United States Department of Agriculture
Forest Service

Laurentian Vegetation Management Project

Environmental Assessment

Deer River Ranger District, Chippewa National Forest, Itasca County, Minnesota

November 2014

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1. Purpose and Need

1.1. Document Structure

The Forest Service (FS) 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:

- Introduction: The section includes information on the history of the project proposal, the purpose of and need for the project, and the agency's proposal for achieving that purpose and need. This section also details how the Forest Service informed the public of the proposal and how the public responded.
- Comparison of Alternatives, including the Proposed Action: This section provides a more detailed description of the agency's proposed action as well as any alternative methods for achieving the stated purpose. Alternatives would be developed based on significant issues raised by the public and other agencies. (This EA has only one action alternative the Proposed Action.) This discussion also includes possible mitigation measures. Finally, this section provides a summary table of the environmental consequences associated with each alternative.
- Environmental Consequences: This section describes the environmental effects of implementing the proposed action. 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 that provides a baseline for evaluation and comparison to the Proposed Action that follows.
- Finding of No Significant Impact – this section provides information about the effect on the human environment of the proposed actions.
- Agencies and Persons Consulted: This section provides a list of preparers and agencies consulted during the development of the environmental assessment.
- Appendices: The appendices provide more detailed information to support the analyses presented in the environmental assessment.

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

1.2. Background

This project area is located in the eastern portion of the Chippewa National Forest. The legal description is T 57N R25-26 West; T58N R25-27W; T59N R26W; T60N R 26-27 W; and T149N R 25–26 W.

The project area encompasses approximately 50,826 acres. The Forest Service ownership within the project area is roughly 30,724 acres, about 60 percent of the area. Estimates of other ownerships within the project area boundary are 1 percent Itasca County, 12 percent State of Minnesota, Lakes 11 percent and other of 16 percent. The project area lies completely outside the boundary of the Leech Lake Band of Ojibwe Reservation.

Landscape Ecosystems

The project area and Proposed Activities are located in one LE, the Dry Mesic Pine (DMP). There are small portions of two other LE's in the project area the Boreal Hardwood/Conifer (BHC LE) and Dry Mesic Pine Oak (DMPO) LE. See the descriptions of these three listed below for full descriptions of LEs refer to the Appendix G of the Chippewa Final Environmental Impact Statement (FEIS). Refer to the attached maps for the location of the project and proposed activities.

Dry Mesic Pine (DMP)

Historically, this LE has mature and older stands dominated by a supercanopy of red pine and white pine. The subcanopy is a mixed stand of red maple and paper birch. White spruce, balsam fir, aspen, northern red oak, bur oak and bigtooth aspen are found in the mixed subcanopy. Fire was the more common natural disturbance factor in this ecosystem.

Dry Mesic Pine Oak (DMPO)

This LE usually occurs on fine-textured, well-drained, gently rolling till plains or stagnation moraines. Historically, the canopy was dominated by sugar maple, basswood, and paper birch. Often listed as associated species present in minor amounts are yellow birch, bur oak and northern red oak. Rare were balsam fir, red pine, white pine and northern white cedar, which are never abundant.

Boreal Hardwood/Conifer (BHC)

Historically, this LE was dominated by mixed stands composed of aspen, paper birch, balsam fir, and northern white cedar. White pine, red pine, ash, basswood, bur oak, white spruce, and elm were also present with minor amounts of red maple, sugar maple, red pine and jack pine.

Areas of High Interest

The Forest Plan delineates Areas of High Interest to the Leech Lake Band of Ojibwe (LLBO) (Forest Plan, Figure TR-1, page 2-37).

This project area does not include any of these Areas of High Interest.

Management Area Forest Plan Direction

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, Riparian Emphasis, Longer Rotation, and Unique Biological, Aquatic, Geological, or Historical Areas. The following provides a brief summary of the management direction for each.

General Forest – Long Rotation 56% of the Forest Service acres in the project area (17,096 acres)

The General Forest – Longer Rotation MA emphasizes land and resource conditions that provide a wide variety of goods, uses, and services. These include wood products, other commercial products, scenic quality, developed and dispersed recreation opportunities, and habitat for a diversity of terrestrial and aquatic wildlife and fish species. Numerous roads that are open to public travel provide access to resources and roaded recreation opportunities. Non-motorized recreation opportunities also occur.

Compared to the General Forest MA, this area, while still having timber production as a key emphasis, will generally have longer rotations and more uneven-aged and partial cut harvests. More detailed information can be found on Desired Conditions, Objectives, and Standards and Guidelines on pages 3-9 through 3-12 of the Forest Plan.

General Forest – Approximately 9% of the Forest Service acres in project area (2,954 acres)

The General Forest Management Area 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. Numerous roads open to public travel provide access to resources and roaded recreation opportunities. Non-motorized recreation opportunities also occur.

Compared to other management areas, the General Forest MA has the most amount of young-forest and the largest sized timber harvest units. (Forest Plan, 3-6). More detailed information can be found on Desired Conditions, Objectives, and Standards and Guidelines on pages 3-5 through 3-8 of the Forest Plan.

Semi-primitive Non-motorized – Approximately 32% of the Forest Service acres in project area (9,739 acres)

The Semi-primitive Non-motorized (SPNM) Management Area emphasizes land and resource conditions that provide recreational opportunities in nearly primitive surroundings where motorized use is NOT permitted. Most of the non-motorized recreation use occurs on lakes, trails, portages, and low standard roads. Interaction among recreational users is low. Forest management enhances recreation and scenic objectives and may occasionally be noticeable to visitors.

The SPNM Management Area is located in parts of the Forest with few low-standard roads and trails. Management activities are not very noticeable. Visitors may occasionally see stands that have been regenerated, low-standard timber access roads, and non-motorized trails. More detailed information can be found on Desired Conditions, Objectives, and Standards and Guidelines on pages 3-20 through 3-22 of the Forest Plan.

Unique Area – Approximately less than 2% of the Forest Service acres in project area (699 acres)

The Unique Biological, Aquatic, Geological, or Historical (UB) management area includes areas with outstanding biological, aquatic, geological, historical, and other special values. Although this management area preserves these values, the UB areas are primarily managed for interpretive purposes. More detailed information can be found on Desired Conditions, Objectives, and Standards and Guidelines on pages 3-23 through 3-28 of the Forest Plan.

No proposed treatments would take place within the Unique Area.

Riparian Emphasis – Approximately 1% of the Forest Service acres in project area (185 acres)

Riparian ecological functions are actively restored, protected, and enhanced in areas where ecosystem processes are sensitive to degradation. This includes maintaining and restoring native vegetation communities; maintaining and restoring riparian/hydrologic functions such as shoreline stability, wildlife habitat, coarse woody debris recruitment to aquatic and riparian ecosystems, and temperature regulation; and controlling non-native invasive species. Restoration focuses on components of the ecosystem that are not functioning at or within the range of desired conditions. Those components that are functioning properly are protected.

These areas are also managed for water based recreational opportunities and visual quality adjacent to bodies of water. More detailed information can be found on Desired Conditions, Objectives, and Standards and Guidelines on pages 3-29 through 3-31 of the Forest Plan.

The remaining acres of Forest Service area in the project are in water.

Overview of Forest Plan Consistency

To meet 2004 Forest Plan objectives, the Laurentian Vegetation Management (LVM) Project interdisciplinary team developed the project proposal to meet direction, objectives, standards and guidelines of the Forest Plan for the project area. Activities included in the Proposed Action considered in detail in this assessment are described in Chapter 2. 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.

In addition to meeting the Forest standards and guidelines, the action alternative considered in detail, include mitigation measures to minimize or eliminate adverse environmental effects. Mitigation measures are shown for the Proposed Action in Appendix C.

1.3. Purpose and Need for Action

This proposed action would conduct a variety of resource management activities directly addressing the purpose and need, including:

The purpose of the Laurentian Vegetation Management Project is to: 1) Move toward achieving Landscape Ecosystem objectives for vegetation composition; 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) Provide wildlife enhancement projects. 6) Improve and protect watershed conditions.

Management activities are needed because of the following:

1) Move toward achieving Landscape Ecosystem objectives for vegetation composition. The existing vegetative conditions in Dry Mesic Pine (DMP) Landscape Ecosystems (LE) is inconsistent with the objectives and desired conditions identified in the Forest Plan (Table DMP—1, Page 2-62). Some of the greater inconsistencies are listed below, more minor differences also exist.

- Increase acres of upland white pine and spruce/fir forest types
- Decrease acres of upland aspen forest types

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

- Maintain and/or increase structural and species diversity in forested stands (young and old)
- Foster native vegetative community development during harvest, site preparation, reforestation, stand improvement activities
- In select permanent openings

3) Manage treatments to maintain or enhance traditional Tribal and community uses (Forest Plan p. 2-5, S-TR-3 and O-SE-1).

4) Provide commercial wood in support of the local and regional economy (Forest Plan, O-TM-1, page 2-19)

5) Provide wildlife and botanical enhancement projects and associated partnership opportunities (Forest Plan, O-WL-1, O-WL-2, O-WL-3, p 2-26)

- Increase habitat opportunities for conifer-dependent forest birds through restoring white pine, spruce-fir and red pine to the landscape
- Provide habitat for wildlife species that require larger tracts of mature forest habitat by maintaining or increasing large, mature upland forest patches
- Maintain select permanent openings
- Provide wildlife boxes where natural snags are limited
- Maintain and manage the hunter walking trails and continue grouse management in these areas

6) Improve and protect watershed conditions. Impending failures at the road and dike crossings represent a risk to downstream water quality and aquatic habitat. Each impoundment within the project area will be evaluated for potential watershed restoration projects (Forest Plan, O-WS-1).

1.4. Proposed Action

This proposed action would conduct a variety of resource management activities directly addressing the purpose and need, including:

Vegetation Management & Provide commercial wood for mills

- Commercial harvest treatments on approximately 3,216 acres with an estimated volume of 38,000 CCF. Refer to the attached maps for locations of harvest units. Approximately one mile of temporary road would be built to access some of the cutting units.

    - 1,104 acres of clear-cutting
    - 216 acres of seed tree
    - 914 acres of commercial thinning
    - 716 acres of single tree cut
    - 272 acres of group selection
    - 50 acres of shelterwood cut
- Forest type conversions: A total of 545 forest types would change as a result of project activities (harvest and planting).
- Aspen acres would be reduced by 396 acres in the project area by converting to other forest types
    - Aspen conversions to:
        - white spruce 83 acres
        - white pine 249 acres
        - Hardwoods and paper birch 41 acres

Maintain or enhance gathering opportunities

- Keeping diversity of species and shrubs during Individual tree release

Provide wildlife enhancement

- Permanent Opening Management
    - A number of permanent openings (63 acres) 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, bear 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 these could be planted with native herbaceous plants.
    - Hunter walking area harvest of aspen for enhancement of grouse habitat
    - Converting approximately 350 acres to pine or spruce/fir

Improve and protect watershed conditions

- Impoundment: Watershed and stream habitat conditions will be improved by decommissioning one wildlife impoundment. The Jingo Lake Impoundment would be removed.

Smith Lake Gravel Pit

- Expansion of the Smith Lake Gravel pit to the north and northwest of the existing pit by the harvesting and clearing of 15 acres would occur.

1.5. Decision Framework

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 Deer River District Ranger will decide whether or not to proceed with the Proposed Action briefly described in Section 1.4, and if so, under what conditions or modifications; or whether to meet the purpose and need by choosing another alternative described in Chapter 2.

Related Documents that Influence the Scope of this EA

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

Applicable Regulatory Requirements and Required Coordination

Compliance with several environmental laws is required in order for the proposed Laurentian Vegetation Management Project to proceed. The Endangered Species Act requires consultation–the Biological Assessment and Biological Evaluation for this project has been sent to the U.S. Fish and Wildlife Service for a concurrence determination concerning species listed as threatened, endangered, and sensitive affected by the project activities. Other laws that the Forest Service is required to follow include the National Historic Preservation Act, the Clean Air Act, the National Environmental Policy Act, and the National Forest Management Act. In addition, consultation is required with the Leech Lake Band of Ojibwe Tribal Historic Preservation Office and the Minnesota State Historic Preservation Office. Results of this consultation are discussed in Chapter 3 Section.

This EA also complies with and addresses the following list of 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

Members of the Forest Service Interdisciplinary Team met with the DRM on March 25, 2014. All Local Indian councils and the DRM were sent scoping letters on April 1, 2014. No comments were received in writing from the scoping mailing.

This project is totally outside the LLBO reservation boundary.

Notes from all tribal meetings are in the project file.

1.7. Public Involvement

The proposal was listed in the Schedule of Proposed Actions since April 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 58 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 Western Itasca Review,* on April 3, 2014.

The Minnesota DNR supplied comments prior to scoping the project (March 2013) including openings for wildlife that they would like to see maintained.

During the scoping period landowners on and near Caribou Lake contacted the team leader and requested a visit to inform them of the proposed activities in the project area around Caribou Lake. The District ranger and IDT leader met with the landowners on April 15, 2014. They requested that in May we come back and visit the stands proposed for activities. The District Ranger, IDT leader and silviculturist met with two landowners on May 28, 2014 and walked through the area.

IDT Members reviewed the comments from the public; other agencies; the Leech Lake Band of Ojibwa LIC's; and internal Forest Service review, the interdisciplinary team for issues to address in this EA. All scoping input and FS responses are in Appendix D.

1.8. Issues

The IDT 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 in the scoping process.

1.9. Other Issues

Other issues are not Key to the decision to be made. They consist of secondary issues and issues dismissed. Reasons regarding their categorization may be found in response to comments and in the project record.

Secondary issues

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

- **Plants and Wildlife** Comments to scoping identified concerns for how proposed timber harvests would affect threatened, endangered, and sensitive (TES) species and their habitats, including mature and large blocks of interior forest. Effects of project activities on these resources will be assessed (see 3.1 Plants and Wildlife) by looking at the results of the Biological Assessment and Biological Evaluation (BE). The BE will include consideration of current and cumulative effects to 59 sensitive species (including both plants and animals).

- **Recreational and scenic qualities** The impacts of harvesting and slash/fuels treatment within the Laurentian Project area on recreational opportunities. This will be assessed by looking at: Number of designated dispersed sites in and/or adjacent to stands proposed for treatment (harvesting, slash/fuels) Number of stands proposed for treatment (harvesting, slash/fuels) adjacent and/or surrounding trails. Scenic Qualities – The visual effects of regeneration harvest and road access along identified road corridors and lake and river shorelines. (See 3.5 Visuals).
- **Aquatics** The effects of treatments and activities on water quality, aquatic: Acres of riparian management zone disturbed; Acres of wetland and miles of stream enhanced or protected by impoundment decommissioning and erosion prevention (See 3.6 Aquatics)
- **Soil** Proposed harvest and site preparation activities of the Laurentian Vegetation Project may change the property of soils in compaction, soil displacement or nutrient loss within the project area.
- **Fuels** The reduction hazardous fuel loadings to maintain ingress and egress routes and reduce the effects of catastrophic wildfire.
- **Non-native Invasive species (NNIS)** potential of introduction of new invasive species and further spread of already present high-priority invasive plant species and earthworms in the project area. (See 3.7 Non-native Invasive species).
- **Economics** Relative comparisons of timber values, and costs associated with activities such as hazard fuel reduction, site preparation, planting, and release will be presented (See 3.12 Economics).
- **Tribal Gathering and Traditional Uses** The effect of treatments on gathering opportunities; harvest treatments and pre-commercial thinning on hare habitat, buffering cedar to minimize blowdown, and effects on goshawk (See 3.11 Tribal Gathering and Traditional Uses).

Issues Dismissed

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

- Harvest of lowland forest stands for final harvest (D-26). Stands of lowland forest were reviewed and found old but very small and would be both not commercial and would not regenerate after harvest.
- Addition of more young age class (0-9) to the DMP LE in the project area (D-25).
- No harvest should be seen from lakes, named trails or developed campground area (D-3).
- No clearcutting on National Forest Lands –Comment was received that clearcuts in the project area are in violation of the National Forest Management Act (NFMA) and is not the optimum method. Under Forest-wide Management Direction, timber management practices are identified for each forest type group (Forest Plan, 2-20). Given the forest types within the project area, clearcutting is a tool available to reach our objectives. The Forest Plan also states "A full suite of timber harvest practices will be allowed. Harvest practices will generally be selected because they provide the most appropriate strategy to achieve or optimize achievement of multiple use management objectives (Forest Plan, 2-20).

2. Alternative

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 2-6, at the end of this chapter, compared 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 D. The alternative considered in detail incorporates applicable laws, regulations and policies that govern land use on national forests; pertinent Forest Plan standards and guidelines; Voluntary Site-Level Forest Management Guidelines (MFRC(gold book)2005).

The decision maker 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.

Maps of the Alternative B are included in Appendix A. Activities by compartment and stand, and associated acres can be found in Appendix B. Implementation of the proposed activities, dependent on availability of adequate funding, could begin as early as fall 2016.

Acreages shown for the proposed activities are approximations based on GIS (Geographical Information System) and other stand records in the Chippewa National Forest databases

2.2 Alternatives

2.2.1 Alternative A - No Action

Under this alternative, no commercial harvest, planting, fuel management, site preparation, impoundment restoration or maintenance, no Permanent Opening (PO) maintenance would occur at this time. Natural processes such as forest succession and stream sedimentation, and human activities such as fire suppression, recreational use, and road maintenance would continue. This alternative provides a baseline to compare the effects of the action alternatives.

2.2.2 Alternative B – Proposed Action

Changes to Scoped Proposed Action

Harvest: The Proposed Action in the scoping letter was developed by the interdisciplinary team to meet the purpose and need for the Laurentian Vegetation Management Project. After comments were received the team made a visit to some of the stands commented on and made modifications to the proposed action. This field review resulting in dropping one stand from harvest considerations due to accessibility and scenic issues.

The CCF (hundred cubic feet) of volume reported in the proposed action at scoping included of five stands (56 acres) which are converting naturally to a desired condition. The volume associated with these 56 acres was removed from the Revised Proposed Action.

Table 2-1 Harvest Changes to Scoped Proposed Action

Harvest type	Revised Proposed Action	Scoped Proposed Action	Change from Scoped Acres
Clearcut	1104	1100	4
Commercial Thinning	914	949	-35
Group selection	272	194	78
Seed tree	216	216	0
Shelterwood	50	43	7
Single tree	716	716	0
Grand Total	3272	3218	-
Volume of harvest	37,717	38,000	283

Impoundments: Upon review after scoping the lone wolf impoundment is in working condition and would require no repair.

Road decommissioning: After a review of the Proposed Action the identified roads for decommissioning during scoping were already in previous environmental assessments (EA). These already identified roads for decommissioning were removed from the Proposed Action. Consequently there would be no road decommissioning in the Laurentian Vegetation Management Project proposed actions.

A summary of the modifications made to the proposed action harvest are described in Table 2-1. From this point forward this Revised Proposed Action will be referred to as Alterative B.

Commercial Timber Harvest

In the Alternative B, 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. The action alternative includes clearcut with reserves, seed tree with reserves, shelterwood tree with reserves, commercial thin and single tree and group selection harvest treatments.

In the Alternative B, some forest types would change due to harvest (not via planting or seeding). Single tree and group selection harvest in a few mixed aspen and paper birch stands would reduce aspen while retaining mostly hardwoods.

Commercial timber harvest treatments on approximately 3,272 acres would result in about 37,717 CCF (hundred cubic feet) of harvest volume. 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

Current Forest Type	Even-Aged					Uneven-Aged			Grand Total
	Clearcut with reserves	Seed Tree with reserves	Commercial Thinning	Shelterwood with reserves	Even-Aged Totals	Single Tree	Group Selection	Uneven-Aged Totals	
Aspen	811			50	924	5	58	63	924
Balsam fir	128				128				128
Black ash / American elm / red maple					0	25		25	25
Black spruce	6				6				6
Eastern white pine			27		27				27
Hard maple / basswood					0	611	9	620	620
Jack pine	47				47				47
Mixed upland hardwoods					0	21		21	21
Non stocked	3				3				3
Paper birch	6	212			218	54	196	250	468
Red pine	51		666		717		9	9	726
Sugar maple / beech / yellow birch	5	4			9				9
Tamarack	13				13				13
White spruce	37		221		258				258
Grand Total	1104	216	914	50	2284	716	272	988	3272

Harvest treatment that would result in a young stand is called an even-aged regeneration harvest. 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. See the glossary for more detailed descriptions of these harvest types.

