

White Mountain National Forest

Appendix F Species Viability

Species Viability

The Rare and Unique Features section addressed the defining features, distribution, potential limiting factors, and direct, indirect, and cumulative effects of the alternatives for ten broad habitats. These habitats support the 109 species of concern identified for the WMNF through our Species Viability Evaluation, including 6 federally listed species and 39 Regional Forester's Sensitive Species.

This appendix identifies which species of concern occur in each of the ten habitats and details ways in which species-specific habitat needs, limiting factors, and effects differ from those in the habitat summary (Tables 1 and 2). Some species are strongly tied to only one of the broad habitat types, while others may occur in multiple habitats (Table 3). For some species, habitat needs, limiting factors, and effects closely match what is described for their habitat(s). Other species have narrower habitat needs or additional limiting factors, or would be affected differently by the alternatives than what is discussed for the habitat(s). Given the number of species involved, alpine habitat is dealt with uniquely: only species that are restricted to alpine habitat are included under this habitat in the Species Viability Evaluation process. Species that occur in a certain habitat (such as rocks or bogs) both in the alpine zone and at lower elevations are addressed within their primary habitat, not the alpine zone.

Tables 1 and 2 also provide viability outcomes for each species. These outcome definitions were developed to provide a consistent basis for judging viability across a wide array of taxa and habitats. Outcomes A-E (see table footnotes) describe a range of conditions from most to least viable. For most species, the current viability outcome for the WMNF was estimated by the panel of local experts that addressed that species, based on their knowledge of the species and existing habitat conditions and limiting factors. For some species, panelists were comfortable just giving a single-letter outcome (e.g. outcome B). Sometimes experts were even more specific. For example, they might believe that a species is just barely within the description of outcome B, but not as far along the scale as outcome C, so they gave the species an outcome of B-. At other times, panelists were uncertain about how much habitat or populations have changed so were unsure where in the viability outcome continuum the species falls. For these species, panels identified a range of outcomes (e.g. B/C) that reflect their understanding of current conditions.

Outcomes for each alternative were determined based on the current outcome for the species, the effects analysis for the habitat(s), and differences from that analysis displayed in the table. Outcomes for alternatives are based on expected changes in management and species status over the next 20 years. For this effort, outcomes A-C are considered viable. The effects column details the reason for any outcomes of D or E and the reason for declines in outcomes.

Most of the information in this table is from the Species Data Collection Forms compiled for each species. These forms are part of the Forest Plan Revision project record. For more detail on federally listed and Regional Forester's Sensitive Species, see the Biological Assessment.

Table F-01. Alpine Species of Concern.

Species	RFSS ¹	WMNF occurrence ²	Analysis area occurrence ²	Alpine habitat(s) used on WMNF	Differences from habitat description	Differences in potential effects	WMNF Viability Outcomes ³				
							Current	Alt. 1	Alt. 2	Alt. 3	Alt. 4
White Mountain butterfly	Y	5 extant; 57 historic; extant are areas; historic are specimens, # of areas unknown	5 extant; 57 historic; extant are areas; historic are specimens, # of areas unknown	Both	Selects for host species, <i>Carex bigelowii</i> , which occurs primarily in wetter, more sheltered dry-mesic heath/meadow communities; occurs less often in snowbank/wet ravine and other habitats; butterfly limited to sedge meadows in these habitats; trampling not likely to impact butterfly directly, but could affect host and habitat; collection may be a concern; climate change may be greatest threat	Collection should be restricted in all alternatives by standard to protect TES species. Alternatives would not affect climate change or potential for it to negatively affect this species. Trampling of host plant could result in slight decrease in viability outcome; climate change could cause greater decrease.	A/B	B/C	B/C	B/C	B/C
White Mountain fritillary	Y	6 extant; 14 historic	6 extant; 14 historic	Snowbank/wet ravine	Only in subalpine, from treeline up to start of actual alpine; trampling not likely to impact directly, but could affect habitat; collection may be a concern; climate change may be greatest threat	Collection should be restricted in all alternatives by standard to protect TES species. Alternatives would not affect climate change or potential for it to negatively affect this species. Trampling could result in slight decrease in viability outcome; climate change could cause greater decrease.	A/B	B/C	B/C	B/C	B/C
Arctostaphylos alpina	N	5 extant; 5 historic	5 extant; 5 historic	Dry-mesic heath/meadow	Found in more exposed portions of dry-mesic heath habitats; found in small, isolated populations on ridgelines; four of the five extant occurrences are on or near trails or paths	Occurrences adjacent to trail emphasize risk from trampling.	B-	B-/C	B-/C	B-/C	B-/C
Arnica lanceolata	Y	5 extant; 1 historic	6 extant; 3 historic	Snowbank/wet ravine	This species is most abundant along rocky rills in alpine ravines. One historic occurrence was along stream at lower elevation.	None. Historic occurrence is believed to have been extirpated by trampling, emphasizing the effects of trampling and need for standards and guidelines to mitigate.	B/C	B/C	B/C	B/C	B/C
Betula minor	Y	12 extant; 8 historic	13 extant; 8 historic	Dry-mesic heath/meadow	On fairly exposed windy ridges of this community and along edge of krummholz. Species is part of a taxonomic complex that makes identification difficult, so occurrences are not certain.	All known occurrences in NH are next to a trail, which increases trampling risk; Standards and guidelines mitigate some of effects as described for habitat	B/C	B/C	B/C	B/C	B/C
Cardamine bellidifolia	Y	2 extant; 7 historic	2 extant; 7 historic	Snowbank/wet ravine	Streamside and cliff seep communities, not snowbanks; therefore winter camping less of a concern	Threat from winter camping may be less than for other species, but other effects of alternatives are same as described for habitat	C	C	C	C	C

Table F-01. Alpine Species of Concern (continued).

Species	RFSS ¹	WMNF occurrence ²	Analysis area occurrence ²	Alpine habitat(s) used on WMNF	Differences from habitat description	Differences in potential effects	WMNF Viability Outcomes ³				
							Current	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Carex capillaris	N	2 extant; 2 historic	2 extant; 2 historic	Both	Snowbank communities, wet rocks, and wetter portions of dry-mesic heath/meadow habitat.	One known extant occurrence is about 10 feet from a trail, which increases the risk of trampling; Standards and guidelines mitigate some of effects as described for habitat	B/C	B/C	B/C	B/C	B/C
Carex capitata ssp. arctogena	N	2 extant; 3 historic	2 extant; 3 historic	Snowbank /wet ravine	Mostly in wet meadows and along streambanks; may use other communities	At least one occurrence is along a trail, which increases the risk of trampling; Standards and guidelines mitigate some of effects as described for habitat	B/C	B/C	B/C	B/C	B/C
Castilleja septentrionalis	N	4 extant; 6 historic	3 extant; 7 historic	Snowbank /wet ravine	Especially in, but not limited to, wet meadows, wet ravines, and along streambanks	None	B/C	B/C	B/C	B/C	B/C
Epilobium anagallidifolium	N	1 extant; 1 historic	1 extant; 1 historic	Snowbank /wet ravine	Occurs on damp moss or wet rock in alpine, including in cool, wet ravines and along alpine brooks and the moist creek sides of recent snow runoff. Species moves around due to seed dispersal, so not always in same place and can just pop up; many people have trouble finding it, probably due to movement, so despite heavy botanizing in alpine, more occurrences may exist on Forest	To meet goals and viability requirements, Forest will do all that is reasonably possible to protect single known occurrence and maintain at least current level of viability. If additional occurrences are located, future outcome would be B-/C for all alternatives. As long as only one occurrence is known, D outcome is possible because preventing the loss of a single occurrence from natural events or recreational use depends on site and species-specific conditions and may be outside the Forest's control.	B-/C	B-/D	B-/D	B-/D	B-/D
Euphrasia oakesii	Y	2 extant; 2 historic	2 extant; 2 historic	Both	Primarily snowbank and streamside communities, but also found in very dry, windswept areas; hemiparasitic, host species unknown. One of very few annual plants in the alpine zone.	At least one historic occurrence was along a trail, emphasizing the risks from trampling; Standards and guidelines mitigate some of effects as described for habitat. As an annual plant, it may be more vulnerable to stochastic events.	B/C	B/C	B/C	B/C	B/C
Festuca prolifera	Y	1 extant; 1 historic	1 extant; 1 historic	Snowbank /wet ravine	Especially, but not limited to, along alpine brooks; vegetative reproduction only, so no seed bank potential to reestablish lost populations	Lack of seed bank makes negative impacts to populations more of a threat to viability than for other species, but the relative effects from the four alternatives are the same as described for the habitat	B/C	B/C	B/C	B/C	B/C

Table F-01. Alpine Species of Concern (continued).

