

### 3.7 REGIONAL FORESTER SENSITIVE SPECIES (RFSS) AND MANAGEMENT INDICATOR SPECIES (MIS)

#### 3.7.1 Summary

The following briefly summarizes the effects determinations for three groups of species: terrestrial wildlife; vascular plants, lichens and bryophytes; and aquatic wildlife. The Glacier Project Biological Evaluation provides more detailed analysis including information on the basis for the effects determination for each species. The complete Biological Evaluation is located in appendix F.

Determinations of effect are based on analysis of direct, indirect, and past, present, and reasonably foreseeable future cumulative effects of the Glacier Project with consideration of and tiering to the analysis of effects of overall Forest Plan implementation that was conducted at the programmatic level in the Forest Plan Final EIS (Section 3.3.5) and Forest Plan Biological Evaluation (USDA Forest Service 2004a, Forest Plan record #20725)

#### **Determination of effects on Terrestrial Wildlife**

Alternative 1 may impact individuals of olive-sided flycatcher, three-toed woodpecker and tiger beetle but is not likely to result in a trend toward federal listing or a loss of viability. No impacts to all other terrestrial species are expected.

Alternatives 2, 3 and 4 may impact individuals of heather vole, gray wolf, northern goshawk, boreal owl, olive-sided flycatcher, black-throated blue warbler, bay-breasted warbler, bald eagle, Connecticut warbler, three-toed warbler, great gray owl, tiger beetle, mancinus alpine butterfly, Nabokov's blue butterfly, jutta arctic butterfly, and Freija's grizzled skipper, but are not likely to result in a trend towards federal listing or a loss of viability. No impacts to all other terrestrial species are expected.

#### **Determination of effects on Vascular Plants, Lichens, and Bryophytes**

Alternative 1 would have no direct, indirect, or cumulative effects to 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, *Cladonia wainoi*, large-leaved sandwort, Appalachian fir clubmoss, *Arctoparmelia centrifuga*, *Arctoparmelia subcentrifuga*, small shinleaf, cloudberry, fairy slipper, ram's head ladyslipper, *Caloplaca parvula*, *Certraria aurescens*, *Menegazzia terebrata*, *Ramalina thrausta*, *Sticta fuliginosa*, *Usnea longissima*, *Pseudocyphellaria crocata*, *Frullania selwyniana*, western Jacob's ladder, New England sedge, Canada yew, barren strawberry, Canada ricegrass, or *Peltigera venosa*.

The proposed activities in Alternatives 1 (due to succession), 2, 3 and 4 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, 3 and 4 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, lance-leaved violet, *Cladonia wainoi*, large-leaved sandwort, Appalachian fir clubmoss, *Arctoparmelia centrifuga*, *Arctoparmelia subcentrifuga*, small shinleaf, cloudberry, fairy slipper, ram's head ladyslipper, *Caloplaca parvula*, *Certraria aurescens*, *Menegazzia terebrata*, *Ramalina thrausta*, *Sticta fuliginosa*, *Usnea longissima*, *Pseudocyphellaria crocata*, *Frullania selwyniana*, western Jacob's ladder, Canada yew, barren strawberry, Canada ricegrass, or *Peltigera venos* but are not likely to cause a trend to federal listing or loss of viability.

### **Determination of effects on Aquatic Wildlife**

Alternative 1 would have no direct, indirect, or cumulative effects to northern brook lamprey, creek heelsplitter, black sandshell mussels, and Quebec emerald dragonfly. Due to the potential habitat in the area and the presence of some vegetation management activities in the analysis area, alternatives 2, 3 and 4 may impact (direct, indirect or cumulative effects) individuals of northern brook lamprey, black sandshell and creek heelsplitter mussels and Quebec emerald dragonfly, but will not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species.

### **3.7.2 Introduction**

Regional Forester Sensitive Species (RFSS) are species for which population viability is a concern due to one or more factors including; habitat and species rarity or poor distribution, population decline trend, risk to habitat integrity, and population vulnerability. These species are administratively designated by the Regional Forester (USDA Forest Service 2003b) to address plant and animal diversity requirements of the National Forest Management Act. Table 3.7-1 below lists those sensitive species which are known or suspected to occur in the Glacier Analysis Area and could be affected. Information on how species were screened and selected is provided in the Forest Plan FEIS (Vol. 2, pp. B-25-26) and on the Forest Service website for sensitive species [http://www.fs.fed.us/r9/wildlife/tes/tes\\_lists.htm](http://www.fs.fed.us/r9/wildlife/tes/tes_lists.htm).

Management Indicator Species (MIS) are species that represent overall objectives for wildlife, fish and plants or groups of species with similar habitat relationships, or habitats that are of high concern. These species are administratively designated by the Superior National Forest (FSM 2620.5, WO amendment 2600-91-5) to meet planning regulations of the National Forest Management Act and are used to assess the effects of management activities. We monitor the populations of and habitats for four indicator species on the Superior National Forest: bald eagle, gray wolf, northern goshawk and white pine. The bald eagle, gray wolf and northern goshawk are also designated as RFSS and are addressed in this section. White pine is addressed in Section 3.9 of this document. Information on how species were screened and selected is provided in the Forest Plan FEIS (Vol. 2, pp. B-25-26).

A Biological Evaluation was conducted to analyze and document the possible effects of project alternatives on RFSS and selected management indicator species. This section summarizes the effects and determinations found by the Biological Evaluation. The district ranger considers the information in the Biological Evaluation when comparing and selecting alternatives for the project. Where applicable, the Glacier Project Biological Evaluation tiers to the analysis conducted in the Forest Plan Biological Evaluation (USDA Forest Service 2004a, Forest Plan record #20725) and Forest Plan FEIS (Vol. 1, Section 3.3.5).

### 3.7.3 Analysis Methods

Analysis of effects was conducted through the use of a variety of quantitative and qualitative indicators and other relevant scientific information. These were selected based on consideration of two factors:

- 1) species' environmental requirements (*e.g.*, habitat quantity, quality, and spatial pattern), life history, and distributional range; and
- 2) potential impacts of management activities.

Analysis focused on the predominant risk factors pertinent to the species. Additionally, indicators were selected to highlight differences among alternatives. In many cases the analysis assumes that activities that increase amount or quality of habitat would likely benefit species and activities that decrease the amount or quality of habitat would likely negatively impact species.