- Clearcut with reserves
- Seed tree with reserves
- Shelterwood with reserves

Harvest treatments would include approximately 1,104 acres proposed for clearcuts with reserve trees, 50 acres for shelterwood, with reserve trees, 216 acres for seedtree with reserve trees

Harvest treatments that result in a change in stand density or result in an uneven-aged stand fall into either an intermediate harvest or uneven-aged regeneration harvest. Alternative B would have approximately 988 acres of group or single-tree selection harvest.

Alternative B would thin about 914 acres of red and white pine and white spruce plantations providing space for remaining trees to grow in size as well as for additional species to increase in size or area.

See the glossary for more detailed descriptions of these harvest types.

- Commercial thinning
- Single tree selection
- Group selection

Vegetation Composition and Conversions

Alternative B moves toward achieving vegetation composition objectives to meet the purpose and need for Laurentian Vegetation Management Project.

The majority of conversions would be to reduce aspen forest type across the project area. Predictions from climate change models were used to choose the species to regenerate to. Climate change models predict white pine to fare well under various scenarios, so over 200 acres of aspen will be converted to white pine. To retain all ecosystem components, white spruce and tamarack would also be regenerated even though they are not predicted to fare well under climate change scenarios. Hardwood species would be promoted as well where applicable. Harvest, planting, seeding and tending would convert 505 acres forest types in the project area.

Table 2-3 Summary of Alternative B proposed Acres of Regeneration Harvest that would result in converting forest type

Current Forest Type	Proposed Black Spruce	Proposed Hard maple / basswood	Proposed Mixed upland hardwoods	Proposed Paper Birch	Proposed White pine	Proposed White Spruce	Proposed Grand Total
Aspen		5	19	17	249	83	373
Balsam Fir	14						14
Paper Birch			66			6	72
Sugar maple / beech / yellow birch				4		5	9
White Spruce					37		37
Grand Total	14	5	85	21	286	94	505

Planting, Seeding, and Natural Regeneration

Planting of approximately 436 acres and seeding of 98 acres would occur after harvests to regenerate stands. An additional 22 acres would be planted to help address diversification of black ash stands.

To establish and maintain regeneration, several activities are planned. Mechanical site preparation of 975 acres will occur. Release from competing vegetation would be scheduled on an “as needed basis” to ensure seedling establishment. Additionaly there may be animal damage control and pruning as needed.

Reforestation

Establishment of seedlings in this project area would be carried out using various methods.

- Site preparation
- Planting

- Seeding
- Natural regeneration with harvest

Tending

Tending is designed to enhance survival, growth, vigor and composition of each stand. This project includes the following treatments:

- Release
- Animal damage control
- Pathological pruning

Table 2-4 Acres of planting and seeding by Forest Type in Alternative B

	Seeding					Seeding Total	Planting						Planting Total	Fill in Plant	Fill in Plant Total	Grand Total
Current Forest Type	Aspen	Balsam fir	Black spruce	Jack pine	Tamarack		Aspen	Hard maple / basswood	Paper birch	Red pine	Sugar maple / beech / yellow birch	White spruce		Black ash / American elm / red maple		
Black ash/ American elm/red maple														13	13	13
Balsam fir			14			14										14
Black spruce			6			6										6
Hard maple/ basswood								17					17			17
Jack pine				47		47										47
Red pine										9			9			9
Tamarack					13	13										13
white pine	18					18	242					37	279			297
White spruce							83		6		5		94			94
Grand Total	18	14	6	47	13	98	325	17	6	9	5	37	399	13	13	510

Temporary Road Construction

Construction of about 1 mile of short road segments would be needed to access some of the harvest proposed. Temporary roads would be decommissioned and re-vegetated following harvest and reforestation activities.

Fuel Treatments

Pile burning of activity fuels after thinning in the Wildland Urban Interface *(*WUI).

Table 2-5 Acres of Fuel treatments proposed in Alternative B

Activity	Acres
Pile burning	95

Permanent Opening Maintenance

- A number of permanent openings (63 acres) would be maintained in partnership with interested parties. Maintenance would be conducted by the Minnesota DNR or other interested partners on Forest Service lands. The focus of maintaining these openings is to provide habitat components for grouse, deer, bear 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.

Impoundments

Watershed and stream habitat conditions would be improved by decommissioning one wildlife impoundment in the project area. Decommissioning of Jingo Lake Impoundment is proposed due to low waterfowl use and high maintenance costs.

Smith Lake Gravel pit expansion

Expansion of the Smith Lake Gravel pit to the north and northwest of the existing pit by the harvesting and clearing of 15 acres would occur.

2.3 Mitigation Measure for Action Alternative

Appendix C contains tables that identify site-specific mitigation measures and design features for each stand in the action alternative. Also included in Appendix C are applicable Forest Plan standards and guidelines, and Voluntary Site-Level Forest Management Guidelines (MFRC (Gold

Book) 2005). These measures have been incorporated into the analysis disclosed in Chapter 3. They would be implemented during harvest and postharvest activities.

2.4 Comparison of Alternatives

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

Summary of Outputs and Activities

Table 2-6 Summaries of Output and Activities by Alternative

Activities		AltA	AltB
Estimated Total Harvest Volume (Ccf)		0	37,717
Acres of Commercial Timber Harvest	Clearcut with Reserves	0	1104
	Shelterwood with Reserves	0	50
	Seedtree with Reserves	0	216
	Commercial Thin	0	914
	Group selection	0	272
	Single Tree Selection	0	716
	Total	0	3272
Acres of Conversion to (proposed Forest type)	Eastern White pine	0	286
	White spruce	0	94
	Black spruce	0	14
	Paper birch	0	21
	Mixed upland hardwoods	0	85
	Hard maple/basswood	0	5
	Total	0	505
Acres of Planting/Seeding		0	556
Acres of Site Preparation		0	975
Acres of Release		0	723
Acres of Fuel Treatments	Pile and burn	0	95
	Total fuel reduction	0	95
Miles of Temporary Road Consturction		0	1
Acres Permanent Openings Maintained		0	63
Smith Lake Gravel pit expansion (acres)		0	15
Smith Lake Gravel pit additional gravel available (cubic yards)		0	115,000

Comparison of Alternatives

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

Table 2-7 Alternative Comparison of Indicators for Secondary issues

Issue Indicator	Alternative A	Alternative B
	Vegetation	
Acres of 0-9	0	1320
	Wildlife	
Relative effect shown in BA on Canada Lynx	No effect	Not likely to adversely affect Canada lynx or its habitat
Relative effect shown in BA on Northern Long-eared bat	No effect	Likely to adversely affect individuals and summer roosting habitat within the project area, but not likely to result in jeopardy to the Northern long-eared bat
Impact on TES animals (6 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 TES Spruce Grouse	No impact	May benefit
Impact on remaining 19 TES animals	No impact	No impact
	Plants	
Impact on 7 TES 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 11 TES 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 14 TES species	No impact	No impact
	Recreation and Visuals	
Miles of trail within or adjacent to proposed harvest units	0	7
Number of designated dispersed site in and /or adjacent to stands proposed for treatment	0	3
Number of acres and stands within high, moderate and combined moderate/high scenic integrity objective (SIO) areas proposed for even-aged regeneration harvest activity	0	1203
	Soils	
Compaction Risk (low) acres	0	1007
Compaction Risk (moderate)acres	0	1964
Compaction Risk (high) acres	0	326
Soil Displacement Risk (low) acres	0	2120
Soil Displacement Risk (moderate) acres	0	1132
Soil Displacement Risk (high) acres	0	45
Nutrient Loss Risk (low) acres	0	80
Nutrient Loss Risk (moderate) acres	0	1965
Nutrient Loss Risk (high) acres	0	1252

Issue Indicator	**Alternative A**	**Alternative B**
	Aquatics	
Acres of Riparian Management Zone (RMZ, area within 200 ft. of lakes and streams) disturbed during vegetation management activities.	0	164
Acres of wetland and miles of stream enhanced or protected by impoundment decommissioning and erosion prevention.	0	32
	Non-native invasive species	
potential to contribute to further spread of already present species	be less in the short-term because it would not increase ground disturbance	See section 3.7
Potential to contribute to further spread of already present 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
	Fuels	
Acres of pile burning	0	95
	Gravel pit expansion	
Additional Cubic Yards of Material Available (approximate)	0	115,000
Provides Additional Gravel to Address Local Needs	No	Yes
	Economics	
Present Net Value	0	$46,644.67
B/C Ratio	0	1.03
	Tribal Gathering and Traditional uses	
Harvest treatments and pre-commercial thinning on hare habitat and goshawk	0	See BE and BA (project record)
Effect on Cedar stands	0	No effect

3. Environmental Consequences

3.1 Vegetation

3.1.1 Issues

No key issues regarding vegetation were identified during the scoping process. The type of harvests that would affect the amount of 0-9 age class in the Dry Mesic Pine Landscape Ecosystem is disclosed in this analysis.

Indicators: Acres of 0-9 age class.

3.1.2 Affected Environment

This project area includes parts of three Landscape Ecosystems (LEs) as defined in Chapter 2 of the Forest Plan. One LE (Dry Mesic Pine (DMP) is addressed in detail in this analysis because existing conditions in this LE are considerably different than the objectives set forth in the Forest Plan. The Boreal Hardwood/Conifer (BHC) and Dry Mesic Pine Oak (DMPO) LEs are not addressed in detail because they make up a minor percentage of the area along the project boundary.

This project focuses primarily on lands within the DMP LE. Historical vegetation conditions for this LE are described in Appendix G of the Final Environmental Impact Statement (USDA 2004b) and are summarized as follows: Fire was the more common natural disturbance factor in the DMP LE. Mature and older stands were dominated by super canopy red pine and white pine. Red maple and paper birch made up the sub-canopy. Beaked hazel was the dominant shrub. Almost ½ of the landscape was multi-aged beyond 175 years old. Patch sizes varied from ten acres to thousands of acres. Blocks of greater than1,000 acres of young aspen occurred, as did older, multi-aged red and white pine.

The current vegetation of the entire LVM 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. This patchwork of vegetation is the result of landforms, soils, plant succession, disturbances, and land use by multiple land owners. Recent disturbances within forested stands in this project area have been predominantly human caused and are mostly associated with timber harvest and fire suppression. Natural disturbances (e.g. wind, insects, disease, drought, and fire) also affect these forests.

Table 3-1 Existing (2014) Forest Types by Age Class Groups on FS Lands (acres) in LVM Project Area. The project area is made up primarily of aspen (49%), mixed northern hardwoods and paper birch (19 and 10%, respectively).

Forest Type	0-9 years	10-39 years	40-79 years	80-179 years	180+ years	Total	Percent of forested acres
Aspen	414	5254	3267	3807	0	**12742**	**49**
Balsam fir	11	1	115	335	0	**462**	**2**
Black Spruce	0	80	124	1108	9	**1321**	**5**
Jack pine	67	46	20	133	0	**266**	**1**
Lowland Hardwoods	0	17	18	660	0	**695**	**3**
Mixed Northern hardwoods	0	35	1246	3551	0	**4832**	**19**
Northern red oak	0	0	0	40	0	**40**	**0**
Paper birch	0	0	481	2228	20	**2729**	**10**
Red pine	19	262	472	794	0	**1547**	**6**
Tamarack	0	0	19	139	17	**175**	**1**
White Cedar	0	0	13	571	21	**605**	**2**
White pine	10	21	0	64	0	**95**	**0**
White spruce	7	311	142	42	0	**502**	**2**
Total	**528**	**6027**	**5917**	**13472**	**67**	**26011**	**-**
Percent	**2**	**23**	**23**	**52**	**0**	**-**	**100**

This table includes only forested stands; upland brush, lowland brush, and openings are included in the project file.

Aspen forest types (e.g. quaking aspen, bigtooth aspen, balsam poplar, and aspen-spruce-fir) dominate this project area, covering about 49 percent of the area. Mixed Northern hardwoods and paper birch make up about 19 and 10 percent, respectively, of the Federal lands. Red pine, black spruce, lowland hardwoods, white cedar, balsam fir, Jack pine and tamarack forest types are uncommon across this landscape. White pine and Northern red oak forest types make up less than 1 percent each of the project area.

Immature aspen stands (10-39 years old) make up the largest portion of the FS aspen resource, totaling about 41 percent of the aspen acreage. These immature aspen stands make up about 20 percent of the total forested acres on FS lands. Mature (40-79) and over mature (80+) aspen stands contribute about 26 and 30 percent, respectively, of the aspen acreage.

For all forest types combined, the 80-179 year age class makes up over half of the forested acres in the project area. Both the 10-39 and 40-79 year age classes contribute almost one fourth of the acres. Young (0-9) and oldest (180+ years old) forests provide minimal amounts.

Management Objective

In addition to Management Area direction included in Chapter 1, the vegetation analysis focuses on LE objectives as described in the Forest Plan (pages 2-62 through 2-63).

3.1.3 Direct and Indirect effects

Scope of the Analysis

Spatial Framework

The spatial boundary used to evaluate direct, indirect, and cumulative vegetation consequences is the LVM 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. In the cumulative effects analyses, 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 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 regeneration harvests and reforestation activities to be completed. The duration of most Federal timber sales is usually about 3-5 years, plus potential extensions. 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. Conditions resulting from this current decision (e.g. age class distribution, vegetation composition, etc.) would be in effect until the next entry.

Effects by Alternative

Table 3-2 Acres of Proposed Harvest Treatment by Alternative. Alternative B proposes over 1300 acres of even-aged regeneration harvests (clearcut and seed tree) and over 900 acres of thinning.

	Harvest Treatment (Acres)									
	Even-Aged Management				Two-Aged		Uneven-Aged Management			
Alternative	Clear-cut	Seed tree	Commercial Thinning	Even-Aged Total	Shelter-wood	Two-Aged Total	Single Tree Selection	Group Selection	Uneven-Aged Total	Grand Total
A	0	0	0	0	0	0	0		0	0
B	1104	216	914	2234	50	50	716	272	988	3272

Alternative A

No new even-aged regeneration harvests would occur under this alternative so no new acres of young age class would be created in the project area. In 2019, about 327 acres of young forest (0-9 years old) would exist in this project area, primarily due to even-aged regeneration harvests from the Bigfork, Central, and Marcell Northeast decisions. These young stands would represent about two percent of the DMP LE in this project area. Across the Forest, the amount of young forest in the DMP LE would remain at five percent.

Alternative B

By 2019, about 1,619 acres of 0-9 year old stands would exist in this project area. About 82 percent of this amount (i.e. 1,320 acres) would be due to Alternative B's proposed even-aged regeneration harvests (i.e. clearcut and seed tree). The percent of young age class in the DMP LE in this project area would increase from two to seven percent. Across the Forest, the amount of young forest in the DMP LE would increase from five to seven percent.

One red pine stand (about 15 acres) would be clearcut to facilitate expansion of the Smith Lake gravel pit. This would create a permanent opening.

3.1.4 Cumulative Effects

Past, Present and Future Activities

Forest Service

Harvest activities from three previous decisions (e.g. Bigfork, Central, and Marcell Northeast) would occur in this project area under all alternatives (including Alternative A). Details are in the project file.

Even-aged regeneration cuts on FS lands within the past 10 years are reflected in the 0-9 year age class in Table 3-1. These recent harvests were primarily clearcuts with reserves in aspen stands. About 176 acres of even-aged regeneration harvests in aspen, balsam fir, white pine, Jack pine, paper birch, and white spruce are planned in the next 5 years (from 3 previous decisions in this project area).

State of Minnesota and Itasca County

There are about 6,257 acres of State and County lands (combined) in this project area. Over half of these lands are typed as aspen. Clearcutting with reserves has been the primary even-aged regeneration harvest method in recent years in aspen, paper birch, 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. Species diversity is maintained by reserving certain species from harvest, and by promoting species that are currently present on site. These trends are expected to continue into the near future. (Cease, 2014; Hertle, 2014; Moberg, 2014; Snyder, 2014).

Private lands

There are approximately 8,003 acres of private land within 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 non-industrial 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 & Need

The following section discusses how each of the alternatives meets Purpose and Need for vegetation composition 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. Since Forest Plan Decade 2 objectives apply from 2014-2023, conditions resulting from alternatives would be compared with Decade 2 objectives for vegetation composition and age class.

Alternatives A and B include LVM’s proposed treatments plus activities from previous decisions that are not yet accomplished in this project area.

This project proposes activities in an LE that covers over one hundred thousand acres forest-wide. Because of this, proposed acre changes may not be large enough to change percentages in the forest-wide comparisons.

Vegetation Composition Objectives – DMP LE

Forest type conversions as proposed in the action alternative were designed to move toward LE vegetation composition objectives. Proposed conversions are summarized in Chapter 2's Table 2-3 "Proposed Acres of Regeneration Harvest that would result in converting forest type." Forest type conversions result from even-aged harvest, uneven-aged harvest, planting and/or seeding.

Purpose and Need Objectives for vegetation composition include:

- Increase acres of upland white pine and spruce/fir forest types
- Decrease acres of upland aspen forest types

Table 3-3 Comparison of Vegetation Composition Objectives & Alternatives in DMP LE (Alternatives A and B reflect conditions in 2019) In the LVM Project area, Alternative B would increase white pine, increase spruce/fir, and decrease aspen to address vegetation composition objectives in the Purpose and Need.

	Forest wide Objectives (%)	Forest wide (%)			LVM Project Area (%)		
Forest Types	Decade 2	Existing 2014	Alt A	Alt. B	Existing 2014	Alt. A	Alt . B
UPLANDS							
Jack pine	1	1	1	1	1	1	1
Red pine	16	15	15	15	7	7	7
White pine	6	1	1	2	0	0	2
Spruce-Fir	9	3	3	4	4	4	5
Oak	6	4	4	4	0	0	0
N. Hardwoods	15	23	23	23	20	20	20
Aspen	37	45	45	44	56	56	54
Paper Birch	10	8	8	8	11	11	10
TOTAL	100	100	100	101	100	99	99
LOWLANDS							
Black Spruce	53	39	39	39	47	47	47
Tamarack	9	10	10	10	6	6	6
L. Hardwoods	24	29	29	29	25	25	25
White Cedar	13	22	22	22	23	23	23
TOTAL	100	100	100	100	100	100	100

Forest-wide, the species that are most under-represented are white pine and spruce-fir. Northern hardwoods and aspen are over-represented.

Alternative A

Alternative A (No Action) is the least responsive alternative with regard to vegetation composition objectives. Because Alternative A proposes no planting or seeding activities, acreage of each forest type within this project area would remain at current levels (e.g. no conversions would be expected). Minimal scattered natural regeneration via seeding, sprouting, and/or suckering would likely cause a negligible change in species composition.

Although natural conversion could occur over time due to successional changes, Alternative A would not actively move toward LE objectives in the next 5 years.

Alternative B

Increase white pine:

In this project area, Alternative B would increase the white pine forest type by about 286 acres in the DMP LE. This increase in acres would be enough to increase the white pine forest type in this part of the LE by about 2 percent, moving slightly toward this vegetation composition objective. Forest-wide levels would increase by 1 percent due to this project. To meet Decade 2's objective, future conversions would be needed forest-wide to increase this forest type by 4 percent (about 3261).

Increase spruce/fir: In this project area, Alternative B would increase spruce/fir by about 94 acres in the DMP LE. This increase in acres would be enough to increase the white spruce and balsam fir forest types in this part of the LE by about 1 percent, moving slightly toward this vegetation composition objective. Forest-wide, the amount of spruce/fir would increase by 1 percent due to this project. To meet Decade 2's objective, future conversions would be needed forest-wide to increase these forest types by 5 percent (about 4076 acres).

Decrease aspen: Alternative B would reduce aspen by about 344 acres, which accounts for a reduction of about 2 percent in the DMP LE within this project area. Conversions from aspen to other forest types via Alternative B would account for a Forest-wide decrease of about 1 percent, moving slightly toward Forest-wide LE objectives. To meet the Decade 2 objective, about 7 percent (5707 acres) of the forest-wide uplands in this LE would need to be converted from aspen.