Species	RFSS ¹	WMNF occurrence ²	Analysis area occurrence ²	Alpine habitat(s) used on WMNF	Differences from habitat description	Differences in potential effects	WMNF Viability Outcomes ³				
							Current	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Geum peckii	Y	27 extant; 6 historic	28 extant; 6 historic	Both	Primarily streamside communities; also in snowbank, wet meadow, cliff seep, and alpine bog communities and along edges of dry-mesic heath/meadow habitats. Also rarely found in exposed streamside spruce-fir habitat.	Several populations occur near trails, which increases the risk of trampling; Standards and guidelines mitigate some of effects as described for habitat	B/C	B/C	B/C	B/C	B/C
Harrimanella (Cassiope) hypnoides	N	5 extant; 7 historic	5 extant; 7 historic	Snowbank/ wet ravine	Especially in snowbank heath communities and wet seeps and crevices; collection pressure greater than for other alpine plant species	At least one occurrence is along a trail, which increases the risk of trampling; Standards and guidelines mitigate some of effects as described for habitat. Collection permits restricted in all alternatives under standard to protect TES species. Increased education emphasis in Alternative 2-4 should increase awareness not to collect species	B/C	B/C	B/C	B/C	B/C
Loiseleuria procumbens	N	11 extant; 1 historic	12 extant; 1 historic	Dry-mesic heath/meadow	Found in more exposed portions of dry-mesic heath habitats; likely extirpation just off-Forest due to recreation impacts highlight concerns	None. Populations that are not extirpated in near-term are expected to be stable and not readily impacted by increasing recreational use	C	C	C	C	C
Luzula confusa	N	4 historic	4 historic	Snowbank/ wet ravine	Wet ravine communities; winter camping not a limiting factor	Winter camping not a limiting factor. Other potential effects are as described for the habitat	B/C	B/C	B/C	B/C	B/C
Nabalus (Prenanthes) bootii	Y	4 extant; 1 historic	4 extant; 1 historic	Both	Primarily in damp meadow communities; also in dry-mesic heath/meadow habitats; tolerant of moderate disturbance	Threat from trampling and winter camping may be slightly less than for other species due to disturbance tolerance. However at least two occurrences are along trails, one in an area popular for off-trail exploration, so there is potential for intensive disturbance; Standards and guidelines mitigate some of effects as described for habitat.	B/C	B/C	B/C	B/C	B/C

Table F-01. Alpine Species of Concern (continued).

Species	RFSS ¹	WMNF occurrence ²	Analysis area occurrence ²	Alpine habitat(s) used on WMNF	Differences from habitat description	Differences in potential effects	WMNF Viability Outcomes ³				
							Current	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Omalotheca (Gnaphalium) supina	Y	1 extant; 3 historic	1 extant; 3 historic	Snowbank/wet ravine	In exposed parts of habitat that lack shrubs and are not dominated by grasses or sedges; availability of disturbed alpine habitat and ice climbing are additional limiting factors. Historic occurrences have been looked for and not found.	Only known extant population is near a popular trail, which increases trampling risk; Standards and guidelines mitigate some effects as described for habitat. To meet goals and viability requirements, Forest will do all that is reasonably possible to protect known occurrence and maintain at least current level of viability. However whether it is possible to prevent the loss of a single occurrence from natural events or recreational use depends on site and species-specific conditions and may be outside the Forest's control.	C	C/D	C/D	C/D	C/D
Oxyria digyna	N	3 extant; 3 historic	2 extant; 4 historic	Snowbank/wet ravine	Typically in snowbank communities and rocky slopes of headwalls; also near streams	None	B-/C+	B-/C+	B-/C+	B-/C+	B-/C+
Persicaria (Polygonum) vivipara	N	2 extant; 1 historic	2 extant; 1 historic	Snowbank/wet ravine	Snowbank and moist meadow communities, wet mossy rocks and seeps, and near streams	At least one occurrence is along a trail in an area popular for off-trail exploration, so potential for trampling is high. Relative effects of four alternatives are same as described for habitats	C+/C	C+/C	C+/C	C+/C	C+/C
Phleum alpinum	N	4 extant; 2 historic	4 extant; 2 historic	Snowbank/wet ravine	Usually in wet ravines, but also in wet meadows or along alpine brooks; winter camping less of a concern in ravines	Occurs next to heavily used trails, so trampling is an increased concern. Threat from winter camping may be slightly less than for other species. Standards and guidelines mitigate some of effects as described for habitat	B-/C+	B-/C+	B-/C+	B-/C+	B-/C+
Poa laxa ssp. fernaldiana	Y	6 extant; 10 historic	6 extant; 10 historic	Both	Prefers thin rocky soils; occurs on wet cliffs and other habitats that are wet due to fog, but not strongly associated with either broad habitat	None	B	B	B	B	B
Poa pratensis ssp. alpigena	N	1 extant; 5 historic	1 extant; 5 historic	Dry-mesic heath/meadow	None. Single extant occurrence may not be definitive as several historic occurrences have not been searched for recently.	None	B/C	B/C	B/C	B/C	B/C

Table F-01. Alpine Species of Concern (continued).

Species	RFSS ¹	WMNF occurrence ²	Analysis area occurrence ²	Alpine habitat(s) used on WMNF	Differences from habitat description	Differences in potential effects	WMNF Viability Outcomes ³				
							Current	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Potentilla robbinsiana	Y	4 extant; 1 historic	4 extant; 1 historic	Dry-mesic heath/meadow	Found in more exposed, gravelly, frost-churned portions of dry-mesic heath habitats; also in cliff crevices below an alpine summit; habitat availability is primary limiting factor	Several populations have been impacted already by trampling, which increases the risk of continued impact; Standards and guidelines mitigate some of effects as described for habitat. Alternatives would not affect habitat availability, which depends on frost heaving. Transplants and management have resulted in larger and new populations, but it is unknown if remaining genetic variability can withstand potential habitat changes.	B-/C	B-/C	B-/C	B-/C	B-/C
Rhinanthus minor ssp. groenlandicus	N	# unknown	# unknown	Snowbank/wet ravine	Snowbank and wet meadow communities; subspecies just being distinguished	None	B/C	B/C	B/C	B/C	B/C
Rhododendron lapponicum	N	8 extant	8 extant	Dry-mesic heath/meadow	Prefers the slightly more sheltered end of these exposed communities, but can be found in full range except rock outcrops; collection is additional concern	Collection permits restricted in all alternatives under standard to protect TES species and education emphasis should increase awareness not to collect species. Naturally limited by tolerance for extremes of its habitat so additional impacts from recreation use may lead to decline in outcome.	B	B/C+	B/C+	B/C+	B/C+
Salix argyrocarpa	N	4 extant; 1 historic	4 extant; 1 historic	Snowbank/wet ravine	Wet ravine and alpine rill communities; winter camping may not be as great a concern	Threat from winter camping is less than for other species	B/C	B/C	B/C	B/C	B/C
Salix herbacea	N	4 extant; 2 historic	4 extant; 2 historic	Snowbank/wet ravine	Wet ravines, snowbank communities, and along brooks; needs some disturbance to keep habitat open; most known sites less accessible than others, but rock climbing may become a concern	Threat from trampling and winter camping may be less than for other species due to accessibility; Standards and guidelines mitigate some of effects as described for habitat. Alternative 1 has option for closure of rock climbing sites if damage occurs; Alternatives 2-4 restrict activities to try to reduce impacts and allow for closure if needed	B-/C+	B-/C+	B-/C+	B-/C+	B-/C+

Table F-01. Alpine Species of Concern (continued).

