

BIOLOGICAL EVALUATION  
OF  
SENSITIVE SPECIES

SOUTH LEECH LAKE 2  
VEGETATION MANAGEMENT PROJECT

WALKER RANGER DISTRICT  
CHIPPEWA NATIONAL FOREST

CASS COUNTY  
MINNESOTA

Prepared by: \_\_\_\_\_

James A. Gallagher  
Wildlife Biologist  
Chippewa National Forest

Date:

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# South Leech Lake 2 Project Biological Evaluation Walker Ranger District, Chippewa National Forest

## I. Project Area Overview and Summary

### Location:

The SLL2 project area is in Cass County in T142N R28-31W and T142-145N R28-31W. The project area lies south of Leech Lake, bounded on the west by Ten Mile Lake and Pine Point Research Natural Area, and on the east by County Highway 125 and Longville. A portion of the project area is within the Leech Lake Band of Ojibwe Reservation boundary. The project area encompasses about 63,000 acres within the Walker Ranger District. The project area includes the Onigum community. Land ownerships are mixed; the Forest Service manages about 45 percent (28,300 acres), private and Tribal lands comprise about 35 percent (22,100 acres), Cass County administers about 13 percent (7,850 acres), and the State of Minnesota 7 percent (4,600 acres). Proposed activities occur on National Forest System lands in the Dry Mesic Pine (DMP) Landscape Ecosystem.

**Table1-1. SLL2 project area and ownership acres.**

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

### Ecological Setting:

The project area includes one Landscape Ecosystem: Dry Mesic Pine (DMP). Table 2 shows NFS landscape ecosystem acres, all landscape ecosystem project area (PA) acres and percents for each.

**Table 2. NFS landscape ecosystem acres and all landscape ecosystem project area acres.**

LE	Description	NFS acres <sup>1</sup>	All acres <sup>1</sup>
DMP - Dry Mesic Pine	Historically, red pine and white pine supercanopy with red maple and paper birch subcanopy.	21926	63,000

<sup>1</sup> acreage is generalized from GIS layers

All vegetation management occurs within the Longer Rotation Management Area (LRMA) and Riparian Emphasis (RE) MA.

Patch size, edge, and forest or habitat fragmentation are elements of the spatial distribution of forest vegetation which affect wildlife, plant communities, and ecological function. The South Leech Lake 2 project area is comparatively more fragmented, has more edge habitat, and has less interior forest than other areas of the Chippewa National

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Forest. Forest Plan objectives for forest spatial patterns include maintaining or increasing the acres and number of large mature/older forest patches and increasing the amount of interior forest.

Forest Plan objectives include maintaining, protecting, or improving habitat for threatened, endangered, or sensitive (TES) species (Forest Plan, O-WL-17, p.2-28), specifically for the goblin fern and bald eagle. In addition, Forest Plan objectives contribute to the conservation and recovery of Canada lynx and gray wolf (Forest Plan, D-WL-3, item c; pages 2-24 – 2-25).

Maps for the location of the project and proposed activities are found in Appendix B of the South Leech Lake 2 EA.

## **Analysis Approach and Context for the South Leech Lake 2 Biological Evaluation**

The analysis within the South Leech Lake 2 Biological Evaluation (BE) is conducted at two scales: 1) the coarse filter using changes to Management Indicator Habitats, and 2) the fine filter using impacts to known occurrences to Regional Forester's Sensitive Species.

The LE vegetation and Management Indicator Habitat (MIH) objectives of the Forest Plan (USDA FS 2004a, pp 2-62 – 64, 2-68 - 70) set forest-wide objectives for forest vegetation composition, structure, age, and tree diversity. By moving toward these long-term desired vegetative conditions, the Forest will move towards desired conditions for amounts, quality, and distribution of important wildlife species and their habitats. Conservation objectives for threatened, endangered and sensitive (TES) species and their habitats are interwoven into the LE objectives.

The ability to achieve objectives for a variety of TES species is directly related to moving towards the vegetative objectives.

In addition to composition and age objectives, the Forest Plan (USDA FS 2004a, pp. 2-23 – 2-24) provides guidance regarding spatial distribution of forest vegetation. Particularly important to a variety of TES species are objectives and guidance related to development of large, mature forest patches, providing opportunities for interior forest habitat conditions. These objectives for large, mature forest patches are of particularly high value to some TES species. Within the SLL2 project area there are currently two large 1000+ acre patch and eight 301 to 1,000 acre patches.

Providing these long-term habitat opportunities through vegetation objectives and goals is part of a coarse-filter, or landscape-level approach intended to provide for the well being of TES species 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 (USDA FS 2004a, 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, will result in a failure to fully redeem Forest Plan direction for conservation of TES species. Site level management cannot compensate for a failure to address landscape-level concerns.

Three alternatives are proposed for consideration. These include:

- Alternative A: No Action.
- Alternative B: Proposed Action.
- Alternative C

A programmatic Biological Evaluation for Regional Forester's Sensitive Species on the Chippewa National Forest was completed in 2004 (USDA FS 2004 c, d), as a part of the revision of the Chippewa's Forest Plan. Sensitive species are defined (FSM 2670.5) as those plant and animal species identified by a Regional Forester for which population viability is a concern as evidenced by:

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

The South Leech Lake 2 project BE was developed in consideration of relevant Forest Plan standards, guidelines, and management objectives, including conservation objectives for Sensitive Species. This required a review and consideration of the programmatic BE, such that context could be fully understood with respect to potential concerns at the project level. It is assumed in this analysis that site level standards, guidelines, and best management practices would be fully implemented. As an example, it is assumed that standing dead trees are retained to the fullest extent practicable and that 6-15 live snag/den trees per acre are retained in final harvest stands.

Forest Service Manual (FSM 2672.42) objectives for completing a BE are to:

1. Ensure that Forest Service actions do not contribute to loss of viability of any native or desired non-native plant or animal species,
2. Ensure that Forest Service activities do not cause any species to move toward federal listing, and
3. Incorporate concerns for sensitive species throughout the planning process, reducing negative impacts to species and enhancing opportunities for mitigation.

## **Regional Forester's Sensitive Species Considered in the Project Area**

Table BE-1 outlines the evaluation of RFSS species occurrences, habitat, and risk for the South Leech Lake 2 project. The table also outlines the species for which a detailed evaluation was completed for the project area.

<b>Table BE-1. Regional Forester's Sensitive Species occurrence in the South Leech Lake 2 project area for the biological evaluation.</b>							
Species	Common name	Detailed Evaluation?	Suitable habitat present?	Documented Occurrence in project area	Risk	Project survey?	Habitat
<b>Birds</b>							
Accipiter gentilis	Northern goshawk	no	yes	no	Low	Yes	Large tracts of mature, closed canopy, deciduous, coniferous and mixed forests with an open understory
Ammodramus leconteii	LeConte's sparrow	no	yes	yes	Low	No	Large sedge-dominated wetlands and wet meadows
Ammodramus nelsoni	Nelson's sharp-tailed sparrow	no	yes	no	Low	No	Wet meadows, marshes, and open peatlands
Buteo lineatus	Red-shouldered hawk	yes	yes	yes	High	Yes	Large tracts of mature, deciduous and mixed riparian forest habitats with a preference for bottomlands and wooded margins near marshes
Chidonis niger	Black tern	no	yes	yes	Low	No	Nests in marshes and wet meadows
Contopus cooperi	Olive-sided flycatcher	No	yes	no	Low	No	Variety of boreal forests including uplands, lowlands, edges and beaver meadows with a preponderance of standing live or dead large pine, spruce or tamarack trees used for foraging
Coturnicops noveboracensis	Yellow rail	no	yes	yes	Low	No	Sedge meadows and grassy marshes
Cygnus buccinator	Trumpeter swan	No	yes	yes	Low	No	Small ponds and lakes or bays with extensive beds of cattails, bulrushes, sedges, and/or horsetail
Dendroica caerulescens	Black-throated blue warbler	no	yes	no	low	Yes	Mature large deciduous trees, especially sugar maple, with a well developed understory of deciduous shrubs in blocks of habitat
Dendroica castenea	Bay-breasted warbler	no	yes	Yes	low	No	Mid-age to mature spruce forests infested with spruce budworm
Falciptennis canadensis	Spruce grouse	No	yes	No	low	No	Coniferous forest of jack pine, black spruce and tamarack; habitat always includes short needled component and branches that extend to the ground
Haliaeetus leucocephalus	Bald eagle	Yes	yes	yes	Moderate	Yes	Fish bearing lakes and rivers, with large trees capable of supporting large nests (predominantly white pine and red pine)
Oporornis agilis	Connecticut warbler	No	yes	No	Low	Yes	Mature lowland coniferous habitats especially mature

