WHYTE FOREST MANAGEMENT PROJECT

Laurentian Ranger District, Superior National Forest

Biological Evaluation

Region 9 Regional Forester Sensitive Species

Wildlife Evaluation and Assessment:

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EXECUTIVE SUMMARY

FEDERALLY LISTED SPECIES

See the Whyte project Biological Assessment (BA) for results.

SENSITIVE SPECIES

WILDLIFE

Alternative 2 (No action) would have no direct, indirect, or cumulative effects to heather vole, northern goshawk, boreal owl, olive-sided flycatcher, black-throated blue warbler, bay-breasted warbler, Connecticut warbler, three-toed woodpecker, great gray owl, wood turtle, northern brook lamprey, creek heelsplitter, black sandshell, tiger beetle, Mancinus alpine butterfly, red-disked alpine butterfly, jutta artic butterfly and Quebec emerald dragon fly.

Alternative 1, 2 and 3 would have no direct, indirect, or cumulative effects to Le Conte's sparrow, yellow rail, peregrine falcon, sharp-tailed grouse, lake sturgeon, shortjaw cisco, Nabokov's blue butterfly and Freija's grizzled skipper butterfly.

For Alternatives 1 and 3, the proposed activities may impact individuals of heather vole, northern goshawk, boreal owl, black-throated blue warbler, bay-breasted warbler, Connecticut warbler, three-toed woodpecker, great gray owl, wood turtle, northern brook lamprey, creek heelsplitter, black sandshell, tiger beetle, Mancinus alpine butterfly, red-disked alpine butterfly, jutta artic butterfly and Quebec emerald dragon fly, but are not likely to cause a trend to federal listing or loss of viability.

Alternative 1 and 3 may have a beneficial impact to the olive-sided flycatcher.

VASCULAR PLANTS, LICHENS, AND BYROPHYTES

Alternative 2 would have no direct, indirect, or cumulative effects to swamp beggar-ticks, floating marsh-marigold, Katahdin sedge, linear-leaved sundew, neat spike rush, moor rush, Vasey's rush, auricled twayblade, fall dropseed muhly, American shoregrass, dwarf water lily, club-spur orchid, northern bur-reed, awlwort, lance-leaved violet, *Cladonia wainoi*, large-leaved sandwort, Appalachian fir clubmoss, *Arctoparmelia centrifuga*, *Arctoparmelia subcentrifuga*, small shinleaf, cloudberry, fairy slipper, ram's head ladyslipper, *Caloplaca parvula, Certraria aurescens, Menegazzia terebrata, Ramalina thrausta, Sticta fuliginosa, Usnea longissima, Pseudocyphellaria crocata, Frullania selwyniana,* triangle grapefern, goblin fern, New England sedge, Canada yew, barren strawberry, Canada ricegrass, or *Peltigera venosa*.

The proposed activities in Alternatives 1, 2, and 3 may impact individuals of pointed moonwort, common moonwort, Michigan moonwort, pale moonwort, ternate grapefern, and least moonwort but are not likely to cause a trend to federal listing or loss of viability.

The proposed activities in Alternatives 1 and 3 may impact individuals of swamp beggar-ticks, floating marsh-marigold, Katahdin sedge, linear-leaved sundew, neat spike rush, moor rush, Vasey's rush, auricled twayblade, fall dropseed muhly, American shoregrass, dwarf water lily, club-spur orchid, northern bur-reed, awlwort, lance-leaved violet, *Cladonia wainoi*, large-leaved sandwort, Appalachian fir clubmoss, *Arctoparmelia centrifuga*, *Arctoparmelia subcentrifuga*, small shinleaf, cloudberry, fairy slipper, ram's head ladyslipper, *Caloplaca parvula, Certraria aurescens, Menegazzia terebrata, Ramalina thrausta, Sticta fuliginosa, Usnea longissima, Pseudocyphellaria crocata, Frullania selwyniana,* triangle grapefern, goblin fern, New England sedge, Canada yew, barren strawberry, Canada ricegrass, or *Peltigera venos* but are not likely to cause a trend to federal listing or loss of viability.

BIOLOGICAL EVALUATION

INTRODUCTION:

This Biological Evaluation (BE) evaluates the effects of the proposed Whyte project on threatened, endangered, proposed, and Regional Forester-listed (R9) sensitive species (U.S. Department of Agriculture (USDA) Forest Service Manual sections 2670.3, 2670.5 (3), 2672.4). The species evaluated in this report include all species on the newly revised R9 sensitive species list (November 8, 2006).

The management objective is to maintain viable and well-distributed representation of all native species that occur on the Superior National Forest (National Forest Management Act Regulation 219.19 and 219.26, Secretary of Agriculture Regulation 9500-4, USDA Forest Service Manual 2670.12, 2670.22, and 2670.32, Forest Plan p. 3-4). I used the following working definitions for viability and well-distributed from Iverson and René (1997):

viability--the likelihood that habitat conditions will support persistent and well-distributed populations over time;

well-distributed--species and habitat distribution are based on the current and historic natural distribution and dispersal capabilities of individual species, and dispersal includes the concepts of metapopulation dynamics and gene flow.

The Whyte project area is north of Two Harbors, MN in Lake and St. Louis Counties. The scope of this project is limited to vegetation management actions and connected road management actions. The Whyte project area encompasses about 219,000 acres of land of which 94,146 acres are National Forest System land.

The area covered by the analysis of direct and indirect effects includes all lands administered by the Superior National Forest within the Whyte project area (see Whyte Forest Management Preliminary Environmental Analysis (PEA) for map). This is appropriate because the area's large size contains known or potential populations, individuals, and enough habitats of many sensitive species to evaluate the effects of proposed activities. The analysis boundary includes that area to which direct and indirect effects would occur.

The area covered by the cumulative effects analysis includes lands of all ownerships within the Whyte project area because the area's large size contains enough habitat of most of the sensitive species to evaluate the effects of the project. The time scale used for the analysis of direct, indirect and cumulative effects is 10 year (or the year 2014). This time scale is chosen because it is reasonable to assume that all proposed projects would be implemented by this time and expected effects have occurred and it coincides with the Forest Plan Decade 1 objectives. This is also an appropriate time scale for cumulative effects because it allows for the most realistic prediction of reasonably foreseeable future projects. Past actions are taken into account in the existing condition. Present and foreseeable future (10 years) actions are considered (Appendix A).

The overall objective of the Whyte Project is to maintain and improve forest health by moving the vegetative component towards the Landscape Ecosystem objectives described in the 2004 Superior National Forest Land and Resource Management Plan (Forest Plan p. 2-23, O-VG-1). The PEA considers three alternatives: 1) harvest of 9,859 acres of mature forest by a variety of harvest methods 2) no-action, 3) harvest of 8,314 acres of mature forest by a variety of harvest methods (Table 1). See the maps, tables and unit cards in the PEA for site-specific locations and more detailed information.

There are a variety of other activities (Table 1) besides timber harvest that are included in this project. They will be discussed for each species that utilize habitat that will be affected by the activities. Below is a list of the other activities and the habitat they will affect.

- Prescribed Burning – This will have the potential to affect upland habitat types.
- Gravel Pits - This will have the potential to affect many different upland habitat types.
- Reforestation – This will have the potential to change brush stands to forested stands
- Restoration – This will have add a white pine or yellow birch component to already forested stands
- Roads – Some roads will be added to the system and some will be decommissioned. This will have the potential to affect both upland and lowland habitats.

Table 1. Comparison of Alternatives Considered in Detail			
	Alternative 1	**Alternative 2 (No Action)**	**Alternative 3**
Vegetation Management	**Acres**	**Acres**	**Acres**
Create young aspen, paper birch, jack pine, balsam-fir/spruce, and black spruce forest through a variety of even-aged management treatments such as clearcut with reserves, overstory removal, and shelterwood harvest.	4918	0	4292
Increase the amount of white pine through two-aged management treatments including shelterwood with reserves and shelterwood with canopy gaps.	510	0	335
Increase the amount of white pine by converting upland brush and poor quality aspen stands.	176	0	157
Enhance riparian habitat by planting longer-lived tree species and releasing existing long- lived tree species adjacent to streams and lakes	241	0	241
Enhance yellow birch forest through site preparation to encourage regeneration of over-mature stand	29	0	29
Improve the quality of red pine, white spruce, upland black spruce, sugar maple, and northern white cedar-aspen/birch stands through a variety of intermediate treatments such as thinning, group selection, and variable gap dynamics.	3928	0	3208
Improve Nabokov Blue butterfly habitat	2	0	2
Restore the ecological effects of fire in older red pine forest through underburning.	50	0	50
Total Acres of Vegetation Management	9859	0	8314
Fire Regime Condition Class	**Acres**	**Acres**	**Acres**
Restore and/or maintain fire regime condition classes 1, 2, and 3 to condition class 1 and 2	9857	0	8312
Road Management	**Miles**	**Miles**	**Miles**
Add existing unauthorized road to the managed system to provide adequate access to lands that are in need of management	2	0	2
Decommission of unauthorized road.	20	0	20
Use previously used temporary road to access vegetation management units	52	0	48
Construct new temporary road to access vegetation management units	20	0	16
Gravel Pits	**Number**	**Number**	**Number**
Approve management plans for gravel extraction	5	0	5

*Data prior to removal of units in Phantom RARE II

Table 2 displays all Region 9 Regional Foresters Sensitive Species (RFSS) known or expected to occur on the Superior National Forest. Species listed in Table 2 that do not have potential habitat present and are not known to occur within the Whyte project area will not receive further discussion in this BE.

Table 2: Sensitive Species Known or Suspected Occurrence in the Whyte Project Area

TES Species			
Scientific name **Common name**	**Potential Habitat Present in project area**	**Known Species Presence in project area**	**Habitat Summary**
SENSITIVE SPECIES: TERRESTRIAL WILDLIFE			
Heather vole *Phenacomys intermedius*	Yes	No	Forest, brushland or clearcuts with *Vaccinium* spp. and rocks.
Northern goshawk *Accipiter gentilis*	Yes	Yes	Large patch of older trees with closed canopy and open understory. Individuals observed in area. No nesting territories known. Individuals have been observed in the project area.
Boreal owl *Aegolius funereus*	Yes	Yes	Secondary cavity nester. Old boreal forest (inc. aspen) next to lowland conifer foraging areas. Detected during owl surveys.
LeConte's sparrow *Ammodramus leconteii*	No	No	Uplands and lowlands with dense, tall, grass/sedge vegetation and thick ground litter. No impact to habitat and no records in project area.
Olive-sided flycatcher *Contopus cooperi*	Yes	Yes	Snags, low density conifer lowlands, riverine/riparian areas. BBS route detection.
Yellow rail *Conturnicops noveboracensis*	No	No	Lowland sedge meadows with specific characteristics such as overhead mat of dead sedge. Nearest detection 35 miles away in Zim bog.
Black-throated blue warbler *Dendroica caerulescens*	Yes	No	Large contiguous mature forests, probably associated with small canopy gaps and a well-developed shrub understory
Bay-breasted warbler *Dendroica castanea*	Yes	No	Mature upland and lowland spruce/fir forests.
Peregrine falcon *Falco peregrinus anatum*	No	No	Nest: cliff/ledges; Hunt: forest openings, lakes, wetlands
Connecticut warbler *Oporornis agilis*	Yes	Yes	Jack pine or lowland conifer with a thick ericaceous understory. BBS route detection.
Three-toed woodpecker *Picoides tridactylus*	Yes	No	Coniferous forests with snags
Great gray owl *Strix nebulosa*	Yes	Yes	Nesting habitat of mature trees on wet soil with >60% canopy closure near open foraging areas. Detected during owl surveys.

TES Species			
Scientific name **Common name**	**Potential Habitat Present in project area**	**Known Species Presence in project area**	**Habitat Summary**
Sharp-tailed grouse *Tympanuchus phasianellus*	No	No	Brushland complexes (>5,000 acres) with open areas, brush and small trees, as well as large open agricultural hay or pasture with associated brush habitat.
Wood turtle *Clemmys insculpta*	Yes	Yes	Upland and lowland habitats with suitable shade and insects for forage. Riparian habitats with open sandy areas for nesting. Dead individual on Hwy 2 near Langley River.
SENSITIVE SPECIES: AQUATIC WILDIFE			
Lake sturgeon *Acipenser fulvescens*	No	No	On SNF: Large lakes and rivers in the Hudson Bay drainage. No habitat present.
Shortjaw cisco *Coregonus zenithicus*	No	No	Lake Superior, Saganaga and Gunflint Lakes, possibly others. No habitat present.
Northern brook lamprey *Ichthyomyzon fossor*	Yes	No	Warm, medium-sized, low-gradient streams with sections of higher gradient reaches suitable for spawning. Ammocoete's require organically enriched, sandy substrate until metamorphosis.
Creek heelsplitter *Lasmigona compressa*	Yes	Yes?	Headwaters of larger rivers. St. Louis river and tributaries. Lake of the Woods tributaries.
Black sandshell *Ligumia recta*	Yes	Yes?	Medium to large rivers.
SENSITIVE SPECIES: INSECTS			
Tiger beetle sp. *Cicindela denikei*	Yes	No	Sandy or rocky openings in northern hardwood forest communities.
Mancinus alpine *Erebia disa mancinus*	Yes	Yes	Shady black spruce swamp. Found in McNair management area adjacent to project area and near Greenwood Lake.
Taiga (Red-disked) alpine *Erebia discoidalis discoidalis*	Yes	Yes	Black spruce areas. Found in McNair management area adjacent to project area and along FR204.
Nabokov's (or Northern) blue *Lycaeides idas nabokovi*	Yes	No	*Vaccinium cespitosum* host in open sandy jack pine areas. Found in McNair management area adjacent to project area.
Jutta arctic *Oeneis jutta ascerta*	Yes	No	Moderately forested black spruce bogs with sedges. Found in McNair management area adjacent to project area.
Freija's grizzled skipper *Pyrgus centaureae freija*	Yes	No	Upland acidic meadow Found in McNair management area adjacent to project area.
Quebec Emerald dragonfly *Somatochlora brevicincta*	Yes	Yes	Predominantly bogs, fens, and heaths.
SENSITIVE SPECIES: Vascular Plants (Note: Unless cited otherwise, habitat descriptions are derived from information provided by the Minnesota Natural Heritage and Non-game Research Program [MNDNR 2006])			
Moschatel *Adoxa moschatellina*	No	No	Shaded damp cliffs and slopes in upland mature northern hardwood forest on North Shore
Long-leaved arnica *Arnica lonchophylla*	No	No	Cool & moist cliffs and ledges on North Shore. Arctic disjunct
Maidenhair spleenwort	No	No	In crevices of moist, mostly east-facing

TES Species			
Scientific name **Common name**	**Potential Habitat Present in project area**	**Known Species Presence in project area**	**Habitat Summary**
Asplenium trichomanes			cliffs, ledges, and talus, Rove formation
Alpine milkvetch *Astragalus alpinus*	No	No	Sandy, gravelly fluctuating shorelines with sparse vegetation. Inland strand beach - sparse vegetation
Swamp beggar-ticks *Bidens discoidea*	Yes	No	Wet habitats: silty shores, hummocks in floating mats and swamps, partly submerged logs
Pointed moonwort *Botrychium acuminatum*	Yes	Yes	Open habitats such as old log landing, old dirt roads, borrow pits
Triangle grape-fern *Botrychium lanceolatum* var *angustisegmentum*	Yes	Yes	Northern hardwood forest, oldfields, old logging roads, trails
Common moonwort *Botrychium lunaria*	Yes	No	Open habitats such as old log landings, sawmill sites, old building sites
Michigan moonwort *Botrychium michiganense (hesperium)*	Yes	Yes	Open habitats such as old log landing, old dirt roads, gravel pits, powerline corridors, borrow pits. Also beach ridges, old fields, trails, and dredge spoil dumps (Walton 2000a)
Goblin fern *Botrychium mormo*	Yes	No	Mesic northern hardwood forest with thick leaf litter layer
Pale moonwort *Botrychium pallidum*	Yes	No	Open, disturbed habitats, log landings, roadsides, dunes, sandy gravel pits.
Ternate grape-fern *Botrychium rugulosum (=ternatum)*	Yes	Yes	Generally open habitats, such as old log landings and edges of trails.
Least moonwort *Botrychium simplex*	Yes	No	Generally open habitats, such as old log landings, roadside ditch, trails, open fields, base of cliff, railroad rights of way
Floating marsh-marigold *Caltha natans*	Yes	No	Perennial herb; shallow water of pools, ditches, sheltered lake margins, slow moving creeks, sloughs and oxbows, pools in shrub swamps
Fairy slipper *Calypso bulbosa*	Yes	Yes	Hummocks in northern white cedar swamps, moist to wet lowland conifer swamps, and to lesser extent in upland coniferous forests (Smith 1993)
Katahdin sedge *Carex katahdinensis*	Yes	No	In seasonally moist, gravelly/sandy soil; along shores of large and small lakes; margins of ephemeral pools; associated with seasonal flooding
New England sedge *Carex novae-angliae*	Yes	Yes	Moist woods with sugar maple, also with birch, aspen, tall shrubs; yellow birch and white spruce dominated forest (USDA Forest Service 2002a, L. Gerdes pers. com)
Ross' sedge *Carex rossii*	No	No	Rocky summits, dry exposed cliff faces, rocky slopes, in east Border Lakes subsection
Douglas's hawthorn *Crataegus douglasii*	No	No	North Shore rocky, gravelly streambeds/banks and open areas; and rocky borders of woods

TES Species			
Scientific name **Common name**	**Potential Habitat Present in project area**	**Known Species Presence in project area**	**Habitat Summary**
Ram's-head lady's slipper *Cypripedium arietinum*	Yes	No	Wide variety of forests, both upland and lowland, but in MN predominantly in white cedar swamps; also in forests dominated by jack pine, red pine, or white pine
Rough-fruited fairy bells *Disporum trachycarpum*	No	No	Semi-open jack pine forest with aspen, birch, shallow rocky soils, in east Border Lakes subsection
Linear leaved sundew *Drosera linearis*	Yes	Yes	Minerotrophic water tracks in patterned peatlands
Neat spike-rush *Eleocharis nitida*	Yes	Yes	Mineral soil of wetlands, often w/ open canopy and disturbance, such as logging roads/ditches through wetlands
Appalachian fir club moss Huperzia appalachiana	Yes	No	Shelves and crevices on cliff/talus/rock outcrops, and shrub dominated talus piles
Moor rush *Juncus stygius*	Yes	Yes	Shallow pools in non-forested peatlands, often in a sedge-dominated community
Creeping rush *Juncus subtilis*	No	No	Sandy lakeshore – only known occurrence in BWCAW
Vasey's rush** *Juncus vaseyi*	Yes	No	Seasonally wet soil of wetlands, often w/ open canopy and disturbance, such as roadside ditch, trail, gravel pit, often with sedges and grasses (Walton 1999, Walton 2000c)
Auricled twayblade *Listera auriculata*	Yes	No	On alluvial or lake-deposited sands or gravels, with occasional seasonal flooding, associated with riparian alder or spruce/fir forest
American shore-grass *Littorella uniflora*	Yes	Yes	Shallow margins of nutrient-poor lakes, seepage lakes, sandy substrate, may have fine gravel/organic soil. Fluctuating water level up to about 1 meter.
Large-leaved sandwort *Moehringia macrophylla*	Yes	Yes	Cliffs/rock outcrops, talus, conifer sites on shallow soils, pine plantation with rocky outcrops; usually semi-open shrub or tree canopy
Fall dropseed muhly *Muhlenbergia uniflora*	Yes	No	Wet sandy beaches, floating peat mats
Dwarf water-lily *Nymphaea leibergii*	Yes	Yes	Slow moving streams, rivers, beaver impoundments 1-2 m deep. Occurs at outer margin of emergent vegetation.
Chilean sweet cicely *Osmorhiza berteroi*	No	No	Northern hardwood forest dominated by sugar maple on North Shore.
Sticky locoweed *Oxytropis borealis* var *viscida (=oxytropis viscida* var *viscida*	No	No	Slate cliffs and talus slopes in east Border Lakes subsection. Arctic/alpine disjunct
Canada Rice Grass *Piptatherum canadensis*	Yes	No	Sandy/gravelly soil; red pine/jack pine plantations, borders, edges, trailsides, openings
Small green woodland orchid	Yes	Yes	Floating bog mats, sphagnum, stunted

TES Species			
Scientific name **Common name**	**Potential Habitat Present in project area**	**Known Species Presence in project area**	**Habitat Summary**
Platanthera clavellata			conifer swamp, mixed spruce tamarack, borrow pits, winter logging roads
Western Jacob's ladder *Polemonium occidentale ssp. lacustre*	Yes	No	Primarily white cedar swamps, also mixed conifer swamps; thrives in openings (Carlson and Sather 2001)
Braun's holly fern *Polystichum braunii*	No	No	Cool, shady cliffs and slopes in northern hardwoods in North Shore Highlands subsection
Lesser wintergreen or Small shinleaf *Pyrola minor*	Yes	Yes	Black spruce swamps, and ecotone between uplands and lowland alder/conifer swamp, prefers closed canopy.
Cloudberry *Rubus chamaemorus*	Yes	No	Black spruce/sphagnum forest, acidic. Superior NF at southern edge of species range
Nodding saxifrage *Saxifraga cernua*	No	No	Cliffs, ledges, diabase cliff (calcium based feldspars). Arctic/alpine disjunct. One location in MN on open cliff.
Encrusted saxifrage *Saxifraga paniculata*	No	No	Cliffs, sheltered crevices, and ledges of north-facing cliffs; Arctic/alpine disjunct
Northern bur-reed *Sparganium glomeratum*	Yes	Yes	Floating muck mats in emergent wetland habitat such as moats, pond margins, road ditches
Awlwort *Subularia aquatica*	Yes	No	Beach zone of sandy nutrient-poor lakes. Shallow lake margins. Submerged or emerged, or stranded. 15-45 cm deep water, but can occur deeper. Can flower while stranded, or under other conditions.
Canada yew *Taxus canadensis*	Yes	Yes	Wide variety of uplands and lowlands, including cedar/ash swamps, talus and cliffs, northern hardwoods, aspen/birch forest (Walton 2001, Schmoller 2001, USDA Forest Service 2003a)
False-asphodel *Tofieldia pusilla*	No	No	Sedge mats at edges of shoreline rock pools along Lake Superior. Arctic disjunct.
Lance-leaved violet *Viola lanceolata*	Yes	No	Sandy to peaty lakeshores; borders of marshes and bogs, damp sand ditches
Barrenstrawberry *Waldsteinia fragarioides*	Yes	No	Upland coniferous and deciduous forests, in recently harvested areas, established plantations, and areas with no recent harvest
Smooth woodsia *Woodsia glabella*	No	No	Moist, north-facing cliffs along Lake Superior. Arctic disjunct.
SENSITIVE SPECIES: LICHENS AND BRYOPHYTES **(Habitat information taken from USDA Forest Service 2000a, and Wetmore 2001a)**			
A lichen sp. *Arctoparmelia centrifuga*	Yes	No	Lichen; Sunny rocks and open talus slopes
A lichen sp. *Arctoparmelia subcentrifuga*	Yes	No	Lichen; Sunny rocks and open talus slopes
a lichen sp. *Caloplaca parvula*	Yes	No	Smooth bark of young black ash in moist, humid old growth black ash stand

TES Species			
Scientific name **Common name**	**Potential Habitat Present in project area**	**Known Species Presence in project area**	**Habitat Summary**
a lichen sp. *Cetraria aurescens*	Yes	No	Conifer bark in lowland conifer swamps (old cedar/black spruce)
a lichen sp. *Cladonia wainoi (= pseudorangiformis)*	Yes	No	On rock outcrops and thin soil – exposed sites with lots of light
A liverwort sp. *Frullania selwyniana*	Yes	Yes	Lowland cedar swamps on bark of white cedar
Port-hole lichen *Menegazzia terebrata*	Yes	Yes	Cedar swamps, especially old growth; base of cedar trees
a Dog lichen *Peltigera venosa*	Yes	No	Soil and moist cliffs, exposed root wads.
a lichen sp. *Pseudocyphellaria crocata*	No	No	Mossy rocks, trees in partially shaded, moist, frequently foggy habitats.
A lichen sp. *Ramalina thrausta*	Yes	No	Cedar swamps, especially old growth
a lichen sp. *Sticta fuliginosa*	Yes	No	On hardwoods in humid, old growth cedar or ash bogs.
a lichen sp. *Usnea longissima*	Yes	No	On old conifers in moist situations, often in or near a conifer or hardwood swamp

** These species are being dropped from the Region 9 RFSS list.

DESCRIPTION OF AFFECTED SPECIES:

TERRESTRIAL WILDLIFE

Heather vole:

Existing Condition

Population and trend: In eastern North America, the range of the heather vole reaches its southernmost point in the Upper Midwest on the Superior National Forest (Jannett 2006). A long-term (1995-2006) study of small mammal populations has documented 64 heather voles, all on the Superior National Forest. The nearest known heather vole location is 12 miles north of the project area off of the Tomahawk road (MN NHP 2006).

