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Forest Service

Eastern Region

Environmental Assessment Shingobee Vegetation Management Project

Chippewa National Forest
Walker Ranger District

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Abbreviations & Acronyms

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)
CCF	100 cubic feet, a volume measurement
CEQ	Council on Environmental Quality
CNF or Forest	Chippewa National Forest
CFR	Code of Federal Regulations
CSE	Common stand exam
DFC	Desired Future Condition (Forest Plan)
DNR	Minnesota Department of Natural Resources
DP LE	Dry Pine Landscape Ecosystem (Forest Plan, pg. 2-59)
DMPO LE	Dry Mesic Pine/Oak Landscape Ecosystem (Forest Plan, pg. 2-65)
DRM	Division of Resource Management (Leech Lake Band of Ojibwe)
EA	Environmental Assessment
EO	Executive Order
ESA	Endangered Species Act
FEIS	Final Environmental Impact Statement 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
FRS	Forest Road System
FSH	Forest Service Handbook
FSM	Forest Service Manual
GS	Group selection harvest
GTR	Green tree retention
HLV	Highway licensed vehicle
HUC	Hydrologic Unit Code
LE	Lanscape Ecosystem
LIC	Local Indian Community
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)
LTP	Land Type Phase
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)*
NFMA	National Forest Management Act
NCT	North Country National Scenic Trail

NCTA	North Country Trail Association
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
OML	Operational Maintenance Level (rating of forest roads)
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
RAP	Roads Analysis Process
RFSS	Regional Forester Sensitive Species
RMZ	Riparian Management Zone
S&G	Standards and Guidelines (Forest Plan)
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)
USDA	United States Department of Agriculture
USFWS	US Fish and Wildlife Service
VDT	Variable density thinning

Chapter 1 Purpose and Need

1.1 Document Structure

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

Chapter 1 Purpose and Need: The section includes information on the history of the project proposal, the purpose of and need for the project, and the agency's proposal for achieving that purpose and need. This section also details how the Forest Service informed the public of the proposal and how the public responded.

Chapter 2 Alternatives: This section provides a more detailed description of the agency's proposed action as well as any alternative methods for achieving the stated purpose. Alternatives would be developed based on significant issues raised by the public and other agencies. This discussion also includes possible mitigation measures. Finally, this section provides a summary table of the environmental consequences associated with each alternative.

Chapter 3 Environmental Consequences: This section describes the environmental effects of implementing the proposed action. This analysis is organized by resource area, issues, affected environment, direct and indirect effects, and cumulative effects. Within each section, the affected environment is described first, followed by the effects of the No Action Alternative and Proposed Action Alternative. The No Action Alternative provides a baseline for evaluation and comparison to the action alternatives.

Chapter 4 Finding of No Significant Impact: This section provides information about the effect on the human environment of the proposed actions.

Chapter 5 Agencies and Persons Consulted: This section provides a list of preparers and agencies consulted during the development of the environmental assessment.

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

Additional documentation, including detailed analyses of project-area resources, may be found in the project planning record at the Walker Ranger District Office in Walker, MN or information may be electronically accessed from: http://www.fs.usda.gov/chippewa.

1.2 Background

The project area is in the west-southwest area of the Chippewa National Forest (CNF or Forest) and includes Oak Point and Stony Point on Leech Lake and the area west of Highway 371 in the vicinity of Walker, Minnesota. The Project encompasses all or portions of the following townships: T. 141 N. R. 30 W., T. 141 N. R. 31 W., T. 142 N. R.30 W., T. 142 N. R. 31 W., T. 143 N. R. 30 W., T. 143 N. R. 31 W., T. 144 N. R. 30 W. and T. 144 N. R. 31.W.

The project area encompasses approximately 47,300 acres. The Forest Service ownership is about 24,000 acres (43%). About half of the project area is within the boundary of the Leech Lake Band of Ojibwe Reservation. (Appendix A map)

1.2.1 Landscape Ecosystems (LE)

The project area includes six Landscape Ecosystems (LE): Boreal Hardwood-Conifer (BHC), Dry Mesic Pine (DMP), Dry Mesic Pine-Oak (DMPO), Dry Pine (DP), Mesic Northern Hardwoods (MNH), and Tamarack Swamp (TS). However, harvest activities are only proposed in the DMPO LE and DP LE which cover 62% and 12% of the project area, respectively. The other four LEs are either present as small slivers within the landscape or are present in the project area and have no proposed harvest activities. Therefore, these LEs are not analyzed in this assessment.

Fire was historically the common natural disturbance factor in the DMPO and DP LEs. A description of fire history is found in the FEIS (2004 Final Environmental Impact Statement, Forest Plan Revision) Volume II, Appendix G, pages G-5 and G-8.

Dry Mesic Pine Oak LE

The DMPO LE comprises the largest portion of the project area (62%). This Landscape 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. (FEIS, Appendix G 2004)

Dry Pine LE

The DP LE represents the second largest portion of the project area (12%). Historically the canopy was dominated by jack pine and red pine. Aspen, paper birch, white pine, oak, white spruce and balsam fir were also present. Mixed cohorts of all three pine species were common in the understory. Initially stands were even-aged, but became multi-aged as stands matured. Jack pine typically succeeds to red pine at approximately 80 years of age. One-third to one-half of the landscape was characterized as multi-aged, beyond 80 years. (FEIS, Appendix G 2004)

1.2.2 Areas of High Interest

The Chippewa National Forest as a whole is important to members of the Leech Lake Band of Ojibwe (LLBO). Areas of High Interest (Forest Plan, Figure TR-1, page 2-37) support specific vegetation, wildlife, and forest settings important to Tribal members (FEIS, section 3.9.2, page 3.9-26) and are under the same Forest Plan management direction as other areas of the Forest (Forest Plan, Tribal Interests and Heritage Resources, pages 2-35 through 2-39). These areas were identified by LLBO members as having a higher degree of interest than other areas within the Forest. (FEIS, section 3.9.2, page 3.9-26)

Areas of High Interest include Onigum/ Stony Point areas and the entire Oak Point Peninsula. The Oak Point Peninsula is not discussed as there are no management actions proposed in that area of the project (Appendix A).

Areas of High Interest within the Project and outside the Reservation boundary were not analyzed in detail due to no specific comment. Tribal interests in these areas are under the same Forest Plan management direction and protection as other areas of the Forest (Forest Plan, pages 2-35 through 2-39). These areas are often along lake and river shorelines and may support specific vegetation, wildlife, and forest settings that afford important cultural, spiritual, gathering, and historical meanings (FEIS, page 3.9-26). Management in these areas includes high scenic integrity, recreation, wildlife, and watershed standards and objectives described in the Forest Plan and in EA, section 1.2.3.

1.2.3 Management Area Forest Plan Direction

Table 1-1. Management Areas in Shingobee Vegetation Management Project

Management Area	Acres	Percent
General Forest- Longer Rotation	21,158	45
General Forest	14,884	32
Riparian Emphasis	5,883	12
Recreation Use in a Scenic Landscape	5,164	11
Unique Biologic, Aquatic, Geologic, or Historical Areas	132	<1
Total acres	47,221	

The 2004 Forest Plan provides Forest-wide desired conditions, objectives, standards, guidelines, and Management Area (MA) direction applicable to the project area. Management Areas within the project boundary are General Forest-Longer Rotation, General Forest, Riparian Emphasis, Recreation Use in Scenic Landscape, and Unique Biological, Aquatic, Geological, or Historical Areas. The following provides a brief summary of the management direction for each. (Table 1-1)

General Forest-Longer Rotation MA emphasizes land and resource conditions that provide a wide variety of goods, uses, and services. These include wood products, other commercial products, scenic quality, developed and dispersed recreation opportunities, and habitat for a diversity of terrestrial and aquatic wildlife and fish. This management area generally has longer rotations and more uneven-aged and partial cut harvests than General Forest MA. (Forest Plan, pages 3-9 through 3-12)

General Forest MA emphasis is similar to General Forest-Longer Rotation. Compared to the other MAs, the General Forest has the greatest amount of young forest. (Forest Plan, pages 3-5 through 3-8)

Riparian Emphasis MA. Riparian ecological functions are actively restored, protected, and enhanced in areas where ecosystem processes are sensitive to degradation. Restoration focuses on components of the ecosystem that are not functioning at or within the range of desired conditions. Those components that are functioning properly are protected. (Forest Plan, pages 3-29 through 3-31)

Recreation Use in a Scenic Landscape MA. These areas offer a natural-appearing forest setting with some facility and trail development and roads for recreation and provide wildlife habitat to enhance opportunities for watching wildlife. (Forest Plan, pages 3-13 through 3-15)

Unique Biologic, Aquatic, Geologic, or Historical Areas (UB) and Research Natural Areas MA (RNA) together, represent only a very small portion of the project area (less than 1%). None

of the UB management areas are suitable for timber management (Forest Plan, pages 3-23 through 3-28)

1.2.4 Overview of Forest Plan Consistency

To meet 2004 Forest Plan objectives, the Shingobee Vegetation Management Project interdisciplinary team developed the project proposal to meet direction, objectives, standards and guidelines of the Forest Plan for the project area. The activities were developed to move the project area toward Forest-wide Desired Conditions and Objectives, meet Forest-wide Standards and Guidelines, and move the project area towards the objectives for the Landscape Ecosystems.

1.3 Purpose and Need for Action

The purpose of the Shingobee Vegetation Management Project is to: 1) Move toward achieving Landscape Ecosystem objectives for vegetation composition and age class; 2) Move toward restoring conditions more representative of native vegetation communities; 3) Manage treatments in areas of interest to maintain or enhance traditional Tribal and community uses; 4) Provide timber products in a manner consistent with the Forest Plan; 5) Maintain and improve wildlife habitat; 6) Improve and protect watershed conditions; and 7) Maintain a range of recreational opportunities appropriate to rural and roaded natural settings.

A variety of resource management activities which directly address the purpose and need are proposed under Alternative B (Proposed Action). The purpose of the Project (bold text) is followed by a description of the need for action.

1. **Move toward achieving Landscape Ecosystem objectives for vegetation composition and age class** (Tables DPMO-l & 2, pg. 2-65; DP-l & 2, pg. 2-59).

   The existing vegetative conditions in Dry-mesic Pine Oak (DMPO) and Dry Pine (DP) Landscape Ecosystems (LE) are inconsistent with the objectives and desired conditions identified in the Forest Plan. Some of the greater inconsistencies are listed below, more minor differences also exist.

   - Increase or maintain acres of upland white pine, jack pine, and red pine forest types.
   - Decrease acres of upland aspen forest types.
   - Increase acres of young forest in the DMPO LE.

2. **Move toward restoring conditions more representative of native vegetation communities** (Forest Plan, Table DMPO-3, page 2-66; O-VG-7, page 2-22).

- Increase, decrease or maintain tree species diversity and structural diversity in forested stands.
- Foster native vegetative community development during harvest, site preparation, reforestation, and when conducting other stand improvement activities.

3. **Manage treatments in areas of interest to maintain or enhance traditional Tribal and community uses** (Forest Plan S-TR-3, S-TR-4, page 2-36; D-TR-1, D-TR-2, D-TR-3, O-SE-l, page 2-35).

   Conduct forest management activities to minimize impacts to the ability of Tribal members to hunt, fish, and gather plants and animals on NFS lands and, address the interests of local Indian communities when planning and implementing vegetation and other resource management activities.

   - Harvest treatments in Areas of High Interest

4. **Provide timber products in a manner consistent with the Forest Plan** (Forest Plan, 0-TM-1, page 2-19).

   Provide commercial wood for mills in northern Minnesota in an environmentally sustainable and acceptable manner to contribute to the social and economic sustainability and diversity of local communities

5. **Maintain and improve wildlife habitat** (Forest Plan, O-WL-l, O-WL-2, 0-WL-3, page 2-26).

   - Increase habitat opportunities, especially in riparian areas, for conifer-dependent forest birds by restoring white pine, spruce-fir, and red pine to the landscape.
   - Provide habitat for wildlife species that require larger tracts of mature upland forest habitat and interior forest by maintaining or increasing large, mature upland forest patches that best meet those requirements.
   - Increase diversity in selected wildlife openings through planting, seeding, or other activities.
   - Maintain and manage the hunter walking trails and continue grouse habitat management in these areas.

6. **Proactively manage for riparian values and watershed conditions**.

   - Promote long-lived tree species on near-bank and remainder riparian management zones. (Forest Plan, O-WS-3, O-WS-5, page 2-12)

- Maintain the integrity of the soil resource on activity sites within the project area. (Forest Plan, O-WS-lO, page 2-13)
- Contribute to identification/ reporting of newly found areas of nonnative invasive plant species. (Forest Plan, O-WL-38, O-WL-39, G-WL-25, page 2-33)

7. **Maintain a range of recreational opportunities appropriate to rural and roaded natural settings**.

   Manage recreation facilities and opportunities to provide a range of quality experiences (scenic views, hunting, angling, wildlife viewing).

   - Recreation activities/ opportunities continue to occur with little or no disruption when forest management activities are near or adjacent to public use areas and facilities (Forest Plan, D-REC-7, pg. 2-39).

1.4 Proposed Action

The Proposed Action resource management activities directly address the Project's Purpose and Need (P&N) as described in Section 1.3 through:

Vegetation Management

Conduct commercial harvest treatments on approximately 3,203 acres, to yield an estimated volume of 44,756 CCF. Harvest treatment methods include clearcutting/ coppice (1,741 acres), commercial thinning (946 acres), single tree cut (255 acres), and group selection (261 acres). Thirteen temporary road segments (totalling about two miles) may be constructed to access some of the harvest landings on NFS lands. (Appendix A)

Forest type conversions

Four stands would convert to a different forest type as a result of harvest and planting/seeding activities; aspen to white pine (14 acres); red pine to white pine (17 acres); mixed hardwoods to oak (39 acres).

Maintain or enhance gathering opportunities

Maintain species diversity in harvest areas; post-harvest activities include planting and seeding for diversity.

Wildlife improvement projects and associated partnership opportunities

Wildlife openings on about 16 acres would be maintained or enhanced through diversity planting, seeding, or other activities. The openings would be maintained in partnership with interested parties. Maintenance would be conducted by the Minnesota DNR or other

interested partners on National Forest Service lands. The focus of maintaining these openings is to provide habitat components for grouse, deer, and woodcock. These areas are also favored by hunters. Maintenance would be accomplished through mowing to reduce the encroachment of woody species into grassy areas. When encountered, fruiting shrubs would be left within the openings. A subset of the openings may be planted or seeded with native herbaceous plants.

Improve and protect watershed conditions

Riparian improvement activities (about 150 acres) promote diversity in species composition through planting/seeding and age class through uneven-aged harvest methods.

Maintain recreation facilities and opportunities to provide a range of quality experiences

Recreation activities/ opportunities continue to occur with little or no disruption when forest management activities are near or adjacent to public use areas and facilities (Forest Plan, D-REC-7, pg. 2-39).

1.5 Decision Framework

1.5.1 Decision to be Made

This environmental assessment discloses the consequences of the alternative actions; it is not a decision document. Based on the analysis documented in this EA, the Walker District Ranger will decide whether or not to proceed with the Proposed Action described in section 1.4 and under what conditions or modifications.

1.5.2 Related Documents Influencing the Scope of this EA

This environmental assessment is tiered to the 2004 Land and Resource Management Plan (Forest Plan) and 2004 Final Environmental Impact Statement Forest Plan Revision (FEIS), and is within the scope of the Record of Decision.

1.5.3 Applicable Regulatory Requirements and Required Coordination

The proposed Shingobee Vegetation Management Project must comply with several environmental laws to proceed; namely, the National Historic Preservation Act, Clean Air Act, National Environmental Policy Act, and National Forest Management Act. The Endangered Species Act (ESA) requires consultation with U.S. Fish and Wildlife Service to determine concurrence concerning listed threatened, endangered, and sensitive species affected by project activities. In addition, consultation is required with the Leech Lake Band

of Ojibwe Tribal Historic Preservation Office (THPO) and the Minnesota State Historic Preservation Office (SHPO).

This EA also complies with and addresses the following list of policies, laws, and regulations: Sensitive Species (Forest Service Manual 2670); Archaeological Resources Protection Act; Native American Graves Protection and Repatriation Act; Wetlands (Executive Order 11990); and Environmental Justice (Executive Order 12898).

1.6 Tribal Involvement

The Forest Service began prework on this project in 2012. We were contacted by the Oak Point LIC Chair on January 13, 2012, the purpose being to restate the LIC's opposition to cutting anything on Oak Point (PR 3.0.0, PR 3.0.0a). Project work resumed in 2014.

In February 2014, the Interdisciplinary Team met with the Leech Lake Division of Resource Management (DRM) at the Walker Office to talk about the project—before project scoping began (PR 3.0.1). Shapefiles showing compartment/ proposed stands/ and project boundary were shared with DRM (PR 3.0.1a). The District Ranger and ID team members met with the Onigum LIC on June 12, 2014, to scope the project (PR 3.0.2). In June 2014 recreation staff found hazardous trees in the Stony Point area. This new information was shared with DRM and ID team members (PR 3.0.2b). A scoping letter was sent to DRM on June 11, 2014 (PR 3.03) and response was received from DRM on September 4, 2014 (PR 3.0.7). The Forest Service responded to DRM on September 19, 2014 (PR 3.0.8).

The District Ranger and Public Service staff met with the Onigum LIC on March 10, 2015, to update the LIC on our analysis (PR 3.0.10). In addition, DRM requested the latest shapefiles and was given an update concerning hazardous tree work along the Stony Point Interpretive Trail (PR 3.0.11, PR 3.0.11a).

1.7 Public Involvement

The proposal was listed in the Schedule of Proposed Actions since July 2014, and has been posted on the Chippewa National Forest website, www.fs.fed.us/r9/forests/chippewa. Scoping was initiated by sending letters with details and maps of the Proposed Action to approximately 42 individuals, groups, and other agencies. A legal ad briefly explaining the Proposed Action and specifying a contact for further information was published in the paper of record, *The Pilot Independent*, on June 11, 2014. (PR 2.0.0, PR 2.0.0a)

The ID team members reviewed the comments from the public, other agencies, Leech Lake Band of Ojibwe DRM and Onigum LIC. In addition, ID team members reviewed internal Forest Service review comments. The ID team used these sources of information to

determine issues to address in this EA. All scoping input and Forest Service responses are in Appendix C.

1.8 Issues

The ID team reviewed scoping comments for key issues. Key issues are defined as issues that directly or indirectly are caused by implementing the proposed action. No key issues were identified. (Appendix C)

1.8.1 Other Issues

Other issues are not key to the decision to be made. These are secondary and dismissed issues. Reasons regarding their categorization may be found in Appendix C Response to Scoping Comments and the project record.

The ID team participated in a Climate Change Vulnerability Assessment in July 2014. The assessment covered projected changes in suitable habitat for tree species and adaptation strategies and approaches. The effect of forest management activities holds greater uncertainty due to multiple climate change scenarios. These changes will occur on a landscape scale and are beyond the scope of this project. However, efforts to promote healthy, resilent stands at the project-level during this entry may help to maintain diverse vegetation and species habitat in the future. (PR 1.2.0, PR 1.2.1, PR 1.2.2)

Secondary Issues

Secondary issues differ from key issues in that they were not used to formulate alternatives; yet resources which may be affected by the planned activities warrant some level of analysis and discussion. The following resource topics and secondary indicators are discussed in Chapter 3. Additionally, heritage resources and environmental justice are addressed in Chapter 3.

