Biological Evaluation of Sensitive Species for the Clara Environmental Assessment

Terrestrial Wildlife Evaluation and Assessment:

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EXECUTIVE SUMMARY **II**

DETERMINATION OF EFFECTS SUMMARY (ATTACHMENT 1) **II**

BIOLOGICAL EVALUATION **4**

INTRODUCTION: *4*
PROJECT DESCRIPTION: *4*
AFFECTED SPECIES, EFFECTS OF PROPOSED ACTIONS AND DETERMINATION OF EFFECTS: *7*
Terrestrial Wildlife Sensitive Species ***10***
Bald Eagle – *Haliaeetus leucocephalus* 10
Northern Goshawk – *Accipiter gentilis* 15
Boreal Owl - *Aegolius funereus* 20
Black-throated blue warbler – *Dendroica caerulescens* 24
Vascular Plant, Lichen, and Bryophyte Sensitive Species ***27***
Habitat Group 1: RFSS plants of shallow water and non-forested wetlands and riparian areas 29
Habitat Group 2: RFSS plants of cliffs and talus slopes 31
Habitat Group 3: RFSS plants of upland disturbed areas 31
Habitat Group 4: RFSS plants of forested wetlands 33
Habitat Group 5: RFSS plants of northern hardwood forests 35
Habitat group 6: RFSS plants of dry to mesic upland forests 37
REFERENCES *41*
ATTACHMENT 1 ***Error! Bookmark not defined.***

Executive Summary

This Biological Evaluation (BE) analyzes the effects of the Clara EA Alternatives on Regional Foresters Sensitive Species (RFSS) known or suspected to occur in the Superior National Forest. This analysis is conducted to ensure that the needs of these species are given full consideration in the planning and decision making process. A Forest-wide Biological Evaluation (BE) (USDA 2004a, USDA 2004b) was conducted for the Forest Plan in 2004 (USDA 2004c). The 2004 Forest Plan considered the needs of sensitive species in the development of objectives for Management Indicator Habitats (MIH) (USDA 2004d). Where appropriate, MIHs were used as indicators to measure the effects of management actions on sensitive species. Where applicable, this BE tiers to the analysis conducted in the Forest Plan BE and FEIS. Refer to the Forest-wide BE, FEIS and the Forest Plan Planning Record for more information. Species specific recommendations are listed in this document, in Appendix E: OpStdGdl of the Clara EA or in the individual unit cards.

Determination of Effects Summary (Attachment 1)

Terrestrial Wildlife

Alternatives 2 and 3 may impact individuals of heather vole, bald eagle, northern goshawk, boreal owl, LeConte's sparrow, olive-sided flycatcher, yellow rail, black-throated blue warbler, bay-breasted warbler, peregrine falcon, Connecticut warbler, three-toed woodpecker, great gray owl, tiger beetle sp., Mancinus alpine butterfly, red-disced alpine butterfly, Nabokov's blue butterfly, jutta arctic butterfly, and Freija's grizzled skipper, but are not likely to result in a trend toward federal listing or a loss of viability. No impacts to all other terrestrial species are expected under Alternatives 2 or 3. Alternative 1 would have no direct, indirect, or cumulative effects on terrestrial wildlife species.

See Attachment 1 for effects determinations for each sensitive species.

Aquatic Wildlife

All alternatives may impact individuals of brook lamprey, black sandshell, creek heelsplitter or Quebec emerald dragonfly but are not likely to cause a trend to federal listing or a loss of viability. The alternatives would have no impact on Lake Sturgeon or shortjaw cisco.

See Attachment 1 for a summary of effects determinations portion of the biological evaluation.

Vascular plants, lichens, and bryophytes

Alternative 1 would have no direct, indirect, or cumulative effects to Canada yew, barren strawberry, Canada ricegrass, *Peltigera venosa,* alpine milkvetch, swamp beggar-ticks, floating marsh-marigold, Katahdin sedge, linear-leaved sundew, neat spike rush, moor rush, auricled twayblade, fall dropseed muhly, American shoregrass, dwarf water lily, club-spur orchid, northern bur-reed, awlwort, lance-leaved violet, small shinleaf, cloudberry, fairy slipper, ram's head ladyslipper, *Caloplaca parvula, Cetraria aurescens, Menegazzia terebrata, Ramalina thrausta, Sticta fuliginosa, Usnea longissima, Pseudocyphellaria crocata, Frullania selwyniana,* and moschatel.

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 2 and 3 may impact individuals of Canada yew, barren strawberry, Canada ricegrass, *Peltigera venosa*, alpine milkvetch, swamp beggar-ticks, floating marsh-marigold, Katahdin sedge, linear-leaved sundew, neat spike rush, moor rush, auricled twayblade, fall dropseed muhly, American shoregrass, dwarf water lily, club-spur orchid, northern bur-reed, awlwort, lance-leaved violet, small shinleaf, cloudberry, fairy slipper, ram's head ladyslipper, *Caloplaca parvula, Cetraria aurescens, Menegazzia terebrata, Ramalina thrausta, Sticta fuliginosa, Usnea longissima, Pseudocyphellaria crocata, Frullania selwyniana,* and moschatel, but are not likely to cause a trend to federal listing or loss of viability.

See Attachment 1 for a summary of effects determinations.

Biological Evaluation

INTRODUCTION:
This Biological Evaluation (BE) evaluates the effects of the proposed Clara EA alternatives on Regional Forester-listed (R9) Sensitive Species (USDA Forest Service Manual sections 2670.3, 2670.5 (3), 2672.4). The species evaluated in this report include all species on the revised R9 sensitive species list (USDA Forest Service 2006). Table 3-RFSS-1 displays the Region 9 Regional Foresters Sensitive Species (RFSS) with a known occurrence or suitable habitat in the Clara Project Area (USDA 2009).

PROJECT DESCRIPTION:
The Clara Project Area is located in Cook County, Minnesota, in Township 61 North, Ranges 3 and 4 West, Township 62 North, Ranges 2, 3 and 4 West, and Township 63 North, Ranges 2 and 3 West. The Clara Project Area encompasses about 48,000 acres of land, of which 35,000 acres are National Forest System land (see Figure 1-1: Vicinity Map, Clara EA). Lakes in the project area include Clara, Tait, Crescent, White Pine, and Christine.

The USDA Forest Service Superior National Forest (SNF) proposes timber, reforestation and fuel reduction management activities in the Clara Environmental Assessment. The proposed action and two other alternatives (including no action) are described in Chapter 2 of the Clara Project EA. The operational standards and guidelines are listed in Appendix E: OpStdGdl of the Clara EA (USDA 2009). The action alternatives include the following activities in different amounts and locations:

- Timber harvest: Includes even-aged and uneven-aged harvest methods. Actual treatment acres will be less than the stand acres disclosed in the EA due to mitigations for soils, visuals, wildlife and other resources.
- Reforestation: Includes site prep, interplanting and seeding.
- Understory fuel reduction through mechanical treatment or prescribed burning.
- Road management: Includes temporary (temp) and OML 1 road construction

Reasonably foreseeable federal actions in addition to the EA activities were proposed in the scoping document (USDA 2008a). A complete list of cumulative effects actions considered is listed in Appendix G: CumEffts of the Clara EA.

All of the management activities are expected to be implemented during the next ten years beginning in 2008. Some activities may be started by the end of 2008 and may be completed before other projects would be started. The harvest activities would occur throughout all seasons. Some units have specific harvest times such as winter or summer because of mitigations. Season of harvest is identified for each harvest unit and is listed on the unit card. The reforestation activities would not occur until after completion of the harvest. The year 2014 marks the first decade of the Forest Plan and is used as our benchmark to measure cumulative changes to management indicator habitats.

The Clara EA (USDA 2009) considers two action alternatives (Alternatives 2 and 3) and one no action alternative (Alternative 1) which are summarized in the tables below. Chapter 2 of the EA provides detailed descriptions of each of the alternatives. Also see maps, tables and unit data in the EA for site-specific locations and more detailed information. This analysis assumes that in addition to the proposed actions identified below, the operational standards, guidelines and recommendations in Appendix E: OpStdGdl would be implemented with all of the action Alternatives and the CE activities.