Small mammal surveys were also coordinated by the 1854 Authority have been conducted each fall since 2002 in an attempt to track trends in small mammal populations within the forested and transition zones in northern Minnesota. Nine of the trapping routes are conducted on the SNF, none in the Whyte project area. Population trends are unknown.

Habitat needs and limiting factors: Coffin and Pfannmuller (1988, p. 308) and McAllister and Hofmann (1988) state that heather vole is found in a wide variety of northern habitats, including coniferous forests, and forest borders, heath shrublands, willow thickets, rocky hillsides, and moist meadows. *Vaccinium* species are often present where they are found. Naylor and Spires (1985) found high densities of heather voles in Ontario in jack pine monocultures with a dense, relatively continuous understory of ericaceous shrubs. Upland forests and openings with ericaceous ground cover and not far from water appear to be preferred habitat. Anything that encourages grasses encourages meadow voles, which are detrimental to the heather vole (SNF Annual Monitoring Report 2006).

Habitat trend: Fires suppression has likely had the biggest negative impact to habitat conditions from historical conditions. Timber harvest potentially perpetuates habitat for this species, however and increase of aspen and a decrease of jack pine has likely reduced the amount of suitable habitat for the species (SNF Annual Monitoring Report 2006).

This project area has a very limited amount of jack pine forest and is probably not a likely area to find heather voles. However, they could still be present in localized areas and will therefore be analyzed.

Analysis Indicator: To assess the change in habitat and effects to heather voles I measure the acres and percent of mature jack pine forest (MIH 8) in the project area. I also measure the amount of Final harvest (Clearcut, Shelterwood, and Shelterwood with reserves) on ELT 1, 2, and 14. These soil types are most vulnerable the establishment of grass after natural or human caused disturbance.

Direct/Indirect Effects

Table 3. Indicators of effects to Heather Voles.

Alternative	MIH 8 mature+	ELT 1, 2 or 14
	Acres and (%) of MIH 8 (1,633 total acres)	Acres and (%) of Final Harvest (69,504, all ownerships)
Existing Condition	8 (0.5)	0
1	186 (11.4)	3,025 (4.4)
2	194 (11.9)	0 (0)
3	186 (11.4)	2,738 (3.9)

Roads, temporary or permanent, allow for the potential of direct mortality of heather voles. Gravel pits may provide future habitat after rehabilitation efforts have been completed by providing sparse, rocky cover. Prescribed burning could pose a direct threat to individuals but it could enhance the habitat for heather voles considerably by stimulating the growth of the understory.

There is only a small amount of mature jack pine forest in the project area. This project will have minimal impact on this habitat type in the project area. There is a large amount of acres in ELT 1, 2, and 14 which is susceptible to grass establishment after harvest. However, this project only will impact approximately 4% of these ELTs with final harvest. Leave trees and reserve areas should help reduce the establishment of grass by providing some shade. The reserve areas would also provide refugia for heather voles if grass does become established and meadow voles increase.

Cumulative Effects

Based on Forest-wide projected habitat trends on federal lands (SNF Annual Monitoring Report 2006) the amount of mature jack pine forest (MIH 8) will increase in the Jack Pine Black Spruce and Mesic Birch Aspen Landscape Ecosystems (LE) in the next 10 years which at a coarse scale would benefit this species. On non-federal lands management for young forest of aspen and conifer will continue, so habitat would be positively and negatively impacted. However when looked at in combination with federal lands, goals established by the Minnesota Forest Resources Council Landscape Committee guide the emphasis of land management on all ownerships that are located within the SNF. Over arching goals are to increase the amount of Jack Pine Forest (MIH 8) over time.

The cumulative effects analysis for the Forest Plan Revision BE concludes that habitat conditions in the future from federal and non-federal lands are predicted to continue to provide a patchy distribution for heather vole. This project and predicted cumulative actions fall within the analysis and effects that were predicted by the Forest Plan Revision BE. Likely habitat for the heather vole will be maintained in patchy distribution.

Determination
The proposed resource management activities planned in the project area under Alternative 1 and 3 may impact individuals but are not likely to cause a trend to federal listing or loss of viability. This determination is based on the assumption that heather vole is adaptable to a wide variety of habitats, can escape direct mortality from logging by burrowing in its nests or leaving the site, and, if present, source populations would be present in some of the project area. There is also an expected small increase in jack pine forest which may benefit the species. This determination is consistent with the determination in the Forest Plan Programmatic BE. Alternative 2 would likely have no effect to the heather vole. All Alternatives are consistent with Forest Plan O-WL-18, G-WL-11, G-WL-12 and S-WL-5.

Mitigations

- None

Northern goshawk:

Existing Condition

Population and trend: Northern goshawk (hereafter goshawk) is a large forest raptor, occupying boreal and temperate forests throughout the Holarctic (Brown and Amadon 1968, cited in Keane and Morrison 1994). Squires and Reynolds (1997) state that *Accipter gentilis atricapillus*, the subspecies occurring in Minnesota, is widely distributed across the northern half of eastern North America and in many parts of western North America. Goshawks are generally uncommon throughout their range. Population productivity and nesting densities coincide with populations of snowshoe hare and grouse (Postupalsky 1997, Squires and Reynolds 1997). Goshawk populations in the Lakes States are perhaps less than prior to early logging and settlement, especially when passenger pigeons were available for prey (Kennedy 1997). Populations may be increasing with the recovery and maturing of forests in recent times in some parts of the United States (Postupalsky 1991, Squires and Reynolds 1997, Kennedy 1997, Rosenfield et al. 1998). Rosenfield et al. (1998) found no evidence of range contraction in Wisconsin. Such data are not available for Minnesota. Increase in human activity in the form of road traffic, structures and communities may dampen some of the potential recovery from large-scale logging 100 years ago (Squires and Reynolds 1997). The reintroduced fisher is blamed for increased nest failure and adult female mortality in Wisconsin (Erdman et al. 1998). Fisher are common in the Whyte project area as documented by the snow tracking surveys.

Surveys for nesting goshawks have been conducted in several project areas within the Laurentian Ranger District over the past 8 years (roughly 370,000 acres, all ownerships). Ten occupied goshawk nesting territories were found. None of them are within the Whyte project area. Five survey routes consisting of approximately 60 calling points were conducted in the Whyte area in 2005 and 2006. There were no detections of goshawks. There have been two incidental sightings of goshawks in the project area in the last few years. These locations were followed up with stand searches and call playback and no goshawks of stick nests were located. Two nests were found in the Whyte project area that have the potential to be historic goshawk nests based on shape and proximity to each other. They were not used by any species in 2006. They will be followed up on in 2007. 2005 Forest-wide survey efforts showed an increase of known breeding pairs over those known in 2003 (Annual Monitoring Report 2006).

Habitat needs and limiting factors: Reynolds et al. (1992), Graham et al. (1994), Squires and Reynolds (1997), and others state that goshawk is a forest dwelling raptor whose habitat preferences are mature deciduous or mixed deciduous and coniferous forest in fairly contiguous blocks intermixed with younger forests and openings for prey species habitat. Goshawks are adapted to flying beneath the forest canopy and use primarily mature forest with sufficient open space between the bottom live tree branches and understory for the birds to fly easily. Some understory (e.g., forbs) and down logs are needed for prey species habitat. Adults and fledglings use large down logs as feeding and plucking perches. Goshawks may use forest edge if large-bodied prey is more common there. Presence of free water is needed.

In eastern deciduous forests, goshawks prefer to nest in large forested areas containing more mature timber than generally present in the landscape, and nests are often close to wood roads or trails that as serve flight corridors (Speiser and Bosakowski 1987 cited in Squires and Reynolds 1997). In Michigan and Wisconsin, Postupalsky 1997) and Rosenfield et al. (1998) found that goshawks nested in a wide array of forest types, including aspen monotypes, pine plantations, sugar maple, maple-oak, and black ash. Most of the 37 known nests between 1977 and 1997 were in the forested northern portions of those states but several were in forest fragments in agriculturally –dominated landscapes. Erdman et al. (1998) reported that monotypic aspen-birch forests provide more exposed nest sites and the effect of loss of nest cover was demonstrated in 1989 in Wisconsin when 66% of goshawk nests failed when forest tent caterpillar defoliated deciduous trees. A Michigan study (Lapinski and Bowerman 2000), has so far found that the six goshawks in their area use forests of "tamarack, black spruce, white spruce, balsam fir and mixed conifer types" along with other kinds of forests, but avoided younger monotypic aspen, cedar and open areas. Across the range of the species, goshawks have demonstrated an ability to use a wide variety of habitat types that have high degree of canopy closure (Squires and Reynolds 1997). In Wisconsin, for example, mean canopy closure at the nest site was 82% (Rosenfield et al. 1998).

Boal et al. (2001) studied habitat use by nesting goshawks in northern Minnesota. Eighty-one percent of 46 nests were built in aspen, 11% in paper birch, 4% in white pine, and 2% each in red oak and red pine. Two nest stands were in jack pine, 12 were in aspen-birch-balsam fir, three were in white and red pine, and two were in northern hardwood. On the Laurentian District, red pine plantations were the most common nest stands (4 out of 10), followed by aspen-spruce-fir (2 nests), aspen (1 nest), jack pine (1 nest), paper birch (1 nest) and maple (1 nest).

While goshawks do not always use the same nest for more than a year, they typically have two and up to nine alternate nest sites to the one they are using at present and these are usually located within a square mile of the present nest (Estabrook 2000). It is, therefore, important to also protect these alternative nest sites that may be used in subsequent years. The highest mean territory longevity recorded in Wisconsin was 10.2 years (Erdman et al. 1998).

Boal et al. (2001) found that foraging stands, regardless of stand type, were consistent in having high stand densities of tall, large canopy trees, with horizontal open spaces of 3 to 12 feet between the bottom of the overstory and top of the understory trees, and up to 3 feet between the bottom of the understory canopy and top of the shrub layer. They suggested that these relatively unobstructed spaces between vegetation layers may serve as important flight paths through forest stands, and the heights in which they occurred was consistent among stand types. Foraging stands had the following characteristics: canopy tree diameter of >7 inch diameter at 4.5 ft., basal area 92-137 ft^2, canopy tree height > 48 ft., canopy closure of 53-70%, and canopy stem density 230-417 stems/acre.

Per Widén (cited in Niemi and Hanowski 1997) suggests that goshawk prefers larger tracts of forest for foraging and, hence, is further affected by fragmentation of forested areas. The species seldom uses recently cut areas for foraging presumably because of the dense understory where prey is hard to detect.

Creation of landscape patterns (e.g., large openings from clearcutting or increased edge habitat) that favor predators such as red-tailed hawk, great-horned owl, fisher or raccoon are a threat to goshawk. In one study, stands larger than 50 acres were used more consistently by goshawk than stands smaller than 25 acres (Estabrook 2000). Per Widén suggests that goshawk has declined in Fennoscandia due to the loss of mature forests and consequent reductions in available foraging areas and food resources. In Wisconsin, Erdman et al. (1998) observed that large clearcuts, selective cuts next to clearcuts, or canopy openings reducing cover to less than 40%, resulted in red-tailed hawks and great horned owl displacing woodland hawks. They attribute most nesting failure to fishers. Boal et al. (2001) summarize that mammalian predation is causing between zero and 30% of nest failures in the western Lakes States.

Reynolds et al. (1992) and Graham et al. (1994) state that the nesting home range of goshawks contains three components: the nest area, the post-fledging family area, and the foraging area. Table 12 illustrates some of the biological functions associated with these three habitat components:

Table 4. Biological function of the three components of goshawk home range.

Biological function	Nest area	Post-fledging	Foraging
Courtship and breeding	x		
Egg-laying and incubation	x		
Security for the female and young	x	x	
Foraging for young and female until dispersal occurs	x	x	
Alternate nest sites	x	x	
Nest and territory defense	x	x	
Foraging for adults and juveniles, and especially male during nesting			x
Security for adults and juveniles, and especially the male, while foraging			x

Goshawks are sensitive to disturbance at nest and roost sites and nest abandonment has been documented within 300 feet of logging or recreational camping (Squires and Reynolds 1997).

Habitat trend: Rangewide, destruction or modification of habitat, including fragmentation, changes in vegetative structure and composition, and effects of activities associated with habitat modification are considered the primary threat to breeding goshawks (Squires and Reynolds 1997). In Michigan, Postupalsky (1991) states that the most significant threat to the species is habitat alteration through timber harvesting which affects the availability of suitable nest sites and enhances the distribution of competitors (primarily red-tailed hawk and great horned owl).

Analysis Indicator: To assess the change in habitat and effects to goshawks, I measured the amount of mature forest availability (Mature + MIH 1), acres and number of mature upland patches over 100 acres and the number of acres of activities that will improve future stand complexity for goshawks.

Direct/Indirect Effects

Roads (temporary, system, special use) should have a minimal impact on goshawks as long as they don't directly impact goshawk nesting habitat of which none is known in the project area. Gravel pits would have a minimal impact on goshawks as long as they are not established in goshawk nesting habitat of which none is known. Prescribed burning should have a minimal impact on goshawks as long as they don't kill existing or potential nest trees in quality habitat. Prescribed burn objectives should ensure this does not happen. Reforestation and restoration projects should benefit goshawks by providing future

foraging and nesting habitat and by increasing within stand diversity, therefore increasing future habitat quality for goshawks.

Direct Effects to Known Goshawk Nests

There are no known goshawk nests in the project area.

Direct Effects to Goshawk Habitat

Goshawk Indicator 1: Mature Forest Availability

All action alternatives show a decrease (Table 5) from existing condition in this indicator during the short-term (2014). However, this decrease is only 7% or 8% less than existing conditions. Alternative 2 will show an increase in the amount of mature forest compared to existing. The young forest created by both action alternatives will provide habitat for important forage species such as ruffed grouse and snowshoe hares that may use the adjacent mature forest and be available to goshawks. Alternative 2 (No action) will not create any new young habitat and will, through time, lose the intermixed habitat of young and mature forest that provide a variety of prey species.

Goshawk Indicator 2: Patch size

Looking at the amounts of mature and older upland forest in patches suitable for goshawks gives a clearer perspective of goshawk habitat conditions by alternative (Tables 5). All action alternatives will reduce (1 to 2%) the area and number of 100 acre or larger upland mature-older forest patches but all will maintain patches over 300 acres. Alternatives 1 and 3, in this order, provide the largest reduction from existing conditions for patch size greater than 100 acres.

The maintenance of all patches over 300 acres (11,708 acres) under all alternatives will help mitigate the harvest of patches ranging in size from 100 to 299 acres. Larger contiguous blocks will provide higher quality habitat for goshawks in the Project Area. Long-term, all alternatives will provide for larger blocks of mature forest which will benefit goshawk. Alternative 2 will show an increase in mature patches 100 acres or larger.

Goshawk Indicator 3: Stand Complexity

All action alternatives will provide similar amounts of stand complexity (Table 5). Stand complexity will be improved through converting stands to white pine, converting upland brush to white pine, underplanting white pine within riparian habitat and enhancing yellow birch through site preparation. Planting for stand conversion will also provide increased stand complexity. Alternatives 1 and 3, in this order, will provide the most future stand complexity through increased planting and underplanting. Stands to be converted will have 40% canopy cover retained and will be underplanted with white pine and/or white spruce. This treatment may provide future foraging habitat for goshawk by providing a multi-layered stand that seems to be preferred by goshawks. Alternative 2 will maintain the existing stand complexity.

Also, mitigation will assure the maintenance of stand complexity in pine and spruce thinning units by requiring the operator to leave 6 to 12 live hardwood trees per acre when available. This will preserve possible future nest trees for goshawks.

Table 5. Northern Goshawk Analysis Indicators in the Whyte project area.

Goshawk				
1. % of Upland Forest in Suitable Habitat**	**Existing***	**Alternative 1**	**Alternative 2 No action**	**Alternative 3**
Acres	29,910	26,026	30,882	26,644
Percent	61	53	63	54
2. Area of 100 acre or Larger Upland Mature/Older Forest Patches				
Acres	18,041	16,817	18,731	17,105
Percent of uplands	36	34	38	35
3. Number of 100 acre or Larger Upland Mature/Older Forest Patches				
Number	65	58	69	60
4. Stand Complexity***				
Acres	N/A	956	0	762

*Existing condition is based in 2006 data. The alternative data is based on 2014. **Goshawk suitable habitat (Federal ownership only) is defined mature or older upland forest types (MIH 1, 49,061 acres). ***Stand complexity includes converting stands to white pine, converting upland brush to white pine, underplanting white pine within riparian habitat and enhancing yellow birch through site preparation.

Cumulative Effects

Management intentions of intermingled state, county and private land managers will probably reduce the present level of large blocks of mature upland forest found in the vicinity of project area and in northeastern Minnesota. The State, St. Louis County, Lake County and TNC plan on harvesting up to 14,000 acres in the project area in the next ten years (Appendix A). Cooperative management, such as that being coordinated by the Sand Lakes Seven Beavers Memorandum of Understanding, should help maintain some large patches of forest by consolidating management across boundary lines.

2006 GIS analysis shows a slight increase in mature upland forest on the Superior as a whole. Although current data shows the Superior exceeds Decade 1 objectives, the amount of mature/old forest in MIH 1 is expected to decrease in decades 1 and 2 (SNF Annual Monitoring Report 2006). The Monitoring report also showed a slight increase in large mature patches Forest-wide. This project will attempt to offset further fragmentation of the landscape by maintaining large, contiguous mature patches of forest and creating large, contiguous patches of young forest. Reduction of goshawk suitable habitat by management of other owners will further increase the importance of maintaining suitable amounts of habitat on federal land.

Fragmentation of larger blocks of habitat would make goshawks more vulnerable to predators and affect species distribution. As mentioned, Boal (2001) documented up to 30% nest predation in northern Minnesota. Wide ranging pairs may not successfully breed if they are forced to expand their home ranges to compensate for further loss of high quality foraging habitat.

This project and predicted cumulative actions fall within the analysis and effects that were predicted by the Forest Plan Revision BE.

Determination
The proposed resource management activities planned in the project area for Alternatives 1 and 3 may impact individuals but are not likely to cause a trend to federal listing or loss of viability. Short-term this project will provide sufficient habitat in the Project Area as a whole. All alternatives will maintain over 50% suitable habitat. All action alternatives will maintain all existing mature patches over 300 acres in the Project Area, will reduce fragmentation by positioning harvest adjacent to recent clearcuts to increase stand size and increase future stand complexity. Also, there are no known goshawk territories in the project area. This determination is consistent with the determination in the Forest Plan Programmatic BE. Alternative 2 will have no effect on goshawks. All Alternatives are consistent with Forest Plan O-WL-18, G-WL-11, G-WL-12 and S-WL-5. Goshawk species specific Standards and Guideline S-WL-10 and G-WL-22 do not apply since there are no known nests in the project area. If one is found they will be implemented.

Mitigations
- Consult immediately with the District Wildlife Biologist if a large stick nest is found and suspend logging temporarily until a mitigation plan can be devised if the nest is used by goshawk.

- Continue to survey the two stick nests off of FR204 to see if they receive use by goshawks in 2007 and 2008.