Vegetation

The creation of young forest (0-9 age class).

Tribal Interests

The effect of proposed harvest treatments on gathering opportunities; in particular, harvest treatments within the LLBO Reservation and Areas of High Interest.

Wildlife MIS and MIH

Findings of the Biological Evaluation (BE) and Biological Assessment (BA).

Threatened, Endangered, and Sensitive Species

Findings of the Biological Evaluation (BE) and Biological Assessment (BA).

Ruffed Grouse

Maintaining habitat for ruffed grouse.

Soils

Soil disturbance within a proposed treatment area or stand: potential risk for disturbance based on soil characteristics; limitations to proposed harvest; and site preparation activities.

Aquatics

Activities to maintain or improve HUC12 watersheds which cross the project area: percent young forest and open area; acres of forested riparian area.

Sensitive Plants

Findings of the Biological Evaluation (BE) for RFSS (Regional Forester Sensitive Species).

Nonnative Invasive Species (NNIS)

Potential to contribute to further spread of already present high priority invasive plant species; potential to contribute to further spread of already present exotic earthworms.

North Country National Scenic Trail (NCT)

Harvest activities adjacent to the North Country National Scenic Trail (NCT) travel way.

Hazardous Fuels

Acres of pine thinning.

Economics

Consideration of economic factors.

1.8.2 Dismissed Issues

These are concerns raised by the public that were not used to develop any new alternative. Refer to Appendix C – response to scoping comments for details.

- Impact to the North Country National Scenic Trail (Appendix C, 1-1). We reviewed the stands and analyzed as a secondary issue in the EA.
- Show an age class and patch size analysis of the hunter walking trail (Appendix C, 2-3). We reviewed the stands and changed the prescription to patch clearcut.
- Underutilized single tree and group selection harvests compared to what was predicted in Forest Plan modeling for implementation. … reduce the amount of clearcutting and coppice harvests (Appendix C, 2-2). We reviewed the alternative stands and 2013 Addendum (PR 7.1). The Forest is still below decade 2, 0-9 age class objectives in all LEs except Dry Pine. Regeneration harvests would help meet 0-9 Forest Plan Objectives for uplands.

Chapter 2 Alternatives

This chapter describes and compares the No Action (Alternative A) and Proposed Action (Alternative B) alternatives. The comparison format helps to more sharply define the differences and provide a clear basis of choice for the decisionmaker and the public.

2.1 Alternative Development

No key issues were identified from public comments; therefore, no additional action alternatives were developed. This EA describes the No Action (Alternative A) and the Proposed Action (Alternative B) alternatives, mitigation measures, and design features. Table 2-3, at the end of this chapter, compares the Proposed Action to the No Action alternative and shows how the Proposed Action alterative addresses the secondary issues. The interdisciplinary team reviewed scoping comments and responded to those comments in Appendix C. The alternative considered in detail incorporates applicable laws, regulations and policies that govern land use on national forests; pertinent Forest Plan standards and guidelines; and Voluntary Site-Level Forest Management Guidelines (MFRC 2005).

The decisionmaker will select the alternative for implementation based on analysis of potential environmental consequences and effectiveness of meeting the purpose and need and Forest Plan management direction.

The Alternative B map and stand lists are in Appendix A. The harvest stand list identifies location of the stand by vegetation name, acres, age, harvest, and post-harvest activities. The nonharvest stand list identifies riparian treatments and trail maintenance in three stands. The temporary road list identifies location, access, and length of each segment. Implementation of the proposed activities could begin as early as fall 2017, depending upon availability of adequate funding.

Acreages and miles shown for the proposed activities are approximations based on GIS (Geographical Information System) and other stand records in the Chippewa National Forest databases. Project data was locked for this analysis on December 2, 2012.

2.2 Alternatives

2.2.1 Alternative A – No Action Alternative

Under the No Action alternative, current management plans would continue to guide management of the project area. Under this alternative, no commercial harvest, planting, site preparation or release, no wildlife opening maintenance, nor any riparian restoration

would occur at this time. Natural processes such as forest succession would continue. Custodial maintenance activities of recreation facilities, trails, and roads would continue. Fire suppression activities on the Forest and in existing partnerships would continue. This alternative provides a baseline to compare the effects of the action alternative.

2.2.2 Alternative B – Proposed Action Alternative

Changes to the Scoped Proposed Action Alternative

About 131 acres were deferred due to cultural sensitivity, merchantability, access, and size. Thus, Alternative B harvest acres decreased from 3,203 acres as scoped in June 2014 (section 1.4), to 3,022 acres as analyzed in this EA (Table 2-1). The volume of harvest (CCF, hundred cubic feet) reported in the proposed action at scoping decreased due to removal of these stands (Table 2-1).

Patch clearcut (about 21 acres) while included in Alternative B harvest activities would use hand felling methods or potentially hydro-axing to create 0-9 age class in small pockets for grouse habitat. This is reported for clarification purposes.

The hazardous tree removal and trail maintenance in Compartment 24 Stand 17 were included in scoping. This activity has been and will continue to be maintenance of an existing trail and does not require NEPA. The ID team felt public disclosure was needed due to its unique biological conditions (Forest Plan, page 3-25). During the next five years recreation staff anticipates minimal maintenance and removal of one or two trees per year.

Table 2-1. Alternative B as analyzed in the EA, showing changes in harvest treatment acres and volume.

Harvest activities (acres)	Alternative B (as scoped)	Alternative B (as analyzed in the EA)	Change in acres
Clearcut/coppice/shelterwood/patch clearcut	1,741	1,663	-66
Single tree selection	255	237	-18
Group selection	261	176	-85
Thinning	946	946	0
Harvest treatment acres	3,203	3,022	-169
Harvest volume (CCF)	44,756	41,860	-1,696

Alternative B, as analyzed in the EA (Table 2-1), reflects these changes. A description of harvest and nonharvest activities follows.

Harvest Activities

Commercial Timber Harvest

The intent of commercial timber harvest is to provide timber products while moving toward LE objectives and addressing other Forest-wide desired conditions and objectives. Alternative B, regeneration harvest methods include clearcut with reserves, coppice with reserves, shelterwood establishment cut, and patch clearcut. Single tree and group selection harvest treatments would create small openings and uneven-aged stands on about 413 acres. Commercial thinning (946 acres) improves stand productivity and may improve or maintain within stand species diversity. Commercial harvest volume totals 41,860 CCF.

Alternative B harvest activities by current forest type are presented in (Table 2-2). Treatment acres are an estimate of what would actually be implemented because of further refinement of unit boundaries and operable areas during implementation.

Table 2-2. Summary of Alternative B Harvest Treatments by Forest Type.

Forest Type	Harvest Type	Number of stands	Acres
Even-Aged Harvest			
Aspen	Coppice with Reserves	30	772
Paper birch	Coppice with Reserves	12	214
		Acres/ Volume	986/ 18,436
Aspen	Clearcut with Reserves	2	93
Balsam fir	Clearcut with Reserves	1	8
Red pine	Clearcut with Reserves	1	10
Mixed upland hardwoods	Clearcut with Reserves	3	49
Northern red oak	Clearcut with Reserves	7	140
White oak / red oak	Clearcut with Reserves	17	335
		Acres/ Volume	635/ 11,580
Paper Birch	Patch Clearcut	1	16
Aspen	Patch Clearcut	1	5
		Acres/ Volume	21/ 126
Paper Birch	Shelterwood Establishment	1	21
		Acres/ Volume	21/ 210
Uneven-Aged Harvest			
Hard maple / basswood	Individual Tree Selection	4	72
Sugar maple / yellow birch	Individual Tree Selection	5	165
		Acres/ Volume	237/ 2,370
Hard maple / basswood	Group Selection	1	24
Paper birch	Group Selection	2	28

Forest Type	Harvest Type	Number of stands	Acres
Sugar maple / yellow birch	Group Selection	3	99
White oak / red oak	Group Selection	1	25
		Acres/ Volume	176/ 1,660
Commercial Thin Harvest			
Eastern white pine	Thinning	2	19
Other pine / hardwood	Thinning	7	184
Red pine	Thinning	37	732
White pine / red oak	Thinning	2	11
		Acres/ Volume	946/ 7,478

Harvest treatment that would result in a young stand is called an even-aged regeneration harvest (Table 2-2). Young (e.g. 0-9 years old) stands would be created 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. Alternative B would have approximately 1,663 acres of even-aged harvest.

Harvest treatments that result in an uneven-aged stand fall into either an intermediate harvest or uneven-aged regeneration harvest. Alternative B would have approximately 413 acres of group or single-tree selection harvest.

Under Alternative B about 946 acres of red and white pine plantations would be thinned to provide space for remaining trees to grow in size as well as for additional species to increase in size or area.

Detailed descriptions of the harvest types in Table 2-2 are found in EA, section 3.1.6 Regeneration Harvest Cutting Methods.

Vegetation Composition and Conversions

Alternative B moves toward achieving vegetation composition objectives to meet the Project's purpose and need by clearcutting about 93 acres of aspen and converting to white pine or a pine/ hardwood mix. Conversion would occur, through the use of either seeding from reserved conifer and hardwood trees, or planting at a rate of 1,000 seedlings per acre. (Table 3-2)

Planting, Seeding, and Natural Regeneration

Natural regeneration to aspen would occur on 777 of the 870 acres of aspen harvested, using a coppice with reserves or patch clearcut methods. The patch clearcuts along hunter

walking trails (HWT) would help maintain ruffed grouse habitat. Openings would be in the range of 3-5 acres.

Reforestation

Seedling establishment would use mechanical site preparation, planting, seeding, and natural regeneration with harvest.

Tending

Tending activities enhance survival, growth, vigor, and composition. Tending treatments include release, animal damage control (bud capping), and removal of lower limbs on pine trees.

Nonharvest Activities

Riparian Improvements

Riparian improvement activities are proposed on a portion of about 148 acres (Appendix A). A range of reforestation and harvest methods would maintain or enhance riparian health and function and meet a range of watershed and vegetation objectives of the Forest Plan. Activities include removal of single trees or small groups of trees to improve long-lived species and age class diversity; mechanical/ hand scarification around mature, cone-bearing white pine/ spruce; thinning to improve age class diversity and vigor of plantation red pine; and planting activities.

Wildlife Opening Maintenance

Wildlife openings would be maintained on about 16 acres through wildlife and botanical enhancement projects and associated partnership opportunities (Forest Plan, O-WL-1, O-WL-2, O-WL-3, page 2-26). 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 habitat components for grouse, deer, bear and woodcock. These areas are also favored by hunters. Maintenance would be accomplished through mowing open grassy areas and hydroaxing to reduce encroachment of woody species or to reopen a grown-in opening. When encountered, fruiting shrubs and mast trees such as oak would be left within the openings.

Temporary Road Construction

New roads built to access land for resource management will be primarily OML 1 or temporary and not intended for public motorized use. About 2 miles (in 13 temporary road

segments) would be constructed to access some of the proposed harvest units (Appendix A). Temporary roads will be closed to motorized use when harvest operations are not active and decommissioned after their use is completed (Forest Plan, O-TS-3, page 2-47). If a section of temporary road was found to be actively eroding, then that section of temporary road would be seeded to promote revegetation (Forest Plan, S-TS-3, page 2-49).

Hazardous Fuels Reduction

Hazardous fuels reduction would be achieved through mechanical treatment in red pine plantations (732 acres). Commercial thinning of conifer is a mechanical fuels treatment and typically used in conifer plantations to reduce the continuity of tree crowns (Forest Plan, O-ID-2, O-ID-4, page 2-18).

2.3 Mitigation Measures

Mitigation measures are in Appendix B. The table identifies mitigation measures and design features specific to each treatment stand. Incorporated by reference are applicable Forest Plan standards and guidelines (S & G) and Voluntary Site-Level Forest Management Guidelines (MFRC 2007). Mitigation measures will be incorporated into Timber Sale Contracts as provisions to be implemented during harvest, post-harvest, and temporary road construction or reopening/ closure activities (this includes provisions for NNIS control).

2.4 Comparison of Alternatives

2.4.1 Summary of Outputs and Activities

Table 2-3. Summary of outputs and activities.

Activities		Alternative A	Alternative B
Estimated Harvest Volume (CCF)		0	
Commercial Timber Harvest	Coppice with Reserves	0	986
	Clearcut with reserves	0	635
	Patch clearcut	0	21
	Shelterwood Establishment Cut	0	21
	Individual tree selection	0	237
	Group selection	0	176
	Commercial thinning	0	946
	Total	0	3,022
Acres 0-9 age class created		0	1,663
Acres conversion from aspen to white pine or pine/hardwood mix		0	93
Acres Planting/ Seeding		0	114
Acres Site Prep		0	853
Acres Release		0	114
Miles temporary road construction		0	2.0
Acres maintained wildlife openings		0	16
Acres riparian improvements		0	148

Activities	Alternative A	Alternative B
Acres hazardous fuel reduction	0	732

2.4.2 Comparison of Alternatives

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

Table 2-4. Comparison of effects by alternative.

Issue Indicator	Alternative A	Alternative B
Vegetation		
Acres of 0-9 age class created	0	1,663
Acres conversion from aspen to white pine or pine/hardwood mix	0	93
Acres affecting Forest Plan vegetation objectives		
Increase red pine Forest Type in		
Dry Pine LE	Remains @ 16%	Increases from 16% to 19%
Dry-mesic Pine Oak LE	Remains @ 11%	Remains @ 11%
Decrease aspen Forest Type		
Dry Pine LE	Remains @ 50%	Decreases from 50% to 47%
Dry-mesic Pine Oak LE	Remains @ 47%	Remains @ 47%
Miles of temporary road construction	0	2.0
Tribal Interests		
Harvest within the LLBO Reservation and Area of High Interest (number stands/acres)	0	11/ 101
Clearcut	0	1/ 15
Group & single tree selection cut	0	3/ 47
Thinning	0	7/ 39
Harvest within the LLBO Reservation (number of stands/acres)	0	21/ 365
Temporary road segments within LLBO Reservation (number of segments/ miles)	0	6/ 1.2
Wildlife MIS/MIH; TES; Ruffed Grouse		
Effect shown in BA on Canada Lynx	No Effect	No Effect
Effect shown in BA on Northern Long-eared bat	No Effect	Likely to Adveresly Affect
Effect shown in BA on Gray wolf	No Effect	Not Likely to Adversely Affect
Impact on Northern Goshawk	No Impact	May Impact
Impact on Bald Eagle	No Impact	May Impact
Impact on Red-Shoulder Hawk	No Impact	May Impact
Impact on Little Brown Bat	No Impact	May Impact
Impact on Large Upland Mature Patches (>300 acres)	8 large patches maintained	8 large patches maintained; 409 acres less than Alt. A
Impact on Ruffed Grouse	Habitat is reduced due to forest aging	Young forest habitat is increased
Soils		
Compaction Risk (slight)	0	926
Compaction Risk (moderate)	0	2,116
Compaction Risk (severe)	0	72
Erosion Risk (slight)	0	2,482
Erosion Risk (moderate)	0	621

2.4 Comparison of Alternatives

Issue Indicator	Alternative A	Alternative B
Erosion Risk (severe)	0	9
Nutrient Loss Risk (slight)	0	952
Nutrient Loss Risk (moderate)	0	1,256
Nutrient Loss Risk (severe)	0	933
Aquatics		
Number of watersheds with >60% young forest or open area as a result of Forest Service regeneration treatments.	0	0
Acres of riparian area treatment (includes harvest and nonharvest stands, Appendix A)	0	148
Sensitive Plants		
Impact on 7 RFSS (sensitive) species	May impact but would not contribute to a trend to federal listing or loss of viability to population or species	May impact but would not contribute to a trend to federal listing or loss of viability to population or species
Impact on 12 RFSS (sensitive) species	No impact	May impact but would not contribute to a trend to federal listing or loss of viability to population or species
Impact on remaining 13 RFSS (sensitive) species	No impact	No impact
Nonnative Invasive Species		
Potential to contribute to further spread of already present high priority species	Be less in the short-term because it would not increase ground disturbance	See section 3.9
Potential to contribute to further spread of already present exotic earthworms	Continue at current levels because of fewer disturbances	Likelihood for earthworm expansion is greater in those areas where the proposed project activities would create more ground disturbance
North Country National Scenic Trail (NCT)		
Harvest type		
Regeneration harvest (number of stands/ acres)	0	5/ 160
Intermediate harvest (number of stands/ acres)	0	1/ 21
Thins (number of stands/ acres)	0	4/ 275
Hazardous Fuels		
Acres of hazardous fuels reduction through thinning	0	732
Economics		
Present Net Value	0	$115,406
B/C ratio	NA	1.09

Chapter 3 Environmental Consequences

3.1 Vegetation

3.1.1 Issues

No key issues related to vegetation were identified during the scoping process. The following analysis discloses the type of harvests that affect the amount of 0-9 age class in the Dry Mesic Pine / Oak Landscape Ecosystem (DMPO) and Dry Pine Landscape Ecosystem (DP)

Indicator: Acres of 0-9 age class.

3.1.2 Affected Environment

The existing vegetation is the result of landforms, soils, plant succession, land ownership and disturbances that have occurred throughout time. 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. 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 lesser roles.

The Dry Mesic Pine Oak Landscape Ecosystem comprises the largest portion of the project area (62%). This landscape 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.

The Dry Pine Landscape Ecosystem represents the second largest portion of the project area (12%). Historically the canopy was dominated by jack pine and red pine. Aspen, paper birch, white pine, oak, white spruce, and balsam fir were also present. Mixed cohorts of all three pine species were common in the understory. Initially stands were even-aged, but became multi-aged as stands matured. Jack pine succeeds to red pine at approximately 80 years of age. One-third to one-half of the landscape was characterized as multi-aged, beyond 80 years.

Dry Mesic Pine LE and Tamarack Swamp LE are also present in smaller proportions and are not analyzed in detail. Historical vegetation conditions for these LEs are described in Appendix G of the Final Environmental Impact Statement (FEIS 2004).

Table 3-1. Existing (2014) forest types by age class within the Shingobee project area.

Forest Type	0-9 years	10-39 years	40-79 years	80-179 years	180+years	Total Acres	Forested Acres (Percent)
Aspen	670	4,775	2,044	841	0	8,330	44
Balsam fir	0	19	51	102	0	172	1
Black Spruce	0	40	5	36	0	81	<1
Jack pine	22	108	41	103	0	274	1
Lowland Hardwoods	12	8	45	109	0	174	1
Mixed Northern hardwoods	162	447	2,001	2,442	0	5,052	27
Northern red oak	0	50	187	158	0	395	2
Paper birch	145	181	396	361	0	1,083	6
Red pine	8	554	705	483	0	1,750	9
Tamarack	0	14	5	72	0	91	<1
White Cedar	0	13	171	550	0	734	4
White pine	19	199	196	448	0	862	5
White spruce	0	49	17	0	0	66	<1
Total acres	1,038	6,457	5,864	5,705	0	19,064	100
Percent	5	34	31	30	0	100	

Forested stands are shown in Table 3-1; upland brush, lowland brush, and openings are included in the project file. The project area is made up primarily of aspen (44%) and mixed northern hardwoods (27%).