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Species	Common name	Detailed Evaluation?	Suitable habitat present?	Documented Occurrence in project area	Risk	Project survey?	Habitat
							black spruce, tamarack bogs and jack pine barrens with thick shrub understory
<i>Phalaropus tricolor</i>	Wilson's phalarope	No	yes	Yes	Low	No	Quiet, shallow pools bordered by wet meadow vegetation
<i>Picoides arcticus</i>	Black-backed woodpecker	Yes	Yes	Yes	Moderate	No	Mature coniferous forests which include dead and dying conifers infested with wood boring beetle larvae
<i>Sterna caspia</i>	Caspian tern	No	No	No	Low	No	Islands in very large lakes
<i>Sterna hirundo</i>	Common tern	No	No	No	Low	No	Isolated, sparsely vegetated islands in large lakes
<i>Strix nebulosa</i>	Great gray owl	No	yes	No	Moderate	No	Mature lowland black spruce, black ash wetlands, tamarack wetlands and conifer and hardwood uplands adjacent to meadow openings
<i>Tympanuchus phasinellus</i>	Sharp-tailed grouse	No	No	No	Low	No	Expansive areas of graminoid and brush habitat. Habitat niche is between grassland and forests, usually created and maintained by fire.
<b>Amphibians</b>							
<i>Hemidactylium scutatum</i>	Four-toed salamander	No	No	No	Low	No	Adults live under or among mosses in swamps, boggy streams, and wet, wooded or open areas near ponds or quiet, mossy or grassy/sedgy pools
<b>Mammals</b>							
<i>Synaptommys borealis</i>	Northern bog lemming	No	yes	No	Low	No	Sphagnum and Labrador tea lowland black spruce/tamarack bogs and peatlands with grasses and sedges in conjunction with an ericaceous shrub layer
<b>Reptiles</b>							
<i>Emydoidea blandingii</i>	Blanding's turtle	No	yes	yes	Low	No	Calm, shallow watered marsh areas with soft bottoms with rich aquatic vegetation and sandy uplands for nesting
<b>Fish</b>							
<i>Lepomis megalotis</i>	Longear Sunfish	No	No	No	Low	No	Proposed addition to R9 List
<i>Moxostoma valenciennesi</i>	Greater redhorse	No	No	No	Low	No	Moderate to fast-flowing, medium-sized to large rivers with sand and gravel substrates
<i>Notropis anogenus</i>	Pugnose shiner	No	yes	No	Low	No	Clear lakes and streams with bottoms of sand and gravel or marl and abundant submerged aquatic vegetation
<i>Etheostoma microperca</i>	Least darter	No	yes	No	Low	No	Clear lakes and streams with abundant submerged aquatic vegetation
<b>Mollusks</b>							
<i>Lasmigona compressa</i>	Creek heelsplitter	No	No	No	Low	No	Headwaters, creeks, and small to medium rivers, in fine gravel or sand

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Species	Common name	Detailed Evaluation?	Suitable habitat present?	Documented Occurrence in project area	Risk	Project survey?	Habitat
<i>Lasmigona costata</i>	Fluted-shell mussel	No	No	No	Low	No	Medium to large rivers in sand, mud or fine gravel in areas with slow to moderate flow
<i>Ligumia recta</i>	Black sandshell	No	No	No	Low	No	Medium to large rivers with a good current, in riffles or raceways in gravel or firm sand
<b>Insects</b>							
<i>Caraclea vertreesi</i>	Vertree's caddisfly	No	No	No	Low	No	Medium to large-sized rivers or lakes that are directly connected to a medium or large-sized river. Typically in spring fed streams.
<b>Plants</b>							
<i>Botrychium lanceolatum</i> var. <i>angustisegmentum</i>	Lanceleaf grapefern	Yes	yes	yes	High	Yes	Northern hardwoods, lowland hardwoods
<i>Botrychium mormo</i>	Goblin fern	Yes	yes	yes	High	Yes	Northern hardwoods, lowland hardwoods
<i>Botrychium oneidense</i>	Blunt-lobed grapefern	Yes	yes	No	High	Yes	Northern hardwoods, especially near ephemeral pools
<i>Botrychium pallidum</i>	Pale moonwort	Yes	yes	yes	High	Yes	Northern hardwoods, odd spots in pine habitat, and openings
<i>Botrychium rugulosum</i>	Ternate grapefern	Yes	yes	yes	High	Yes	Odd spots, particularly in pine habitat
<i>Botrychium simplex</i>	Least moonwort	Yes	yes	yes	Mod	Yes	Northern hardwoods, openings
<i>Calypso bulbosa</i>	Fairy slipper	No	Yes	yes	Low	Yes	Lowland conifer
<i>Cardamine pratensis</i> var. <i>palustris</i>	Cuckoo-flower	No	Yes	No	Low	No	Proposed addition to RFSS list; marsh, bog, swamp, and streamside habitats; unknown but unique microhabitat characteristics
<i>Cypripedium arietinum</i>	Ram's-head lady's slipper	No	yes	No	low	Yes	Lowland conifer, transition between upland hardwood and lowland conifer
<i>Dicentra canadensis</i>	Squirrel Corn	No	yes	No	Low	No	Proposed addition to RFSS list; rich mesic forests; old growth maple basswood forest.
<i>Dryopteris goldiana</i>	Goldie's wood-fern	No	yes	no	Mod	Yes	Northern hardwoods, lowland hardwoods
<i>Eleocharis olivacea</i>	Olivaceous spike-rush	No	yes	No	Low	Yes	Bogs, lakes, streams, and shoreline
<i>Eleocharis quinqueflora</i>	Few-flowered spike-rush	No	yes	No	Low	Yes	Bogs, lakes, streams, and shoreline
<i>Erythronium albidum</i>	White trout-lily	No	yes	No	Mod	yes	Northern hardwoods by large lakes
<i>Gymnocarpium robertianum</i>	Limestone oak fern	No	yes	No	Low	Yes	Lowland conifer

**Table BE-1. Regional Forester's Sensitive Species occurrence in the South Leech Lake 2 project area for the biological evaluation.**

Species	Common name	Detailed Evaluation?	Suitable habitat present?	Documented Occurrence in project area	Risk	Project survey?	Habitat
<i>Littorella uniflora</i>	American shoreweed	No	No	No	Low	No	Proposed addition to RFSS list; shallow margins of oligotrophic (nutrient-poor) lakes, sandy or gravelly substrates; sandy and gravel shoreline.
Malaxis brachypoda	White adder's mouth	No	yes	yes	Low	Yes	Lowland hardwoods, lowland conifer
<i>Malaxis paludosa</i>	Bog Adder's-mouth	No	yes	No	Low	Yes	Proposed addition to RFSS list; on hummocks of sphagnum moss in rich conifer swamps of black spruce and tamarack.
<i>Najas gracillima</i>	Slender waternymph	No	Yes	No	Low	No	Proposed addition to RFSS list; clear, healthy, softwater lakes with minimal development or agriculture.
<i>Najas guadalupensis spp. olivacea</i>	Southern waternymph	No	Yes	No	Low	No	Proposed addition to RFSS list; occurs along the margins of fairly alkaline lakes in 1-2 meters of water with sand or silt substrates.
Orobanche uniflora	One-flowered broomrape	Yes	yes	No	Mod	Yes	Northern hardwoods, lowland conifer, upland/lowland conifer transition
Plancherella clavellata	Club-spur orchid	No	yes	No	Low	Yes	Lowland conifer and bog
<i>Potamogeton bicipulatus</i>	Snail Seed Pondweed	No	Yes	No	Low	No	Proposed addition to RFSS list in lakes that have clear water and relatively low levels of dissolved minerals (soft water lakes).
<i>Potamogeton vaginatus</i>	Sheathed Pondweed	No	Yes	No	Low	No	Proposed addition to RFSS list; growing in deepwater zones and near shore areas of very large, fairly alkaline lakes.
<i>Silene drummondii</i>	Drummond's campion	No	Yes	No	Low	No	Proposed addition to RFSS list; a species of dry, sandy, prairie or prairie-like habitats where conditions might be described as semi-arid.
Sparganium glomeratum	Northern bur-reed	No	yes	yes	Low	Yes	Bogs, sedge meadows, wetlands, lakes, streams, and shoreline
<i>Stricta beauvoisii</i>	Beavois' spotted felt Lichen		Yes	No	Mod	No	Proposed addition to RFSS list; on soil, rock and tree bases, frequently over moss. Generally prefers dry, open woods.
Subularia aquatica	Awlwort	No	No	No	Low	Yes	Lakes, streams, and shoreline
Taxus canadensis	Canada yew	No	yes	yes	High	Yes	Northern hardwoods, lowland conifer, moist sites in upland conifers
<i>Usnea angulata</i>	Beard Lichen	No	Yes	No	Mod	No	Proposed addition to RFSS list; found on the bark of a black spruce ( <i>Picea mariana</i> ) in an acid peatland; old growth forests in very humid localities.