Summary of DMP Vegetation Composition Objectives:

- In this project area, Alternative B is designed to move towards vegetation composition objectives for Decade 2.

Native Vegetation Community Objectives – DMP LE

Many stands across the project area consist of a primary species as well as other species components (e.g. scattered white pine, red pine, balsam fir, white spruce, hardwoods, etc.). 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:

- Maintain and/or increase structural and species diversity in forested stands (young and old).
- Foster native vegetative community development during harvest, site preparation, reforestation, stand improvement activities.

Alternative A

Alternative A (No Action) would not actively move toward diversity objectives and is the least responsive alternative. Alternative A proposes no 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 thereby limiting the effects.

The speed of succession to other forest types would depend upon natural processes such as wind, fire, insects, and diseases. Species and structural diversity and spatial patterns would depend upon these natural processes.

Alternative B

In this action alternative, treatments were designed to restore conditions more representative of native vegetation communities. Alternative B would move slightly toward objectives for intra-stand species and structural diversity.

Maintaining species and structural diversity in regenerating stands would be addressed before mature stands are cut via final harvest. Silvicultural prescriptions for harvest would incorporate Forest Plan Standards and Guidelines as well as MFRC guidelines. Reserve species (e.g. northern white cedar), clumped trees of representative habitats (e.g. legacy patches), seed trees (e.g. paper birch), and scattered individual reserve trees would serve as refugia, perches, and nest sites. These residual overstory trees would be retained after harvest and would be beneficial for plants, reptiles, animals, birds, and visually sensitive areas. Where available, pockets of existing desired regeneration (e.g. conifers) would be retained to provide multiple cohorts within stands.

To maintain structural diversity while thinning in pole and sawtimber size red pine stands, trees from all size classes would be cut. Some suppressed or dying conifers would be retained. Existing variations in density would be maintained or enhanced. Red pine would be the primary species to be removed; other species would be retained for species diversity unless for operability.

Planting and seeding would be accomplished via mixtures of tree species to increase species diversity at the stand level and across the landscape. Upland and lowland conifer stands, as well as lowland hardwood stands, would be regenerated with the featured species plus other species that are suitable on those specific sites. 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 (Handler, et. al, 2014). Specific tree species that are projected to increase under climate change (i.e. white pine, Northern red oak, and bur oak) would be promoted in this VMP via planting. Diversity planting after harvest in black ash stands would occur on about 13 acres. Planting species would include black spruce, tamarack, white spruce, yellow birch, white pine, hackberry, and other suitable species. These lowland hardwood stands would be under-planted to increase tree species diversity, increase resiliency, and reduce potential impacts of Emerald Ash Borer. One birch stand (9 acres) and one hardwood stand (17 acres) would not be harvested due to visual and riparian values, respectively, but would be under-planted with white pine to increase diversity of longer lived species.

Site preparation (e.g. scarification of soil) would be accomplished via harvest operations and/or mechanical treatments in stands identified for seeding or planting. These mechanical activities would expose mineral soil in irregular spatial patterns across the majority of each stand, creating a mosaic of scarified and un-scarified areas. Mechanized equipment would go around residual trees, stumps, wetlands, etc. Residual trees, shrubs, forbs, herbs, and grasses would be retained in the untreated areas, thereby retaining components of the local vegetative community.

During individual tree release, multiple species of trees, shrubs, forbs, and grasses in sapling-size stands would be retained for species diversity and local gathering opportunities. For example, cutting primarily hazel and aspen in conifer stands would result in stands with mixtures of conifers and/or hardwood trees as well as fruiting shrubs. Pockets of aspen or hazel would be retained if they are not competing with desired species, and would provide within-stand species and structural diversity. Release of desired species would open the forest floor to sunlight, which could result in increased shrub, herb and forb growth.

Various animal damage control treatments (e.g. bud capping, repellant spraying, etc.) would be applied in young stands in the next 5 years to deter deer browsing so woodlands remain forested with a variety of species. In the last 10 years, survival of tree seedlings has depended upon 1) availability of funds for animal control and 2) timing of spraying or budcapping seedlings before browsing started. All species of trees have suffered heavy damage by deer browsing, but white pine seedlings and saplings have been hit especially hard. Browsing pressure is expected to continue until the current deer population level decreases. It is hoped that seedlings that develop from seeding (vs. planting) would be less favorable as deer browse. Animal damage control would protect diverse and desirable tree species, as well as maintain forested stands in a forested condition.

Pathological pruning would be carried out in immature white pine stands to prevent white pine blister rust (WPBR) disease. Since WPBR spores enter tree needles during cool, wet weather, it is important to remove branches from the bottom 1/3 of white pine saplings. These low branches are typically surrounded by tall grasses that provide cool, wet conditions. Pathological pruning would increase likelihood of survival of white pine saplings so this tree species continues as a component across the landscape.

In addition, Alternative B would:
- retain snags, downed logs, and/or slash piles in harvest stands
- retain jack pine (where present) in conifer stands proposed for even-aged harvest, and retain existing scattered white pine in harvest stands

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

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."

Choosing the optimum harvest method for regenerating a particular stand is influenced by the silvicultural requirements of the species on the site, existing stand conditions, issues raised during the analysis, prior experiences in the area, and Forest Plan direction. A silvicultural prescription is based primarily on the biological requirements of the stand and Landscape Ecosystem objectives. The harvest method for any given stand may differ from another stand. The method may be modified to mitigate other resource concerns such as visual quality or desired future conditions. However, the proposed harvest method is required to be sufficient to ensure regeneration of the stand.

The Forest Plan FEIS analyzed the appropriateness of even-aged management (UDSA 2004b Chapter 3.4). Generally tree species that require more sunlight to survive and grow do better with even-aged management. These 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 LVM Project proposes the use of even-aged regeneration treatments – clearcut with reserves and seed tree with reserves-- in aspen, balsam fir, black spruce, jack pine, paper birch, red pine, hardwood, tamarack, and white spruce forest types. Alternative B proposes approximately 1,320 acres of even-aged regeneration harvest. It was determined that even-aged management was appropriate for stands in the LVM project where it is prescribed.

The use of clearcutting was also analyzed in the Forest Plan FEIS (USDA 2004b Chapter 3.4, and Forest Plan p. 2-20). According to Forest Plan direction (p. 2-20, G-TM-7), a full suite of timber harvest practices is allowed. Clearcutting provides light conditions required for aspen, paper birch, jack pine, red pine, and tamarack. It also reduces wind throw in spruce-fir and lowland conifer forest types. In Alternative B, clearcut with reserves is prescribed in aspen, balsam fir, black spruce, Jack pine, paper birch, red pine, hardwoods, tamarack, and white spruce forest types to facilitate regeneration to jack pine, white pine, spruce/fir, black spruce, tamarack, and aspen. In Alternative B, about 1,104 acres of clearcut with reserves would occur. It was determined that clearcutting was optimal for these prescribed stands in the LVM project.

Alternative A is the no action alternative. No commercial timber harvest would occur under this alternative.

3.2 Plants and Wildlife

3.2.1 Issues

Secondary Issue – Effects of project activities on TES species and their habitats, including mature and large blocks of interior forest.

Indicators: Relative effects on TES shown in BE and BA for this project.

3.2.2 Affected Environment – TES

The Laurentian project area occurs primarily within the Dry Mesic Pine Landscape Ecosystem (LE). The LE vegetation and Management Indicator Habitat (MIH) objectives of the Forest Plan (Forest Plan p. 2-65 – 2-67) set forest-wide objectives for forest vegetation composition, structure, age, and tree diversity. By moving toward these long-term desired vegetative conditions, the Forest would move towards desired conditions for amounts, quality, and distribution of important wildlife species and their habitats. Conservation objectives for threatened, endangered and sensitive (TES) species and their habitats are interwoven into the LE objectives. The analysis of these conditions relative to the Laurentian project is contained in the Biological Assessment (BA) and Biological Evaluation (BE) (project file). The BA and BE are available upon request.

A recent evaluation of forest-wide habitat trends of designated MIH's provides a comprehensive picture of wildlife habitat trends with implementation of the Chippewa National Forest Plan. It indicates that relatively small changes in amounts and ages of MIH's have occurred since the inception of the Plan in 2004. Forests on the Chippewa National Forest are relatively young (86% of upland forests are less than 100 years old), but the oldest age groups are slowly increasing. About three fourths of the Chippewa's upland forests are deciduous; one fourth are coniferous. The most prevalent upland MIH is aspen-birch, comprising over half of the Chippewa's upland forests. Jack pine and spruce-fir are the least prevalent upland MIH's.

A second look at forest-wide LE-MIH trends was completed following a substantial windstorm that occurred on the Chippewa National Forest on July 2, 2012. Although the storm created considerably more 0-9 age class habitats at the expense of older habitats, most MIH trends were not altered by the storm. Most LE objectives remain on track with Forest Plan objectives (USDA FS 2013, p. B-7 and Attachment A).

In a general sense, what this means for wildlife is that habitats are abundant for early successional- and young forest-associated species, such as white-tailed deer and ruffed grouse. A reflection of widespread current habitat conditions, these species are generally quite common in the modern landscape. Species more typical of upland conifers and mature forests have far less available habitats, and as a result, are less common. Some of these species are listed as Regional Forester's Sensitive Species (RFSS). The BE focuses on RFSS.

In addition to composition and age objectives, the Forest Plan (USDA FS 2004a) provides guidance regarding spatial distribution of forest vegetation (pp. 2-23 through 2-24). Particularly important to a variety of TES species are objectives and guidance related to development of large forest patches, providing opportunities for interior forest habitat conditions. Of particularly high value to some TES species are objectives for large, mature forest patches.

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

3.2.3 Direct and Indirect Effects – TES Species

This section discloses estimated effects in terms of Issue: Effects on TES (Threatened, Endangered and Sensitive Species) described in Section 1.8 and 1.9 Key Issues and Other issues.

Scope of the Analysis

Spatial Framework

The spatial boundary used to evaluate direct, indirect, and cumulative effects to TES varies by species, and is included within the BA and BEs for this project.

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. The duration of most Federal timber sales is usually about 3-5 years, plus potential extensions. 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. Conditions resulting from this current decision (e.g. age class distribution, vegetation composition, etc.) would be in effect until the next entry.

Effects by Alternative

Alternatives A and B – Proposed and Threatened Species Effects Summary

The Biological Assessment (BA, project file) documents the potential effects on federally proposed, candidate, threatened or endangered species and designated critical habitat that could result from proposed activities in the Laurentian Vegetation Management Project. The BA was prepared in compliance with the requirements of Forest Service Manual Directives sections 2670.31, 2670.5(3), and 2672.4, the Endangered Species Act of 1973 as amended, and the National Forest Management Act of 1976.

Consultation specific to the Laurentian project BA was conducted with the U.S. Fish and Wildlife Service (FWS). Concurrence with the effects determinations as shown in the table below has been requested from the FWS (project file). The BA is available upon request.

The Laurentian BA evaluates both alternatives for effects on Canada lynx, listed as a threatened species, and the Northern long-eared bat, proposed as endangered. A summary of BA findings is presented in Table 3-4.

Table 3-4 Relative effects on Proposed and Threatened species (Summary of BA Findings)

Species	Alternative A	Alternative B	Rationale
Canada lynx	No effect	Not likely to adversely affect Canada lynx or its habitat	Small reductions in habitat occur which are unlikely to adversely affect Canada lynx.
Northern long-eared bat (NLEB)	No effect	Likely to adversely affect individuals and summer roosting habitat within the project area, but not likely to result in jeopardy to the Northern long-eared bat	Individuals in stands that are summer harvested could be adversely affected, assuming that NLEB is present in the affected stands. However, the amount of summer roosting habitat that would be affected (3,272 acres) is minimal in comparison to the amount of summer roosting habitat available throughout the project area (21,028 acres) and forest-wide (524,899 acres). The proposed project would affect about 16% of the currently suitable habitat in the project area, and less than 0.06% of the currently suitable habitat available across Chippewa National Forest. Across the NLEB's range the effects of the Laurentian project on NLEB and their summer habitat is minimal. No summer roost sites or winter hibernacula occur in the project area.

Neither of the alternatives would result in an adverse effect to Canada lynx. Currently proposed as endangered, if the Northern long-eared bat is listed, the Chippewa National Forest and the FWS will complete formal section 7 consultation and a biological opinion would need to be issued by the FWS. A final decision on listing the NLEB is expected no later than April 2, 2015.

Alternatives A and B – Key Points from the Biological Assessment

Following are key points of interest from the analysis used to develop findings for the Northern long-eared bat. The full evaluation is contained in the body of the BA (project file). The BA is available upon request.

Currently proposed as threatened under the Endangered Species Act, the Northern long-eared bat (NLEB) can be found in Minnesota in low numbers year round. Population trends are likely declining due to White Nose Syndrome, a fungus that has had dramatic effects on NLEB where it occurs. NLEB's can contract White Nose Syndrome while hibernating in caves (hibernacula) where the fungus occurs. This fungus has been found in the Sudan mine near Tower, Minnesota, within typical NLEB flight distance from the Laurentian project area.

There are no known winter hibernacula within the Chippewa National Forest, but most of the forested lands would be considered potential summer roosting habitat. During the summer, NLEB's roost singly or in colonies in cavities, underneath bark, crevices, or hollows of both live and dead trees.

The Laurentian project area contains an abundance of potential summer habitat on USFS land (21,556 acres), 98 percent of which is considered to be currently in suitable condition for use by NLEB's. Forest-wide, the Chippewa National Forest contains an abundance of potential summer habitat on USFS land (547,768 acres), 96 percent of which is considered to be currently in suitable condition for use by NLEB's.

The proposed project would affect about 3,272 acres of currently suitable NLEB habitat. This constitutes 16 percent of the currently suitable NLEB habitat present within the Laurentian project area, and 0.06 percent of the currently suitable habitat present on Chippewa National Forest.

Proposed timber harvest (especially clearcutting, seedtree, or shelterwood harvest) within currently suitable summer habitat would temporarily reduce the amount of habitat available in the project area, until the forested stands grow back. At least 91 percent of the forested USFS land within the project area would still be considered currently suitable after project completion.

Additionally, direct effects to roosting bats could occur if an occupied roost tree were removed or damaged by proposed harvest activities. The likelihood of this occurring is relatively low given the amount of timber harvest proposed compared to the available habitat in the project area.

Alternatives A and B – Sensitive Species Effects Summary

Sensitive species are plant and animal species identified by a Regional Forester for which population viability is a concern as evidenced by (USDA FS 2005a Sec .5):

- Significant current or predicted downward trends in population numbers or density.

- Significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution.

The Biological Evaluation (BE) of the Laurentian project evaluates all proposed project alternatives for effects on Regional Forester's Sensitive Species. A summary of findings of the Laurentian BE is presented in Table 3-5. The full analysis of effects on RFSS is contained within the BE (project record). The BE is available upon request.

Animals

There are 59 species listed as Regional Forester's Sensitive Species on the Chippewa National Forest, 27 of which are animals (i.e. birds, mammals, amphibians, reptiles, fish, and mollusks). None of the Laurentian project alternatives would result in a trend to federal listing or loss of viability to a population or species. Of the 27 sensitive animal species on the Chippewa, the Laurentian project would have no impact to 19 species. A finding of "may benefit" is associated with 1 species. A finding of "may impact" is associated with 6 species. One species is evaluated in the BA.

The primary difference between Alternatives A and B relates to timber harvest proposed in Alternative B, especially even-aged regeneration harvesting in mature habitats. This reduces habitat available for some sensitive species, such as northern goshawk, red-shouldered hawk, and great gray owl. Alternative A allows acres of mature habitats to increase.

Standards, guidelines, and required mitigation measures associated with these findings are presented in the body of the BE, and in stand-specific tables in Appendix C.

Table 3-5 Summary of effects determinations for Sensitive Species (Animals)

Species	No impact	May benefit	May impact but would not contribute to a trend to federal listing or loss of viability to population or species
Northern goshawk	A		B
Red-shouldered hawk	A		B
Spruce grouse		A, B	
Bald eagle	A		B
Black-backed woodpecker	A		B
Great gray owl	A		B
Four-toed salamander	A		B

Plants

As indicated, there are 59 species listed as RFSS on the Chippewa National Forest. Between all sensitive species, the 32 plant species consist of 29 vascular plants and 3 non-vascular plants. Initial analyses considered all of the 32 plant species. Based on lack of suitable habitat in the project area and/or low risk, this analysis reduced the list to 18 species. The table below displays a summary of findings for all plant species evaluated in detail in the Laurentian BE for RFSS Plant Species. As mentioned, a separate Biological Evaluation evaluated the animal species.

Neither of the Laurentian project alternatives would result in a trend to federal listing or loss of viability to a population or species. Of the 32 sensitive plant species on the Chippewa, the Laurentian project would have no impact to 14 species. A finding of “may impact individuals or habitat, but not likely to cause trend toward federal listing or reduce viability of a population or species” is associated with 18 species.

Table 3-6 Summary of effects determinations for Sensitive Species (Plants)

Species	No impact	May benefit	May impact but would 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
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
Spotted felt lichen	A		B

*has a **"may impact"** determination because of probable expansion of exotic invasive earthworms

As mentioned in the animal section, the primary difference between Alternatives A and B relate to timber harvest. Again, conversion of abundant habitats, especially aspen, to conifers could eventually benefit some sensitive species. Where RFSS plants occur in small microsites of available habitat, those species requiring older mature habitat would likewise benefit.

Standards, guidelines, and required mitigation measures associated with these findings are presented in the body of the BE, all mitigation measures are listed in Appendix C.

Alternatives A and B – Key Points from the Biological Evaluation (animals)

Following are key points of interest from the analysis used to develop findings for sensitive species. The full evaluation is contained in the body of the BE (project file). The BE is available upon request.

<u>MIH Trend Analysis:</u> MIH trend analysis for the period 2004 – 2018, which includes planned but not yet implemented forest management projects, includes the following aspects (Barrett 2013, p. 14):

- About 3/4 of the mature and older upland forests on the Chippewa are deciduous forests. The amount of mature and older upland deciduous forest has increased somewhat since 2004. Mature and older northern hardwoods have increased somewhat. Mature and older aspen/birch forest has decreased somewhat, but still occurs at very high levels.

- Coniferous forests comprise roughly 1/4 of mature and older upland forests on the Chippewa National Forest. The amount of mature and older upland coniferous forest has decreased (3%) from 2004 to 2013. Declines in spruce-fir and jack pine forests have been offset by amounts of red and white pine forest. Forest aging is predicted to increase mature and older upland coniferous forest by 2018.

Concerns for limited amounts of conifer forest habitats on Chippewa National Forest prompted the development of the following Purpose and Need statement in the Laurentian Vegetation Management Project:

- Increase habitat opportunities for conifer-dependent forest birds through restoring white pine, spruce-fir and red pine to the landscape (Section 1.3).

Alternative B proposes conversion of 338 acres of aspen and birch forest types to white pine and white spruce forest types, which would be mixed plantings incorporating white pine, red pine, and white spruce. This activity would modestly increase the amount of white pine, spruce-fir and red pine on the Laurentian landscape over the long term.

Spatial Distribution of Forest Vegetation

Forest-wide spatial pattern trend analysis for the period 2004 – 2011 indicates an increase in acres of large, mature upland patches of about 3 percent across the Chippewa National Forest, consequent increase in acres of forest interior habitat, and reduction in forest edge created through vegetation management (USDA FS 2013b). This is reflected in the table below.

Table 3-7 Forest-wide spatial pattern trend analysis for the period 2004 – 2011

Patch size class	2004 Forest Plan		2011	
	No.	Acres in size class	No.	Acres in size class
301-500	46	17325	51	19804
501-1000	31	20897	29	20710
1001-2500	14	20844	14	21319
2501-5000	2	6072	2	6082
5001-10000	5	31521	5	32300
Total	98	96659	101	100215

Since that time, a combination of factors has resulted in change. Forest maturation contributes to patch growth. Conversely, the July 2, 2012 storm and subsequent treatments reduced patch acres. Data are still being updated and analyzed following this storm event in order to clarify forest-wide trends.