Species	RFSS ¹	WMNF occurrence ²	Analysis area occurrence ²	Alpine habitat(s) used on WMNF	Differences from habitat description	Differences in potential effects	WMNF Viability Outcomes ³				
Saxifraga rivularis	N	Uncertain; likely 3 extant; 2 historic	Uncertain; likely 3 extant; 2 historic	Both	Primarily in wet ravines, wet mossy areas, and wet cliffs, but uses some dry-mesic heath/meadow habitats; may benefit from limited disturbance; may be nitrophile or calciphile; trampling still key threat	Only known extant population is near a trail and has been impacted by trampling, which increases trampling risk for future, though it may tolerate limited trampling better than other species. Standards and guidelines mitigate some of effects as described for habitat	B-/C+	B-/C+	B-/C+	B-/C+	B-/C+
Sibbaldia procumbens	N	1 extant	1 extant	Snowbank/wet ravine	Only known from bottom of snowfield, but may use other communities in habitats; late season skiing is primary threat; small population at the base of a large ravine is very vulnerable to natural landslides.	Only known extant population is where skiers come off a snowfield, which increases trampling risk from late season skiing. Standards and guidelines mitigate some effects as described for habitat. To meet goals and viability requirements, Forest will do all that is reasonably possible to protect known occurrence and maintain at least current level of viability. However whether it is possible to prevent the loss of a single occurrence from natural events or recreational use depends on site and species-specific conditions and may be outside the Forest's control.	C	C/D	C/D	C/D	C/D
Silene acaulis var. exscapa	Y	2 extant; 5 historic	2 extant; 5 historic	Dry-mesic heath/meadow	Found in more exposed portions of dry-mesic heath/meadow habitats; debris from Auto Road is additional concern and part of one population is where ice climbers exit Huntington ravine	Auto Road is not managed by WMNF, so alternatives would not affect debris from road. Panel believes impacts to Auto road population could reflect a decrease in viability outcome in future. Other effects are same as for habitat.	C	C/D	C/D	C/D	C/D
Sphagnum lindbergii	N	2 extant	2 extant	Neither; uses peatlands	In New Hampshire, restricted to alpine and subalpine peatlands; forms carpets in high elevation heath balds and bogs with full sun, low to medium nutrient levels, and pH of 4.0-6.0; threats similar to those for snowbank habitats, but not winter camping; peat mining is additional peatland concern, though not locally	Surveys have been limited, so lack of many occurrences is not a big concern. Peat mining would be prohibited by Standards and guidelines to protect wetlands. Other effects as described for snowbank/wet alpine habitats.	B	B	B	B	B

Table F-01. Alpine Species of Concern (continued).

Species	RFSS ¹	WMNF occurrence ²	Analysis area occurrence ²	Alpine habitat(s) used on WMNF	Differences from habitat description	Differences in potential effects	WMNF Viability Outcomes ³				
Spiraea septentrionalis	N	# unknown	# unknown	Snowbank/wet ravine	Wet ravines and snowbank communities; species is poorly documented, especially in NH	None known. Outcomes are tentative due to recent taxonomic changes and lack of tracking by NHNHB. Future field documentation should clarify needs, threats, and trends.	B/C	B/C	B/C	B/C	B/C
Vaccinium boreale	Y	14 extant; 1 historic	15 extant; 2 historic	Both	Exposed windy areas in both broad habitats as well as subalpine heath krummholz and bare rock subalpine summits	None. Species may be more common than numbers indicate because it was recently separated from common V. angustifolium var. angustifolium, so some occurrences of V. boreale have probably gone undocumented	B	B	B	B	B
Vahlodea (Deschampsia) atropurpurea	N	5 extant; 6 historic	5 extant; 6 historic	Snowbank/wet ravine	Snowbank communities	None	B-/C+	B-/C+	B-/C+	B-/C+	B-/C+

¹ Is this a Regional Forester’s Sensitive Species: N = No; Y = Yes; ESA = Federally listed as Endangered or Threatened

² Number of documented occurrences within the White Mountain National Forest or the analysis area (see habitat description for definition). Analysis area occurrences include WMNF occurrences. When a species occurs in multiple habitats, the analysis areas and related number of occurrences may vary among habitats. Extant = last documented as existing within last 20 years; Historic = last documented as existing more than 20 years ago or known to no longer exist; Unconfirmed = reported by credible person, but not yet documented or verified; # unknown = species is known to occur in the analysis area, but documented occurrences are not track by any State heritage program or town information was not provided.

³ Outcomes are based on current population and habitat conditions and opinions of expert panelists.

Outcome A: Habitat is distributed broadly across the taxon’s historic range and is of sufficient quality to support the type and degree of intrademe and metapopulation interactions that the taxon would characteristically engage in if it were not habitat limited.

Outcome B: Habitat across the taxon’s historic range is reduced in quality or quantity. Local demes may be extirpated. Metapopulation interactions are adversely altered, but the taxon generally retains the geographic extent typical of the historic distribution.

Outcome C: Habitat across the taxon’s historic range is reduced in quality or quantity. Local demes have been extirpated. Metapopulation interactions are adversely altered throughout most or in significant portions of the taxon’s range. The geographic extent of the taxon is reduced.

Outcome D: Habitat across the taxon’s historic range is much reduced in quality or quantity. A majority of the historic populations have been extirpated. Metapopulation interactions are essentially precluded. The geographic extent of the taxon is significantly reduced.

Outcome E: Habitat across the taxon’s historic range is much reduced in quantity and quality. A majority of the historic populations have been extirpated. Metapopulation interactions are essentially precluded. The geographic extent of the taxon is reduced so much that the taxon would benefit from the protections of the Endangered Species Act.

Table F-02. Species of Concern in Other Habitats.

Species	RFSS ¹	WMNF occurrence ²	Analysis area occurrence ²	Differences from habitat description	Differences in effects	WMNF Viability Outcomes ³				
						Current	Alt. 1	Alt. 2	Alt. 3	Alt. 4
ENRICHED HARDWOOD FOREST SPECIES										
Arabis missouriensis	N	1 extant	3 extant	Semi-rich and rich sites; often in semi-open rocky woods or on rock outcrops within rocky ridge woodlands. Trampling and genetic inbreeding are additional threats; timber harvest not likely to limit this species	Trampling concern is addressed for rock habitats, where trampling is most likely. Timber harvest effects less applicable to this species than to habitat because species prefers more open canopy than others in this habitat. WMNF management would not affect genetic concerns. Single small population on WMNF comprised of weak plants near a popular climbing site indicates potential for decline due to natural or recreation factors under all alternatives. To meet goals and viability requirements, Forest will do all that is reasonably possible to protect known occurrence and maintain at least current level of viability. However whether it is possible to prevent the loss of a single occurrence from natural events or recreational use depends on site and species-specific conditions and may be outside the Forest's control. If it occurs elsewhere on the Forest, the potential for other impacts are as described for the habitats.	C	C/D	C/D	C/D	C/D
Cardamine concatenata	N	Likely 1 historic	1 historic	Also occurs in wooded bottoms and wooded, calcareous rocky habitats. Rock climbing may limit sites; may be gathered for peppery roots. Single occurrence is in an area with mixed ownership; it was probably on the WMNF but that cannot be confirmed unless it is relocated. It is possible it occurs in a couple other spots on the Forest, but calcareous rocky forest habitat is very limited, so it is not likely.	Single occurrence location is near base of popular rock climbing cliffs, so trampling is primary concern and may have already resulted in extirpation. This uncertainty leads to C/D outcome currently. To meet goals and viability requirements, Forest will do all that is reasonably possible to relocate known occurrence and protect it to maintain at least current level of viability, if it is on WMNF land. Even if it is still extant (C outcome), a future D outcome is possible because preventing the loss of a single occurrence from natural events or recreational use depends on site and species-specific conditions and may be outside the Forest's control.	C/D	C/D	C/D	C/D	C/D

Table F-02. Species of Concern in Other Habitats (continued).