- Harvest and temporary road construction should not be done between February 1 and August 31 within 2,885 feet of an active nest, if found.

- If a new goshawk territory is found, suspend harvest until a home range analysis can be conducted on the new site. If there will be enough suitable habitat (using criteria above) remaining after the proposed harvest, continue with the operation. However, if the proposed harvest will lower the suitable upland habitat to levels below the threshold, defer the harvest unit.

- If a new active nest is found in a known goshawk territory, follow the time restrictions listed earlier for the new 500-acre post-fledging territory.

Boreal owl:

Existing Condition

Population and trend: Hayward (1994) states that boreal owls occupy boreal forests throughout the northern hemisphere. East of the Rocky Mountains, breeding has been confirmed only in Minnesota, and then primarily in northeastern Minnesota. Nesting boreal owls have generally not been detected west of Highway 53 or the Vermillion River, or within 8 miles of the shore of Lake Superior. The prime area for boreal owl appears to the eastern portion of the Laurentian RD, southern portion of Kawishwi RD, and the middle portion of the Tofte RD, but they are not confined to that area (Steve Wilson, Wildlife Biologist, Minnesota DNR and Bill Lane, Research Wildlife Biologist and consultant). Detection probability decreases west of Highway 53 although a few have been observed in Koochiching County (Lisa Belmonte, research wildlife graduate student, University of Minnesota at Duluth 18 Sep. 2001).

The Minnesota Generic Environmental Impact Statement (Jaakko Poyry Consulting Inc. 1994, p. 7-45) projected a decrease in the Minnesota boreal owl population if statewide timber harvest increased over one million cords overall or about 25% higher than at present. While attempts have been made to monitor

boreal owl populations, present survey techniques are not sufficiently precise to detect population trends for northern Minnesota. Boreal owl populations fluctuate with winter snow depth and prey availability, and winter population irruptions occur periodically (Hayward 1994, Kirk 1994, Wilson 1996, Lane 1997, Wilson 1997). The population on the Superior National Forest is part of a larger Canadian population and may not be viable by itself at present (SNF Annual Monitoring Report 2006). Population trends are difficult to detect given normal large population fluctuations and low precision of survey estimates.

Boreal owls were surveyed in the project area in 2005 and 2006 using both call playback and listening stops. Five survey routes were run and consisted of 70 survey points along roads. These routes were run 2 to 4 times in the spring both years. Three boreal owls were detected within the project area and one just outside the boundary.

Boreal owls have also been monitored in the project area as part of a pilot project to test the effectiveness of using nest boxes to monitor boreal owls. Twenty boxes were established in the project area as part of a larger study in 2004 and monitored for the last three springs. No boreal owls were found to be using the nest boxes.

Habitat needs and limiting factors: Kirk (1994) states that boreal owls prefer forests dominated by black spruce, white spruce, balsam fir, balsam poplar, trembling aspen, and paper birch. They favor mature forest during winter because snow conditions (uncrusted snow) facilitate access to prey; likewise, in summer, mature forest sites have less herbaceous cover than open sites, allowing greater access to prey. Following spring thaw, before herbaceous vegetation becomes dense, owls shift to openings where densities of voles exceed densities in forested stands (The Birds of North America Online 2006).

Nesting habitat is mixed deciduous/conifer usually older than 70 years. Nest trees are typically aspen and birch with an average diameter of 16 to 17.5 inches. Cavities excavated by pileated woodpeckers are often used for nesting. Within 8 acres centered on each nest site nest another important habitat component is six or more dominant or co-dominant conifer that are used as song perches. Nest sites are usually within 200 yards of large areas of productive mature lowland conifer, primarily black spruce, which are preferred for foraging and roosting. Nests that are further than 200 yards from lowland conifer typically have a mature forest corridor to that lowland conifer. Populations are limited by availability of cavities for nesting and food supply (Hayward 1994, Kirk 1994). Limiting factors may be the right combination of nesting and foraging/roosting habitat, and possibly the distribution of these habitats and cavity trees. Fragmentation has been implicated in the isolation of boreal forest lowlands (USDA Forest Service 2004c). Other limiting factors include automobile collisions, and low prey density.

Analysis Indicator: To assess the change in habitat and effects to boreal owls I measured the acres of foraging lowland habitat and upland nesting habitat. Foraging habitat was assumed to be black spruce and mixed swamp conifer stands $\geq$50 years old with a site index >25 and size density > 4 greater than 10 acres in size. Nesting habitat was assumed to be uplands with aspen component greater than 70 years old with a site index $\geq$ 50 adjacent to foraging lowlands greater than 10 acres in size.

Direct/Indirect Effects

There are no known current boreal owl nest sites in the project area. Nests have been found in the past but they would no longer be suitable due to the short time period that dead snags are suitable before falling down. All alternatives will attempt to protect, through deferring harvest or mitigation measures, quality boreal owl nesting habitat: mature upland forest nesting habitat (>70 year old aspen and conifer mixed forest) adjacent to lowland conifer forest foraging and roosting habitat. During project planning 1,017 acres of suitable timber was deferred from harvest to provide suitable boreal owl nesting habitat.

Nesting habitat that was selected for harvest met other objectives; mainly they were adjacent to previous clearcuts and would consolidate the young forest into larger blocks.

Boreal owl habitat does currently exist in the project area (6,506 acres nest habitat and 6,143 acres of foraging habitat greater than 10 acres in size) and should be maintained through the retention of mature patches greater than 300 acres, limited black spruce harvest, cRNA's, riparian management and in harvest units leaving large aspen/birch as reserve trees and positioning reserve areas along the wetland/upland interface to provide and protect nesting habitat. All stands identified as potential boreal nesting habitat were identified and the above mitigation was specified. Boreal owls will nest in clearcuts as long as there are old trees left that provide cavities (Steve Wilson, personal communication). One of the boreal owls in 2006, just outside the project area, was using an old paper birch snag in a clearcut as a possible nest cavity.

Roads (temporary, system, special use) should have a minimal impact on boreal owls as long as they don't directly impact boreal owl nesting and foraging habitat. Many of the proposed roads use already existing road corridors which are not owl habitat. New construction will be located to avoid disturbance to as much wetland and mature forest as feasible and will be decommissioned after use. Gravel pits would have a minimal impact on boreal owls since they are already existing and not located in quality owl habitat. Prescribed burning should have a minimal impact on boreal owls as long as they don't kill existing or potential nest trees in quality habitat. Prescribed burn objectives should ensure this does not happen.

Alternative 1
Harvest of 1,136 acres of potential nest habitat would reduce boreal owl nesting habitat (Table 6). This will be less than a 2% decrease in nesting habitat over the existing conditions. Harvest of 308 acres of lowland habitat would reduce boreal owl foraging habitat. This will be less than a 3% decrease in nesting habitat over the existing conditions. Mitigation measures should help offset this loss of habitat. The harvested nesting habitat should continue to provide some level of nesting opportunities for boreal owls since large trees will be left that could provide cavities.

Alternative 2
Habitat will not be affected. Stands will continue to grow into potential nesting and foraging habitat. This alternative will maintain 11,283 acres of lowland foraging habitat in patches greater than 10 acres and will increase upland nest habitat adjacent to suitable foraging habitat by 1,014 acres (Table 6).

Alternative 3
Harvest of 977 acres of potential nest habitat would reduce boreal owl nesting habitat (Table 6). However, there will be more nesting habitat in 2014 compared to the existing conditions in 2006. Harvest of 266 acres of lowland habitat would reduce boreal owl foraging habitat. This will be less than a 3% decrease in nesting habitat over the existing conditions. Mitigation measures should help offset this loss of habitat. The harvested nesting habitat should continue to provide some level of nesting opportunities for boreal owls since large trees will be left that could provide cavities.

Table 6. Acres of Boreal Owl Foraging and Nesting Habitat in the Project Area for all Alternatives.

Habitat Type	Current 2006	Alt. 1 (2014)		Alt. 2 (2014) No Action		Alt.3 (2014)	
		Acres	%	Acres	%	Acres	%
Foraging/Nesting – Lowland*	11,283	10,975	97%	11,283	100%	11,017	98%
Nesting – Uplands**	7,507	7,385	98%	8,521	113%	7,544	100%

* Black spruce and mixed swamp conifer stands ≥50 years old with a site index >25 and size density > 4 greater than 10 acres in size.
** Uplands with aspen component greater than 70 years old with a site index ≥ 50 adjacent to foraging lowlands greater than 10 acres in size.

Cumulative Effects

To provide a summary of the analysis in the PEA, at the cumulative effects analysis scale in both the mesic birch aspen (MBA) and jack pine black spruce (JPB) Landscape Ecosystems mature aspen-birch forest (MIH 4) is expected to decrease but the amount of Old increases. On federal lands within these LEs there is anticipated to be a reduction in mature upland patches (less than 300 acres) and a reduction in interior forest but an increase in mature lowland patches greater than 300 acres. Harvest by other landowners in the project area (Appendix A) has the potential to further reduce boreal owl nesting, and to a lesser extent, foraging habitat. Most of the other owners will follow the MFRC guidelines which will help retain possible nesting trees in their harvest units. Private land will continue to be bought and sold which could reduce boreal owl habitat. However, this is a small portion of the project area.

2005 Forest-wide monitoring (Annual Monitoring Report 2006) showed a slight decrease in mature upland deciduous and a slight increase in upland mature conifer habitat which are both still above FEIS projected condition. It also showed a slight decrease in mature lowland conifer which is slightly below FEIS projected conditions.

This analysis is consistent with the cumulative effects expected in the Programmatic BE for the forest plan where habitat conditions are not anticipated to improve with implementation of the plan. Due to the small amount of boreal owl habitat impacted by this, compare to the amounts available forest wide, implementation of Forest Plan Standards and Guidelines together with MFRC best management practices, including maintenance of leave trees and reserve islands in harvest areas should prevent a negative trend in viability.

Determination

The proposed resource management activities planned in the project area for Alternative 1 and 3 may impact individuals but are not likely to cause a trend to federal listing or loss of viability. Alternative 1 will reduce nesting habitat less than 2% compared to existing and Alternative 3 will show an increase over existing in the Project Area. The majority of this reduction comes from harvesting older aspen greater than 70 years of age. Some harvest of this old aspen is needed to regenerate aspen for future nest habitat. Harvest units should continue to provide some nest habitat through legacy patches and reserve trees/islands left along the wetland/upland interface. This should help offset the loss of nesting habitat. Reduction of fragmentation and the increase of the conifer component in the Project Area should help provide better boreal owl habitat in the long-term. This determination is consistent with the determination in the Forest Plan Programmatic BE. Alternative 2 will have no effect on boreal owls. Mature habitat will continue to increase.

All Alternatives are consistent with Forest Plan O-WL-18, G-WL-11, G-WL-12, O-WL-20 and S-WL-5. Boreal owl specific Standards and Guidelines S-WL-6 and G-WL-13 do not apply since they pertain to known nest sites. If any nests are discovered they will then be implemented.

Mitigations

- If a boreal owl nest site is discovered, immediately contact the District Wildlife Biologist.
- If any nesting pairs are discovered, avoid all activity that may disturb known nesting pairs during the nesting season (March 1 – June 1).
- In potential boreal owl nesting habitat, consolidate reserve areas and leave trees along wetland boundary to maintain potential nesting trees. Leave large aspen capable of producing cavities.
- Continue surveys adjacent to a subset of harvest units in 2007 to locate potential breeding owls.

Olive-sided flycatcher:

Existing Condition

Population and trend: MacLean (1999) summarizes that olive-sided flycatcher (*Contopus cooperi)* has a large breeding range that includes the wooded areas of Canada, Alaska, and the western and northeastern U.S. While secure in some places, a large and significant decline has occurred in many areas. Breeding Bird Survey data for North America shows the species declined 4%/year between 1966 and 1998, 5%/year between 1986 and 1998, and more than 1.5%/year in northern Minnesota between 1966 and 1996 (Sauer et al. 1999). A few individuals are detected each year on songbird monitoring plots in the Superior National Forest but numbers are not large enough to estimate population trends (University of Minnesota Natural Resources Research Institute web site). One to four olive-sided flycatchers have been recorded on the Jordan BBS route every year, except 1998, since 1993. No olive-sided flycatchers were recorded during the project bird surveys in 2005.

NRRI's Breeding Bird Monitoring effort surveys 169 stands on the Superior. It has been detected in 37 stands on the SNF. However, detections are rare and irregular with only one detection in 20 of the stands during the period of 1991 thru 2005. A detection of a nesting olive-sided flycatcher was reported on the Gunflint Ranger District in 2005 (Annual Monitoring Report 2006).

Habitat needs and limiting factors: Olive-sided flycatchers nest most frequently in larger black spruce-tamarack bogs or in large openings with residuals (USDA Forest Service 2000c). MacLean (1999) states they use burned or cleared areas with standing trees, primarily conifers. Beaver ponds are important habitat. Timber harvest does not provide habitat if it results in an even aged stand with little variation in canopy height, or few dead standing trees. At least 50 acres of habitat may be needed to support a single territorial pair (Niemi and Hanowski 1992, updated 2001). The primary threat to the species, however, appears to be destruction of wintering habitats in the Andes of South America.

Habitat trend: Unknown, possibly decreasing with fire suppression, salvage logging of fire-killed trees, and clearcuts with few residual trees or little variety in canopy structure.

Analysis Indicators: Analysis Indicators used for the olive-sided flycatcher are the acres and % of young upland conifer (MIH 5), acres and % of mature/old upland riparian forest (MIH 10) and acres of treatments planned in the following forest types: balsam fir-aspen-birch (11), lowland black spruce (12), white spruce-balsam fir (16), and Norway spruce (17). Treatments included clear-cut, partial harvest and non harvest restoration planting. These treatments could enhance or create flycatcher habitat.

Direct/Indirect Effects

Table 7. Indicators of effects to Olive-sided flycatcher.		
Alternative	MIH 5 young Acres and (%) of MIH 1	MIH 10 mature + Acres and (%) of MIH 1
Existing Condition	255 (0.5)	1,440 (2.9)
1	913 (1.9)	1,177 (2.4)
2	56 (0.1)	1,335 (2.7)
3	832 (1.7)	1,188 (2.4)

	Alt 1	Alt 2	Alt 3
Acres of treatment in FT 11, 12, 16 and 17	1,546	0	1,428

Roads (temporary, system, special use) should have a minimal impact on olive-sided flycatchers as long as they don't directly impact nesting and foraging habitat. Many of the proposed roads use already existing road corridors which are not flycatcher habitat. New construction will be located to avoid disturbance to as much wetland habitat as feasible. Gravel pits would have a minimal impact since they are already existing and not located in quality habitat. Prescribed burning could have a positive impact on flycatchers due to the possible creation of snags.

Alternative 1 and 3
Existing flycatcher habitat should not be affected by any proposed management activities since low-density conifer lowlands would not be harvested and riverine/riparian areas would be maintained or enhanced through proper riparian management found in the State Best Management Practices (BMP's) and Forest Plan Standards and Guidelines. Also, residual trees would be left during harvest activities.

The project could enhance potential flycatcher habitat in upland forests that are harvested leaving residual trees and more varied forest structure. Residual trees will be left in all harvest units with forest structure most varied in two-aged and birch shelterwood management. Alternative 1 harvests more area to create temporary openings with residual trees than does Alternatives 3. Given the rarity of the species, all Alternatives create more than adequate temporary habitat for the species in the project area.

Forest Plan O-WL-25 involves maintaining, protecting or improving quality nesting and foraging habitat in mainly riparian or riverine areas. These alternatives will maintain all existing habitat and will improve some borderline habitat through harvest, underplanting of riparian areas and retention of leave trees and snags.

Alternative 2

Direct effects would not occur because no planned activities would occur in suitable habitat. Through succession young conifer forest (MIH 5) and mature riparian forest (MIH 10) are reduced slightly from existing condition in the 10 year analysis window (Table 7). However, existing habitat will be maintained and it is fairly well distributed.

Cumulative Effects
Based on Forest-wide projected habitat trends on federal lands (2006 Annual Monitoring Report) in the project Landscape Ecosystems the amount of young upland conifer (MIH 5) increases providing much more potential habitat as long as timber harvests that create this habitat include residual standing conifer

trees that provide needed habitat structure. Forest-wide objectives, standards and guidelines will move more upland riparian forest (MIH 10) to a mature condition.

This project, combined with other similar timber sales on the Superior National Forest as well as other ownerships could enhance habitat for this species if abundant conifer residuals are left, especially in large openings. MFRC Management Guidelines should be followed by the State, County and Potlatch and most of the other private landowners in the Project Area during their harvest activities (Appendix A). These guidelines recommend maintaining an adequate amount of residual trees during harvest operations. It is recognized that historically, fire disturbance in upland conifer would have created abundant forage habitat that timber harvest may not be able to replicate at the cumulative effects scale. This result is lower habitat and amount than would occur under natural conditions. This analysis is consistent with the cumulative effects analysis conducted for the Programmatic BE for the forest plan.

Determination

The proposed resource management activities planned in the project area may have a beneficial impact to olive-sided flycatchers under Alternative 1 and 3. Lowland and riparian flycatcher habitat should not be affected by management activities and all other harvest activities should retain an adequate amount of residual trees, especially two-aged and birch shelterwood types, to increase temporary flycatcher habitat over existing. This determination is consistent with the determination in the Forest Plan Programmatic BE. Alternative 2 will have no impact since existing flycatcher habitat will not be treated.

All Alternatives are consistent with the Forest Plan O-WL-18, G-WL-11, G-WL-12 S-WL-5, and O-WL-25.

Mitigations

- See leave tree mitigations in Whyte PEA.

<u>Black-throated blue warbler:</u>

Existing Condition

No individuals have been detected on the Jordan BBS route. No individuals were detected during the project area bird surveys. NRRI's Breeding Bird Monitoring effort has detected black throated blue warblers in 50 of 169 stands but they have been rather rare (SNF Annual Monitoring Report 2006). This species uses large contiguous northern hardwood forests and is probably associated with small gaps and a well-developed understory (especially Canada yew). Black-throated blue warblers are found only in relatively large blocks of contiguous mature forest (Robbins et al. 1989). It nests in small trees, saplings, or shrubs in dense undergrowth, within about a meter of the ground (Holmes et al. 1986, NatureServe 2003).

Risk factors include timber harvest (including thinning and partial harvest), forest fragmentation, reduction of mature forest patch size, and cultured forests that remove structure. The salvage of patchy blow-down can negatively impact the species, although patch harvest for stand management may improve conditions.

The black-throated blue warbler is area sensitive, requiring large, relatively intact areas of continuous canopy forest. Research from the eastern parts if its range (Robbins et. al, 1989) suggests that areas at least 2,500 acres in size and greater than 70% closed canopy are needed to support populations. Fragmented habitats create conditions for American redstarts (*Setophaga ruticilla*) and chestnut-sided warblers (*Dendroica pensylvanica*) that compete with and exclude black-throated blue warblers from an

area. Small amounts of fragmentation in otherwise interior forest result in moderate populations of American redstarts and chestnut-sided warblers. In such cases, the likelihood of these species invading adjacent interior patches after a disturbance event is relatively low. As fragmentation of interior forest increases and interior patches become smaller and more isolated, populations of American redstarts and chestnut-sided warblers become much higher and denser in the fragmented landscape. In these situations, the likelihood of these species invading interior patches after even a slight amount of disturbance is much greater. Secure populations of black-throated blue warblers require large areas of interior forest with little or no fragmentation in the form of canopy openings.

Analysis Indicators: For this analysis I measure acres and % of mature upland forest (MIH 1), and number of mature upland patches greater the 300 ac to represent suitable nesting habitat. I also measure the acres of partial harvest (includes thinning, group selection and variable gap dynamics) planned in upland forest (MIH 1) and acres of interior habitat to assess potential declines in habitat suitability and potential for increase in competition from American Redstarts and chestnut-sided warblers.

Direct/Indirect Effects

Table 8. Indicators of effects to Black-throated blue warbler.

Alternative	MIH 1 mature+	Number of 300+ ac mature patches	Acres of interior forest
	Acres and (%) of MIH 1		
Existing Condition	29,910 (61.0)	18	6,554
1	26,027 (53.1)	18	5,969
2	30,882 (62.9)	18	6,850
3	26,645 (54.3)	18	6,114

	Alt 1	Alt 2	Alt 3
Acres of partial harvest in MIH 1	3,928	0	3,208

Roads (temporary, system, special use) should have a minimal impact on black-throated blue warblers as long as they don't directly impact nesting and foraging habitat. Many of the proposed roads use already existing road corridors which are not warbler habitat. Gravel pits would have a minimal impact since they are already existing and not located in quality habitat. Prescribed burning could have a short-term negative impact by removing the understory vegetation. Long-term it could lead to a more diverse multi-layered stand creating better habitat quality.

Alternative 1 and 3

Direct effects could occur with all action alternatives in the form of disturbance from timber harvest and road construction during the nesting season. The risk of these potential impacts in generally expected to be low and within acceptable risk levels. Forest plan standards and guidelines would be implemented to protect (with a seasonal restriction) known sites if black throated blue warblers are found. Table 8 provides the results of analysis indicators. All action alternatives would result in less mature upland forest habitat (7 to 8% reduction) and all would result in an increase in some within stand fragmentation from implementing 3,208 to 3,928 acres of partial harvest. This could have negative indirect effects to the black-throated blue warbler, but in combination with maintaining all large patches and decreasing interior forest less than 10%, these effects are expected to be minimal because project area wide habitat would continue to be well distributed. Although outside the analysis time frame, longer-term alternatives

1 and 3 may begin to provide the most beneficial effect as partial harvest treatment begin to result in multi-layering and increase in within stand complexity.

Alternative 2
No direct effects are expected. Indirectly, changes in habitat suitability would occur. Through succession some mature aspen-birch forest habitat (MIH 4) would succeed to spruce fir forest. The numbers of large mature patches increase also as a result of succession. As stands continue to mature the amount of interior habitat available in the project area would increase from existing condition. No management induced gaps would be created in mature upland aspen-birch forest. Existing roads would continue to fragment some potential habitat. In general, this alternative would result in a small beneficial increase in habitat for the black-throated blue warbler.