Concerns for the effects of the 2012 storm on large, mature upland patches prompted the development of the following Purpose and Need statement in the Laurentian Vegetation Management Project:

- Provide habitat for wildlife species that require larger tracts of mature forest habitat by maintaining or increasing large, mature upland forest patches (Section 1.3).

The indicator used for MIH 12 Upland interior forest habitat is mature upland patches, shown in the table below as a combination of moderate and large patch size classes. The indicator used for MIH 13 Large patches of upland mature forest is shown in the table below as large patch size classes.

Table 3-8 Mature, upland patches in the Laurentian project area, by Alternative.

Patch size class		Existing (2014)		Alt. A (2019)		Alt. B (2019)	
Size	**Acres**	**No.**	**Acres in size class**	**No.**	**Acres in size class**	**No.**	**Acres in size class**
Moderate	41-100	29	1914	30	1932	29	1794
	101-300	15	2615	12	2115	6	1236
Large	301-500	3	1185	3	1232	3	1035
	501-1000	2	1481	1	671	1	671
	1001-2500	1	1352	2	2401	2	2390
	2501-5000	1	3185	1	3150	1	3150
	5001-10000	1	8767	1	9009	1	8785
Total moderate and large patches		52	20,499	50	20,510	43	19,061

Within the Laurentian project area, upland mature forest patches would increase 3 percent under Alternative A, and less than 1 percent under Alternative B. Forest interior would hold steady under Alternative A, but decline (7%) under Alternative B.

The table above provides comparison of both of the alternatives analyzed to the year 2019. Alternatives A and B also include the effects of past decisions that are not yet fully implemented (i.e. even-aged regeneration harvests not yet implemented). Forest aging results in an increase in patch acres when compared to the existing condition in 2014. Alternative B proposes new harvest treatments within these patches. These include harvests which would maintain a minimum of 50 percent canopy closure, such as thinnings, single-tree or group selection cuts, as well as clearcut harvests. Clearcut harvests reduce patch acres; treatments which maintain a minimum of 50 percent canopy closure do not reduce patch acres, although they may affect habitat quality within patches.

The large, mature upland patches in the Laurentian project area occur both in- and outside of Trout Lake and Suomi Hills Semi-primitive Non-motorized Recreation (SPNM) Area. Harvest proposals within the Trout Lake and Suomi Hills areas have been quite limited since the inception of the 2004 Forest Plan, and tended to be limited prior to that date, as well. In the large, mature forest patches outside of Trout Lake and Suomi Hills, there has been about 368 acres of timber harvest since 2004, including clearcut, shelterwood, partial removal, and thinning. Alternative B proposes an additional 1250 acres of harvest, including singletree, group select, clearcut, or thinning. Cumulatively, within the Laurentian project area about 36 percent of the large, mature upland forest patch acres outside of Trout Lake and Suomi Hills has been subjected to timber harvest in the past 10 years, or will be harvested in the next 5 years.

The effect of timber harvest upon old/mature forest values for wildlife varies considerably with the treatment. Clear-cuts have the strongest effect, resulting in young forests. Single-tree, group selection, thinning, and partial removal harvests can enhance some patch characteristics if they are designed to increase species diversity and structural complexity where they are presently lacking. Conversely, these harvests can also result in forest simplification and loss in habitat values if they reduce species diversity or structural complexity, or result in the removal of snags and coarse woody debris.

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

<u>**Northern goshawk:**</u> About 52 percent (16,085 acres) of the Forest Service lands within the Laurentian project area currently constitute suitable goshawk habitat. Aspen forest type constitutes the majority (42%) of the upland acres in the project area. About 56 percent of the aspen in the project area is currently too young to constitute suitable goshawk habitat. There are currently 6 known active goshawk territories intersecting the Laurentian project area and 1 historic, inactive territory.

About 19 percent of the suitable goshawk habitat in the project area would be subject to some form of timber harvest under Alternative B. Target minimum habitat conditions are easily met in the foraging and post-fledging zones of all 6 goshawk territories. The nest zone target minimum habitat condition is not met in 4 of the territories. Where the target minimum is not being met, the Laurentian project does not exacerbate the situation because it does not include new harvest proposals in suitable goshawk habitat in the nest zone.

<u>**Red-shouldered hawk:**</u> Habitat occurs for this species within the Laurentian project area. Four nesting pairs have been detected within the project area by current or previous project surveys. Acres of red-shouldered hawk habitat would decrease about 9 percent under Alternative B due to clearcut harvest of aspen and birch, which are thought to be fringe hawk habitat. Primary habitat is lowland hardwoods and northern hardwoods, which holds steady through the planning period. Habitat which occurs in larger blocks is likely to have higher quality than that which does not. Large, mature upland patches would increase under either alternative. Upland interior forest habitat would decrease under Alternative B due to clearcut harvesting.

<u>**Spruce grouse:**</u> A species of mature coniferous forests, trees with live branches extending to ground level and short-needled conifer trees are important habitat components for the spruce grouse. Habitat quantity and distribution are primary concerns for the spruce grouse on the Chippewa National Forest. Both Alternatives A and B would provide for minor increases in

spruce grouse habitat components, and are of potential short- and long-term benefit to this species when considered cumulatively with other habitat increases across the Forest.

Bald eagle: The Laurentian project area has a modest number of nesting bald eagles, with at least 18 known historic and current eagle nests. Eagle nesting in this area is attributable to a combination of nesting opportunities provided by pine forest habitat and feeding opportunities provided by numerous lakes. Acres of mature and older red and white pine forests would increase modestly under both alternatives, due to forest aging. Known nest sites would be protected by application of buffer zones per the U.S. Fish and Wildlife Service Bald Eagle Recovery Plan (1983).

Great gray owl: Great gray owl habitat occurs within the Laurentian project area, where patches of dense, mature and old-aged aspen and mixed conifer stands ae located proximate to open park-like areas suitable for foraging. Interior forest is preferable for its reduced potential for avian and mammalian predation on young. Down wood is an important habitat component of both foraging and nesting habitat. Alternative B would reduce the amount of upland nesting habitat by about 12 percent, primarily due to clearcutting of mature aspen-birch. Alternative B would also reduce upland interior forest habitat due to clearcutting. Application of Minnesota Forest Resource Council site-level forest management guidelines would help to ensure that snags, reserve trees, and down wood are provided in all harvest stands.

Black-backed woodpecker: A specialist that forages on wood-boring insect larvae in dead/dying conifer trees, black-backed woodpecker habitat occurs within the Laurentian project area in mature and older upland and lowland conifers. Acres of habitat available would increase slightly under both Alternatives due to forest aging. Planned harvests would affect habitat through reducing amount of mature conifer on the landscape when even-aged regeneration cuts are planned, and through removal of decadent trees during thinning. Planting or seeding of conifers proposed under Alternative B would eventually provide additional habitat when these stands reach maturity.

Four-toed salamander: Much of the Laurentian project is located within the Marcell Moraine, which is considered to be among the most significant landforms in Minnesota for this rare salamander. Four-toed salamanders typically occupy mature upland deciduous or mixed deciduous-coniferous forests interspersed with sphagnum seepages, vernal ponds, or other fish-free habitats that serve as nesting sites. Mature closed-canopy forests provide favorable conditions including a shaded moist forest floor with organic soils and woody debris. Mature forests also encourage the growth of moss around pond margins.

There are currently 13 records of four-toed salamanders on the Chippewa National Forest, all of which occur in the Northeastern part of the Forest, and 8 of which are found in the Laurentian project area. The Minnesota Department of Natural Resources recommends no timber harvest within wetlands supporting rare salamanders, and no harvest/limited harvest (80% residual basal area) buffers around these wetlands and to the extent possible throughout stands potentially supporting this species. It is at least 800 feet from any proposed Laurentian project activity to a known salamander occurrence. Within northern hardwood communities, Forest Plan Guideline G-TM-6 would be applied, which provides for generally maintaining a closed canopy (at least 70%) of mature forest vegetation in a minimum 200-foot zone surrounding seasonal ponds.

Alternatives A and B – Key Points from the Biological Evaluation (plants)

The existing vegetation in the Laurentian 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 (PR PlantsBE) found on the Chippewa: shallow water communities, non-forest wetlands, upland disturbed forest, forested wetlands, forested wetlands-cedar, mesic northern hardwoods, and diverse habitat.

Considering the wide variety of habitat located across the Laurentian 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 six habitat types, at least one species in the group, determined as either a moderate or a high risk for possible negative effects because of activities in the project proposal is included in the analyses.

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

<u>**Upward-lobed moonwort and crenulate moonwort:**</u> (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 *B. mormo*, but occur closer to wetter springy areas next to open wetland. Neither species has a known population in the Laurentian project area, so any probable indirect effects by the proposed activities in Alternative B would occur only to their unoccupied habitat or possible yet undiscovered plants.

<u>**Narrow triangle moonwort:**</u> (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 11 populations in the project area. One population occurs within an activity area 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 53 populations within the Laurentian project area, but none of these known sites occurs anywhere close to the proposed project activities in Alternative B.

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. 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 one known population within the project area, but this site is not near any proposed activity areas in Alternative B.

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 two known occurrences within the Laurentian project area. Of these sites, one population occurs within 250 feet and east of a proposed Alternative B activity area. By placement of a project mitigation buffer zone around the population, this action would extend into the nearby activity area. One other population occurs within the project area, but this site is not near any proposed activity areas in Alternative B.

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 14 known occurrences within the Laurentian project area with only 1 population existing within a proposed activity areas in Alternative B. Two other populations occur within 250 feet of proposed activity areas. Placement of project mitigation buffers would provide protection to the plants from proposed activities within the activity areas, as well as minimizing any potential effects to habitat.

Fairy slipper: (Forested Wetlands-Cedar) Habitat for this species 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). This species has 14 known populations within the project area. Of these sites, one population occurs within 250 feet of a proposed activity area in Alternative B. Because the site is west of the area and across an existing roadway, the project mitigation measure is the existing distance it occurs from the proposed activities.

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 one known population within the project area, but this site is not near any proposed activity areas in Alternative B. This species exists in swamps dominated by northern white cedar, and the Laurentian project does not propose any cutting of this habitat, as is typical for other current Forest projects. Considering these factors, any effects to the species would likely occur to its habitat rather than to individual plants.

Squirrel-corn, white fawnlily, and Goldie's woodfern: (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 the distance from these lakes. Most populations of Goldie's woodfern also occur near large lakes. None of these three species has any known populations within the Laurentian project area. Considering these factors, any effects to all of these species would likely occur to their habitat rather than to individual plants, if at all, by project activities in Alternative B.

One-flowered broomrape: (Mesic Northern Hardwoods) This species does not have any known populations in the Laurentian project area. Its only two known sites on the Forest exist next to each other well south of the project area. Generally, the typical habitat is in the transition zone between northern hardwood forest and white cedar swamp. The plants are small and inconspicuous and botanists are not clear on the amount of suitable habitat, so there are some slight possibilities to affect its habitat by project activities in Alternative B.

White adder's-mouth orchid: (Forested Wetlands) 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 species has 9 known populations in the project area, but none of these sites occur within 250 feet of any proposed activities in Alternative B. This species exists in swamps dominated by northern white cedar, so any possible indirect effects to its habitat by proposed 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 eight populations within the project area. Two of these populations both exist within the same proposed activity area in

Alternative B. Both sites would receive protection buffer zones around each population according to project mitigation measures.

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 21 known populations in the project area, with 6 of these occurring within 250 feet of proposed activity areas in Alternative B. All sites would receive protection buffer zones around each population according to project mitigation measures. Three of these populations exist within the proposed activity areas in Alternative B. Three other sites occur outside of proposed activity areas at differing distances, and application of buffer zones would extend into these project areas at correspondingly values.

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 6 known populations in the project area, with 2 of these occurring within 250 feet of proposed activity areas in Alternative B. Both sites would receive protection buffer zones around each population according to project mitigation measures. Again, application of buffer zones would extend differing distances into the nearby activity areas.

Spotted felt lichen: (Forested Wetlands) Habitat for the species typically occurs on hardwoods in humid, mature to old growth white cedar or ash bogs. Plant surveyors located 11 populations within the project area, with 1 site located within 250 feet of a proposed activity area in Alternative B. By placement of a project mitigation buffer zone around the population, this action would extend into the nearby activity area.

3.2.4 Cumulative Effects – TES Species

Spatial Framework

Analysis area varies by species and guilds considered. Spatial framework is contained in the BA and BEs for each respective species in the project file.

Timeframe

Time frames for each respective species are delineated within the BA and BEs in the project file.

Past, Present, and Reasonably Foreseeable Future Effects

Past, present, and reasonably foreseeable effects for each species are identified and analyzed in detail in the BA and BE in the project file. The following are noteworthy conclusions relating to the cumulative effects for TES species.

Alternative A

Since no new vegetation management activities are proposed in Alternative A, no new substantial cumulative animal TES species impacts would occur.

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 Laurentian project area. However, existing non-native invasive plant infestations would 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

Alternative B would not result in an adverse effect to the Canada lynx, a threatened species. Alternative B would be likely to adversely affect individuals and summer roost habitat within the project area for Northern long-eared bats, proposed as an endangered species. However, Alternative B is not likely to result in jeopardy to the NLEB. The project as proposed would affect about 16 percent of the currently suitable NLEB habitat in the project area, and less than 0.1 percent of the currently suitable habitat available across Chippewa National Forest.

Animals

None of the Laurentian project alternatives would result in a trend to federal listing or loss of viability to a population or species. Of the 27 sensitive animal species on the Chippewa, the Laurentian project would have no impact to 19 species. A finding of “may benefit” is associated with 1 species. A finding of “may impact” is associated with 6 species. One species is evaluated in the BA.

The primary difference between Alternatives A and B relate to timber harvest, especially even-aged regeneration harvesting in mature habitats, which reduces habitat available for some species such as northern goshawk, red-shouldered hawk, or great gray owl. Alternative A allows acres of mature habitats to increase.

Forest aging increases habitat components for a number of species. The Laurentian project area has a modest number of nesting bald eagles. As red and white pine forest ages in the project area, some additional nesting opportunities may eventually develop.

Within the Laurentian project area, upland mature forest patches would increase 3 percent under Alternative A, and less than 1 percent under Alternative B. Forest interior would hold steady under Alternative A, but decline (7%) under Alternative B.

Forest-wide spatial pattern trend analysis for the period 2004 – 2011 indicates an increase in acres of large, mature upland patches of about 3 percent across the Chippewa National Forest, consequent increase in acres of forest interior habitat, and reduction in forest edge created through vegetation management Since that time, a combination of factors has resulted in change. Forest maturation contributes to patch growth. Conversely, the July 2, 2012 storm and subsequent treatments reduced patch acres. Data are still being updated and analyzed following this storm event in order to clarify forest-wide trends.

Conversion of abundant habitats, especially aspen, to conifers could eventually benefit some sensitive species. Spruce grouse habitat, lacking throughout the Chippewa National forest, would be modestly increased through Alternative B. When these conifers eventually mature, they would benefit species like the black-backed woodpecker and bald eagle.

Although the various long-term increases in these habitats are modest within the scope and timeframe of the Laurentian project, they are cumulatively a part of a trend in MIH habitats seen across Chippewa National Forest since the inception of the Forest Plan in 2004. Relatively small changes in amounts and ages of MIH's have occurred since that time, and forests on the Chippewa National Forest are relatively young, but the oldest age groups are slowly increasing. The amount of mature and older upland deciduous forest has increased somewhat on a forest-wide basis since 2004. Mature and older northern hardwoods have increased somewhat. Mature and older upland coniferous forest has decreased 3 percent from 2004 to 2013. Declines in mature spruce-fir and jack pine forests have been offset by amounts of red and white pine forest.

Plants

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, municipalities, 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 Laurentian VMP 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 Laurentian 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 Laurentian 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 Laurentian project area, and number of acres disturbed.

3.2.5 Management Indicator Species (MIS)

MIS are defined as species monitored over time to assess the effects of management activities on their populations and the populations of other species with similar habitat needs. MIS were identified in the Final Environmental Impact Statement for Forest Plan Revision for the Superior and Chippewa NF. Species selected include the gray wolf, bald eagle, northern goshawk and white pine. All of these species are discussed elsewhere in this EA. The gray wolf, bald eagle and northern goshawk (Regional Forester’s Sensitive Species) are analyzed in the BE (project record); Laurentian project effects are summarized in the section on TES species. White pine is discussed in Vegetation Composition.

3.3 Recreation

3.3.1 Issues

Recreation resources were not part of the key issues identified during scoping. Recreation resources are considered a secondary issue – not used to formulate alternatives, yet resources may be affected by the planned activities.

Road Access and Off-Highway Vehicle access is described, but not analyzed in detail within the environment assessment. Temporary roads are not open for public vehicle use, including OHVs. (Off-Highway Road Travel Vehicle Access Project, Chippewa National Forest, May, 2007)

Secondary Issues: Recreational Opportunities - Impacts of harvesting on recreational opportunities.

Specifically, the impacts of harvesting and slash/fuels treatment within the Laurentian Project area will be assessed regarding trails and designated dispersed recreation sites. The indicators are as follows:

Indicators:
- Number of designated dispersed sites in and/or adjacent to stands proposed for treatment (harvesting, slash/fuels)
- Miles of trail within or adjacent to proposed harvest units

The above were selected as indicators because they relate directly to an individual's recreational experience in terms of affecting access to the general forest, dispersed recreation sites and trails and may be affected by the proposed action.

There are no effects of any activities to the developed recreation, interpretative sites and Recreational Opportunity spectrum in this project. These items were reviewed in the project and that information is available in the project record.

3.3.2 Affected Environment

The project area encompasses approximately 50,826 acres of all ownership, including 30,724 acres of Forest Service ownership. Within the area the ownership includes private, county, state, and federally-owned lands. The project proposal only addresses management on National Forest administrated lands.

Annually there are more than 610,000 visitors to the Chippewa NF. This area's lakes and woods are used for a wide variety of recreation activities. These activities include but are not limited to snowmobiling; camping in campgrounds and non-developed areas; hunting; fishing; boating; and driving for pleasure. (Kocis 2011 pg 8)

The CNF Forest Plan and maps filed in the Forest Service Corporate database and network drives containing recreation site inventory and direction to manage recreation sites. There are hiking, snowmobile, and interpretive trails within the project area. There are also roads open to off highway vehicles.

The existing condition also includes recreational facilities as follows:

Dispersed Recreation:

Dispersed recreation are recreational activities that occur outside of developed recreation sites and includes activities such as hunting, scenic driving, trapping, fishing, and general forest use. There are also designated dispersed camping sites.

There is a high level of dispersed recreation use and 36 designated dispersed recreation campsites in the project area. Dispersed sites are minimally maintained by the Forest Service and sometimes, but not always, contain a picnic table, fire ring, and wilderness-type latrine. Most of these sites are related to water-based recreation and can be accessed by forest roads, trails, or water. The majority of dispersed camping occurs in the summer for camping and fishing and in the fall during the small and big game seasons.

Hunting is popular within the Laurentian Project area and can be divided into upland birds (ruffed grouse and woodcock), and large game (deer), and duck hunting. Roads and trails are important for hunting access. Trapping of beaver, mink, raccoon, and other small mammals is also a popular activity, although not as common. There is one designated hunter walking trail system (Jingo Lake) in the project area and is managed for upland bird hunting.

Fishing accounts for another substantial portion of the recreation activities occurring throughout and adjacent to the project area. The lakes adjacent to and within this area range from small to large in size and through boat access sites, offer fishing opportunities for panfish, northern pike, walleye, and bass. Angling opportunities are not expected to be impacted by the action alternative.

The analysis area supports a mix of other dispersed recreation activities. These include activities such as bird/wildlife watching, opportunities for solitude, and localized cross country skiing and snowshoeing in the undeveloped portions of the forest. Gathering of forest products also occurs in the project area. Gathering is done primarily by local residents as a tradition and/or to provide for family. The most common types of forest products gathered in the project area include birch bark, balsam boughs, maple syrup, Christmas trees, and berries. The present road system appears to be adequate for these gathering purposes.

Trail Use:

There is hiking, snowmobile, interpretive, and hunter walking trails within the project area. There are approximately 41.2 miles of designated National Forest system trails within the

Laurentian project area. Trails within the analysis area can be subdivided into two broad categories; motorized trails and non-motorized trails.