The information used to develop analysis methods is based on currently accepted and applicable scientific literature and other scientific sources, as well as information from species experts and professional judgment of Forest Service biologists. The key sources for species information include those developed for the Forest Plan 2004 (summarized Forest Plan FEIS, vol. II, p. B-29; Forest Plan Biological Evaluation planning USDA Forest Service 2004a, Forest Plan record #20725) and new relevant information collected for the Glacier Project and documented for each species in the Glacier Project Biological Evaluation.

To briefly summarize the analysis methods of the Glacier Biological Evaluation the sensitive species that are known to occur or have suitable habitat in the analysis area are addressed by:

- Coarse filter indicators of major biological communities (for example, Management Indicator Habitats)
- Indicators of species-specific habitats and microhabitats
- Indicators of ground disturbing and other human activities

The analysis of effects results in one of the following determinations;

- *No impact*
- *Beneficial effects* – used when proposed alternative is determined to be wholly beneficial without potential negative impacts.
- *May impact individuals but is not likely to cause a trend to federal listing or loss of viability* – used when it is determined the proposed alternative may cause some negative effects, even if overall effect to species may be beneficial
- *High risk of loss of viability in the planning area (National Forest), but not likely to cause a trend toward federal listing; or Likely to result in a loss of viability and a trend toward federal listing*

The determination addresses the question of whether alternatives would likely maintain species viability across its range on the forest or prevent a trend toward federal listing. However, it recognizes

the uncertainty inherent in evaluating both future scenarios and many sensitive species whose environmental conditions are often not well understood.

The effects analysis and determinations are based on the assumption that all Operational Standards and Guidelines and Unit Specific Operational Standards and Guidelines (Appendices B and E) are followed during implementation. As discussed in the Wildlife sections of the 2005 to 2007 Monitoring and Evaluation Reports, it was found that Operational Standards and Guidelines have been followed during implementation of projects (examples: see pp. 135-136 for terrestrial RFSS, pp. 145-147 for aquatic RFSS, p. 152 for sensitive plants in the 2005 Report ). Furthermore, these mitigation measures have been effective since implementation of the Forest Plan has generally resulted in the Forest moving towards achieving Forest Plan goals for wildlife and wildlife habitats as shown by surveys and information in the 2005-2007 Monitoring Reports (examples: see pp 60-62 for Forest Type and Age MIH, pg 51-59 for MIS and pp 68-70 for RFSS in the 2007 Report).

### **3.7.4 Analysis Area**

#### **Terrestrial Wildlife**

The analysis area for impacts to RFSS varies by species according to the ecological characteristics of that species and where effects to the species would potentially occur. For most species, the analysis area is the Glacier Project Area, while for other species, the analysis area includes additional areas. When appropriate, the analysis area includes areas in the BWCAW. See the Biological Evaluation for further discussion on the analysis area for each RFSS. Unless otherwise noted in the discussion of individual species analysis sections of the Biological Evaluation, the area covered by the analysis of direct and indirect effects includes all lands administered by the Superior National Forest within the Glacier Project Area. The area covered by cumulative effects analysis includes lands of all ownerships within the cumulative effects analysis area described for each species in the Biological Evaluation. The analysis area boundaries include those areas to which direct, indirect and cumulative effects would occur. The selected analysis areas contain known or potential populations, individuals, and enough habitats of many species to evaluate the effects of proposed activities. In the Biological Evaluation for the Glacier Project, population viability determinations are made at the scale of the population on the entire SNF. This larger landscape considers habitats for species that occur in the Boundary Waters Canoe Area Wilderness.

The time scale used for the analysis of direct, indirect and cumulative effects is 10 year (or the year 2017). 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.

#### **Vascular Plants, Lichens, and Bryophytes**

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 Glacier Project Area. This is because potential effects to these plants would occur in the immediate vicinity of project activities in the Glacier Project Area. The area covered by the cumulative effects analysis includes lands of all ownerships within the Glacier Project Area. This cumulative effects analysis area was selected because the adjacent non-

National Forest lands in the project area share a number of physical characteristics (e.g. bedrock features, land forming processes) which have influenced and constrained land uses in a similar manner. Furthermore, lands of other ownerships are often in close proximity to National Forest lands. For these reasons, the project area boundary makes a logical analysis unit for cumulative effects.

The time period covered by the cumulative effects analysis is from the 1870s to approximately 2017. The 1870s was chosen because that was when European settlement began to increase in Northeastern Minnesota in association with the development of iron mines and timber production (MFRC 1999a). 2017 was chosen because the project area is likely to be considered for Forest Service vegetation management projects approximately every ten years.

### **Aquatic Wildlife**

The scale for analysis of potential direct effects includes all National Forest lands within the project area. The area covered by indirect and cumulative effects is all ownerships in each 6th level (12 digit) hydrologic unit code (HUC) that is within and/or intersects the project area, including those watersheds that extend into the BWCAW. These are appropriate analysis areas because the effects of potential sediment input into local streams as well as a measure of potential change to watershed, stream, and wetland hydrologic functions can best be measured at these scales.

The timescale selected for the direct, indirect and cumulative effects for all aquatic indicators is 20 years because effects from road construction, stream crossings, and vegetative management may be observable for many years following the initial impact of a particular activity. In the Superior National Forest Land and Resource Management Plan FEIS, page 3.6-6, a timescale of 10-20 years was selected for the same indicators (USDA Forest Service 2004a).

### **3.7.5 Affected Environment**

The affected environment for sensitive species that occur or may occur in the analysis area (3.7-1), including its population, habitat condition and trend, and known risk or limiting factors, is documented in the Glacier Project Biological Evaluation.