Table EA-2.9. Comparison of Activities and Acres Proposed Under Each Alternative, Acres[1] by Forest Type and Alternative for Clara Project Area.*

Primary Treatments	Forest Type	Alt 1	Alt 2	Alt 3
Clearcut with Reserves	Aspen-White Spruce-Fir	0	824	525
	Quaking Aspen	0	739	600
	Balsam Fir-Aspen-Paper Birch	0	436	310
	Paper Birch	0	214	177
	White Pine (aspen is being taken out of the stand, white pine trees will not be cut)	0	10	10
	TOTAL:	**0**	**2,223**	**1,622**
Shelterwood Seed Cut with Reserves	Quaking Aspen	0	64	64
	Aspen-White Spruce-Fir	0	116	0
	Paper Birch	0	45	45
	White Pine	0	25	25
	TOTAL:	**0**	**250**	**134**
Seed-Tree Cut	Paper Birch	0	179	13
	Aspen-White Spruce-Fir	0	65	65
	Balsam Fir-Aspen-Paper Birch	0	19	19
	TOTAL:	**0**	**263**	**97**
Single-Tree Selection	Aspen-White Spruce-Fir	0	182	95
	Quaking Aspen	0	174	0
	TOTAL:	**0**	**356**	**95**
	TOTAL HARVEST ACRES:	**0**	**3,092**	**1,948**
Mechanical Site Preparation	Balsam Fir-Aspen-Paper Birch	0	27	27
	White Pine	0	21	21
	TOTAL:	**0**	**48**	**48**
Underplant	Aspen-White spruce-fir	0	81	81
	Quaking Aspen	0	61	61
	Balsam Fir-Aspen-Paper Birch	0	58	58
	Paper Birch	0	59	225
	TOTAL:	**0**	**259**	**425**
Mechanical Fuel Reduction	Balsam Fir-Aspen-Paper Birch	0	225	225
	Red Pine	0	206	206

Table EA-2.9. Comparison of Activities and Acres Proposed Under Each Alternative, Acres[1] by Forest Type and Alternative for Clara Project Area.*

	Aspen-White Spruce-Fir	0	138	436
	Paper Birch	0	12	12
	Quaking Aspen	0	0	174
	TOTAL:	**0**	**581**	**1,053**
Underburn	Aspen-White Spruce-Fir	0	162	162
	TOTAL:	**0**	**162**	**162**

Secondary Treatments	**Forest Type**	**Alt 1**	**Alt 2**	**Alt 3**
Mechanical Site Preparation	Paper Birch	0	428	225
	Aspen-White Spruce-Fir	0	227	159
	Quaking Aspen	0	210	90
	Balsam Fir – Aspen - Paper Birch	0	38	65
	White Pine	0	35	56
	TOTAL:	**0**	**938**	**595**
Slash Disposal	Aspen - White Spruce - Balsam Fir	0	1,015	557
	Quaking Aspen	0	794	537
	Balsam Fir – Aspen - Paper Birch	0	559	365
	Paper Birch	0	130	118
	White Pine	0	10	0
	TOTAL:	**0**	**2,508**	**1,577**
Reforestation after Harvesting		**Alt 1**	**Alt 2**	**Alt 3**
Natural Regeneration	**Forest Type**			
	Aspen - White Spruce – Balsam Fir	0	1,019	689
	Quaking Aspen	0	769	511
	Balsam Fir – Aspen - Paper Birch	0	417	300
	Paper Birch	0	245	79
	TOTAL:	**0**	**2,450**	**1,579**
Natural Regeneration with Interplanting[2]	**Tree Species**			
	White Pine	0	212	59
	White Pine and White Spruce	0	83	0
	White Pine and seeding Birch	0	79	79
	TOTAL:	**0**	**374**	**138**
Planting[2]	White Pine	0	155	155
	White Pine and White Spruce	0	50	50
	Red Pine and Jack Pine	0	26	26
	TOTAL:	**0**	**231**	**231**
Seeding	Jack Pine and Black Spruce	0	37	0
	TOTAL:	**0**	**37**	**0**

Table EA-2.9. Comparison of Activities and Acres Proposed Under Each Alternative, Acres[1] by Forest Type and Alternative for Clara Project Area.*

	TOTAL REFORESTATION:	**0**	**3,092**	**1,948**
Planting after other Treatments		**Alt 1**	**Alt 2**	**Alt 3**
	Tree species			
Planting after site preparation	White pine	0	21	21
Underplanting after Mechanical Fuel Reduction	White pine and White spruce	0	0	83
	White pine	0	91	244
	Black spruce and tamarack	0	84	84
	TOTAL:	**0**	**196**	**432**

[1]All acres shown are estimates based on stand acres. Actual treated acres could be less due to legacy patches, reserve islands, operational standards and guidelines, and other factors.
[2]Monitoring the amount of competing vegetation and browse on planted regeneration would determine necessary actions to protect the seedlings. This could include releasing the seedlings from competing vegetation or applying deer repellant.

Table EA-2.10: Proposed Transportation Management Activities for the Clara Project Area

Transportation System	***Alt. 1***	***Alt. 2***	***Alt. 3***
Miles of Temporary Access (Construction of Temp. Roads)	*0*	*9.3*	*6.0*
Miles of OML 1 constructed (using old road bed)	*0*	*1.8*	*1.2*
Miles of Unclassified used as temporary access	*0*	*2.5*	*2.5*
TOTAL:	***0***	***13.6***	***9.7***

AFFECTED SPECIES, EFFECTS OF PROPOSED ACTIONS AND DETERMINATION OF EFFECTS:

Table 3-RFSS-1 below lists the sensitive species which are known or could occur in the project area and could be affected.

The U.S. Fish and Wildlife Service (USFWS) recently removed Endangered Species Act protection for the Gray Wolf Western Great Lakes Distinct Population Segment. The final rule to remove this Distinct Population Segment from federal threatened listing was published in the Federal Register on February 8, 2007, and took effect on March 12, 2007. The gray wolf was put back under federal protection in September of 2008 as a result of a court order (Friedman 2008, Civil Action No. 07-0677 PLF). The USFWS must satisfy the court that it is not arbitrary and capricious in simultaneously designating the Great Lakes Segment as a distinct wolf population and removing it from the Federal List of Threatened Species. Until this is resolved, the wolf will again be included in our Biological Assessments for management projects.

In October, 2006, five species were added to the Regional Forester's Sensitive Species List, and three species were removed. The species added are: *Somatochlora brevicincta* (Quebec emerald dragonfly), *Frullania selwyniana* (a liverwort), *Drosera linearis* (Slender sundew), *Huperzia appalachiana* (Appalachian fir-clubmoss), and *Oryzopsis canadensis* (Canada mountain-ricegrass). The three species removed are: *Chlidonias niger* (Black tern), *Phalaropus tricolor* (Wilson's phalarope), and *Juncus caseyi* (Vasey's rush).

Table 3-RFSS-1. Regional Forester's sensitive species and federally threatened and endangered species with known occurrence or suitable habitat in the Clara Project Area

Terrestrial Wildlife	***Rare Plants***	
Gray wolf	*Moschatel*	*Canada ricegrass*
Canada lynx	*Alpine milkvetch*	*Club-spur orchid*
Heather vole	*Swamp beggar- ticks*	*Lesser wintergreen*
Bald eagle[1]	*Pointed moonwort*	*Cloudberry*
Northern goshawk[1]	*Common moonwort*	*Northern bur-reed*
Boreal owl	*Michigan moonwort*	*Awlwort*
LeConte's sparrow	*Pale moonwort*	*Canada yew*
Olive-sided flycatcher	*Ternate grape-fern*	*Lance-leaved violet*
Yellow rail	*Least moonwort*	*Barren strawberry*
Black-throated blue warbler	*Floating marsh-marigold*	Caloplaca parvula
Bay-breasted warbler	*Fairy slipper*	Cetraria aurescens
Peregrine falcon	*Katahdin sedge*	Frullania selwyniana
Connecticut warbler	*Ram's-head lady's slipper*	*Port-hole lichen*
Three-toed woodpecker	*Linear leaved sundew*	Peltigera venosa
Great gray owl	*Neat spike-rush*	*Yellow specklebelly lichen*
Tiger beetle sp.	*Moor rush*	Ramalina thrausta
Mancinus alpine butterfly	*Auricled twayblade*	Sticta fuliginosa
Red-disked alpine butterfly	*American shoregrass*	Usnea longissima
Nabokov's blue butterfly	*Fal1 dropseed muhly*	
Jutta arctic butterfly	*Dwarf water-lily*	
Freija's grizzled skipper (butterfly)		
Aquatic Wildlife		
Northern brook lamprey		
Creek heelsplitter mussel		
Black sandshell mussel		
Quebec emerald dragonfly		

[1]*Also a Forest Plan Management Indicator Species*

Sensitive species known to occur or with suitable habitat in the Clara project area are evaluated in the discussion below or in the attached summary table. If a species is not included below for further evaluation, it is because we have determined that they are not known or expected in the project area, there is not sufficient or appropriate habitat within

the analysis area, or little to no effects are predicted as a result of the proposed project. The effects to federally listed Threatened or Endangered species were analyzed and documented in a Biological Assessment (BA) as part of the consultation process with the U.S. Fish and Wildlife Service (USDA 2008b).

Terrestrial Wildlife Sensitive Species

Analysis Area and Time Frame
The area covered by the analysis of direct and indirect effects includes all lands administered by the Superior National Forest within the project area. 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. Changes in habitat were measured within the Mesic Birch-Aspen-Spruce-Fir Landscape Ecosystem portion of the project area. Most of the forested acres in this project area are within this Landscape Ecosystem.

The area covered by the cumulative effects analysis is broader to include all lands on the Superior National Forest within the Mesic Birch-Aspen-Spruce-Fir Ecosystem. This cumulative effects analysis area was selected because lands within this LE share a number of physical characteristics (e.g. bedrock features, land forming processes) with the project area which have influenced and constrained land uses in a similar manner. For northern goshawk and other area sensitive species, I considered large upland and lowland patches that extended across the project boundary.