Species	Common name	Detailed Evaluation?	Suitable habitat present?	Documented Occurrence in project area	Risk	Project survey?	Habitat
<i>Utricularia geminiscapa</i>	Hidden-fruit bladderwort	No	Yes	No	Low	No	Proposed addition to RFSS list; in shallow lakes and ponds; in reservoirs and cranberry ditches; in interdunal swales; an aquatic species of acidic shallow water in lowland bogs, fens, and pakihi (poorly drained infertile land).

## Summary of Conclusions

In summary, the purpose of a BE is to ensure that Forest Service actions (1)do not contribute to loss of viability of any native or desired non-native plant or animal species, (2)do not cause any species to move toward federal listing, and (3)to incorporate concerns for sensitive species throughout the planning process, reducing negative impacts to species and enhancing opportunities for mitigation. None of the South Leech Lake 2 project alternatives would result in a loss of viability of any sensitive species, or cause any sensitive species to move toward federal listing. From that perspective, the first two objectives for completing the BE have been met by all alternatives.

However, there are identifiable negative effects predicted for 8 of the 60 sensitive or proposed sensitive species due to project action alternatives, primarily due to indirect effects to species’ habitats. These are the red-shouldered hawk, black-backed woodpecker, lance-leaf grapefern, blunt-lobed grapefern, goblin fern, pale moonwort, ternate grapefern, and the least moonwort. The action alternatives result in positive effects to the bald eagle. Alternatives B and C are similar in the amounts of pine thinning that would be conducted. Alternative C would result in more new pine forest than Alternative B. The Alternatives differ in the amount of upland mature forest that would be harvested.

Alternatives B and C result in an improvement of all habitat indicators for the bald eagle over the existing condition. Alternative C would cause the greatest increase of new pine forest created within the project area and result in the most pine forest overall.

Alternative C would conduct less single tree and group selection harvests in potential red-shouldered hawk habitat. Both Alternatives will impact red-shouldered hawk breeding habitat, though the negative effects are mitigated by application of basal area retention requirements to retain forest canopy and by seasonal harvest restrictions. These mitigations meet the requirements of Forest Plan standards and guidelines for the red-shouldered hawk.

Alternative C would affect more acres of potential habitat for the guild of mesic northern hardwood plant species including the lance-leaf grapefern, goblin fern, and blunt-lobed grapefern.

Both Alternatives would treat the same acreage using prescribed fire. This would benefit the black-backed woodpecker. Alternatives B and C would thin the same amount of red pine. This forest type serves as habitat for the black-backed woodpecker. Therefore, Alternatives B and C would have a similar negative impact on this species as a result of thinning activity.

Alternative C was designed, in part, to increase the harvest volume over that provided by Alternative B through more even-aged regeneration harvests. The potential for indirect effects to sensitive species would be greater in Alternative C.

**Table BE-2. Summary of effects and determinations for Sensitive Species in the South Leech Lake 2 Project Area, Chippewa NF.**

<b>Species</b>	<b>No Impact</b>	<b>May Impact but will not contribute to a trend to Federal listing or loss of viability to population or species</b>	<b>Action alternative that least impacts species, or most contributes to conservation of species</b>	<b>Action alternatives that most impacts species, or least contributes to conservation of species</b>	<b>Rationale</b>
Bald Eagle		Alt A, B, C	Alternative C	Alternatives are similar	Alternative C causes the greatest improvement in habitat indicators, followed by Alternative B. No Direct impacts are anticipated.
Red-shouldered hawk	Alt A	Alt. B, C	Alternative B	Alternative C	Alternative B has the greatest area where mitigation measures would be applied. Alternative C causes the greatest amount of indirect effects to this species Alternative C would cause the greatest decrease of large mature patch acres and cause the greatest reduction of spatial habitat quality.
Black-backed woodpecker	Alt. A	Alt. B, C	Alternatives B and C	Alternatives B and C	Alternatives B and C are the same in the amount of beneficial prescribed burning activities that would occur and the same in their potential to adversely affect the black-backed woodpecker.
Mesic northern hardwoods sensitive plants: lance-leaf grapefern, blunt-lobed grapefern, goblin fern, one-flowered broomrape, Goldie's	Alt. A	Alt. B, C	Alternative B	Alternative C	Alternative C would cause a greater decrease of indicator acres than Alternative B and would have greater indirect effects to this guild of species. The addition of OHVs to FR 2107 could affect goblin fern in Alternatives B and C.

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wood fern					
Upland disturbed sensitive plants: pale moonwort, ternate grapefern, least moonwort	Alt. A	Alt. B,C	Alternatives are similar	Alternatives are similar	Both action alternatives propose the same amount of forest opening maintenance (72 acres) using fire and similar amounts of temporary road construction (2.9 miles in Alt. B and 2.7 miles in Alt. C). As a result, Alternatives B and C would have about equal impact on these species.

### Determinations

None of the alternatives would result in a trend to federal listing or loss of viability to a population or species, but there are negative effects predicted for 8 of the 60 sensitive or proposed sensitive species for project action alternatives. These are red-shouldered hawk, black-backed woodpecker, lance-leaf grapefern, blunt-lobed grapefern, goblin fern, pale moonwort, ternate grapefern, and the least moonwort. The potential for indirect effects to sensitive species would be greatest in Alternative C. Habitat conditions for the bald eagle would be improved under Alternatives B and C.

Other RFSS sensitive species received ‘no impact’ determinations for all alternatives.

Required mitigation measures associated with these findings are presented in the body of the BE, and in the stand-specific tables in Appendix B of the EA.

## **II. Coarse Filter Analysis of Vegetation Management Indicator Habitats**

### **Scope of the Analysis**

The South Leech Lake 2 project area is dominated by one Landscape Ecosystem (LE). Proposed activities would occur primarily on the Dry Mesic Pine (DMP) Landscape Ecosystem. A complete description of this LE is provided in Appendix G of the Final Environmental Impact Statement (FEIS) for the Forest Plan (USDA FS 2004). Additionally, the analysis of forest composition and age in Chapter 3 of the South Leech Lake 2 EA examines activities and their effect on this LE within the project area.

Refer to Chapters 1 and 2 and related maps of the South Leech Lake 2 EA for the location of the project and proposed activities.

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

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

### **Species Associations with MIHs**

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

Species associated with young aged forest MIHs 1-9 are gray wolf, lynx, moose, deer, ruffed grouse, American woodcock, gray catbird, indigo bunting, golden-winged warbler, rose-breasted grosbeak, chestnut-sided warbler, mourning warbler, song sparrow, and dark-eyed junco. All of these species will also utilize other age classes or habitats. For example, the American woodcock utilizes mature riparian forest, upland edge habitats, and a range of non-forest habitats irrespective of age. The golden-winged warbler has been associated with young forest but it occurs in a broader range of age groups within MIHs where micro-site habitat occurs or in unforested upland and lowland communities. The ruffed grouse is shown as an upland deciduous forest dwelling species and is associated with multiple age groups within upland deciduous forest MIHs.

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

## **Management Direction**

The LE vegetation and Management Indicator Habitat (MIH) objectives of the Forest Plan (USFS 2004, pp 2-62 – 64, 2-68 - 70) set forest-wide objectives for forest vegetation composition, structure, age, and tree diversity. By moving toward these long-term desired vegetative conditions, the Forest will move towards desired conditions for amounts, quality, and distribution of important wildlife species and their habitats. Conservation objectives for threatened, endangered and sensitive (TES) species, other wildlife species, and their habitats are interwoven into the LE objectives.

Project objectives are addressed in more detail in Chapter 1 of the South Leech Lake 2 EA and analyzed in the Vegetation analysis in Chapter 3.

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

In addition to composition and age objectives, the Forest Plan (USDA FS 2004a, pp. 2-23 – 2-24) provides guidance regarding spatial distribution of forest vegetation. Particularly important to a variety of TES species are objectives and guidance related to maintenance and development of large mature forest patches and providing opportunities for interior forest habitat conditions. These objectives for large, mature forest patches are of particularly high value to some TES species. Within the South Leech Lake 2 project area there are currently two large 1000+ acre patch and eight 301 to 1,000 acre patches. Providing these long-term habitat opportunities through vegetation objectives and goals is part of a coarse-filter, or landscape-level approach intended to provide for the well being of TES species and other wildlife on the Chippewa. These objectives seek to address species' needs through integrated resource management at large landscape scales. Fine filter, or site-level management needs are addressed by managing specifically for high quality potential habitat or known locations of sensitive species (USDA FS 2004a, 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, will result in a failure to fully redeem Forest Plan direction for conservation of TES species and other wildlife. Site level management cannot compensate for a failure to address landscape-level concerns.

## **Direct and Indirect Effects**

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

negative trend analysis was used to quantitatively and objectively evaluate each alternative considered in the South Leech Lake 2 RMP. A negative trend was determined if *proposed management actions* moved existing conditions opposite from the Forest Plan objective for that MIH. The total acre departure is shown by alternative within each age grouping (young/seedling/open, mature, old/old growth) (*in* Biological Evaluation, Tables BE-1 – BE-3).

