 feet, 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.