The time scale used for the analysis of direct, indirect and cumulative effects is the first decade following the revised Forest Plan. 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. This is also an appropriate time scale for cumulative effects because it allows for the most realistic prediction of reasonably foreseeable future projects and for comparison with Plan objectives. Past actions are taken into account in the existing condition. Present and foreseeable future actions are considered for the year 2014.

Analysis for cumulative effects considers past, on-going and reasonably foreseeable future (to 2014) State, County, private and federal activities within the project area. Past federal actions are taken into account in the existing condition (Appendix G: CumEffts, Clara EA).

Bald Eagle – *Haliaeetus leucocephalus*

Existing Condition
Population and trend:
Recovery goals in the United States have been met. The final rule to de-list the bald eagle was published July 9, 2007 (USDI 2007a). Statewide there appears to be a 28% increase in active nests from the 2000 survey (MN DNR 2006). On the Superior National Forest the 2005 survey shows a 15.4% increase in active nests from 2000 (MN DNR 2006). Population trends on SNF, based on active nest survey in 2005, have increased since 2000: 90 active breeding territories, exceeding Forest Plan goal of 85 (MN DNR 2006, USDA 2004c).

An aerial nest survey completed for the Clara project in 2008 located three nests either within the project area or within ½ mile of proposed activities. Two of these nests held incubating adult eagles and one was inactive. A fourth historical nest in the project area was last observed in 2006 and will receive the same mitigations as other nests in the project area. Eagles in the Clara area rebuild nests near to those that fall apart and one nest territory is known to have been active since 1988. Two nests have been used in the past by osprey, possibly indicating competition for nesting sites or high prey abundance.

Habitat needs and limiting factors: Bald eagles are known to use suitable habitat on the Forest during the spring and summer for breeding, nesting, and raising young. The maintenance of successful reproducing eagles requires a balance of suitable habitat, low contaminants in prey, and low human disturbance. Suitable nesting habitat consists of stands dominated by mature and old growth timber or younger forest with a remnant component of older super (above) canopy trees located within 0.25 miles streams and lakes bearing predominantly shallow water fish species. Nests are sometimes found further from water than 0.25 miles. On the Superior National Forest, 85% of nest trees selected by eagles are large-diameter, old age, white pine (Lindquist 1995). Eagle habitat also includes foraging and roosting areas within 1.5 miles of nesting areas. Limiting factors for eagle appear to be suitable nesting and roosting sites and disturbance from humans during the nesting season.

Habitat is currently well met and well distributed in the Clara project area because of the high density of fish-bearing lakes. Three of the nests are in white pine and one is in an aspen tree. There is an abundance of super-canopy white pine and large aspen trees although the largest aspen are aging and declining in vigor, reducing their ability to support the weight of eagle nests.

Forest Plan direction

With the delisting of the bald eagle in 2007, management objectives identified by the Forest Plan on the Superior National Forest have changed from seeking to recover the species to seeking to maintain, protect and enhance its habitat and prevent federal listing. The following Forest Plan objectives, guidelines, and standards apply to bald eagles: O-WL-1, O-WL-2, O-WL-18, G-WL-11, G-WL 12 and S-WL-5. Eagles are still protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. On National Forest System lands bald eagles are also protected by the National Forest Management Act. Activities in the selected alternative will be managed according to the National Bald Eagle Management Guidelines (USDI 2007b).

Analysis Indicators

Indicators used relate to current and future nesting habitat and the potential for human disturbance from access on lower standard roads. Table BE-Eagle-1 includes the rationale for indicator use.

Table BE-Eagle-1: Bald Eagle Indicators for the Clara Project.

Analysis Indicator	***Rationale for inclusion***
1. Red and White pine type, 0-9 yrs old	*Indicates potential future habitat*

Table BE-Eagle-1: Bald Eagle Indicators for the Clara Project.

Analysis Indicator	***Rationale for inclusion***
2. Miles of temporary, unclassified, and OML 1 roads used for Clara project access	*Indicates a level of potential for human disturbance most likely to change during vegetation projects*
3. Acres of underplanting of white pine to increase within stand diversity within ½ mile of fish bearing waters	*To indicate habitat improvement activities which include increasing white pine as a component of other forest stands*
4. Acres of mature red and white pine treated to reduce fuels for improvement of eagle habitat	*To indicate habitat improvement activities which include forest health and wildfire effects*

Direct/Indirect Effects

Alternative 1

In the no action alternative, potential nesting habitat would be allowed to grow older. The amount of pine habitat for nesting and roosting would remain about the same as is found on the landscape today (MIH7 in Appendix I: MIH). No additional pine habitat would be added for future nesting and roosting areas, however white pine is currently found scattered throughout the analysis area in the understory though no timber stand improvement work would be done to improve its chances for survival. No sites would be disturbed by management activities. No fuel reduction would occur beneath existing riparian forest habitat. The amount of temporary and OML 1 roads in potential habitat would not be changed because of the Clara project, providing potential for human disturbance. In general, this alterative would have no additional effects than the existing condition. Currently eagles are successfully breeding and raising young in the Clara area.

Alternatives 2 and 3

Alternatives 2 and 3 have similar effects to eagle so are discussed together here.

Riparian underplanting of white pine specifically aimed at improving eagle and fisheries habitat would occur on about 10 percent of 169 acres of forest along streams and lakes. Of that riparian forest area, 128 acres are greater than 100 years old and all are over 88 years old. Within these same 169 acres, fuel reduction on 77 acres would be implemented to maintain and/or enhance white pine for bald eagles and reduce understory dead, down, and ladder fuel hazards to minimize the negative effects to white pine from unwanted wildfire. These actions would benefit eagles by reducing the risk of wildfire killing and consuming existing nesting and perching trees.

Both action alternatives could benefit eagle by increasing red and white pine in the landscape both through restoration of these forest types and diversity planting (under planting and interplanting) within other forest types. Red and white pine planting after harvest or mechanical site preparation would increase 0-9 year old pine type by 176 acres in each action alternative (Table BE-Eagle-2).

Table BE-Eagle-2: Bald Eagle Indicators by Alternative in the Clara Project Area.

Indicator	Alt 1	Alt 2	Alt 3
1. Acres of Red and White pine type 0-9 yrs old	0	176	176
2. Miles of temporary, unclassified. and OML 1 roads used for Clara project access	0	13.6	9.7
3. Acres of under-planting of white pine to increase within stand diversity within ½ mile of fish bearing waters	0	17	17
4. Acres of mature red and white pine treated to reduce fuels for improvement of eagle habitat	0	77	77

In addition to underplanting in riparian areas, within-stand treatments of interplanting and underplanting would increase white pine on 486 acres of upland forest in both action alternatives (Table 2.8) , but specifics would vary by alternative. Natural regeneration with interplanting of white pine, white pine/white spruce, or white pine/birch would increase the white pine component on the landscape on 374 acres in Alternative 2 and 138 acres in Alternative 3. Underplanting white pine or the combinations of species mentioned above in stands treated with mechanical fuel reduction would add white pine to 112 acres in Alternative 2 and 348 acres in Alternative 3. Although specifics would vary between Alternatives 2 and 3 the resulting effects would be to add the same amount of white pine to the landscape, increasing the opportunity for future nesting and perching sites and benefiting eagles. The close proximity of upland forest in Clara to lakes suitable for eagles would result in benefiting eagles in the long-term.

Existing low-standard roads include those that are currently unclassified, OML 1 and temporary access roads. Both action alternatives would allow access to areas within the project area that are not currently as accessible under the no action alternative. Alternative 2 would increase the use of low-standard roads by 13.6 miles while Alternative 3 would use 9.7 miles for access to treatments. The classification and use determination will occur under the forest-wide Off-Highway Management plan, outside the scope of the Clara project (see Cumulative Effects, below).

Management activities near eagle nests will follow the National Bald Eagle Management Guidelines (USDI 2007b) and are not expected to disturb eagles at their nests during the breeding season.

Cumulative Effects

The FEIS for the Forest Plan states that “additional impact to bald eagle would occur on lands outside of the National Forest jurisdiction. Specifically, cumulative effects related to habitat conditions such as red and white pine forest and human disturbances could occur” (USFS 2004d p. 3.3.4-16). Past land management activities on all ownerships have shaped the habitat that exists today for bald eagle in the project area. Appendix G: CumEffts of the Clara EA summarizes past, present and expected future management actions that might contribute to cumulative effects (USDA 2009).

The LE and MIH cumulative effects analyses included any of the projects where actions have occurred, are decided, or have been proposed. Timber harvesting of red and white pine can affect the availability of trees to eagles for nesting and perching. Past federal actions include thinning activities in pine stands (see Appendix G: CumEffts, Clara EA). Little impact to eagle foraging or nesting habitats is expected as a result of thinning operations. Thinning generally removes subdominant trees that are not preferred for nesting or perching. Forest-wide acreage of mature and older red and white pine is predicted to increase from the existing condition of 2.0% of the total of upland forest to 2.6% of the upland forest in all alternatives, meeting Forest Plan objectives to increase acreage and benefiting eagles (MIH summary, project file).