**Table 3.7-1. Sensitive Species Known or Suspected to Occur within the Glacier Project Area**

Terrestrial Wildlife	Aquatic Wildlife	Rare Plants	
Gray wolf* Heather vole Northern goshawk* Boreal owl Olive-sided flycatcher Black-throated blue warbler Bay-breasted warbler Bald eagle* Connecticut warbler Three-toed woodpecker Great gray owl Tiger beetle sp. Mancius alpine butterfly Nabokov’s blue butterfly Jutta arctic butterfly Freija’s grizzled skipper (butterfly)	Northern brook lamprey Creek heelsplitter mussel Black sandshell mussel Quebec Emerald (dragonfly)	Alpine milkvetch Swamp begger-ticks Pointed moonwort Common moonwort Michigan moonwort Pale moonwort Ternate grape-fern Least moonwort Floating marsh-marigold Fairy slipper Katahidin sedge Ram’s-head lady’s slipper Linear leaved sundew Neat spike-rush Moor rush Auricled twayblade American shoregrass Large-leaved sandwort Fall dropseed muhly Dwarf water-lily Appalachian fir clubmoss Western Jacob’s ladder New England sedge	Canada ricegrass Club-spur orchid Small shinleaf Cloudberry Northern bur-reed Awlwort Canada yew Lance-leaved violet Barren strawberry <i>Arctoparmelia centrifuga</i> <i>Arctoparmelia subcentrifuga</i> <i>Caloplaca parvula</i> <i>Certraria aurescens</i> <i>Cladonia wainoi</i> <i>Menegazzia terebrata</i> <i>Peltigera vensosa</i> <i>Pseudocyphellaria crocata</i> <i>Ramalina thrausta</i> <i>Sticta fuliginosa</i> <i>Usnea longissima</i> <i>Frullania selwyniana</i>

\* Also a Forest Plan Management Indicator Species

The proposed alternatives are expected to have no impact for species that do not have potential habitat present and are not known to occur within the analysis area. Thus they are not discussed further in this section. Documentation of effects and rationale for a finding of no impact are in the Glacier Project Biological Evaluation.

### 3.7.6 Environmental Consequences

Proposed management actions may negatively or positively impact species. Impacts mainly result from indirect or cumulative effects of alteration of habitat conditions such as increase or decrease in amount or spatial pattern or qualitative change in habitat composition, structure, and function. For some species potential direct impacts may also occur (for example, harm to an individual plant from logging equipment). The focus of the analysis is on those condition changes that would pose a risk (limiting factors) to likelihood of viability and well-distributed habitats on the National Forests, but beneficial effects are also analyzed.

#### Effects Common to All Alternatives

Although each alternative varies, (for example, different alternatives provide different amounts of suitable habitat conditions for a given species), all alternatives would meet Forest Plan direction to maintain, protect, or improve habitat for all sensitive species (O-WL-18), to minimize or avoid negative effects (G-WL-11 and 12) and to ensure that management would not lead to a trend toward federal listing (S-WL-5). This is because adequate habitat would be maintained under all action alternatives. In addition, each alternative is consistent with the expected effects documented in the Forest Plan FEIS (Vol. 1, Section 3.3.5). Other factors also contribute to maintaining, protecting, or improving habitat including:

- Operational Standards and Guidelines (Appendices B and E) and integrated management standards and guidelines (Forest Plan Chapters 2 and 3 direction for wildlife, threatened, endangered, and sensitive (TES) species, watershed health, riparian management, vegetation management, recreation, transportation, soils, and other resource areas)
- Species-specific mitigations (Project Biological Evaluation, mitigation sections for each species or species group, Appendices B and F).

Therefore, where any potential negative impacts may occur, necessary management for species conservation would provide sufficient habitat and habitat protection to ensure that species are maintained at the Forest level.

### **Alternative 1**

#### **Direct Effects**

Alternative 1 would have no direct impacts on sensitive species since no activities are proposed and there are no known high risk conditions that would directly impact species unless actions were taken.

#### **Indirect Effects**

##### Vegetation Management

Through vegetation succession, Alternative 1 would result in a nearly 14% increase of older forest habitat while young forests would be reduced.

Alternative 1 would result in increased spruce-fir (+5%) forest habitats, while jack pine forest would decrease (~1%). Aspen birch (early successional) forest would decrease by ~5%. These effects may result in beneficial impacts to species associated with the increasing forest types, such as northern goshawk and black throated blue warbler. Conversely, negative effects may result for sensitive species and rare plants associated with young, open or disturbed habitats, such as *Botrychium* species (moonworts and grapeferns) and gray wolf. The benefits or negative impacts of this alternative are unlikely to have measurable impacts to species in the next ten years since habitat conditions for most sensitive species are generally sufficient and this analysis area provides only a portion of the species' ranges. For terrestrial species that utilize disturbed sites, this alternative could have stronger negative impacts over the long term (>10 years) if no other human or natural disturbance occurred. There would be no change to other vegetative habitats such as non-forest wetlands or brush so species using this habitat type would not be impacted.

##### Roads and Trails Management

No roads or trails would be built or decommissioned with this alternative so effects from recreational vehicles use would remain at current levels.

### **Alternatives 2, 3 and 4**

These alternatives are summarized as a group. Generally their impacts are similar to all sensitive species. This is because total amounts, percents, miles, number of management activities, and other quantitative or qualitative indicators of effects vary by relatively minor amounts, location, or intensity of management. The project Biological Evaluation contains detailed analysis for each alternative.

### **Direct Effects**

Proposed ground disturbing management activities, including timber harvest (all types), prescribed burning, mechanical site preparation, and construction or rehabilitation of roads and gravel pits, may directly impact sensitive terrestrial and aquatic species and rare plants.

- Activities may harm, kill, displace, or temporarily disturb some species depending on seasonal timing or severity of activity.
- Activities may destroy sites for rare species that are not readily reestablished elsewhere because of dispersal, rarity or other limiting factors.

The risk of these potential impacts is generally expected to be low and within an acceptable risk level. This is because the Forest Plan provides direction to minimize or avoid negative effects (G-WL-11 and 12, pp. 2-31); to ensure that management would not lead to a trend toward federal listing (S-WL-5, pp. 2-32); and to protect known locations of species where appropriate (S-WL-6-9; G-WL-13-21, pp. 2-32 to 2-34). In other words, projects are designed to minimize and mitigate negative effects up front. Additional mitigations are established for species threatened by direct harm to meet Forest Plan direction (see Appendices B and E and H for Operational Standards and Guidelines). Finally, for most sensitive species the analysis area represents a small portion of their available habitat and in general impacts would likely be short-term.

### **Indirect Effects**

#### Vegetation management

Vegetation management, including timber harvest, forest regeneration, site preparation, prescribed fire, and natural processes, has a variety of potential positive and negative effects to species and their habitats. These effects vary based on the amount, timing, location, or intensity of management activities. Vegetation management activities may alter habitats for terrestrial, aquatic and plant species by changing amount, distribution, or quality of habitats. The following effects to sensitive species were considered.