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

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

**Table BE-1. Negative trends of young/seedling/open MIH objectives resulting from management activities proposed in the South Leech Lake 2 project area.**

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

**Table BE-2. Negative trends of mature forest MIH objectives resulting from management activities proposed in the South Leech Lake 2 project area.**

LE	Management Indicator Habitat	Forest Plan Objective	Acres of negative trend		
			Alt A	Alt B	Alt C
DMP					
	Total acre departure from objectives		0	0	0

**Table BE-3. Negative trends of old/old growth forest MIH objectives resulting from management activities proposed in the South Leech Lake 2 project area.**

LE	Management Indicator Habitat	Forest Plan Objective	Acres of negative trend		
			Alt A	Alt B	Alt C
DMP					

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	Total acre departure from objectives		0	0	0
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### **Alternative A (No Action)**

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

### **Alternative B (Proposed Action) and Alternative C**

Alternatives B and C show 63 and 93 acres respectively of negative trends of MIHs as a result of active management activities in Northern Hardwood types. All the negative trends occur in the young/seedling/open age class of this MIH. Young forest is being created in Northern Hardwood types through shelterwood harvests. While shelterwood harvest is considered a regeneration harvest method, an overstory of as much as 60 square feet of basal area is typically left on site to ‘shelter’ the young trees that are sprouting or seeding in to the site. The habitat value of a post-harvest shelterwood site would be quite a bit different than a clearcut with reserves, though both would contribute to the young/seedling/open age class.

### **Cumulative Effects**

For cumulative effects, the forest-wide analysis of MIH changes in the 2006 Monitoring and Evaluation report for the CPF ([http://www.fs.fed.us/r9/forests/chippewa/publications/monitoring\\_reports/final\\_fy06\\_MonitoringReport.pdf](http://www.fs.fed.us/r9/forests/chippewa/publications/monitoring_reports/final_fy06_MonitoringReport.pdf)) were compared to proposed management activities in the South Leech Lake 2 EA. The 2006 monitoring and evaluation report represents the most recent report where MIH changes were examined. Following are the forest-wide highlights of MIH changes and trends, with an assessment of the contribution of the South Leech Lake 2 EA management activities to those changes.

#### **Dry Mesic Pine LE**

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

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

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

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

## **Spatial MIH 13: Large Mature Upland Forest Patches**

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

### **Scope of the Analysis**

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

### **Management Direction**

Management Indicator Habitat 13 from the Forest Plan provides forest-wide direction as a part of the coarse-filter approach to providing landscape-level conditions for rare species sensitive to patch size. Patch management also affects edge (MIH-11) and interior forest (MIH-12). Forest Plan objective O-VG-19 compels management of the CPF to result in maintaining or increasing large mature forest patches:

O-VG-19 - Maintain or increase the acres and number of patches of mature or older upland forest in patches 300 acres or greater. Large upland forest patches may cross Landscape Ecosystem or other ecological boundaries (such as watersheds, Landtypes). When determining which large upland mature patches will be retained, take into consideration the contribution of other unmanaged lands within the same ecological setting and proximity.

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

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

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

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

### **Direct and Indirect Effects**

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

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

#### **Alternative A (No Action)**

The No Action alternative in the South Leech Lake 2 Project would increase the number and acreage in large mature/older upland forest patches over the existing condition. In five years following implementation of the No Action alternative there would be 11 large mature/older forest patches totaling 8,052 acres (Table BE-6).

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

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

#### **Alternative B (Proposed Action Alternative), and Alternative C**

Alternatives B and C would maintain the number of large mature/older upland forest patches. Each alternative would maintain 10 large mature/older patches in the project

area compared to the existing condition. However, both alternatives would cause a decrease in the acres of mature/older forest within large forest patches (Table BE-6).

The impacts of Alternative B can be mitigated by adjusting the amount of harvest removal (basal area retention) or by accounting for stand level reserves (Tables BE-4, BE-5). This would result in a 23 acre increase of patch acres over the existing condition.

After applying similar mitigations to Alternative C, this alternative would still result in 71 fewer acres within large mature/older patches than the existing condition. This is a small amount when considered at the Forest level, but it helps to demonstrate that Alternative C has the greatest impact to the large mature/older upland patch resource of the alternatives considered in the SLL2 EA.

Alternative B would increase the number of patches greater than 1,000 acres to three and increase the total acreage within this patch class by 464 acres to a total of 3610 acres project-wide. Of the action alternatives, Alternative B does the best job of increasing this relatively rare landscape element on the Chippewa.

Alternative C would maintain the number of patches greater than 1,000 acres at two. However the total acreage within this patch class would be reduced by 581 acres to a total of 2565 acres project-wide.

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

**Mitigation**

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

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

<b>Table BE-4.</b> Forest Stands where large mature upland patch mitigation LMP- 1 is applicable in the South Leech Lake 2 Project Area.					
Compartment	Stand	Stand acres	Alt B: area mitigated	Alt C: area mitigated	notes

76	11	23.7	8	8	Apply to western 1/3 of stand (8 acres)
76	21	19.4	19.4	19.4	Apply to entire stand
76	67	11.9	(none needed)	11.9	Apply to entire stand
87	26	21.2	21.2	21.2	Apply to entire stand
87	103	18.9	18.9	18.9	Apply to entire stand
Mitigation area total			67.5	79.4	

LMP-2 - For the following locations, harvest area will be reduced for the specific area and reasons listed.

**Table BE-5.** Forest Stands where large mature upland patch mitigation LMP- 2 is applicable in the South Leech Lake 2 Project Area.

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

## **Cumulative Effects**

The area for cumulative effects analysis is forest-wide on the Chippewa during the next 10 years of Forest Plan implementation.

### **No Action Alternative**

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

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

### **Alternative B (Proposed Action Alternative) and Alternative C**

Other recent projects on the Chippewa show variable trends towards meeting Forest Plan spatial objectives to “maintain or increase” acres and number of large mature/older upland forest patches. As examples, a subset of these include: on the Walker RD the Boy River 2 project, the Cuba Hill project, the Steamboat project, the Portage Lake project and the South Leech Lake project; the Southeast and the Mississippi Projects on the Deer River RD; and the Northwoods and the Round Island projects on the Blackduck RD. The Moon, Boy River 2, Cuba Hill, Steamboat, Portage Lake, and the 2005 South Leech Lake projects maintained existing conditions of upland mature forest patches and will result in increases of patch acres and numbers in five years. The Southeast and Mississippi projects would result in no reductions in large mature patches. The Big Fork project will result in a decrease of large mature patch numbers and patch acres. The Northwoods and the Round Island projects result in no loss of patch numbers though the acres within large mature patches are decreased over existing condition. Forest-wide in consideration of these planned projects, patch numbers and acres are modeled to increase over the course of the next 10 years.

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

**Table BE-6. Mature/Older Forest Patches within the South Leech Lake 2 Project Area: existing condition (2011), and by Alternatives A, B, and C five years from present.**

Patch Size Class	Existing Condition Number	Existing Condition (Acres)	Alternative A + 5 Years (Number)	Alternative A + 5 Years (Acres)	Alternative B + 5 Years (Number)	Alternative B + 5 Years (Acres)	Alternative C + 5 Years (Number)	Alternative C + 5 Years (Acres)
1-40	188	2189	188	2257	190	2187	191	2188
41-100	38	2525	34	2292	34	2277	33	2209
101-300	8	1403	7	1006	7	1334	7	1334
301-500	6	2337	7	2671	5	1992	5	1973
501-1000	2	1646	2	1660	2	1457	3	2429
1001-2500	2	3146	2	3721	3	3610	2	2565
2501-5000	0		0		0		0	
5001-10000	0		0		0		0	
Number / acreage of large mature forest patches	10	7129	11	8052	10	7059	10	6967
Patch acres mitigated (tables LMP-1, LMP-2)						93		91
Total patch acreage		7129		8052		7152		7058
Mature or older forest total		13246		13607		12857		12698

### **III. Species-Specific Fine Filter Analysis of Effects**

#### **Bald eagle (*Haliaeetus leucocephalus*)**

The bald eagle is a seasonal resident in much of the Chippewa National Forest, overwintering further south along the Mississippi River and other locations. Bald eagles build nests in large trees, usually within site of a lake or large river. They feed primarily on fish, though waterfowl and carrion also are used as food sources. To be successful, bald eagles require a reliable food source and large trees for nesting. The Chippewa National Forest Land and Resource Management Plan has guidelines for projects that occur within the vicinity of bald eagle nests.