Species	RFSS ¹	WMNF occurrence ²	Analysis area occurrence ²	Differences from habitat description	Differences in effects	WMNF Viability Outcomes ³				
						Current	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Carex backii	N	1 extant	At least 4 extant	Rich oak-hardwood and transitional limestone hardwood forest habitats. Also along trails and roads and on calcareous to circumneutral rock habitats. Fire appears to be beneficial. Trampling and small populations are additional concerns. Not tracked previously in NH so single occurrence is not a concern.	Potential for trampling addressed in rock habitat analysis. WMNF management would not affect concerns due to population size. Effects of timber harvest are uncertain, but species uses at least semi-open habitat so some harvest may not be a concern. Fire use is essentially the same in all alternatives. Acres allowing fire use vary slightly, but not near known occurrence.	C	C	C	C	C
Cynoglossum virginianum var. boreale	N	2 historic; may occur elsewhere	2 extant; 8 historic	Primarily rich hardwood forests, but also occurs in woody, rocky habitats; prefers somewhat open canopy. Fire may be beneficial, helping keep the canopy open. Logging may benefit or threaten populations depending on site conditions and intensity of harvest. One of historic occurrences is believed to be extirpated due to canopy closure; other unknown.	Partial canopy removal, which is more abundant in Alternatives 3 and 4, may be beneficial; impacts from even-aged regeneration harvest are as described for habitat, with more impact in Alternative 1. Low site fidelity and apparent extirpations in NH and on WMNF are reason for low outcomes and would not be affected by WMNF management. Fire use is essentially the same in all alternatives. Acres allowing fire use vary slightly, but not near known occurrences.	D	D	D	D	D
Cypripedium parviflorum var. pubescens	N	Possibly 1 extant; likely to occur elsewhere	15 extant; 5 historic; plus Maine	Any rich mesic forest, including forested wetlands, with a closed to somewhat open canopy. Experts believe there is more than one occurrence on WMNF. Collection, changes to hydrology, and genetics are additional concerns.	Collection permits restricted in all alternatives under standard to protect TES species. WMNF management would not affect genetic concerns. Potential for changes to hydrology addressed under wetland habitat. Difference in outcomes is because higher even-aged regeneration harvest in northern hardwood habitat in Alternative 1 could decrease suitable habitat on Forest, impact occurrences, and reduce dispersal capability.	C	C-	C	C	C
Dicentra canadensis	Y	15 extant	28 extant plus VT; 6 historic	None, this is a classic rich hardwood forest species.	None. Difference in outcomes is because higher even-aged regeneration harvest in northern hardwood habitat in Alternative 1 could decrease suitable habitat on Forest, impact occurrences, and reduce dispersal capability.	B	B-	B	B	B

Table F-02. Species of Concern in Other Habitats (continued).

Species	RFSS ¹	WMNF occurrence ²	Analysis area occurrence ²	Differences from habitat description	Differences in effects	WMNF Viability Outcomes ³				
						Current	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Dryopteris goldiana	Y	7 extant; 1 historic	17 extant; 10 historic	Also occurs in limey seeps and swamp edges; may tolerate more open canopy if moist. Availability of circumneutral habitat and collection are additional limiting factors.	Collection permits restricted in all alternatives under standard to protect TES species. WMNF management would not affect habitat availability. Spring protection would mitigate some potential impacts, but other seep habitats lack specific protection. Other effects as described for habitats. Difference in outcomes is because higher even-aged regeneration harvest in northern hardwood habitat in Alternative 1 could decrease suitable habitat on Forest, impact occurrences, and dispersal capability.	B	B-	B	B	B
Juglans cinerea	Y	Known to occur; # unknown	# unknown	Also in floodplain forest and calcareous talus habitats; open canopy required; Disease is primary threat; succession also limits it, so logging probably not a concern	Timber harvest may be beneficial as species needs open canopy, not closed. Therefore despite increased risk from development, alternatives with more acres of harvest (1 and 4) could provide more suitable habitat. WMNF management cannot alter spread of disease, which is likely to continue causing decline regardless of habitat availability.	C	D	D	D	D
Osmorhiza berteroi	Y	4 extant; 5 historic	4 extant; 11 historic	More in semi-rich hardwoods than classic rich hardwood forest	Unsuccessful searches for some historic occurrences cause concern; if populations are truly extirpated, outcome would be D. Recent location of new occurrence indicates outcome may be C. Unknown what caused apparent decline, if it is real, but known threats are as described for habitat.	C/D	C/D	C/D	C/D	C/D
Panax quinquefolius	Y	22 extant; 2 historic	53 extant; 8 historic	Semi-rich and rich forests; harvest of roots is key threat	Collection permits restricted in all alternatives under standard to protect TES species. However illegal collection is expected to continue and may increase, causing a decline in outcomes, if price remains high.	C	C/D	C/D	C/D	C/D
Polygonum douglasii	N	6 extant; 1 historic	7 extant; 3 historic	Exposed rocky slopes and hillside ledges in well-drained soil where little other vegetation grows; can also grow in open oak-hardwood forests. Trampling, rock climbing, and succession are additional concerns; timber harvest not a threat.	Even-aged regeneration may create suitable open habitat. Experts felt that increased hiking use in rock habitats could result in decreased viability outcome on Forest. Recreation use not expected to vary among alternatives.	B	B/C	B/C	B/C	B/C

Table F-02. Species of Concern in Other Habitats (continued).

Species	RFSS ¹	WMNF occurrence ²	Analysis area occurrence ²	Differences from habitat description	Differences in effects	WMNF Viability Outcomes ³				
						Current	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Pyrola asarifolia	Y	1 extant	7 extant; 8 historic	Rich woods and thickets, especially alluvial river terraces, open wetlands, and cedar swamps; often at forest edge. Changes to hydrology and trampling are additional limiting factors. NHNHB only tracks one occurrence as on WMNF and suitable habitat is limited, but panelists believe others exist and some occurrences in NHNHB database are very close to, or on, WMNF without certain accuracy so there may be additional WMNF occurrences	Potential negative impacts from changes to hydrology and trampling are addressed for wetland habitats. Partial canopy removal, which is more abundant in Alternatives 3 and 4, may be beneficial; impacts from even-aged regeneration harvest are as described for habitat, with more impact in Alternative 1. To meet goals and viability requirements, Forest will do all that is reasonably possible to protect known occurrence and maintain at least current level of viability. If additional occurrences are located or determined to be on the WMF, future outcome would be C- for Alternative 1 and C for others. As long as only one occurrence is known, D outcome is possible for all alternatives because preventing the loss of a single occurrence from natural events or recreational use depends on site and species-specific conditions and may be outside the Forest's control. Difference in outcomes is because higher even-aged regeneration harvest in northern hardwood habitat in Alternative 1 could decrease suitable habitat on Forest, impact occurrences, and alter dispersal capability.	C	C-/D	C/D	C/D	C/D
Sanicula trifoliata	N	1-2 extant; 0-1 historic	3-4 extant; 7 historic	Mature forest species that uses small canopy gaps, so single tree selection harvest may not be a concern or could maintain habitat. One small occurrence on the Forest may have been extirpated by even-aged regeneration harvest; if so, only one occurrence remains on WMNF lands and second occurrence is historic.	Even-aged regeneration harvest likely detrimental, but single tree selection may be OK. Definite extant occurrence on WMNF is a Legacy Tract in Lyme, so not at risk from timber harvest. To meet goals and viability requirements, Forest will do all that is reasonably possible to protect that occurrence and maintain at least current level of viability. However whether it is possible to prevent the loss of a single occurrence depends on site and species-specific conditions and may be outside the Forest's control.	C/C-	C/D	C/D	C/D	C/D

Table F-02. Species of Concern in Other Habitats (continued).

Species	RFSS ¹	WMNF occurrence ²	Analysis area occurrence ²	Differences from habitat description	Differences in effects	WMNF Viability Outcomes ³				
						Current	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Solidago calcicola	N	4 historic	4 historic	Open habitats including edges and openings of moist rich woods, rocky or gravelly thickets, talus and cliffs. Succession is additional limiting factor; timber harvest not a threat. Fire may be beneficial to prevent succession.	Timber harvest could impact individuals, but also may create suitable edge or open habitat. Therefore alternatives with more acres of even-aged regeneration harvest (1 and 4) could provide more suitable habitat. Fire use is essentially the same in all alternatives. Acres allowing fire use vary slightly, but not near known occurrences. Current and future outcomes depend on whether known occurrences are really historic or just have not been revisited, so surveys are needed.	B/D	B/D	B/D	B/D	B/D
ROCK AND CLIFF SPECIES										
American peregrine falcon	Y	9 extant; 7-11 historic	23 extant; 38 historic	Nest primarily on ledges of cliffs, sometimes on tall buildings. Pesticides is key additional threat; development and succession threats not a real concern for cliff habitat on Forest	WMNF does not typically use pesticides. Easy to locate and protection Standards and guidelines already limit impacts from climbing and hiking so species likely to continue recovery.	B	B+	B+	B+	B+
Eastern small-footed myotis	Y	# unknown	# unknown	Under rocks and in crevices in summer, caves in winter; may also roost under tree bark, in buildings, and bridge expansion joints in summer; trampling is not a concern, but rock climbing is a concern as cleaning of routes may directly impact or displace roosting bats and reduce habitat suitability and climbing can disturb bats; additional threats = harassment and other concerns at hibernacula, pesticides, killing of bats, timber harvest, wind turbines, and cell towers	Harassment, pesticide, and direct killing threats would not result from WMNF management, so no additional effects for those concerns. Wind turbines and cell towers would not vary among alternatives; S&G requiring surveys and mitigation should reduce impacts. Hiking and development effects unlikely to impact this species. Potential for timber harvest to impact this species is uncertain given limited evidence of tree use, but if it is a concern, Alternative 4 would impact the most acres in the first two decades, then 1, then 3, and Alternative 2 would impact the fewest acres; snag Standards and guidelines should mitigate the harvest effects and prevent any alternative from reducing viability due to harvest; establishment and cleaning of climbing routes and related disturbance are key concerns that no alternative addresses so potential for impacts remain and are equal; TES protection Standards and guidelines will have limited benefit because summer rock roosts are hard to locate.	B/C	C	C	C	C

Table F-02. Species of Concern in Other Habitats (continued).