- Alteration of habitat structural, compositional, and functional complexity or diversity
- Habitat fragmentation of forest interior habitat
- Increased potential for non-native species occurrences
- Increased amounts of sunlight reaching plants on the forest floor
- Hydrologic alteration – impacts to habitat caused by changes in hydrology, such as increases in water yield and sedimentation due to upland timber harvest and associated soil disturbance. See Section 3.14 Water Quality and Watershed Health for additional impacts to watershed health and riparian areas, Section 3.9 for impacts to vegetation, and Section 3.8 for impacts to Management Indicator Habitats.

Vegetation managed through timber harvest under Alternatives 2, 3 and 4 would reduce upland mature forest habitat with resulting potential negative impacts to terrestrial species that are mature forest associates: heather vole, boreal owl, goshawk, black-throated blue warbler, bay breasted warbler,

Connecticut warbler, great gray owl [nesting], Mancinus alpine and Jutta arctic. Mature and older forested habitat would decrease 10-16% in the action alternatives as compared to Alternative 1. However, in general, the remaining suitable habitat would be sufficient for species needs and well-distributed across the analysis area.

Vegetation managed through timber harvest under Alternatives 2, 3 and 4 would increase early successional forest habitat with potential short term (5-10 years) beneficial impacts to early successional forest or disturbance associates, including three terrestrial species (gray wolf, great gray owl and olive-sided flycatcher) which may use these habitats for foraging. Overall effect to great gray owl and olive-sided flycatcher are minimal and along with project design criteria and mitigation measures are likely to result in sufficient overall habitat for the species.

Timber harvest could also have short-term negative indirect impacts on sensitive plant species associated with rock outcrops, upland disturbed areas, forested wetlands, and upland forested areas. Timber harvest could indirectly impact some species because it could cause increased light levels for species adapted to shady conditions, spread invasive plants, or alter hydrology in the short term. Over the long term timber harvest would create suitable habitat for some of the sensitive *Botrychium* species. Other species, such as barren strawberry and Canada ricegrass, are fairly tolerant of disturbance. For other species that are sensitive to disturbance, the impacts would be reduced to levels consistent with Forest Plan direction by the project's operational standards and guidelines (for example, generally prohibiting harvest on mapped Ecological Landtype 18) and general project design (for example, high percentage of winter harvest which helps limit spread of invasives). In general, Alternative 4 would have somewhat greater impacts to sensitive plant suitable habitat than Alternative 2, and both Alternatives 2 and 4 would have greater impacts to sensitive plant suitable habitat than Alternative 3.

Vegetation management in the Glacier Analysis Area should have little impact to the aquatic environment and to sensitive species provided that project design criteria and mitigation measures are in place and Forest Plan standards and guidelines are met with regard to riparian and aquatic Best Management Practices. Both the black sandshell and creek heelsplitter mussel have marginal habitat within the analysis area with no known species occurrence; however, one known location for creek heelsplitter exists in the BWCAW in the Kawishiwi River and is adjacent to and within the same watershed as the Glacier Analysis Area. The Kawishiwi River is the only likely habitat for these two species within the analysis area and disturbance near those riparian areas with respect to vegetation management is minimal. There are no known occurrences of northern brook lamprey in the analysis area and the area has very little suitable habitat; the areas with marginal habitat for this species are Keeley and Nira Creek.

#### Roads and Trails Management

Ground disturbance associated with construction, maintenance, and management of stream crossings, permanent and temporary roads and trails, and gravel pits may result in positive and negative impacts to sensitive species habitat. Potential impacts include:

- Potential erosion/sedimentation, soil compaction, gravel extraction, trampling, new habitat creation for species that are associated with disturbed habitats
- Habitat fragmentation
- Changed microclimate conditions to adjacent forested habitats

- Vector for non-native invasive species and predators
- Increased human access with potential for impacts to species from harm, poaching, and/or collection
- Alteration of aquatic habitat due to sedimentation from an activity such as short-term ground disturbance from road/stream crossing activities.
- Improvements on existing stream crossings – benefit to aquatic species and habitat due to re-establishment of natural flow regimes, proper transport of water and sediment, and aquatic organism passage.
- See Section 3.14 for additional impacts to water quality from roads and stream crossings.

Impacts from roads and trails are generally expected to be localized and short-term. This is in part because the Forest Plan provides direction to minimize or avoid negative effects (G-WL-11 and 12, pp. 2-31); to ensure that management would not lead to a trend toward federal listing (S-WL-5 pp. 2-32); and to protect known locations of species where appropriate (S-WL-6-9; G-WL-13-21, pp. 2-32 to 2-34). Additionally mitigations are established for species threatened by direct harm of implementing the Forest Plan. Road, trail, gravel pit, and stream crossing management would likely result in short-term indirect impacts to suitable habitat for the terrestrial species Laurentian tiger beetle, *Mancinus* alpine butterfly and Jutta arctic butterfly.

Road management would potentially result in short-term indirect impacts to suitable habitat for: the suite of lowland non-forested wetland sensitive plants; six of the sensitive *Botrychium* species; and the sensitive plants of upland forested habitats. The impacts would be reduced to levels consistent with Forest Plan direction by the project's operational standards and guidelines and general project design. In general, Alternative 4 would have somewhat greater impacts to sensitive plant suitable habitat than Alternative 2, and both Alternatives 2 and 4 would have greater impacts to sensitive plant suitable habitat than Alternative 3.

Road management has potential to have both positive and negative indirect impacts to suitable habitat for northern brook lamprey; one of the stream crossing improvement projects is located on Keeley Creek, an area of potential habitat for the species. If negative impact occurs during the crossing improvement project, it would be short-term. Most potential negative impacts will be addressed using proper design features, installation methods, and on-site mitigation measures. Long-term benefits to the species would occur because the improvement to the crossing would benefit long-term stream function by the re-establishment of natural flow regimes, proper transport of water and sediment, and aquatic organism passage. Road management may have potential negative impacts to Quebec emerald dragonfly by roads being placed in potential habitat; however, potential effects would be considered local and minor over the analysis area. Given this organism's large capacity to move about and disperse, along with the prevalence of suitable habitat over its range, the overall risk for impact is low.