Motorized Trail Opportunities

There are four Grant-In-Aid (GIA) snowmobile trails within the project area, including Cameron Lake, Marcell North, Marcell South and Suomi. There are 15.5 miles of snowmobile trails total within the project area.

Non-Motorized Trail Opportunities

There are six non-motorized trails within the project area, including Jingo Lake, Suomi Hills, Laurentian Divide Interpretive, Miller Lake, Spur Lake, and Trout Lake. There are 25.7 miles of non-motorized trail within the project area.

The following table illustrates the trails and trail mileage within the Laurentian Project area:

Table 3-9 Trail Mileage within the Laurentian Project Area

Forest Service System Trail	Motorized Miles	Non-Motorized Miles
Snowmobile		
Cameron Lake	0.7	-
Marcell North	1.5	-
Marcell South	6.0	-
Suomi	7.3	-
Hunter Walking Trail: Jingo Lake	-	5.0
Interpretive Trail: Laurentian Divide	-	0.5
Hiking:		
Miller Lake	-	0.35
Spur Lake	-	0.15
Suomi Hills	-	11.8
Trout Lake	-	7.9

Off Highway Vehicle Use:

Forest Service System roads are used by the public for many reasons and by many different types of vehicles There are 1,103 miles of Forest Service System Roads within the project area. There are eight miles of unauthorized roads within the project area.

Off highway vehicle (OHVs) use is common in the area. OHVs are defined as all-terrain vehicles (ATVs), off highway motorcycles (OHVs), and off-road vehicles (ORVs). OHV users are currently permitted to operate on designated low and high standard development forest roads.

Cross country motorized travel, (travel not on designated roads or trails), in the Chippewa National Forest is prohibited

There are no proposals for change of motorized access within the project area on existing roads. Temporary roads and approaches are not open for off highway vehicle use.

Management Direction – Policy, Law, Forest Plan Direction

The 2004 Forest Plan guides all natural resource management activity and establishes management standards and guidelines for the Chippewa NF.

- The Forest Plan establishes that the Forest will provide a range of quality motorized and non-motorized recreation opportunities to satisfy diverse public interests while maintaining sustainable ecosystems (Forest Plan D-REC-1).
- The Forest provides developed sites, facilities, trails, water access sites and other recreation opportunities within health and safety, resource protection, cost and maintenance requirements. (Forest Plan D-REC-3)
- Recreation activities 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).
- Remove hazard Trees, retain dead or dying trees not posing a hazard to people or facilities if they provide ecological benefits. (Forest Plan S-REC-1)
- Forest management activities will generally reflect recreation objectives while minimizing conflicts with recreation users by: 1) Avoiding use of system trails for skidding logs, 2) Minimizing crossing skid trails over system trails, 3) Placing safety signing to warn recreationists of activities in an area, 4) Piling slash and other logging debris out of view of recreation sites and system trails, 5) and scheduling activities during low recreation use periods (Forest Plan G-REC-2).
- Vegetation will generally be managed to remove hazards, improve scenic quality, control insects, or diseases or meet other recreation purposes. (Forest Plan G-REC-5)
- In regards to trails, during timber sale activities, combined use of roads or trails by logging trucks and motorized or non-motorized recreationists will generally be avoided when other routes are available (Forest Plan G-RTL-2).

- The Forest Plan (Forest Plan 2-42 through 43) also contains direction for managing OHV's. Access roads must be designated if open for OHV use; prohibited cross-country travel; and all trails are closed to OHV use unless designated as open.

Wilderness/Roadless Areas/Wild and Scenic Rivers

There are no Wilderness Areas, Roadless Areas, or Wild and Scenic River corridors within the Laurentian project area.

3.3.3 Direct and Indirect Effects

Scope of the Analysis

Spatial Framework

The Laurentian Restoration Project area is used to measure effects because it allows consideration of project-wide effects within Forest Service administered public lands and associated recreation facilities and land designations.

Timeframe

Direct and indirect consequences are considered in the short term for a period of ten years. This timeframe was selected because the effects on visitors having the most impact occur within ten years of harvest.

Effects by Alternative

Table 3-10 Summary of Recreation Indicators by Alternative

Recreation Indicators	Alternative A	Alternative B
Miles of trail within or adjacent to proposed harvest unit.	0	7
Number of designated dispersed site in and/or adjacent to stands proposed for treatment	0	3

Alternative A

Trails, Dispersed Recreation Sites:

Alternative A would maintain the current levels and types of recreation opportunities in the Laurentian project area over all timeframes. Vegetation would not be directly affected within this alternative. Trees would continue to grow and tree mortality would occur overtime. Natural processes would dominate in terms of changes in vegetative character.

Opportunities for dispersed uses such as hunting and fishing would not change substantially. Vegetation would grow older and be subject to mortality by natural processes.

Trails and roads would continue to be used and accessible as they have been with designated uses and annual maintenance.

Alternative B

Dispersed Recreation Sites:

Dispersed campsite recreation would generally continue to occur at similar levels and type of use. Individuals participating in dispersed camping at three designated dispersed campsites may be impacted by active harvesting in the forest surrounding the campsite in the short term. For some members of the public, these are negative impacts, and people may move to a location where they may again enjoy a remote dispersed recreation experience unaffected by current forest management.

Opportunities for fishing and hunting may be affected during project operations if areas are actively being harvested or if the site changes significantly. People may choose to use another site. Individuals participating in activities that use the general forest, such as bird/wildlife watching, localized cross-country skiing, and gathering plants, would experience short term impacts associated with management activities, but over time (five to ten seasons) would not be affected. These recreationists may also choose a different location.

Of the 36 dispersed sites within the proposed harvest area, two would be affected by thinning and single tree harvests retaining a variety of trees sizes adjacent to the sites. Shade and visual diversity would continue to enhance the sites. The remaining site, adjacent to a clear-cut, would have considerably less shade, have vistas into the forest for the first decade and would not be visually diverse.

Table 3.10 indicates the number of dispersed designated recreation areas in the project area adjacent proposed harvest units.

Trails:

Hunter walking trails, hiking trails, and snowmobile trails within Alternative B would be affected by vegetation management activities.

Uneven-aged (single tree selection) forest management along a trail would continue to provide a continuous forest cover that has trees of many different ages and sizes creating a diverse forested landscape close to the mostly shaded trail. Group selection would harvest more trees within a smaller area, opening smaller vistas to the forest.

Even-aged forest management (thinning, clear-cutting, seed tree) would create a forest of trees similar in ages and sizes. Thinning and existing forest would continue to provide trees of similar age along-side the trails. Clear-cutting along a trail would create in the short term open areas with none too few trees. Shade over the trail would be in short supply; vistas would open up into the forest for the first decade. Seed tree harvest would leave a few older, seed producing trees in the area while harvesting the remainder of the trees.

The following tables indicate the number of trails in the project area and the number of adjacent proposed harvest units by type of harvest.

Table 3-11 Trails, Miles, Proposed Harvest

Trail Name	Trail Type	Trail Miles within Project Area	Trail Miles adjacent to area of proposed harvest	Harvest Type
Jingo Lake	Hunter Walking Trail	5.0	0.4	Clear-cut
Laurentian Divide Interpretive Trail	Interpretive	0.5	0	None
Miller Lake	Hiking	0.35	0	None
Spur Lake	Hiking	0.15	0	None
Suomi Hills	Hiking	11.8	1.6	Thinning
Trout Lake	Hiking	7.9	0	-
Trail Name	**Trail Type**	**Trail Miles within Project Area**	**Trail Miles adjacent to area of proposed harvest**	**Harvest Type**
Cameron Lake	Snowmobile	0.7	0	None
Marcell North	Snowmobile	1.5	0.8	Clear-cut
Marcell South	Snowmobile	6.0	1.6	Clear-cut
			0.3	Seed Tree
			0.3	Single Tree Selection
			0.3	Group Selection
			1.5	Thinning
Suomi	Snowmobile	7.3	0.2	Single tree selection

There are four snowmobile trails within the project area. The snowmobile trails are managed as Grant-in-Aid trails, resulting in local snowmobile clubs working in conjunction with the counties to provide maintenance. This would not change within Alternative B.

Alternative B would impact 5 miles of trails alongside three snowmobile trails. Harvest activities in these stands preferably would be done in snow-free conditions, thus not directly affecting snowmobiling use during the Grant-In-Aid snowmobile season. In certain cases, this may not be possible and a safe re-route of the trail section would need to be developed. Care would be taken during sale design to ensure the trail is not adversely impacted post-harvest.

There is one hunter walking trail, Jingo Lake that would be affected by Alternative B. The clear-cut proposed along the trail would open the vegetation up, provide for longer views into the landscape from the trails and provide the young vegetative habitat for game birds.

One hiking trial, Suomi, would have vegetative management along the trail. Thinning is proposed to occur, which would leave a forested setting similar to the existing condition. Short term impacts of harvesting activities may change the quantity of hikers using the trail. Care would be taken during sale design to not adversely impact the trail.

Direct and indirect effects to the trails and trail users include the following. Trail users would be impacted by harvest operations when returning to a familiar area and witness changed land conditions (slash, disturbed soil, and stumps) or short term restricted access. Some people may move to a different location. In the long term of over ten years, harvest treatments would have a mixed effect on the snowmobile trails and the general hiking experience as trail users would observe a diverse forest. It is expected most small game hunters would be pleased for the harvest and future regrowth of aspen trees near the hunter walking trails. Overall, it is expected there would be sufficient habitat to sustain hunting opportunities. For the time period of greater than ten years, it would be expected the environment would begin to show signs of regrowth and little impacts of the activities would remain.

With the application of design features and mitigations within the Laurentian Vegetation Management Project Area three would be no changes to dispersed recreation areas, trails, or OHV access.

3.3.4 Cummulative Effects

There are no cumulative effects to the dispersed recreation areas or trails.

3.4 Soils

3.4.1 Issues

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

Soil disturbance can be observed and documented by changes in soil properties. Table 3-12 provided below lists possible soil property changes, their associated indicator and an ecosystem response that may result from project activities (USDA, 2012). 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. A low, moderate, or high risk rating for soil properties will be quantified by acres that occur within a proposed treatment area.

Table 3-12 Soil Property Change and associated Indicators

Soil Property Change	Soil Property Change Indicator[1]	Ecosystem Response to Soil Property Change
Compaction	• Bulk Density • Pore Space • Water Infiltration Rate	• Increased surface runoff • Loss in productivity • Changes in plant community composition and distribution
Soil Displacement	• Erosion (sheet, rill, gully) • Pedestals and/or Terracettes • Mass Movement	• Increased sediment • Changes in plant community composition, distribution and regeneration
Nutrient Loss	• Soil loss • Harvest • Leaching	• Changes in plant community composition and distribution • Loss in productivity

[1]Indicators will be analyzed by a risk rating analysis for this report. During project activities indicators may be measured in the field by visual observations or following the Forest Soil Disturbance Monitoring Protocol (Page-Dumroese, 2009a & b)

3.4.2 Affected Environment

The classification system used for the Laurentian Vegetation Management Project area is part of the Terrestrial Ecological Unit Inventory or TEUI.

As shown in Figure 3-1, the Marcell Moraine Landtype Association makes up 70%, or approximately 36 thousand acres of the proposed project boundary. Thus, this section will provide a brief description of the Marcell Moraine, other Landtype Association descriptions can be found in the soil resource report supporting documentation.

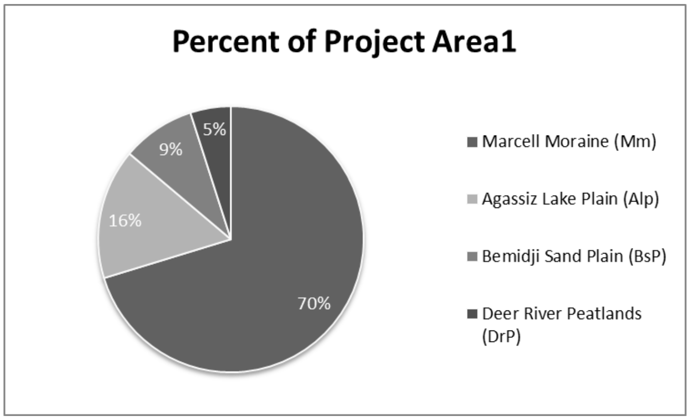

Figure 3-1 Landtype Associations within the proposed project boundary([1]Percentage is based on project boundary acreage (50728 acres)**)**

The proposed project area is dominantly considered a Fire Tolerant White Pine-Hardwoods Forest (LT 25), which occurs on topographically higher, better drained, rolling portions of the landscape. The local relief and geologic materials control soil drainage patterns that are often characteristic of this landtype. The soils generally are loamy to fine textured, are often stratified, and well to moderately well-drained. Landtype descriptions can be found with the soil resource report supporting documentation.

Landtype Phase (LTP)

There are 39 unique phases mapped within the proposed project boundary with a range in acres of 5 to just over 11 thousand. This section will provide a brief description of the three most common phases with the project area, others descriptions can be found in the soils resource report supporting documentation.

Landtype Phase (e) is found on 22% (approximately 11,000 acres) of the project area. The typical landscape of phase (e) is found on steep, complex slopes with many closed depressions. The soils are typically well drained, but the textures are highly variable. The native plant community is considered mesic boreal hardwood forest.

Landtype Phase (h) is found on 14% (approximately 7100 acres) of the project area. The typical landscape of phase (h) is gently to steep sloping terrain on well to moderately well drained soils. It is formed in areas of glacial till soils within the End Moraine. The texture of the soil is finer than phase (e). The native plant community is considered mesic northern hardwood.

Landtype Phase (b) is found on 9% (approximately 4500 acres) of the project area. The typical landscape of phase (b) is rolling topography with occasional steep, but short slopes. The soils are somewhat excessive to excessively well drained fine sand. The native plant community is considered to be a jack pine and red pine forest (Barrot, 2004-2010).

Management Objective

The National Forest Service Manual (FSM) state that soils should be managed "to sustain ecological processes and function so that desired ecosystem services are provided in perpetuity" (USDA FS 2012). This Project will be consistent with the Chippewa National Forest Land and Resource Management Plan and was designed in conformance with the following "Soil Resources" land management plan direction relevant to project activities;

- Forest-wide Management Direction [Forest Plan Ch. 2 pgs. 1-80]
- Forest-wide Goals [Forest Plan Ch. 2 pg. 5]
- All Resource Management Direction [Forest Plan Ch. 2 pgs. 8-9]
- Watershed Health, Riparian Areas, and Soil Resources Management Direction [Forest Plan Ch. 2 pgs. 11-17]
- Soil Resources Desired Conditions [Forest Plan Ch. 2 pgs. 11-12]
- Soil Resources Objectives [Forest Plan Ch. 2 pgs. 12-13]
- Soil Resources Standards and Guidelines [Forest Plan Ch. 2 pg. 15]
- Forest Service Manual, Watershed and Air Management [FSM 2500]
- Region 9 supplement Forest Service Manual 2500, Chapter 2550 – Soil Management [FSM 2550]

The National Core BMP Technical Guide [FS-990-a]

3.4.3 Direct and Indirect effects

Scope of the 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 may range from as little as one growing season to several decades depending on disturbance intensity and inherent soil characteristics. See Table 3-13 below.

Table 3-13 Range of recovery times for disturbances of greatest concern to soils within the Laurentian Vegetation Management Project area (Grigal and Bates, 1992; Grigal, 2004; USDA, 2004a; Page-Dumroese et al, 2006; and Voldseth et al. 2011).

Disturbance	General Recovery Period
Compaction or Nutrient Loss	One or more decades
Erosion	One or more growing seasons

Effects by Alternative

Alternative A

Soils would 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

In order to assess potential soil disturbance due to proposed treatments under alternative B, the phase units were grouped (Project Record) based on soil characteristics. These groupings will also aid in implementation of Forest Management activity limitations found in the Chippewa National Forest Land and Resource Management Plan (USDA FS, 2004a).

A range of soil disturbance would occur as a result of proposed harvest and site preparation activities. See Table 3-14 below.

Table 3-14 Risk of soil disturbance from proposed harvest and site preparation activities, by acres occurring within treatment stands in the Laurentian Vegetation Management Project area.

Alternative	Compaction Risk			Soil Displacement Risk			Nutrient Loss Risk		
	Low	Moderate	High	Low	Moderate	High	Low	Moderate	High
B	1007 (30%)	1964 (60%)	326 (10%)	2120 (64%)	1132 (35%)	45 (1%)	80 (2%)	1965 (60%)	1252 (38%)

The total disturbed soil acres within the project area are approximately 3297 acres. Soils were ranked Low, Moderate, High based on county Soil Survey Data and Chippewa National Forest Land and Resource Management Plan guidelines (USDA, 2004a).

Alternative B has a higher potential to disturb soils than alternative A because acres would receive a proposed treatment. It is unlikely that disturbance in alternative B would be detrimental to soils as long as Chippewa National Forest Plan Standards and Guidelines are met, and Best Management Practices (BMP) are implemented. Results of Forest Plan implementation monitoring over the last five years have helped 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 are 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 Chippewa National Forests treatments by the Minnesota Department of Natural Resources has shown that infrastructure has consistently remained below recommended guidelines for forest management in Minnesota (Dahlman and Phillips, 2004; Dahlman, 2008; Dahlman and Rossman, 2009; and Rossman, 2011). Outside of established infrastructure, the general treatment area, operation restrictions would minimize the area and intensity of impacts to soils by heavy equipment (See Appendix C). 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; 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, and more observations will be necessary to determine long-term effects on soil productivity.

Portions of harvest units may be treated in preparation for natural seeding or artificial planting. These treatments would 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 within the range of natural variation (Gries, 2013). Most of the site preparation proposed in alternative B 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. Ensuring that (BMPs), Chippewa National Forest Land and Resource Management Plan Standards and Guidelines, and Minnesota Forest Resource Council soil productivity guidelines (MFRC, 2005) are applied, it is unlikely the treatments proposed would have any long-term negative impacts on soil productivity.

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 C 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.

3.4.4 Cumulative Effects

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 timber sale 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 temporary infrastructure would be cumulative with past impacts. Past FS harvest monitoring by the DNR has shown that the CNF has consistently managed its timber sale infrastructure below areal recommendations in BMPs (Dahlman and Rossman, 2009 and Dahlman 2008). The high frequency of using preexisting infrastructure has greatly reduced the detrimental effect of timber sale infrastructure on soil productivity at the treatment area scale.

3.5 Visuals

3.5.1 Issues

There were no key issues identified through scoping efforts related to scenic quality. Key issues are defined as those issues that would substantially change the way an alternative is developed.

Secondary Issues: Scenic Quality – scenic quality is considered a secondary issue – not used to formulate alternatives, yet resources may be affected by the planned activities.

Specifically, the impacts of harvesting within the Laurentian Project area will be assessed in areas of visually sensitive areas, including along identified road corridors and lake and river shorelines.

Even-aged regeneration harvests, (clearcut, seed tree, and shelterwood), may affect visual quality within high and moderate scenic integrity areas. Management actions such as regeneration harvests will be analyzed because these harvests create temporary open areas. Temporary open areas are discussed within G-SC-1(Forest Plan, p. 2-45) and primarily describe regeneration harvest expectations.

Even-aged regeneration harvests in high and moderate SIO corridors would meet SIO criteria if not visible from travel ways/lakeshores; or if temporary openings are similar in size, shape and edge characteristics to natural openings in the landscape being viewed; or temporary openings mimic a natural disturbance process typical for the area so that when ground cover has been established the opening appears to be a natural occurrence.

Indicators:

- Number of acres and stands within high, moderate and combined moderate/high scenic integrity objective (SIO) areas proposed for even-aged regeneration harvest activity.

Harvests such as selection and thinning result in a multiage forest. The outcome is a quantity of trees that create big tree appearance, reduces edge differentiation, retains canopies over travel routes, and enhances views, creates vistas, and features natural openings. (Forest Plan, pg 2-45, DC-SC-2) Because these harvests do not create the temporary openings (see issues), this harvest method will not be analyzed. However, mitigation measures related to harvesting activities will apply.