Using fire for restoration or fuel reduction may kill a few mature pine trees but can also create suitable conditions for pine regeneration and/or suitable perch or nest trees. Where fuel reduction activities would occur within ½ mile of suitable lakes, the activities primarily target young balsam and retain young pine wherever possible. Restoration activities such as mechanical site prep will generally leave overstory trees standing and favor tree regeneration. Fuels projects should not impact eagles because seasonal restrictions or other mitigating measures would be put in place to protect nesting eagles. The necessary mitigating measure would be identified during the specific fuels planning for each site.

Road construction on nonfederal land has the potential to disturb nesting eagles. Roads on National Forest lands available for motorized recreational use (all-terrain and off-highway vehicles) would decrease by 0.8 mile because of the Travel Management Rule decision, potentially reducing disturbance and benefiting eagles (Appendix G: CumEffts, Clara EA).

Nonfederal lands make up about 18% of the Clara project area. Residential development around Tait and Christine Lakes may reduce habitat quality and increase disturbance for eagles but private land represents only about 4% of land within the project boundary. State lands encompass approximately 14 percent (6,608 acres) of the project area. Based on stand information from the MN DNR website and discussions with the state resource planners, of those 6,608 acres, the State is currently proposing stand examinations and harvest needs on 1,650 acres within the project boundary through 2015. Minimal cumulative effects are expected as a result of timber harvesting on State and Private land.

Insignificant or discountable effects are expected from all other activities listed in Appendix G: CumEffts or within ½ mile of fish-bearing lakes. Overall, minimal cumulative effects would occur from the activities listed in Appendix G: CumEffts. Eagle populations are rising and cumulative impacts associated with this project are not expected to reverse this trend.

Determination

The proposed resource management activities planned in the project area may impact individuals but are not likely to adversely effect the eagle population. Habitat conditions (red and white pine) would remain the same or increase with the action alternatives.

Action alternatives would result in an increase of open roads within potential eagle habitat. Seasonal restriction and reserve tree design criteria on some management activities would mitigate potential negative effects from disturbance.

Operational Standards and Guidelines and Project Recommendations (See Appendix E: OpStdGdl and Unit Cards)

- Activities planned in the following units should not occur between Feb 15 and Oct 1 to protect nesting eagles (when nests are active). See the Unit Cards in the project file for the specific units to which this applies.
- Where they occur, all super-canopy red and white pine trees should be retained, where possible in the units that are within ¼ mile of bald eagle foraging areas. See the Unit Cards in the project file for the specific units to which this applies.
- If a new bald eagle nest is found during project implementation, activities would be temporarily halted in the area. The District Biologist would be consulted and appropriate mitigation measure would be designed and carried out prior to restarting operations.

Northern Goshawk – *Accipiter gentilis*

Existing Condition

Population and trend: The northern goshawk (hereafter goshawk) is a large forest raptor, occupying boreal and temperate forests throughout the Holarctic. *Accipter gentillis 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. Goshawk populations in the Lakes States may have been higher 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 (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.

There are no known goshawk nests in the Clara project area; however, it is a species that is difficult to find so presence is still assumed. Play call-back surveys between June 22 and July 11, 2007 failed to elicit any goshawk response (map and summary in project record). The best potential goshawk habitat in the analysis area is within the large mature upland patches in the northern portion of the Clara project area.

Habitat needs and limiting factors: Reynolds et al. (1992), Squires and Reynolds (1997), and others state that the 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 downed logs are needed for prey species habitat. Adults and fledglings use large down logs as feeding and plucking perches.

In eastern deciduous forests, goshawks prefer to nest in large forested areas containing more mature timber than is randomly available on the landscape. In Wisconsin, 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 with a mean canopy closure at the nest site of 82%. Boal et al. (2001) studied habitat use of nesting goshawks in northern Minnesota. Eighty-one percent of 46 nests in northern MN were built in aspen, 11% in paper birch, 4% in white pine, and 2% each in red oak and red pine. Nesting stands in MN had similar stand structures with 1.1m to 3.5m between the bottom of the overstory and the top of the understory trees (Boal et al. 2001).

Goshawks forage in mature forest habitats. In Minnesota, goshawks preferentially used older (>50 years) upland deciduous and deciduous mixed stands. 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 were consistent among stand types.

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). 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). 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).

Analysis Indicators
1) Acres and percent of mature upland forest which is suitable habitat for goshawk (MIH1 50+ yrs)

2) Acres and number of large (>300 acres) mature upland patches and percent change in 2014 compared to the existing condition in 2008 and in 2004.

Direct/Indirect/Cumulative Effects to Goshawk Habitat
Alternatives 1-3

<u>Goshawk Indicator 1: Mature Upland Forest (MIH1 50+ yrs)</u>

The relative abundance of different vegetative growth stages is important in determining the quality and quantity of goshawk foraging habitat. The mature and older forest growth stage is considered to be the most critical in defining foraging habitat and optimal

conditions occur when 40-80% of the uplands exist as mature habitat (50+ years). Between 55-65% of the upland habitat in Clara would be suitable under any alternative (Table BE Goshawk-1). There would be a slight decrease in existing suitable habitat under Alternative 1 (No-Action) by the year 2014. Alternative 3 would maintain more suitable habitat (59%) than Alternative 2 (55%) but less than Alternative 1 (65%). All the alternatives would maintain suitable habitat above the desired 40%.

There are no past, present or reasonably foreseeable Forest Service vegetation management actions in the project area that would significantly affect northern goshawk habitat (Appendix G: CumEffts, Clara EA). Restoration and fuel reduction activities are expected to improve habitat by increasing prey diversity and improving forest flight pathways. The proportion of mature and old/old growth and multi-aged forest on the landscape varies little between alternatives and remains above 50% (MIH summary, project record).

Nonfederal lands (9% of project area) will continue to provide habitat and add to forest patches in some areas but suitable habitat is likely to be harvested on other nonfederal lands. We expect that most of the mature forest stands on state and private lands will continue to provide suitable habitat conditions for goshawks (Appendix G: CumEffts, Clara EA).

Table BE-Goshawk-1: Northern Goshawk: Effects on suitable habitat by 2014.

	2008 Existing Condition	***Alternative 1 (No Action)***	***Alternative 2***	***Alternative 3***
Upland forest considered suitable habitat for goshawk in the Clara portion of the MBASF landscape ecosystem. [a]				
Acres	*17,825*	*16,374*	*13,861*	*14,982*
Percent[b]	*70*	*65*	*55*	*59*

[a] Total upland acres (MIH1) within the Mesic birch-aspen-spruce-fir portion of the project area in 2008 = 25,300. Suitable goshawk habitat = mature uplands > 50 years old (MIH1 50+). [b]Percent of total upland acres that are mature or older. Effects by alternative are projected to year 2014.

Goshawk Indicator 2: Mature upland patches

Within the project area, between one (Alt 1), two (Alt 3) and four (Alt 2) mature upland forest patches would decrease below 300 acres by 2014 (See Mature Upland Patch Section of EA 3.4). As a result of past management actions and succession, the southern half of the Clara project area provides marginal habitat conditions under any alternative. The best potential for nesting goshawks remains in the northern half of Clara where the largest blocks of mature forest remain. All of the alternatives would maintain potential nesting habitat.

Cumulative effects include all management actions from past, present, and reasonably foreseeable projects in the project area. Forest Plan direction for Spatial Zone 3 is to strive to minimize the decrease in number and acres of patches. Based on our model, conditions under Alternative 2 show 165 large forest patches compared to Alternative 1 (169 patches) or Alternative 3 (167 patches) (See Mature Upland Patch Section of EA

3.4)). The Forest Plan FEIS indicated that by following forest type and age objectives, the Forest would likely lose acres and numbers of upland mature patches and connectivity (p. 3.2-60 to -61) in all three spatial zones for at least two decades. Based on analyses for this project, the trend for forest-wide Spatial Zone 3 large patches is consistent with predictions from the Forest Plan and recent forest-wide monitoring results (USDA 2008e).

Cumulative effects as a result of future timber harvest on non-federal lands are anticipated to be minimal. State harvesting could contribute to fragmentation, especially in the large upland patch near Crescent Lake. Maintaining large forest blocks on federal lands will help to mitigate these effects. County and private land ownership amounts to 4-5% of the project area. Activities on these lands are expected to have minimal effects on upland mature forest patches.

Habitat fragmentation may make goshawks more vulnerable to predators and affect species distribution. 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. The projected reduction in large forest patches and in interior forest discussed in the Clara EA is consistent with the trends predicted in the Forest Plan EIS. Project alternatives would attempt to offset further fragmentation of the landscape by maintaining large, contiguous mature patches of forest and creating large, contiguous patches of young forest.