Gravel pit expansion could both destroy and create habitat for tiger beetles, but potential for negative impacts would be minimal since habitat alteration could occur on a very small percentage of suitable habitat and impacts would be further reduced through mitigations. Road construction through lowland conifer forest may reduce or increase habitat for the *Mancinus* alpine butterfly and Jutta arctic butterfly. Since these species are so rare and there is an abundant extent of suitable habitat, impacts are likely to be minimal.

Road, gravel pit, and stream crossing management activities not likely to affect all other terrestrial species provided that required species-specific Operational Standards and Guidelines and mitigation measures are followed during implementation (Appendices B, E, and F).

### **Cumulative Effects to Terrestrial Species**

The Glacier project supplement appendix C provides a list of past, present and reasonably foreseeable future actions that could contribute to cumulative effects.

#### ***Gray Wolf***

Past vegetation management projects on both federal lands (such as the Rusty Diamond and Tomahawk) and non-federal ownership (such as state, county and private) have created and maintained suitable forest habitat conditions for wolf in this area. Current and planned timber harvesting, restoration and fuel reduction activities are expected to improve foraging conditions for moose and deer. Nonfederal lands (48% of analysis area) would continue to provide foraging and thermal habitat for deer and moose. Overall, more than adequate deer habitat is available in North-central and Northeastern Minnesota. This condition is not expected to change in the near term. Trends in edge habitat appear to be increasing (Wolter and White 2002).

Cumulative impacts could occur as a result of human access and disturbance although with this project these cumulative impacts are expected to be minimal for the reasons stated below. It is known that as people buy, subdivide and develop private lands there is an increase in the potential for human access into wolf territory that could result in disturbance to wolves or wolf mortality. In this analysis area the only known planned development is the Black Wolf Lots. This 60 acre parcel is located just outside of the city of Ely in an area that is relatively highly developed already, and provides marginal wolf habitat at best. It is known that Potlatch Corporation recently sold all of their lands in Lake County; however future development plans for these lands are not known at this time. The South Kawishiwi Land Exchange is not likely to contribute to cumulative impacts to wolves because these lands are already developed and further development on them is unlikely. In exchange for the 424 acres of land the summer home group is located on the Forest Service would receive approximately 1,254 acres of lands that are currently and would remain undeveloped and may provide better quality habitat for wolf and its prey. Ample amounts of suitable habitat will continue to be provided by the BWCAW.

Harvesting on state, county, and private land and mineral exploration on all ownerships would require additional road development. Not all of these roads may be effectively closed following harvest. Proposed Travel Management Project on the SNF, once signed and implemented, would reduce the number of open roads on federal lands which could help offset increases in open roads on non-federal lands. The density of higher standard roads (OML 3-5) in the analysis area is currently near 1 mile/square mile which is recommended for minimizing wolf mortality. Planned hunter walking trails could contribute a slight increase in negative effects because they would likely result in a slightly higher hunter use and risk to wolves. Shooting, trapping, or other harassment of wolves would most likely continue to occur on all land ownerships at a minimal level. Additional mortality associated with vehicle collision would continue, especially as design speeds roads increase (such as on Hwy 1). However, based on increasing wolf populations over the past two decades, cumulative impacts to wolf related to changes in habitat and human disturbance are not expected to have major impacts on wolf populations.

### ***Heather Vole***

The Glacier Project Supplement Appendix C provides a list of past, present and reasonably foreseeable future actions that could contribute to cumulative effects. The cumulative effects to heather vole would generally be minor. Past activities, such as road construction and timber harvest, have influenced the amount of available suitable habitat. Current and future activities, such as timber harvest and road construction on state, private and county lands, exploratory mineral proposals, and private developments, would negatively impact suitable habitat in the analysis area. Future harvests that promote jack pine would have beneficial impacts to suitable habitat. Enough suitable habitat in the analysis area would remain undisturbed to ensure that Forest Plan direction for sensitive species is met. Likely habitat for the heather vole will be maintained in patchy distribution in the analysis area and across the forest (including the BWCAW).

### ***Northern Goshawk***

Fragmentation of larger blocks of habitat would make goshawks more vulnerable to predators and affect species distribution. As mentioned, Boal (2001) documented up to 30% nest predation in northern Minnesota. Wide ranging pairs may not successfully breed if they are forced to expand their home ranges to compensate for further loss of high quality foraging habitat. It would be difficult for and unlikely that other ownerships, or combinations of ownerships, would provide very much suitable interior habitat for this species. Reduction of suitable habitat by management of other owners would further increase the importance of maintaining suitable amounts of habitat on National Forest System Lands. This project attempts to offset further fragmentation of the landscape by maintaining large, contiguous mature patches of forest and creating large, contiguous patches of young forest, thus ensuring that suitable habitat would continue to be available on federal lands. Vegetation management of intermingled federal state, county and private land managers in the glacier area would reduce the present level of large blocks of mature upland habitat under all alternatives. Past, present and future harvests in the Glacier Area over the next 10 years are listed in Appendix C. However, cooperative management should help maintain some large patches of forest by consolidating management across boundary lines.

Planned fuels projects would have minimal impacts to goshawk because anticipated changes to suitable habitat would be minor. New developments (Black Wolf lots) would have minimal cumulative impacts due to their location on the landscape they are located in marginal habitat. Impacts from hunter walking trails, and mining exploration would be primarily in the form of disturbance to nesting goshawks. These cumulative impacts are expected to be minimal because none of the activities are located near known sites. The Highway 1 construction would contribute minimal cumulative impacts because although reconstruction activities could disturb nesting goshawks, the result would contribute very little change to existing habitat conditions. Non-native invasive species management would contribute no cumulative impacts.

### ***Black Throated Blue Warbler***

Past, on-going and future planned vegetation management on intermingled state, county and private lands would probably reduce the present level of large blocks of mature upland forest leading to an increase in fragmentation and decrease in interior forest habitat conditions. This could result in cumulative impacts because the decrease of habitat quality improves conditions for American redstarts and chestnut-sided warblers that compete with and exclude black-throated blue warblers from an area. All action alternatives would attempt to offset further fragmentation of the landscape by maintaining large, contiguous mature patches of forest on federal lands and creating large, contiguous patches of young forest. According to the 2006 Annual Monitoring report, Forest-wide on national forest lands, in both the JPB and DRW LEs the amount of mature and older upland deciduous forest is predicted to decrease which could negatively affect the species. However, acres of aspen maintained would still be more than would have occurred under the range of natural variability and adequate amounts of habitat for the species would be retained (Annual Monitoring report 2006). On NFS lands, the project falls in Forest Plan Spatial Management Zone 3 which is not generally considered prime black-throated blue warbler habitat on the forest. Compared to Existing conditions, mature/old interior forest is projected to decrease slightly in Zone 3. This decrease in suitable habitat conditions is consistent with the cumulative effects analysis and predictions conducted in the programmatic BE for the forest plan. Despite the decrease in suitable habitat, adequate amounts should be maintain in prime range (patch zones 1 and 2) in order to maintain viability. The BWCAW likely provides little suitable habitat for black throated blue warblers due to the larger amounts of conifer forest that dominates.