Species	RFSS ¹	WMNF occurrence ²	Analysis area occurrence ²	Differences from habitat description	Differences in effects	WMNF Viability Outcomes ³				
						Current	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Arabis missouriensis	N	1 extant	3 extant	Semi-rich and rich sites; often in semi-open rocky woods or on rock outcrops within rocky ridge woodlands. Trampling and genetic inbreeding are additional threats; timber harvest not likely to limit this species	Trampling concern is addressed for rock habitats, where trampling is most likely. Timber harvest effects less applicable to this species than to habitat because species prefers more open canopy than others in this habitat. WMNF management would not affect genetic concerns. Single small population on WMNF comprised of weak plants near a popular climbing site indicates potential for decline due to natural or recreation factors under all alternatives. To meet goals and viability requirements, Forest will do all that is reasonably possible to protect known occurrence and maintain at least current level of viability. However whether it is possible to prevent the loss of a single occurrence from natural events or recreational use depends on site and species-specific conditions and may be outside the Forest's control. If it occurs elsewhere on the Forest, the potential for other impacts are as described for the habitats.	C	C/D	C/D	C/D	C/D
Calamagrostis stricta ssp. inexpansa	Y	5 extant; 4 historic	8 extant; 5 historic	Cliffs and ledges, river and stream banks, bogs, fens, seeps, and wet alpine. Fire may be beneficial – may have led to increase in one population. Change in hydrology is additional concern	Rock climbing less of a concern for wet cliffs, but may result in trampling on drier habitats, including at least one large population on Forest. Ice climbing occurs at one site, unknown if a concern, but use is likely to increase. Trampling by hikers is addressed in habitat effects. Natural processes would affect succession, and habitat management would be allowed in MA 2.1 if needed to prevent succession and maintain suitable habitat. Other concerns addressed for habitats. Fire use is essentially the same in all alternatives. Acres allowing fire use vary slightly. Allocation for one known occurrence would vary among alternatives – not allowing the use of prescribed fire in Alternative 3.	B/C	B/C	B/C	B/C	B/C

Table F-02. Species of Concern in Other Habitats (continued).

Species	RFSS ¹	WMNF occurrence ²	Analysis area occurrence ²	Differences from habitat description	Differences in effects	WMNF Viability Outcomes ³				
						Current	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Carex backii	N	# unknown; likely to occur	# unknown	Occurs in rich oak-hardwood and transitional limestone hardwood forest habitats, along trails and roads, and on calcareous to circumneutral rock habitats. Fire appears to be beneficial. Small populations and availability of circumneutral habitat are additional limiting factors.	WMNF management would not affect concerns due to population size or availability of calcareous to circumneutral. Effects of timber harvest are uncertain, but species uses at least semi-open habitat so some harvest may not be a concern. Fire use is essentially the same in all alternatives. Acres allowing fire use vary slightly, but not near known occurrence.	C	C	C	C	C
Carex scirpoidea	N	3 extant; 5 historic	10 extant; 6 historic	In NH, prefers circumneutral to calcareous rocky summits and ledges; outside NH also uses hardwood forest, sedge meadow, and boreal shorelines with circumneutral to calcareous soils. Succession not as much a concern as for other species. Circumneutral to calcareous habitat availability is known limiting factor.	Species is naturally limited by habitat availability, so impacts to a known site could affect viability more than for species with more habitat. One extant occurrence is in area popular for off-trail flower walks and exploration, which increases the risk of trampling by hikers. Establishment and cleaning of rock climbing is an impact in all alternatives. This combination of concerns leads to likely decline in outcome.	B/C	B-/C-	B-/C-	B-/C-	B-/C-
Chenopodium foggii	N	1 extant; possibly 1 historic	2 extant, 2 historic	In New England, limited to high pH rock habitats, including cliff bases, rocky slopes and outcrops, and rocks in open woods. Circumneutral to calcareous habitat availability is known limiting factor.	WMNF management does not alter availability of high pH rock habitats. Occurrence data is a question due to taxonomic confusion; need to validate occurrences after states update databases to new taxonomy. Other potential impacts assumed to be same as for habitat.	B/C	B/C	B/C	B/C	B/C
Minuartia glabra	N	1 extant; 1 historic	2 extant; 3 historic	Prefers non-calcareous rocky summits and outcrops up to 3000 feet in elevation; also in forest openings created by rocky ledges. Climbing not a big concern because not a cliff species. Needs some disturbance to reduce competition; uncertain if it can tolerate higher levels of trampling than other species	Effects from climbing not likely to impact this species. Increased hiking traffic may result in decrease in outcome given apparent rarity of species and proximity of occurrence to trail	B	B/C	B/C	B/C	B/C
Oligoneuron album	N	2 extant	3 extant	Dry, calcareous cliffs and ledges; may also occur in open fields and roadsides; ski area mowing and logging also limit some populations, though not on WMNF lands.	Effects from increases in hiking and climbing apply and may result in decline in outcome in all alternatives; only known occurrences are along the Appalachian Trail or in Legacy Tract in Lyme, where new trails are unlikely so effects are same in all alternatives.	B	C	C	C	C

Table F-02. Species of Concern in Other Habitats (continued).

Species	RFSS ¹	WMNF occurrence ²	Analysis area occurrence ²	Differences from habitat description	Differences in effects	WMNF Viability Outcomes ³				
						Current	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Paronychia argyrocoma	Y	9 extant; 3 historic	16 extant; 5 historic	Prefers open, non-calcareous habitat at subalpine elevations; can also grow along low elevation riverbanks; collection and wind/ice scour may be additional limiting factors.	Effects from increases in hiking and climbing apply and result in decline in outcome in all alternatives; impacts might be more in Alternatives 1 and 4 due to increases in trails if new trails bring hikers to new areas.	B/C	B-/C-	B-/C	B-/C	B-/C-
Pinus banksiana	N	4 extant; 3 historic	8 extant; 4 historic	On the WMNF it occurs on rocky summits, rock outcrops, and ledges from 2200-4000' elevation; requires disturbance, such as fire for regeneration; lack of disturbance and succession are key threats, also trampling and disease; climbing not as much a concern as for cliff species though may occur at tops of cliffs	Forest management would not affect threat from disease. Effects of climbing limited to impacts at top of cliffs, which are mitigated by Standards and guidelines. Fire use is essentially the same in all alternatives. Acres allowing fire use vary slightly, but not near known occurrences. Changes in harvest levels are unlikely to result in different disturbance levels because species occurs at high elevations where MA 2.1 lands and harvest are limited. Fire use may provide disturbance, but only when conditions are right so some decline is likely. Lack of disturbance may lead to decline in outcome.	B	B-	B-	B-	B-
Piptatherum (Oryzopsis) canadense	Y	1 extant	2 extant; 2 historic	Uses dry, sandy or rocky, open habitats, including rock ledges, roadsides, young woodlands, and open shrublands; climbing not as much a concern as for cliff species; succession is key known threat; unknown if trampling is a concern. Single known occurrence is a concern because WMNF is at edge of range, but species uses a variety of habitats so could occur elsewhere on the Forest.	Timber harvest and fire may increase or maintain habitat, and limit effects of succession. Alternatives 4 and 1 propose harvest on greatest number of acres. Fire use is allowed to benefit species and communities that need it in many management areas in all alternatives. Acres allowing fire use vary slightly, but not near known occurrences. Unknown if trampling is a threat, but part of known occurrence is adjacent to a trail so effects from increased use are likely in all alternatives. To meet goals and viability requirements, Forest will do all that is reasonably possible to protect known occurrence and maintain at least current level of viability. If additional occurrences are located, future outcome would be B/C for all alternatives. As long as only one occurrence is known, D outcome is possible because preventing the loss of a single occurrence from natural events or recreational use depends on site and species-specific conditions and may be outside the Forest's control.	B/C	B/D	B/D	B/D	B/D

Table F-02. Species of Concern in Other Habitats (continued).