Aspen forest types (e.g, quaking aspen, bigtooth aspen, and balsam poplar) dominate the project area, covering approximately 44% of the area. Mixed northern hardwoods make up another 27% of the Federal lands. Red pine, paper birch, northern white cedar, and white pine are present in lesser amounts. Black spruce, balsam fir, jack pine, lowland hardwoods, tamarack and white spruce forest types each make up 1% of the project area.

The immature aspen age class (10-39 years) forms the largest portion of the aspen resource, totaling 57% of the aspen acreage and 25% of the total NFS lands within the project area. Mature (40-79) and over mature (80+) aspen stands contribute about 25% and 10%, respectively, of the aspen acreage. For all forest types combined, the 80-179 year age class makes up 30% of the forested acres in the project area. The young (0-9) age class makes up 5%.

Management Objectives

In addition to Management Area direction included in Chapter 1, the vegetation analysis focuses on LE objectives as described in the Forest Plan (DMPO LE, pages 2-65-67 and DP LE, pages 2-59-61).

3.1.3 Direct and Indirect Effects

Scope of Analysis

Spatial Framework

The spatial boundary used to evaluate direct and indirect vegetation effects are NFS lands within the Shingobee Project area as described in Chapter 1, Section 1.2. This boundary is appropriate to analyze vegetation effects because it contains similar, local vegetative conditions and, more importantly, objectives are quantified in the Forest Plan according to LE boundaries. The direct and indirect effects analysis looks at the effects of each alternative on NFS lands.

Timeframe

The timeframe for direct and indirect effects considers activities that have occurred in the past 10 years and are 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. Conditions resulting from this current decision (e.g., age class distribution, vegetation composition) would be in effect until the next entry.

Effects by Alternative

Table 3-2. Acres of proposed harvest and reforestation treatments by alternative.

Harvest Method	Alternative A	Alternative B	Site prep	Planting	Stocking surveys	Release	ADC Bud capping
Even-aged (0-9 age class) harvest methods							
Coppice with Reserves (4102)	0	986	0	0	986	0	0
Clearcut with Reserves (4117)	0	635	635	93	635	93	93
Patch Clearcut (4115)	0	21	21	0	0	0	0
Shelterwood Establishment Cut (4131)	0	21	21	21	21	21	21

Harvest Method	Alternative A	Alternative B	Site prep	Planting	Stocking surveys	Release	ADC Bud capping
Uneven-aged (multi-age class) harvest methods							
Individual Tree Selection (4151)	0	237	0	0	237	0	0
Group Selection (4152)	0	176	176	0	176	0	0
Commercial thinning							
Commercial Thinning (4220)	0	946	0	0	0	0	0
Total acres	0	3,022	853	114	2,076	114	114

Acres of young forest (0-9 age class)

Alternative A

No harvest activities would occur under this alternative (Table 3-2). 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. 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. 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

Alternative B would result in the largest amount of regeneration harvest (0-9 age class) through implementation of coppice with reserves, clearcut with reserves, patch clearcut and shelterwood establishment cut methods (Table 3-2). A total of 1,663 acres would be regenerated through even-aged management. Natural regeneration to aspen would occur on 777 of the 870 acres of aspen harvested, using a coppice with reserves or patch clearcut methods. Reserve trees (6 to 12 per acre) would be retained in all stands for the next rotation period, but would cause no change to the overall forest type of the stand. Another 542 acres would be harvested using the clearcut with reserves method in forest types other than aspen. Mechanical site prep would take place following harvest, to expose mineral soil. Natural regeneration is expected from on-site seed sources, but may include follow-up planting if regeneration is not successful.

3.1.4 Cumulative Effects

Scope of Analysis

Spatial Framework

The spatial boundary used to evaluate cumulative vegetation effects is the Shingobee Project area as described in Chapter 1, Section 1.2. This boundary is appropriate to analyze vegetation effects because it contains similar, local vegetative conditions and, more importantly, objectives are quantified in the Forest Plan according to LE boundaries. Past, present, and reasonably foreseeable effects for each alternative across all public lands are assessed. No data is available (except aerial photographs) for private ownerships regarding existing vegetation, harvest history, or harvest plans.

Timeframe

The cumulative analysis timeframe is the same as direct and indirect effects. Information about projects beyond 5 years into the future is not readily available from any agency. Therefore, the 5-year future timeframe seems to be the most reasonably foreseeable one.

Past, Present and Future Activities

Forest Service

Harvest activities from the 2007 Steamboat decision would occur in this project area under both alternatives. Even-aged regeneration cuts on Forest Service lands within the past 10 years (1,038 acres) are reflected in the 0-9 year age class table for the Shingobee Project Area (Table 3-1). These recent harvests were primarily coppice with reserve cuts in aspen and paper birch stands. There have been a small amount of forest type conversions. Approximately 1,038 acres have been regenerated across all forest types within the past 10 years.

There are currently no active Forest Service timber sales in the Shingobee area.

State of Minnesota and Cass County

There are approximately 5,784 acres of State and County lands (combined) in the Shingobee project area. During the past 10 years there have been 441 acres of county land and 153 acres of state land harvested. Over half of the State and County lands are typed as aspen. Coppice with reserves has been the primary even-aged harvest method in aspen stands, and clearcutting with reserves has been the primary even-aged harvest method in balsam fir, jack pine, and black spruce forest types. Paper birch and tamarack stands have been regenerated using seed tree harvests. Commercial thinnings in red pine and white spruce stands are

common. These trends are expected to continue into the near future. State and County lands are managed separately from NFS administered lands; there are no cumulative effects.

Private Lands

There is a mosaic of other private lands scattered throughout the project area. Information on these lands is limited and difficult to obtain. For the purposes of analysis, the following assumptions were made. Agricultural lands were developed decades ago and would not be expected to change substantially in the near future. There may be a decline in some farming activity resulting in some lands slowly reverting to shrubs or forest. In contrast, there may be an increase in rural or recreational home sites. Based on patterns elsewhere, these residents would likely be interested in maintaining the aesthetic values of their properties. Harvesting on nonindustrial private lands and industrial lands would likely occur; however, the amount of planned harvest is unknown.

3.1.5 Comparison of how alternatives meet Purpose and Need

The following section discusses how the alternatives meet the Purpose and Need for vegetation composition and age class, and native vegetation communities (as described in Chapter 1, Section 1.3).

Data for Alternatives A and B reflect conditions in 2019, assuming it would take 5 years to accomplish proposed treatments from Alternative B. Since Forest Plan Decade 2 objectives apply from 2014-2023, conditions resulting from the alternatives are compared with Forest Plan, Decade 2 objectives for vegetation composition and age class in the DMPO and DP Landscape Ecosystems.

Vegetation composition objectives

Proposed management activities under Alternative B were designed to move vegetation composition in the DMPO and DP LEs toward Decade 2 objectives. Forest type conversions are summarized in Chapter 2, Table 2-4. Forest type conversions result from even-aged harvest, planting, and seeding.

Purpose and need objectives include:

- Increase or maintain acres of upland white pine, jack pine, and red pine forest types.
- Decrease acres of upland aspen forest types.

Table 3-3. Comparison of vegetation objectives and alternatives in the DMPO LE (Alternatives A and B reflect conditions in 2019).

Forest Type	CPF Existing Condition (2011) Forest-wide		Decade 2 (Forest Plan)	Existing Condition (2014) Shingobee Project Area		Alternative A (2019)		Alternative B (2019)	
UPLAND	Acres	%	%	Acres	%	Acres	%	Acres	%
Jack Pine	6,832	4%	11%	183	1	183	1	183	1
Red Pine	47,734	30%	33%	1608	11	1608	11	1592	11
White Pine	2,909	2%	2%	485	3	485	3	523	4
Spruce-fir	5,577	4%	4%	140	1	140	1	140	1
Oak	2,482	2%	2%	1589	11	1589	11	1628	11
Northern Hdwds	17,176	11%	11%	2972	20	2972	20	2933	20
Aspen	63,067	40%	30%	6812	47	6812	47	6812	47
Paper Birch	11,839	8%	7%	857	6	857	6	836	6
Total	157,616	100%	100%	14646	100%	14646	100%	14646	100%

Table 3-4. Comparison of Vegetation Objectives and Alternatives in the DP LE (Alternatives A and B reflect conditions in 2019).

Forest Type	CPF Existing Condition (2011)		Decade 2 (Forest Plan)	Existing Condition Shingobee Project Area (2014)		Alternative A (2019)		Alternative B (2019)	
UPLAND	Acres	%	%	Acres	%	Acres	%	Acres	%
Jack Pine	2,579	22	41	91	4	91	4	91	4
Red Pine	4,942	41	37	407	16	407	16	485	19
White Pine	221	2	2	89	4	89	4	103	4
Spruce-fir	123	1	2	73	3	73	3	73	3
Oak	504	3	3	229	9	229	9	229	9
Northern Hdwds	347	3	1	171	7	171	7	171	7
Aspen	2,670	22	12	1268	50	1268	50	1175	47
Paper Birch	533	4	2	191	8	191	8	191	8
Total	11,918	100	100	2518	100	2518	100	2518	100

Alternative A

No harvest activities would occur under this alternative in either the DMPO or DP LEs. 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.

Alternative B

Increase red pine

Under Alternative B the amount of red pine in the DP LE would increase by 78 acres. This increase in acres would equate to a 3% increase for the project area portion of the LE. Further conversions would be needed within the DP LE on a forestwide scale to reach the 37% decade 2 objectives.

The proposed harvests under Alternative B do not accomplish any conversions to increase red pine in the DMPO LE. There would be a small shift of 16 acres from red pine to white pine through a thinning harvest, but the red pine forest type would remain at 11% for the project area, compared to a forestwide decade 2 objective of 33%.

Increase white pine

Under Alternative B white pine would increase by 1% (about 38 acres) in the DMPO LE.

In the DP LE white pine would increase by 14 acres. This increase would not be large enough to change the related percentages associated with the decade 2 objective.

Decrease aspen

Under Alternative B aspen would decrease by 93 acres, which equates to a 3% reduction for the DP LE. Projecting this to a forestwide scale, the amount of aspen would be reduced by 1% for the LE and move slightly toward decade 2 objectives.

There would be no changes in DMPO LE aspen acres. Current percentages of aspen would be maintained.

Native Vegetation Community Objectives

Many stands across the project area consist of a primary species as well as other species components (for example, scattered white pine, red pine, balsam fir, white spruce, hardwoods). However, fire suppression, plantation establishment, and past management activities have shifted species composition and diversity, spatial patterns, and structure. For example, older red pine plantations are typically dominated by one species and are structurally simple, hazel occurs at higher densities than historically occurred, and release in conifer stands has primarily favored conifers.

Purpose and Need Objectives for native vegetation communities include:

- Increase, decrease or maintain tree species diversity and structural diversity in forested stands.
- Foster native vegetative community development during harvest, site preparation, reforestation, and when conducting other stand improvement activities.

Alternative A

Alternative A would not actively change stand conditions related to diversity. There are no proposed activities related to harvest, planting, seeding or tending activities. No active changes in vegetation would occur. Wind, insect and disease events may occur, causing changes in species, spatial arrangement of vegetation, and mortality. Natural and human caused fires may occur, but these would be suppressed, and result in limited effects.

Alternative B

Alternative B would provide more focus on species and structural diversity. Silvicultural prescriptions for harvest and reforestation would include direction for species to be deferred during harvest. Reserved species clumps of reserved trees and reserved individual trees provide micro habitats, perches and nest sites. Trees deferred during harvest would provide benefits for birds, reptiles, animals, and plants.

Structural diversity would be encouraged during thinning and stand release projects, to maintain and develop a variety of size classes.

Planting and seeding activities would be accomplished using a mixture of tree species to increase diversity. Stands would be regenerated with the featured species, as well as additional species that are suited to the specific site. Adjacent native vegetation would continue to provide local genetic diversity via seeding, suckering, and sprouting in regenerating stands.

Projected changes in suitable habitat for tree species have been identified for multiple climate change scenarios (PR 7.3, PR 7.4). Specific tree species that are projected to increase under climate change (e.g., white pine, oak) would be added to species mixtures, as a form of assisted migration, and to promote resiliency to climate change.

3.1.6 Regeneration Harvest Cutting Methods: Optimality and Appropriateness of Even-aged Management

The Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA) (P.L. 93-378), as amended by the National Forest Management Act of 1976 (NFMA), 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. Regeneration prescriptions are prepared based primarily upon the desired future condition (DFC) of a stand, silvicultural requirements of species to meet the DFC, 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 DFC 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 coppice is 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. The National Forest Management Act states, “When timber is to be harvested using an even-aged management system, a determination that the system is appropriate to meet the objectives and requirements of the Forest Plan must be made and where clear cutting is to be used, it must be determined to be the optimum method.”

The CNF FEIS (chapter 3.4) analyzed the appropriateness of even-aged management. Generally tree species that require more sunlight to survive and grow do better with even-aged management. These tree species include aspen, paper birch, jack pine, red pine, and tamarack. Species that survive under shade can also be managed with even-aged management. These include white spruce, black spruce, white pine, and balsam fir. The Shingobee Project (Alternative B) proposes the use of even-aged management – coppice with reserves, clearcut with reserves and shelterwood harvest- in aspen, paper birch, balsam fir, red pine, and oak stands on approximately 1,675 acres.

Harvest Methods and Regeneration Activities

The following list is a description of harvest methods that may be used during harvest and reforestation in this project.

Clearcut with Reserve Trees – This prescription would remove all merchantable stems with the exception of reserve trees (9-12 per acre) to serve as GTRs (green tree retention), 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 onsite unless they are a safety hazard. Legacy patches of 5% of the stand area (in units greater than 20 acres) 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.

Coppice with Reserve Trees – This harvest method would remove all merchantable stems from the stand, with the exception of reserve trees (9-12 per acre) to serve as GTRs (green tree retention, 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 onsite unless they are a safety hazard. Legacy patches would be retained on 5% of the stand area (in units greater than 20 acres). The majority of the regeneration in these stands is from stump sprouts or root suckers.

Shelterwood - This harvest would vary according to Forest Type:

Conifer Type – In stands containing a component of large conifer, the objective would be to regenerate the stand to long rotation conifer. These stands would be harvested leaving approximately 40 square feet of basal area per acre (BA) 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 conifers. Site preparation would generally consist of summer mechanical scarification. Some stands would be planted with a mixture of white pine, red 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 approximately 40 BA in residual trees, in order to provide enough shade to produce a new age class in a moderated microclimate. Leave trees would favor white pine, red oak, and basswood. Site preparation would generally consist of summer mechanical scarification or prescription fire. Some stands would be under planted with a mixture of white pine or red oak.

Reforestation activities would include site preparation, seeding or planting, release of seedlings or hardwood sprouts, animal damage control bud capping and pathological pruning. Shelterwood with reserves harvests set the age of the stand back to year zero. Residual canopy trees would be available for harvest once regeneration is well established.

Group Selection – This harvest activity is designed to create small forest openings while improving the health and vigor of the 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 selections are 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 one acre with one-half acre as a desired objective. As much as 40% 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 stand, reducing residual basal area to an average of about 85 BA (square feet of basal area per acre). 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 the spacing objectives. Removal of competition on at least three sides of the residuals is desirable. Hardwoods such as basswood or red oak should be favored for retention during this activity. White pine would be deferred except in dense areas that would benefit from thinning of the species.

Individual Tree Selection - Individual trees of all size classes would be removed more or less uniformly throughout the stand, to promote growth of remaining trees and to provide space for regeneration. White pine would be deferred in order to provide a seed source for the future. Openings should be created that are adjacent to these trees in an attempt to encourage white pine regeneration. Residual basal area following harvest would be approximately 80 BA.

Individual tree selection would occur in aspen/mixed hardwood forest types. Selection in this type would reduce residual basal area to an average of approximately 80 square feet of basal area per acre (BA). This target would be variable in 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 achieve the thinning objective and progress toward an uneven-aged distribution of residual trees. The overall objective 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 in the ecosystem.

Thinning - Conifer stands would be thinned in both a traditional manner, with a residual basal area of approximately 80 BA, and using variable density thinning. The variable density thinning would have an overall residual basal area of 80 BA. Some portions of the stand would be thinned to lower basal areas in an attempt to gain advanced regeneration. Basal areas would

be left heavier in other portions of the stand. The long term objective with this type of thinning is to move the stand toward multi-aged pine by encouraging natural regeneration.

Traditional thinnings would establish access corridors as part of the first thinning of a plantation. Subsequent thinnings would focus on residual basal area requirements that would maximize volume over lifetime thinning schedules. Pine plantations would generally follow a thinning schedule of every 5-10 years.

No essential reforestation activities are associated with thinning harvests.

Post Harvest Activities

Site preparation treatments would be used in stands where mineral soil exposure is needed for regeneration activities. These mechanical activities would expose mineral soil in irregular spatial patterns across the stand, creating a mosaic of treated and untreated areas. Untreated areas would retain vegetation characteristics of the original stand, as the mechanical equipment maneuvers around residual trees, stumps, and wetlands. Mechanical methods include disc work with equipment suited to individual site characteristics (Chippewa harrow or disc trench).

Following site preparation, stands would regenerate naturally from a seed source on site, or receive a full planting (about 1,000 seedlings per acre).

Release treatments would be used in the years following regeneration to free young trees from undesirable, usually overtopping, competing vegetation. Multiple species of trees, shrubs and forbs would be retained for diversity purposes.

Animal damage control (bud caps, repellant spraying, and temporary fencing) would be implemented in some areas to protect seedlings from white-tailed deer browse. The practice of bud capping consists of stapling a 4x4 inch piece of paper over the terminal bud of a seedling; on an annual basis, during the fall, until the seedling is above the height of deer browse.

3.2 Tribal Interests

3.2.1 Issues

No key issues were identified during scoping. The analysis focuses on potential impacts to traditional resource gathering and other activities based on harvest acres and location as a secondary issue.

Indicators: Acres of harvest within the LLBO Reservation and Area of High Interest. The indicator addresses amount of harvest and type of harvest.

3.2.2 Affected Environment

The Affected Environment includes the NFS administered lands within the Shingobee project area and LLBO Reservation. The ID team met with Onigum LIC and Leech Lake DRM to discuss the harvest proposals (PR 3.0.1, PR 3.0.1a, PR 3.0.2). Continuing discussions informed the ID team that location and method of harvest could be used as indicators of impact (PR 3.0.6, PR 3.0.7, PR 3.0.7a, PR 3.0.8, PR 3.0.9, PR 3.0.10, PR 3.0.11, PR 3.0.12). The analysis tiers to stands within the Leech Lake Band of Ojibwe Reservation and the Forest Plan designated Areas of High Interest map (page 2-37).