Determination
Cumulative effects on suitable goshawk habitat and upland mature patches are expected to be minimal and within the projections of the Forest Plan. For all the reasons listed above, we conclude that the Clara EA alternatives *may impact individuals but are not likely to cause a trend to federal listing or loss of viability* for the northern goshawk

The proposed resource management activities planned in the project area may impact goshawk individuals or pairs but are not likely to cause a trend to federal listing or loss of viability. In summary, analysis indictors predict both positive and negative changes to goshawk habitat that could have both positive and negative effects on goshawk individuals or pairs. With all the action alternatives, within stand complexity would increase thereby potentially improving conditions for foraging and nesting goshawks. All Alternatives would result in greater than 40% suitable habitat within the project area in the next decade. There are no known territories within the project area. Alternative 2 would result in more risk to goshawk pairs in the project area than the other alternatives due to the amount suitable habitat being harvested and the effects on large mature patches; however, the risk would be low. All alternatives would maintain habitat well-distributed across the project area and none of the alternatives would result in a negative trend in viability for northern goshawk populations.

Operational Standards and Guidelines and Project Recommendations (See Appendix E: OpStdGdls and Unit Cards)

- G-WL-11 Avoid or minimize negative impacts to known occurrences of sensitive species.

- CP-WL-2 The Biologist or Botanist may identify other species of concern specific to the project area. A list of species of concern and important habitat components will be provided to the implementation crew prior to layout operations. If any threatened, endangered or sensitive plants and animals or their nests, dens or roost trees are found during planning layout or operations, activities would be temporarily halted in the area and the District Biologist or Forest Botanist would be notified. The District Biologist or Botanist would assess the risk to species and where appropriate; mitigation measures would be implemented prior to restarting operations. The Forest Plan, recovery plans and conservation strategies will be used when making mitigation recommendations.

- S-WL-6 Prohibit management activities within 300 feet of known nest sites.

- G-WL-13 Minimize activities that may disturb nesting pairs during critical nesting season (March 1-June 1).

- CP-WL-3 If any tree with a large stick nest is discovered, this tree and a 150 foot buffer (to provide wind shelter and cover) should be retained (excluded from harvest). Look for opportunities to incorporate nest tree into reserve tree clumps or legacy patches. Nest tree and/or buffer may be removed if District Biologist visits site and determines that protection is not warranted

- S-WL-10 At northern goshawk nest sites with an existing nest structure, prohibit or minimize, to the extent practical, activities that may disturb nesting pairs in an area of 50 acres minimum (860 ft. radius) during critical nesting season (March 1 – August 30). At northern goshawk nest sites in an area of 50 acres minimum (860 ft. radius), to the extent practical, allow only those activities that protect, maintain, or enhance high quality habitat conditions: 100% mature forest (>50 yrs old) with continuous forest canopy (>90% canopy closure) and large trees with large branches capable of supporting nests.

- G-WL-22 Within northern goshawk post-fledging areas, minimize activities, to the extent practical, that may disturb nesting pairs during critical nesting season (March 1 – August 30) and, to the extent practical, within a 500 acre area encompassing all known nest areas within the territory: Maintain suitable habitat conditions on a minimum of 60% of the upland forested acres in post-fledging areas. Suitable habitat: jack pine and spruce/fir forest types >25 years and all other forest types >50 years with semi-closed to closed canopy (>70%). Aspen and birch forest types 25-50 years may be considered suitable if field review verifies that foraging habitat trees average 50 feet tall and canopy closure is 50-70% or greater.

Boreal Owl - *Aegolius funereus*

Existing Condition

Population and trend: Boreal owls occupy boreal forests throughout the northern hemisphere. In the U.S. east of the Rocky Mountains, breeding has been confirmed only in Minnesota, and then primarily in northeastern Minnesota. The population of boreal owls in Minnesota is part of a larger Canadian population and may not be viable by itself (USDA Forest Service 2004a, Niemi 2003). Population trends are difficult to detect given normal large population fluctuations and low precision of survey estimates. As with other northern owl species, populations are cyclical and tied to the abundance of prey (small mammals) in an area. The breeding population of boreal owls in Minnesota was estimated to range between 100-600 individuals (Lane 2000), but declines in local survey indices may indicate a reduction in the local breeding population (Lane 2001). Home range size for radio-tagged boreal owls on the Superior National Forest is highly variable (Lane 2000, Niemi 2003). Home range size is likely dependent on prey density and other factors.

During 20 years of inventory, Lane (pers. comm.) has tallied numerous nesting sites within the project boundaries or on survey routes crossing the project boundaries. Only one of these nest cavities was located in a stand proposed for treatment in this project. None of these sites have been active for six years (Lane pers. comm.). No vocalizations have been heard since 2005 and nest boxes erected for boreal owl use have not been occupied by this species.

Habitat needs and limiting factors: The glacial topography of upland ridges and adjacent lowlands is a key feature of boreal owl habitat in northeastern Minnesota. Landscape heterogeneity of mixed upland forests with high densities of cavity trees mixed with conifer dominated uplands and lowlands and small openings for foraging appear to provide the best quality habitat in this part of the owl's range (Niemi 2003). Upland conifer and upland mixed stands are also used for nesting, foraging and roosting. Roost sites are generally within 100 meters of lowland conifer stands (Niemi 2003). Boreal owls rely on species such as pileated woodpeckers and northern flickers to excavate cavities. Limiting factors may be the right combination of nesting, foraging and roosting habitat and possibly the distribution of these habitats and cavity trees. Other limiting factors include automobile collisions and low prey density.

Analysis Indicators

Nesting habitat is generally provided by upland aspen and aspen-conifer mix forest with large diameter (>12") trees suitable for nesting cavities. To consider nesting habitat on a coarse scale, I summarized acres of mature aspen-birch and mixed aspen-conifer forest (MHI 4 mature (50 years) and older) for 2014 by alternative. I summarized foraging and roosting habitat as acres of lowland black spruce and tamarack forest greater than 60 years old (MIH9 mature and older).

To refine the analysis, hypothetical territories were considered where large lowland patches (>500 acres) occur with adjacent upland nesting habitat (Project file: Clara_Alt2_boreal_owl_habitat.pdf and Clara_Alt3_boreal_owl_habitat.pdf). There are only two areas approaching 500 acres of mature plus, lowland conifers that are intermixed with uplands, one near Brule Lake and one on the west edge of the project area west of White Pine Lake. Both of these two lowland patches will remain intact and no treatments are planned in adjacent stands. Other smaller patches of mature lowland patches retain some adjacent upland mature forest to provide nesting habitat should boreal owls choose to nest there.

Direct/Indirect Effects

Alternatives 1-3

One large lowland complex identified as potential owl foraging habitat with adjacent potential nesting habitat, on the east side of the Clara project area east of Mistletoe Lake, was identified and removed from treatment consideration in the early project planning stages. Numerous other small mixed complexes occur throughout the project area. No boreal owls have been recorded in recent years during annual owl surveys in the project vicinity (B. Lane, pers. comm.).

Stand prescriptions developed for the Upper Caribou project, to retain canopy in stands near historical nest or vocaliztion locations, have been applied in the action alternatives of the Clara project.

Direct and indirect effects on mature deciduous types and lowlands in the project area in 2014 are summarized in Table BE-Owl-1. Alternative 1 (no action) would retain more of the mature aspen-birch type (36%) than Alternative 2 (31%) or Alternative 3 (35%). The decrease from the existing condition of 52% is largely a result of successional changes in mature and older forest as it dies and then regenerates to predominantly young forest with scattered old trees which may provide nesting opportunities.

However, not all of the mature aspen-birch type measured in Table BE-Owl-1 exists adjacent to adequate foraging habitat, therefore the actual effect on potential nesting habitat is less. The spatial arrangement of lowland foraging areas and upland nesting areas is important in identifying suitable boreal owl habitat.

The Forest Plan objective for boreal owl habitat in suitable areas is to "*maintain or restore quality habitat conditions: suitable nesting habitat adjacent to or within ½ mile of foraging and roosting habitat*". Alternative 1 would maintain more of the existing boreal owl habitat type by not proposing any harvesting but much of the aspen and birch component could be lost as the stands mature. Of the action alternatives, Alternative 2 would be more likely to temporarily displace nesting birds than Alternative 3 due to the additional harvest proposed. Alternative 3 will retain more potential nesting trees than Alternative 2 as a result of less harvesting. However, Alternative 2 restores more of the aspen/birch type by harvesting and may maintain more habitat in the long-term. The aspen and birch trees are being replaced by spruce and fir in some of the older stands and harvesting would result in restoration of these species.

In summary, all Alternatives protect quality boreal owl habitat conditions in suitable areas through maintaining existing potential nesting habitat and by applying standards, guidelines and recommendations (see below). Impacts to potential nesting habitat have been addressed in the action alternatives through deferral of harvesting in some areas and by retaining large diameter aspen and birch in reserve areas along the wetland/upland interface.

Table BE-Owl-1: Effects on mature hardwood and lowland forest types within the Project Area

	Existing Conditions 2008	**Alternative 1 (No Action) 2014**	**Alternative 2 2014**	**Alternative 3 2014**
Mature aspen/birch and mixed aspen-conifer forest (MIH4 mature +) in the MBASF portion of the Clara Project Area [a]				
Acres	13,227	9,141	7,856	8,821
% of MIH 4	52%	36%	31%	35%
Mature lowland conifers(MIH 9 mature+) in the MBASF portion of the Clara Project Area [b]				
Acres	3,159	3,292	3,292	3,292
% of Lowlands	79%	83%	83%	83%

[a] For the mesic birch-aspen-spruce-fir landscape ecosystem portion of the project area: total MIH4 acres in 2008 equals 18,280 acres.
[b] Total lowland acres (MIH9) within the lowland conifer landscape ecosystem portion of the project area in 2008 and 2014 = 3,978.