Species	RFSS ¹	WMNF occurrence ²	Analysis area occurrence ²	Differences from habitat description	Differences in effects	WMNF Viability Outcomes ³				
						Current	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Polygonum douglasii	N	6 extant; 1 historic	7 extant; 3 historic	Exposed rocky slopes and hillside ledges with thin, well-drained soil where little other vegetation grows; can also grow in open, nutrient-enriched hardwood and oak-hardwood forests.	Timber harvest could impact individuals, but even-aged regeneration may create suitable open habitat. Experts felt that increased hiking use in rock habitats could result in decreased viability outcome on Forest. Recreation use not expected to vary among alternatives.	B	B/C	B/C	B/C	B/C
Saxifraga paniculata ssp. neogaea	Y	1 extant	3 extant	Calcareous, seepy, open cliffs. Single known occurrence on Forest is a concern given regional rarity due to edge of range.	Species is naturally limited by habitat availability, so impacts to a known site could affect viability more than for species with more habitat. Only known occurrence is relatively inaccessible, so trampling may not be a concern on Forest; Establishment and cleaning of rock climbing could be an impact in all alternatives, but use of wet cliffs reduces potential risks. To meet goals and viability requirements, Forest will do all that is reasonably possible to protect known occurrence and maintain at least current level of viability. However whether it is possible to prevent the loss of a single occurrence from natural events or recreational use depends on site and species-specific conditions and may be outside the Forest's control.	B/C	B/D	B/D	B/D	B/D
Solidago calcicola	N	4 historic	4 historic	Open habitats including edges and openings of moist rich woods, rocky or gravelly thickets, talus and cliffs. Timber harvest not a threat. Fire may be beneficial to prevent succession.	Timber harvest could impact individuals, but also may create suitable edge or open habitat. Therefore alternatives with more acres of even-aged regeneration harvest (1 and 4) could provide more suitable habitat. Fire use is essentially the same in all alternatives. Acres allowing fire use vary slightly, but not near known occurrences. Current and future outcomes depend on whether known occurrences are really historic or just have not been revisited, so surveys are needed.	B/D	B/D	B/D	B/D	B/D
Sphagnum pylaesii	N	1 extant; ? historic	2 extant; 2 historic	Forms mats over moist or wet rock or is submerged in fen pools. Lack of occurrences may be due to limited survey effort, so not identified as a concern.	Surveys have been limited, so lack of many occurrences is not a big concern. Peat mining would be prohibited by Standards and guidelines to protect wetlands. Rock climbing not likely to affect most wet rock species.	B/C	B/C	B/C	B/C	B/C

Table F-02. Species of Concern in Other Habitats (continued).

Species	RFSS ¹	WMNF occurrence ²	Analysis area occurrence ²	Differences from habitat description	Differences in effects	WMNF Viability Outcomes ³				
						Current	Alt. 1	Alt. 2	Alt. 3	Alt. 4
CONIFER FOREST SPECIES										
Bay-breasted warbler	N	# unknown	# unknown	Prefer mature, closed canopy forest, but may use small openings or edges; need landscape that is more than 55% mature forest; spruce budworm control and loss of wintering habitat are additional concerns.	Mature forest needs would be met on Forest in all alternatives. Budworm control would only occur if a severe infestation occurred, and would not vary by alternative. WMNF management does not affect wintering habitat concerns.	B/C	B/C	B/C	B/C	B/C
Bicknell’s thrush	Y	Extant on 67 of 80 surveyed peaks; # unknown	# unknown; majority on WMNF	High elevation spruce-fir forest; prefers young or edge forest. Harvest not permitted in most high elevation habitat, so not a concern; loss of wintering habitat is an additional limiting factor. Unknown what is causing apparently decline on WMNF.	Standard requires no net loss of suitable habitat on Forest; potential for increased disturbance from increased recreation use, new trails, etc. Intensity and effects of this increased disturbance are unknown.	B/C	B/C	B/C	B/C	B/C
Northern bog lemming	Y	1 extant; 1-2 historic	1 extant; 2 historic	Prefers moist conditions with dense ground cover in mixed or conifer forest, sphagnum bogs; uses burrows below ground and shallow runways on the surface; away from streams they are likely below ground and not easily found. Threats unknown.	Threats are largely unknown, so effects are uncertain. Potential for compaction of burrows from logging (year-round) in all alternatives, though greatest in 4 and 1, which affect most total acres. Riparian Standards and guidelines would help protect bogs and local hydrology. Single extant occurrence not a concern because species is difficult to survey for and has been known on Forest for over a century. Experts believe it is more common than numbers indicate.	B*	B	B	B	B
Rusty blackbird	N	At least 4 extant	At least 4 extant	Coniferous wetlands and conifer forest near water or wetlands. Apparent tolerance of disturbance makes harvest less of a concern. Changes to hydrology and pesticides are additional concerns. Occurrences not well documented.	WMNF does not typically use pesticides. Riparian Standards and guidelines would help protect wetlands and local hydrology. Potential for impact to individuals from harvest and recreation, but probably not populations.	B/C	B/C	B/C	B/C	B/C
Three-toed woodpecker	N	At least 4 extant	At least 4 extant	Montane conifer forest; need dead and dying conifers; may prefer wet areas for nest sites; prefers extensive mature forest but may use younger if snags abundant; fir waves are good foraging habitat. Loss of snag habitat is additional concern. Occurrences not well documented.	Snag and wildlife tree Standards and guidelines would help maintain necessary snag habitat in harvested lands. Most MAs would maintain mature forest and aging would result in more snags and cavities with time. Potential for impact to individuals, but probably not populations unless large-scale natural disturbance occurs and salvage harvest follows.	B	B	B	B	B

Table F-02. Species of Concern in Other Habitats (continued).

Species	RFSS ¹	WMNF occurrence ²	Analysis area occurrence ²	Differences from habitat description	Differences in effects	WMNF Viability Outcomes ³				
						Current	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Wood turtle	Y	At least 2 extant	At least 2 extant	Summer in a wide variety of habitats within 1000' of streams; need bare, sunny sand/gravel for nest; hibernate in protected portions of permanent, low to moderate gradient waters. Delayed sexual maturity, collection, egg predation, road mortality, and succession are additional limiting factors. In such a long-lived species, loss of just a few adults can cause eventual demise of a population. NH reptile and amphibian database info does not include specific locations, so occurrences uncertain.	WMNF management would not affect sexual maturity. Collection would not be permitted, but could occur illegally. Ease of collection and increased predation as a result of additional recreational sites, roads, and trails could impact populations if activities are not kept well away from populations; surveys of suitable streams within 1000' of projects will be critical, but do not guarantee protection of every individual so decline may occur despite best efforts of WMNF. Habitat management would be allowed in MA 2.1 in all alternatives if needed to prevent succession and maintain suitable habitat. Potential for noticeably more trails, roads, and facilities in Alternatives 1 and 4 means risk of impact is higher and slightly lower outcome may be appropriate	C/D	C-/D	C/D	C/D	C-/D
Galium kamtschaticum	N	5 extant; 9-14 historic	5 extant; 12-15 historic	Prefers somewhat rich seep habitats with non-channelized flowing surface water; uses cool, wet hardwood, mixed, or conifer woods, swamps, and streamsid es.	Not tracked until recently, so may be more common than indicated. Spring protection would mitigate some potential impacts, but other seep habitats lack specific protection. Seeps can be hard to detect, so harvest and trail construction may occur near these habitats. This risk leads to potential for decline in outcome with all alternatives.	B	B/C	B/C	B/C	B/C
Geocaulon lividum	Y	2 extant; 4 historic	12 extant; 5 historic	Moist coniferous woods and bogs; in woods, does best in late-successional forest; root parasite on several tree species and low heaths; bog trails and identification difficulty are added concerns.	Riparian Standards and guidelines would help protect wetlands from recreational development and harvest under all alternatives.	B	B	B	B	B

Table F-02. Species of Concern in Other Habitats (continued).