Lands and resources within and outside the Leech Lake Reservation boundary are very important to Native Americans for subsistence gathering, for the collection of plants for medicines, for spiritual and ceremonial purposes, and, in general, for living and being. Maintaining the health, availability, and access to these resources is of vital concern to those involved in traditional practices. Any proposals that manipulate, change, or alter forest resources may prevent or alter the ability to gather and utilize valuable and potentially scarce resources (eg. quality birch bark, blueberries, and medicinal plants). Some Tribal issues may be resolved or mitigated when people are informed of management activities prior to implementation. Forest Service managers are aware of the sensitivity of the issue to Native Americans, and work collaboratively with Local Indian Communities and Reservation officers prior to making any decisions that may be perceived by the public as denying access to the land.

Management Objective

Tribal interests and uses on NFS lands are protected through various statutes. The Federal Trust Doctrine requires that Federal agencies manage their lands with full consideration of tribal rights and interests. To this end, plant and animal species of traditional use have been given consideration through geographic location and intensity of management activities (FEIS, page 3.9-27). Potential impacts to traditional resources were considered and stands were deferred in culturally sensitive areas (PR 3.0.0, PR 3.0.0a, PR 3.0.2b, PR 3.0.7a, PR 3.0.8, PR 3.0.11).

The Forest Plan (pages 2-35-36) contains several items that deal indirectly or directly with gathering and traditional uses. These include:

- Lands within the Forest serve to help sustain American Indians' way of life, cultural integrity, social cohesion, and economic well-being. (Forest Plan, D-TR-1, page 2-35).

- 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. (Forest Plan, S-TR-3, page 2-36).
- Plant and animal species of traditional use should be given consideration in any management project when desired and sought after by tribal members. (Forest Plan, G-TR-3, page 2-36).

Access for traditional gathering and identification of likely firewood collection and hunting sites were factors in choosing stands south of State Highway 200. 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" are met (Forest Plan, page 2-35).

3.2.3 Direct and Indirect Effects

Scope of Analysis

Spatial Framework

The spatial framework used to evaluate direct and indirect effects is the National Forest System (NFS) administered lands within the Shingobee Project. More specifically, the spatial framework focuses on acres of harvest by treatment type within the LLBO Reservation and Area of High Interest (Forest Plan, page 2-37; Appendix A Proposed Action map). No harvest activities occur on Oak Point and this area is excluded from analysis (PR 3.0.0, PR 3.0.0a).

Timeframe

The Forest Service is mindful that tribal interests extend over a long timeframe and traditional resource locations are fluid over time; however, this environmental assessment considers a 10-year period and moves towards minimizing, mitigating, and avoiding impacts within this window (Appendix B Mitigations).

Effects by Alternative

Table 3-5 and Table 3-6 summarize harvest methods based on harvest location and tree harvest method. The harvest acres are used to ascribe the intensity of harvest method to its impact on traditional gathering, recognizing that traditional gathering opportunities may still be foregone. (PR 1.0.3)

Alternative A

Under Alternative A no new harvest operations or associated temporary road construction activities are proposed which could "eliminate the opportunities to conduct traditional gathering" (PR 1.0.3).

The lands within the project area and especially within the Leech Lake Reservation, would continue to sustain American Indians' way of life, cultural integrity, social cohesion, and economic well-being (Forest Plan, D-TR-1, page 2-35). Forest Service system roads would continue to receive custodial maintenance and could be used as land access trails and travel corridors by traditional resource gatherers. Alternative A would likely benefit most traditional gathering in high interest areas on NFS administered lands within the Shingobee Project because there would be no management activities (Forest Plan, S-TR-3, page 2-36).

Alternative B

Many tribal members see harvest operations as an intrusion that disrupts the historical meaning of a place and ability to hunt, fish, and gather plants and animals on Forest Service administered lands (Forest Plan, S-TR-3, page 2-36). Seven stands on the LLBO Reservation in the Onigum/ Stony Point area were deferred due to traditional gathering or cultural resource concerns (PR 3.0.7). Eleven stands (about 101 acres) remain within the LLBO Reservation high interest area (Table 3-5). Twenty-one stands totalling about 365 acres and including those stand acres in Table 3-5 are within the LLBO Reservation (Appendix A; Table 3-6).

Under Alternative B, harvest operations would likely be viewed as negatively impacting traditional gathering opportunities. Ground scarification and large logging equipment can uproot native plants and compact soils during harvest operations and may potentially eliminate a traditional gathering place. Harvest operations may afford benefits to certain traditional plant resources and detract from other traditional gathering opportunities. As a benefit, ground scarification during harvest operations exposes mineral soils which can promote natural regeneration from the existing seedbed or promote suckering of native plants into a new opening. In addition, easily accessed firewood is often collected from these former log landings.

Temporary road construction would generally occur in short road segments within the project. The ID team reviewed existing/ previously used access to project stands and found old revegetated temporary roads could be reopened. Temporary road segments total about 2 miles (13 segments throughout the project area). Six of the thirteen temporary road segments occur within the reservation boundary (Appendix A). One road segment accesses a harvest stand via the Onigum gravel pit. Mitigations would be applied through Timber Sale Contract provisions to reduce the risk of NNIS transport.

Table 3-5. Alternative B harvest acres within the LLBO Reservation and Area of High Interest (see Appendix A map).

Harvest Method	Number of Stands	Alternative B (acres)*	Area of High Interest (acres)*
Clearcut with reserves	1	15	15
Group & single tree selection cut	3	58	47
Thinning	7	61	39
Total	11	134	101
*Acres are rounded up. Several stands are partially within the high interest area as shown on Appendix A Proposed Action map, hence Alt B acres and high interest acres do not match.			

Table 3-5 shows clearcut harvest in one oak stand (15 acres) within the Reservation and Area of High Interest (Appendix A map). Proposed clearcuts change the landscape; however, these areas may benefit some traditional resources. This harvest is in an area that is often hunted by Tribal members. The new vegetation would attract deer and grouse. Post-harvest site prep and planting activities would use a diverse mix of tree species. Adjacent native vegetation would provide local genetic diversity via seeding, suckering, and sprouting. In addition, this location affords access from State Highway 200 and potential firewood gathering opportunities.

Group selection occurs in two maple/basswood stands (about 35 acres) within the LLBO Reservation and Area of High Interest (Table 3-5). The proposed group selection cut would create openings and develop multi-aged stands. The uncut clumps of trees and undisturbed areas would serve as micro habitats, perches, and nest sites for birds, reptiles, animals, and plants. Post-harvest site prep would encourage natural regeneration from onsite seed sources. Single tree selection harvest is proposed in one 12 acre stand of maple/basswood. Uneven-aged harvests and post-harvest site prep may help promote stand resiliency to long term climate change (PR 1.2.1), resistence to insects and disease (forest health), and could reinvigorate native plant habitat.

Thinning is proposed in seven red pine plantations (39 acres) located within or partially within the Area of High Interest and Reservation (Table 3-5). Thinning pine plantations helps to create more natural appearing stands and may help the stand to be more resilent to changes in climate over time (PR 1.2.1). In addition, hazardous fuels would be reduced in these stands.

Table 3-6. Harvest acres within the LLBO Reservation (see Appendix A map).

Harvest Method	Number of Stands	Alternative B acres*
Clearcut or coppice with reserves	9	220
Group or single tree selection	4	80
Thinning	8	65
Totals	21	365
*One stand is partially within the LLBO Reservation (about 30 acres). Acres are rounded up. The number of stands and Alternative B acres represents total stands and total acres and includes stands and acres from Table 3-5.		

Under Alternative B, 365 acres of proposed harvest would occur within the LLBO Reservation boundary (Table 3-6). About 205 acres out of 220 acres are proposed clearcut and coppice cuts in oak and aspen stands within the LLBO Reservation. Eight of the nine stands are outside the Area of High Interest (Appendix A map). Post-harvest site prep and diversity planting would occur on about 148 acres. The proposed harvests would increase acres of young, healthy oak forest, and regenerate aspen. Harvested areas would afford hunting opportunities in new growth and additional firewood gathering opportunities.

Proposed group and single tree selection harvests (Table 3-6) would create openings and post-harvest site prepration would encourage natural regeneration from existing seed sources. These harvests would develop multi-aged stands.

Thinning in pine plantations helps to create more natural appearing stands and may help the stands to be more resilent to changes in climate over time (PR 1.2.1). In addition, hazardous fuels would be reduced in these stands (Table 3-6).

3.2.4 Cumulative Effects

Scope of Analysis

Spatial Framework

The spatial framework used to evaluate cumulative effects is the National Forest System (NFS) administered lands within the Shingobee Project. More specifically, the spatial framework focuses on treated unit acres by treatment type within the LLBO Reservation (Appendix A Proposed Action map).

Timeframe

The traditional resources cumulative timeframe varies and extends beyond this planning period. Some plants and their medicinal values are not realized until the plant community matures, for example, the Stony Point area on Leech Lake (Forest Plan, page 3-25).

Past, Present and Future Activities

The effect of management activities on high interest areas with traditional use would likely vary depending on the type of traditional resource (forb, grass, shrub, or tree species, and animal species) and intensity of harvest. Management proposals manipulate, change, or alter forest resources and may prevent or alter the ability to gather and utilize valuable and potentially scarce resources. Some traditional resources would likely reappear and some traditional gathering and hunting could possibly begin again; however, other spiritual/cultural connections to the land could be lost.

The cumulative effect of traditional resource gathering issues may be resolved or mitigated when people are informed of management activities prior to implementation. Forest Service managers are aware of the sensitivity of the issue to Native Americans, and work collaboratively with Local Indian Communities and Reservation officers prior to making any decisions.

3.3 Wildlife Management Indicator Species (MIS) and Habitat (MIH)

3.3.1 Issues

No key issues related to wildlife MIS and MIH were identified during the scoping process. The following analysis discloses the effect of project activities on MIS and MIH as a secondary issue.

Indicators: Findings of the Biological Evaluation (BE) for wildlife (PR 5.0); Findings of the Biological Assessment (BA) submission pending (PR 5.4).

3.3.2 Affected Environment

Wildlife Management Indicator Species

The affected environment includes four MIS and their habitats within the Project area. They are the gray wolf, bald eagle, northern goshawk, and white pine. The affected environment for the gray wolf, bald eagle, and northern goshawk are discussed in detail in the Wildlife BE (PR 5.0) and summarized below. The affected environment for white pine is discussed in Vegetation (3.1) and is also discussed in the FEIS 3.3.6 (pages 16-17). Forest cover is analyzed in Vegetation, Direct and Indirect Effects.

Table 3-7 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.

Table 3-7. Chippewa National Forest MIS and preferred habitat.

Common Name	Reason for Selection	Preferred Habitat
Gray wolf	Federally threatened	Habitat generalist with abundant ungulate prey
Bald eagle	Federally threatened (formerly)	Large trees near lakes/rivers that contain 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

Gray wolf and bald eagle were selected during the revision of the Forest Plan because of their status as federally threatened. Bald eagles have been removed from the Federal threatened and endangered list, and are now considered R9 Sensitive Species.

Gray wolf - The gray wolf population in Minnesota far exceeds the population goal of 1,400 wolves in the state. The 2012-13 wolf survey results show an estimated 2,211 wolves in the State (Erb and Sampson 2013).

Bald Eagle – The Project area supports a number of nesting bald eagles, with at least 32 known historic and current nests.

Northern Goshawk - There are three known and historic goshawk territories within the Project area. Two territories were active in 2014.

Wildlife Management Indicator Habitats (MIH)

The affected environment includes MIHs in forested habitat within the six LEs in the project area: Boreal Hardwood-Conifer (BHC), Dry Mesic Pine (DMP), Dry Mesic Pine-Oak (DMPO), Dry Pine (DP), Mesic Northern Hardwoods (MNH), and Tamarack Swamp (TS). Project activities primarily occur in the DP and DMPO LEs. Only MIHs in these two LEs were analyzed further.

3.3.3 Direct, Indirect, and Cumulative Effects Summary

Scope of Analysis for MIS and MIH

Spatial Framework

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

Timeframe

Unless otherwise indicated within the BA or BEs, the direct, indirect, and cumulative analyses consider activities that have occurred in the past 10 years and are 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 even-aged regeneration harvests and reforestation activities to be completed.

Management Objectives

Management Indicator Species – Management indicator species are those species that are monitored over time to assess the effects of management activities on their populations. MIS monitoring also indicates the effects on populations of other species with similar habitat needs, which represent major biological communities. NFMA regulations [CFR 36, part 219.19, paragraph a-6] state that "Population trends of management indicator species would be monitored and relationships to habitat changes determined." This direction applies specifically to the forest planning process, but also has implications for project planning.

Management Indicator Habitat – The Forest Plan (pages 2-22, 2-23, 2-32) provides guidance regarding vegetation composition and structure. More specific guidance relating to Management Indicator Habitats (MIH) 1-9 for each Landscape Ecosystem (LE) can be found on Forest Plan, pages 2-55 to 2-80. By moving towards objectives for these MIHs the Forest will move toward long-term desired conditions for the amount, quality, and distribution of MIHs and their associated wildlife and plant species. Detailed descriptions of the forest types and ages that comprise each MIH are found in Appendix C of the Forest Plan.

The Forest Plan (pages 2-23, 2-24, 2-33) also provides guidance regarding spatial distribution of forest vegetation. Patch size, edge, and forest or habitat fragmentation are elements of spatial distribution which affect a variety of sensitive species.

3.3.4 Direct, Indirect, and Cumulative Effects Summary

Management Indicator Species

Gray wolf – It was determined in the BA that this project was a low risk to gray wolves. As a result, Alternative A would have "no effect" and it was determined that Alternative B "may effect, not likely to adversely affect" wolves.

Bald eagle – The BE examines effects of this Project on bald eagles. Alternative A would have "no impact" and Alternative B "may impact individuals or habitat...." Refer to Section 3.3 for a summary of effects.

Northern goshawk – The BE examines effects of this Project on northern goshawks. Alternative A would have "no impact" and Alternative B "may impact individuals or habitat...." Refer to Section 3.3 for a summary of effects.

White pine – Refer to the Vegetation Section 3.1 for discussion on the effects of this Project on white pine.

Management Indicator Habitat

MIH 1-9 – In the Dry Pine LE, MIH objectives are generally met under Alternative B. Young aspen-birch is maintained which does not meet the MIH objectives. In the old aspen-birch MIH's there is an increase which will meet the MIH objectives, while in the mature aspen-birch there is a decrease which meets MIH objectives. In the Dry Mesic Pine/Oak LE, there is a major increase in young aspen-birch with only a minor reduction in aspen-birch acreage through conversion to coniferous forest types (21 acres to white pine) which does not help to meet long-term MIH and vegetation composition objectives(Table 3-3). Old aspen-birch continues to increase which also does not meet MIH objectives. As a result, Alternative B will continue to contribute to the over-representation of aspen-birch in this LE in the project area.

Alternative B results in no appreciable gain in habitat in this LE in the project area both short-term and long-term for species associated with pine forests. Historically and per Forest Plan direction, the DMPO LE should be dominated by pine forest. Currently, this LE is dominated by aspen (47 %) in the project area.

At the forest-wide scale the cumulative impact of the Shingobee Project with other projects implemented across the forest will determine over time if objectives are met or trending towards objectives. By meeting these landscape scale objectives, habitat for wildlife will be maintained/increased across the CNF. Forest-wide monitoring of MIH's will be important for identifying and monitoring trends.

MIH 11-13 – Alternative B maintains 8 large upland mature patches > 300 acres (409 acres less than Alternative A) and a mix of smaller patches that provide various types of habitat. Maintaining these large patches helps to reduce forest edge and increase interior forest.

Cumulatively, the number and acreage of large upland mature patches continues to be maintained above Forest Plan Objectives with implementation of Alternative B.

3.4 Threatened or Sensitive Species

The Chippewa National Forest has no endangered species listed.

3.4.1 Issues

No key issues related to threatened or sensitive species were identified during the scoping process. The following analysis discloses effects of project activities on federally listed or Forest sensitive species (RFSS) as a secondary issue.

Indicators: Findings of the Biological Evaluation (BE); Findings of the Biological Assessment (BA)

3.4.2 Affected Environment

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). The BA tiers to the programmatic biological assessment for the revision of the Forest Plan (USFS 2004c) and provides detailed information regarding site-specific effects of this Project on threatened and endangered species. Consultation is currently ongoing with the USFWS (PR5.1, PR 5.4). The BA will be submitted to USFWS in early May 2015. No decision will be made until concurrence and a Biological Opinion for northern long-eared bat is received from the U.S. Fish and Wildlife 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 the Project BE's (PR 5.0, PR 5.7).

3.4.3 Direct and Indirect Effects

Scope of Analysis

Spatial Framework

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

Timeframe

Unless otherwise indicated within the BA or BEs, the direct, indirect, and cumulative analyses consider activities that have occurred in the past 10 years and are 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 even-aged regeneration harvests and reforestation activities to be completed.

Management Objective

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).

Direct, Indirect, and Cumulative Effects

There are potential effects to 4 of the 60 sensitive species, and three threatened species on the Forest due to implementation of Alternative B. Those species affected are the northern goshawk, bald eagle, red-shouldered hawk, little brown bat, Canada lynx, gray wolf, and northern long-eared bat.

Table 3-8 and Table 3-9 summarize the determination of effects of Alternative B for all threatened and sensitive species, respectively. See the BA (PR 5.5) and BE (PR 5.0) for detailed analyses. Alternative A would have no impact on all threatened or sensitive species.

Mitigation measures for site specific impacts are listed in the BE in Appendix A and in Appendix B of this EA.

Table 3-8. Summary of effects and determinations from implementation of Alternative B on threatened species from this Project (PR 5.5).

Species	Effect Determination	Rationale
Canada lynx (Threatened)	No Effect	The project area lacks sufficient habitat to support lynx reproduction and survival. The project area is outside of Lynx Analysis Units.
Gray Wolf (Threatened)	Not Likely to Adversely Affect	Minor changes in deer habitat. No changes in road densities.
Northern long-eared bat (Threatened)	Likely to Adversely Affect	Potential for mortality if bats are present in stands that are summer harvested. Varying effects on potential summer roosting habitat. Snags are retained in harvest units. Large upland mature patches are maintained.

Table 3-9. Summary of effects and determinations from implementation of Alternative B on Chippewa National Forest RFSS (PR 5.0).

Species	Effects Determination[1]	Rationale
Bald Eagle	MIHN	Thinning red and white pine will help to develop future super-canopy pine trees that may provide nesting habitat. No direct impacts are anticipated due to timing restrictions around known nests.
Northern Goshawk	MIHN	Habitat is maintained at current levels in nesting and post-fledging zones on FS land within known territories. Proposed regeneration harvest will reduce foraging habitat. No direct impacts are anticipated due to timing restrictions and harvest mitigations around known nests.

Species	Effects Determination[1]	Rationale
Red-shouldered Hawk	MIHN	No direct impacts are anticipated due to timing restrictions and harvest mitigations around known nests. Minor reductions in habitat due to regeneration harvest in mixed hardwoods. Individual tree/group selection harvest in northern hardwoods may be beneficial due to creation of gap-phase type forest structure.
Little Brown Bat	MIHN	Slight risk for mortality in stands that are summer harvested. Snags are retained in harvest units. Large upland mature patches are maintained.
[1] MIHN: May impact individuals or habitat, but will not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species.		