Cumulative Effects

It would be difficult for and unlikely that other ownerships, or combinations of ownerships, would provide very much suitable interior habitat for this species. Providing habitat for the black-throated blue warbler in the Project Area is going to rely heavily on national forest management in cooperation with state and county land managers with intermingled land parcels. Habitat availability outside of the national forest boundaries would probably be scarce. The cumulative effects for this species are likely to be worse than those projected for the National Forests (Appendix A). The Annual Monitoring Report (2006) showed a slight Forest-wide increase in mature upland forest. This may provide more habitat for this species. This analysis is consistent with the cumulative effects analysis conducted in the programmatic BE for the forest plan.

Determination
The proposed resource management activities planned in the project area may impact individuals but are not likely to cause a trend to federal listing or loss of viability for alternatives 1 and 3. All alternatives will maintain well distributed habitat and maintain large mature patches and most interior forest habitat. This determination is consistent with the determination in the Forest Plan Programmatic BE. Alternative 2 will have no effect on the black throated blue warbler. All Alternatives are consistent with O-WL-18, G-WL-11, G-WL-12 and S-WL-5.

Mitigations
- Implement seasonal restrictions to protect known black throated blue warblers if know to occur within a stand.

<u>Bay-breasted warbler:</u>

Existing Condition

Population and trend: Maxson (1999) summarizes that bay-breasted warbler (*Dendroica castanea*) breed throughout the spruce-fir forest of Canada and the northernmost parts of the U.S. following the range of spruce budworm (*Choristoneura fumiferana*). The project area is at the very edge of the range in Minnesota (Janssen 1987), although vegetation data from the time of European settlement shows most of it as spruce-fir forest. Populations are decreasing rangewide (4.5%/year in North America between 1986 and 1998, Sauer et al. 1999) but trends in northeastern Minnesota are unknown. Loss of habitat, change in vegetation composition, management to control spruce-budworm, fire suppression, and deforestation in wintering habitat all contribute to the population decline.

No bay-breasted warblers have been observed in the project area during the Jordan BBS routes or the project area bird surveys. NRRI's Breeding Bird Monitoring effort has detected black throated blue warblers in 21 of 169 stands but they have been rather rare (SNF Annual Monitoring Report 2006).

Habitat needs and limiting factors: Maxson (1999) summarizes that bay-breasted warbler breeds primarily in old spruce-fir forests, sometimes pine, and also in spruce bogs and coniferous riparian areas. They breed in forests where the conifers are dominant or co-dominant trees. We do not have information about their use of black spruce lowlands in Minnesota. They need patches of spruce budworm outbreak over a large area. Birds often move to such an area in large groups. It is possible that maintenance of a viable and well-distributed population may require patches of relatively unfragmented old spruce-fir forest of more than 3,000 acres capable of hosting a large enough spruce budworm outbreak. Robbins (1989) suggested that some warblers may require extensive areas of interior forest habitat but research has not been done to find out to determine its applicability to bay-breasted warbler in northeastern Minnesota.

Habitat trend: Decreasing (Maxson 1999). Green (1995) states that conifer dominated stands have decreased and been replaced by aspen over the past 100 years, indicating that less habitat is available at present compared to 100 years ago. Today the landscape has more habitat fragmentation due to limits on size of timber harvests, and previous Forest Plan emphasis on management for edge species such as deer, and mixed ownership. USDA Forest Service data show that spruce budworm defoliation in the eastern United States dropped substantially in 1986 from 5-8 million acres per year prior to that to less than 1 million acres per year after 1985. In Minnesota, there were about 70,000 of spruce-budworm defoliation in 1999 compared to a million acres in 1958.

Analysis Indicators: Indicator used is the acres and % of mature spruce fir forest (MIH 6) because it represents main habitat requirements of the bay-breasted warbler that would be affected by this project.

Direct/Indirect Effects

Effects to Bay-breasted warblers will be analyzed by comparing the amounts of mature spruce-fir forest and any increases in spruce-fir forest between alternatives. The project area has 13,053 acres (27% of federal upland) typed balsam fir or white spruce. Some of these balsam fir stands will be clearcut under all action alternatives and made unsuitable for bay-breasted warblers. White spruce stands will be thinned and will remain suitable habitat.

Table 9. Indicators of effects to Bay-breasted warbler.

Alternative	MIH 6 mature+ Acres and (%) of MIH 1
Existing Condition	7,703 (15.7)
1	8,093 (16.5)
2	8,344 (17.0)
3	8,093 (16.5)

Roads (temporary, system, special use) should have a minimal impact on bay-breasted warblers as long as they don't directly impact nesting and foraging habitat. Many of the proposed roads use already existing road corridors which are not bay-breasted habitat. Gravel pits would have a minimal impact since they are already existing and not located in quality habitat. Prescribed burning may have a negative impact on bay-breasted warblers due to the killing of balsam fir within the pine stands.

Alternative 1 and 3

There will be a 390 acre increase in mature/old spruce-fir in 2014 compared to 2006 conditions. This is due to a large amount of stands in the 40 year old age class that will grow into mature habitat in the next ten years. This project also avoided most fir stands for clearcut harvest for this and other species. There will be a 251 acre reduction in mature spruce-fir forest compared to the no action alternative from timber harvest. There will be an increase of 510 acres (18%) of conifer forest (white pine dominated) through planting that will be future bay-breasted warbler habitat.

Alternative 2

There will be no change to current conditions. Long-term older aspen dominated stands will slowly succeed to spruce-fir habitat.

Cumulative Effects

This project, combined with other similar timber sales on the Superior National Forest as well as other ownerships (Appendix A), will continue to maintain more aspen than existed prior to European settlement in the project area. This translates to less habitat than would have been available for bay-breasted warbler 100 years ago.

Spruce-fir forest is currently below Forest Plan objectives in the NSU and all LE's in the Project Area (USFS 2003f). The Minnesota Forest Resources Council Landscape Committee set a goal to increase spruce-fir forest in Minnesota. These spruce-fir goals will also be used as a guideline, to varying extents, by other land management agencies in the Project Area. Therefore, amounts of spruce-fir forest should continue to be maintained or move closer to objectives in the NSU and LE's through conversion to spruce-fir or through natural succession. The Annual Monitoring Report (2006) showed a slight increase Forest-wide in both mature spruce-fir and mature lowland conifer forest which may benefit this species.

Determination

The proposed resource management activities planned in the project area may impact individuals but are not likely to cause a trend to federal listing or loss of viability in alternative 1 and 3. There is an increase of bay-breasted warbler habitat under all alternatives due to the large amount of 40 year old spruce-fir habitat in the project area growing into the mature age class. Retention of all mature patches of forest greater than 300 acres and other spruce-fir forest deferred from harvest for other reasons should provide an adequate amount of habitat to provide for the viability of this species in the Project Area. This determination is consistent with the determination in the Forest Plan Programmatic BE. Alternative 2 will have no effect to the bay breasted warbler. All Alternatives are consistent with forest plan O-WL-18, G-WL-11, G-WL-12 and S-WL-5.

Mitigations

None identified.

<u>Connecticut warbler:</u>

Existing Condition

Population and trend: Rieck (1999) summarizes that the Connecticut warbler (*Oporornis agilis)* breeds from British Columbia to Quebec including the northern Lakes States. The bird is very secretive and difficult to detect. Breeding bird survey data show a 5%/year population decline between 1986 and 1988

in North America (Sauer et al. 1999). NRRI songbird monitoring (Lind et al. 2001) over the past ten years in Minnesota and Chequamegon National Forests shows a significant decline ($p \leq 0.01$). The mean smoothed count per stand dropped from 1.5 to 0.1 on the Chippewa National Forest. One to 6 Connecticut warblers have been recorded on the Jordan BBS route every year, except 1997 and 2005, since 1993. No Connecticut warblers were recorded during the project bird surveys in 2005. NRRI's Breeding Bird Monitoring effort surveys 169 stands on the Superior. It has been detected in 41 stands on the SNF during the period of 1991 thru 2005 (Annual Monitoring Report 2006).

Habitat needs and limiting factors: USDA Forest Service (2000c) notes state that Connecticut warbler breeds in short-needle conifer with low ericaceous shrubs (3 feet or less). They may also be in jack pine with a dense blueberry understory. They forage on the ground and in low shrubs. Boreal bogs that are 100 acres of larger are typical habitat in northeastern Minnesota. Territories of a breeding pair are about 1.2 acres. Trees should be at least 15-30 feet tall. Typical habitat consists of wet areas with black spruce, tamarack, mosses, alder, dogwood, Labrador tea, bog rosemary, bog laurel, and leather leaf (Rieck 1999).

Habitat trend: Rieck (1999) and USDA Forest Service (2000c) state that wintering habitat in northern South America is declining and breeding habitat may also be in decline rangewide.

Analysis Indicator: Indicators used for this analysis are acres and % of mature jack pine forest (MIH 8) and mature lowland black spruce forest (MIH 9). These were chosen for analysis because they represent the most common nesting and cover habitat for Connecticut warblers. This analysis recognizes the limitation that not all mature jack pine provides suitable habitat.

Direct/Indirect Effects

There would be minimal impacts to boreal bogs under all alternatives. The primary impact to Connecticut warblers would presumably be from logging nesting habitat during the breeding season (May 15 to August 1). Roads (temporary, system, special use) should have a minimal impact on Connecticut warblers as long as they don't directly impact nesting and foraging habitat. Many of the proposed roads use already existing road corridors which are not bay-breasted habitat and wetlands will be avoided whenever possible. Gravel pits would have a minimal impact since they are already existing and not located in quality habitat. Prescribed burning may have a positive impact on Connecticut warblers if the burning stimulates growth of the understory within the pine stands.

Table 10. Connecticut Warbler habitat in the Project Area.

Alternative	Acres	
	MIH 8 mature+ Acres and (%) of MIH 1	MIH 9 mature+ Acres and (%) of MIH 9
Existing	194 (0.4)	21,741 (94.2)
1	186 (0.4)	21,781 (94.3)
2	194 (0.4)	22,340 (96.7)
3	186 (0.4)	21,850 (94.6)

Alternative 1 and 3

Indirect effects could occur with all action alternatives with changes to suitable habitat (Table 10). Both action Alternatives would have similar results. Both mature jack pine forest and mature lowland black spruce-tamarack habitat Indicators would be less than predicted with the no action alternative. However, mature + lowland black spruce habitat would be found in slightly higher amounts than is found today due to mature stands growing into this older age class. Amounts vary by alternative by not by a large degree. This increase in habitat should be beneficial to the species.

Alternative 2
Indirect effects could occur in the form of changes to suitable habitat (Table 10). During the analysis timeframe (10 years) more jack pine and lowland black spruce-tamarack forest will grow into a mature age class potentially providing more suitable habitat for these species. This increase in habitat should be favorable to the species.

Cumulative Effects
This project, combined with other similar timber sales on the Superior National Forest (Appendix A) as well as other ownerships could impact habitat for this species by altering understory vegetation or by directly impacting nest sites during the breeding season. The cumulative impact of the project would be minimal since the primary habitat for the species (large boreal bogs) should not be impacted by the USFS or other ownerships in the Project Area except for limited timber harvest. Forest-wide monitoring showed a slight increase in mature lowland conifer (Annual Monitoring Report 2006).

Determination
The proposed resource management activities planned in the project area may impact individuals but are not likely to cause a trend to federal listing or loss of viability under alternatives 1 and 3. There is very limited harvest in large boreal bogs and very small amounts of jack pine in the project area. This determination is consistent with the determination in the Forest Plan Programmatic BE. Alternative 2 will have no effect. All Alternatives are consistent with the forest plan O-WL-18, G-WL-11, G-WL-12 and S-WL-5.

Mitigations
None identified.

Three-toed woodpecker:

Existing Condition
Habitat for this species is conifers killed by fire, beetles, partial blowdown, or flooding. The bird keys in on beetles that feed on dead trees 1-5 years after trees are killed. This species can be nomadic and shift over large portions of the landscape depending on habitat conditions. Promotion of conifer and retaining residual trees (preferably long-lived, windfirm conifers) in large openings may maintain or enhance habitat conditions for three-toed woodpeckers.

Drey (1999) summarizes that three-toed woodpecker (*Picoides tridactylus*) breed throughout coniferous forests in Canada and the western U.S., and in northern Minnesota and Wisconsin. Population trends are unknown.

Habitat needs and limiting factors: Three-toed woodpecker is a species of boreal and montane coniferous forests. It usually inhabits mature or old-growth coniferous stands with abundant insect-infected dead and dying trees (Leonard 2001). Even in predominately living forests, Three-toed woodpeckers forage mainly on dead and dying timber. In Region 9 they seem to nest mainly in spruce and balsam snags and mature trees. This dependence on insect-infected dead and dying timber frequently results in populations showing an association with forest disturbances such as fire, wind throw, floods, insect outbreaks and disease. In particular, Three-toed woodpecker populations often show an increased abundance in early post-fire successional seres (Burdette and Niemi 2002a). According to Green and Niemi (1980), black spruce/tamarack stands are the vegetation community most likely to contain Three-toed woodpeckers in Minnesota.

Studies have also found that they are more likely to occur in larger areas of virgin forest vs. smaller patches (Burdette and Niemi 2002a) suggesting forest fragmentation may harm Three-toed woodpeckers. In summary, Three-toed woodpeckers generally inhabit larger patches of recently burned or decadent old growth coniferous (primarily spruce) stands (Burdette and Niemi 2002a).

Threats facing this species include habitat loss, fire suppression, salvage logging, conifer conversion to aspen, beaver control and poor snag retention policies. Quality habitat on the Superior has been greatly reduced due to the above factors. No Three-toed woodpeckers have been recorded on the BBS survey route in the area.

NRRI's Breeding Bird Monitoring effort surveys 169 stands on the Superior. It has not detected three-toed woodpeckers on the SNF; however timing and location of survey routes are such that this species is not adequately surveyed (Annual Monitoring Report 2006).

Habitat trend: Drey (1999) reports that habitat is decreasing rangewide. Fire suppression, salvage logging, clearcutting without abundant conifer reserve trees, maintenance of aspen, beaver and spruce budworm control, and habitat fragmentation threaten habitat. Forest management that removes conifers that have the potential to have high populations of insects, especially wood-boring beetles, is detrimental to the three-toed woodpecker (Niemi and Hanowski 1992).

Analysis Indicator: Indicators used for this analysis are acres of lowland black spruce harvested, conversion to conifer and edge density of young upland forest. These were chosen for analysis because they represent the most common nesting and cover habitat for Three-toed woodpeckers.

Direct/Indirect Effects

Road system management and gravel pit use and expansion will have minimal effects on this species except where dead trees are removed. The removal of foraging trees is anticipated to be relatively low with these activities. Prescribed burning may be beneficial to this species if it leads to some mortality of overstory trees.

Table 11. Management activities affecting Three-toed woodpeckers in the Project Area.

	Alt. 1	Alt. 2	Alt. 3
Acres of lowland black spruce harvested	560	0	491
Conversion to conifer	686	0	555
Edge density (miles/square mile) of young upland forest (0-19 years)	20.6	23.3	20.5

Alternative 1 and 3

There is a very limited amount of lowland black spruce harvest (<3% by type) under both action alternatives (Table 11). Harvest was designed to reduce fragmentation by harvesting adjacent to existing clearcuts. There will also be black spruce leave trees left in these harvest areas which will provide temporary habitat for Three-toed woodpeckers. All Alternatives also increase potential future habitat for three-toed woodpeckers by planting a combination of white pine and white spruce with Alternative 1 planting the most.

All current mature upland patches over 300 acres will be retained under all action alternatives. These large blocks could provide habitat for three-toed woodpeckers. Long-term, fragmentation will also be reduced under all action alternatives as shown by the reduction of edge density of young forest patches.

Mitigation measures included for all alternatives should provide good foraging habitat for three-toed woodpeckers. Six to ten jack pine trees per acre will be left in even-aged jack pine clearcuts and upland black spruce/jack pine clearcuts. Trees will be left evenly spaced or clumped depending on site conditions.

The species is probably not common in the project area at the present time. Timber harvest during the breeding season could result in reduced reproduction that year and loss of individuals, although it would be a very small chance given species rarity and the absence of large areas of standing conifers killed recently by fire or flood.

Alternative 2

There would be a minimal impact to Three-toed woodpecker habitat. Additional habitat could be provided by occasional insect infestation, beaver flooding and small wildfires.

Cumulative Effects

Historically, natural fire regimes in mature conifer and large amounts of old growth forest would have created abundant foraging habitat for Three-toed woodpeckers in the Northern Superior Uplands prior to European settlement. Clearing of the forests and fire suppression after settlement would have started to reduce habitat for this species.

Habitat is decreasing rangewide. Fire suppression, salvage logging, clearcutting without abundant conifer reserve trees, maintenance of aspen, beaver and spruce budworm control, and habitat fragmentation threaten habitat. Forest management that removes conifers that have the potential to have high populations of insects, especially wood-boring beetles, is detrimental to the Three-toed woodpecker. The Annual Monitoring Report (2006) shows a slight increase in mature lowland conifer forest which could benefit this species.

Other ownerships (especially the State) have started converting some aspen stands to conifer stands which should help increase habitat (Appendix A). The July 4th-windstorm created large areas of habitat for this species in other parts of the Superior National Forest. Beaver control measures would probably be similar between all alternatives and would be mainly driven by fur prices, with higher trapping when fur prices are higher. During low fur prices, beaver populations may increase and thereby increase ephemeral Three-toed woodpecker habitat (flood-killed trees).

Determination

The proposed resource management activities planned in the project area may impact individuals but are not likely to cause a trend to federal listing or loss of viability under alternatives 1 and 3. There is limited harvest in lowland black spruce habitat, large mature patches will be protected and mitigation measures will provide habitat in harvest units. This determination is consistent with the determination in the Forest Plan Programmatic BE. Alternative 2 will have no effect. All Alternatives are consistent with the Forest Plan O-WL-18, G-WL-11, G-WL-12 and S-WL-5, O-WL-23, O-WL-24, G-WL-17 and G-WL-18.

Mitigations

- Leave a few clumps of long-lived and wind-firm residual conifer trees in clearcuts, especially in large openings, for potential future habitat (when trees are dying).

- Leave 6 to 10 jack pine per acre in jack pine clearcuts and upland black spruce/jack pine clearcuts when appropriate. Leave trees evenly spaced when possible or in clumps on less windfirm sites.

- Immediately contact Wildlife Biologist if a three-toed woodpecker nest is discovered.

Great gray owl:

Existing Condition

Population and trend: Kozie (1999) summarizes that great gray owl (*Strix nebulosa)* has a holarctic distribution and also breeds in the western United States and in the northern Lakes States. Available evidence does not indicate a decline in the United States. Populations are limited by the availability of pre-existing nest sites and prey. Surveys have been conducted for stick nests and several have been found to-date. None have been found to have great gray owls occupying them. Great gray owls were surveyed in the project area in 2005 and 2006 using both call playback and listening stops. Five survey routes were run and consisted of 70 survey points along roads. These routes were run 2 to 4 times in the spring both years. One great gray owl was detected within the project area and one just outside the boundary. Nest searches were not conducted for these locations because there were not any proposed activities within a mile of the locations.

Habitat needs and limiting factors: Kozie (1999) states that natural foraging habitat for great gray owls include anywhere meadow voles (*Microtus pennsylvanicus*) are abundant and available to great gray owls. Meadow vole abundance is influenced by season (more numerous in late summer and fall), a 3-5 year cycle in Minnesota, and habitat capacity. They prefer moist soils and relatively open areas with high primary production of prey (meadow voles). Kozie (1999) summarizes that great gray owl breed in a variety of vegetation types. Nesting commonly occurs in mature aspen adjacent to muskegs. Minimum nest stand size in studies was 10 acres in Manitoba and 27 acres Alberta. Foraging occurs in open habitat, including bogs, selective and clear-cut logged areas with residual perches, natural meadows, and open forests within 1.5 miles of the nest. Perches need not be tall; they can be high stumps, broken-off trees, and the short black spruce found in peatland bogs. Voles 50 feet or more from a perch or forest edge are not available to great gray owls. Kozie (1999) states that great gray owls avoid jack pine, taller black spruce, dense forest cover, large open treeless areas without perches, and habitats with a dense shrub layer for nesting and foraging sites. They also avoid concentrations of predators such as great horned owls. Average home range size for breeding adults was 1.7 mile^2 in Oregon and a Minnesota study found 8 nests in 20 mile^2.

Kozie (1999) recommends the following forestry practices to maintain or enhance great gray owl habitat: 1) Restriction of harvest unit size to < 25 acres with a mosaic of multi-sized units, 2) retention of forest stands within 900 feet of known or potential nest trees or sites, 3) provision of hunting perches in clearcuts, 4) ensuring irregularly shaped harvest units with maximum distance across the cut < 300 feet, and 5) maintenance of forested travel corridors, 150-300 feet wide, should be left between cut areas for moving and sheltered resting places. In the Pacific Northwest, the USDA Forest Service recommended providing a no-harvest buffer of about 300 feet around meadows and natural openings and establishment of a 1320-foot protection zone (125 acres) around nest trees. Kozie (1999) recommended placing priority on maintaining nesting habitat within 0.5 and 1.5 miles of natural openings rather than clearcuts.

Habitat trend: Suitable habitat has likely decreased from historical levels due to permanent land conversion to other use and unsuitable forest types. Current population and trends are unknown, however it was estimated that approximately 200 great gray owl pairs are found in Minnesota year around (Jaakko Poyry, 1992). The winter of 2004/2005 saw a large influx of great gray owls from Canada probably due to low small mammal numbers in Canada. Most of these birds returned north in the spring.

Analysis Indicator: For this analysis I used acres and % of mature upland forest (MIH 1) to represent nesting habitat. For foraging habitat I considered all lowland conifer forest (MIH 9), and young upland forest (MIH 1). Non-forest (upland and lowland) and lowland hardwood forest also provides foraging habitat but these forest types will not be impacted by management and were not included in this analysis.