Projects such as Travel Management, mining exploration, hunter walking trails, and new private developments would not contribute cumulative effect to black-throated blue warbler.

### ***Boreal Owl***

Past, on-going and future vegetation and fuels management projects on federal lands such as the Rusty Diamond Decision, Tomahawk EA, and past and planned timber harvest on other ownerships (listed in Appendix C) have the potential to further reduce nesting habitat and to a lesser extent, foraging habitat for boreal owl. These impacts are not thought to be significant because available boreal owl habitat in the Glacier Area is currently limited by the small amount of suitable foraging habitat. In addition, timber management projects on federal lands would mitigate impacts to boreal owl by leaving some old aspen in harvest units. Most of the other owners will follow the MFRC guidelines which will help retain possible nesting trees in their harvest units. Other activities listed in appendix C are not expected to have any significant cumulative effects. At the forest scale the 2006 Annual Monitoring Report shows a slight decrease in mature upland deciduous and a slight increase in upland mature conifer habitat, however both are still above the Forest Plan FEIS project condition. It also showed a slight decrease in mature lowland conifer which is slightly below FEIS projected conditions. This analysis is consistent with the cumulative effects expected in the Programmatic BE for the forest plan where habitat conditions are not anticipated to improve with implementation of the plan. Due to the location of this project (not in prime boreal owl habitat) and the small amount of boreal owl habitat impacted by this, compare to the amounts available forest wide, implementation of Forest Plan Standards and Guidelines together with MFRC best management practices, including maintenance of leave trees and reserve islands in harvest areas should prevent a negative trend in viability. The BWCAW likely provides some suitable habitat for boreal owl due to the amount of large lowland forest complexes.

### ***Great Gray Owl***

Forest wide, in the next ten years, nesting habitat is projected to increase in the Jack Pine Black Spruce LE while it would decrease slightly in the Dry Red and White Pine LE (net decrease of 131 acres). This slight decrease is not likely to cause any significant negative effects or associated cumulative effects to the species, especially when considering that nesting habitat is not thought to be the limiting factor in the SNF. Future Forest Service vegetation management (*Appendix C*), within the next ten years are expected to harvest nesting habitat and thus create foraging habitat. This would presumably offset or lessen the negative impacts to gray owls from the projected decrease in foraging habitat. No treatments or changes are expected to occur in non-forest or lowland hardwoods which also serve as foraging habitat. This project, combined with other similar timber sales on the Superior National Forest as well as other ownerships (*Appendix C*) could impact habitat for this species, both positively and negatively. Potential nesting habitat will be harvested and additional temporary foraging areas will be created. Leave trees (MFRC site-level guidelines) would provide foraging perches in harvested areas. Creation of temporary foraging habitat through harvest should assure that the remaining potential nest habitat (>59 years of age) will be within 1.5 miles of some type of foraging habitat. Suitable habitat is also maintained in the BWCAW. Other projects listed in *Appendix C* would not contribute to cumulative effects.

### ***Olive-sided Flycatcher***

This project, combined with other similar timber sales in the analysis area on all ownerships could enhance habitat for this species by planting conifer and leaving abundant conifer residuals, especially in large openings. MFRC Management Guidelines should be followed by the Minnesota Department of Natural Resources, St. Louis and Lake Counties, and most of the other private landowners in the analysis area during their harvest activities (*Appendix C*). These guidelines recommend maintaining an adequate amount of residual trees during harvest operations. Other projects listed in *Appendix C* would contribute little to cumulative effect on olive-sided flycatcher. Based on forest-wide projected habitat trends on federal lands (2006 Annual Monitoring Report) in the project Landscape Ecosystems the amount of young upland conifer (Management Indicator Habitat 5) increases providing more potential habitat and reserve tree guidelines would ensure that residual standing conifer trees were left to provide needed habitat structure. This would benefit the olive-sided flycatcher, because the amount of suitable habitat would increase in the Jack Pine Black Spruce (JBS) Landscape Ecosystems (LE) and decrease in the Dry Mesic Red and White Pine (DRW) LE. Forest-wide objectives, standards and guidelines would move upland riparian forest (Indicator Habitat 10) to a mature condition. It is recognized that historically, fire disturbance in upland conifer would have created abundant forage habitat that timber harvest may not be able to replicate at the cumulative effects scale. This result is lower habitat and amount than would occur under natural conditions. This analysis is consistent with the cumulative effects analysis conducted for the Programmatic Biological Evaluation for the Forest Plan. Natural processes such as large scale blow down event and fires in the BWCAW help to maintain habitat for the olive-sided flycatcher.

### ***Bay-breasted Warbler***

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

JPB Landscape Ecosystems, upland spruce-fir forest is projected to increase overall and in particular mature and older spruce-fir would increase. This may, to a small degree, benefit the species on a larger scale. The Minnesota Forest Resources Council Landscape Committee set a goal to increase spruce-fir forest in Minnesota. These spruce-fir goals will also be used as a guideline, to varying extents, by other land management agencies in the analysis area. Therefore, amounts of spruce-fir forest should continue to be maintained or move closer to objectives in the NSU and LE's through conversion to spruce-fir or through natural succession. The best potential habitat for the bay-breasted warbler would still occur in the BWCAW. Other projects listed in Appendix C would contribute little to cumulative effects to bay-breasted warbler.