3.5 Ruffed Grouse

3.5.1 Issues

No key issues related to ruffed grouse were identified during the scoping process. The following analysis discloses effects of project activities on the habitat for ruffed grouse as a secondary issue. (Appendix C)

Indicators: Acres of young aspen/ birch habitat created.

3.5.2 Affected Environment

Ruffed grouse were evaluated in the FEIS (pages 3.3.6 23-27 and 34-42). Ruffed grouse are a widely distributed species, with fairly specific habitat requirements. On the CNF, aspen-birch forest types provide optimal habitat with ruffed grouse requiring multiple age classes of aspen-birch for optimal habitat.

Table 3-10. Ruffed grouse habitat classes in aspen-birch forest types.

Age	Habitat Cover
4-15 years	Brood cover
6-25 years	Spring/fall cover
>25 years	Food, winter/ nesting cover

3.5.3 Direct and Indirect Effects

Scope of Analysis

The age class distribution of aspen and how aspen is regenerated is relevant at the project scale and in an LE context within the Project.

Spatial Framework

Direct and indirect effects are evaluated at the project level. Cumulative effects are evaluated at the Forest level.

Timeframe

The direct, indirect, and cumulative analyses consider activities that have occurred in the past 10 years and are 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 even-aged regeneration harvests and reforestation activities to be completed.

Management Objective

The Forest Plan provides an Objective (O-WL-40) for game species. This objective is to provide habitat for all aquatic and terrestrial game populations.

Effects by Alternatives

Table 3-11. Effects of Alternatives on ruffed grouse habitat.

Habitat Component	Existing Condition Acres (2014)	Alternative A Acres (2019)	Alternative B Acres (2019)
Brood cover	1,171	867	1,991
Spring/fall cover	2,770	2,686	2,686
Food, winter/cover	6,328	7,135	6,011
Total grouse habitat	10,269	10,688	10,688

Alternative A

Under Alternative A, young forest habitat for grouse would decline (Table 3-11). Aspen would continue to grow older, resulting in less preferred habitat for this species.

Alternative B

Grouse would benefit from the 1,124 acres of proposed regeneration harvest in aspen-birch by increasing young forest habitat across the project area (Table 3-11). Small patch clearcutting in two stands along the County 50 HWT will improve grouse habitat in this area by continuing to provide a flow of age classes of aspen.

Grouse may also benefit from the enhancement of wildlife openings (up to 16 acres) through diversity planting, seeding, or other activities.

3.5.4 Cumulative Effects

Cumulatively, habitat for ruffed grouse would be maintained across the landscape where recent regeneration harvest of aspen-birch occurs on all ownerships. The state and county lands in the project area are dominated by aspen. There is a small reduction (93 acres) in aspen on NFS land in the project area, but the project area will continue to be dominated by aspen. Refer to the Vegetation section 3.1 for age class distribution and species composition changes as a result of this Project and Table 3-11 for the distribution of grouse habitat of NFS land in the project area.

3.6 Soils

3.6.1 Issues

No key issues related to soils were raised during public scoping of this project. Effects of proposed activities on soils are disclosed in this section as a secondary issue. Proposed harvest and site preparation activities may disturb soils within the project area.

Indicators: The indicator for soil disturbance within the project area is expressed as the potential risk for disturbance, based on inherent soil characteristics and limitations to proposed harvest and site preparation activities. Slight, moderate, or severe risk for soil disturbance is quantified by acres that occur within a proposed treatment area or stand.

3.6.2 Affected Environment

Inherent soil characteristics such as texture, drainage, and nutrient status helped to assess the potential impacts of proposed activities on soils within the project area. The presence of earthworms and vectors for their expansion is also part of the assessment.

Two-fifths 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 10% of the landbase in the project area. The potential for accelerated erosion and soil displacement is primarily a function of topography, soil texture, ground cover, and precipitation; 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.

One-quarter 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 (GEIS) 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 FEIS (2004). Adjustments to retention may occur as site conditions warrant.

The intensity and areal extent of soil disturbance currently on CNF lands within the project area is uncertain. Past monitoring of FS harvests by both the CNF and the Minnesota Department of Natural Resources (DNR) revealed that soil disturbance has occurred as a result of forest management activities, but it was generally infrequent and did not appear to affect overall site productivity (Dahlman and Phillips 2004, Dahlman 2008, Dahlman and Rossman 2009, Rossman 2011, and Morley 2013).

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).

One-quarter of the landbase in the project area 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 5.6).

Management Direction

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

- National Environmental Policy Act (NEPA)
- National Forest Management Act (NFMA)

- Multiple-use Sustained Yield Act

National Forest Service Manual (FSM) states that soils should be managed "to sustain ecological processes and function so that desired ecosystem services are provided in perpetuity" (FSM 2550.2). Assessments, analysis, and monitoring are processes used to determine if desired soil quality conditions have been achieved. Standards should be developed to provide a baseline from which to measure change (FSM 2550.2). The Chippewa National Forest (CNF) is currently in the process of developing soil quality standards through implementation of the Forest Soil Disturbance Monitoring Protocol (Page-Dumroese *et al.* 2009a and 2009b). Until new standards have been developed using this protocol, management activities on the CNF are guided by its Forest Plan. The CNF Plan states in guideline G-WS-9 that management activities should strive to have no more than 15% of a treatment area in a detrimentally compacted, eroded, rutted, displaced, or severely burned condition (FEIS 2004).

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 (MPWG 2009).

All management activities in this project comply with relevant Forest Plan Standards and Guidelines (S & Gs) for soils: G-FW-1, G-WS-8 through 14 (FEIS 2004).

3.6.3 Direct and Indirect Effects

Scope of Analysis

Spatial Framework

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

Timeframe

The time necessary for soils to recover from disturbance as shown in Table 3-12 may range from as little as one growing season to several decades depending on disturbance intensity and inherent soil characteristics (Grigal and Bates 1992; Grigal 2004; Page-Dumroese *et al*. 2006; Voldseth *et al*. 2011; FEIS 2004).

Table 3-12. Range of recovery times for disturbances of greatest concern to soils within the Shingobee project area.

Disturbance	General Recovery Period
Compaction or Nutrient Loss	One or more decades

Disturbance	General Recovery Period
Erosion	One or more growing seasons

Soils were mapped within the project area as part of the Terrestrial Ecological Unit Inventory or TEUI. More detailed soils information specific to the project area is in the project record (PR 5.6).

The TEUI is a national framework used to classify and map ecological units throughout FS 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 Landtype Phases (LTs and LTPs). LTPs are mapping units at the finest scale. This system guided forest management activities proposed within the project area. The Cass County Soil Survey (USDA 1997) and Field Guide to the Native Plant Communities of Minnesota (DNR 2003) were also used to support ecological interpretations.

Effects by Alternative

Alternative A

Soils would not be not be directly or indirectly affected by this alternative because no new activities would be proposed. Preexisting soil disturbance from past vegetation management activities would remain on the landscape for a few years to several decades depending on disturbance intensity and inherent soil characteristics.

Alternative B

Table 3-13. Alternative B risk of soil disturbance from proposed harvest and site preparation activities by acres occurring within treatment stands in the Shingobee project area.

	Compaction Risk			Erosion Risk			Nutrient Loss Risk		
Alternative	Slight	Moderate	Severe	Slight	Moderate	Severe	Slight	Moderate	Severe
B	926	2,116	72	2,482	621	9	952	1,256	933

A range of soil disturbance (FEIS 2004) would occur under Alternative B as a result of proposed harvest and site preparation activities (Table 3-13).

It is unlikely that disturbance 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 2013). 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, erosion, and displacement are likely to be greatest in portions of treatment areas devoted to infrastructure (e.g. temporary roads, skid trails, and log landings). Past monitoring of CNF harvests by the DNR has shown that infrastructure has consistently remained below recommended guidelines for forest management in Minnesota (Dahlman and Phillips 2004, Dahlman 2008 and Dahlman and Rossman 2009, Rossman 2011). Outside of established infrastructure, the general treatment area, operational restrictions would minimize the area and intensity of impact to soils by heavy equipment (see Appendix B for a list of stands where this mitigation applies). Studies on Great Lakes National Forests have shown that winter harvest, when soils are frozen, effectively minimizes soil disturbance and impacts on site productivity for a range of various soil types (Range and Gries 2008 and Voldseth 2011). Where rutting, a visual cue commonly used to assess soil compaction, was found in CNF harvests, it was generally small and isolated (Dahlman and Phillips 2004, Dahlman 2008, Dahlman and Rossman 2009, and Rossman 2011) having little impact on soil productivity within the treatment area (Morley 2013). Monitoring efforts to this point have been rather short term, so more observations will be necessary to determine long-term effects on soil productivity.

Portions of harvest units may be treated by brush raking, disking, or scalping in preparation for natural seeding or artificial planting. These treatments will heavily disturb soils through mixing and displacement in order to establish more ideal conditions for seedling establishment. The Hiawatha National Forest monitored the chronosequence of jack pine sites that had undergone site preparation and found that sandy, well-drained soils recovered from disturbance within 5 years. Within 25 years, horizonation and other soil processes had reestablished with the range of natural variation (Gries 2013). Most of the site preparation proposed in both alternatives would occur within soil types similar to those observed in the Hiawatha National Forest study, consisting of native plant communities adapted to frequent and sometimes intense disturbance. As long as BMPs, Forest Plan S & Gs, and soils mitigations from Appendix B are applied, it is unlikely these treatments will have any long-term negative impact on soil productivity.

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 (FEIS 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 all of the following criteria, they were assigned mitigation

to reduce the risk of earthworm spread (see Appendix B for a list of stands where this mitigation applies).

- 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 mixed northern hardwoods or the Mesic Northern Hardwood LTP.

All heavy equipment operating in areas that meet the aforementioned criteria would be cleaned prior to leaving the timber sale 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.

3.6.4 Cumulative Effects

Please see Section 3.6.3 for a discussion of the spatial framework, timeline, and methodology used for determining cumulative effects to soils within the project area.

Past, Present and Future Activities

Other than thinning, proposed vegetation treatment areas in this project have had little to no management in them since the last rotation (a minimum of 40 years for some forest types). Although the extent to which soils have been disturbed in the past is uncertain, monitoring of FS harvests in past years indicate that CNF management activities have had little impact on soil productivity outside of areas devoted to timbersale infrastructure (Morley 2013). 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. Past FS harvest monitoring by the DNR has shown that the CNF has consistently managed its timbersale infrastructure below areal recommendations in BMPs (Dahlman and Rossman 2009). The high frequency of using preexisting infrastructure has greatly reduced the detrimental effect of timbersale infrastructure on soil productivity at the treatment area scale.

3.7 Aquatics

3.7.1 Issues

No key issues related to aquatic resources were raised during public scoping of this project. Effects of proposed activities on aquatic resources are disclosed in this section as a secondary issue. Proposed vegetation management activities may affect aquatic resources within Hydrologic Unit Code 12 (HUC12 or 6th Level HUC) watersheds that cross the project area.

Indicator: The indicators most relevant to the effects of proposed vegetation management activities within HUC12 watersheds that cross the project area are percent young forest and open area and acres of forested riparian area maintained or improved by HUC12 watershed. (PR 5.6)

3.7.2 Affected Environment

There are seven HUC12 watersheds that cross the project area covering roughly 339,963 acres, over one-third of which consist of open water and wetlands. A map and table with more information about these watersheds are in the project record (PR 5.6).

The amount of young forest and open area and the health and function of forested riparian area on FS lands are of greatest concern to assessing the potential impacts of proposed vegetation management activities within HUC12 watersheds that cross the project area (Table 3-14).

Table 3-14. Measures of greatest concern to aquatic resources within HUC12 watersheds that cross the Shingobee project area.

HUC 12 Watershed	% Young Forest and Open Area	Forest Riparian Area Health and Function on FS Lands
Crooked Lake	15	Fair
Eleventh Crow Wing Lake	37	Fair
Kabekona Bay	23	Fair
Leech Lake	7	Fair
Shingobee River	32	Fair
Tenmile Lake	19	Fair
Urem Bay	18	Fair
Forest riparian area health and function on FS lands was ranked Good, Fair, or Poor based on comparison of current age class distribution and forest type longevity to Forest Plan projections by 2024. The project record provides greater detail on the existing riparian area condition (PR 5.6).		

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 peak flow in stream channels. The increase in peak flow can result in flooding and excessive stream channel erosion (Verry 2000, Sebestyen et al. 2011). No HUC12 watersheds that cross the project area currently exceed this threshold.

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 (FEIS 2004). In watersheds that cross the project area, age class distribution of riparian forestland tends toward the mature age class. Long-lived species are well represented in three of the seven watersheds crossing the project area. Most watersheds consist of a diverse range of forest types; however species such as

aspen and paper birch are most common across all landscape ecosystems (LEs). Riparian forest age and type longevity, by watershed, are in the project record (PR 5.6).

Management Direction

The Forest Service follows all applicable laws regarding aquatic resource management, including the following:

- NEPA
- 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 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 proposed in this project comply with relevant CNF Plan Standards and Guidelines (S & Gs) for aquatic resources: G-FW-1; S-WS-1, 4, 6, and 9; G-WS-4 through 6 and 11 through 14; G-TM-6; S-TS-2 through 4; G-TS-6, 13, and 16 (Forest Plan 2004).

3.7.3 Direct and Indirect Effects

Scope of Analysis

Spatial Framework

Direct, indirect, and cumulative effects to aquatic resources were analyzed at the HUC12 watershed scale, because it is most relevant for analyzing the effects of forest management activities on aquatic resources within the Chippewa National Forest, or CNF (FEIS 2004).

Timeframe

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 3-15).

Table 3-15. Range of recovery times for various disturbances of greatest concern to aquatic resources within HUC12 watersheds that cross the Shingobee project area (Verry 2000, Sebestyen et al. 2011).

Disturbance	General Recovery Period
Creation of Young Forest or Open Area	Up to 16 years following regeneration harvest (Verry 2000).
Riparian Vegetation Treatments	Several years to decades to achieve desired future condition.

The data sources mentioned in Section 3.7.1 include:

- National Hydrography Dataset (NHD)
- National Wetlands Inventory (NWI) (last updated mid-1970s)
- CNF, DNR, and Cass County forest inventories (last updated 2009-2012)
- 2008-2010 color infrared aerial photography provided by the DNR
- 1996 satellite imagery produced by the Manitoba Remote Sensing Center

Effects by Alternative

Table 3-16. Acres of riparian area treated in Alternative B within the Shingobee project area.

Riparian Area Treatment	Alternative B
Remove only single trees or small groups of trees in boreal/mixed northern hardwood stands to improve long-lived species and age class diversity. Retain all long-lived conifers where possible.	65
Increase the long-lived conifer component in boreal hardwoods through mechanical/hand scarification around mature, cone-bearing white pine/spruce in preparation for natural regeneration.	*44
Thin to improve age class diversity and vigor of plantation red pine. Retain some long-lived hardwood species for diversity.	23
Defer harvest and plant white spruce and hackberry for diversity.	3
Defer harvest and plant white pine for diversity.	13
*The 44 acres of treatment is a subset of the 65 acres of treatment described above it.	

Alternative A

Aquatic resources would not be not be directly or indirectly affected by this alternative because no new activities would be proposed. Young forest would continue to age and over time reduce the amount of young forest and open area within watersheds. Existing timbersale infrastructure (i.e. roads, skid trails, and log landings) may continue to alter natural hydrology or impact water quality until native vegetation recovers.

Most of the forested riparian vegetation would continue to grow older and shift toward plant communities comprised of long-lived, late successional species.

Alternative B

The amount of forest regeneration (i.e. clearcut and coppice cut harvest) in Alternative B would not cause watersheds crossing the project area to exceed 60% of their total watershed area in young forest and openings. The percentage of young forest and open area would gradually decrease over time as forests mature (percentages by watershed are listed in the project record, PR 5.6).

A portion of roughly 148 acres of riparian area would be treated in Alternative B. A range of harvest and reforestation methods (Table 3-16) would maintain or enhance riparian health and function and meet a range of watershed and vegetation objectives of the CNF Plan (FEIS 2004).

Proposed vegetation management activities within riparian areas will have some influence on water flows or yields; however the magnitude of hydrologic response will be driven mainly by landuse change at the watershed scale (RSTC 2007). Earlier this was mentioned to not be an issue for either alternative.

Also noted here for disclosure, some of the activities proposed in this project occur within the Riparian Emphasis Area (Riparian MA), one of many management areas identified within the CNF Plan. Within the project area, the Riparian MA consists of a ¼-mile buffer around the Shingobee River and Leech Lake. Forest Plan objectives for the Riparian MA include maintaining or increasing stands and acres of red pine, white pine, white spruce, and northern hardwoods, primarily through partial cutting prescriptions (Forest Plan 2004). Roughly 113 acres of harvest treatments proposed in this project, under Alternative B, fall within this area and appear to conflict with those objectives (e.g. regeneration harvest to aspen or other short-lived tree species); however these activities have little effect on the health and function of the riparian area due to their distance away from the Shingobee River and Leech Lake.

Water quality effects have largely been addressed through past implementation and effectiveness monitoring of Minnesota forest best management practices (BMPs) (MFRC 2012). Implementation of most water quality BMPs, across all ownerships, has been on the rise since 2001. Where impacts were observed they were generally small in size and isolated rather than dispersed throughout the treatment area (Dahlman and Phillips 2004, Dahlman 2008, Dahlman and Rossman 2009, Rossman 2011). Several CNF timber sale units were reviewed by CNF staff post-harvest in 2007, and all were found to meet filter strip disturbance and RMZ width and basal area guidelines. Where soil disturbance was found it was limited in extent and was not an impact to water quality (Rutten and Morley 2007). As a result of past monitoring, it is not likely that proposed activities will negatively impact water quality as long as BMPs, CNF Plan S & Gs, and soils and aquatics mitigation in Appendix B are implemented.

The greatest impact proposed activities will have is on aquatic habitat and associated terrestrial and aquatic species (the wildlife section goes into greater detail on effects to terrestrial wildlife species). Reestablishing or introducing a greater component of tree species and age class diversity to riparian areas will maintain or improve stand longevity and windfirmness over time. It would also discourage beaver activity, particularly in aspen or birch dominated stands, by reducing the amount of favorable forage. Reduced forage would also have a positive effect on stand reforestation and windfirmness as well as better maintain the adjacent aquatic habitat and connectivity (Verry 2006).

3.7.4 Cumulative Effects

Please see Section 3.7.3 for a discussion of the spatial framework, timeline, and methodology used for determining cumulative effects to aquatic resources in HUC12 watersheds that cross the project area.

Past, Present and Future Activities

All previously planned and foreseeable regeneration harvest on CNF, DNR, and Cass County lands over the next 15 years would not cause a HUC12 watershed to exceed 60% young forest and open area. Percentages by watershed are in the project record (PR 5.6).

The forest management approach to riparian areas on other public lands is consistent with some of the goals and objectives of the CNF Plan (Cass 2003, FEIS 2004, Hubbard 2002, and DNR 2009). Although riparian management is not as explicitly defined in these plans as it is in the CNF Plan, they contain enough management guidance to indicate similar desired conditions.

Despite the lack of forest cover and management data on tribal and private lands, it is unlikely that these areas would contribute to exceeding the young forest and open area threshold or greatly affect overall riparian area health in HUC12 watersheds crossing the project area. Tribal and private ownership covers a smaller percentage of total watershed area than the remaining public lands; therefore changes would have less of an effect than those planned on public lands.