Direct/Indirect Effects

Roads (temporary, system, special use) should have a minimal impact on great gray owls. Owls forage readily along roadsides. Many of the proposed roads use already existing road corridors which are not owl nesting habitat and wetlands will be avoided whenever possible. Gravel pits would have a minimal impact since they are already existing and not located in quality habitat. Prescribed burning should not have an impact on great gray owls unless there was a nest present in the stand. All burn units will be surveyed prior to burning to locate any potential nests.

Logging in nesting habitat could impact the great gray owl in all alternatives, by removing suitable nesting structure. Consequently, harvest can also create more temporary foraging habitat in some conifer forest types. Also, maintaining large mature patches of upland forest would help to ensure suitable interior nesting habitat would be available across the landscape. And implementation of Minnesota Forest Resources Council's Voluntary Site-Level Forest Management Guidelines (MFRC 1999b) would help to ensure that snags, reserve trees, and down wood are provided in all harvested stands.

The project area contains natural habitats that may serve as foraging habitat for great gray owl. The project would create additional temporary foraging habitat for great gray owl with clearcut, two-aged and shelterwood harvest.

Table 12. Habitat for Great Gray Owls in the Project Area.

Alternative	Nesting Habitat (MIH1 Mature) Acres and %	Foraging Habitat Acres (MIH9 Mature, MIH1 Young)
Existing	29,910 (61%)	22,983
1	26,027 (53%)	26,534
2 (No Action)	30,882 (63%)	22,396
3	26,645 (54%)	26,054

Alternative 1 and 3

Both action alternatives will provide more foraging than existing conditions and the no action alternative. Both will also have a 6% to 8% decrease in nesting habitat compared to existing. All existing mature patches over 300 acres will be maintained. This should provide good quality nesting habitat now and in the future. These alternatives will follow the great gray owl specific Forest plan objectives and guidelines; O-WL-21, G-WL-14 and G-WL-15. No nests are currently known but if found they will be protected. They also maintain quality habitat adjacent to quality foraging habitat.

Alternative 2

This alternative would have a minimal impact to great gray owl habitat. No new temporary foraging habitat will be created on USFS land and all existing nesting habitat will be retained. Foraging habitat will be reduced over time as existing young clearcuts age. Foraging habitat will have to be provided solely by sedge meadows, shrub wetlands, and sparsely stocked lowland forests after ten years on USFS land.

Cumulative Effects

This project, combined with other similar timber sales on the Superior National Forest as well as other ownerships (Appendix A) could impact habitat for this species, both positively and negatively. Potential nesting habitat will be harvested and additional temporary foraging areas will be created. The overall impact should not be significant as long as sufficient nesting habitats are maintained within 1.5 miles of natural foraging habitats and MFRC leave tree guidelines are followed. Forest-wide habitat monitoring (Annual Monitoring Report 2006) showed a slight increase in mature nesting habitat and a slight decrease in young foraging habitat.

Determination

All alternatives may impact but not likely to cause a trend to federal listing or loss of viability under alternatives 1 and 3. Adequate amount of suitable nesting and foraging habitat appear to be available with all alternatives. Site specific standards and guidelines would help to protect any discovered nest sites from adverse affects of forest management. This determination is consistent with the determination in the Forest Plan Programmatic BE. Alternative 2 would have no effect on the great gray owl. All Alternatives are consistent with the forest plan O-WL-18, G-WL-11, G-WL-12, S-WL-5, O-WL-21, G-WL-14 and G-WL-15.

Mitigations

- Follow MFRC leave trees guidelines
- Immediately contact District Wildlife Biologist if a stick nest and/or great gray owl nest is discovered.
- Protect any known great gray owl nest and avoid disturbance of nesting pairs during the critical nesting season (March 1 – June 1).

<u>Wood turtle:</u>

Existing Condition

Historical population information about the wood turtle is very limited or unavailable. The population was probably larger than it is currently because of less habitat degradation due to recreational activities, road and trail building and illegal collection by humans (USDA FS 2000c).

The wood turtle utilizes well drained moist sand or soil along streams where the substrate is not subject to flooding, free of rocks and thick vegetation. They prefer clear streams with a moderate current. They are also usually found where openings in the streamside canopy allow growth of herbaceous plants.

The wood turtle is currently present just south and west of the Superior National Forest along the St. Louis River and in the south end of the Superior National Forest along the Cloquet River (USDA FS 2000c). Populations are isolated and may travel 3 miles to find nesting sites. The Cloquet and Langley rivers both have a wood turtle population present. However, Dick Beuch surveyed the area extensively and did not feel that the area near and upstream of Highway 2 was good nesting habitat (email 6/20/2005). He also did not find any wood turtles close to Highway

2 in either river. I did find a vehicle-killed pregnant female on Highway 2 (the west edge of the project area). The project area may not provide much nesting habitat but it is probably used by foraging wood turtles.

Direct/Indirect Effects

Riparian disturbances would occur in all action alternatives due to vegetation treatments and road and trail building impacting sandy substrate and herbaceous cover. Standards and guidelines and mitigation would reduce the impacts in riparian areas. Gravel pit management could affect nesting turtles if they are using those pits for nesting. These pits have all been looked at and no wood turtle activity was observed. Prescribed burning activities could impact individuals if they are located within the burn units. It is low odds that a foraging wood turtle would be within the two areas proposed for an underburn even though they are near the Cloquet River. Burn personnel will be made aware of the possibility of their presence and they will be looked for during other activity within the unit.

Alternative 1 and 3

All action alternatives would have some disturbance to riparian areas. Alternative 1 would have higher risk of riparian disturbance because of more vegetation management compared to Alternative 3. However, effects of this kind are expected to be minor to non-existent, as best management practices are applied to riparian zone work and wood turtle are absent or rare. These alternatives are consistent with specific Forest plan direction (O-WL-19) for the wood turtle because no known nesting areas are present. If found they will be protected by a seasonal restriction.

Alternative 2

There would be no ground disturbance occurring under Alternative 2. Therefore, there would be no direct or indirect effects to this species.

Cumulative Effects

Cumulative effects should also be minor if best management practices are followed by other landowners. The Highway 2 Reconstruction project (Appendix A) may directly disturb potential wood turtle habitat where it crosses the Cloquet and Sandy River and other streams in the area. This project will include hardened shoulders adjacent to the Langley and Cloquet Rivers to directly limit potential vehicle/turtle mortality by not providing suitable nesting material. Impacts from other projects in the area should be minimized by following MFRC best management practices.

Determination

All alternatives may impact individuals but are not likely to cause a trend to federal listing or a loss of viability due to mitigation that protects areas surrounding lakes and streams under alternatives 1 and 3. This determination is consistent with the determination in the Forest Plan Programmatic BE. Alternative 2 will have no impact on the wood turtle. All Alternatives are consistent with the forest plan O-WL-18, G-WL-11, G-WL-12, and S-WL-5.

Mitigations

- Follow riparian mitigation found in EA

- Make fire crew aware of the potential of the presence of wood turtles in the underburn units near the Cloquet River and have them look for them during their other duties in the stand.

- If a nesting area is found near a harvest unit, no activity will be allowed from April 1 to July 1.

SENSITIVE SPECIES: AQUATIC WILDLIFE

Three Regional Forester Sensitive Species (RFSS) fish, two RFSS mussels, and one RFSS aquatic insect occur on the Superior National Forest:

SENSITIVE FISH:	Lake Sturgeon (*Acipenser fulvescens)* Shortjaw Cisco (*Coregonus zenithicus)* Northern Brook Lamprey (*Ichthyomyzon fossor)*
SENSITIVE MUSSELS:	Creek Heelsplitter (*Lasmigona compresssa)* Black Sandshell (*Ligumia recta)*
SENSITIVE INSECT:	Quebec Emerald (*Somatochlora brevicincta)*

The known or likely occurrence of a RFSS species or its habitat within the project area was first evaluated to determine the need for analysis. If a species was known or likely to occur within the project area or if the suitable habitat is present in the project area, additional analysis indicators were used to evaluate potential direct, indirect, and cumulative effects. Lake Sturgeon and Shortjaw Cisco are not known to be present or have appropriate habitat so they will not be further analyzed.

<u>Northern brook lamprey:</u>

Existing Condition

The northern brook lamprey is a non-parasitic lamprey that is uncommon with a relatively restricted range. They require moderately warm, low-gradient streams with sections of higher gradient (riffle) reaches suitable for spawning. They are most common in streams of medium size, averaging 19m wide and 0.7m deep; but can occur in smaller (1m to 3m wide) and larger rivers (30m to 100m wide). Spawning occurs in May to June in gravel areas near riffles about 0.3m deep (Becker 1983). Larval forms (ammocoetes) require soft substrate (approx. 80% sand and silt) for burrowing, often among vegetation at depths of 0.2m to 0.6m. Ammocoetes diet consists of diatoms and unicellular algae and growth is rapid; larvae require organically enriched, sandy substrate until metamorphosis. After a 3 to 6 year growth period, metamorphosis occurs and adults spawn about 3-4 months afterwards. As adults they do not feed and are believed to

die a few days after spawning. Northern brook lamprey occur in several watersheds on the Superior National Forest in streams of medium size. Although this species has not been documented within the Whyte Project Area, it has been observed in similar habitats (MN NHR database 2006). Due to its presence in a variety of habitat conditions on the Forest, it is somewhat likely that this species may occur within the project area. Potential habitat in the analysis area includes upper sections of the St. Louis River, Cloquet River, Stony River, and Langley River.

Analysis Indicators: Miles of new temporary road construction and the miles of decommissioned roads by alternative is a useful indicator of potential sediment input into local waterbodies as well as a measure of potential change to watershed, stream, and wetland hydrologic functions. These potential changes can affect populations and habitat of aquatic RFSS if not properly mitigated. The number of new and decommissioned stream crossings associated with alternatives is also a useful indicator for evaluating potential effects to aquatic sensitive species because it is a good index of potential change in sediment input, stream flow, and channel conditions, as well as the potential for fish migration barriers, stream connectivity and/or habitat loss.

Direct/Indirect Effects

Vegetative management activities, new road construction, and stream crossings associated with the Whyte Project alternatives may affect individuals, populations, and/or habitat of northern brook lamprey within the project area by potentially increasing inputs of fine sediment into local streams, increasing or rerouting stream flow, increasing stream temperatures, and disrupting existing and/or future habitat unless properly mitigated. Alternatives 1 and 3 propose various levels of vegetative management with associated new road construction, road decommissioning, and stream crossings.

Alternative 1 and 3 – Action Alternatives

Proposed vegetative management associated with alternatives 1 and 3 would not likely affect individuals, populations, and/or habitat of northern brook lamprey provided that required design criteria and mitigation measures are followed during implementation (Appendix C, Whyte EA). These design criteria have been developed to maintain or restore riparian ecological function within riparian areas. Under these design criteria, no harvest of trees would occur within certain distances of different types of streams except for the purpose of maintaining or restoring riparian ecological function.

Alternatives 1 and 3 each propose constructing new temporary roads as well as decommissioning existing unclassified and newly constructed temporary roads (Table 13). Alternative 1 includes constructing 17 miles of new temporary road and decommissioning 24.2 miles of system and unclassified roads; Alternative 3 includes constructing 15.2 miles of new temporary road and decommissioning 23.6 miles of system and unclassified roads (Table 13). Under both action alternatives, newly constructed temporary roads would be decommissioned after all use is completed, rendering each road unusable by motorized vehicles, remove stream crossings and fill from flood prone and wetland areas, and revegetating exposed soil surfaces.

Table 13. Summary of miles of road and number of crossings decommissioned or temporarily added to the Whyte project.

	Decommissioned Roads		New Temporary Roads	
	Miles of Road	# of Crossings	Miles of Road	# of Crossings
Alt 1	24.2	6	17.0	2
Alt 2(na)	0.0	0	0.0	0
Alt 3	23.6	5	15.2	2

Alternatives 1 and 3 each propose to reduce the total number of stream crossings within the Project Area (Table 13). Removal of these stream crossings would potentially benefit northern brook lamprey and their habitat, if present, by improving fish passage and flood flow capability as well as reducing potential sediment sources at existing stream crossing sites.

Alternatives 1 and 3 each propose to increase the total number of stream crossings associated with new temporary roads (Table 13). Although this addition would temporarily increase the crossing density, they would be offset by those crossings proposed for decommissioning and be removed themselves after the temporary use. New temporary stream crossings may temporarily impact northern brook lamprey and habitat by increasing localized sediment inputs into streams, unnaturally confining and increasing stream flows, reducing sediment transport, decreasing flood flow capacities, and creating potential fish migration barriers unless properly designed and constructed. These potential impacts would continue until roads are decommissioned after use.

Alternative 2 – No Action Alternative

No vegetative treatments, new road construction, or road decommissioning are proposed under alternative 2, therefore there would be no negative impacts to northern brook lamprey or their habitat from these activities. Under the no action alternative, improvement of watershed conditions and reduction in sediment sources would not occur from decommissioning existing system and unclassified roads. Continued use of unclassified roads and stream crossings may continue to contribute sediment into local streams and potentially affect brook lamprey spawning habitat as well as developing eggs and juveniles.

Cumulative Effects

It is likely that historical events have affected individuals and populations of northern brook lamprey within the Whyte Project Area, the Superior National Forest, and on adjacent non-federal lands. It is possible that historical timber harvest, road and trail construction, and poorly designed stream crossings, may have affected lamprey habitat and ammocoete survival by contributing sediment, increasing stream temperatures, and altering stream flow (USDA Forest Service 2004b). Standards and guidelines in the Forest Plan will help to ensure that USFS activities will not contribute to cumulative effects. In addition to Federal standards and guidelines, State, private and local land owners and managers follow established best management practices that should also contribute to eliminating cumulative effects. Provided

that best management practices are implemented by all land owners and managers, there should be no cumulative effects to northern brook lamprey and habitat.

Determination

Provided that all design criteria and mitigation measures required by this BE as well as those included in the EA and Forest Plan are followed during implementation, there is a low risk that the activities associated with the action alternatives would affect northern brook lamprey and habitat. After considering the direct, indirect, and cumulative effects, it has been determined that both action alternatives *may impact individuals or habitat, but will not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species.*

Mitigation and Recommendations

Follow all relevant design criteria and mitigation measures described in Appendix C of the Whyte EA. In addition to required design criteria and mitigation measures, all Forest-wide desired conditions, objectives, standards and guidelines contained in the Superior National Forest Land and Resource Management Plan apply, including those established for: 1) Watershed Health, Riparian Areas, and Soil Resources, 2) Terrestrial and Aquatic Wildlife; and 3) Transportation System (USDA Forest Service 2004b).

<u>Creek Heelsplitter and Black Sandshell Mussel</u>

Existing Condition

Creek Heelsplitter:

The creek heelsplitter mussel is known to occur on the Superior National Forest and within the Whyte Project Area in the Cloquet River and may occur in larger tributaries of the Cloquet River (MN NHR database 2006, SNF Annual Monitoring Report 2005, MNDNR 2002). Due to this species habitat requirements and existing habitat conditions, it is possible that it occurs in additional areas within the project area.

The creek heelsplitter mussel typically occurs in small headwater streams and requires riverine habitat conditions to survive and proliferate (Anderson 2001). It has also been documented at or near river inlets in lakes on the Superior National Forest (MNDNR 2002). Although the creek heelsplitter is capable of self-fertilization, it relies extensively on host fish species for its parasite life stage (glochidia larvae) and dispersal (Anderson 2001). Because of its habitat and host fish requirements, the creek heelsplitter may be affected by vegetative management and road construction activities that could potentially increase sedimentation and stream flow as well as create potential host fish migration barriers at road crossings.

Black Sandshell Mussel:

The black sandshell mussel is known to occur on the Superior National Forest but not within the Whyte Project Area (MN NHR database 2006, SNF Annual Monitoring Report 2005). It is possible that existing habitat conditions within the Whyte Project area may support individuals or populations of this RFSS.

The black sandshell mussel is primarily a riverine species that requires deep run or glide habitat in wide rivers with moderate current (USDA FS 2004a). Although the Superior National Forest is near the edge of this species range, it has been documented in several locations in the St. Louis River system (MN NHR 2006 database, MNDNR 2002). The nearest occurrence of this species is in the St. Louis River, immediately downstream of the Whyte Project Area (MNDNR 2002). The black sandshell mussel also relies on host fish species for its parasitic stage and dispersal. Because of its habitat and host fish requirements, the black sandshell mussel may be affected by vegetative management and road construction activities associated with the Whyte Project that could potentially increase sedimentation and stream flow as well as create potential host fish migration barriers at stream crossings.

Analysis Indicators: Miles of new temporary road construction and the miles of decommissioned roads by alternative is a useful indicator of potential sediment input into local waterbodies as well as a measure of potential change to watershed, stream, and wetland hydrologic functions. These potential changes can affect populations and habitat of aquatic RFSS if not properly mitigated. The number of new and decommissioned stream crossings associated with alternatives is also a useful indicator for evaluating potential effects to aquatic sensitive species because it is a good index of potential change in sediment input, stream flow, and channel conditions, as well as the potential for fish migration barriers, stream connectivity and/or habitat loss.

Direct/Indirect Effects

Vegetative management activities, new road construction, and stream crossings may affect individuals, populations, and/or habitat of creek heelsplitter and black sandshell mussels within the Whyte Project Area by potentially increasing inputs of fine sediment into local streams, increasing or rerouting stream flow, increasing stream temperatures, and disrupting existing and/or future habitat unless properly mitigated. Activities at or near road stream crossings may also affect distribution of mussels and movement of their host fish species. Alternatives 1 and 3 propose various levels of vegetative management with associated new road construction, road decommissioning, and stream crossings.

Alternatives 1 and 3

Proposed vegetative management associated with alternatives 1 and 3 would not likely affect individuals, populations, and/or habitat of creek heelsplitter and black sandshell mussels provided that required design criteria and mitigation measures are followed during project implementation (Appendix C, Whyte EA). These design criteria have been developed to maintain or restore riparian ecological function within near-bank and remainder zone areas.

Under these design criteria, no harvest of trees would occur within certain distances of different types of streams except for the purpose of maintaining or restoring riparian ecological function.

Alternatives 1 and 3 each propose constructing new temporary roads as well as decommissioning existing unclassified roads (Table 13). Alternative 1 includes constructing 17 miles of new temporary road and decommissioning 24 miles of system and unclassified roads; Alternative 3 includes constructing 15 miles of new temporary road and decommissioning 24 miles of system and unclassified roads (Table 13). Under both action alternatives, newly constructed temporary roads would be decommissioned after all use is completed, rendering each road unusable by motorized vehicles, remove stream crossings and fill from flood prone and wetland areas, and revegetating exposed soil surfaces.

Alternatives 1 and 3 each propose to decommission several stream crossings within the Project Area (Table 13). Removal of these stream crossings would potentially benefit creek heelsplitter and black sandshell mussels and their habitat, if present, by improving fish passage and flood flow capability as well as reducing potential sediment sources at existing stream crossing sites.

Alternatives 1 and 3 each propose to increase the total number of stream crossings associated with new temporary roads (Table 13). New temporary stream crossings may temporarily impact creek heelsplitter and black sandshell mussels and habitat by increasing point source sediment inputs into local streams, unnaturally confining and increasing stream flows, reducing sediment transport, decreasing flood flow capacities, and creating potential fish migration barriers unless properly designed and constructed. These potential impacts would continue until roads are decommissioned after use. Although this addition would temporarily increase the crossing density, they would be offset by those crossings proposed for decommissioning and be removed themselves after the temporary use.

Alternative 2- No Action Alternative

No vegetative treatments would occur under alternative 1, therefore there would be no potential impacts to creek heelsplitter or black sandshell mussels from these activities. Continued use of unclassified roads and stream crossings continue to contribute sediment into local streams and potentially threaten RFSS mussels and habitat. Under the no action alternative, improvement of watershed conditions and reduction in sediment sources would also not occur from decommissioning existing system and unclassified roads. Because this alternative does not include riparian management to enhance riparian functions, RFSS mussels and habitat would not benefit from those activities.

Cumulative Effects

Substrate quality, channel stability, and host fish migration opportunities are key habitat components for maintaining individuals, populations, and habitat of creek heelsplitter and black sandshell mussels (USDA Forest Service 2004a). It is likely that historical timber harvest, road and trail construction, and poorly designed stream crossings may have affected RFSS mussels and habitat by altering stream channels and flow, contributing sediment into local streams, increasing stream temperatures, and restricting host fish migration (USDA Forest Service

2004a). Standards and guidelines in the Forest Plan will help to ensure that USFS activities will not contribute to cumulative effects. In addition to Federal standards and guidelines, State, private and local land owners and managers follow established best management practices that should also contribute to eliminating cumulative effects. Provided that best management practices are implemented by all land owners and managers, there should be no cumulative effects to creek heelsplitter and black sandshell mussels and habitat.

Determination

Provided that all design criteria and mitigation measures required by this BE as well as those included in the EA and Forest Plan are followed during implementation, there is a low risk that the activities associated with the action alternatives would affect creek heelsplitter and black sandshell mussels and habitat. After considering the direct, indirect, and cumulative effects, it has been determined that both action alternatives *may impact individuals or habitat, but will not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species.*

Mitigation and Recommendations

Follow all relevant design criteria and mitigation measures described in Appendix C of the Whyte EA. In addition to required design criteria and mitigation measures, all Forest-wide desired conditions, objectives, standards and guidelines contained in the Superior National Forest Land and Resource Management Plan apply, including those established for: 1) Watershed Health, Riparian Areas, and Soil Resources, 2) Terrestrial and Aquatic Wildlife; and 3) Transportation System (USDA Forest Service 2004b).

<u>Quebec Emerald Dragonfly:</u>

Existing Condition

The Quebec emerald dragonfly (*Somatochlora brevicincta*) is known to occur on the Superior National Forest within the Whyte Project Area (Wayne Steffens, personal communication, 2006). Due to this species habitat requirements and existing habitat conditions, it is possible that it occurs in other areas within the Whyte Project Area and has yet to be documented.