Species	RFSS ¹	WMNF occurrence ²	Analysis area occurrence ²	Differences from habitat description	Differences in effects	WMNF Viability Outcomes ³				
						Current	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Listera convallarioides	Y	5 extant; 2 historic	5 extant; 4 historic plus unknown # in ME and VT	Wet, shaded woods, cedar swamps, and seeps. Trampling and herbivory are additional limiting factors.	Spring protection would mitigate some potential impacts at seeps, but other seep habitats lack specific protection. Seeps can be hard to detect, so harvest and trail construction may occur near these habitats despite survey efforts. This risk leads to potential for decline in outcome with all alternatives. Alternatives would not change overall herbivore populations, but regeneration harvest could attract deer, etc., changing the risk of herbivory nearby; Alternative 1 has most, 2 and 4 have slight increase from current, and Alternative 3 has least regeneration habitat.	B/C	B/C-	B/C-	B/C-	B/C-
Listera cordata	Y	7 extant; 6 historic	9 extant; 13 historic; plus Maine	Wet, cold, coniferous woods, often on mossy ground or rocks; in NH, also in high elevation forest; trail maintenance and herbivory are additional threats.	Some seep habitats, which are used by this species, do not have specific protection. Standard to protect known TES species should minimize impacts from trail maintenance. Alternatives would not change overall herbivore populations, but regeneration harvest could alter local populations, changing the risk of herbivory nearby; Alternative 1 has most, 2 and 4 have only slight increase from current, and Alternative 3 has least regeneration habitat.	B/C	B/C	B/C	B/C	B/C

Table F-02. Species of Concern in Other Habitats (continued).

Species	RFSS ¹	WMNF occurrence ²	Analysis area occurrence ²	Differences from habitat description	Differences in effects	WMNF Viability Outcomes ³				
LANDSCAPE-LEVEL HABITAT SPECIES										
Gray wolf	ESA	extirpated	extirpated	Habitat defined by prey (deer, moose, beaver) and low human density; prey abundance, competition with coyotes, and disease are additional limiting factors.	Amount of even-aged regeneration harvest would impact prey concentration, with more such harvest concentrating prey in certain areas. However Alternatives with the highest regeneration harvest (1 and 4) also have highest increase in recreational development and road densities, and they allow summer motorized trails. Alternatives 2 and 3 have less potential for disturbance, but less prey habitat creation. Prey may be more important, given relatively low levels of development on the Forest in all alternatives. Deer yard protection would help maintain prey. However, none of this will affect populations unless animals arrive naturally or are reintroduced, both of which are outside WMNF control.	E	E	E	E	E
Eastern cougar	ESA	extirpated	extirpated	Habitat defined by deer abundance and low human density; prey abundance and disease are additional limiting factors.	Same as wolf discussion above.	E	E	E	E	E
Canada lynx	ESA	extirpated	1 extant population; historic unknown	Coniferous and mixed forest and wetlands; dense young conifers important to prey; large woody debris and deep snow important to lynx. Low hare habitat and population levels and snow depth are primary limiting factors; Canadian harvest is an additional concern. Occasional sightings reported, but none corroborated with photos, hair, or scat.	WMNF management cannot affect snow depth or Canadian harvest. Low levels of regeneration harvest in softwood habitat would limit prey base in all alternatives; Alt. 3 and 4 have most uneven-aged management and therefore greatest potential for group selection, which can benefit prey. Down wood guidelines would help protect denning habitat in all alternatives. However, none of this will affect populations unless animals arrive naturally or are reintroduced, both of which are outside WMNF control.	E	E	E	E	E

Table F-02. Species of Concern in Other Habitats (continued).

Species	RFSS ¹	WMNF occurrence ²	Analysis area occurrence ²	Differences from habitat description	Differences in effects	WMNF Viability Outcomes ³				
American marten	N	# unknown; fewer now than historically	# unknown; fewer now than historically	Prefer 80% of home range in forest that is greater than 30' tall and has more than 80 ft ² /acre of basal area; uses all types of forest; large woody debris and deep snow are important. Timber harvest and climate change are primary threats; fisher and trapping are additional concerns.	Timber harvest would not reduce Forest as a whole below 80% threshold in any alternative, but areas of the Forest could be unsuitable due to concentrations of even-aged regeneration harvest, especially in Alternative 1. However martens are most abundant at higher elevations where harvest is less likely given MA allocations in all alternatives, so harvest is not likely to change viability outcome. WMNF management would not alter climate change (snow depth), fisher, or trapping threats, but these factors are what local experts think will determine whether the future outcome goes up or down.	C	B/D	B/D	B/D	B/D
HARDWOOD AND MIXEDWOOD FOREST SPECIES										
a big-headed fly	N	1 extant; 3 historic	1 extant; 4 historic	Late-successional to old growth hardwood or mixed forest. Unknown whether old growth is more important than mature forest. Current outcome assumes that closed canopy mature forest is suitable; would be lower if old growth conditions are important. Lack of occurrences may be due to limited survey effort, so not identified as a concern.	Direct impacts from machinery/skidding are not a concern, but other impacts from harvest are as described for the habitat. Difference in outcomes is because higher even-aged regeneration harvest in northern hardwood habitat in Alternative 1 could decrease suitable habitat on Forest and impact occurrences and dispersal capability. Other alternatives would provide substantial late-successional hardwoods and mixedwoods.	B/C	C	B/C	B/C	B/C
Black lordithon rove beetle	N	2 extant	2 extant	Late-successional to old growth hardwood or mixed forest. Unknown whether old growth is more important than mature forest. Current outcome assumes that closed canopy mature forest is suitable; would be lower if old growth conditions are important.	Direct impacts from machinery/skidding are not a concern, but other impacts from harvest are as described for the habitat. Difference in outcomes is because higher even-aged regeneration harvest in northern hardwood habitat in Alternative 1 could decrease suitable habitat on Forest and impact occurrences and reduce dispersal capability. Other alternatives would provide substantial late-successional hardwoods and mixedwoods.	B/C	C	B/C	B/C	B/C

Table F-02. Species of Concern in Other Habitats (continued).

Species	RFSS ¹	WMNF occurrence ²	Analysis area occurrence ²	Differences from habitat description	Differences in effects	WMNF Viability Outcomes ³				
						Current	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Indiana bat	ESA	1 extant	1 extant	Hibernates in caves and mines; maternity colonies located under loose bark of snags/trees often near forest edge and riparian areas. Hibernaculum availability, harassment at hibernacula, pesticides, collisions with wind turbines and cell towers, and purposeful killing of bats are additional threats.	Harassment, pesticide, and direct killing threats would not occur on WMNF, so no additional effects for those concerns. Snag and wildlife tree Standards and guidelines would reduce the impacts from harvest in all alternatives, minimizing loss of suitable habitat. Indiana bat has never been documented as a breeding species on the WMNF, and is not considered likely to occur regularly on the Forest, so none of the viability outcomes is appropriate.	N/A	N/A	N/A	N/A	N/A
Jefferson salamander	N	1 extant possible	1 extant possible	Prefers vernal and semi-permanent pools; uses other wetlands for breeding; needs mature, closed-canopy hardwood or mixed forest surrounding pool. Hybridization, road mortality, and acidification are concerns. Lack of occurrences may be due to limited survey effort, but Forest is at edge of range so species is definitely rare.	WMNF management would not affect hybridization, which could result in some population decline. Even-aged regeneration harvest could reduce upland habitat, which could affect breeding pool suitability and reproductive success. Construction of roads, campsites, and ATV trails could result in mortality as well as habitat losses, so risk of impacts is higher in Alternatives 1 and 4.	C	C/D	C/C-	C/C-	C/D
Wood turtle	Y	At least 2 extant	At least 2 extant	Summer in a wide variety of habitats within 1000' of streams; need bare, sunny sand/gravel for nest; hibernate in protected portions of permanent, low to moderate gradient waters. Delayed sexual maturity, collection, egg predation, road mortality, and succession are additional limiting factors. In such a long-lived species, loss of just a few adults can cause eventual demise of a population. NH reptile and amphibian database info does not include specific locations, so occurrences uncertain.	WMNF management would not affect sexual maturity. Collection would not be permitted, but could occur illegally. Ease of collection and increased predation as a result of additional recreational sites, roads, and trails could impact populations if activities are not kept well away from populations; surveys of suitable streams within 1000' of projects will be critical, but do not guarantee protection of every individual so decline may occur despite best efforts of WMNF. Habitat management would be allowed in MA 2.1 in all alternatives if needed to prevent succession and maintain suitable habitat. Potential for noticeably more trails, roads, and facilities in Alternatives 1 and 4 means risk of impact is higher and slightly lower outcome may be appropriate	C/D	C-/D	C/D	C/D	C-/D

Table F-02. Species of Concern in Other Habitats (continued).