### ***Bald Eagle***

Cumulative effects of forest management on all ownerships, including those listed in Appendix C, should benefit eagle by increasing preferred nesting, roosting, and perching habitat over the next four or more decades on both NFS and non-NFS lands. 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. Development in the Black Wolf Lots and hunter walking trails would have not impact on eagles because the area is located in marginal habitat for eagles. The cumulative impact from minerals exploration is expected to be minimal because mitigations have been applied to that project to minimize disturbance and exploration would not change habitat conditions. Non-native invasive species management would have no cumulative impact to eagles. The Travel Management project may have beneficial impacts by resulting in a lower road density in eagle habitat. The South Kawishiwi Summer Home land exchange would be no cumulative impacts on eagles because changes in vegetation of land use would not change as a result of the project. Ample amounts of suitable habitat will continue to be provided by the BWCAW.

### ***Connecticut Warbler***

This project, combined with other similar timber sales on the Superior National Forest (Appendix C) as well as other ownerships could impact habitat for this species by altering understory vegetation or by directly impacting nest sites during the breeding season. The cumulative impact of the project would be minimal since the primary habitat for the species (large boreal bogs) should not be impacted by the USFS or other ownerships in the Analysis area except for limited timber harvest. Forest-wide monitoring showed a slight increase in mature lowland conifer (Annual Monitoring Report 2006). Forest-wide in both DRW and JPB Landscape Ecosystems, mature and older jack pine will increase providing more habitat for this species. Harvest on non-federal lands may provide slightly more acreage of jack pine through conversion but probably not a large contribution. Project alternatives would have no impact on potential habitat available in the BWCAW.

### ***Three-toed Woodpecker***

Habitat is decreasing rangewide wide from historic conditions. Fire suppression, salvage logging, clearcutting without abundant conifer reserve trees, maintenance of aspen, beaver and spruce budworm control, and habitat fragmentation threaten habitat for this species, however the windstorm of July 4<sup>th</sup> 1999 created large areas of habitat for this species in some parts of the Superior National Forest. Forest management that removes conifers that have the potential to have high populations of

insects, especially wood-boring beetles, is detrimental to the Three-toed woodpecker. On NFS lands on the Superior, mature and older spruce-fir, jack pine and lowland black spruce tamarack forest would increase in both the JPB and DRW Landscape Ecosystems (2006 Annual Monitoring Report). This would benefit the species by providing more potential habitat. Other ownerships (especially the state) have started converting some aspen stands to conifer stands (Appendix C). This would gradually increase habitat for the three-toed woodpecker from existing conditions. Natural processes such as large scale blow down event and fires in the BWCAW help to maintain habitat for the three-toed woodpecker. Other projects listed in Appendix C would have no cumulative impacts.

### ***Tiger Beetle***

Gravel pit management is likely to be similar on all ownership: pits would be expanded and eventually revegetated. The cumulative effect of these alternatives together with gravel pit expansion on non-federal land could degrade habitat as well as create future habitat. Mining operations can also impact tiger beetles. However, adequate habitat will be maintained. Cumulative effects are expected to be minimal however, adequate habitat likely would be maintained and cumulative effects are expected to be minimal. Habitat for tiger beetles is known to occur in the BWCAW and would be maintained.

### ***Mancinus alpine and Jutta arctic (Butterflies)***

Timber harvest and road construction (Appendix C) will continue to have the biggest impact on Mancinus Alpine and Jutta Arctic habitat. The Travel Management Project may have some long term beneficial effects if lowland roads are closed and allowed to re-vegetate. Only small amounts of suitable habitat would be affected in the analysis area and ample amounts of habitat would remain unaffected so cumulative impacts should be minimal. It is likely that the Mancinus alpine and Jutta Arctic occur in habitats other than mature black spruce-tamarack forest. Forest-wide habitat monitoring (Annual Monitoring Report 2006) showed a slight increase to mature lowland conifer which could benefit this species. Suitable habitat in the BWCAW would remain unaffected.

### ***Nabokov's Blue and Freija's Grizzled Skipper (Butterflies)***

Young conifer should continue to be created through timber harvest on other ownerships (Appendix C). There should be minimal impact to existing young conifer and permanent openings. Forest wide in the DRW and JBP Landscape Ecosystems, young and mature and older conifer forest habitat would increase (Annual Monitoring Report 2006) providing more potential habitat for these species. Timber harvest in suitable habitat would be expected to continue on all ownerships, which would maintain young openings in conifer types necessary for these species. Harvested units could provide a short-term (10-20 year) increase in potential suitable sites for these species. However, these temporary openings may not stay open long enough for these species to colonize, so any cumulative beneficial effects are expected to be minimal. This analysis is consistent with the cumulative effects predicted in the programmatic BE for the Forest Plan. The BWCAW does not likely provide much suitable habitat for these species.

### ***Sensitive Plants***

For the sensitive plant species, cumulative effects of Alternatives 2, 3 and 4 would generally be minor. Past activities, such as road construction and timber harvest, have influenced the amount of available

suitable habitat. Current and future activities, such as timber harvest and road construction on state, private, and county lands, exploratory mineral proposals, and private developments, would negatively impact suitable habitat in the analysis area. Other future activities, such as weed treatments, would be a beneficial effect to suitable habitat. In general, Alternatives 2, 3 and 4 would cause minor cumulative effects because enough suitable habitat in the analysis area would remain undisturbed to ensure that Forest Plan direction for sensitive species is met.

### ***Sensitive Aquatic Wildlife***

For the sensitive aquatic wildlife species, cumulative effects of all alternatives would generally be minor. Past activities, such as development, road construction, and timber harvest, have influenced the amount and quality of available habitat. Current and future activities, such as timber harvest and road construction on state, private, and county lands, exploratory mineral proposals, and private developments, would negatively impact suitable habitat in the analysis area. Other future activities, such as stream crossing improvements, would have a beneficial effect to suitable habitat. Enough suitable habitat in the analysis area would remain undisturbed or recover from past disturbance to ensure that Forest Plan direction for sensitive aquatic species is met.

### **Management Indicator Species**

#### ***Gray Wolf***

According to the FEIS for the Forest Plan gray wolf was selected as a Management Indicator Species because management activities and human access/development can cause changes in wolf populations, prey habitat, and related prey species populations (deer, moose, and beaver). It was also chosen because it can be practically monitored. Finally, National Forests in the Western Great Lakes Region play a major role in contributing to overall conservation of the species (Forest Plan FEIS section 3.3.4.2). Key findings from the draft 2007 Monitoring and Evaluation Report show that with 3 years of Forest Plan implementation:

- Population trends on SNF since the mid 1970s, based on 2003-2004 State wolf survey and SNF study, appear to be increasing (DNR 2005): DNR concludes there was insignificant change in wolf population between 2000 and 2005. SNF continues to meet or exceed Forest Plan goal of contributing to statewide population of 1250-1400 wolves.
- Between 2004-2007 most vegetation management projects benefited wolf by providing habitat for their prey species, deer and moose.
- Wolf was delisted from threatened status in 2007 because successful management efforts on the SNF, together with similar efforts by partners from the previous thirty or more years, helped contribute to the successful recovery of the species
- The rule to de-list wolf was receded by a recent court ruling in October 2008. Therefore wolf is also considered as a Threatened species in the Glacier EIS and further analysis can be found in section 3.4 of this document.