The Quebec emerald typically occurs in lentic environments. "Habitat is predominantly bogs, fens, and heaths. The microhabitat is water-suspended or water-saturated sphagnum, whether or not associated with open water, and typically showing graminaceous emergents indicating weak minerotrophism. Eggs are laid outside plant tissues on the moss or adjacent water surface, with the larvae likely living within the saturated moss itself rather than on its interface with open water. The species has not been observed at open-water peatland ponds. Landforms in which the habitat can develop will generally be of bedrock or surficial deposits with little mineralizing potential and…may also form adjacent to or within peat bogs or heaths which can form in low relief areas." (NatureServe, 2006).

Analysis Indicators: *The analysis indicator for the Quebec emerald is the miles of Temporary winter roads and System winter roads. This indicator is used also as a measure of potential habitat change and highlights differences between Alternatives well because lowland road construction is one of the only proposed management activities that would have any direct effects to this habitat. Lowlands are considered to be lands classified as ELT 1, 2, 3, 4, 5, or 6. Miles of new temporary road construction and the miles of decommissioned roads by alternative is a useful indicator of potential sediment input into local waterbodies as well as a measure of potential change to watershed, stream, and wetland hydrologic functions. These potential changes can affect populations and habitat of aquatic RFSS if not properly mitigated. The number of new and decommissioned stream crossings associated with alternatives is also a useful indicator for evaluating potential effects to aquatic sensitive species because it is a good index of potential change in sediment input, stream flow, and channel conditions, as well as the potential for fish migration barriers, stream connectivity and/or habitat loss.*

Direct/Indirect Effects

New winter road construction associated with lowland vegetation management may affect individuals, populations, and/or habitat of Quebec emerald within the Whyte Project Area by potential inundation or desiccation of habitat due to water level changes or changes in flow regimes. Potential direct and indirect effects would be considered local and minor over the project area. Given high vagility (3 miles/day; NatureServe, 2006) and prevalence of suitable habitat over its range, the overall population in not considered fragile; localized extirpations would likely be re-inhabited shortly after habitat recovery.

Alternatives 1 and 3

Proposed vegetative management associated with alternatives 1 and 3 would not likely directly affect individuals, populations, and/or habitat of Quebec emerald dragonfly provided that required design criteria and mitigation measures are followed during project implementation (Appendix C, Whyte EA).

Alternatives 1 and 3 each propose constructing new temporary winter roads (Table 14). Alternative 1 includes constructing 3.7 miles of new temporary winter road; Alternative 3 includes constructing 3.2 miles of new temporary winter road (Table 14).

Table 14. New temporary winter roads proposed by alternative for the Whyte project area.

	New Temporary Winter Roads (miles)
Alt 1	3.7
Alt 2(na)	0
Alt 3	3.2

Alternative 1 and 3 each proposed to improve watershed conditions that have potential to benefit habitat for the Quebec emerald; this includes restoring more natural flow regimes and water levels associated with the decommissioning of existing winter roads and removing stream crossings (Table 14).

Alternative 2- No Action Alternative

No vegetative treatments would occur under alternative 2, therefore there would be no potential impacts to the Quebec emerald dragonfly from these activities (Table 14). However, under the no action alternative, improvement of watershed conditions that have potential to benefit habitat for the Quebec emerald would not occur (Table 13); this includes restoring more natural flow regimes and water levels associated with the decommissioning of existing winter roads and removing stream crossings.

Cumulative Effects

Standards and guidelines in the 2004 Forest Plan will help to ensure that USFS activities will not contribute to cumulative effects. In addition to Federal standards and guidelines, State, private and local land owners and managers follow established best management practices that should also contribute to minimizing cumulative effects. Provided that best management practices are implemented by all land owners and managers, there should be no cumulative effects to Quebec emerald dragonfly and their habitat.

Determination

The determination of effects from the proposed alternatives is based upon the direct, indirect, and cumulative effects on populations and habitat of Quebec emerald dragonfly. Provided that all design criteria and mitigation measures are followed during implementation, there is a low risk that the activities associated with the action alternatives would affect this species. Both action alternatives *may impact individuals or habitat, but will not likely contribute to a trend toward federal listing or cause a loss of viability to the populations or species.*

Mitigation and Recommendations

Follow all relevant design criteria and mitigation measures described in Appendix C of the Whyte EA. In addition to required design criteria and mitigation measures, all Forest-wide desired conditions, objectives, standards and guidelines contained in the Superior National Forest Land and Resource Management Plan apply, including those established for: 1) Watershed Health, Riparian Areas, and Soil Resources, 2) Terrestrial and Aquatic Wildlife; and 3) Transportation System (USDA Forest Service 2004b).

SENSITIVE SPECIES: INSECTS

<u>Tiger beetle sp.:</u>

Existing Condition

This species uses sandy or rocky openings, bedrock exposures and gravel pits. It may occur in the project area in the few areas of coarse sand and gravel. Tiger beetles appear to have adapted

to the use of gravel pits. They may also use abandoned or little-used logging roads. The existing gravel pits were surveyed for tiger beetles (email 6/21/2006) and none were found.

Analysis Indicators: For this analysis I used the acres of existing gravel pits and the proposed expansion acres to measure the impacts to tiger beetles thru changes is suitable habitat.

Direct/Indirect Effects

Larval habitat of open sandy, gravelly substrate is critical. This stage of habitat is most susceptible to environmental disturbance, as adults can probably disperse to new habitats if disturbance occurs (Steffens 2001). All alternatives would have activities that may negatively impact larval habitat. These include gravel excavation, soil compaction by heavy machinery, vehicles, or RMVs (recreational motor vehicles), and alteration of soil moisture, vegetation, and sun exposure (Steffens 2001). Vegetation succession results in abandonment or dispersal from formerly suitable habitats. The activities in all alternatives that would most commonly cause these changes would include gravel excavation, logging, management-ignited fire, road or trail building and vegetation succession. These same activities, under some circumstances, may also provide new habitats in all alternatives.

Alternative 1 and 3

Gravel pit expansion would be the same under all action alternatives. This could lead to an increase in habitat for tiger beetles. There will be mitigation in each gravel pit to ensure that some portion of the pit would not be active, to provide refugia for adult and larval tiger beetles.

Timber harvest and the associated road building (temporary and permanent) is higher in Alternative 1 compared to Alternative 3. The project should have minimal direct impact to tiger beetles due to the exclusion of logging in ELT 18 (exposed bedrock). Road construction can create future habitat for the species.

Alternative 2

There would be no ground disturbance occurring under Alternative 2. Therefore, there would be no direct or indirect effects to this species.

Cumulative Effects

Similar activities will continue on other ownerships (Appendix A). These activities, as on USFS land, could degrade habitat as well as create future habitat. Mining operations can also impact tiger beetles. However, presumably adequate habitat will be maintained. Cumulative effects are expected to be minimal.

Determination

The action alternatives may impact but not likely to cause a trend to federal listing or loss of viability under Alternatives 1 and 3. This determination is consistent with the determination in the Forest Plan Programmatic BE. Alternative 2 will have no effect on the tiger beetle. All Alternatives are consistent with the forest plan O-WL-18, G-WL-11, G-WL-12, and S-WL-5.

Mitigations

- Maintain some portion of the pit in an inactive state, so the area could act as refugia for adult and larval tiger beetles.

Mancinus alpine and Jutta arctic:

Existing Condition

Mancinus Alpine is known from one location in the project area near Greenwood Lake. It is also known from the McNair Butterfly Management Area just one mile west of the project boundary. Jutta Arctic has not been documented in the project area but it has been located at the McNair area. These species prefer shady, mature black spruce-tamarack forest that is dense enough to be subject to logging or management-ignited fire (MacLean 2001). They may also occur in younger lowland conifer or more open lowland conifer that is not usually subject to logging because of low site productivity. Suitable habitat has likely always been widespread but patchy (USFS, 2004b). No surveys were conducted in the project area but annual surveys are conducted at the McNair area. Threats included timber harvest, management ignited fire, or road construction and use in black spruce-tamarack forest or any other activity that may alter hydrologic conditions of wetland forest (USFS, 2004b).

Analysis Indicators: For this analysis I compare the acres of mature lowland conifer forest (MIH 9) by alternative to measure differences in potential impacts, acknowledging limitations of its use. Although this is a key habitat type for these species, it is likely that these species occur in habitats other than MIH 9. Until further surveying and study of population status and habitat relationships is conducted, this effect analysis retains uncertainty. In addition, I compare the miles of Temporary winter roads and System winter roads. This indicator is used also as a measure of potential habitat change.

Direct/Indirect Effects

Activities that decrease suitable habitat include timber harvest, management-ignited fire, or road construction and use in black spruce-tamarack forest or any other activity that may alter hydrologic conditions of wetland forests habitat. Changes due to timber harvest or fire are relatively long-term as forests take up to 60 years to become mature again. Road construction or hydrological changes can be either short-term (5-10 years) or long-term (greater than 10 years). I will use miles of new temporary roads affecting wetlands (all wetlands not just Mancinus Alpine and Jutta Arctic habitat) to show the difference between alternatives even though impacts to Mancinus Alpine and Jutta Arctic habitat will be less.

Mature black spruce-tamarack forest that is dense enough to be subject to logging or management-ignited fire is a key habitat for the Mancinus alpine and Jutta Arctic , but the species may also occur in younger lowland conifer or more open lowland conifer that is not usually subject to logging because of low site productivity. It is likely that the Mancinus alpine and Jutta Arctic occurs in habitats other than mature black spruce-tamarack forest and until further surveying and study of population status and habitat relationships is conducted, this effects analysis retains uncertainty.

Table 15. Habitat and management activities for Mancinus Alpine and Jutta Arctic in the Project Area.

Alternative	Habitat retained (acres)*	New Temporary Winter Roads (miles)
Existing (2006)	21,741 (94.2)	0
1	21,781 (94.3)	3.7
2	22,340 (96.7)	0
3	21,850 (94.6)	3.2

* Mature lowland black spruce/tamarack forest (MIH 9)

Alternative 1 and 3
Both action alternatives show an increase in mature lowland black spruce habitat compared to existing conditions (Table 15) due to some younger lowland forest growing into this age class. This should lead to a slight beneficial effect for these species. There will also be limited new temporary road construction in wetlands. Alternative 1 has more new temporary roads than Alternative 3. This could lead to some disturbance of these species if it occurs in potential habitat.

Alternative 2
There would be no ground disturbance occurring under Alternative 2. Therefore, there would be no direct or indirect effects to any of this species.

Cumulative Effects
Similar activities will occur on other ownerships in the Project Area. Timber harvest and road construction (Appendix A) will continue to have the biggest impact on Mancinus Alpine and Jutta Arctic habitat as we know it. The Highway 2 reconstruction will affect a few acres of wetland bog adjacent to the highway (Hwy 2 Reconstruction EA 2005). It will still be a small percentage of this type affected in the Project Area so cumulative impacts should be minimal. It is likely that the Mancinus alpine and Jutta Arctic occur in habitats other than mature black spruce-tamarack forest and until further surveying and study of population status and habitat relationships is conducted, this cumulative effects analysis remains uncertain. Forest-wide habitat monitoring (Annual Monitoring Report 2006) showed a slight increase to mature lowland conifer which could benefit this species.

Determination
This project may impact individuals of Mancinus alpine and Jutta Arctic, but is not likely to cause a trend to federal listing or loss of viability on the Superior National Forest due to the limited amount of harvest and disturbance in lowland black spruce under alternatives 1 and 3. This determination is consistent with the determination in the Forest Plan Programmatic BE. Alternative 2 will have no effect on these species. All Alternatives are consistent with the Forest Plan O-WL-18, G-WL-11, G-WL-12, S-WL-5, O-WL-26 and S-WL-7.

Mitigations
- If Mancinus alpine or Jutta Arctic is found within a proposed harvest unit or road corridor, that district Biologist should be consulted with for an appropriate mitigation (O-WL-26 and S-WL-7).

Taiga alpine:

Existing Condition

This species has not been located in the project area. But it has been found on other parts of the SNF in Cook and Lake County in 2001 by MacLean (2001) including the McNair Butterfly Management Area. They have been found in black spruce bogs with typical bog plants such as bog laurel, Labrador tea, leather leaf and sedges including patches of cotton grass. They seemed to favor open bog conditions. This habitat is present in the Whyte area and so the species could be present. Since it favors open bog conditions management activities should not affect the population unless there is damage to the understory plant species.

Direct/Indirect Effects

Activities that both decrease and increase suitable habitat include timber harvest, management-ignited fire, or road construction and use in black spruce-tamarack forest or any other activity that may alter hydrologic conditions of wetland forests habitat (USDA FS 2000c). There will be no timber harvest in open bogs in the Project Area. Road construction may impact this habitat type but will be avoided whenever possible. See the Mancinus Alpine and Jutta Arctic discussion for more detailed information.

Alternative 1 and 3

No timber harvest will occur in this habitat type under any action alternative. See Mancinus Alpine and Jutta Arctic discussion for details on road construction. A minimum of this habitat type should be affected by road construction since this type is usually avoided for summer roads and would only be used in the winter for a temporary road.

Alternative 2

No impacts expected.

Cumulative Effects

There should be a minimal impact to open bog conditions by other ownerships in the Project Area since this habitat does not provide adequate timber volume to harvest (Appendix A). The one activity that will affect this habitat type in the future is road construction. The Highway 2 reconstruction will affect a few acres of wetland bog (Hwy 2 Reconstruction EA 2005). It will still be a small percentage of this type affected in the Project Area so cumulative impacts should be minimal. Forest-wide habitat monitoring (Annual Monitoring Report 2006) showed a slight increase to mature lowland conifer which could benefit this species.

Determination

This project may impact individuals of Taiga Alpine, but is not likely to cause a trend to federal listing or loss of viability on the Superior National Forest under alternatives 1 and 3. Open bog conditions should remain relatively unchanged. This determination is consistent with the determination in the Forest Plan Programmatic BE. Alternative 2 will have no effect on the Red-disked alpine. All Alternatives are consistent with the Forest Plan O-WL-18, G-WL-11, G-WL-12, S-WL-5, O-WL-26 and S-WL-7.

Mitigations

- If Taiga Alpine is found within a proposed harvest unit or road corridor, that district Biologist should be consulted with for an appropriate mitigation (O-WL-26 and S-WL-7).

Nabokov's blue and Freija's Grizzled Skipper:

Existing Condition

These species have not been located in the project area. But they have been found on other parts of the SNF in Cook and Lake Counties including the McNair butterfly management area. The Nabokov's Blue butterfly seems to prefer open sandy, grassy jack pine areas with abundant blueberry and dwarf bilberry (*Vaccinium ceespitosum*) primarily on the Vermillion moraine (USFS 2002g, MacLean 2001). This habitat may be present in the project area. Habitat needs for Freija's grizzled skipper are less well understood on the Superior National Forest, but is thought to be provided by upland grasslands, acidic meadows and small grassy opening in boreal forest. Threats to both species include forest succession to ages and forest types that suppress or exclude V*accinium* species and grasses.

Analysis Indicators: For this analysis I compare the acres of young conifer forest (MIH 5), acknowledging limitations of its use for both species. I also compared the acres of habitat directly enhanced. Not all young conifer forest is suitable for these species because of the patchy distribution of bilberry and grassy inclusions. Until further survey and study of population status and habitat relationships is conducted, this effect analysis retains uncertainty.

Direct/Indirect Effects

Creation of young open patches of conifer would sustain habitat for these species in all action alternatives. The effects of establishing young forest are relatively short-term, since conifer grows into pole class at ten years and becomes less suitable for the species (USDA FS 2000c).

This analysis uses young conifer forest (MIH 5) as an indicator of differences in potential impacts among the alternatives, acknowledging limitations of its use. The species also is known to occur in other mature upland conifer forests, and in some cases in inclusions in aspen forest. However, young conifer can indicate likely general trends to northern blue's and Freija's grizzled skipper habitat over time.

Table 16. Habitat for Nabokov's Blue and Freija's Grizzled Skipper butterfly in the Project Area.

Alternative	Young Conifer (MIH 5)	Acres of Habitat Enhanced
Existing (2006)	255	0
1	913	2
2	56	0
3	832	2

Alternative 1 and 3

Alternative 1 would produce more young conifer than Alternative 3 (Table 16). However, these temporary openings will probably not stay open long enough for these species to colonize, if they are in the area. The project will not impact current known habitat for these species. The project improves the quality of a known dwarf bilberry patch that could lead to increased use of the area by Nabokov's and possibly Freija's Grizzled Skipper.

Alternative 2

There would be no ground disturbance occurring under Alternative 2. Therefore, there would be no direct or indirect effects to any of these species.

Cumulative Effects
Young conifer should continue to be created through timber harvest on other ownerships (Appendix A). There should be minimal impact to existing young conifer and permanent openings. Forest-wide habitat monitoring (Annual Monitoring Report 2006) showed a no change to young jack pine forest in 2005.

Determination
This project will have no impact on Nabokov's blue or Freija's Grizzled Skipper and is not likely to cause a trend to federal listing or loss of viability on the Superior National Forest under alternatives 1 and 3. This determination is consistent with the determination in the Forest Plan Programmatic BE. Alternative 2 will have no effect on either of these species. All Alternatives are consistent with the Forest Plan O-WL-18, G-WL-11, G-WL-12, S-WL-5, O-WL-26, O-WL-27 and S-WL-7.

Mitigations
None identified.

SENSITIVE SPECIES: VASCULAR PLANTS, LICHENS, AND BRYOPHYTES

Analysis area and methods

For sensitive plants, the area covered by the analysis of direct and indirect effects includes all lands administered by the Superior National Forest within the Whyte Forest Management Project area. The area covered by the cumulative effects analysis includes lands of all ownerships within the Whyte Forest Management Project area. This cumulative effects analysis area was selected because the adjacent non-Forest Service lands in the project area share a number of physical characteristics (e.g. soils, landforms, etc.) which have influenced and constrained land uses in a similar manner. Furthermore, lands of other ownerships are often in close proximity to Forest Service lands. For these reasons, the project area boundary makes a logical analysis unit for cumulative effects.

The time period covered by the cumulative effects analysis is from the 1870's to approximately 2017. The 1870's was chosen because that was when white settlement began to increase in northeastern Minnesota in association with the development of iron mines and timber production (MFRC 1999a). 2017 was chosen because most project activities should be completed within 10 years.

Indicators and habitat groups were used to help evaluate the potential effects of management activities on RFSS plants (Table 17). Indicator 1 describes the number of known RFSS plant occurrences affected by project activities. The remaining Indicators relate to the amount of a ground disturbing activity occurring in different RFSS plant habitats. The Indicators are described below for each of six RFSS plant habitat groups. RFSS plants are grouped by habitat to reduce the amount of repetition in the analysis. The habitat groups are described in more detail in the Biological Evaluation for the Superior National Forest Plan (USDA Forest Service 2004b)

- **Habitat group 1**: RFSS plants of non-forested wetlands, shallow water, and riparian areas

Indicator: Miles of new lowland road construction on FS lands. This indicator highlights differences between Alternatives well because lowland road construction is one of the only proposed management activities that would have any direct effects to this habitat. Lowlands are considered to be lands classified as ELT 1, 2, 3, 4, 5, or 6. This indicator includes both temporary and classified roads.

- **Habitat group 2**: RFSS plants of cliffs and talus slopes
  Indicator: Acres of ELT 18 in proposed treatment units. This indicator highlights the difference between alternatives well because one component that makes up ELT 18 is cliffs and rock outcrops. The indicator provides a rough measure of how much suitable habitat would be impacted by each alternative. Because rock outcrops and cliffs are just one component of ELT 18, the actual amount of suitable habitat for this group that is impacted by project activities would be much less than shown by the indicator.

- **Habitat group 3**: RFSS plants of upland disturbed areas (old landings, old roadbeds, etc.)
  Indicators: Acres of upland commercial timber harvest and miles of unclassified road impacted by construction or reconstruction activities. These Indicators highlight differences between Alternatives well because each provides a rough indication of impacts to the types of habitats typically occupied by species in this habitat group. For example, not every acre of commercial timber harvest impacts an acre of disturbed upland areas, but 1000 acres of commercial timber harvest would likely impact more of this habitat than 500 acres of commercial timber harvest. For the last indicator in this group, the roads covered by the indicator are unclassified roads (which includes unclassified roads that ATV's are using, unclassified roads that are drivable, and unclassified decommissioned roads) that are being converted to classified, special use, or temporary roads.

- **Habitat group 4:** RFSS plants of forested wetlands
  Indicators: Acres of lowland black spruce harvest, and miles of new lowland road construction on FS lands. Acres of lowland black spruce harvest is a good indicator for this habitat since it provides a direct evaluation of how much lowland forest habitat is impacted by alternative. Miles of lowland road construction highlight differences between Alternatives well because lowland road construction also causes direct impacts to this habitat. This latter indicator includes both temporary and classified roads.

- **Habitat group 5**: RFSS plants of northern hardwood forests (sugar maple, basswood, yellow birch, red oak)
  Indicator: Acres of northern hardwood forest types (Forest Type 80's) proposed for treatments. Acres of northern hardwoods harvest is a good indicator for this habitat group since it provides a direct evaluation of how much northern hardwood forest habitat is potentially impacted by alternative.

- **Habitat group 6**: RFSS plants of dry to mesic upland forests
  Indicators: Acres of upland commercial timber harvest and miles of new upland road construction on FS lands. These Indicators highlight differences between Alternatives

well because each provides an indication of the amount of potential impact to upland forest habitats. Miles of new upland road construction includes both temporary and classified roads.

Table 17. Indicators 1-8 used for RFSS plants effects analysis.*

Indicator	Alternative 1	Alternative 2	Alternative 3	
1. Number of known sensitive plant occurrences in or next to proposed treatment units	9	0	5	
2. Miles of new lowland road construction on FS lands	5.9	0	4.8	
3. Miles of new upland road construction on FS lands	10.3	0	8.1	
4. Miles of unclassified road impacted by construction and reconstruction	2.5	0	2.5	
5. Acres of upland commercial timber harvest	8798	0	7345	
6. Acres of lowland black spruce harvest	560	0	491	
7. Acres of ELT 18 in proposed treatment units	7	0	7	
8. Acres of northern hardwood forest types proposed for treatments	2129	0	1414	
***NOTE:** After this TES plant analysis was conducted, the stands proposed for treatment in the Phantom Lake RARE II area were dropped from alternatives 1 and 3, resulting in a decrease of 863 acres and 475 acres proposed for treatment, respectively. This change causes decreases in indicators 2, 3, 5, and 7 for alternatives 1 and 3. The changes in these indicators were not quantified. The result of this change is that the effects to TES plants will be somewhat less than how they are described in the analysis that follows.				