There would be no effects from any of the alternatives on foraging habitat for boreal owls. Acreage of mature lowland black spruce is expected to increase in the project area by 2014 as stands mature and move out of the sapling-pole age group and into mature age group (Table BE-Owl-1).

Cumulative Effects
The cumulative effects on mature MIH4 habitats are summarized in Table BE-Owl-2. A 5% total reduction in mature and older aspen-birch and mixed aspen-conifer habitats is predicted for the landscape ecosystem (decrease in mature, increase in old-growth) by 2014. All but 300-400 acres of this decrease is a result of succession of mature forest to Old/Old Growth and Multi-Aged forest.

Boreal owls will also use scattered birch and aspen within conifer stands for nesting. Therefore, the effects of a reduction in the aspen birch types across the landscape may be lessened by the increase in spruce-fir forest types and by maintaining tree diversity within treatment units. The Forest Plan BE predicts very little change to mature lowland habitats within the first decade (USDA 2004a) which is consistent with project level impacts on lowlands.

Table BE-Owl-2. Cumulative effects on the Mesic Birch-Aspen-Spruce-Fir Landscape Ecosystem

Management Indicator Habitat	2008 Existing Condition		Condition in 2014 (Alt 1)		Condition in 2014 (Alt 2)		Condition in 2014 (Alt 3)		Forest Plan	
									Objectives Decade 1*	2004
	Acres**	%**	Acres**	%**	Acres**	%**	Acres**	%**		%
MIH 4: Aspen-Birch and Mixed Aspen-Conifer Forest										
Young	8165	2.7	9718	3.3	11985	4.0	10984	3.7	+	7.1
Pole	57,715	19.4	61576	20.7	61597	20.7	61669	20.8	n/a	15.4
Mature	51,296	17.3	28687	9.7	28202	9.5	28348	9.5	-	21.4
Old/Old Growth and Multi-Aged	59,159	19.9	66579	22.4	65779	22.2	66598	22.4	+	15.9
Totals:	176,334	59.3	166,559	56.1	167,563	56.4	167,600	56.4		

Data Source: Queries for MBA LE MIH 1-10, forest-wide. This includes existing condition through 2008 and all decisions and proposals, including Alt. 1-No Action and Alt. 3 through 2014**,** 09/19/08. It includes Table BEIS-11- Superior NF LEs: Jack Pine-Black Spruce , Dry Mesic Red & White Pine, Mesic Red & White Pine, Birch-Aspen-Spruce-Fir, Upland within Lowland Conifer, Succession Modeling Rules for the Dualplan Harvest Model, pp. B-17 and B-18.
*Table MBA-4. Management Indicator Habitat Objectives for MBA LE, Forest Plan, July 2004, pp. 2-72.
**Acres, percentages, and total percentages have been rounded to the nearest tenth and hundredth. Percents represent % of total upland forest on NF system lands (total acres in MIH 1: Existing Condition) in models for MIHs 1-8.

There are no past, present or reasonably foreseeable Forest Service vegetation management actions in the project area that would significantly affect boreal owl habitats (Appendix G: CumEffts, Clara EA). Fuel reduction activities could remove young conifers that serve as roost trees. These effects are expected to be minimal due to the number of acres being treated and recommendations to retain young conifers near potential cavity trees. Restoration activities are likely to improve habitat conditions by creating vegetative diversity and increasing the conifer component in hardwood stands. Forest-wide, old-growth uplands and mature lowland forest types are expected to increase which may benefit this species (Table BE-Owl-2).

Nonfederal lands (about 18% of project area) will continue to provide habitat and add to forest patches in some areas but suitable habitat is likely to be harvested on other nonfederal lands. We expect that most of the mature upland and lowland forest stands on state and private lands would continue to provide habitat potential for boreal owls (Appendix G: CumEffts, Clara EA).

Results of the analysis for this project are consistent with the cumulative effects expected in the Programmatic BE for the Forest Plan which portray a reduction in available nesting and foraging habitat and increased fragmentation during Plan implementation. Cumulatively, a negative trend in viability for boreal owl is not expected due to the lack of disturbance of boreal owl foraging habitat in this project compared to the amounts available forest-wide, the availability of nesting habitat across the landscape and the maintenance of leave trees and legacy patches in treatment units.

Determination
The proposed resource management activities planned in the project area *may impact individuals of boreal owl but are not likely to cause a trend to federal listing or loss of viability*. All action alternatives would reduce mature aspen-birch forest types in the project area; however, some of the upland mature forest stands adjacent to lowlands would be left undisturbed and suitable nest trees and legacy patches would be reserved within harvest units. As a result, habitat would remain present and well distributed across the project area. An increase in the conifer component and within-stand diversity/complexity in the project area as a result of the action alternatives could improve boreal owl habitat conditions in the long-term. A negative trend in viability for boreal owl is not expected due to the availability of nesting and foraging habitat across the landscape, the retention of potential nesting habitat and the maintenance of leave trees and reserve islands in harvest units. All Alternatives are consistent with the forest plan O-WL-18, G-WL-11, G-WL-12 and S-WL-5, O-WL-20, S-WL-6 and G-WL-3.

Operational Standards and Guidelines and Project Recommendations (See Appendix E: OpStdGdl and Unit Cards)

- G-WL-11 Avoid or minimize negative impacts to known occurrences of sensitive species.

- CP-WL-2 The Biologist or Botanist may identify other species of concern specific to the project area. A list of species of concern and important habitat components will be provided to the implementation crew prior to layout operations. If any threatened, endangered or sensitive plants and animals or their nests, dens or roost trees are found during planning layout or operations, activities would be temporarily halted in the area and the District Biologist or Forest Botanist would be notified. The District Biologist or Botanist would assess the risk to species and where appropriate; mitigation measures would be implemented prior to restarting operations. The Forest Plan, recovery plans and conservation strategies will be used when making mitigation recommendations.

- S-WL-6 Prohibit management activities within 300 feet of known nest sites.

- G-WL-13 Minimize activities that may disturb nesting pairs during critical nesting season (March 1-June 1).

Black-throated blue warbler – *Dendroica caerulescens*

Existing Condition
Population and trend: This species is considered widespread and relatively abundant with no evidence of large scale declines over its entire range (NatureServe 2008). On the Superior National Forest this species has a very limited range where it is found nesting primarily in northeastern Minnesota in Cook and southeastern Lake Counties, however singing males are found across the forest. NRRI bird monitoring on the Superior National Forest shows black-throated blue warbler rate of increase was >9%, but they

were tested on 11 or fewer stands and their trends may be more susceptible to site-specific influences than other species (Danz et al. 2008).

There are two historical observations of black-throated blue warblers during breeding season in the Clara project (MN DNR 2007). No activities are planned near those observation sites. During the 2008 early breeding season a black-throated blue warbler was heard north of stand 7-63-02. The prescription for 7-63-02 will maintain structure and suitable nesting habitat in portions of the stand.

Habitat use and limiting factors: This species uses large contiguous hardwood forests and is probably associated with small gaps and a well-developed understory. Black-throated blue warblers breed mainly in large, more or less continuous tracts of relatively undisturbed deciduous or mixed deciduous/coniferous forests (Holmes et al. 2005, USFS 2001-2004CA). It nests in small trees, saplings, or shrubs in dense undergrowth, within about a meter of the ground (NatureServe 2008). Black-throated blue warblers have been considered an area sensitive species but it is not yet clear how fragmentation impacts abundance, spatial distribution or population dynamics (Holmes 2005). Risk factors include timber harvest (including thinning and partial harvest), forest fragmentation, reduction of mature forest patch size, and cultured forests that remove structure. Analysis of changes to shrub cover were considered but shrub reduction was not considered a risk in the Clara area. A review of Kearns et al. (2006) showed a large difference in shrub layer species between the research plots and the Clara area and there is a high relative abundance of deciduous shrubs and small balsam fir in the Clara stands (Clara project file, stand surveys).

Analysis Indicators
For this analysis the indicators measured acres and percent of mature upland forest (MIH 2).

Table BE-BTBW-1: Indicators for Black-throated blue warbler.

	2008 Existing Condition	Alt 1 in 2014	Alt 2 in 2014	Alt 3 in 2014
MIH 2: Upland Deciduous Forest, Mature and Older				
Acres in Clara	13,247	9,161	7,876	8,841
Change from Existing condition	0	4,086	5,371	4,406
Percent in Clara	52	36	31	35
Percent Forest-wide	41	36	36	36

Direct/Indirect Effects
Alternative 1
No direct effects are expected. Indirectly, changes in habitat suitability would occur as mature and older forest ages, and mature canopy succeeds to young forest with scattered old trees. Approximately 16% of mature aspen-birch forest habitat (MIH 2) would succeed to spruce fir forest (MIH summary, project file). 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 16% decrease in habitat for the black-throated blue warbler as compared to the existing condition.