#### **Species Status**

In 1978 the bald eagle was listed as a threatened species in Minnesota, Wisconsin, Michigan, Oregon, and Washington, and as endangered in the remaining contiguous United States. Recovery efforts were assumed in five regions in the country. Minnesota was grouped with 23 other states into the Northern States Region. The success of the recovery effort allowed the US Fish and Wildlife Service to take the eagle off the Threatened and Endangered Species list (USDI FWS 1999) in 2007.

#### **Forest Plan Management Direction**

Since the bald eagle was delisted in 2007, it was adopted as a Regional Forester's Sensitive Species. As with other sensitive species, the following general Forest Plan objective applies:

O-WL-17: Maintain, protect, or improve habitat for all sensitive species.

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

a.

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

b.

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

More specifically, revised management guides the National Bald Eagle Management Guidelines (USDI Fish and Wildlife Service 2007) are the method for maintaining the viability of this species and protect it from management actions on the national forest.

These are excerpted below:

#### Category C. Timber Operations and Forestry Practices

- Avoid clear cutting or removal of overstory trees within 330 feet of the nest at any time.
- Avoid timber harvesting operations, including road construction and chain saw and yarding operations, during the breeding season within 660 feet of the nest. The distance may be decreased to 330 feet around alternate nests within a particular territory, including nests that were attended during the current breeding season but not used to raise young, after eggs laid in another nest within the territory have hatched.
- Selective thinning and other silviculture management practices designed to conserve or enhance habitat, including prescribed burning close to the nest tree, should be undertaken outside the breeding season. Precautions such as raking leaves and woody debris from around the nest tree should be taken to prevent crown fire or fire climbing the nest tree. If it is determined that a burn during the breeding season would be beneficial, then, to ensure that no take or disturbance will occur, these activities should be conducted only when neither adult eagles nor young are present at the nest tree (i.e., at the beginning of, or end of, the breeding season, either before the particular nest is active or after the young have fledged from that nest). Appropriate Federal and state biologists should be consulted before any prescribed burning is conducted during the breeding season.
- Avoid construction of log transfer facilities and in-water log storage areas within 330 feet of the nest.

#### Category G. Helicopters and fixed-wing aircraft.

Except for authorized biologists trained in survey techniques, avoid operating aircraft within 1,000 feet of the nest during the breeding season, except where eagles have demonstrated tolerance for such activity.

### Affected Environment for Bald Eagle

There are 17 known bald eagle nests within the South Leech Lake 2 project. The project area contains numerous productive fish bearing lakes that help to support this breeding population.

Meeting the management guidance from the Northern States Bald Eagle Recovery Plan has been a highly successful approach for maintaining the bald eagle on the Chippewa. Each management alternative and specific action are examined in the context of these guides.

Conserving existing old growth superstory pine and creating new pine forest across the Chippewa are important to the long term conservation of the bald eagle. To compare among the management alternatives in the South Leech Lake 2 EA, acres of 0-9 year white and red pine, total acres of red and white pine all ages, and acres of red and white pine greater than 100 yrs. old are examined. These indicators are useful in determining the degree to which each alternative is likely to affect this species.

## Analysis of Effects

### Direct Effects

For direct effects to the bald eagle, management activities that fall within 660 feet of known eagle nests are examined. Eagle nest management guidelines as stated in the National Bald Eagle Management Guidelines (USDI Fish and Wildlife Service 2007) would be applied as mitigation measures, though no management activities proposed fall within the direct effects area. Alternatives B and C are the same in this regard.

### Indirect Effects

Both Alternatives B and C result in an improvement of all habitat indicators for the eagle over the existing condition. Alternative A is more variable and would cause a decrease of young pine forest, a maintaining of pine forest acres, and an increase of old pine in the project area. Alternative C would cause the greatest increase of new pine forest created within the project area and result in the most pine forest overall. Amounts of old growth pine that can serve as nesting habitat would increase above existing condition and is the same under all alternatives.

<b>Table Eagle-3.</b> Eagle habitat indicators for the South Leech Lake 2 project area for existing condition and five years from present following implementation of alternatives.				
	Existing	Alt A	Alt B	Alt C
Age 0-9 red and white pine	170	144	252	387
Total acres of red and white pine	4765	4765	4910	5042
Red and white pine >100 yrs old	1492	1543	1543	1543

### Cumulative Effects

The Forest Plan Final EIS for the Chippewa projected a greater rate of increase of young red and white pine than is occurring forestwide according to the 2006 Monitoring and

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Evaluation report for the CPF. Amounts of young red/white pine forest has decreased in the DMP LE rather than increased. The South Leech Lake 2 project maintains the large majority of old pine forest. Cumulative effects are expected to be similar to the indirect effects for the eagle.

#### Determination

Alternative A would have a beneficial effect on the bald eagle. Total amounts of pine forest would be maintained in the project area and amounts of old growth would be increased. There are no direct effects anticipated for Alternative A. Alternatives B and C are not likely to cause a loss of viability of the bald eagle or a trend towards Federal listing. The action alternatives are the same in the amount of possible direct effects to known eagle nests. While habitat conditions may be improved over existing condition under the action alternatives, some direct effects are possible even with application of mitigation measures.

### **Red-shouldered hawk (*Buteo lineatus*)**

#### **Species Status**

This hawk is a species of extensive, contiguous blocks of mature and older deciduous forest with interspersed small to medium sized open marshes and wet meadows, where it forages for prey (USFS 2002; TNC 1992). These conditions are typically found in bottomland hardwood forests, but are also found in more upland habitats, particularly in northern Minnesota (USFS 2004b, p. 45). Water is a critical element of the habitat, and a high percent of the diet includes frogs and other herps (USFS 2002).

Nesting habitat is characterized as having a taller than average closed canopy of large trees with well developed crowns. Nest sites are correlated with large tree diameter, lower levels of saplings and under-story vegetation, large crotches with large diameter supporting branches (older trees), high basal area of larger trees, and a higher canopy height (TNC 1992). These are all old growth characteristics (USFS 2004b, p. 46).

A conservation assessment has been prepared for red-shouldered hawks in the National Forests of the North Central States (USFS 2002). Red-shouldered hawks are believed to have been one of the most common hawks in its historic range prior to 1900. A general major decline in red-shouldered hawk populations for the north central and northeast states is believed to have been caused by the major logging conducted during the 1800's and the early 1900's. Additional declines also appear to have occurred during the mid 1900's. Loss of wetlands and the use of pesticides probably also contributed to the decline.

There is speculation that the red-shouldered hawk has expanded its range northward into more forested regions as its more southern habitats have been destroyed. It is also suspected that these northern populations may not be as productive as their southern

counterparts and may actually be population sinks, but there are few data from which to draw conclusions (USFS 2004b, p. 46).

Breeding bird survey data indicate a population decline of between 65% and 95% in the Great Lakes States between 1950 and 1970 (TNC 1992). Factors thought to be limiting to red-shouldered hawks include loss of habitat, loss of mature forest conditions, human disturbance, predation, and competition with red-tailed hawks (TNC 1992).

### **Environmental Baseline:**

Red-shouldered hawks are at the northern periphery of their range in the National Forests of Minnesota, Wisconsin, and Michigan (USFS 2002). Much of this species' former habitat in southern and central Minnesota has been destroyed or highly fragmented with greatly reduced population levels as a result of human settlement, logging and agricultural development (USFS 2004b, p. 46). There are presently about 429 known or suspected nesting sites in Minnesota; a majority of these sites are located within just a few meta-populations (USFS 2004b, p. 46). One of these meta-populations occurs on the Chippewa National Forest on the Ottertail Peninsula of Leech Lake.

A two-year study located 20 red-shouldered hawk nests on the Chippewa. These nests occur in closed-canopy mature northern hardwoods (17 nests) or mature aspen (3 nests) with interspersed wetlands (McLeod and Anderson 1997).

Although red-shouldered hawks can be found nesting in patches of old aspen and mixed aspen/hardwood forest on the Chippewa, northern hardwood forest is considered to be their primary habitat. Nesting sites in old aspen and mixed aspen hardwood forest tend to be isolated and scattered on the landscape, and are considered to be occupation of fringe habitat. Cumulatively, there are 52 recorded nesting territories on the Chippewa.

Stick nest surveys and call-back surveys for the red-shouldered hawk were conducted on suitable habitat within the project area (Cable 2009). This effort included possible activity stands and buffer stands adjacent to activity stands. In total, 5 red-shouldered hawk territories are known in the South Leech Lake 2 project area. This survey effort was not comprehensive for the project area, but focused on areas of proposed management. Suitable un-surveyed habitat exists within the project area and could contain active red-shouldered hawk territories.

Red-shouldered hawk habitat occurs within the South Leech Lake 2 project area, within mature northern hardwoods, lowland hardwoods, and aspen forest types, of suitable ages. Within the South Leech Lake 2 project area there are currently two large 1000+ acre patch and eight 301 to 1,000 acre patches. These are unique habitat features on the Chippewa and for this species.