Sensitive plant survey results

Rare plant surveys were conducted in the Whyte Forest Management Project area in 2005 and 2006 by: Forest Service contract botanists, Forest Service botanists, and DNR MNCBS botanists. Approximately 3440 acres of the project area were surveyed in 2005 and 2006 by Forest Service contract botanists or Forest Service botanists, with surveys focusing on suitable timber stands, as well as some stands selected because they represent high quality rare plant habitat. Portions of the project area were surveyed for rare lichens by University of Minnesota lichenologist Cliff Wetmore in 1999 (Wetmore 2000), and University of Minnesota graduate student Becky Knowles surveyed a portion of the project area for lichens in the genus *Peltigera* in summer 2001 (Knowles pers. comm.).

Forest Service contract botanists and Forest Service botanists found several new TES plant occurrences in 2005 and 2006 in the Whyte project area. Details of survey results can be found in CCES (2005), Delaney (2005), Delaney (2006), and USDA Forest Service (2006). New finds include: 8 populations of New England sedge, 13 populations of Canada yew, one population of

least moonwort, 2 populations of neat spike rush, and one population of clustered bur-reed. New populations found by MNDNR MNCBS botanists are reported and tracked in the MNDNR Natural Heritage Database (MN DNR 2006).

All sensitive vascular and non-vascular plant species known or suspected to occur in the project area are displayed in Table 2. Ten RFSS plant populations occur in stands or on roads proposed for management: neat spike rush (1), Canada yew (3), club spur orchid (1), clustered bur reed (2), and New England sedge (2).

Habitat Group 1: RFSS plants of shallow water and non-forested wetlands and riparian areas

Existing Condition
The following sensitive plants use this habitat group and either occur in or have suitable habitat in the analysis area (Table 2): swamp beggar-ticks, floating marsh-marigold, Katahdin sedge, linear-leaved sundew, neat spike rush, moor rush, Vasey's rush, auricled twayblade, fall dropseed muhly, American shoregrass, dwarf water lily, club-spur orchid, northern bur-reed, awlwort, and lance-leaved violet. One proposed harvest unit contains a population of neat spike rush and a population of club spur orchid. There are 13,781 acres of this type of wetland and riparian habitat scattered throughout the Whyte Forest Management project area.

Direct/Indirect Effects
Alternative 2
Indicator 2 – Miles of new lowland road construction on FS lands. There would be no ground disturbance occurring under Alternative 2. Therefore, there would be no direct or indirect effects to any of these species.

Alternative 1
Indicator 1 – Number of known sensitive plant occurrences in or next to proposed treatment units. For Alternative 1, road use in unit 39 would have short term direct negative impacts to the neat spike rush in the unit. Plants could be driven over and crushed, but over the long term this would not impact the population. Impacts from road maintenance would be minimized by avoiding the population during road maintenance activities.

For the club-spur orchid in unit 39, the plants would be avoided with a 50 foot no activity buffer during harvest activities, and this would limit any direct or indirect impacts from alternative 1.

For the clustered bur-reed in unit 224, the wetland that the plants occur in would be avoided with a 50 foot no activity buffer. This would limit direct and indirect impacts from alternative 1.

For the clustered bur-reed in unit 276, the wetland that the plants occur in would be avoided with a 50 foot no activity buffer. This would limit direct and indirect impacts from alternative 1.

Indicator 2 – Miles of new lowland road construction on FS lands.
There would be no direct negative effect of timber harvesting under alternative 1 since aquatic, non-forested wetland, and non-forested riparian habitats would not be treated. Some

sedimentation may be an indirect negative effect of timber harvest, but the open water wetland and perennial/intermittent stream mitigations would help minimize sedimentation effects on suitable habitat for these species. Lowland roads constructed under any alternative would go through some suitable habitat for this suite of species and thus impact suitable habitat, but use would be during frozen conditions (see soil mitigation section of EA), so no long term negative impacts are expected to suitable habitat for these RFSS plants. Less than 1% of the acreage of all wetland types would be directly impacted by creation of lowland roads under this Alternative.

Alternative 3

Indicator 1 – Number of known sensitive plant occurrences in or next to proposed treatment units. There would be no direct impacts to the known populations of club spur orchid or neat spike rush in alternative 3 because no activities are proposed for the area where the plants occur.

For the clustered bur-reed in unit 224, the wetland that the plants occur in would be avoided with a 50 foot no activity buffer. For the clustered bur-reed in unit 276, the wetland that the plants occur in would be avoided with a 50 foot no activity buffer. This would limit direct and indirect impacts from alternative 3.

Indicator 2 – Miles of new lowland road construction on FS lands. The types of impacts of alternative 3 to plants in this habitat group would be similar to the impacts of alternative 1 described above. Alternative 1 would affect slightly more habitat than Alternative 3, based on the number of miles of new lowland road construction on Forest Service lands (Table 17).

Cumulative Effects

For alternative 2, there would be no cumulative effects to these species since no ground disturbance would occur under Alternative 2.

There would be few cumulative effects of Alternatives 1 or 3 on these species since very little management is proposed in the habitats that they inhabit. In the past, construction and use of lowland roads and wetland draining were the two actions that probably had the biggest impacts on species in this habitat group within the cumulative effects analysis area. At present and in the future, construction and use of roads in lowlands proposed under these Alternatives and elsewhere in the cumulative effects analysis area, including construction of non-jurisdictional roads, future special use permit roads, roads associated with county or state timber sales, and possible ATV trail construction associated with the Lake County ATV planning, would continue to impact suitable habitat, but the proportion of total suitable habitat affected by these activities would be very small.

Summary: Project activities associated with Alternatives 1 and 3 would have only minor direct and indirect negative effects on the suitable habitat for these species. Alternative 1 would impact the greatest amount of suitable habitat, followed by Alternative 3, based on the miles of new lowland road construction on FS lands by alternative (Table 17).

Determination
For Alternative 2, the proposed activities would have no impact on swamp beggar-ticks, floating marsh-marigold, Katahdin sedge, linear-leaved sundew, neat spike rush, moor rush, Vasey's rush, auricled twayblade, fall dropseed muhly, American shoregrass, dwarf water lily, club-spur orchid, northern bur-reed, awlwort, and lance-leaved violet.

For Alternatives 1 and 3, the proposed activities may impact individuals of swamp beggar-ticks, floating marsh-marigold, Katahdin sedge, linear-leaved sundew, neat spike rush, moor rush, Vasey's rush, auricled twayblade, fall dropseed muhly, American shoregrass, dwarf water lily, club-spur orchid, northern bur-reed, awlwort, and lance-leaved violet, but are not likely to cause a trend to federal listing or loss of viability.

Additional Mitigations and Design Criteria

- For neat spike rush in unit 39, avoid road maintenance activities on the logging road where this species occurs.
- For club spur orchid in unit 39, do not harvest timber within 50 feet of where this plant occurs.
- For clustered bur-reed in unit 224, do not harvest timber within 50 feet of the wetland where this plant occurs.
- For clustered bur-reed in unit 276, do not harvest timber within 50 feet of the wetland where this plant occurs.

Habitat Group 2: RFSS plants of cliffs and talus slopes

Existing Condition
The following sensitive plants use this habitat group and either occur in or have suitable habitat in the analysis area (Table 2): *Cladonia wainoi*, large-leaved sandwort, Appalachian fir clubmoss, *Arctoparmelia centrifuga*, and *Arctoparmelia subcentrifuga*. There is very little suitable habitat for species in this habitat group in the project area. It is difficult to quantify the amount of cliff/talus slope habitat in the project area. Stands in the project area classified as Ecological Landtype (ELT) 18 are composed of extremely shallow soils with bedrock outcrops. Some ELT 18 sites have rock outcrops, cliffs, and talus slope habitats that could be used by plants in this habitat group; there are 42 acres of ELT 18 in the Whyte Forest Management project area. However, because this type of habitat also occurs as unmapped inclusions in other ELT's, it is difficult to quantify the total amount of this type of habitat in the project area.

Direct/Indirect Effects
Alternative 2
There would be no ground disturbance occurring under Alternative 2. Therefore, there would be no direct or indirect effects to any suitable habitat for species in this habitat group.

Alternative 1
Indicator 7 – Acres of ELT 18 in proposed treatment units. Very little timber harvest (approximately 7 acres – Table 17) would occur on ELT 18. Harvest on ELT 18 would occur during winter/frozen ground conditions. Some rock and cliff habitat could experience short term

negative impacts as a result of project activities. Ground disturbance from logging activities could cause short term direct impacts to suitable habitat. Light levels could increase due to removal of the forest canopy on or next to rocky outcrops, but this would not cause any negative impacts to potential occurrences of these species, particularly *Cladonia wainoi*, which is known to occur on exposed sites with lots of sunlight (USDA Forest Service 2000a). None of the other proposed activities in alternative 1 would impact habitat for these plants.

Alternative 3

Indicator 7 - Acres of ELT 18 in proposed treatment units. The impacts of alternative 3 to plants in this habitat group would be identical to the impacts of alternative 1 described above. Alternatives 1 and 3 would affect the same amount of suitable habitat, based on the acres of ELT 18 in proposed treatment units (Table 17).

Cumulative Effects

For Alternative 2, there would be no cumulative effects to these species since no ground disturbance would occur under Alternative 2.

There would be few cumulative effects of Alternatives 1 and 3 on these species or their suitable habitat since very little management is proposed that would affect their suitable habitat. Since Europeans began settling the area, there have been relatively few past actions that have impacted this habitat within the cumulative effects analysis area except for road construction and occasional timber harvest. For example, past vegetation management projects may have had some small direct or indirect impacts on cliff or rock outcrop habitat as described above. Current and future actions in the cumulative effects analysis area that could affect this habitat include both road construction and timber harvest. Construction of future special use or non-jurisdictional roads could impact a small amount of rock outcrop habitat, as could current federal timber sales as well as future federal and non-federal timber sales. However, cumulative impacts of Alternatives 1 and 3 would be minimal because these habitats are quite dispersed and only a small proportion of this suitable habitat would be affected by management activities.

Summary: Project activities associated with these Alternatives could have short term direct and indirect negative effects on the suitable habitat for these species. Alternative 1 and 3 would not differ in their impacts, based on acres of ELT 18 in stands proposed for harvest (Table 17).

Determination

For Alternative 2, the proposed activities would have no impact on *Cladonia wainoi*, large-leaved sandwort, Appalachian fir clubmoss, *Arctoparmelia centrifuga*, and *Arctoparmelia subcentrifuga*.

For Alternatives 1 and 3, the proposed activities may impact individuals of *Cladonia wainoi*, large-leaved sandwort, Appalachian fir clubmoss, *Arctoparmelia centrifuga*, and *Arctoparmelia subcentrifuga*, but are not likely to cause a trend to federal listing or loss of viability.

Habitat Group 3: RFSS plants of upland disturbed areas

Existing Condition
The following sensitive plants use this habitat group and either occur in or have suitable habitat in the analysis area (Table 2): pointed moonwort, common moonwort, Michigan moonwort, pale moonwort, ternate grapefern, and least moonwort. It is difficult to quantify how much of this type of suitable habitat exists in the project area. There are no known occurrences of any of these species in proposed treatment units.

Direct/Indirect Effects
Alternative 2
Indicators 4 and 5. There would be no ground disturbance occurring under Alternative 2. Therefore, there would be no direct impacts to any of these species as a result of this project. However, succession and lack of disturbance would probably diminish the amount of suitable habitat in the project area over time under this alternative (USDA Forest Service 2001a, b, c, d, and e), which could lead to long-term downward population trends for any occurrences of these species in the project area. These *Botrychium* species frequently occupy habitats where some disturbance occurred in the past, such as a log landing or old road, and they depend to some degree on disturbance to create suitable habitat.

Alternative 1
Indicator 4 – Miles of unclassified road impacted by construction and reconstruction. There are no known occurrences of species in this habitat group on or near unclassified roads proposed for construction or reconstruction, so direct impacts to known occurrences are not expected. However, there would be direct and indirect short-term negative impacts to suitable habitat for these *Botrychium* species from construction and reconstruction activities on unclassified roads. Ground disturbance associated with road construction and reconstruction would cause short-term impacts to suitable habitat – some individuals could be destroyed, since they sometimes occur on old, infrequently used roadbeds. However, over the long term the majority of unclassified roads impacted by construction and reconstruction would still serve as suitable habitat, particularly if the unclassified road is converted to a temporary road or an OML-1 road. Any remaining individuals in treated or untreated portions of the project area could colonize this habitat. Although the biology of these *Botrychium* species is poorly understood (USDA Forest Service 2001a, b, c, d, and e), the creation of new ruderal habitats through project activities would likely perpetuate any populations of these species that may have been missed during project inventories.

Indicator 5 – Acres of upland commercial timber harvest. There are no populations of these species known from proposed treatments units, so there would be no impacts to known occurrences. There would be direct and indirect short-term impacts to suitable habitat for these *Botrychium* species from timber harvest and related activities. Ground disturbance associated with timber harvest would cause short-term impacts to suitable habitat – some individuals could be destroyed. After several years, however, new suitable habitat would be available, such as log landings. Any remaining individuals in treated or untreated portions of the project area could colonize these habitats. Although the biology of these *Botrychium* species is poorly understood (USDA Forest Service 2001a, b, c, d, and e), the creation of new ruderal habitats through project

activities would likely perpetuate any populations of these species that may have been missed during project inventories.

Gravel pit use and expansion could have direct and indirect short term impacts to suitable habitat for these *Botrychium* species. Some individuals could be destroyed by this activity. However, all of the areas affected by this activity would still serve as suitable habitat for these species in the long term. Any remaining individuals in treated or untreated portions of the project area could colonize this habitat. Although the biology of these *Botrychium* species is poorly understood (USDA Forest Service 2001a, b, c, d, and e), the creation of new ruderal habitats through project activities would likely perpetuate any populations of these species that may have been missed during project inventories.

Alternative 3

Indicator 4 - Miles of unclassified road impacted by construction and reconstruction.
The impacts of alternative 3 to plants in this habitat group would be identical to the impacts of alternative 1 described above. Alternatives 1 and 3 would affect the same amount of suitable habitat, based on the miles of unclassified road impacted by construction and reconstruction (Table 17).

Indicator 5 - Acres of upland commercial timber harvest
The types of impacts of alternative 3 to plants in this habitat group would be similar to the impacts of alternative 1 described above for Indicator 5. Alternative 1 would affect slightly more habitat than Alternative 3, based on the acres of upland commercial timber harvest (Table 17).

The proposals for gravel pit use and expansion do not differ between alternatives 1 and 3, so the impacts of gravel pit use and expansion under alternative 3 to plants in this habitat group would be identical to alternative 1.

Cumulative Effects
Very little is known about the distribution of these *Botrychium* species within the cumulative effects analysis area. However, it is unlikely that the lack of ground disturbance associated with Alternative 2 would have any cumulative effects on suitable habitat for these species in the project area.

There would be few cumulative effects of the action Alternatives on these species. Very little is known about the distribution of these *Botrychium* species within the cumulative effects analysis area. However, similar types of disturbance (for example, timber harvest, road building, and gravel pit development) have occurred within the cumulative effects analysis areas as have occurred within the direct/indirect effects analysis areas. These activities, while sometimes impacting suitable habitat, have also created suitable habitat at the same time. Because ground disturbing activities have created ample suitable habitat in the past and at present, and because similar types of activities will probably occur into the future, it is unlikely that there will be any cumulative effects to species in this habitat group.

Summary: Project activities would have short-term negative direct and indirect effects on suitable habitat for these species in the analysis area. Over the long-term, ground disturbance

associated with these Alternatives would maintain or create suitable habitat for these species. Alternative 1 would have slightly greater impacts to suitable habitat for species in this group than Alternative 3, and both would have greater impacts than alternative 2, based on an analysis of Indicators 4 and 5 (Table 17).

Determination
For Alternatives 1, 2, and 3, the proposed activities may impact individuals of pointed moonwort, common moonwort, Michigan moonwort, pale moonwort, ternate grapefern, and least moonwort but are not likely to cause a trend to federal listing or loss of viability.

Habitat Group 4: RFSS plants of forested wetlands

Existing Condition
The following sensitive plants use this habitat group and either occur in or have suitable habitat in the analysis area (Table 2): small shinleaf, cloudberry, fairy slipper, ram's head ladyslipper, western Jacob's ladder, *Caloplaca parvula, Certraria aurescens, Frullania selwyniana, Menegazzia terebrata, Ramalina thrausta, Sticta fuliginosa,* and *Usnea longissima*. *Pseudocyphellaria crocata* is analyzed here as well because local occurrences are found in open and forested peatlands. There are approximately 27,190 acres of stands typed as forested wetlands habitat in the project area.

Direct/Indirect Effects
Alternative 2
Indicators 2 and 6. There would be no ground disturbance occurring under alternative 2. Therefore, there would be no direct or indirect effects to any of these species.

Alternative 1
Indicator 2 – Miles of new lowland road construction on FS lands. Alternative 1 proposes the greatest amount of lowland road construction at 5.9 miles, followed by Alternative 3 at 4.8 miles (Table 17). For alternative 1, lowland roads constructed through forested wetlands would potentially cause direct negative impacts (i.e. burial under fill material if it is an all-season classified road) and indirect negative impacts (i.e. increased light levels or change in vegetative composition) to some suitable habitat for these species. For winter roads, impacts such as rutting would be minimized because construction and use would be during frozen conditions. For this alternative, much less than 1% of the acreage of all forested wetlands would be directly impacted by creation of lowland roads, so impacts to this suitable habitat would be minimal. Road construction through lowland cedar and black ash stands would be avoided when possible, but when avoidance is not possible, another RFSS plant survey specific to the lowland road construction would be conducted.

Indicator 6 – Acres of lowland black spruce harvest. For Alternative 1, approximately 560 acres of lowland black spruce harvest are proposed (Table 17), while 491 acres of lowland black spruce harvest are proposed under Alternative 3. These stands are good suitable habitat for small shinleaf, cloudberry, and *Pseudocyphellaria crocata* but poor habitat for the other species in this habitat group. No RFSS plants were found during surveys of lowland black spruce stands, so there would be no direct impacts to known populations. However, there could be indirect

negative impacts to suitable habitat for small shinleaf, cloudberry, and *Pseudocyphellaria crocata* due to timber harvest of lowland black spruce stands. For example, the increased light levels resulting from timber harvest could have minor negative affects on these species. However, impacts to suitable habitat would be minimized because harvest would occur only during frozen conditions when plants are dormant. Only approximately 2% of suitable lowland forest habitat would be affected by lowland black spruce harvest, thereby further demonstrating the minimal impacts to suitable habitat.

No lowland white cedar, black ash, or mixed conifer stands are proposed for harvest. These lowland forest types are suitable habitat for the other RFSS species in this habitat group (i.e. fairy slipper, ram's head ladyslipper, western Jacob's ladder, *Caloplaca parvula, Certraria aurescens, Frullania selwyniana, Menegazzia terebrata, Ramalina thrausta, Sticta fuliginosa*, and *Usnea longissima*.) There would be no timber harvest-related impacts to these species in alternative 1.

There would be no impacts to species in this habitat group from other proposed project activities associated with Alternative 1.

Alternative 3
Indicator 2 – Miles of new lowland road construction on FS lands. The types of impacts of alternative 3 to plants in this habitat group would be similar to the impacts of alternative 1 described above for Indicator 2. Alternative 1 would affect slightly more suitable habitat than Alternative 3, based on analysis of Indicator 2 (Table 17).

Indicator 6 – Acres of lowland black spruce harvest. The types of impacts of alternative 3 to plants in this habitat group would be similar to the impacts of alternative 1 described above for Indicator 6. Alternative 1 would affect slightly more suitable habitat than Alternative 3, based on analysis of Indicator 6 (Table 17).

There would be no impacts to species in this habitat group from other proposed project activities associated with Alternative 3.

Cumulative Effects
For alternative 2, there would be no cumulative effects to these species since no ground disturbance would occur under alternative 2.

There would be few cumulative effects of the action Alternatives on these species since very little management is proposed in the habitats that they inhabit, and because such management affects a small proportion of the overall habitat. Since Europeans began settling the area, timber harvest, wetland drainage, and road construction have impacted forested wetlands and reduced the amount and distribution of this habitat within the cumulative effects analysis area (Bradof 1992, Heinselman 1996, Frelich 1998, MN FRC 1999a). More recently, timber sales on federal, State, county, and private lands have changed the age class distribution of lowland black spruce habitats, but have not altered the overall suitability of the habitat for species in this habitat group; see Appendix A for a summary of current and future timber harvest acres on federal, state, and county lands. At present and in the future, construction and use of roads in lowland forests

proposed under these Alternatives and elsewhere in the cumulative effects analysis area, including construction of non-jurisdictional roads, future special use permit roads, and possible ATV trail construction associated with the Lake County ATV planning, would continue to impact suitable habitat, but the proportion of total suitable habitat affected by these activities would be very small. Similarly, current and future timber sales affecting lowlands on state or county lands could change the age class of lowland black spruce forests in the project area, temporarily making some stands less suitable for this suite of sensitive plants. However, the proportion of total suitable habitat affected by these activities would be very small. On the Superior National Forest, potential impacts of these activities would be mitigated by adherence to the Forest Plan standards and guidelines, and on other ownerships the impacts would be mitigated by voluntary adherence to the best management practices (MFRC 1999b).