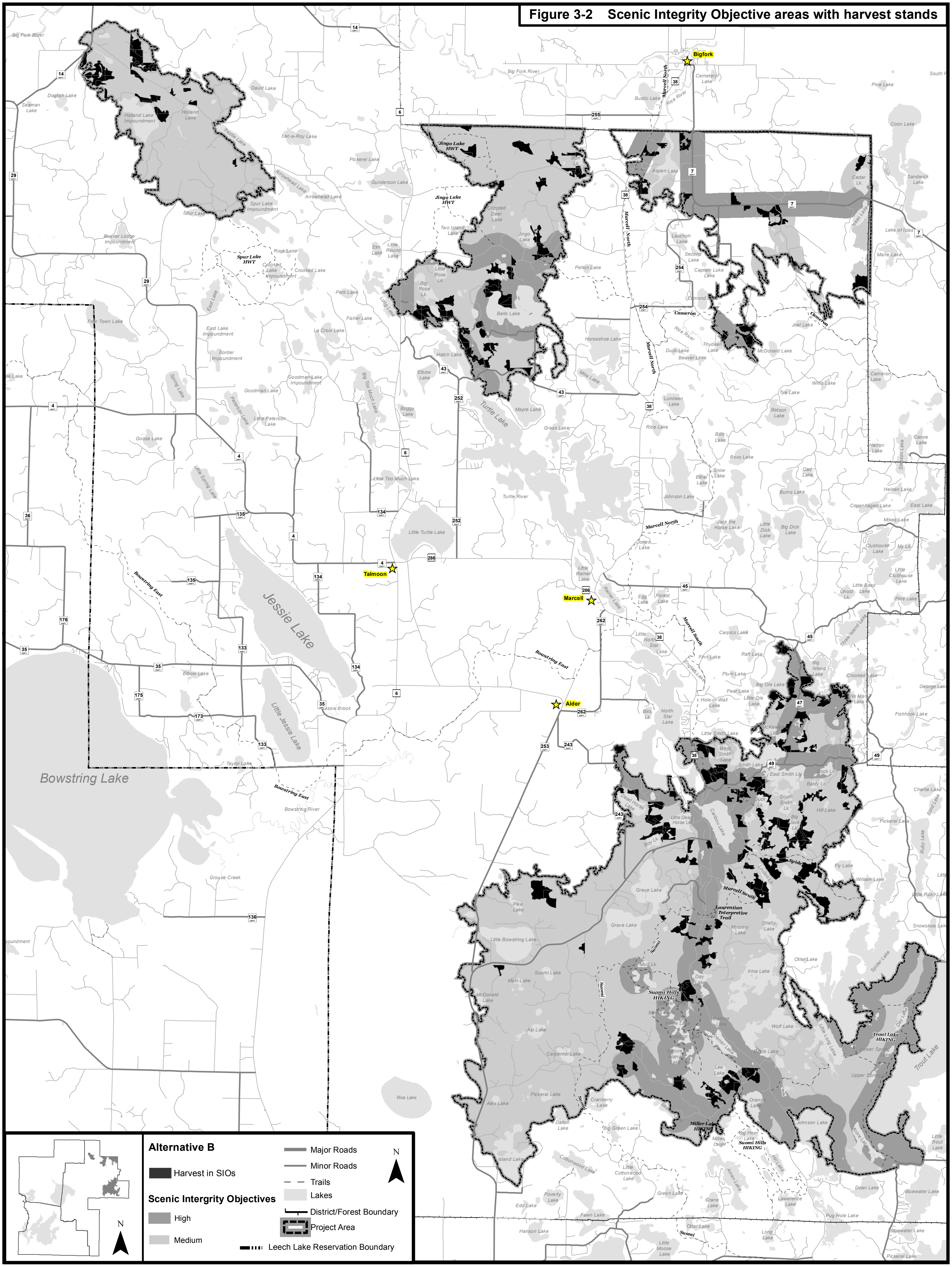

Figure 3-2 Scenic Integrity Objective areas with harvest stands

3.5.2 Affected Environment

Nature, cultural influences and directed landscape management have combined to create an appealing environment within the project area. This area is characteristic of northern Minnesota, providing a “northwoods” experience for local residents and for visitors to the Chippewa National Forest. The landscape character of the project area can be described as diverse - ranging from rolling to relatively flat terrain that is heavily forested and is interspersed with a large variety of lakes, ponds and streams.

The Chippewa National Forest Plan uses the Scenery Management System (SMS) as a tool to manage landscapes for scenic integrity. The SMS classifies landscapes and sets goals and objectives for maintaining, enhancing, restoring, and monitoring scenic integrity in Forest Plan(USDA FS 1995). It characterizes all land areas into three Scenic Integrity Objectives (SIO’s) categories: High, Moderate, and Low. The higher the scenic integrity objective, the more emphasis is placed on maintaining desirable scenery by making management activities less evident. Figure 3-2 depicts the High SIO areas within the project area.

The following table indicates the Forest wide and the existing SIO inventory condition of the Laurentian Project area.

Table 3-15 Comparison of Scenic Integrity Objectives on the CNF and the Laurentian Project Area

Scenic Integrity Objective	Percent All NFS Lands	Percent in Project Area
High	18%	25%
Medium	52%	67%
Low	30%	8%

Management Objective

The Forest Plan contains several items that deal directly or indirectly with the visual resource. A forest-wide goal is to emphasize scenic quality in areas of high interest to people. (Forest Plan pg 2-5)

In an area of high scenic integrity the landscape appears unaltered, and management activities are hardly noticeable. An area of moderate scenic integrity reflects a landscape that appears slightly altered, and management activities are slightly noticeable but they remain subordinate to the surrounding landscape character. Low scenic integrity landscapes appear somewhat altered where management activities may be noticeable. (USDA FS 2004b p 3.8-32)

Scenic resources are addressed in the Forest Plan in terms of desired conditions, objectives, standards and guidelines. The desired condition in moderate and high scenic integrity objective areas where vegetation management is visible from travel ways, recreation sites, and lakes with access is addressed within D-SC-2 as follows:

- Enhance views, creates vistas, and feature natural openings;
- Retain canopies over travel routes;
- Encourage vegetative diversity and seasonal color contrast; and
- Enhance big-tree appearance

Permanent openings through vegetation management are addressed within D-SC-3:

- Permanent openings created through management will blend with adjacent landscapes and have a natural appearance.

Other applicable standards and guidelines will be considered in the project design. The Laurentian Project area contains high, moderate and low scenic integrity objective areas.

3.5.3 Direct and Indirect effects

Scope of the Analysis

Spatial Framework

The Laurentian Project area boundary and even-aged regeneration harvests are used to measure effects because it allows consideration of project-wide effects to visual resources.

Timeframe

Direct and indirect consequences are considered in the short term for a period immediately after harvest to twenty years – the most visually disruptive portions of the projects (e.g. even-aged regeneration harvests). Long term is a general view of the following 20 to 100 years. (USDA FS 2004b)

Effects by Alternative

Alternative A

No commercial harvesting or slash treatment is being proposed so there are no impacts to the visual resources from Laurentian Project area planned resource management activities. Natural changes and consequences, such as vegetative growth, fire, and wind events, would continue. These natural events would continue to meet the Scenic Integrity Objectives as outlined in the CNF Forest Plan.

Alternative B

Alternative B has numerous harvest units in high and moderate SIO's. Unless completely buffered from the adjacent roads and lakes, all of the harvesting activities are noticeable in the short term and during treatment.

Appropriate design of even-aged regeneration harvest areas must be applied in areas of high/moderate scenic integrity, such as designing the edges so that the characteristics would be similar to those in the surrounding landscape (Appendix C -mitigations). The effect on scenic integrity can be lessened by the design of the treatments though mitigations.

Immediately after even-aged regeneration harvest to 20 years, vegetation re-growth normally hides slash and the ground disturbance from visitors on the highways, roads, and lakes. The vegetation structure is changed, and the size difference between untreated older adjacent forest and the younger recently harvested areas are apparent. Reserve trees and buffer areas of remaining trees would lessen the apparent size of the harvest area.

Table 3-16 shows the number of acres that are being treated in the SIO categories (high and moderate). There are 136 acres of proposed treatments in the high SIO areas and 644 acres of proposed treatment in areas of combined high and moderate SIO areas along lakes, rivers and highly developed and traveled roads. In the moderate SIO zones there are 423 acres proposed for treatments that are potentially visible along various sections of gravel and paved roads. These stands would require special design features for aesthetics such as placement of reserve trees, buffer strips, and temporary haul roads.

Table 3-16 High and Moderate SIO Acres and Number of Stands Containing Proposed Vegetation Even-Aged Regeneration Harvesting Management Activities

Alternative B Proposed Harvest Treatment	High SIO Acres	High SIO Number of Stands	High and Moderate* SIO Acres	High and Moderate* SIO Number of Stands	Moderate SIO Acres	Moderate SIO Number of Stands
Even-Aged Regeneration	136	14	644	49	423	28

*Stands that have both High and Moderate SIO areas within their border

Over the next ten plus years, it is expected there would be increasing amounts of diversity within the project area as Forest Plan objectives for stand/tree sizes and age compositions are approached. Large, long-lived conifers would increase in density and size.

Additionally some treatments would occur in the areas visible from low standard roads, not typically accessed by the general public.

There are no conflicts between the alternative and Federal, regional, State, and local laws; land use plans, policies and controls for the resource concerned. With the application of all mitigations and design criteria there would be no effects to the visual resource.

3.5.4 Cumulative effects

There would be no cumulative effects.

3.6 Aquatics

3.6.1 Issues

No key issues related to aquatics were raised during public scoping of this project. Effects of proposed activities on aquatic resources are disclosed in this section as secondary issues.

Indicators:

- Acres of Riparian Management Zone (RMZ, area within 200 ft. of lakes and streams) disturbed during vegetation management activities.
- Acres of wetland and miles of stream enhanced or protected by impoundment decommissioning and erosion prevention.

Rational for issues Identified not analyzed and topics dismissed:

Stream flow and channel dynamics can be altered through timber harvest and road construction by increasing the amount of young and open condition within sub-watersheds. Maximum proposed harvest amounts within the watersheds range from zero to two percent. No alternative would approach the 60 percent effects threshold identified in the forest plan nor contribute a significant amount to young and open condition within the project area watersheds, thus young and open forest will not be further analyzed.

Permanent roads are potential sources for erosion and sedimentation and can interrupt hydrologic function—the higher the road density, the greater the potential for impacts to aquatic resources (Trombulak and Frissel 2000). Because no permanent road building or decommissioning within the RMZ is proposed under all action alternatives, road densities within the RMZ is not used as an indicator to analyze the alternatives.

No wetland crossings by temporary roads have been proposed under any alternative, thus wetland crossings will not be used as an indicator to analyze alternatives.

3.6.2 Affected Environment

The 50,826 acre Laurentian Vegetation Management Project Area includes proposed activities in 12 6^{th} Level Sub-Watersheds [Hydrologic Unit Code (HUC) 6]. These watersheds, or analysis units, comprise the aquatics analysis area and total 277,334 acres. The analysis area within the Chippewa National Forest includes 156 miles of streams, 24,429 acres of lakes, 47,376 acres of wetlands (not including open water wetlands already included in lake acres), and 30,646 acres of Riparian Management Zone (RMZ). 789 miles of roads exist within the analysis area across all land ownerships, with 373 miles of those being forest service roads.

Management Objective

A variety of sources provide direction for management related to wetlands, water quality, riparian areas, and fish and aquatic habitat on the Forest. These include Executive Orders 11990 (requires protection of wetlands and defines them) and 11988 (requires protection of floodplains and defines them) for the protection of wetlands and floodplains, the Clean Water Act, National Forest Management Act (NFMA), and the Forest Service Manual (FSM); Chapters 2526 and 2527. In addition, FS policy mandates management of "riparian areas in the context of the environment in which they are located, recognizing their unique value" (USDA FS 2004f p31) and directs managers to "give preferential consideration to riparian dependent resources when conflicts among land use activities occur" (USDA 2004f p31). Forest management activities in RMZs (the area within 200 ft. of a lake, stream, or open water wetland) would only be conducted for the purposes of maintaining or restoring riparian ecological condition, and all activities would be conducted so as not to cause a reduction in existing water quality or to impair designated uses (Forest Plan, p. 2-11 – 2-15). Management direction is also given in the Forest Plan for the Riparian Emphasis Management Area (Forest Plan, p 3-29 – 3-31).

Diverse, healthy, productive, and resilient aquatic and terrestrial habitats are the desired condition for fish and wildlife habitat in the Forest Plan. The Forest Plan also states that aquatic and terrestrial wildlife habitats on NFS land shall contribute to ecosystem sustainability and biological diversity of Northern Minnesota and, for wide-ranging species, larger landscape scales. As directed by the Plan, increased emphasis is to be placed on the health, quality, and ecological function of aquatic ecosystems which would provide improved habitat conditions for fish, mollusks, invertebrates, plants, and other aquatic species. A desired condition (Forest Plan D-WS-8) within the Forest Plan is to maintain or restore hydrologic connectivity of aquatic ecosystems and wetlands to assure passage of water, sediment, nutrients, wood, invertebrates, and fish and to facilitate freshwater mussel dispersal—this includes minimizing the number of impoundments.

The Forest Plan states the Forest road system is the minimum needed to provide adequate access to both federal and non-federal lands, and that road and trail crossings of streams, wetlands, and riparian areas will be minimized with hydrologic and riparian functions maintained or improved when roads or trails are constructed across wetlands. Under frozen conditions, wetlands may be used for permanent roads, temporary roads, and skid trails, provided that no fill is placed in the wetland and that these roads and trails are blocked to prevent use under unfrozen conditions. Felling trees into non-forested wetlands should be avoided except where done for purposes of habitat restoration (Forest Plan, pg. 2-15).

The Forest is also committed to implementing State of Minnesota site-level best management practices (BMPs; Minnesota Forest Resources Council 2005) related to timber harvest and road construction or maintenance.

3.6.3 Direct and Indirect effects

Scope of the Analysis

Spatial Framework

The RMZ of lakes and streams (in the absence of a site-specific boundary delineation, the default "near-bank" zone is the first 100 ft. from the water body and the second 100 ft. from the waterbody represents the "remainder" zone) was used to analyze the potential direct, indirect, and cumulative effects to aquatic resources from activities that can lead to sedimentation (Indicator 1). Activities outside of the riparian areas would have little impact on aquatic resources from sedimentation because soil erosion would be minimized by following Forest Plan Standards and Guidelines (FS ownership), the Voluntary Site-level Forest Management Guidelines developed by the Minnesota Forest Resources Council (MFRC 2005; all ownerships), and design features located in Appendix C of this document (FS ownership)—potential impacts from sedimentation would then be very localized. Therefore, the area examined for direct, indirect, and cumulative effects related to potential sedimentation from vegetation management activities would be the RMZ within the Laurentian analysis area activity stands.

For impoundment management (indicator 2), the spatial framework is the individual stream or wetland flowage. Impacts from the impoundment on the hydrology of a water body or the passage of aquatic organisms would be localized and apply to the individual stream or wetland flowage (Forman and Alexander 1998, Trombulak and Frissell 2000).

Timeframe

For direct, indirect, and cumulative effects, the amount and the duration of sediment entering lakes and streams from harvest activities in the RMZ is highly variable and dependent upon a variety of physical and ecological factors (Swank et al. 1989). Because of this variability, predicting the duration of erosion and the resulting sedimentation at a site is difficult. Until soils are stabilized through re-vegetation the potential exists for sedimentation to nearby water bodies. However, ground-covering vegetation is expected to recover quickly after vegetation management activities (Swank et al. 1989), so the effects of soil erosion and the resulting sedimentation should be short-lived (1-2 years), especially with the implementation of the Voluntary Site-level Forest Management Guidelines (MFRC 2005).

Direct, indirect, and cumulative effects related to impoundments on hydrologic function, water quality, and fish habitat would last indefinitely (Trombulak 2000), since these structures would be maintained, eroded materials would be replaced, and use would not be expected to cease. Alternatively, activities that restore impounded sites back to natural conditions are permanent. Short term elevated turbidities during decommissioning activities and 1-2 days after, and minor sedimentation prior to establishment of vegetative cover in excavated areas would also occur (1-2 years)

Effects by Alternative

Indicator 1: Acres of Riparian Management Zone disturbed during vegetation management activities.

Alternative A

Alternative A is the no action alternative. No vegetation management would be conducted in or adjacent to RMZs, thus direct and indirect effects would be zero. RMZs impacted by past activities would continue to move slowly towards desired riparian conditions through stand aging and natural conversion or stay the same.

Alternative B

Alternative B was designed to incorporate proactive riparian management where stand prescriptions were compatible with the goals described in the Forest Plan for RMZ management. While posing a short term risk to water quality due to the proximity of the harvest activity to watercourses, activities that increase structural and species diversity or favor long lived tree species would have long term benefits to the water quality and the aquatic and terrestrial habitats that the RMZ is designed to protect. The components of the RMZ such as shading, large wood habitat source, nutrient inputs and stream bank composition are protected to a large extent by the near-zone RMZ. These components would be preserved through silviculture prescriptions designed to enhance the RMZs function over the long term while limiting short term impacts to the RMZ components, erosion, and sedimentation. Harvest activities within the RMZ under the action alternatives are generally only permitted where prescriptions would increase within stand diversity and improve riparian functions. Probable benefits for treatments to the RMZ include:

- increase within stand diversity by creating light conditions on the forest floor light over a considerable portion of the stand that would allow for the establishment and advancement of other tree, shrub, and herbaceous species,
- protect existing within-stand tree species and age-class diversity, by retaining and protecting all non-featured tree species in the treatment areas, and/or
- promote long-lived site suitable tree species in RMZ (i.e., red pine, white pine, tamarack, cedar, maple, basswood, oak, black spruce)—this includes retaining all large diameter (20+ inches) long-lived conifer species (e.g., red pine, white pine, cedar, tamarack) in the RMZs.

For the Alternative B, 51 stands that intersect the RMZ could receive some type of vegetation management treatment within the RMZ; provided that the treatment meets Forest Plan direction. The RMZ within these stands total 164 acres, approximately 32 acres near zone and 132 acres of remainder zone. Prescriptions in the near zone generally include a not cut buffer of either the bank slope or 50 feet and one or more of the following: single tree selection, feathered edges, species designation removal, thinning, and group select or clearcuts with conversion to long lived conifer species. The prescriptions in the remainder zone may include those within the near zone with the addition of extended rotation of site appropriate tree species (long - or short-lived). Heavy site prep is generally not permitted unless necessary for a conversion driven by riparian composition needs. For alternative B, activities within the near zone include up to 17 acres of single tree selection, 7 acres of aspen to pine conversions, and 8 acres of thinning. Each of these activities would increase age and structural diversity; increase tree vigor for faster recruitment as a shade, nutrient, or large woody debris component to watercourses; and favor development of a self-sustaining RMZ.

Table 3-17 RMZ Activity Indicator and Related Data

Activity in RMZ	Alt. A	Alt. B
Acres of riparian management zone (area within 200 ft. of lakes and streams) potentially disturbed during vegetation management activities (i.e., timber harvest, reforestation)	0	164
Acres of RMZ in near zone (1st 100 ft.) where siliviculture presctiptions could include harvest.	0	32

Source: GIS data, 2014.