3.8 Sensitive Plants

3.8.1 Issues

No key issues related to sensitive plants were identified during the scoping process. The following analysis discloses effects of project activities on plants of Regional Forester Sensitive Species (RFSS) and their habitats as a secondary issue.

Indicators: Findings of the Biological Evaluation (BE) for RFSS Plant species (PR 5.7)

3.8.2 Affected Environment

The Shingobee project activities occur in the DMPO and DP LEs, plus minor activities in the TS LE. The project proposal does not include any treatments within the DMP, BHC, or MNH LEs.

The LE vegetation and Management Indicator Habitat (MIH) objectives of the Forest Plan (pages 2-59 – 2-61, 2-65 – 2-67, 2-77 – 2-79) set forestwide objectives for vegetation composition, structure, age, and tree diversity for the above-mentioned LEs where project activities would occur. 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. Likewise, the project proposal would provide some benefits to plant species, as well. The Wildlife BE (PR 5.0) provides analyses of the LEs and MIH objectives as potentially affected by the project activities in the BE for sensitive wildlife species.

In addition to composition and age objectives, the 2004 Forest Plan provides guidance regarding spatial distribution of forest vegetation (pages 2-23 – 2-24). The Wildlife BE (PR 5.0) provides details on the importance of large forest patches to animal RFSS species. These areas can similarly provide valuable habitat for some RFSS plants.

3.8.3 Direct and Indirect Effects

Scope of Analysis

Spatial Framework

The spatial boundary used to evaluate the direct and indirect effects to sensitive plants varies by species, and is included within the RFSS Plant BE for this project (PR 5.7).

Timeframe

Unless otherwise indicated within the RFSS Plant BE, the direct, indirect, and cumulative analyses consider activities that have occurred in the past 10 years and are projected to occur in the next 5 years. We used the last 10 years for determining the past effects in order to be consistent with age class distributions and to allow adequate time for past even-aged regeneration harvests and reforestation activities to be completed.

Effects by Alternative

Table 3-17. Summary of effects determinations for Regional Forester Sensitive Species (Plants) from the Biological Evaluation (PR 5.7).

Species	No impact	May benefit	May impact but will not contribute to a trend to Federal listing or loss of viability to population or species
Upward-lobed moonwort			A*, B
Crenulate moonwort			A*, B
Narrow triangle moonwort			A*, B
Little goblin moonwort			A*, B
Bluntlobe grapefern			A*, B
Pale moonwort			A*, B
Ternate grapefern			A*, B
Fairy slipper	A		B
Ram's-head lady's-slipper	A		B
Squirrel-corn	A		B
Goldie's woodfern	A		B
White fawnlily	A		B
Limestone oak fern	A		B
White adder's-mouth orchid	A		B
One-flowered broomrape	A		B
Northern bur-reed	A		B
Canada yew	A		B
Beauvois' spotted felt lichen	A		B
Beard lichen	A		B
* Determination of a "may impact" because of probable expansion of exotic invasive earthworms			

Alternatives A and B – Key Points from the Biological Evaluation

The existing vegetation in the Shingobee project area consists of a mosaic of upland conifer and hardwood forests, lowland conifer and hardwood forests, upland openings, and wetlands on public lands. Private lands include agricultural fields, upland and lowland forests, and wetlands.

All plant species of RFSS occur within seven principal habitat types found on the Chippewa: shallow water communities, nonforest wetlands, upland disturbed forest, forested wetlands, forested wetlands-cedar, mesic northern hardwoods, and diverse habitat.

Considering the wide variety of habitat located across the Shingobee project area, all community groups exist in the project area. In some instances, the habitat may occur in the project area, but the project activities would not affect the associated RFSS plants because of project design (mitigation) criteria and Forest Plan direction, or due to the sensitive plant

populations' location in relation to the proposed activities. Generally, the proposed project would not be detrimental to the continued viability of populations of sensitive species or their habitat in shallow water communities. Because project activities would not affect sensitive species inhabiting this habitat type, there likewise would be no cumulative effects. For the remaining habitat types, at least one species in the group is included in the analyses for the BE, and determined as either a moderate or a high risk for possible negative effects (PR 5.7).

One of the primary methods used in determining habitat components and locations present in the Shingobee project area for RFSS plants was through examination and analysis of the current forest type of site-specific common stand exam (CSE) data collected throughout selected portions of the project area. Another useful technique to determine potential habitat for RFSS plants is through examining (GIS) map layers of landtype and landtype phase data that occurs across the project area. The district hydrologist identified that the predominant landtype (LT) found in the project area is LT 15 – Fire Dependent Mixed Pine/Hardwood consisting of about 68%. Another 10% of similar LT 16 – Fire Dependent Mixed Pine/Hardwood (Oak Point) occurs in the northern portion of the project area. LT 75 – Fire Intolerant Conifer Swamp is about 9%, as well as minimal amounts of three other LTs comprise the remaining portions of the Shingobee project area. He further determined that the mesic oak/white pine forest landtype phase (LTP) (d), comprises the largest percentage of land (30%) within the project area. The next most abundant landtype phases are dry red pine forest LTP (c) and mesic northern hardwoods LTP (h), with each consisting of about 24% of the project area. Other landtype phases (LTPs) of smaller values make up the remaining mapped polygons (PR 5.6).

Mesic northern hardwoods (MNH) are areas that provide likely habitat for several RFSS plants, especially for many moonwort and grapefern species, as well as other species determined as a moderate or high risk from possible effects due to the proposed project activities.

LTs and LTPs are ecological map units based on similarities in soils, landform, rock types, geomorphic processes, and plant associations. This data provided a secondary source for determining probable habitat within the project area, and subsequent analyses of potentially affected RFSS known population plant sites or their habitat.

Forest personnel and contractors provided the bulk of the plant surveys conducted within the most likely habitat of each individual forest stand in preparation of the Shingobee Vegetation Management Project in 2011-2013. Other discovery dates of sensitive plants in the Shingobee project area include 1992-1994, 1997, 1999-2000, 2006, 2009, and 2011-2014.

Sensitive plants typically occur in specialized habitats of the above-mentioned seven principal habitat types. Prior to conducting rare plant surveys, a prefield review to assess stand conditions is done to determine areas for likely habitat of according to Forest screening criteria for each sensitive species. During the planning stages of the project, the ID team selected

various forest stands for RFSS plant surveys based on possible future consideration for harvest and other proposed project activities.

Plant Species Evaluated in Detail: Following are some key points of interest from sensitive species evaluated in detail. Full analysis is contained within the RFSS Plant BE (PR 5.7).

Upward-lobed moonwort and crenulate moonwort: (Mesic Northern Hardwoods) Habitat for both species on the Chippewa National Forest are in northern mesic hardwoods and lowland hardwood forest; all known populations on the Forest are co-located together, and near populations of little goblin moonworts, but they occur closer to wetter springy areas next to an open wetland. Neither species has a known population in the Shingobee project area, so any probable indirect effects by the proposed activities in Alternative B would occur primarily only to their unoccupied habitat, or less likely to possible yet undiscovered plants because of their extreme rarity on the Forest.

Narrow triangle moonwort: (Mesic Northern Hardwoods) Habitat for this species typically exists in northern mesic hardwoods and lowland hardwood forest; the species also occurs in other areas such as in old fields, old logging roads, and trails. This species has 4 populations in the project area. One population occurs near but outside of a stand proposed for harvest in Alternative B, and this is the only site within 250 feet of any proposed project activities. This site would receive a buffer zone around the population according to project mitigation measures to protect the plants from physical harm and any indirect effects to its habitat.

Little goblin moonwort: (Mesic Northern Hardwoods) Habitat for the species is primarily in northern mesic hardwoods and lowland hardwood forest; mesic deciduous forest with thick leaf layer, and relatively open understory; plants most often occurs in forest stands considered as hard maple/basswood. The little goblin moonwort has 3 populations within the Shingobee project area. One population occurs near but outside of a stand proposed for harvest in Alternative B, and this is the only site within 250 feet of any proposed project activities. This site would receive a buffer zone around the population according to the Forest Plan standard (S-WL-7) to protect the plants from physical harm and any indirect effects to its habitat. This small population of goblin ferns exists in a microsite habitat area with little or no adjacent appropriate habitat in the surrounding stands. Thus, because of the lack of any contiguous habitat for this goblin fern population, no additional implementation of other Forest Plan standards and guidelines sub-elements are necessary for the added protection of the plants or its habitat.

During the early planning stages of the project, the interdisciplinary team dropped various forest stands under consideration for harvest and other project activities because of documented RFSS populations, including a little goblin moonwort population, as well as other

MNH species' populations. By taking the above mentioned action to drop forest stands, the project is in compliance to the applicable Forest Plan Guidance for RFSS.

For all moonwort and grapefern species' that exist in mesic northern hardwoods, and especially the little goblin moonwort, these plants are vulnerable to the continued spread of invasive exotic earthworms that alter or destroy species habitat. Because of the decision to drop various proposed activities from stands where these species occur and other adjacent habitat, this action would aide in preventing new areas of ground disturbance that has the potential to spread earthworms on contaminated soil. As indicated, the application of protection buffers around the above-mentioned little goblin moonwort population and other moonworts or grapeferns, would likewise reduce the spread of earthworms near these populations. However, there is some slight potential to affect this unoccupied moonwort habitat or any undiscovered plants where the proposed activities would occur somewhat nearby.

Bluntlobe grapefern: (Mesic Northern Hardwoods) Habitat is primarily in northern hardwoods, especially near ephemeral pools in maple/basswood. This species has 2 known populations within the project area. One of the populations occurs within a stand proposed for a group selection cut in Alternative B. Again, this site would receive a buffer zone around the population according to project mitigation measures to protect the plants from physical harm and any indirect effects to its habitat.

Pale moonwort: (Upland Disturbed Forest) Habitat includes northern hardwoods, odd spots in pine habitat, and openings; often in disturbed habitats, log landings, roadsides, dunes, and sandy gravel pits. This species has 2 known occurrences within the Shingobee project area, but both populations are not anywhere close to the proposed activities in Alternative B. Because of the broad range of habitat of which pale moonwort can occur, the proposed project may have some slight potential to affect appropriate unoccupied habitat or any undiscovered plants. Thus, any indirect effects to the sensitive species' populations or its habitat by the proposed project activities are mostly minimal, if at all, because of its ability to tolerant disturbance.

Ternate grapefern: (Upland Disturbed Forest) Habitat are dry areas with short grasses, bracken and sweet fern, jack and red pine, aspen/fir, open areas within these types; or in margins of ephemeral pools in pines, spruce, and birch/aspen. This species has 4 known occurrences within the Shingobee project area. Two of the populations occur within stands proposed for a red pine thinning. The other population occurs near (within 250 feet) but outside of a stand proposed for harvest in Alternative B. All of these sites would receive placement of project mitigation buffers that would provide protection to the plants from the proposed activities, as well as minimizing any potential indirect effects to their habitat.

Fairy slipper and limestone oak fern: (Forested Wetlands-Cedar) Habitat for fairy slipper primarily occurs on hummocks in northern white cedar swamps; moist lowland conifer swamps

dominated by cedar with thick humus layer, and includes pine stands proximate to cedar (within 150 feet). Fairy slipper has 7 known populations within the project area. Limestone oak fern also occurs in lowland conifer swamps dominated by northern white cedar, and it has 5 known populations in the project area. For both species, none of these sites is anywhere close to the proposed activities in Alternative B. The Shingobee project proposal does not propose any cutting of their typical habitat, which are lowland swamps dominated by northern white cedar. Considering these factors, any indirect effects to these species' or their habitat by the proposed project activities are mostly minimal.

Ram's-head lady's-slipper: (Forested Wetlands-Cedar) Habitat is predominantly in white cedar swamps but the plants prefers more upland conditions; it also exists in the transition zone between upland hardwood and lowland conifer forests, where proximate to cedar (within 200 feet). The ram's-head lady's-slipper has 26 known populations within the project area. This species exists in swamps dominated by northern white cedar, and the Shingobee project does not propose any cutting of this habitat, as is typical for other current Forest projects. One of the populations occurs in cedar habitat on the boundary of an aspen stand proposed for harvest. The other population occurs near (within 250 feet) but outside of a stand proposed for harvest in Alternative B. Both of these sites would receive placement of project mitigation buffers that would provide protection to the plants from the proposed activities, as well as minimizing any potential indirect effects to their habitat.

Squirrel-corn, white fawnlily, and one-flowered broomrape: (Mesic Northern Hardwoods) Squirrel-corn and white fawnlily have very few populations on the Chippewa, and biologists anticipate that they inhabit only sites on the Forest within ¼ mile of large lakes such as Lake Winnibigoshish or Leech Lake. These two plants are visible for only a short time, so some yet undiscovered plants may occur in the project area, although unlikely because of their extreme rarity on the Forest. These two species do not have any known populations within the Shingobee project area. Regarding one-flowered broomrape, it likewise has no known populations in the project area, and it is also small and inconspicuous with unclearly defined suitable habitat requirements on the Forest. Considering these factors, any effects to all of these species would likely occur to their habitat rather than to individual plants by project activities in Alternative B.

Goldie's woodfern: (Mesic Northern Hardwoods) Habitat is typically in northern hardwoods or lowland hardwoods, most often in mature sugar maple/basswood forest. Most of the populations of Goldie's woodfern also occur near large lakes. The species has 3 known populations in the Shingobee project area, all clustered close together, but none of these sites occurs within 250 feet of any proposed activities in Alternative B. In areas where the project proposal includes harvesting within or adjacent to lowlands hardwoods, this activity has some slight potential to affect any unoccupied habitat for the species or any undiscovered plants.

Thus, any indirect effects to the sensitive species or its habitat by the proposed project activities are mostly minimal.

White adder's-mouth orchid and beard lichen: (Forested Wetlands) White adder's-mouth orchid Habitat is in lowland conifer swamps, generally dominated by white cedar; it also occurs in black ash swamps; usually at base of peat moss (Sphagnum) hummocks. The orchid has 9 known populations in the project area, but none of these sites occurs within 250 feet of any proposed activities in Alternative B. The beard lichen occurs on hardwoods in humid, mature to old growth white cedar or in ash bogs. Plant surveyors located 4 populations of beard lichen within the project area, but likewise none of these sites is near the proposed activities. Both of these species exist in swamps dominated by northern white cedar, which the project proposal is not proposing for cutting. Where proposed project activities do harvest trees immediately adjacent to cedar, this action has some slight potential to affect any unoccupied habitat for the two species or any undiscovered plants. Thus, any indirect effects to these sensitive species' or their habitat by the proposed project activities are mostly minimal.

Northern bur-reed: (Non-Forested Wetlands) Habitat typically occurs in bogs, sedge meadows, wetlands, lakes, streams, and shoreline; usually in floating muck mats or muck substrates adjacent to ponds, ditches, and moats. Plant surveyors located 8 populations within the project area. Two populations of the species occur within the stands proposed for harvest in Alternative B. Another two populations occur near (within 250 feet) but outside of a stand proposed for harvest in Alternative B. All of these sites would receive placement of project mitigation buffers that would provide protection to the plants from the proposed activities, as well as minimizing any potential indirect effects to their habitat.

Canada yew: (Diverse Habitat) Habitat for the species occurs in northern hardwoods, lowland hardwoods, lowland conifer, including cedar and ash swamps, or in moist sites in upland conifers; where found in pine stands, it occurs proximate to white cedar (within 300 feet). The species has 23 known populations in the project area, but these sites are not anywhere close to the proposed activities in Alternative B. Considering the diverse habitat where the species may occur, there is some slight potential to affect its unoccupied habitat or any undiscovered plants by the proposed activities in Alternative B, but any indirect effects are mostly minimal.

Beauvois' spotted felt lichen: (Diverse Habitat) Habitat typically is on soil, rock and tree bases, frequently over moss; the species generally prefers dry, open woods. The species has 1 known population in the project area, and the site is not anywhere close to the proposed activities in Alternative B. Again, because of its diverse habitat, there is some slight potential to affect its unoccupied habitat or any undiscovered plants by the proposed activities in Alternative B, and overall any indirect effects are mainly minimal.

3.8.4 Cumulative Effects

Scope of Analysis

Spatial Framework

The analysis varies by species and habitat type groups or guilds. The BE for RFSS Plant Species describes the spatial values used in analyses for each respective species, and is in the project file.

Timeframe

Analyses for all plant species used the same period of time as documented in the BE for RFSS Plant Species (PR 5.7).

Past, Present and Future Activities

The past, present, and reasonably foreseeable effects for plant species are identified and collectively analyzed as a group in detail in the BE (PR 5.7). The following are noteworthy conclusions relating to the cumulative effects for RFSS plant species.

Alternative A

The cumulative effect of no action would result in no additional ground disturbing activities or other actions that could contribute to possible effects to RFSS plants within the Shingobee project area. However, existing non-native invasive plant infestations will continue to spread at their current levels, including the continued spread of invasive exotic earthworms that affects many sensitive Botrychium moonwort or grapefern species because of earlier Forest projects or actions done on other ownerships. Overall, since Alternative A does not propose any new vegetation management activities, this action would not contribute to any new substantial cumulative RFSS species impacts.

Alternative B

Although we do not anticipate any negative impacts to RFSS plants that would result in a loss of viability or a trend to Federal listing as likely to result from the proposed project (including those private lands that are part of the project area), some actions may affect some RFSS species or habitat. Additionally, there are foreseeable actions among private concerns, counties, and the state of Minnesota that may affect these species or their habitats on nearby lands within in-holdings or on other ownership throughout the Chippewa National Forest and outside of the boundaries of the Forest. Past, present, and foreseeable actions on NFS lands within the Shingobee project area include a wide variety of Forest projects. As indicated, these

other activities could have resulted in spreading non-native invasive species (NNIS) plants or exotic invasive earthworms within portions of the Shingobee project area.

Some other actions that may occur within nearby areas on the Chippewa National Forest include continuation of forest openings maintenance, prescribed burning, NNIS control treatments including some herbicide use, trail and road maintenance, power right-of-ways maintenance, and other future vegetation management projects.

Although there are identifiable sources of cumulative impact that may affect various habitat elements of these RFSS species on lands adjacent to the project area on non-NFS lands, the proposed project would not contribute to any appreciable source of cumulative impact to these species that occur in the Shingobee project area or the adjacent lands. The project would only have anticipated minimal effects to individual plants, but not to the level where any incremental cumulative impacts are detrimental to these species or their continued viability.

Past and present disturbances, when added to reasonably foreseeable actions, all contribute to possible decreases in suitable or potential habitat for some sensitive plant species, depending on the location of the various activities. The degree of effects would vary depending on the number of entrances over time, the distribution of disturbance across the Forest or areas within the Shingobee project area, and number of acres disturbed.

3.9 NNIS

3.9.1 Issues

No key issues related to NNIS were identified during the scoping process. The following analysis discloses effects of project activities on the potential for introduction of new invasive species and contributing to the further spread of already present high priority plant species and exotic earthworms as a secondary issue.