Summary: Project activities associated with these Alternatives would have only minor direct and indirect negative effects on the suitable habitat for these species. Alternative 1 would have the greatest impacts to suitable habitat, followed by Alternative 3, based on an analysis of Indicators 2 and 6 (Table 17)

Determination
For alternative 2, the proposed activities would have no impact on small shinleaf, cloudberry, fairy slipper, western Jacob's ladder, ram's head ladyslipper, *Caloplaca parvula, Certraria aurescens, Frullania selwyniana, Menegazzia terebrata, Ramalina thrausta, Sticta fuliginosa, Usnea longissima,* and *Pseudocyphellaria crocata.*

For Alternatives 1 and 3, the proposed activities may impact individuals of small shinleaf, cloudberry, fairy slipper, western Jacob's ladder, ram's head ladyslipper, *Caloplaca parvula, Certraria aurescens, Frullania selwyniana, Menegazzia terebrata, Ramalina thrausta, Sticta fuliginosa*, *Usnea longissima,* and *Pseudocyphellaria crocata*, but are not likely to cause a trend to federal listing or loss of viability.

Additional Mitigations and Design Criteria

- Where possible, no roads would be placed in lowland cedar or black ash stands; in cases where this is unavoidable, a Sensitive (RFSS) plant survey would be conducted prior to road construction.

Habitat Group 5: RFSS plants of northern hardwood forests

Existing Condition
The following sensitive plants use this habitat group and either occur in or have suitable habitat in the analysis area (Attachment 1): triangle (or lance-leaf) grapefern, goblin fern, and New England sedge. Three proposed harvest units contain occurrences of New England sedge. There are approximately 3,655 acres of northern hardwoods (Forest type 80's) in the project area. There are also approximately 1,895 acres of cedar-aspen-paper birch (Forest type 19) habitat in the project area; this forest type is sometimes suitable habitat for New England sedge.

Direct/Indirect Effects
Alternative 2

There would be no ground disturbance occurring under alternative 2. Therefore, there would be no direct or indirect effects to any of these species.

Alternative 1

Indicator 1 – Number of known sensitive plant occurrences in or next to proposed treatment units. Three occurrences of New England sedge occur in proposed harvest units 140, 235, and 268 in alternative 1. For these occurrences, impacts to New England sedge populations would be eliminated by not treating the portions of the stands that contain New England sedge. There would be no direct or indirect impacts to known populations of New England sedge under alternative 1.

Indicator 8 – Acres of northern hardwood forest types proposed for treatments. There are 2,129 acres of suitable northern hardwoods habitats proposed for harvest in alternative 1; this represents treatments in 58% of suitable habitat for species in this habitat group. Although treatments are proposed for a relatively high proportion of suitable habitat, the potential effects of timber harvest to New England sedge and triangle grapefern suitable habitat would be low because the proposed treatment would be an intermediate harvest (thinning, group selection, or variable retention). Some ground disturbance would occur during harvest in these habitats that would affect suitable habitat for these species, and there would be a small, temporary increase in light levels in treated stands. However, neither the ground disturbance nor light increase would be enough to alter the suitability of the habitat for the species in this group.

Of the three species in this habitat group, goblin fern is the most sensitive to disturbance. Although no goblin fern is known from the project area (the nearest known occurrence is 2.5 miles south), there is up to 3,655 acres of suitable habitat. Nineteen northern hardwoods stands in two MCBS sites (Marble Beaver River and Marble Kit Creek) ranked with a statewide biodiversity significance of high represent the northern hardwoods sites of highest conservation value within the project area (see comment 8-1 in EA Appendix E) and are likely the best goblin fern habitat. Twelve northern hardwoods stands representing 830 acres were surveyed for goblin fern during 2005 and 2006.

Anecdotal observations indicate that some types of timber harvest can impact goblin fern. Generally, it appears that greater amounts of canopy removal have greater indirect impacts on goblin fern via greater impacts on forest floor temperatures and light regimes (USDA Forest Service 2002n). Also, soil disturbance caused by timber harvest can have direct impacts to goblin fern individuals and goblin fern suitable habitat. The goblin fern CA states, "Intermediate harvest, single tree selection, and group harvests may simulate natural gap forming processes, but may still impact *B. mormo* from soil compaction, loss of soil nutrients, and changes in moisture regimes." The precise relationship between intermediate harvests and goblin fern are not well understood; anecdotal observation indicate that some intermediate harvests have negatively impacted goblin fern, while others have had minimal effects (USDA Forest Service 2002n).

Another possible impact of timber harvest is that it can spread exotic earthworms, which have been documented to degrade goblin fern habitat and cause goblin fern population declines

(USDA Forest Service 2002n, Gundale 2002). Frozen ground harvest limits the spread of earthworms.

The impact of alternative 1 intermediate harvests on goblin fern suitable habitat is likely to be low. Intermediate harvests will leave approximately 80% cover (Chuck Cutter pers. comm.) which should be adequate for maintaining habitat suitability. Intermediate harvest could result in some soil compaction, loss of soil nutrients, or changes in moisture regimes, but probably not to a large enough degree to make the habitat unsuitable for goblin fern. The proposed intermediate harvests in northern hardwoods could spread exotic earthworms. To limit the spread of exotic earthworms and mitigate the potential impacts of exotic earthworms to goblin fern suitable habitat, the nineteen northern hardwood stands referred to in the MCBS comment in the Marble Beaver River Site and Marble Kit Creek Site would be harvested in winter.

Alternative 3

Indicator 1 – Number of known sensitive plant occurrences in or next to proposed treatment units. Two occurrences of New England sedge occur in proposed harvest units 140 and 235 in alternative 3. For these occurrences, impacts to the New England sedge populations would be eliminated by not treating the portion of the stand that contains New England sedge. There would be no direct or indirect impacts to known populations of New England sedge under alternative 3.

Indicator 8 – Acres of northern hardwood forest types proposed for treatments. There are 1,414 acres of suitable northern hardwoods habitats proposed for harvest in alternative 3; this represents treatments in 39% of suitable habitat for species in this habitat group. The types of effects of this harvest would be similar to those described above for alternative 1. Because fewer acres of northern hardwoods suitable habitat are proposed for treatment in alternative 3, there would be lower impacts to suitable habitat for species in this habitat group. The same winter harvest mitigations would apply as described above.

Cumulative Effects

For alternative 2, there would be no cumulative effects to these species since no ground disturbance would occur under alternative 2.

There would be few cumulative effects of the action Alternatives on these species. Since Europeans began settling the area, timber harvest (and subsequent forest type changes) and road construction are among the land uses that have most greatly impacted upland forests and altered the amount and distribution of this habitat in the cumulative effects analysis area. In the habitats where these species occur, some species like yellow birch, white spruce, and white cedar have decreased in abundance compared to the historical condition, while other species like aspen have increased (USDA Forest Service 2004b). More recently, timber sales on federal, State, county, and private lands have changed the age class distribution of upland forest habitats; see Appendix A for a summary of current and future timber harvest acres on federal, state, and county lands. Construction of federal and non-federal roads in the project area has also impacted a small proportion of suitable habitat for this suite of species. For these species, current and reasonably foreseeable timber harvest and road construction on lands in the cumulative effects analysis area would impact suitable habitat for this species, but negligible cumulative impacts would result

and the viability of the species would be maintained by the existing known occurrences throughout the Superior NF. On the Superior National Forest, potential impacts of these activities would be mitigated by adherence to the Forest Plan standards and guidelines, and on other ownerships the impacts would be mitigated by voluntary adherence to the best management practices (MFRC 1999b).

Summary:
Project activities associated with these Alternatives would have only minor direct and indirect negative effects on the suitable habitat for these species. Alternative 1 would have the greatest impacts to suitable habitat, followed by Alternative 3, based on an analysis of Indicators 1 and 8 (Table 16)

Determination
For alternative 2, the proposed activities would have no impact on triangle (or lance-leaf) grapefern, goblin fern, or New England sedge.

For Alternatives 1 and 3, the proposed activities may impact individuals of triangle (or lance-leaf) grapefern, goblin fern, or New England sedge, but are not likely to cause a trend to federal listing or loss of viability.

Additional Mitigations and Design Criteria

- For units 140, 235, and 268, do not treat the portion of the stand that contains New England sedge populations. For units 140 and 268, drop the portion of the stand containing New England sedge. For unit 235, leave a one tree length no harvest buffer around the known populations, and do not place any temporary roads within one tree length of known populations.
- Harvest units 137, 138, 139, 140, 190, 191, 192, 247, 249, 254, 256, 267, 268, 269, 271, 272, 273, 274, 276, and 277 during frozen ground conditions.

Habitat group 6: RFSS plants of dry to mesic upland forests

Existing Condition
The following sensitive plants use this habitat group and either occur in or have suitable habitat in the analysis area (Table 2): Canada yew, barren strawberry, Canada ricegrass, and *Peltigera venosa*. *Peltigera venosa*, although not included as part of any habitat group in the Forest Plan BE, is analyzed with this habitat group in this BE because of its affinity for bare soil habitats such as rootwads. Canada yew occurs in two proposed treatment units and on one road proposed for decommissioning. Based on the criteria in the Forest Plan BE, there are 42,616 acres of upland forest types that could serve as suitable habitat for barren strawberry in the project area. There are 38,445 acres of forest that could serve as suitable habitat for Canada yew. There are 15,501 acres of uplands in ELT 9, 11, and 13 that could serve as suitable habitat for Canada ricegrass; this species, known from only six occurrences in Minnesota, occurs in sandy and sandy/gravelly soils (Gerdes 2005) such as is found in these three ELT's. It is difficult to quantify the number of acres of suitable bare soil habitat available for *Peltigera venosa*.

Direct/Indirect Effects

Alternative 2

Indicators 3 and 5. There would be no ground disturbance occurring under alternative 2. Therefore, there would be no direct effects to any of these species, and there would be no indirect impacts to Canada ricegrass, barren strawberry, or *Peltigera venosa*. For Canada yew, the lack of ground disturbance would lead to an indirect benefit for both the known yew occurrence in the analysis area as well as suitable habitat in the analysis area. Deer herbivory on Canada yew severely limits Canada yew growth and sexual reproduction, both in the analysis area (Greenlee pers. obs.) and elsewhere in the upper Midwest (Schmoller 1999). Lack of timber harvest in the analysis area under alternative 2 would probably lead to a long term decrease in the whitetail deer population, which would be an indirect benefit to Canada yew.

Alternative 1

Indicator 1 - Number of known sensitive plant occurrences in or next to proposed treatment units. There are ten Canada yew occurrences in areas proposed for treatment in alternative 1: in unit 137, 140, 166, 247, 268, 272, 274, 276, 277, and on an unclassified road proposed for decommissioning. For the Canada yew in unit 166 and on the unclassified road, there would be no impacts of alternative 1 because each patch of yew would be avoided during project implementation. For the Canada yew in the other units listed above, the proposed treatment is an intermediate harvest that would be conducted in frozen ground conditions. Sufficient canopy would remain to provide shade for the yew population and minimal ground disturbance would occur because harvest would be during frozen ground conditions. So, there would be minimal direct effects of alternative 1 on the Canada yew in units 137, 140, 247, 268, 272, 274, 276, and 277.

Indicator 3 – Miles of new upland road construction on FS lands. Alternative 1 proposes approximately 10.3 miles of new upland road construction. For Canada yew, barren strawberry, Canada ricegrass, and *Peltigera venosa*, upland road construction would have direct and indirect impacts to suitable habitat for these species, but sufficient suitable habitat would remain undisturbed to ensure there is no viability risk to these species. Alternative 1 would impact less than 1% of suitable habitat in the project area for species in this group. New upland road construction would have minimal effects to suitable habitat for these species.

Indicator 5 – Acres of upland commercial timber harvest. Approximately 8,798 acres of upland commercial timber harvest is proposed in Alternative 1. Timber harvesting would cause direct and indirect effects to suitable Canada yew upland habitat. Clearcuts would remove the overstory and create open conditions not favored by Canada yew. However, there would be no disturbance in lowland cedar forests in the analysis area, which are also an important habitat for Canada yew. This alternative would probably at a minimum maintain the deer herd in the analysis area, so there would be continued browse pressure on Canada yew in the analysis area. There are 65 known occurrences of Canada yew on the Superior National Forest (USDA Forest Service 2004c). Because it is a sensitive species, Canada yew occurrences are generally avoided by Forest Service projects on the Superior (e.g. USDA Forest Service 2004d). Despite potential impacts to suitable habitat, the protection of known occurrences would ensure that there is no risk to the viability of this species due to project activities.

For barren strawberry, ground disturbance caused by timber harvest and site preparation would have short term direct impacts to suitable habitat. However, in the long term timber harvest activities would probably have minimal effects on barren strawberry suitable habitat. Of the three known barren strawberry occurrences on the Superior, one was found in a clearcut, and another in a red pine plantation; these occurrences suggest that the species can tolerate some level of disturbance. The red pine plantation containing one occurrence was thinned in 2003, and preliminary monitoring results show no population decline as a result of the thinning (USDA Forest Service 2005a).

For *Peltigera venosa*, timber harvest could have direct and indirect impacts to suitable habitat in the short term. Over the long term however, blowdown at the edges of clearcuts would create suitable habitat for *Peltigera venosa* in the form of the exposed dirt of rootwads. Because there are no known occurrences in the project area, and because recent surveys in the project area or on the Forest did not locate this species (Wetmore 2000; Knowles pers. comm.), it is not likely that timber harvest in Alternative 1 would cause any viability risk for *Peltigera venosa*.

For Canada ricegrass, timber harvest could have direct short-term impacts to suitable habitat for this species. However, over the long term the effects of timber harvest to Canada ricegrass would probably be neutral to somewhat beneficial. In Michigan, the species occurs in logged areas and on road margins (Gerdes 2005). In Minnesota the species occurs in openings and clearings, along abandoned logging roads, thinned mixed pine-hardwood forest, young pine plantation, as well as unlogged red pine forest (Gerdes 2005). Based on the habitats of known occurrences, it seems likely that timber harvest proposed in alternative 1 in the project area would create some suitable habitat for Canada ricegrass in the long term.

There would be no impacts to TES plants in this habitat group from gravel pit use as proposed.

Alternative 3

Indicator 1 - Number of known sensitive plant occurrences in or next to proposed treatment units. Seven known Canada yew occurrences are found in areas proposed for treatment in alternative 3: unit 137, 140, 166, 247, 276, 277 and on an unclassified road proposed for decommissioning. For the Canada yew in unit 166 and on the unclassified road, there would be no impacts of alternative 3 because each patch of yew would be avoided during project implementation. For the Canada yew in the other units listed above, the proposed treatment is an intermediate harvest that would be conducted in frozen ground conditions. Sufficient canopy would remain to provide shade for the yew population and minimal ground disturbance would occur because harvest would be during frozen ground conditions. So, there would be minimal direct effects of alternative 1 on the Canada yew in units 137, 140, 247, 276, and 277.

Indicator 3 – Miles of new upland road construction on FS lands. Alternative 3 proposes approximately 8.1 miles of new upland road construction. The types of effects of this activity on Canada yew, barren strawberry, Canada ricegrass, and *Peltigera venosa* would be similar to those described for alternative 1. The potential impacts of alternative 3 to suitable habitat for these species would be lower than for alternative 1. Alternative 3 would impact less than 1% of

suitable habitat in the project area for species in this group. New upland road construction would have minimal effects to suitable habitat for these species.

Indicator 5 – Acres of upland commercial timber harvest. Approximately 7,345 acres of upland commercial timber harvest is proposed in Alternative 3. For Canada yew, barren strawberry, Canada ricegrass, and *Peltigera venosa*, the types of impacts would be similar to those described for alternative 1 above. However, alternative 3 would impact fewer acres of suitable habitat for each of these species than alternative 1 based on analysis of indicator 5.

Cumulative Effects
For alternative 2, there would be no cumulative effects to RFSS plants in this group since no ground disturbance would occur under alternative 2.

There would be few cumulative effects of the action Alternatives on these species. Since Europeans began settling the area, timber harvest (and subsequent forest type changes) and road construction are among the land uses that have most greatly impacted upland forests and altered the amount and distribution of this habitat in the cumulative effects analysis area. Some upland forest types like aspen have increased in acreage since pre-settlement times, while other forest types like red, white and jack pine have decreased (Frelich 1998). More recently, timber sales on federal, State, county, and private lands have changed the age class distribution of upland forest habitats; see Appendix A for a summary of current and future timber harvest acres on federal, state, and county lands. Construction of roads in the project area, such as Forest Highway 11, as well as federal and non-federal timber harvest roads, have also impacted a small proportion of suitable habitat for these species. For Canada ricegrass and barren strawberry, past, present, and reasonably foreseeable timber harvest would not have any long term cumulative impacts to suitable habitat for these species because they appear to be able to tolerate some levels of disturbance. Suitable habitat for *Peltigera venosa* (in the form of tip-ups) would continue to be created by future timber harvests. For Canada yew, future timber harvest on federal and non-federal lands would impact suitable habitat for this species, but negligible cumulative impacts would result and the viability of the species would be maintained by the existing known occurrences throughout the Superior.

Future road construction in the cumulative effects analysis area, including construction of non-jurisdictional roads, future special use permit roads, and possible ATV trail construction associated with Lake County ATV planning, would impact suitable habitats for this suite of rare plants, but would not result in cumulative impacts because these activities would affect only a small proportion of the available suitable habitat. On the Superior National Forest, potential impacts of these activities to this suitable habitat would be mitigated by adherence to the Forest Plan standards and guidelines, and on other ownerships the impacts would be mitigated by voluntary adherence to the best management practices (MFRC 1999).

Summary: Project activities associated with these Alternatives would have short-term negative direct and indirect effects on suitable habitat for these species. Over the long term, however, there should be only minor impacts to suitable habitat for these species. Based on analysis of Indicators 1, 3, and 5, the effects to suitable habitat for species in this group would be greatest for Alternative 1, followed by Alternative 3.

Determination
For alternative 2, the proposed activities would have no impact on Canada yew, barren strawberry, Canada ricegrass, or *Peltigera venosa*.

For Alternatives 1 and 3, the proposed activities may impact individuals of Canada yew, barren strawberry, Canada ricegrass, or *Peltigera venosa* but are not likely to cause a trend to federal listing or loss of viability.

Additional Mitigations and Design Criteria

- For unit 166, drop the eastern finger of the stand that contains Canada yew.
- For unclassified road U1LC1508, avoid disturbing the Canada yew near the beginning of the road during decommissioning.

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APPENDIX A

Whyte Project Cumulative Effects List

The Laurentian Ranger District of the Superior National Forest is completing an environmental analysis for the Whyte Forest Management Project. The project proposes to manage vegetation and associated roads, on approximately 9,850 acres. As part of the effects analysis, resource specialists determined cumulative effects that would occur under each alternative.

The President's Council on Environmental Quality (CEQ) defined "cumulative impact" in regulations implementing the procedural provisions of NEPA as follows:

"Cumulative impact" is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. *(40 CFR 1508.7)*

Past, On-going, and Future Projects

The following list identifies the known past, on-going, and proposed future projects occurring in or near the Whyte Project Area.

Correll Land Exchange – The USFS is proceeding with a land exchange with Randy Correll. The United States will receive 760.00 acres of private land. The proponent will receive 720.00 acres of National Forest System land. The existing condition of the vegetation on the land the USFS is acquiring has been taken into account in the project.

THE CORRELL'S STATED THAT THE LAND THEY WOULD ACQUIRE WOULD NOT BE LOGGED AND THEY MAY CONSTRUCT A HOUSE AND ASSOCIATED ROADS. THE LAND THE USFS WOULD ACQUIRE IS CURRENTLY YOUNG FOREST AND NO ADDITIONAL MANAGEMENT ACTIONS WOULD BE PLANNED IN THE NEAR FUTURE.

Rifle Land Exchange with Lake County –specific lands are under consideration but the agency has not yet developed a proposed action.

Forest Service vegetation management within past 10 years

Regeneration harvest	1,355 acres
Thinning	743 acres
Planting	310 acres

Estimate of State, Counties, TNC, and Private forest aged 0-9 (shows regeneration harvest occurring during past 10 years)

State	2035 acres
Lake and St. Louis Counties	2325 acres
The Nature Conservancy	388 acres
Private	638 acres

Estimate of State, Counties, TNC, and private proposed harvest in next 5 to 10 years

State	12,856 acres
Lake and St. Louis Counties	861 acres*

The Nature Conservancy	462 acres
Private	Unknown but estimated to be similar to past 10 years

* Lake County cover for current sales only.
State shows potential acres only, not actual planned acres. Planned acres would be less.

Upgrade of County State Aid Highway 2 – the portion of road south from FH 11 is proposed to be reconstructed in 2007. May impact some Federal land along the road where existing road is widened but would not result in a measurable change in species composition, age class, MIH, or wildlife habitat.

Mining – We are not aware of any mining proposals in or near the project area.

Land development – Potlatch has leased some lands but no other changes or plans are known.

Land sales or leasing – Land continues to be bought and sold throughout the area. No major projects are known.

Rural Schools Initiative – 240 acres of land in the Project Area were included in the Secure Rural Schools Initiative. At this time, there is no active move toward implementing this initiative. Management actions are proposed on 2 of the tracts. It is unlikely the Whyte project would affect this initiative.

Moose browse projects – cooperative project between the USFS and MN DNR to mow brushy sites to create moose forage areas. No new projects are planned at this time.

Sand Lake Seven Beavers Memorandum of Understanding – a collaborative effort between The Nature Conservancy, St. Louis County, Lake County, Forest Service, and MN DNR. The Whyte Project Team collaborated with the SL7B group in developing proposed vegetation projects. Collaboration continues to occur between all groups for road access and vegetation management on State, County, and TNC lands.

Lake County ATV Plan – a collaborative effort between the county, State of MN, and USFS to plan for ATV trails. Group is just forming and no specific proposals have been identified.

Lake County Wild Fire Protection Plan – Plan is complete. No specific proposals in the project area.

Special Use Permit requests there are 10 known access needs in the area. The roads currently exist so the permitting process would not lead to additional miles of road on the ground.

Superior National Forest Landscape Ecosystems. The existing condition for the vegetation age class, species composition, and management indicator habitats was used as a baseline for existing condition and to determine cumulative effects. All of the projects with decisions but not yet implemented, along with specific proposed actions, have been added together, to show the cumulative effects of all the vegetation projects occurring on National Forest land. This analysis was run during September 2006 and the effects are summarized in Chapter 3. The full report is in the Project Record.