Proposed South Leech Lake 2 project activities which would affect the environment of the red-shouldered hawk include timber harvest and associated activities. These activities can affect red-shouldered hawks as they are nesting through direct disturbance. They can also affect long-term habitat suitability for red-shouldered hawks across the landscape, through their effect on forest type and age, and structure. Management practices which

result in habitat fragmentation, or which open up the forest canopy too much, can allow a competitive advantage to the red-tailed hawk, a species which is adapted to open habitats with scattered trees or smaller woodlots (USFS 2004b, p. 47).

**Effects of Action:**

**Direct Effects:**

Eleven forest stands fall within 600 acre nest territories for red shouldered hawks in the project area. Three are proposed for even-aged regeneration harvests (a coppice cut and two shelterwood harvests), three are red pine plantations proposed for thinning, and five are hardwood stands including aspen, red oak, and maple/basswood that are proposed for either single tree selection or group selection harvest. Each of the three groups of harvest activities pose specific direct effects to the red-shouldered hawk.

Direct effects would be mitigated by the following mitigation measures:

WL1 : To meet G-WL-14 for the Red-shouldered Hawk, defer coppice or shelterwood harvest in that portion of the forest stand that falls within the 600 acre red-shouldered hawk nest area..

<b>Table RSH-1.</b> Forest Stands where Red-shouldered hawk mitigation WL 1 (harvest deferral) is applicable in the South Leech Lake 2 Project Area.						
Compartment	Stand	Stand acres	Alt B treatment	Alt C treatment	Stand Area affected	notes
00085	57	46.9	4102	4102	9.39	defer area within RSH territory
00087	103	18.9	4193	4193	0.89	defer area within RSH

WL2 : To meet G-WL-14 for the Red-shouldered Hawk, restrict harvest activity to the period of August 16 to March 31.

<b>Table RSH-2.</b> Forest Stands where Red-shouldered hawk mitigation WL 2 (Seasonal restriction) is applicable in the South Leech Lake 2 Project Area.						
Compartment	Stand	Stand acres	Alt B treatment	Alt C treatment	Stand Area affected	notes
00077	2	87.5	4220	4220	12.67	Red pine plantation
00085	14	47.2	4220	4220	2.80	Red pine plantation
00085	31	18.3	4220	4220	16.29	Red pine plantation

WL3 : To meet G-WL-14 for the Red-shouldered Hawk, maintain a basal area of at least 100 square feet within the portion of the stand within the 600 acre nest area and restrict harvest activity to the period of August 16 to March 31.

<b>Table RSH-3.</b> Forest Stands where Red-shouldered hawk mitigation WL 3 (Retain basal area of 100 and apply a seasonal restriction for harvest) is applicable in the South Leech Lake 2 Project Area.						
Compartment	Stand	Stand acres	Alt B treatment	Alt C treatment	Stand Area affected	notes
77	19	36.00	(no harvest)	4194	24.95	Aspen
87	21	26.4	4151	4151	22.12	Aspen
89	34	20.6	4151	(no harvest)	15.74	Hard maple / basswood
89	3	19.2	4152	4152	11.06	Mixed upland hardwoods
87	25	35.4	4151	4151	35.40	Northern red oak
87	111	62.0	4151	(no harvest)	23.5	Hard maple / basswood

No activities are proposed in Alternatives A within 600 acre breeding territories surrounding known nest sites.

In Alternatives B and C, no activities are proposed in the 50 acre nest stands for red-shouldered hawk territories in the project area.

Alternatives B and C would affect habitat within 600 acre breeding territories of known nest sites. Alternative B would affect about 140 acres by intermediate harvest methods and 10 acres by coppice or shelterwood harvests across two breeding territories. Alternative C would affect about 100 acres by intermediate harvest methods and 35 acres by coppice or shelterwood. Mitigation measures (tables RSH-1,2,3) would limit the direct effects by each alternative. Alternative B has the greatest area where mitigation measures would be applied. Potential for direct effects exist in stands proposed for harvest because the nest area is an essential use area for the breeding pair, but also because red-shouldered hawk nests and breeding activity are dynamic. The possibility exists that harvest activity could impact nests established since surveys were last conducted.

**Indirect Effects:** Timber harvest and activities associated with timber harvest within suitable forest types may affect long-term habitat opportunities for red-shouldered hawk within the project area. Changes in motorized use as a result of opening portions of FR 2107 to OHVs may affect the suitability of breeding and foraging for this species. Amounts of habitat after implementation of activities are shown in the table below (most habitats are mature vegetation growth stage or older).

<b>Table RSH-2: Acres of red-shouldered hawk habitat, Projected to year 2016, South Leech Lake 2 Project Area.</b>				
Habitat component	Existing	Alt. A	Alt. B	Alt.C
Lowland hardwoods (all acres)	151	151	151	151
Northern hardwoods (MIH 3, mature/old)	6235	6191	6027	5943
Aspen/birch (MIH 4, mature/old)	2742	2929	2263	2154
<b>Total</b>	<b>9128</b>	<b>9271</b>	<b>8441</b>	<b>8248</b>

In both action alternatives, amounts of red-shouldered hawk habitat are reduced over existing condition and over Alternative A (No Action) as a result of even-aged regeneration harvests in mature/older aspen and northern hardwoods. Alternative C causes the greatest amount of indirect effects to this species

In addition to forest type, spatial patterns of vegetation are an important aspect of red-shouldered hawk habitat suitability. Habitat which occurs in larger blocks, or patches, has higher quality than habitat in small blocks or in a fragmented forest matrix. The large, mature upland patches referenced in “Spatial Distribution of Forest Vegetation” elsewhere in this BE include 10 existing large mature/older upland forest patches.

Alternative A would increase both the number and acreage of large mature forest patches. The action alternatives result in the maintenance of the number of large mature forest patch numbers and a decrease of acreage within large mature forest patches. Alternative A results in an improvement of spatial habitat conditions for this species. Alternatives B and C both reduce the condition of spatial habitat. The impacts of Alternative B to patch acres would be completely mitigated. Alternative C would cause the greatest decrease of large mature patch acres and cause the greatest reduction of spatial habitat quality.

One red-shouldered hawk territory overlaps with the FR 2107 corridor considered in the SLL2 transportation proposal. An additional 1.1 miles of forest roads within this territory would receive use by OHVs under Alternatives B and C as a result of opening FR 2107. OHV use could disturb the nesting pair of red-shouldered hawks during the breeding season of April 1 to August 15. OHV use could also disturb adults as they feed their young in the post-fledging analysis area. The result could be reduced productivity or loss of the breeding territory. Other suitable habitat for this species exists along the FR 2107 corridor, including large blocks of mature deciduous forest with wetland and marsh inclusions. Other active territories may exist and could be directly or indirectly affected by OHV use.

**Cumulative effects:** At the landscape scale, the Chippewa provides important northern hardwood habitat for red-shouldered hawks (USDA FS 2004b, p. 49). The time period for cumulative effects for this species is the next 15 years in the project area.

Hardwood-dominated, large mature patches are particularly important for this species. Proposed harvests would reduce the amount of suitable habitat or alter the structure or extent of existing large mature forest patches. State and county lands are generally managed more intensively than federal lands. Alternative C would cause the greatest amount of cumulative effects when proposed Federal activities and activities on other ownerships are considered. Alternative B would cause the least amount of cumulative effects of the action alternatives.

### **Determination of effects:**

Alternative A would have a beneficial impact to the red-shouldered hawk and its habitat. Alternatives B and C may impact individual red-shouldered hawks or its habitat, but will not contribute to a trend towards federal listing or loss of viability to the population or species.

## **Black-backed Woodpecker (*Picoides arcticus*)**

### **Species Status:**

The black-backed woodpecker is a secretive and rare North American woodpecker. This is a species of the northern conifer forests. Though it appears to be widespread, it is confined primarily to mature, fire regulated, boreal and coniferous forest with decadent trees, snags and fallen logs. This woodpecker feeds on wood-boring insect larvae in dead/dying conifer trees. Even in preferred habitats, they are considered uncommon to rare except when populations irrupt in response to out-breaks of wood-boring insects due to fires, flooding, and other disturbances which cause these kinds of insect infestations. This species has a wandering habit, so the total amount of available dead and dying conifer is likely more important than the configuration upon the landscape. According to the Nature Conservancy Species Status Sheet (1999), the black-backed woodpecker most frequently inhabits coniferous forest, especially blowdowns and burned areas with standing dead trees; less frequently in mixed forest; and rarely, in winter, in deciduous woodland.

### **Environmental baseline:**

This woodpecker is a permanent resident in the conifer forests of northeastern and north-central Minnesota. It is very rare on the CNF. One hundred five (105) observations of this species have been recorded on the Chippewa. Four (4) have been recorded in the South Leech Lake 2 Project Area.