Indicators: Findings of the Nonnative Invasive Species Specialist Report; Potential to contribute to further spread of already present high priority plant species; Potential to contribute to further spread of already present exotic earthworms

3.9.2 Affected Environment

Since 2001, the Chippewa National Forest has inventoried and documented 113 non-native invasive plant infestations in the Shingobee project area. These documented infestations include eleven different plant species. As indicated, these surveys located several infestations considered as high priority species' for invasive control according to listing in the Non-native Invasive Plant Management Environmental Assessment (NNIP EA 2011). These plants include garlic mustard (*Alliaria petiolata*), leafy spurge (*Euphorbia esula*), glossy buckthorn (*Frangula*

alnus), common buckthorn (*Rhamnus cathartica*), and Bell's bush honeysuckle (*Lonicera X bella*), which are likewise designated as a Chippewa National Forest priority high ecological risk species' (Larson 2013). Of these high-risk species, garlic mustard has the most known infestations in the Shingobee project area with 20 known populations, then common buckthorn (19 populations), and leafy spurge (3 populations). Glossy buckthorn and Bell's bush honeysuckle each have 1 known population within the Shingobee project area. The majority of these high-risk infestations do not occur within or near the proposed activities in the Shingobee project area. Table 3-18 displays the high priority plants and already known infestations within or near (100 feet) of the proposed activities.

Purple loosestrife (*Lythrum salicaria*) is an invasive plant that typically inhabits the edges of lakeshores, wetlands, or ditches. This medium/high risk priority species has 17 documented infestations in various locales, primarily along shorelines of lakes, across the Shingobee project area. For medium risk priority species, spotted knapweed (*Centaurea stoebe spp. micranthos*) has 10 known infestations and wild parsnip (*Pastinaca sativa*) has only 1 known infestation in the project area. The latter two species are included as high priority plants, but because of their relative lower invasiveness and overall medium risk ecological designation, they have a somewhat less concern of spreading because of proposed activities than the other species.

The majority (27) of the low risk priority known infestations are common tansy (*Tanacetum vulgare*), which typically occurs in disturbed open land habitat on the Forest. The next most abundant low priority species' in the project area with 13 documented infestations is Canada thistle (*Cirsium arvense*), and lastly hoary alyssum (*Berteroa incana*) with 1 documented population. These infestations occur throughout various sites within the project area where plant surveyors most often find invasive plants, which primarily is in disturbed open lands along roadsides, wildlife openings, gravel pits, and similar locales.

Non-native Invasive Species – Earthworms

Since the 1980s, forest observers have noticed the presence of invasive exotic earthworms on the Chippewa National Forest. There are no native earthworms in the post-glacial landscape of northern Minnesota. Earthworms have profound effects on ecosystems, particularly on soil structure, with potential effects on virtually all parts of the ecosystem, biotic and abiotic. Effects include threats to population viability of sensitive plant species and potential effects on forest productivity. (GLEW 2012).

Introduction of earthworms into northern Minnesota forests preceded knowledge of the problem by decades. Before the discovery of the problem, invasion by earthworms had occurred over much of the Chippewa National Forest.

Earthworms are widespread throughout the project area. Field employees trained in spotting earthworm infestation have reported that most stands dominated by deciduous trees have some degree of earthworm infestation. Reports of the degree of earthworm infestation are highly variable within stands and between stands. See EA Soils 3.6 for further discussion regarding exotic earthworms.

Management Objective

The action alternative is consistent with Forest Service Manual directives. Appropriate regulations include Forest Service Manual 2900 (USDA FS 2011). As indicated, any NNIS plant control activities in the project area would tier to and be conducted according to the Non-native Invasive Plant Management Environmental Assessment (NNIP EA 2011). These probable related actions would meet the intent of other Federal acts and authorities relevant to invasive species such as Executive Order 13112 (Federal Register 1999) and the Forest Service National Strategy and Implementation Plan for Invasive Species Management (USDA FS 2004).

All management activities in this project comply with relevant Chippewa National Forest Forest Plan Objectives and Guidelines for NNIS: O-WL-38, O-WL-39, and G-WL-25.

3.9.3 Direct and Indirect Effects

Scope of Analysis

Spatial Framework

Generally, the spatial boundary for direct effects is 100 feet and for any indirect effects, we would use up to a 500-foot maximum distance. The principal spatial boundary used to evaluate direct and indirect effects are the activity areas consisting of the proposed commercial harvest activities, site preparation activities in harvested stands, permanent opening maintenance, planting/seeding activities, new temporary road construction, water impoundment activities, and any other associated ground-disturbance included in the action alternative. In addition, analyses would consider possible indirect effects regarding the potential spread of NNIS plants to adjacent lands for a distance of up to 500 feet beyond the proposed activity areas in those locations proposed for ground disturbing activities.

For most of the proposed activity areas, this distance is within the boundaries of the project area, but several activity areas do occur near the outer project boundaries throughout the project area. At these locations, our proposed activities may have indirect effects for the potential to spread NNIS plants up to 500 feet beyond the outer project boundary where the disturbance occurs on the periphery of the Shingobee project area.

Timeframe

Generally, for most NNIS plants known within the project area, their seed remains viable in the soil from one to six years. For other species such as Canada thistle and purple loosestrife, their seed may lie dormant and remain viable for 15 to 20 years. Considering these factors, a 15 to 20-year timeframe is appropriate for non-native invasive plants (NNIPs), as well. For invasive earthworms, their effects may be longer, and addition research is required to make any long-term assessments.

If any NNIPs invade and develop new infestations within areas specifically disturbed by project proposals (in spite of implementing design criteria and control measures) developing effective control of new infestations may not occur until the end of this period.

Effects by Alternative

Table 3-18. NNIS high priority plants and known infestations within or near (100 feet) of proposed activities.

High Priority Invasive Plants and Ecological Risk Value	Number and Size (acres) of the Infestation(s)	Proposed Action – Alternative B Activities Near Infestation(s)
Leafy spurge (*Euphorbia esula*) – High Risk	1 population = 0.1	Aspen coppice cut – roadside site is on boundary of stand
Glossy buckthorn (*Frangula alnus*) – High Risk	1 population = 0.1	Paper birch group selection – single shrub near boundary at north end of stand
Common buckthorn (*Rhamnus cathartica*) – High Risk Note: The sites shown as 0.1 acres actually exist as 1-few shrubs, so infestations are much smaller. The sizes of the populations were rounded up to 0.1 acre.	1 population = 0.7 1 population = 0.3 2 populations = 0.2 1 population = 0.1 1 population = 0.1 1 population = 0.1 1 population = 0.1 1 population = 0.1 1 population = 0.1 1 population = 0.1 1 population = 0.1 1 population = 0.1	Site is in a red pine thinning Site is in an aspen coppice cut Each site of 0.1 ac are in an aspen clearcut Site is in a pine/hardwood thinning Site is in an aspen coppice cut Site is in a white oak/red oak/hickory clearcut Site is in a red pine thinning Site is in a paper birch group selection Site occurs roadside next to aspen coppice cut Site is about 60 feet from aspen coppice cut Site is across the road from aspen coppice cut Site is about 100 feet from aspen coppice cut
Spotted knapweed (*Centaurea stoebe spp. micranthos*) – Medium Risk	1 population = 0.2 1 population = 4.1	Aspen clearcuts (2 stands) – roadside population occurs through both stands Site is in gravel pit about 90 feet from red pine thinning. Temp road is in-between pit/stand
Wild parsnip (*Pastinaca sativa*) – Medium Risk	1 population = 1.5	White oak/red oak/hickory clearcut – roadside population begins at north boundary of stand. Site is mostly north of the stand.

Alternative A

Non-native invasive plant populations will likely increase within the project area regardless of the alternative selected, including no action. Active non-native invasive plant colonization and establishment as influenced by ongoing activities other than the proposed Shingobee VMP would continue at current rates within the project area. Any change to the rate of spread of NNIS plants would depend upon existing Forest projects that overlap the project area and any other future invasive plant control done according to the Non-native Invasive Plant Management EA within or adjacent to the project (NNIP EA 2011). The rate of spread under the no action alternative would be less in the short-term because it would not increase ground disturbance.

Similarly, the spread of invasive exotic earthworms would likewise continue at current levels because of fewer disturbances, and a reduced probability of movement of contaminated soil.

Alternative B

The primary indicator used in the following analyses are how the proposed project activities would potentially contribute to further spread of already present high-priority invasive species'.

The next high-risk species with the most infestations (19 populations) in the Shingobee area is common buckthorn. Of these populations, 13 sites occur in the proposed stands for harvest or they exist within 100 feet, so there is potential for the project activities to contribute to the spread of the species. The documented largest populations are at one site in stand 28, which is about 0.7 acres proposed for a red pine thinning, and another site of 0.3 acres in stand 93 (aspen coppice). Two sites each 0.1 acre in size occur in the same aspen clearcut. The remaining sites are extremely small consisting of one to a few shrubs in size, so for consistency the acreage total for each site is round up to 0.1 acre. Five of these populations occur within the boundaries of various proposed harvests with 1 in a pine/hardwood thinning, 1 is in paper birch group selection cut, 1 in a white oak/red oak/hickory clearcut, 1 in an aspen coppice cut, and another in a red pine thinning. Another 4 populations occur adjacent or within 100 feet of proposed activities in Alternative B (Table 3-18).

Because of the greater ground disturbance, the coppice and clearcuts have the greatest potential for spreading the shrubs through movement of the existing seed source, and opening of the tree canopy that may facilitate germination of the seed at these sites. Depending on the proximity of the shrubs to project activities and the level of disturbance at the nearby common buckthorn sites, there is some increased probability of spreading the invasive plants as compared to other locales of the Shingobee project area. Where project activities occur more than 100 feet from the invasive shrub sites, it is unlikely that the proposed action would directly

contribute to spread of the species. Birds and animals may still disperse the fruit to the stands proposed for harvest and other activities.

Leafy spurge is another high-risk species, which has 3 populations recorded within the Shingobee project area. One small roadside infestation of about 0.1 acre occurs on the boundary of a stand proposed for a coppice cut. The other two populations are not near any of the proposed project activities In Alternative B.

The remaining high-risk species known in the project area include glossy buckthorn and Bell's bush honeysuckle, each with 1 documented population. The glossy buckthorn infestation of one shrub occurs at the north part of a stand proposed for paper birch selection cut. No project activities occur anywhere near the Bell's bush honeysuckle population in Alternative B.

Purple loosestrife is medium/high risk species, which has 17 populations in the project area. None of these infestations occurs anywhere close to the proposed project activities.

Regarding the medium risk species with known populations in the project area, spotted knapweed has 10 populations and wild parsnip has 1 known population in the Shingobee area. Of these sites, 2 populations of spotted knapweed each occur in stands proposed for an aspen clearcut. Similar to other sites that would receive substantial ground disturbance, this action may contribute to spreading the species depending on the level of disturbance and its proximity to the invasive plants in the stand. Another infestation exists within a gravel pit that occurs about 90 feet from a stand proposed for thinning. The proposal would include constructing a temporary road nearby in-between the stand and gravel pit. The wild parsnip population occurs in a roadside infestation that is at the north boundary of a proposed oak clearcut, but most of the infestation is beyond the stand to the north. For the activities proposed nearby the known NNIS populations, these actions would not directly contribute to further spread of the species, but indirectly the nearby harvest would provide appropriate conditions for the species to colonize adjacent portions of the harvest area.

By properly implementing project-level design criteria and appropriate BMPs, the Chippewa National Forest anticipates a low to moderate risk for new introductions and for the overall possible spread of NNIS plants associated with the proposed project activities. Because NNIS plant infestations occur throughout the project area, there is potential for disturbance from logging activities and other ground-disturbing activities that indirectly could spread invasive plants to some degree or provide new areas for them to colonize by the action alternative. Current inventories show that NNIP populations exist primarily along roads and trails leading to them. Some infestations are concentrated near gravel pits. These areas are the locales with the greatest likelihood for project activities directly contributing to the spread of invasive plants. Other invasive plants occur in less abundance in forested areas along other roads and

trails. Locales further to the interior of the forest contain fewer infestations and much reduced net infested acres in population areas of all terrestrial NNIP species.

A similar analysis of the proposed action and comparison to the no action alternative is appropriate in determining likely effects by exotic invasive earthworms and their possible spread due to increased movement of contaminated soil by the proposed project activities. Thus, the likelihood for earthworm expansion is greater in those areas where the proposed project activities would create more ground disturbance. As indicated, field personnel have observed earthworms across the project area, but Forest has not yet completed a comprehensive project-level inventory of invasive earthworms. Reports of earthworm infestations are highly variable across portions of the project area, including those areas within or near proposed activity areas. See 3.6 Soils section of the EA for further discussion regarding exotic earthworms.

3.9.4 Cumulative Effects

Scope of Analysis

Spatial Framework

The spatial framework for cumulative effects is much the same as described in the direct and indirect effects section. Possible cumulative effects regarding the potential spread of NNIS plants to adjacent lands is likewise appropriate for a distance of up to 500 feet beyond those areas proposed for ground disturbing activities. The spatial boundary used to address cumulative effects is the project area, and where our proposed activities lie at the outer project boundaries, this distance would extend 500 feet beyond the project area. Regarding cumulative effects, the spatial distances are equal to the direct and indirect effects. However, those other connected actions of non-Shingobee VMP activities would also contribute to possible spread of NNIS.

Timeframe

The cumulative effects timeline is the same as described in the direct and indirect effects section.

Past, Present and Future Activities

Alternative A

The cumulative effect of no action would be to allow these alien and invasive species to spread, largely unabated in most locations across the Shingobee VMP area. Because this alternative does not propose any new ground disturbance the spread of NNIS would occur because of

existing infestations already in the project area, and their movement would continue at current rates. The rate of spread would be less than the proposed action. Risks to rates of NNIS plant expansion under this alternative would depend upon human disturbances and available funding to mitigate effects caused by those actions or activities not associated with the Shingobee VMP. Other Forest projects or actions done on other ownerships may provide some limited indirect NNIP control in selected locales of the project area, but the cumulative effect would result in further spread of invasive plants. Again, with no action, the primary avenue for conducting NNIP control in the project area would be through the invasive control activities in the Non-native Invasive Plant Management EA (NNIP EA 2011).

Alternative B

Non-native invasive plants and exotic invasive earthworms occur throughout the cumulative effects area on NFS lands, as well as adjacent county, state, private, or other ownership. For many species, establishment of these populations occurred prior to the existence of the Chippewa National Forest or NFS ownership.

Invasive plants and invasive earthworms will continue to invade and spread across the landscape. The cumulative effect of implementing the action alternative combined with ongoing human and natural disturbances is the continuing spread of these species. The actions and processes differ in various locations in the project area and across the Forest, so the rate of spread would also differ. Vehicles, equipment, wind, rain, animals, and humans have the potential to carry invasive plant seed or contaminated soil with invasive earthworm cases to new and currently uninfested areas. This spread really has no limit other than the susceptibility of the receiving habitats. Given the inherent susceptibility of some habitats across the Forest and within the project area, spread is likely.

At the same time, Forest-wide NNIS plant management and site-specific project level control activities are increasing, which may result in reduced invasive plant populations. By diligent and proper application of invasive plant control treatment using an integrated pest management process in appropriate areas where feasible and necessary, we anticipate a further reduction for the possible spread of NNIS plants through implementation of the Non-native Invasive Plant Management Environmental Assessment. Private landowners are sporadically taking action against NNIPs on their lands, with some actions possibly occurring within the project area. Site-specific design criteria prevention measures like equipment cleaning identified for the Shingobee VMP would also help in controlling the problem.

3.10 North Country National Scenic Trail

3.10.1 Issues

No key issues related to NFS recreation trails or scenic resources were identified during the scoping process. The following analysis discloses effects of project activities on the North Country National Scenic Trail (NCT) and its scenic resources as a secondary issue.

Indicators: The number of proposed vegetation harvest units, by harvest type and the associated acreage of units adjacent to the NCT.

3.10.2 Affected Environment

The NCT passes through a wide variety of ownerships within the Chippewa National Forest. The trail's travel way is through southern portions of the Forest for approximately 72 miles and through the Shingobee Project for about 7 miles (Appendix A map). The NCT is designated as nonmotorized trail. Other nonmotorized uses such as biking, horse riding, and cross-country skiing occur within the NCT corridor.

The Forest Service works with the North Country Trail Association (NCTA) and follows NCTA timber harvesting guidance (PR 5.9) to minimize impacts to the scenery along the trail and recreation in areas managed for timber.

The NCT Scenic Integrity Objective (SIO) is high per Forest Plan Administrative Correction 7, Change to SIO Map (August 18, 2006). By Forest Plan Correction 7, "[SIOs] guide the amount, degree, intensity, and distribution of management objectives needed to achieve desired scenic conditions." Further, a High SIO is defined as, "Landscapes where the valued landscape character appears intact. Deviations may be present, but must repeat the form, line, color, texture, and pattern common to the landscape character, so completely and at such a scale that they are not noticeable" (Forest Plan, Glossary-24).

Timber management within the NCT travel way follows Forest Plan standards, objectives, and guidelines to mitigate impacts (D-REC-7, page 2-39; O-SC-1, G-SC-1, G-SC-4, G-SC-5, G-SC-6, pages 2-45, 2-47).

3.10.3 Direct and Indirect Effects

Scope of Analysis

Spatial Framework

The spatial framework used to evaluate direct, indirect, and cumulative effects are treatment stands on NFS administered lands, one-quarter mile from the *actual location* of the NCT travel way (Forest Plan, pages 2-45, 2-46) within the project area (Appendix A).

Timeframe

The direct, indirect, and cumulative analyses consider activities that have occurred in the past 10 years and are projected to occur in the next 5 years. The past 10 years are used to be consistent with age class distribution and 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.

Effects by Alternative

Table 3-19. Harvest type and number of units adjacent to the North Country National Scenic Trail (NCT).

Alternative	Harvest Type	Number Harvest Units	Acres
A	Regeneration	0	0
	Intermediate	0	0
	Thin	0	0
B	Regeneration	5	160
	Intermediate	1	21
	Thin	4	275

Table 3-19 shows regeneration harvests (clearcut with reserve trees creates a uniform young age class) in 5 stands (160 acres), intermediate harvest (group selection which creates multi-age tree canopy), and thinning in 4 stands (275 acres). The intensity of harvest treatment decreases from regeneration to intermediate to thinning harvests.

Alternative A

Under Alternative A, the NCT travel corridor would receive routine maintenance such as mowing, signing, and brushing. There would be no harvest treatments and no direct, indirect, or cumulative effects.

Alternative B

Under Alternative B, impacts to the NCT's High SIO would occur to various minor degrees, depending on the type of harvest occurring adjacent to the NCT travel way. Regeneration harvests which create a 0-9 age class would have a greater impact on the NCT's High SIO than intermediate group selection harvests or thins. Intermediate harvests (group selection) would create a mixed age canopy and small openings in treatment units adjacent to the trail. Thinning typically creates a more natural appearing stand by developing a variety of size classes.

Harvest operations require access trails. The access into the stand can be mitigated by cutting routes parallel to the High SIO corridor to reduce unnatural appearing lines. Edges of cut units may also be feathered to reduce the straight line appearance and blend with the scenery (Forest Plan, pages 2-45, 2-46).