Alternatives 2 and 3
Direct effects could occur with all action alternatives in the form of disturbance from timber harvest and road construction and use during the nesting season. The risk of these potential impacts is generally expected to be low and within acceptable risk levels. Forest plan standards and guidelines would be implemented to protect known sites where the species occur. Table BE-BTBW-1 provides the results of the indicators analysis.

Alternative 2 would result in 21 % less mature upland deciduous forest habitat than existing condition and Alternative 3 would result in a 17% decrease. The majority of this change would result from forest succession and a lesser amount from implementing 2,223 acres of clearcut with reserves harvest in Alternative 2 and 1,622 acres in Alternative 3. Project-wide habitat would continue to be well distributed.

In general, Alternatives 2 and 3 would result in a decrease in habitat for the black-throated blue warbler. Both alternatives reduce the amount of suitable habitat for black-throated blue warblers, but the level of habitat remaining (MIH 2, mature and older) is within the levels projected for the range of natural variability (RNV) in the FEIS (USDA 2004d, page 3.3.1-7) where conditions in 2004 were three times the amount expected in RNV. Individual black throated blue warblers may be affected by a reduction in nesting habitat.

Cumulative Effects
All alternatives would increase fragmentation of large, mature patches, reducing the forest-wide number of large patches by 1 in Alternative 1, by 4 in Alternative 2 and by 2 patches in Alternative 3 (Sect. 3.4, Clara EA). Management activities on intermingled state, county, and private lands managers may also reduce the present level of large blocks of mature upland forest in the cumulative effects areas.

On national forest the amount of mature upland deciduous forest (MIH 2) will decrease but old/old growth and multi-aged upland deciduous forest increase; both age groupings moving in the desired direction of the Forest Plan (USDA 2004c). It would be difficult for and unlikely that other ownerships, or combinations of ownerships, would provide very much suitable interior habitat. 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 because all alternatives will maintain well distributed habitat. Large, mature patches and interior forest habitat would be reduced but nesting habitat acreage would remain above RNV in all alternatives.

Vascular Plant, Lichen, and Bryophyte Sensitive Species

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 Clara Project area. The area covered by the cumulative effects analysis includes lands of all ownerships within the Clara 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 direct, indirect, and 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). 2019 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 BE-Plants-1). 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 2004c); they were updated in 2007 (USDA 2007).

- **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
  This group is not included. No cliffs or talus slopes occur in the project area.

- **Habitat group 3**: RFSS plants of upland disturbed areas (old landings, old roadbeds, etc.)
  Indicators: Acres of upland commercial timber harvest, and miles of road impacted by construction 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 existing corridors that have grown in but which would be opened back up to provide stand access.

- **Habitat group 4:** RFSS plants of forested wetlands
  Indicators: Miles of new lowland road construction on FS lands. Miles of lowland road construction is a good indicator for this habitat because lowland road construction can cause direct impacts to this habitat. This indicator includes both temporary and classified roads.

- **Habitat group 5**: RFSS plants of northern hardwood forests (sugar maple, basswood, yellow birch, red oak)
  This group is not included. None of this habitat type occurs in the proposal.

- **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 BE-Plants-1. Indicators 1-5 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*	*0*	*1*	*1*
2*. Miles of new lowland road construction on FS lands*	*0*	*0.6*	*0.5*
3*. Miles of new upland road construction on FS lands*	*0*	*7.1*	*4.1*
4*. Miles of road impacted by construction activities*	*0*	*3.0*	*2.2*
5*. Acres of upland commercial timber harvest*	*0*	*3701*	*3014*

Sensitive plant survey results

Rare plant surveys were conducted in the Clara Project area in 2007 by Forest Service contract botanists and by Forest Service botanists. Approximately 1,012 acres of the project area were surveyed in 2007 by either 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 found 2 new occurrences of the TES plant Canada yew in the Clara analysis area; neither is in stands proposed for treatment. Details of survey results can be found in Schmoller (2007). Forest Service botanists found no new TES plants during surveys (USDA Forest Service 2008c). In addition to rare plant surveys conducted for the project, the MNDNR Natural Heritage Database (MN DNR 2007) was queried to locate known populations of rare plants in the project area.

All sensitive vascular and non-vascular plant species known or suspected to occur in the project area are displayed in Table 3-RFSS-1, with habitat descriptions found in Attachment 1 (BE Summary Table). These species are analyzed further in this BE. The remaining Superior National Forest RFSS plants do not have suitable habitat in the project area and are not analyzed further.

One RFSS plant, moschatel, occurs in a stand proposed for a mechanical fuels reduction, Compartment 97 Stand 13.

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 3-RFSS-1): alpine milkvetch, swamp beggar-ticks, floating marsh-marigold, Katahdin sedge, linear-leaved sundew, neat spike rush, moor rush, auricled twayblade, fall dropseed muhly, American shoregrass, dwarf water lily, club-spur orchid, northern bur-reed, awlwort, and lance-leaved violet. No populations of any of these species occur in proposed treatment units. There are 1,233 acres of this type of wetland and riparian habitat scattered throughout the Clara Vegetation Management project area.

Direct/Indirect Effects
Alternative 1
There would be no ground disturbance occurring under Alternative 1. Therefore, there would be no direct or indirect effects to any of these species.

Alternative 2
Indicator 2 – Miles of new lowland road construction on FS lands.
There would be no direct negative effect of timber harvesting under alternative 2 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. Temporary 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 Appendix E: OpStdGdl), so no long term negative impacts are expected to suitable habitat for these RFSS plants. Based on Indicator 2, 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 2 – Miles of new lowland road construction on FS lands. The types of impacts of alternative 3 to suitable habitat for plants in this habitat group would be similar to the impacts of alternative 2 described above. Alternative 3 would affect slightly less habitat than Alternative 2, based on the number of miles of new lowland road construction on Forest Service lands (Table BE-Plants-1). Less than 1% of the acreage of all wetland types would be directly impacted by creation of lowland roads under alternative 3, so impacts to suitable habitat would be very minor.

Cumulative Effects

For alternative 1, there would be no cumulative effects to these species since no ground disturbance would occur under Alternative.

There would be few cumulative effects of Alternatives 2 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, or roads associated with possible state or county timber sales (Appendix G: CumEffts), 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 2 and 3 would have only minor direct and indirect negative effects on the suitable habitat for these species. Alternative 2 would impact a slightly greater amount of suitable habitat than Alternative 3, based on the miles of new lowland road construction on FS lands by alternative (Table BE-Plants-1).

Determination

For Alternative 1, the proposed activities would have no impact on alpine milkvetch, swamp beggar-ticks, floating marsh-marigold, Katahdin sedge, linear-leaved sundew, neat spike rush, moor rush, auricled twayblade, fall dropseed muhly, American shoregrass, dwarf water lily, club-spur orchid, northern bur-reed, awlwort, and lance-leaved violet.

For Alternatives 2 and 3, the proposed activities may impact individuals of alpine milkvetch, swamp beggar-ticks, floating marsh-marigold, Katahdin sedge, linear-leaved sundew, neat spike rush, moor 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.

Habitat Group 2: RFSS plants of cliffs and talus slopes

Based on field observations in the analysis area and on the amount of Ecological Landtype 18 in the analysis area, there is only a small amount of suitable habitat for plants in this habitat group in the analysis area, with no habitat in stands proposed for treatment. Therefore, this suite of plants is not analyzed in this BE.

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 3-RFSS-1): 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.

Direct/Indirect Effects
Alternative 1
Indicators 4 and 5. There would be no ground disturbance occurring under Alternative 1. 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 2001-2004CA), 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, and they depend to some degree on disturbance to create suitable habitat.

Alternative 2
Indicator 4 – Miles of road impacted by construction activities. There are no known occurrences of species in this habitat group on or near old road corridors that would be reconstructed and used during the Clara project, so direct impacts to known occurrences are not expected. However, construction activities that re-open old, grown-in road corridors would cause direct and indirect short-term negative impacts to suitable habitat for these *Botrychium*. Ground disturbance associated with road construction 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 grown-in road corridors impacted by construction would still serve as suitable habitat, since nearly all of these roads would temporary roads in the Clara Project, and old temporary roads are frequently where these species get found. 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 (USDA2001-2004CA), 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 like mechanical fuels reduction and mechanical site prep. Ground disturbance associated with these activities 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 (USDA2001-2004CA), 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 could have direct and indirect short term impacts to suitable habitat for these *Botrychium* species. In the short term, some suitable gravel pit habitat could be impacted through gravel use. 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 (USDA2001-2004CA), 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 road impacted by construction activities

The types of impacts of alternative 3 to plants in this habitat group would be identical to the impacts of alternative 2 described above. Alternative 3 would impact slightly less suitable habitat than alternative 2, based on the value for indicator 4 (Table BE-Plants-1). The impact to suitable habitat from construction activities would be minor.

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 2 described above for Indicator 5. Alternative 3 would affect less habitat than Alternative 2, based on the acres of upland commercial timber harvest (Table BE-Plants-1). Therefore, impacts to plants in this habitat group would be higher under alternative 2.