No alternative is expected to have significant effects on the RMZs ability to provide protection for aquatic resources. Each action alternative is consistent with forest plan direction on RMZ management. Because of the proactive Riparian management proposed and described earlier in this section, any permitted activities within the RMZ are expected to have benefits that outweigh the near term (one to two years)risks to water quality. Between the two alternatives, potential sedimentation to water courses that lowers water quality and habitat quality for aquatic organisms is expected to be highest for Alternative B due to the greater number of management activities in the RMZ. Alternative A would have the lowest potential for sedimentation. The cause-effect relationship among vegetation management activities, soil erosion, and sedimentation to watercourses is well described in the literature (Riekerk et al. 1988, Marion and Ursic 1993, Swank et al. 2001). However, the amount of sediment entering lakes and streams from this activity is highly variable and dependent upon the amount of soil exposed, the soil type, steepness of slope, weather conditions, and the treatments following disturbance (Swank et al. 1989). Because of the variability in these factors, predicting the amount of sedimentation is impracticable. Placement of deferral areas (areas of no harvest) would favor RMZ locations, thus acres of silviculture treatments would further be reduced, however the amount of additional deferral is dependent on a variety of resource and operational concerns. Voluntary Site-Level Forest Management Guidelines (MFRC 2005) would be implemented to ensure that water quality is maintained, through the use of filter strips. Research on the use of similar filter-strip buffers has shown that they are very effective in reducing sediment and nutrient inputs into streams and lakes that are derived from logging and other ground-disturbing actions (Osborne and Kovacic 1993, Gharabaghi et al. 2000, Aust and Blinn 2004, Croke and Hairsine 2006). Impacts to water quality through soil disturbance and compaction is expected to be minimal since most stands would be harvested during winter, under frozen conditions, or during summer on dry soil conditions under the two action alternatives. Similarly, the aforementioned harvest conditions would minimize potential negative impacts to aquatic organism and their habitats from sedimentation and increased flows resulting from compacted soils. The mitigations and BMPs in Appendix C would also minimize any effects of harvest on water quality, RMZs, streams, lakes, wetlands, and aquatic organisms.

Indicator 2: Acres of wetland and miles of stream enhanced or protected by impoundment decommissioning and erosion prevention.

The US Forest Service currently maintains approximately 30 small impoundments across the Chippewa National Forest. Most of these impoundments were constructed in the 1970's and 1980's with the expectation that the control structures would need to be replaced or receive major repair after 20-30 years—failure of a control structure generally results from oxidation (rusting) of the structure's metal components. Structural failure of the control structure often leads to catastrophic failure of the dam which can result in large amounts of sediment entering a watercourse. This phenomenon has occurred for a few impoundments across the Forest.

Three forest service impoundments are located within the Laurentian project area. Holland and Lone Wolf Impoundments have had recent maintenance and cleanouts and are in sound physical condition. They provide good waterfowl habitat and are intended to be operated in the foreseeable future. Management action on Jingo Lake Impoundment is being considered in the proposed action (Alternative B).

Jingo Lake Impoundment is 23 acres and was built in 1978. In Alternative B this site is proposed as being restored to natural. The intake to the control structure was damaged several years ago rendering it in operable as a means to manipulate water levels. The access road is chronically inaccessible due to wet conditions, so regular maintenance and operation has been an ongoing issue. Both the access road and impoundment have consistently had beaver issues, exacerbating the poor condition and access to the site. Removing it would reduce future maintenance costs and follow forest plan direction to minimize impoundments. A small section of access road of .2 miles (half acre) would also be decommissioned in this alternative. Approximately ½ acre of wetland fill would be removed. No net loss of wetlands are expected as forested and emergent wetlands were historically present before being inundated by the impoundment. By removing the threat of berm material washing downstream, 4 miles of stream habitat would be protected between the impoundment and where it enters the Rice River.

The restoration would cause minor amounts of sediment to be transferred in the section downstream and cause short term high turbidity during and in the 12 hours after equipment operation. Erosion at the site would continue until fully vegetated in 1 -2 years. Erosion would be minimized by application of erosion control matting and native seed on slopes. By removing fill material down to a level consistent with the natural wetland flood plain, it would limit the amount of sediment reaching the stream to small amounts as the site re-vegetates and stabilizes.

3.6.4 Cumulative Effects

Because of the short timeframe of potential effects and narrow spatial frameworks, Indicators 1 and 2 have no other past, concurrent or future actions foreseeable that would contribute effects, thus, cumulative effects equal the direct/indirect effects. No alternative has cumulative effects related to aquatic resources.

3.7 NNIS

3.7.1 Issues

The potential of introduction of new invasive species and further spread of already present high-priority plant species and earthworms in the project areas.

3.7.2 Affected Environment

Since 2001, the Chippewa National Forest (CNF) has inventoried and documented 85 non-native invasive plant infestations in the Laurentian project area. These documented infestations include nine different plant species. As indicated, these surveys located one infestation considered as a high priority species for invasive control according to listing in the Non-native Invasive Plant Management Environmental Assessment (NNIP EA 2011). This plant is common buckthorn (*Rhamnus cathartica*), which is likewise designated as a CNF priority high ecological risk species (Larson 2013).

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 30 documented infestations in various locales, primarily along shorelines of lakes, across the Laurentian project area. Another medium/high risk priority plant, Siberian peashrub (*Caragana aborescens*), has one known population in the project area. For medium risk priority species, spotted knapweed (*Centaurea stoebe spp. micranthos*), is the only plant in that ecological risk category with two known infestations in the project area.

Table 3-18 NNIS Plants and known infestations within or near proposed activities

High Priority Invasive Plants and Ecological Risk Value	Number and Size of the Infestation	Proposed Action –Alt B Activity Near Infestation(s)
Common buckthorn (*Rhamnus cathartica*) – High Risk	1 population – 0.05 acres	Red Pine Thinning – 110 feet from two Activity Area boundaries
Siberian peashrub (*Caragana aborescens*) – Medium/High Risk	1 population – 0.06 acres	Site is not near any proposed activity areas
Purple loosestrife (*Lythrum salicaria*) – Medium/High Risk	2 populations (Twin Lakes) – 0.17 acres 1 population (Smith Lake) – 1.1 acres	Hard maple/basswood Single Tree Cut – Unlikely to cut trees in two NNIP sites Hard maple/basswood Site Prep Activities – Site adjacent to activity area
Spotted knapweed (*Centaurea stoebe spp. micranthos*) – Medium Risk	1 population – 0.005 acres 1 population – 0.1 acres	Red Pine Clearcut – Adjacent to area Balsam Fir Clearcut – Within boundary of Activity Area, but site is in an area restricted for cutting

Lastly, those invasive species considered a low risk that have infestations within or adjacent to proposed activities, are likewise evaluated in a more general scope, where applicable.

The majority (29) 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 each 8 documented infestations are field sowthistle (*Sonchus arvensis*) and Canada thistle (*Cirsium arvense*), then oxeye daisy (*Leucanthemum vulgare*) (3 populations), yellow (white) sweetclover (*Melilotus officinalis*) (2 populations), and lastly reed canarygrass (*Phalaris arundinacea*) with one documented population. These infestations occur throughout various sites within the project area in their typical habitat, which primarily is in disturbed open lands along roadsides, wildlife opening, 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 CNF. 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 2013)

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 CNF.

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

Approximately 27% of the forested acres in the project area consist 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 soils resource report supporting documentation.

Management Objective

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

All management activities in this project comply with relevant Chippewa National Forest (CNF) Plan Objectives and Guidelines for NNIS: O-WL-38, O-WL-39, and G-WL-25 (USDA FS FS 2004a).

3.7.3 Direct and Indirect effects

Scope of the Analysis

Spatial Framework

Generally, the spatial boundary for direct consequences is 100 feet and for any indirect consequences, we would use up to a 500-foot maximum distance. The principal spatial boundary used to evaluate direct and indirect consequences are the activity areas consisting of the proposed commercial harvest activities, site preparation activities in harvested stands, and pile burning, 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 Laurentian VMP 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 (*Cirsium arvense*) and purple loosestrife (*Lythrium salicaria*), 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 NNIPs, as well. For invasive earthworms, their effects may be longer, and additional 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

Alternative A

Non-native invasive plant populations would 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 Laurentian 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. This would include the high, medium/high, and medium risk plant species consisting of common buckthorn, Siberian peashrub, purple loosestrife, spotted knapweed, respectively. These four species exist in scattered infestations throughout the Laurentian project area.

As indicated, common buckthorn (*Rhamnus cathartica*) is the only high risk priority species with a known population in the project area. The population is very small, consisting of about 0.05 acres in size. The infestation occurs near two proposed red pine thinning activity areas in the northwest project polygon area. The infestation exists about 110 feet from the closest point to the proposed activities. Birds and other animals may disperse the fruit into the thinning areas, but the proposed activities should not directly contribute to spread of the population.

Siberian peashrub (*Caragana aborescens*) a medium/high risk priority plant, has one known population in the project area of about 0.06 acres. The site is not near any proposed harvest or other activity areas at the southern portion of the Laurentian VMP. Because of its isolation from all proposed activities, the proposed action is not anticipated to contribute to spread of the species.

Purple loosestrife (*Lythrum salicaria*) is also a medium/high risk priority species that has 30 documented infestations in various locales across the Laurentian project area. Within the north-center polygon area of the Laurentian VMP, the species occurs in multiple population sites near Twin Lakes and Turtle Lake. At Twin Lakes, a large infestation occurs around the perimeter of the lake, of which, most of it exists outside of the project area. At this locale, five populations occur within the Laurentian VMP that collectively totals about 1.4 acres. A proposed single tree harvest in a hard maple/basswood stand occurs nearby, with two small population segments consisting of about 0.17 acres located within or immediately adjacent to the proposed activity area. Because cutting of trees would most likely not occur in these areas, the relatively small disturbance, and mostly a lack of appropriate habitat for colonization of new loosestrife, the proposed activities are not anticipated to contribute to spread of the species. Another cluster of 13 loosestrife populations consisting of 1.6 acres occurs along the shoreline of Turtle Lake. None of the populations occur anywhere near any proposed harvest or activity area, so Alternative B would not contribute to the spread of the species at this location.

Several other loosestrife populations occur in the vicinity around Smith Lake. Of the 10 populations in this portion of the project, only one site is near any of the proposed Alternative B activities. The proposed activities near the location of this infestation would include site preparation for seeding and planting, plus tending activities but none of the work would occur directly within the loosestrife infestation. Additionally, the ground disturbance is relatively small and unlikely to occur in habitat for purple loosestrife. Most of the infestation occurs well away from the proposed activities, and only a small corner is adjacent to the loosestrife population, so there are no direct effects that could contribute to spreading the infestation. Indirectly, the activities may provide some small amount of available disturbed habit for loosestrife colonization in areas next to the shoreline.

The remaining two loosestrife populations in the project area occur along the north shoreline of Trout Lake. No harvest or other proposed activities occur anywhere near these two sites, so the Alternative B activities would not contribute to the spread of loosestrife at these locales.

For the medium risk priority species, spotted knapweed (*Centaurea stoebe spp. micranthos*), it has two populations occurring within or near proposed activity areas in Alternative B. One very small population of only 0.005 acres occurs north of FS Road 2354 and adjacent to a proposed red pine clearcut. Because of its adjacency to the harvest activities, the proposed action should not have much direct contribution to the spread of the infestation, but indirectly the large ground disturbance would provide appropriate conditions for the species to colonize nearby portions of the harvest area. The other spotted knapweed population of about 0.1 acre, also occurs along the FS Road 3274A, which is within a clearcut proposed in Alternative B. However, the infestation occurs on the west-side of the roadway, and project planning intends to restrict harvest in this portion of the activity area. Thus, this proposed activity would likewise not directly contribute to further spread of the species, but indirectly the nearby harvest would provide appropriate conditions for the species to colonize nearby portions of the harvest area.

By properly implementing project level design criteria and appropriate BMPs, the CNF anticipates a low to moderate risk for new introductions and 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 subsequent prescribed burning 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. 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.

Again, 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 the Soils section of the EA for further discussion regarding exotic earthworms.

3.7.4 Cumulative Effects

Alternative A – No Action

The cumulative effect of no action would be to allow these alien and invasive species to spread, largely unabated in most locations across the Laurentian 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 Laurentian 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 Proposed Action

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 would 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.

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.

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. 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 Laurentian VMP would also help in controlling the problem.

Refer to the Vegetation section – cumulative effects portions of the EA for detailed information of past, present, and future activities that could contribute to the spreading of NNIS.

Within the Laurentian VMP area, the Forest has made several other Decisions under previous EA's, including the Upper Bowstring River, Central, Bigfork, Talmoon, Marcell Northeast, and Rice River Vegetation Management Plans, which are not yet fully implemented, would be implemented. This includes timber harvest and associated activities in a number of forested stands. Timber sales have been sold under these decisions, which are not yet fully cut out.

3.8 Fuels

3.8.1 Issues

Within the project area high fuel loading caused by the pine thinning of 95 acres in a Wildland Urban Interface area will increase the potential for severe wildfire. *Wildland Urban Interface (WUI) is defined as an area within 1 ½ miles of residence, high value infrastructure, high recreation areas and within ½ mile of major transportation corridors.* Fire management's goal is to reduce the fuel loadings to provide for public safety, minimize the risk of severe wildfire, and restore the forest to desired conditions. The desired conditions are addressed in Affected Environment.

There were no issues indicated in response to scoping comments on the proposed action. However; 95 acres of pine thinning was within an identified WUI area and thus requires the need for fuels treatment. Activity fuels created by the thinning will increase the tons per acre of fuels on the forest floor. These fuels will be subsequently treated. This treatment will help lower the risk of catastrophic fire by reducing the fuel loading along travel corridors within the project area.

The effects of 95 acres of thinning in the WUI will be analyzed in this section.

Indicator:

- The reduction of hazardous fuels commonly known as activity fuels created by thinning within the Wildland Urban Interface (WUI) will be evaluated in terms of acres of pile burning.

3.8.2 Affected Environment

Hazardous fuel loads can quickly build up in the absence of periodic surface fires. Thinning conifer counts towards hazardous fuels reduction acres because wildfire behavior is affected by crown density, crown base heights, and ladder fuels. Thinning reduces crown density, raises crown base heights, and decreases ladder fuels. The conifer thinning offers the opportunity to mitigate the potential for catastrophic wildfire. When thinning occurs in a WUI additional measures should be taken to reduce the short-term rise created by the activity fuels.

The proposed thinning is located within the boundaries of the project area and located within the Deer River Ranger District of the Chippewa National Forest. The project area is comprised of a fire dependent "Dry Mesic Pine" red pine forest that was maintained by disturbance resulting from frequent low intensity surface fires and periodic crown fires.

The fire regimes and land type vary throughout the project area. The fire regimes frequency varies from 0-35 years to 200+ year frequency. The fire regimes have been characterized by frequent, low intensity ground fires occurring about every 20 years followed by severe crown fires every 100 to 500 years (Aaseng et.al 1993).

Each Fire Regime has three condition classes (CC) based on a relative measure describing the degree of departure from the historical natural fire regime. This 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). The three classes are based on low (CC1), moderate (CC2), and high (CC3) departure from the natural regime. Low departure is considered to be within, while moderate and high departures are outside the natural range of variability. Condition Class and Fire Regime are combined for the Fire Regime Condition Class (FRCC). There are no wildland vegetation and fuel conditions or wildland fire situations that do not fit within one of the three classes. These fire regimes correspond to the disturbance intervals described in the Landscape Ecosystems in the Forest Plan FEIS Appendix G (USDA FS 2004a). The five coarse scale regimes include:

I. 0 – 35 year frequency and low (surface fires most common) to mixed severity (less than 75% of the dominant overstory vegetation replaced)

II. 0 – 35 year frequency and high (stand replacement) severity (greater than 75% of the dominant overstory vegetation replaced)

III. 35 – 100+ year frequency and mixed severity (less than 75% of the dominant overstory vegetation replaced)

IV. 35 – 100+ year frequency and high (stand replacement) severity (greater than 75% of the dominant overstory vegetation replaced)

V. 200+ year frequency and high (stand replacement) severity

The desired future condition of these fire dependent and fire tolerant lands is to change them by at least one condition class, and two condition classes is preferred.

The Healthy Forests Initiative emphasizes the need for fuel treatment on NFS lands and describes the need to positively change the condition class of stands on fire dependent land types.

This project is comprised of areas categorized as Condition Class III and Fire Regimes of I and IV. Of the 50,826 acres within the project area 914 acres have designated for thinning 95 of these acres or 10% is in a WUI and Condition Class 3. These WUI areas have been identified for hazardous fuels treatment (pile burning) after harvest. Pine thinning will increase the tons per acre of fuel on the forest floor and increase the risk for wildfire.

Human Values and Wildfire Risk

On average there are 53 wildfires annually on the Chippewa National; Forest. Within the project area there have been approximately 24 fires over the past 66 years. The majority of the fire starts are human caused. Thus, concerns of treating activity fuels are elevated within the vicinity of the WUI.Direct and Indirect effects

Scope of the Analysis

Spatial Framework

The scope of this analysis focuses on the increased fuel load created by the pine thinning, and the effects of reducing the fuel load located in the WUI within in the project area.

Timeframe

Duration of effects of pile burning would be at least 1-4 years. Therefore, the time frame for direct, indirect, and cumulative effects analysis is from the harvest date through the projected timeframe.

3.8.3 Direct and Indirect effects

Effects by Alternative

Table 3-19 Summary of Fuel resource indicator

Indicator	Alternative A	Alternative B
Acres of geographic location of mechanical piling and burning.	0	95

Alternative A

Under the No Action Alternative, There would be no harvest and consequently no activity fuel generated from harvest operations. Prescribed fire would not be used. No Condition Class improvement would occur. The stands would continue to age and therefore contribute to higher fuel loadings and be susceptible to insect, disease, and wind events that will eventually contribute to higher fuel accumulations. Desired future conditions, objectives for the landscape, and guidelines set forth in the Forest Plan and Chippewa Fire Management Plan would not be met. With no management activities, the cost and complexity of wildfire containment around the wildland urban interface would increase.

Alternative B

Under Alternative B, 95 acres prescribed pile burning will be used for reduction of activity fuels located within the WUI after thinning activities. This will reduce fuel loadings and minimize fire intensity if a wildfire were to occur.

Analysis of Alternative B has shown that the proposed pile burning in the conifer plantations could move Condition Class III areas towards Condition Class II.

Where slash is piled and burned (up to approximately 95 acres in Alternative B), the surface area immediately under where these piles have been burned would be devoid of vegetation anywhere from 1 to 4 years (J. Tobin, R. Rockis; pers. Comm.). This timeframe depends on: arrangement of the pile, size of the pile, intensity of the fire, seed bank on site, and weather conditions during the time of the burn. Usually the vegetation reestablishes within 1 year, however; those species reestablishing are of the could be undersirable non native invasive species. This is mitigated for, in many cases, monitoring and follow up treatment if needed on the site. Usually after 4 years pass, the result of the burning activity goes unnoticed.

By treating the activity fuels created by thinning there will be no effects.

3.8.4 Cumulative Effects

There are no cumulative effects to consider.

3.9 Heritage Resources

3.9.1 Issues

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 3.11. Effects to heritage resources are disclosed in this section as a secondary issue.

3.9.2 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 Laurentian Vegetation Management Project study area is outside of the boundaries of the Leech Lake Reservation. Lands and resources both 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 Agency 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.

The Laurentian Vegetation Management Project area has been occupied for at least the last 10,000 years by various densities of people. Their 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 Laurentian Vegetation Management 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 Objective

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).

3.9.3 Direct and Indirect effects

Scope of the Analysis

Spatial Framework

Cultural resources are analyzed within treated units and in the whole Laurentian Vegetation Management Project area.

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 Laurentian Vegetation Management Project area. They would be protected from any affects to them. Sites would be protected by avoidance in treated units. There would be no effects to known sites from treatments. If any sites are found during treatments, the work would stop and the site would be subsequently avoided.

3.9.4 Cumulative Effects

Cultural resource reconnaissance surveys were done for all soil-disturbing projects, so there have been no known effects to cultural sites. Similar projects have been done on other ownerships. They do surveys as required by their regulations. There would continue to be soil-disturbing projects on all ownerships, but surveys would be done according to regulations, so sites would be protected.

3.10 Gravel pit expansion

3.10.1 Issues

Availability of local gravel is extremely limited and the expansion of the pit would be beneficial to the Forest Service, Itasca County, and Leech Lake Band of Ojibwe.

3.10.2 Affected Environment

The Smith Lake pit deposit is a glacial esker running from southeast to the northwest. It is composed of a heterogeneous till consisting of an occasional clay cap underlain by a usually medium-course to medium-fine sand matrix in which the rock is found. The pit is located at the apex of a broad, high ridge which formed as an esker segment or ice crevasse filling. The ridge trends north northwest and forks into several smaller ridges in that direction.

The Smith Lake Gravel Pit is being used as a gravel source, although the amount of gravel at the pit's faces is limited at the present location.

Management Objective

D-MN-1 Exploration and development of mineral and mineral material resources is allowed on National Forest System land.