Suitable habitat conditions for “normal” population levels are present in three situations. These are: 1) mature and older (decadent) jack pine (forest type 01), red pine (02), white pine (03), balsam fir (11), white spruce (16), lowland conifers (12, 15, 18), and white cedar (14, 19), where the amount of natural mortality occurring within the stand provides suitable foraging substrate and prey availability; 2) flooded conifer forests, where abundant amounts of dead and near-dead trees provide a temporary (up to five years) source of available foraging and nesting habitat; and 3) localized endemic wood-boring insect infestations occurring at the site level caused by disease, windthrow, flooding, other insect outbreaks, fire, etc.

Habitat conditions which provide for “irrupted” population levels are related to larger scale (10s - 1000s of acres) disturbances including fire, disease, wind events, flooding, and insect infestations such as spruce budworm outbreaks. During these events, populations of black-backed woodpeckers tend to increase because of the increase in wood-boring beetle larvae. (NRRI 2001; Murphy and Lenhausen 1998; USFS 2001b; Yunick 1985).

Suitable black-backed woodpecker habitat occurs in the project area.

**Effects of Action:**

Four indicators were examined to assess effects resulting from the alternatives in the South Leech Lake 2 EA. Amounts of mature/older upland conifer forest were examined. This indicator does a good job of highlighting differences between existing condition and the alternatives in one of the primary forest communities affected by the South Leech Lake 2 project and utilized by this species. The amounts of upland conifer forest regeneration and conifer forest thinning between alternatives are the second and third indicators examined. These indicators do a good job of showing the level of indirect effects to the species in the project area by the alternatives. The fourth indicator is the amount of prescribed burning that could occur in upland forested stands.

**Direct and Indirect Effects:**

Direct effects to this species are not known. Breeding territories and foraging use of forest habitat change annually. Table BBWP -1 display the indicators of indirect effects to this species.

<b>Table BBWP-1:</b> Acres of black-backed woodpecker habitat by indicator, projected to year 2015, National Forest ownership, South Leech Lake 2 Project Area.				
Habitat component	Existing	Alt. A	Alt. B	Alt.C
Upland Conifer (MIH5, mature/older)	2890	3108	3192	3192
Acres of	0	0	0	0

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regeneration harvest in upland conifer				
Acres of intermediate harvest harvest in upland conifer	0	0	708	708
Acres of prescribed burning in upland forest	0	0	764	764

Alternatives B and C are the same in the amount of beneficial prescribed burning activities that would occur. Each would burn as much as 764 acres of forested upland areas in the Woodtick Fields and Goose Lake Trails areas. Actual burn acreages are expected to be less as logical burn blocks are established. The action alternatives are the same in their potential to adversely affect the black-backed woodpecker. They would thin the greatest amount of upland conifer forest. Thinning occurs primarily in red pine plantation, pine and other species in these stands serve as foraging and nesting habitat for this species. Harvest operations routinely remove trees with poor growth form or that are diseased. These trees often provide habitat where it may otherwise be sparse.

Alternatives B and C are also the same in the amount of mature or older aged forest dominated by upland conifer species that is created. Each action alternative would shift 84 acres of upland forest from hardwood dominated to conifer dominated (pine and other conifer species) by harvesting hardwood species and retaining conifer species in those selected areas.

Alternative A would be beneficial to the black-backed woodpecker by not altering the within stand structure of conifer stands through thinning or regeneration harvest. No prescribed burning would occur in Alternative A and there would be no active improvement of habitat conditions for this species in the project area.

**Cumulative Effects:**

The cumulative effects are expected to be the same as the indirect effects for this species.

**Determination of effects:** Alternative A would have beneficial effects to black-backed woodpecker and its habitat. Alternatives B and C have similar impacts to the black-backed woodpecker and may impact individual black-backed woodpeckers or their habitats, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species.

***Mesic Northern Hardwoods Sensitive Plants Guild***

The following five species are evaluated as a guild, due to similarities in habitat requirements: blunt-lobed grapefern, goblin fern, one-flowered broomrape, Goldie’s

wood fern, and lanceleaf grapefern. All of these species are associated with mesic northern hardwood forests. Species information is based on USFS 2004a, USFS 1999b, USFS 1999c, USFS 1999d, and USFS 1999e.

**Species Status:** The table below provides a summary of habitat associations, life history, and risk factors associated with each species.

Common name <i>Scientific name</i>	# sites known on Chip	# sites known in South Leech Lake 2 project area	Habitat indicators	Life History/Habitat Summary	Risk factors	Specific Forest Plan Protections
Blunt-lobed grapefern <i>Botrychium oneidense</i>	16	0	Upland northern hardwoods and black ash: mature, old, older	Perennial fern; fluctuating woodland pools in maple basswood	Logging and associated activities, road building, other management activities	Forest Plan guideline G-TM-6 leaving a buffer around vernal ponds in northern hardwoods G-WL-11: avoid or minimize negative impacts to known occurrences of sensitive species
Goblin fern <i>Botrychium mormo</i>	331	4	Upland northern hardwoods, Quaking aspen, Paper birch: mature, old, older	Perennial fern; mesic deciduous forest with thick leaf layer, open understory. Very narrow global distribution, only northern MN, WI, MI. Half of range-wide occurrences are on the Chippewa; these are being invaded by earthworms.	Logging and associated activities, road building, other management activities	Forest Plan Standard S-WL-7 protects known sites and high quality habitats G-WL-11: avoid or minimize negative impacts to known occurrences of sensitive species
One-flowered broomrape <i>Orobanche uniflora</i>	1	0	Upland northern hardwoods and oaks: all	Perennial herb, a root parasite on forest trees and herbs; transition zone between northern hardwood forest and white cedar swamp. Single known site on Chip is disjunct from the statewide range in southern MN.	Logging and associated activities, road building, other management activities	G-WL-11: avoid or minimize negative impacts to known occurrences of sensitive species
Goldie's wood fern <i>Dryopteris goldiana</i>	29	0	Upland northern hardwoods: old, older	Maple-basswood forest. Currently known only within 0.4 miles of very large lakes, apparently due to climatic influence of large water bodies.	Logging and associated activities, road building,	G-WL-11: avoid or minimize negative impacts to known occurrences of sensitive species
Lanceleaf grapefern <i>Botrychium lanceolatum</i> var. <i>angustisegmentum</i>	63	5	Northern hardwoods, aspen, generally greater than 40 yrs old	Perennial fern; mesic deciduous forest with thick leaf layer, open understory. Rare at the western edge of its Great Lakes range, and is reported as extremely	Logging and associated activities, road building, other management activities	G-WL-11: avoid or minimize negative impacts to known occurrences of sensitive species

				rare in Minnesota (USFS 2001a, p. 5); sporophytes fluctuate and individual plants may not appear every year		
Squirrel Corn ( <i>Dicentra canadensis</i> )	1	0	Upland northern hardwoods (MIH 3): old, older	Proposed addition to RFSS list; in rich mesic forests; old growth maple basswood forest.	<b>Logging and associated activities, road building,</b> negatively correlated with invasive earthworm densities; garlic mustard negatively affects species diversity	G-WL-11: avoid or minimize negative impacts to known occurrences of sensitive species

### Environmental Baseline:

Suitable habitat within the South Leech Lake 2 project area which is proposed for project activities was surveyed for the presence of these species. Any new additions found during this effort are included in occurrence numbers in the table above.

Sensitive plants are generally habitat specialists. The distribution and abundance of their suitable habitats has declined since historical times. The Mesic Northern Hardwoods Sensitive Species Plant Guild (MNH Guild) contains species that are currently and historically associated with northern hardwoods, and micro-sites within these forest communities. Timber harvest range-wide, and on the Chippewa, has resulted in younger, more even-aged, fragmented northern hardwoods forests that occupy a smaller portion of the landscape. Consequently, suitable ecological conditions for these plants are frequently isolated, and the plants generally occur at very low abundance. There are limited, if any, opportunities for sub-populations of these plants to interact. Although some sub-populations may be self-sustaining, there is a strong potential for extirpations to occur, with little likelihood of re-colonization of such patches. (USDA FS 2004c)

Proposed South Leech Lake 2 project activities which would affect the environment of MNH Guild species include timber harvest, road/trail construction, and site preparation. Timber harvest can cause impacts to plant habitats from ground disturbance associated with logging, and with associated activities, such as construction of landings, skidding, site prep, and potential erosion/sedimentation and soil compaction. Timber harvest can alter forest over-story composition and structure, and result in changes to light conditions on the forest floor, which can result in a direct reduction in habitat suitability, or can allow competing species to flourish.

Construction of temporary roads can cause similar direct effects as timber harvest, and can also be an instrument in facilitating dispersal of non-native invasive species. These can include competing plant species (e.g. garlic mustard), or, of particular concern for the MNH Guild is the spread of non-native earthworms. There are documented negative impacts of earthworm invasions on species such as the goblin fern. Goblin fern occurrences on the Chippewa are being invaded by non-native earthworms, as are goblin fern occurrences in most other parts of the species range (USDA FS 2004c, p. 52).