The proposals for gravel pit use do not differ between alternatives 2 and 3, so the impacts of gravel pit use under alternative 3 to plants in this habitat group would be identical to alternative 2.

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 1 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 and road building) have occurred within the cumulative effects analysis area as have occurred within the direct/indirect effects analysis area. 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 3 would have lower impacts to suitable habitat for species in this group than Alternative 2, based on an analysis of Indicators 4 and 5 (Table BE-Plants-1).

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 have suitable habitat in the analysis area (Table 3-RFSS-1): small shinleaf, cloudberry, fairy slipper, ram's head ladyslipper, *Caloplaca parvula, Cetraria 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 no known occurrences of any of these species in or near treatment units in the project area. There are approximately 5,422 acres of stands typed as forested wetlands habitat in the project area.

Direct/Indirect Effects
Alternative 1
Indicators 2. There would be no ground disturbance occurring under alternative 1. Therefore, there would be no direct or indirect effects to any of these species.

Alternative 2
Indicator 2 – Miles of new lowland road construction on FS lands. Alternatives 2 and 3 propose nearly the same amount of lowland road construction, 0.6 miles and 0.5 miles,

respectively (Table BE-Plants-1). All the roads proposed for construction are temporary roads. For alternative 2, lowland roads constructed through forested wetlands would potentially cause direct negative impacts (for example, compaction of wetland soils that the plants could be growing in) and indirect negative impacts (i.e. increased light levels or change in vegetative composition) to some suitable habitat for these species. However, impacts such as rutting and compaction would be minimized because construction and use of these temporary roads 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.

Because no timber harvest in lowland forests is proposed for alternatives 2 or 3, there would be no timber harvest-related impacts to these species.

There would be no impacts to species in this habitat group from other proposed project activities associated with Alternative 2.

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 2 described above for Indicator 2. Alternative 3 would affect slightly less suitable habitat than Alternative 2, based on analysis of Indicator 2 (Table BE-Plants-1). As described above for Indicator 2 under alternative 2, the impacts of lowland road construction to suitable habitat in alternative 3 would be minor.

Because no timber harvest in lowland forests is proposed for alternatives 2 or 3, there would be no timber harvest-related impacts to these species.

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

Cumulative Effects
For alternative 1, there would be no cumulative effects to these species since no ground disturbance would occur under alternative 1.

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, 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 EA Appendix G: CumEffts

for a summary of current and future timber harvest acres on federal and state 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 or roads for state or county timber harvest, 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 2 would have the greatest impacts to suitable habitat, followed by Alternative 3, based on an analysis of Indicator 2 (Table BE-Plants-1).

Determination
For alternative 1, the proposed activities would have no impact on small shinleaf, cloudberry, fairy slipper, ram's head ladyslipper, *Caloplaca parvula, Certraria aurescens, Frullania selwyniana, Menegazzia terebrata, Ramalina thrausta, Sticta fuliginosa, Usnea longissima,* and *Pseudocyphellaria crocata.*

For Alternatives 2 and 3, the proposed activities may impact individuals of small shinleaf, cloudberry, fairy slipper, 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
There is only a small amount of suitable habitat for plants in this habitat group in the analysis area, and no sugar maple stands or stands with a sugar maple component are proposed for treatment. However, there are two proposed treatment stands (Compartment 97 Stands 1 and 13) that contain both suitable northern hardwood forest habitat and also an occurrence of the RFSS plant moschatel. This stand is unusual in that it is a 41 year old red pine plantation with a very depauperate ground layer plant

community. However, within the stand there are windrows where soil and debris were pushed during site prep for the red pine stand. Growing in the windrows are all the understory indicator species for a northern hardwoods forest type, and it is in these windrows where the moschatel occurs. Most likely the stand was a northern hardwoods stand in the past, but was converted to red pine, and during site preparation most of the soil ended up in the windrows. The following analysis is for the moschatel occurrence in Compartment 97 Stands 1 and 13.

Direct/Indirect Effects

Alternative 1

There would be no ground disturbance occurring under alternative 1. Therefore, there would be no direct or indirect effects to any of these species.

Alternative 2

Impacts to the windrows where the moschatel occurs would be minimized by avoiding them during fuels reduction activities. During mechanical fuels reduction, piles of cut fuels would not be placed in the windrows where the moschatel occurs. If mechanized equipment is used for fuels reduction, equipment would not operate in designated windrows. Designated windrows would not be used as control lines if the stands are included in a prescribed burn. If the stand as a whole is prescribed burned, the burning would only cause minimal impacts to the moschatel. By avoiding piling fuels jackpots on designated windrows, impacts to the known moschatel occurrence would be minimized.

No other suitable northern hardwoods habitat occurs in any proposed treatment units, so there would be no other impacts in alternative 2 to species in this habitat group.

Alternative 3

The same avoidance mitigations for moschatel would apply in alternative 3. The potential impacts of alternative 3 to moschatel would be the same as those described above for alternative 2.

No other suitable northern hardwoods habitat occurs in any proposed treatment units, so there would be no other impacts in alternative 3 to species in this habitat group.

Cumulative Effects

For alternative 1, there would be no cumulative effects to these species since no ground disturbance would occur under alternative 1.

Because there is so little suitable habitat for species in this habitat group in the analysis area, and because the direct and indirect impacts to the known moschatel occurrence would be so minor, there would essentially be no cumulative impacts to moschatel or suitable northern hardwoods habitats from alternatives 2 or 3.

Summary: Project activities associated with these Alternatives would have only minor direct and indirect negative effects on the known moschatel occurrence. Impacts would not differ between alternatives 2 and 3.

Determination
For alternative 1, the proposed activities would have no impact on moschatel.

For Alternatives 2 and 3, the proposed activities may impact individuals of moschatel, but are not likely to cause a trend to federal listing or loss of viability.

Additional Mitigations and Design Criteria

- Windrows where moschatel occurs will be protected during fuels reduction activities.

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 3-RFSS-1): 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. One species in this habitat group, Canada yew, occurs in the analysis area but not near any proposed treatment units. Based on the criteria in the Forest Plan BE, there are 25,331 acres of upland forest types that could serve as suitable habitat for barren strawberry in the project area. There are 20,070 acres of forest that could serve as suitable habitat for Canada yew. There are 1,822 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 ELTs. It is difficult to quantify the number of acres of suitable bare soil habitat available for *Peltigera venosa*.

Direct/Indirect Effects
Alternative 1
Indicators 3 and 5. There would be no ground disturbance occurring under alternative 1. 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 occurrences 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 1 would probably lead to a long term decrease in the whitetail deer population, which would be an indirect benefit to Canada yew.

Alternative 2

Indicator 3 – Miles of new upland road construction on FS lands. Alternative 2 proposes approximately 7.1 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. For this habitat group, there would be less than 1% of suitable habitat impacted by upland road construction in Alternative 2. New upland road construction would have minimal effects to suitable habitat for these species.

Indicator 5 – Acres of upland commercial timber harvest. Approximately 3,701 acres of upland commercial timber harvest is proposed in Alternative 2. Timber harvesting would cause direct and indirect effects to approximately 18% of 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 and where most occurrences are found on the Superior National Forest (USDA Forest Service 2006b). 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 304 known occurrences of Canada yew on the Superior National Forest (USDA Forest Service 2006b). Because it is a sensitive species, Canada yew occurrences are generally avoided by Forest Service projects on the Superior (e.g. USDA Forest Service 2004e). Despite potential impacts to suitable habitat, the number of known occurrences on the Forest 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 seven known barren strawberry occurrences on the Superior, one was found in a clearcut, and three in a red pine plantation; these occurrences suggest that the species can tolerate some level of disturbance. The red pine plantation containing three occurrences was thinned in 2003, and preliminary monitoring results show no population decline as a result of the thinning (USDA Forest Service 2005).

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 2 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 2 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 3 – Miles of new upland road construction on FS lands. Alternative 3 proposes approximately 4.1 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 2. The potential impacts of alternative 3 to suitable habitat for these species would be lower than for alternative 2. 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 and mechanical site prep. Approximately 3,014 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 2 above. However, alternative 3 would impact fewer acres of suitable habitat for each of these species than alternative 2 based on analysis of indicator 5. Despite the impacts to suitable habitat for these species, alternative 3 would not cause any viability risk for any of these species for the reasons described for alternative 2 above.

Cumulative Effects

For alternative 1, there would be no cumulative effects to RFSS plants in this group since no ground disturbance would occur under alternative 1.

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, and county lands have changed the age class distribution of upland forest habitats; see EA Appendix G: CumEffts for a summary of current and future timber harvest acres on federal, state, and county lands. Construction of federal and non-federal timber harvest roads in the project area 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 and roads for state or county timber harvest access, 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. The Superior National Forest Travel Management Project would represent a beneficial effect on these habitats over the long term, since it would result in a net decrease of 2 miles of road in the analysis area. 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 3 and 5, the effects to suitable habitat for species in this group would be greatest for Alternative 2, followed by Alternative 3.

Determination
For alternative 1, the proposed activities would have no impact on Canada yew, barren strawberry, Canada ricegrass, or *Peltigera venosa*.

For Alternatives 2 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.

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