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

3.10.3 Direct and Indirect effects

It is estimated that there are 115,000 cu. yards available in the proposed expansion area.

Table 3-20 Summary of Alternatives

Indicator	No Action Alternative A	Alternative B
Provides Additional Gravel to Address Local Needs	No	Yes
Additional Cubic Yards of Material Available (approximate)	0	115,000
Acres of vegetation removed	0	15
Acres of vegetation rehabilitated	0	2
Regulates Access to Gravel Pits	Yes	Yes
Season of Operation	Gates would remain closed unless access to gravel is needed	Gates would remain closed unless access to gravel is needed
Utilize gravel in a manner that does not adversely impact wildlife TES.	No expansion so no change	

Scope of the Analysis

Spatial Framework

The current gravel pit and the stand adjacent

Timeframe

The scope of analysis is the Smith Lake Pit and the proposed expansion area for the next 10 years.

Effects by Alternative

Alternative A

Under the No Action alternative the pit expansion would not occur.

Alternative B

The action proposed to expand the Smith Lake Pit off of the north end by approximately 15 acres, perform reclamation on areas of the Smith Lake Pit no longer available for gravel extraction. Trees will be removed during the expansion phase in areas of gravel extraction. When the gravel source is exhausted, reclamation of the area would include replacing topsoil and planting trees or other vegetation.

3.10.4 Cumulative Effects

The Smith Lake Pit has been in operation for over 30 years. There has been occasional use for over 30 years in the pit. In the past 15 years, demand for gravel at the Smith Lake Pit has increased, so the use at the pit has increased accordingly. It is apparent that there would be a continued need for gravel all across the Forest. It is important to have sources of gravel close to the end use areas due to the expense of hauling it.

3.11 Tribal Gathering and Traditional Uses

3.11.1 Issues

One of the Forest-wide goals (Forest Plan, P. 2-5) is to contribute to the efforts to sustain the American Indian way of life. This includes gathering of natural resources for tribal use. While this project is entirely outside the LLBO reservation boundary there may be use of the area for tribal and traditional gathering by communities. With one purpose and need in this project for fostering native vegetation community development during harvest, site preparation, reforestation and stand improvement activities (Purpose and Need , Section 1.3) the gathers should continue to find native species in the future.

The Laurentian Vegetation Management Project objectives and alternatives were presented to the LLBO Division of Resource Management (DRM) with a mailed scoping letter and a meeting in March 2014.

During a meeting with the DRM staff, the potential use d pre-commercial thinning for hare habitat, buffering cedar to minimize blowdown, and effects on goshawk (project record) were discussed (Project Record).

3.11.2 Affected Environment

For American Indian traditional users of natural resources - especially for the Leech Lake Band of Ojibwe (LLBO) - practically all natural resources of the Chippewa National Forest, are resources that have been and would continue to be utilized for food, clothing, shelter, utensils, transportation, medicinal, and ceremonial purposes.

The Laurentian Vegetation Management Project area is outside but in close proximity to the Leech Lake Indian Reservation and there are no Areas of High Interest (Forest Plan, Figure TR-1, page 2-37). Native American communities in the vicinity are Inger, Deer River, and S-Lake. Tribal members may use the project area for hunting, recreation and gathering activities.

Management Objective

Tribal interests and uses on the Forest are protected through various statutes. The federal trust doctrine requires that federal agencies manage their lands with full consideration of tribal rights and interests.

The Forest Plan also contains several items that deal indirectly or directly with gathering and traditional uses.

- 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,p. 2-35)

Forest management activities would 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, p. 2-36)

3.11.3 Direct and Indirect effects

Scope of the Analysis

Spatial Framework

The spatial boundary used to evaluate direct, indirect, and cumulative vegetation consequences is the Forest Service ownership within the LVM Project area as described in Chapter 1, Section 1.2.

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.

Effects by Alternative

Alternative A

This alternative proposes no new harvest operations, prescribed burning or temporary road construction activities that would affect existing traditional resources gathering opportunities. Forest Service system and temporary roads would continue to be used as land access trails and travel corridors by traditional resource gatherers. There would be no change in the availability of resources for traditional uses.

Alternative B

Harvest operations or temporary road construction activities could affect existing traditional resources gathering opportunities. This could result in some gatherers finding alternate locations during harvest operations. Harvest would occur on approximately 3,272 acres in Alternative B with one mile of temporary road segments.

The effects of harvest on hare as a prey for lynx and goshawk are covered in the wildlife BE and BA (Project Record).

In the past the forest has not done pre-commercial thinning because funding has been used to ensure desired regeneration (i.e. long lived conifer) is established and grows above the surrounding vegetation. This is accomplished though site preparation, planting, animal damage control and release.

There could be blowdown of northern white cedar trees due to harvest next to stands of cedar. No harvest of cedar is proposed in Alternative B, there would be harvest in stands adjacent to cedar stands. Four stands of even-aged regeneration harvest share a total of .8 miles of boundary with cedar stands. The short segments of boundary affected on these stands should result in very little blowdown of cedar.

3.12 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.

3.12.1 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.

3.12.2 Affected Environment

The affected environment for this project is the local economy of community around the Chippewa National Forest and the county of Itasca where this project would occur.

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 Forest Plan FEIS and FEIS Appendix J, Response to Public Comments, pgs 426-450). An economic analysis was included in the FEIS for the Forest.

3.12.3 Direct and Indirect effects

Scope of the Analysis

Spatial Framework

This analysis is limited to the measureable cost and benefits of the proposed activities within the Laurentian Vegetation Management Project boundary.

Timeframe

All activities will be reviewed in the Quick Silver program to start in one year with follow up activities falling out approximately 10 years.

Effects by Alternative

Table 3-21 Quicksilver results

Factor	Alternative A	Alternative B
Estimated Volume of timber harvested (CCF)	0	37,717
PV-Benefits ()	0	$1,810,780.26
PV-Costs ()	0	($1,764,135.59)
Present Net Value ()	0	$46,644.67
B/C Ratio	0	1.03

Alternative A

Under 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 (except transportation) are shown in Table 3.21. 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 3-21). Alternative B cuts 3,737 acres which reflects a higher benefit/cost ratio than Alternative A.

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 Forest Plan (FEIS, section 3.9) and still holds true today. Because of the regional nature of the wood products supply and demand, the time to prep and sell sales, and the length of timber sale contracts, it is difficult to analyze the effects of a specific project on the local economy in terms of jobs and the effects on local mills. However, Table 3-22 provides some context in terms of the volume offered and sold, volume harvested, and uncut volume under contract for the Chippewa National Forest.

Table 3-22 Timber Targets FY 2011 - 2013

	FY 2011	FY 2012	FY 2013
Timber Target (MBF)	42,810	44,500	46,000
Volume Sold (MBF)	43,706	46,695	51,982
Volume Harvested (MBF)	34,803	33,756	49,132
Uncut volume under contract (MMBF)	109.8	122.5	125.4

The volume sold in FY 2013 was over 51,000 MBF which is 8,000 MBF over FY 2011. The uncut volume under contract has steadily increased since FY 2011.

The timber industry is an important component of Itasca County and northern Minnesota. It is one of the largest employment sectors, employing over 200 direct jobs and a total of over 500 in the harvest (UMD 2011), transportation and manufacturing (pulp and paper, structural, biomass, etc.) of forest products. In addition by assuring forest health the forest provides recreational opportunities, wildlife habitat, decreases catastrophic fire risk and other benefits that allow for continued economic growth and stability.

3.13 Other Disclosures

3.13.1 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. The Clean Air Act is the primary instrument for air resource management. The EPA has issued an interim policy on wild-land prescribed fire to address the impacts of air pollutant emissions from prescribed fire. They established six criteria for National Ambient Air Quality Standards for fine particles. Geographic regions of the country are classified by level of air quality protection they need and designated as a Class I, Class II or Class III air-shed, Class I is the most restrictive and Class III is the least restrictive. The Chippewa National Forest is in a Class II air shed which allows some temporary air impairment.

The prevailing winds on the Forest are from the west and northwest to the east. The smell of smoke as well as visible particulates from burning agricultural fields in Canada is occasionally experienced across the Chippewa National Forest. Smoke from prescribed burning does affect air quality. Depending on fuel moisture and weather, smoke from prescribed burning can last up to eight hours after ignition. Where there are large concentrations of slowly smoldering, wet slash piles, the smoke may last up to a month; however, the smoke is usually localized near the burn piles. Because prescribed burns are controlled, they generally diminish air quality for shorter periods of time than wildfires.

The dispersion index must be “fair” or better before any prescribed fire may occur on the Chippewa National Forest (Project Record).

There are no direct, indirect, or cumulative effects associated with air quality found in the Laurentian Vegetation Management Project.

3.13.2 Roads

Forest Service system and unauthorized (non-system) roads within the Laurentian Vegetation Management Project were previously evaluated to determine the minimum transportation system that still provides access to areas requiring management. No further Roads analysis was completed as this area has been previously covered in earlier assessments, and is still being implemented.

The proposed action (Alternative B) would not decommission any roads.

About one mile of temporary roads in the proposed action (about 14-foot wide corridors) would be constructed as needed and decommissioned following management operations, and are not part of the permanent Forest Service system roads. Estimated effects of the temporary roads are discussed primarily in other sections of this chapter.

3.13.3 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). The project area lies outside the Leech Lake Reservation. 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 Counsels and the Division of Resource Management Leech Lake Band Ojibwe (Section 1.7).

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 (Section 1.7, 3.11 and Project File)
- Scoping and meetings with the LLBO Division of Resource Management staff
- Consultation with the Tribal Historic Preservation officer (Project File)
- Archaeological and traditional cultural property surveys (Project File)

A discussion on tribal rights and issues can be found in Heritage sections and Tribal Interests and Traditional Resources 3.9 and 3.11. 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 activities proposed would not result in demographic changes such as displacement of minorities, geographic changes such as land use, or economic hardship such as an increase in taxes. The action 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 Laurentian Vegetation Management Project.

4. FINDING OF NO SIGNIFICANT IMPACT (FONSI)

4.1 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.

4.2 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 this project will not have a significant impact (beneficial or adverse) on the land and its natural resources, air quality, or water quality (EA pages 28-98).

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

Prescribed fire has been used successfully in the past on the Chippewa National Forest with no effects on citizens. 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 Laurentian 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 (page 92- 94) or wetlands (pp. 77-83). Treatments are consistent with Forest Plan direction (Forest Plan, 2004, 3-36 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 1.7, and Appendices D). 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, burning, planting, temporary road construction, and road 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, seeding and planting 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).

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 23-105) 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 Heritage Resources Report and EA disclosure (page 92-94), 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. Based on this information, I conclude that this action will not cause loss or destruction of significant scientific, cultural, or historical resources (Section 3.9 & 3.11).

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 3.2), the Biological Assessment (PR BA), the Laurentian Vegetation Management Project not likely adversely affect the Canada lynx or its habitat. The US Fish and Wildlife Service also concurred with the Biological Assessment determinations for the federally threatened Canada lynx (EA, page 36). A letter of concurrence from the US Fish and Wildlife Service was received and dated September 3, 2014.

The northern long-eared bat (NLEB), which is proposed for Federal listing no later than April 1, 2015, may be present in the project area and was analyzed in a Biological Assessment (PR BA). On 9/3/14, the USFWS agreed that this project is not likely to jeopardize the continued existence of NLEB. If tree felling is not completed by March 31, 2015 a biological opinion may need to be issued by the USFWS. Forest Service Manual direction at 2670 requires analysis of potential impacts to sensitive species, which are those species for which the Regional Forester has determined population viability is a concern. Potential effects of this decision on sensitive species have been analyzed and documented in a Biological Evaluation (PR BE). Of the 59 sensitive species on the Chippewa, the Laurentian Vegetation Management Project would have no impact to 33species. A finding of "may impact" is associated with 24 species and a "may benefit to 1 species. The additional species the NLEB was covered in the BA.

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 (below), I find that the proposed activities do not threaten a violation of Federal, State, or local law imposed for the protection of the environment.

5. List of Preparers, Agencies and Persons Consulted

5.1 Forest Service Interdisciplinary Team

Barbara Knight	IDT Leader, Planning Team Leader
Kelly Barrett	Wildlife Biologist
Carl Crawford	Fuels Planner
Audrey Gustafson	Forester - Silviculturist
Jeremy Back	Soils Specialist
Kirk Larson	Botanist
Eric Raitanen	Fisheries Biologist
Drew Wilson	GIS Resource Information Specialist
Ann Long-Voelkner and Christine Brown	Recreation Specialist
Millie Baird	Civil Engineer

5.2 Other Forest Service Contributors

Greg Van Orsow	Forester
William Yourd and Sean Dunham	Archaeologist

5.3 Tribal Consultations

Leech Lake Band of the Ojibwe
Tribal Historic Preservation Office
Division of Resource Management
Local Indian Councils (Deer River, Inger, S Lake, Winnie Dam)

5.4 Other Agencies Consulted

United States Department of Interior Fish and Wildlife Service
Minnesota State Historic Preservation Office
Minnesota Department of Natural Resources

6. Glossary

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

Clearcut is an even-aged harvest used to regenerate stands that are currently mature. Approximately 6-12 reserve trees per acre would be retained to provide for multiple benefits (e.g. future snags, large woody debris, wildlife seed sources, or visual concerns).

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

Commercial thinning would be applied to red pine and mixed jack pine-red pine stands. Approximately 1/3 – ½ of the basal area (BA) would be removed; stands would be thinned to no less than 90 square feet of BA due to concerns that heavy thinning would increase hazel densities.

Existing variations in density would be maintained and/or enhanced. Existing within-stand species diversity would be maintained by retaining species such as white pine, jack pine and hardwoods, as practicable.

Supercanopy white pine and red pine would be retained.

Unthinned areas would be retained to provide natural tree mortality for wildlife objectives.

In stands 40 years and older, and greater than 10 acres in size,

- Thin throughout 95% of each stand to a target BA based on stand conditions.
- Leave 5% of each stand un-thinned; no harvest activities would occur in these areas.
- Remove red pine in favor of other species for diversity.

In stands less than 40 years old (which are first time commercial thins in stands of relatively high basal areas) or stands less than 10 acres in size, the thinning treatment would be more regimented to row thinning or thinning to a specific target basal area across the stands to provide access and minimize damage to the remaining trees.

Condition Class is a measure of ecological departure from historical reference conditions. Fire Regime Condition Class (FRCC). FRCC 1 represents ecosystems with low (<33 percent) departure from a defined reference period – that is, landscapes still within the natural or historical range of variation; FRCC 2 indicates ecosystems with moderate (33 to 66 percent) departure; and FRCC 3 indicates ecosystems with high (>66 percent) departure from reference conditions.

Group selection harvesting is an uneven-aged method used to establish and maintain a multi-aged structure but involves the removal of small groups of trees; groups would be approximately ¼ - 1 acre in size.

Large, mature upland patches are large (300 to 1000s of acres) blocks of upland forest that are managed to maintain the characteristics of mature and older native upland forest vegetation communities, and promote the maintenance or development of interior forest habitat valuable for a variety of plant and wildlife species (O-VG-16; O-VG-22; D-VG-7b).

In general, old/mature forests are dominated by long-lived tree species. These forests are interspersed with old, usually large trees and tree fall gaps invaded by a variety of tree, shrub, and herbaceous species forming multiple canopy layers and increasing structural diversity. The tree, shrub and herbaceous communities should reflect the composition of native vegetation communities (O-VG-7, O-VG-8). These communities contain a high frequency of standing dead and dying trees, and down logs of various sizes and in various stages of decay. In general, the older the forest, the larger the canopy-layer trees, the greater the amount of dead and dying, standing and downed trees, and the more structurally complex the forest (FEIS pp. 3.2-15, 3.3.1-4). For specific descriptions of mature and older growth stages specific to each Landscape Ecosystem see FEIS Appendix G.

Vegetation management treatments within large, mature upland patches must maintain a minimum of 50% canopy closure and large diameter trees (S-VG-3). Harvests also need to be designed so that stand structure and species composition reflect the later stages of stand development, and the characteristics described above. The desired conditions include uneven-aged and multi-aged forests with a variety of tree ages and different vegetation layers (heights) within the same community (D-VG-6), and should allow for the continuance of ecological processes of native vegetation communities, including disturbances from fire, wind, flooding, insects and diseases (D-VG-8).

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

Planting in even-aged regeneration harvest would be accomplished with about 1000 trees per acre of mixed species that are suitable for those specific sites. On these planting sites, the featured species would make up about 50-60% of the seedlings, with other species each making up about 20-25% of the mix. Fill-in planting may be necessary if stocking levels do not meet minimum standards within 3 years of harvest in stands treated with clearcut, seed tree, or shelterwood treatments.

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

There would be a minimum of 5 feet from the branches of the released desired species to the branches of competing species. If not directly competing with a desired seedling/sapling, oaks, maples, and fruiting shrubs (e.g. pin cherry, chokecherry, high bush cranberry, juneberry, plum, blueberries, etc.) would be retained.

Pockets of aspen or hazel would also be retained if they are not competing with desired species.

In stands with paper birch stump sprouts, cut all but one stump sprout to provide all nutrients, water, growing space, etc. to one stem.

Seed tree is an even-aged harvest that would regenerate mature stands from existing scattered seed trees (e.g. white pine, paper birch, jack pine, balsam fir). Approximately 10-20 square feet of overstory basal area would be retained. Overstory trees would be retained after regeneration to meet multiple resource objectives (e.g. visual concerns, wildlife values).

Seeding the distribution of seed by hand or machine in regeneration. All seeding rates depend upon the objective (e.g. diversity or regeneration) and the species being sown. Species to be seeded include white pine, red pine, white spruce, black spruce.

Scenic Intergrity Objectives guide the amount, degree, intensity, and distribution of management activities needed to achieve desired scenic conditions.

High: Landscapes where the valued landscape character appears intact. Deviations may be present, but must repeat the form, line, color, texture, and pattern common to the landscape character, so completely and at such a scale that they are not noticeable.

Moderate: Landscapes where the valued landscape character appears slightly altered. Noticeable deviations must remain visually subordinate to the landscape character being viewed.

Seed tree with reserves harvest method would regenerate stands using existing scattered seed trees (e.g. paper birch, balsam fir). Approximately 10-20 square feet of overstory basal area would be retained. Overstory trees would be retained after regeneration to meet multiple resource objectives (e.g. visual concerns, wildlife values).

Shelterwood with reserves (i.e. establishment cut) would regenerate stands while retaining about 40 square feet of overstory basal area. Overstory trees would be retained after regeneration to meet multiple resource objectives (e.g. visual concerns, wildlife values, Riparian Emphasis Management Area objectives). In some stands, existing natural regeneration (e.g. hardwoods, balsam fir) would be released via harvest operations.

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

Single tree and Group selection is an uneven-aged method used to establish or maintain a multi-aged structure. It involves the removal of individual or groups of trees in all size classes to promote growth of remaining trees, provide space for regeneration (especially northern hardwoods), and inhibit aspen suckering.

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

Road Decommissioning or Closure Road decommissioning or closure is effective blocking of the road in such a manner as to prevent motorized traffic. Decommissioning of roads in activity stands would take place after harvest and regeneration activities are complete.

7. Abbreviations

BA biological assessment

BE biological evaluation

CFR Code of Federal Regulations

CNF Chippewa National Forest

DNR Minnesota Department of Natural Resources

EIS environmental impact statement

FP Forest Plan

FS Forest Service

FSH Forest Service Handbook

FSM Forest Service Manual

GIS Geographical Information Systems

LE landscape ecosystem

LIC Local Indian Council

LLBO Leech Lake Band of Ojibwe

MFRC Minnesota Forest Resource Council

MIH Management Indicator Habitat

MIS Management Indicator Species

NEPA National Environmental Policy Act

NF National Forest

NFMA National Forest Management Act

NFS National Forest System

OML objective maintenance level (roads)

R9 Region 9 (Forest Service Eastern Region)

RFSS Regional Forester Sensitive Species

RMV recreation motor vehicle

ROS recreation opportunity spectrum

SIO scenic integrity objective

TES threatened, endangered, and sensitive (species)

USDA United States Department of Agriculture

USFWS United States Fish and Wildlife Service