Forest management activities would result in little to no disruption of recreational activities as most harvest would either occur outside periods of high use (Forest Plan, page 2-39). Trail tread impacts would be mitigated under provisions included in timber sale contracts.

Visual harvest impacts are typically most visible for the first two years after harvest or until the ground cover reestablishes. Five years after harvest, ground cover, understory species, and young trees are typically found throughout the treatment unit. In some instances, the NCT may be relocated for a few years; however, passage through harvested stands may also afford recreational viewing opportunities (for example, watching wildlife).

Harvest operations afford wildlife viewing and hunting opportunities because the young vegetation often attracts deer and grouse. Post-harvest site prep in regenerated stands may aid in recolonization of native plants into newly exposed mineral soils (EA, section 3.1). In intermediate harvest stands, clumps of trees provide micro habitats, perches and nest sites and bird watching opportunities.

3.10.4 Cumulative Effects

Past, Present and Future Activities

Timber harvests have occurred adjacent to the NCT travel way in the past and will continue to occur in the future because the Chippewa National Forest actively manages forest resources. Harvest operations are temporary, generally less than 5 years; therefore, there are no cumulative effects.

3.11 Hazardous Fuels

3.11.1 Issues

No key issues related to hazardous fuels were identified during the scoping process. Fuels are addressed as a secondary issue. However; due to the current Condition Class 3 designation, 732 acres of red pine thinning is proposed in the Condition Class 3 areas. Thinning treatments would help move the Condition Class 3 areas to a Condition Class 2 by the rearrangement of the pine canopy to reduce the continuity of the tree crowns.

Indicator: Acres red pine thinning.

3.11.2 Affected Environment

A majority of the area has been identified as Condition Class 3. Condition Class 3 is described as a departure from the historical natural fire regime. This departure (which is a high departure) results in changes to one (or more) of the following ecological components: vegetation characteristics (species composition, structural stages, stand age, canopy closure, and mosaic pattern); fuel composition; fire frequency, severity, and pattern; and other associated disturbances (e.g., insect and disease mortality, grazing and drought).

Commercial thinning is proposed on 964 acres (less than 1% of the project area). The composition of these plantations includes 732 acres of red pine; 19 acres of white pine; 11 acres of white pine/red oak/white ash; and 184 acres other pine/hardwood. Nonconifer species such as northern hardwoods and aspen stands are not included in this analysis because of the low frequency of fire occurrence and very low potential for crown fire development.

3.11.3 Direct and Indirect Effects

Within the project area the majority of the forest is classified as a Condition Class 3. Fire management's goal is to move the current Condition Class from 3 to a Condition Class 2. The benefit realized is in moving the current Condition Class 3 towards Condition Class 2. Thinning is a means to reach this fire management goal. This action would potentially reduce the risk for catastrophic fire; therefore, enhancing public safety, reducing the effects of severe fire, and over the long term, restoring the forest to desired fuels conditions.

Scope of Analysis

Spatial Framework

Direct, indirect, and cumulative effects are at the stand scale; specifically, the proposed thinning of 732 acres in red pine plantations. It is assumed that thinning provides a beneficial

response in fuels reduction; particularly when red pine plantations are adjacent to other red pine plantations (rearrangement of the pine canopy to reduce the continuity of the tree crowns).

Timeframe

The duration of effects from red pine thinning would be at least 5 years prior to and 5 years after the activity harvest date.

Effects by Alternative

Alternative A

Under Alternative A, with no thinning activities, no Condition Class improvement would occur. Fuel loads would increase over time as the stands aged. In addition, susceptibility to insect, disease, and wind events would increase in these stands and eventually contribute to higher fuel loads as well. 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 would likely increase.

Alternative B

The proposed thinning of 732 acres of red pine would likely result in a wildfire staying on the ground. Wildfire behavior is affected by crown density, crown base heights, and ladder fuels. Conifer thinning reduces crown density, raises crown base heights, and decreases ladder fuels. This would allow for safe and cost effective suppression action by initial attack fire crews.

Under Alternative B, proposed thinning in red pine plantations would move these stands from a Condition Class III towards a Condition Class II. This positive direction contributes to desired conditions for vegetation characteristics; fuel composition, and other associated disturbances. The activity fuels created would be lopped and scattered throughout the thinning sites. Initially, the activity fuels produced by a recent thinning could promote increased fire behavior if a wildfire were to develop in the thinned area. However; due to the generally moist growing season and warm, humid summers, the activity fuels would eventually deteriorate (decay) to a point where they would not remain a factor of crown fire development. (Innes, North, and Williamson 2006).

3.11.4 Cumulative Effects

Past, Present and Future Activities

Forest Service

Commercial thinning in red pine stands has been a common occurrence in the recent past. About 2,285 acres of plantation origin red pine thins occurred under a 2012 decision; however, none of these stands are adjacent to proposed Shingobee project red pine thins. Thus there are no cumulative effects.

State of Minnesota and Cass County

There are about 5,784 acres of State and County lands (combined) in the project area. Commercial thinning in red pine is common. The State and County stands layer was compared to the Forest Service's stands layer and no State or County red pine stands were found adjacent to Forest Service red pine stands; therefore, there are no cumulative effects.

Private Lands

Due to the lack of data acres of red pine thinning on private land within the project area is unknown. Information on these lands is limited and difficult to obtain. For the purpose of analysis, the following assumptions were made. Agricultural lands were developed decades ago and would not be expected to change substantially in the near future. There may be a decline in some farming activity resulting in some lands slowly reverting to shrubs or forest. Based on patterns elsewhere, these residents would likely be interested in maintaining the aesthetic values of their properties. Harvesting on these lands would likely occur, however the amount of planned harvest is unknown.

3.12 Heritage Resources

3.12.1 Issues

The following analysis discloses effects of project activities on heritage resources as a secondary issue. No issues specifically addressing archeological and historic sites were received in scoping. Tribal gathering and traditional uses (potential traditional cultural properties) has been discussed in Section 3.2.

3.12.2 Affected Environment

The general area contains numerous heritage resource sites resulting from human settlement and other activities over the last 10,000 years. These include camping sites, villages, special

activity areas such as wild rice processing sites, cemeteries, and sites of spiritual and traditional use. There is also evidence of a wide range of later historic activities ranging from the fur trade up to and including Forest Service administrative sites which are still in use today. Common late historic sites include those associated with mineral exploration, settlement, logging, fur trapping, resorts, and recreational dwellings such as cabins.

The Shingobee project area has been occupied by various densities of people over the last 10,000 years. The main impacts on the landscape were fire related, with periodic "prescribed" burning. The larger populations of the last several centuries prior to the arrival of Europeans created greater impact within the ecosystems than previous occupations. Through treaty and federal legislation most of the ancestral lands of the Ojibwe people were ceded and opened to logging, farming, and permanent settlement by Euroamericans in the late 19th century. This era of increased use, settlement, and fire suppression forever changed the character of the area in a number of ways (less white pine, decline in fire dependent pine forests, increase in hardwoods, balsam fir, and shrubs). The practice of temporarily damming waterways to provide flow for floating logs during the early pine logging also altered both terrestrial and aquatic habitats within the watersheds.

Although much of the land within the project area has been surveyed to some extent for evidence of heritage sites (by use of historic records and field examination), the inventory is far from complete as it has been focused on planned project land areas only. Only a small portion of the known heritage sites have been subject to more extensive evaluation of their eligibility for the National Register of Historic Places. Most often, known heritage resources, (usually archeological sites), are simply excluded from the project area. Sites include earliest periods of human occupation down to the industrial logging period, homesteading, and more recent Ojibwe occupation.

Tribal gathering and traditional use areas have been identified, but the National Register eligibility of these sites as traditional heritage properties has not been evaluated. Instead, the continued management of these areas and effect of this proposal on the commodities gathered is being considered.

Management Objectives

Investigations of heritage resources for this project follow the implementing regulations of Section 106 (36 CFR 800) of the National Historic Preservation Act (PL 89-665; 16USC470) as amended 1992, to fulfill National Environmental Policy Act requirements. Information concerning the location and nature of heritage resource sites is protected from public disclosure by the National Historic Preservation Act, the Archeological Resources Protection Act (PL 96-95), and is exempt from information requests under the Freedom of Information Act.

All management activities in this project comply with relevant Chippewa National Forest (CNF) Plan Objectives and Guidelines for Heritage Resources (Forest Plan, p2 - 38-39).

3.12.3 Direct and Indirect Effects

Scope of Analysis

Spatial Framework

Cultural resources are analyzed within treated units.

Timeframe

There is no timeframe on heritage sites as they are protected from any activity.

Effects by Alternative

Alternative A

No treatments are being done, so there are no effects.

Alternative B

There are known archeological sites in the Shingobee Vegetation Management Project area. If any sites are found during treatments, the work would stop and the site would be subsequently avoided.

3.12.4 Cumulative Effects

There are no direct or indirect effects; therefore, no cumulative effects.

3.13 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 MN, twice the state percentage is 21.2 percent for low-income and 27.4 percent for minority populations (US Census Bureau

2010). About half of the project area is within the boundary of the Leech Lake Band of Ojibwe Reservation; however, no management activities are proposed on Oak Point Peninsula. The Reservation has a minority population of 42.1 percent and 21.2 percent of the population is below the poverty level. Since Reservation numbers are at or exceed the state numbers, an Environmental Justice assessment is necessary.

The minority population in the vicinity of the project area is predominately Ojibwe Indian. Tribal members and local residents may use the project area for hunting, recreation and gathering activities. Native American communities contacted during scoping include the Local Indian Councils and the Division of Resource Management Leech Lake Band Ojibwe (Section 1.6).

This environmental assessment incorporates an analysis of issues, concerns, and effects that may be specific to Environmental Justice issues through:

- Scoping of Ojibwe communities through mailings to Local Indian Council meetings (Sections 1.6 and 3.2, PR 3.0.0, PR 3.0.0a, PR 3.0.2, PR 3.0.2b, PR 3.0.10)
- Scoping and meetings with the LLBO Division of Resource Management staff (PR 3.0.1, PR 3.0.1a, PR 3.0.3, PR 3.0.7, PR 3.0.8, PR 3.0.11, PR 3.0.12)
- Consultation with the Tribal Historic Preservation officer (PR 3.0.4, PR 3.0.4a)
- Archaeological and traditional cultural property surveys (*in* Project File 9_PriviledgedInformation(non-FOIA))

A discussion on tribal rights and issues can be found in Tribal Interests 3.2 and Heritage Resources 3.12. Please refer to those sections for summaries on tribal concerns and how the Forest used that information in Alternative B. Mitigation measures are applied to provide for traditional resources.

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 activitiesproposed 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 alternative 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 disproportionate hardship on minorities, low-income people, or local communities and would not produce hazardous waste or conditions that might adversely affect local populations.

There are no direct, indirect, or cumulative effects associated with environmental justice found in the Shingobee Vegetation Management Project.

3.14 Economics

For this 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 non-market benefits and a lack of widely accepted standards for doing so. The project record contains detailed information about this economic analysis.

3.14.1 Issues

There were no key issues as a result of scoping this project. Effects to economics resources are disclosed in this section as a secondary issue.

3.14.2 Affected Environment

The affected environment for this project is the local economy and communities around the Chippewa National Forest and Cass County.

Management Objective

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 non-commodity 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 2004 FEIS Appendix J, Response to Public Comments, pages 426-450). An economic analysis was included in the FEIS for the Forest.

3.14.3 Direct and Indirect Effects

Effects by Alternative

Table 3-20. Quicksilver results.

Factor	Alternative A	Alternative C
Estimated volume of timber harvested (CCF)	0	41,860
Present Value of timber harvested	0	$1,376,349.00
Present Value Costs of associated sale preparation, administration, reforestation activities	0	$1,260,943.00
Present Net Value	0	$ 115,406.00
Benefit/Cost Ratio	NA	1.09

Alternative A

Alternative A has no dollar costs or benefits; 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

The benefit/cost of Alternative B was generated with the Quick Silver program for all proposed activities are shown in Table 3-20. These numbers reflect the benefits and costs associated with timber harvest, reforestation, and habitat improvement. The Alternative B benefit/cost ratio is shown in (Table 3-20). Alternative B cuts 3,022 acres and implements over 1,000 acres of reforestation activities which reflect a positive benefit/cost ratio. Alternative B harvest treatments would bring economic benefits to local workers.

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 (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 3-21 provides some context in terms of the volume offered and sold, volume harvested, and uncut volume under contract for the Chippewa National Forest.

Table 3-21. Timber target, volume offered and sold, volume harvested, and uncut volume under contract, and acres offered by FY.

	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Timber Target	37,110 MBF	42,810 MBF	42,810 MBF	44,500 MBF	46,000 MBF
Volume Offered & sold[1]	35,414 MBF	44,154 MBF	43,706 MBF	46,695 MBF	51,982 MBF
Volume Harvested	25.6 MMBF	35.7 MMBF	34.8 MMBF	33,.7 MMBF	49.1 MMBF
Uncut volume under contract	94.5 MMBF	102.9 MMBF	109.8 MMBF	122.5 MMBF	125.4 MMBF
[1]/ From FY 2013 Monitoring and Evaluation Report, Chippewa National Forest.					

The volume sold in FY 2013 was 51,982 MBF and the sell is expected to maintain closely to 47,500 MBF. The uncut volume under contract has steadily increased since FY 2009 and has held at about 120 MMBF for two years. The increase in harvest volume can be explained by improved economic conditions and the 2012 blowdown event on the Forest.

This project and others the forest is currently working on will contribute to the volume offered and sold. Because it takes a year or more before the harvest treatments planned are prepared for sale and finally offered, Shingobee Project sales will likely be part of the FY 2017 or FY2018 out year timber sale programs.

Nonmonetary benefits associated with this Project include riparian improvement to increase diversity and wildlife habitat improvements such as opening maintenance and seeding/planting.

Alternative B implements portions of the Forest Plan and incrementally contributes to the economic factors listed in the analysis in the FEIS. Alternative A does not implement the economic factors for the FEIS and does not incrementally add monetary values to the local economy.

3.15 Other Disclosures

No key issues related to air quality or roads were identified during the scoping process.

3.15.1 Air Quality

Air Quality was not raised as an issue, but particle emissions from prescribed burning and wildfires can impact human health and smoke can reduce visibility.

Under Alternative B, there are no proposed prescribed fires. There are no direct, indirect, or cumulative effects associated with air quality found in the Shingobee Vegetation Management Project.

3.15.2 Forest System Roads (FSR)

Forest System Roads (FSRs) and unauthorized (nonsystem) roads within the project area were previously evaluated to determine the minimum transportation system as part of the 2007 Steamboat Decision. These existing FSRs still provide access to management areas. No further road analysis or road decommissioning was proposed under Alternative B.

Temporary roads are in EA section 2.2.2.

Chapter 4 Finding Of No Significant Impact (FONSI)

A. Context

This decision is consistent with the activities implemented by the Chippewa National Forest, which lead toward achieving the goals, objectives and requirements in the Forest Plan identified for the management areas within the project area (Forest Plan, Chapter 2 and 3), while meeting the purpose and need of the EA. This project is tiered to the Forest Plan, and all of the expected impacts from this project are consistent with the expected impacts disclosed in the Final Environmental Impact Statement for the Forest Plan.

B. Intensity

I have determined the following with regard to the intensity of the project. Bold items are directly from 40 CFR 1508.27):

1. Impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes the effect will be beneficial.

The beneficial effects of the action do not bias my finding of no significant environmental effects. Impacts associated with my decision are discussed in Chapter 3 of the EA. The environmental assessment provides sufficient information to determine that the Shingobee Vegetation Management Project will not have a significant impact (beneficial or adverse) on the land and its natural resources, air quality, or water quality (EA, Chapter 3, pages 21-86).

2. The degree to which the proposed action affects public health or safety.

The chosen alternative would not degrade air quality. Hazardous fuel loads would be reduced through commercial thinning of pine plantations. The chosen alternative would not degrade public water supplies. Considering the effects disclosed in Chapter 3 of the EA, and the information contained in the project file, I conclude that implementing the chosen alternative with mitigation would not significantly affect public health or safety.

3. Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.

There are no parklands, prime farmlands, or wild and scenic rivers affected by the Shingobee Vegetation Management Project. In addition, the supporting documentation located in Chapter 3 of the EA and the project file provides sufficient information to determine that this project

will not affect any known unique characteristics of the geographic area such as cultural resources (pages 79-81) or wetlands (pages 52-57). The project treats a portion of Stony Point on Leech Lake, a unique biological area. Treatments are consistent with Forest Plan direction (Forest Plan 2004, pages 3-26 and 3-27).

4. The degree to which the effects on the quality of the human environment are likely to be highly controversial.

The degree of controversy with regard to effects on the quality of the human environment are limited and considered not significant based on comments received during the scoping and the comment periods (EA, section 1.8, and Appendix C). Differing opinions do not indicate controversy.

5. The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.

Timber harvest, hazardous fuels reduction, site preparation, planting, tending, temporary road construction and decommissioning, wildlife opening maintenance, nonstructural riparian improvements, and trail maintenance activities have occurred previously on the Chippewa and other national forests. No impacts to the human environment that are highly uncertain or involve unique or unknown risks have been identified in this analysis.

6. The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.

Timber harvest, site preparation, planting, wildlife opening maintenance, riparian improvement, and temporary road construction and decommissioning are well-established practices on the Chippewa National Forest and do not establish a precedent for future actions. The Chippewa National Forest Land and Resource Management Plan allocates areas scheduled for activity to management areas that allow for such activities (EA, section 1.2.3).

7. Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.

There would be no significant cumulative effects as a result of this project beyond those discussed in the Chippewa National Forest Land and Resource Management Plan. I have reviewed the impacts of those past, present, and reasonably foreseeable actions described in the Environmental Effects Section of the EA (pages 21-86) and find that this action will not have a significant cumulative impact on the environment.

8. The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.

A cultural resource inventory has been completed for this project. The Cultural Resources Report and EA disclosure (pages 79-81), project file, Tribal Historic Preservation Office and State Historic Preservation Office consultation indicate that no properties eligible for or listed on the National Register of Historic Places are within the project's area of effect. The potential for impacting yet undiscovered sites is adequately mitigated in Forest Plan Standards and the timber sale contract. Based on this information, I conclude that this action will not cause loss or destruction of significant scientific, cultural, or historical resources. (EA, sections 3.2 Tribal Interests; 3.12 Heritage Resources)

9. The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.

Based on the information disclosed in the EA (section 3.4) and the Biological Assessment (PR 5.5), adverse effects are anticipated for northern long-eared bat as a result of implementing this decision. These adverse effects are exempted from "incidental take" under a 4d rule that exempts standard forest practices. The Biological Assessment and letter requesting written concurrence (gray wolf) and formal consultation for the northern long-eared bat from the U.S. Fish and Wildlife Service will be sent in early May 2015. No decision will be made until concurrence and a Biological Opinion for northern long-eared bat is received from the U.S. Fish and Wildlife Service.

10. Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.

Laws imposed for the protection of the environment provided the framework for the 2004 Chippewa National Forest Land and Resource Management Plan. From the documentation provided in the EA, the project file, and Other Findings Required by Law, I find that the proposed activities do not threaten a violation of Federal, State, or local law imposed for the protection of the environment.

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