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## Effects of Action:

The table below provides estimated amounts of habitat within the South Leech Lake 2 project area which may be capable of supporting MNH guild species, by Alternative.

Table MNH-2. South Leech Lake 2 Project Area MNH Guild Habitat Indicators (projected to year 2016).				
Species	Habitat Indicator	Acres in South Leech Lake 2 Project Area		
		Alt. A	Alt. B	Alt. C
Blunt-lobed grapefern	Upland northern hardwoods, black ash: mature, old, older	6342	6178	6094
Goblin fern	Upland northern hardwoods, quaking aspen, paper birch (MIH 3, 4): mature, old, older	9120	8290	8097
One-flowered broomrape	Upland northern hardwoods and oaks (MIH 3): all	7012	6836	6782
Goldie's wood fern	Upland northern hardwoods (MIH 3): old, older	250	237	237
Lanceleaf grapefern	Upland northern hardwoods, quaking aspen, paper birch (MIH 3, 4): mature, old, older	9120	8290	8097
Squirrel Corn	Upland northern hardwoods (MIH 3): old, older	250	237	237

### Direct effects:

One goblin fern population exists within 250 feet of FR 2107 and could be affected by the addition of OHVs to FR 2107 proposed under Alternatives B and C. Habitat exists elsewhere along the FR 2107 corridor and OHVs may indirectly affect the goblin fern. Site specific surveys for the goblin fern are not complete within habitat adjacent to FR 2107. OHVs that explore dead-end roads eventually expand roads further into the forest, which may directly affect sensitive plants by trampling. OHVs can cause soil compaction, which reduces soil aeration, structure, hydrology, pH, nutrients, and spore dispersal. Especially relevant to the goblin fern, OHVs can also contribute to the invasion of exotic earthworms that consume the duff layer, by spreading earthworm eggs via tire treads. OHVs can also contribute to the infestation of nonnative plants by transporting noxious weed seeds in clods of earth, and disturbing the soil to allow the establishment of aggressive exotic plants. These effects could lead to the loss of goblin fern populations.

**Indirect effects:** Changes in forest cover type and age due to timber harvest may affect long-term opportunities for the MNH guild plants across the South Leech Lake 2 project area landscape. Table MNH-2 shows changes in suitable species habitat by alternative as expressed by amounts of single MIHs or combinations of MIHs following project implementation.

Decreases in acres of habitat for all guild species in Alternatives B and C from existing condition are a result of even-aged harvest in mature or older northern hardwood and aspen/paper birch forest. This decreases the amounts and suitability of habitat over the long term. Alternative C shows greater decreases of indicator acres than Alternative B and would have greater indirect effects to this guild of species. Alternative A would cause no indirect impacts and would do the best job of conserving MNH guild species.

Both action alternatives propose construction of the same amount of temporary road. Temporary roads can be a concern for potential transport of earthworms between infested sites or introduction of non-native invasive plants (e.g. garlic mustard). This risk would be the same between action alternatives.

**Cumulative effects:** Recent past Forest Service projects in the South Leech Lake 2 project area include the Walker Conifer Thin project (2004). Older projects were implemented under the 1986 Forest Plan and helped to create the forest vegetation patterns that affect the South Leech Lake 2 project today. These projects emphasized aspen management, some on sites that would support MNH guild species or habitat. There are no additional Forest Service plans for timber harvest in MNH guild habitat within the South Leech Lake 2 project area. The State of MN and Cass County have harvests planned or already implemented in areas within the project area.

Timber harvest range-wide, and on the Chippewa, has resulted in younger, more even-aged fragmented northern hardwood forests that occupy a smaller portion of the landscape. The 2004 Chippewa Forest Plan sets a new course for forest management on the Chippewa, moving towards older northern hardwoods managed through uneven-aged harvest techniques, with larger patch sizes as a goal. To the extent that the South Leech Lake 2 project falls within this framework, by following LE vegetation objectives, large, mature upland patch objectives, and recognizing MNH guild species where they occur, Alternatives B and C would cumulatively contribute to meeting some of these objectives. Alternative A would cumulatively best meet these combined objectives in the context of losses of habitat on other public and private ownerships.

### **Determination of effects:**

Alternative A would have a beneficial impact on MNH guild plant species or their habitats. Alternatives B and C may impact individual MNH guild plant species or their habitats, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species.

Of the action alternatives, Alternative C is greatest in its potential to negatively affect MNH guild plant species' habitats.

## Upland Disturbed Sensitive Plants Guild

The following three species are evaluated as a guild, due to similarities in habitat requirements: pale moonwort, least moonwort, and ternate grapefern. All of these species are associated with upland disturbed, barrens, or early successional forest habitats. These species will be collectively referred to as “Upland Disturbed Sensitive Plants Guild (UD Guild)”. Species information is based on USFS 2004a.

**Species Status:** The table below provides a summary of habitat associations, life history, and risk factors associated with each species.

<b>Table UD-1.</b> Summary of Upland Disturbed Sensitive Plants Guild for the SLL2 project area.				
Common name <i>Scientific name</i>	# known sites on Chip.	# known sites in the SLL2 area	Life History/Habitat Summary	Risk factors
Pale moonwort <i>Botrychium pallidum</i>	51	2	Perennial fern; open, disturbed habitats, log landings, roadsides, dunes, sandy gravel pits	Logging and associated activities, road building, succession, fire
Ternate grapefern <i>Botrychium rugulosum</i>	38	2	Perennial fern; dry areas with short grasses, bracken, sweet fern, jack and red pine, aspen/fir, open areas within these types. Margins of ephemeral pools in pines, spruce, birch/aspen. pH near neutral.	Logging and associated activities, road building, succession, fire
Least moonwort <i>Botrychium simplex</i>	53	1	Perennial fern; generally open habitats, such as old log landings, roadside ditch, trails, open fields, base of cliff, railroad ROW.	Logging and associated activities, road building, succession, fire

### Environmental Baseline:

Table UD-1 outlines the number of known occurrences for the species in this guild. Suitable habitat within the SLL2 area which is proposed for project activities was surveyed for the presence of these species.

The UD Guild contains species that are currently found in habitats which experienced some heavy ground disturbance (e.g. pipe line, roadside ditch, old log landing, old building sites, old roads, old field, edges of trails, and gravel pits) in the past, but which are currently dominated by graminoids and forbs. Few are known from sites that originated from a natural disturbance (e.g. wildfire, windthrow). However, some are found in forested habitats. (USDA FS 2004c)

Historical natural disturbances such as wildfire and windthrow created early successional forest habitat in a variety of patch sizes. Early successional forest habitat on the current landscape is dominated by patches of human origin that are on average smaller than historical patches. Historically, disturbance and succession created a mosaic of suitable habitat for this suite of plants that shifted across the landscape. Today, early successional habitat still shifts across the landscape, but more early successional habitat is maintained in that state through repeated disturbance of, for example, roadside ditches or log landings. Current ecological conditions differ from historic in that disturbance regimes and patch sizes have changed. In addition, suitable forested habitat is being impacted by exotic earthworms. (USDA FS 2004c). Because the current populations of UD Guild plants occur in limited abundance and disjunct locations, disturbances could impact populations of these plants.

Proposed SLL2 project activities that would affect the environment of UD Guild plants include timber harvest and associated activities (e.g. site preparation, reforestation) and maintenance of forest openings. Timber harvest can cause impacts to plant habitat from ground disturbance associated with logging, and with associated activities, such as construction of landings, skidding, site preparation, and potential erosion/sedimentation and soil compaction. Reforestation can cause changes to local conditions around plants through changes in light regimes. Maintenance activities in forest openings would have effects that range from being similar to those of harvest and site preparation to having virtually no effect. Road building can allow competing non-native invasive species to come into an area, or to have a competitive advantage within sites where they occur. (USDA FS 2004c)

## **Effects of Action:**

### ***Direct effects:***

No occurrences of these species occur within activity stands of either action alternative. No direct effects are anticipated.

***Indirect effects:*** Because UD Guild plants are associated with previous disturbance, it is not anticipated that activities within potential plant habitats will necessarily result in a negative impact due to disturbance per se, particularly over the long-term, provided that existing colonies are not directly affected. The exception may be activities such as road building, which provide opportunities for invasion, or competitive advantage, of non-native invasive species (such as exotic earthworms). Both action alternatives propose the same amount of forest opening maintenance (72 acres) using fire and similar amounts of temporary road construction (2.9 miles in Alt. B and 2.7 miles in Alt. C). As a result, Alternatives B and C would have about equal impact on these species.

***Cumulative effects:*** Cumulative effects to UD guild habitat would be similar as described for direct and indirect effects.

## **Determination of effects:**

Alternative A would have no impact to UD guild plant species or their habitats. Alternatives B and C may impact individual UD guild plant species or their habitats, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species.

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