Glacier Project Alternatives meet or contribute to Forest Plan direction for gray wolf as a management indicator species. The Glacier Project action alternatives benefit wolf by increasing habitat for prey species; deer and moose. Glacier action alternatives also maintain high standard road densities below the standard 1 mile/square mile. Project alternatives also result in a net decrease in lower standard roads. Lower levels of roading maintain or improve habitat for the wolf by limiting human access to

acceptable levels within the species' range. See the Glacier BE for more detailed effects analysis on wolf. Also see the 2007 Monitoring and Evaluation report for more information on gray wolf monitoring.

### ***Northern Goshawk***

According to the FEIS for the Forest Plan, northern goshawk was selected as a Management Indicator Species because population changes may indicate effects of management; it is a high public interest species and a Region 9 Forester's sensitive species; its habitat associations are well-documented in science literature; it can function as umbrella species – (its large area requirements and use of multiple habitats encompass habitat requirements of many other species); and its breeding productivity and population and habitat trends can be monitored at site and landscape level. Finally, National Forests in the Western Great Lakes Region play a major role in contributing to viability and well-distributed habitats (see Forest Plan FEIS section 3.3.6.1). Key findings from the draft 2007 Monitoring and Evaluation Report show that with 3 years of Forest Plan implementation:

- In 1996 there were no known nests on the SNF. By 2007 twenty-four nests had been found.
- In 2007 there were 7 active goshawk nests: 5 pairs successfully produced young. SNF goal is 20-30 breeding pairs.
- Between 2004-2007 most vegetation management projects impacted goshawk habitat, but were not likely to cause loss of viability or a trend toward listing.
- In 2007, mature and older upland forest, a key indicator of suitable habitat for goshawk, was 58% forest wide outside the BWCAW, well above the 41% threshold and the 48% projected in the Forest Plan EIS for the end of Decade 1 of Plan implementation. Inside the BWCAW, 51% is in mature and older upland forest.

Glacier Project alternatives meet or contribute to Forest Plan direction for goshawk as a management indicator species. The Glacier Project action alternatives maintain well-distributed habitat throughout the analysis area. In addition, standards and guidelines specific to known nest sites are adhered to in all Glacier Project alternatives. See the Glacier BE for more detailed effects analysis on goshawk. Also see the draft 2007 Monitoring and Evaluation report for more information on goshawk monitoring.

### ***Bald Eagle***

According to the FEIS for the Forest Plan bald eagle was selected as a Management Indicator Species because: changes in eagle populations and habitat can indicate effects of management on other species requiring mature riparian forest; it is a species of high public interest and addresses major management issues such as riparian forest with old, large trees and watershed health; and can be practically monitored. Finally, National Forests in the Western Great Lakes Region play a major role in contributing to overall conservation of the species (Forest Plan FEIS section 3.3.4.3). Key findings from the draft 2007 Monitoring and Evaluation Report show that with 3 years of Forest Plan implementation:

- 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.
- Between 2004-2007 most vegetation management projects benefited eagle by restoring, maintaining or improving survival of white pine near lakes and streams.

- Eagle was de-listed from threatened status in 2007 because successful management efforts on the SNF, together with similar efforts by partners from the previous thirty or more years, helped contribute to the successful recovery of the species.

Glacier Project alternatives meet or contribute to Forest Plan direction for bald eagle as a management indicator species. Within or adjacent to the Glacier there are 14 known eagle territories. Glacier Project alternatives maintain and improve bald eagle nesting habitat in the area. See the Glacier BE for more detailed effects analysis on bald eagle. Also see the draft 2007 Monitoring and Evaluation report for more information on bald eagle monitoring.

### ***White Pine***

According to the FEIS for the Forest Plan white pine was identified as a management indicator species because its population changes are believed to indicate effects of forest management. It is a species of high public interest because of its many social, economic, and ecological values. It addresses major management issues about how much and where to promote white pine for its important wildlife habitat features, timber value, scenic quality, and role in maintaining ecologically healthy forest composition and structure. (Forest Plan FEIS section 3.3.6.2). Key findings from the draft 2007 Monitoring and Evaluation Report show that with 3 years of Forest Plan implementation:

- Through management activities such as planting, forest succession, white pine acreages continue to increase when compared to 2003.
- Since the Forest Plan was revised, approximately 1,700,000 white pine seedlings have been planted in 3,060 acres outside the BWCAW for the purpose of restoring white pine on different forest types such as aspen-conifer mix.
- White pine were also planted on 570 acres of other forest types to restore diversity of tree species to conditions more representative of native plant communities. Survival surveys since 2005 indicate an average third year survival rate of 70 percent.
- 1,653 acres of white pine were pruned to minimize the likelihood of blister rust.
- 10,500 acres of white pine were released. Release is the cutting or removal of unwanted tree species to reduce competition for water, soil, and sunlight. This also reduces the cooler and moister microclimate that favors blister rust.
- 257 acres of white pine growing on nutrient poor sites were fertilized to improve growing conditions.

Glacier Project alternatives meet or contribute to Forest Plan direction for white pine through managing for white pine. Between 135 and 199 acres of aspen forest types would be converted to white pine through harvest followed by site preparation activities and planting. Between 1,100 and 2,900 acres would receive diversity planting, including white pine along with other desired species such as red pine and white spruce. And over 5,000 acres would undergo non-harvest treatments including releasing desired species, planting, fuel reduction, and mechanical disturbance for the purpose of increasing species diversity, including white pine. In addition, several stands proposed for treatment in the scoping report were dropped from this project because of the amount of young white pine coming up in the understory. These stands that contain natural regeneration of white pine will contribute to the overall objective for increasing white pine. See Section 3.9 Vegetation for more information on white pine.

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