Species	RFSS ¹	WMNF occurrence ²	Analysis area occurrence ²	Differences from habitat description	Differences in effects	WMNF Viability Outcomes ³				
						Current	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Carex cumulata	Y	1 extant	2 extant; 2 historic	Open or young, dry oak, oak-pine, and hardwood forests; succession is additional limiting factor and harvest of all types and fire may be beneficial. Panel felt possible other places on forest, but habitat and preference for fire limit that possibility so single known occurrence is a concern.	Even-aged timber harvest may be beneficial if timed to avoid direct impacts to plants; Similar levels of oak-pine habitat in areas allowing harvest in all alternatives, so this species could be managed for equally well under all alternatives. Acres allowing fire use vary slightly among alternatives, but not near known occurrence. Single occurrence is near popular recreation site, responded well to fire in recent past. To meet goals and viability requirements, Forest will do all that is reasonably possible to protect known occurrence and maintain at least current level of viability. However whether it is possible to prevent the loss of a single occurrence depends on site and species-specific conditions and may be outside the Forest's control.	C	C/D	C/D	C/D	C/D
Corallorhiza odontorhiza	N	1 extant	1 extant	Habitat conditions at known occurrences across its range are quite variable, including dry and moist sites, several types of soils with a wide range of pH, and closed canopy to more open edge conditions; mycorrhizal requirements may be limiting and impacts to host would affect this species; effects of timber harvest unknown; collection and trampling are additional concerns. Forest is at northern edge of range, but occurs in hardwood forest habitat, which is abundant, so may occur in other stands at southern edge of Forest	Increased education emphasis could reduce collection threat, but no difference between alternatives. Potential for effects from timber harvest and trampling are addressed for habitat. Impacts of harvest on this species are uncertain, but no reason to believe effects are different than described for the habitat. To meet goals and viability requirements, Forest will do all that is reasonably possible to protect known occurrence and maintain at least current level of viability. If additional occurrences are located, future outcome would be B/C for all alternatives. As long as only one occurrence is known, D outcome is possible because preventing the loss of a single occurrence from natural events or recreational use depends on site and species-specific conditions and may be outside the Forest's control.	B/C	B/D	B/D	B/D	B/D

Table F-02. Species of Concern in Other Habitats (continued).

Species	RFSS ¹	WMNF occurrence ²	Analysis area occurrence ²	Differences from habitat description	Differences in effects	WMNF Viability Outcomes ³				
Galium kamtschaticum	N	5 extant; 9-14 historic	5 extant; 12-15 historic	Prefers somewhat rich seep habitats with non-channelized flowing surface water; uses cool, wet hardwood, mixed, or conifer woods, swamps, and streamsides.	Not tracked until recently, so may be more common than indicated. Spring protection would mitigate some potential impacts, but other seep habitats lack specific protection. Seeps can be hard to detect, so harvest and trail construction may occur near these habitats. This risk leads to potential for decline in outcome with all alternatives.	B	B/C	B/C	B/C	B/C
Isotria medeoloides	ESA	3 extant	# uncertain; likely less than 10 total, extant and historic	Seems to benefit from canopy opening near populations. Light availability may be additional limiting factor; collection also a concern in places. Small size of WMNF populations may make light availability a greater concern here than where populations are larger. Habitat model was developed for this species in New Hampshire and Maine and most suitable habitat was surveyed; no additional populations were located, so potential for more occurrences on the WMNF is low.	Partial canopy removal through timber harvest, which is more abundant in Alternatives 3 and 4, may be beneficial to habitat if timed to avoid direct impacts to plants. Surveys of suitable habitat on Forest minimize potential for even-aged regeneration harvest impacts. Collection permits restricted in all alternatives under standard to protect TES species. Limited size and number of populations increases potential for alternatives to affect outcomes by limiting or enhancing dispersal.	C	C	C	C	C
Listera convallarioides	Y	5 extant; 2 historic	5 extant; 4 historic plus unknown # in ME and VT	Wet, shaded woods, cedar swamps, and seeps. Trampling and herbivory are additional limiting factors.	Spring protection would mitigate some potential impacts at seeps, but other seep habitats lack specific protection. Seeps can be hard to detect, so harvest and trail construction may occur near these habitats despite survey efforts. This risk leads to potential for decline in outcome with all alternatives. Alternatives would not change overall herbivore populations, but regeneration harvest could attract deer, etc., changing the risk of herbivory in some areas; Alternative 1 has most, 2 and 4 have slight increase from current, and Alternative 3 has least regeneration habitat.	B/C	B/C-	B/C-	B/C-	B/C-

Table F-02. Species of Concern in Other Habitats (continued).

Species	RFSS ¹	WMNF occurrence ²	Analysis area occurrence ²	Differences from habitat description	Differences in effects	WMNF Viability Outcomes ³				
						Current	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Listera cordata	Y	7 extant; 6 historic	9 extant; 13 historic; plus Maine	Wet, cold, coniferous woods, often on mossy ground or rocks; in NH, also in high elevation forest; trail maintenance and herbivory are additional threats.	Some seep habitats, which are used by this species, do not have specific protection. Standard to protect known TES species should minimize impacts from trail maintenance. Alternatives would not change overall herbivore populations, but regeneration harvest could alter local populations, changing the risk of herbivory nearby; Alternative 1 has most, 2 and 4 have only slight increase from current, and Alternative 3 has least regeneration habitat.	B/C	B/C	B/C	B/C	B/C
Symphyotrichum ciliolatum	N	1 extant; 1 historic	1 extant; 9 historic	Openings in mature barrens and dry hardwood or mixedwood forest, including roadsides; succession is additional limiting factor, but regeneration harvest also a concern. Single historic site not a big concern because local experts believe it is extant in other locations on Forest, just need surveys to find it. May be overlooked as S. cordifolius.	Thinning and uneven-aged harvest would result in suitable habitat and reduce threat from succession, so may be beneficial if timed to avoid direct impacts to plants. Even-aged regeneration harvest impacts would reduce suitable habitat. Alternative 1 has highest even-aged regeneration and least uneven-aged mgmt, so may have slightly lower outcome.	B/C	B-/C	B/C	B/C	B/C
Triphora trianthophora	Y	7 extant; 1 historic	10 extant; 3 historic	Leaf litter pockets in moist, beech-dominated woods with 70-80% canopy closure. Population size, herbivory, collection, and global warming are additional threats.	WMNF management will not alter the population size or global warming threats. Alternatives would not change overall herbivore populations, but even-aged regeneration harvest could concentrate populations, changing the risk of herbivory nearby; Increased education emphasis could reduce collection threat, but no difference between alternatives. Thinning and uneven-aged harvest could improve habitat, so may be beneficial if timed to avoid direct impacts. Even-aged regeneration harvest impacts would reduce suitable habitat. Alternative 1 has highest even-aged regeneration and least uneven-aged mgmt, so lowest outcome.	C	C	C+	C+	C+

Table F-02. Species of Concern in Other Habitats (continued).

Species	RFSS ¹	WMNF occurrence ²	Analysis area occurrence ²	Differences from habitat description	Differences in effects	WMNF Viability Outcomes ³				
						Current	Alt. 1	Alt. 2	Alt. 3	Alt. 4
LAKE AND POND SPECIES										
Atlantic salmon	N	Abundant historically; now stocked with adults stopped in MA for hatchery	Abundant historically; now stocked with adults stopped in MA for hatchery	Mostly streams and rivers; landlocked salmon use deep lakes with cold, well-oxygenated water for much of their lives. Commercial fishing, lack of dam passage, and disease are additional concerns for species as a whole.	Additional concerns are not impacted by WMNF management, so effects are as described for habitats. Atlantic salmon are a reintroduced, stocked species on the WMNF. The native strain of this species no longer exists – the stocked strain is non-native. Historic populations of the native strain are completely extirpated, metapopulation dynamics are entirely precluded, and the geographic distribution of the native strain is reduced to nothing. The non-native strain of the species still exists, but as a stocked species that is not allowed to naturally return to spawn. Therefore none of the viability outcomes apply.	N/A	N/A	N/A	N/A	N/A
Bald eagle	ESA	No nest sites	1 extant; 1 historic	Large trees near moderate to large-sized fish-bearing ponds, lakes, and rivers. Killing, pesticides, prey loss, low reproduction are additional threats.	Harvest could result in loss of large trees near, but not adjacent to, suitable water bodies. Bald eagles do not nest on the WMNF, nor are concentrated foraging or roosting areas known. Therefore none of the viability outcomes applies.	N/A	N/A	N/A	N/A	N/A
Common loon	Y	3+ extant; historic unknown but more	unknown	Large and small fish-bearing lakes with clear, warm, shallow water, and little or no human disturbance.	Increasing recreational use of lakes could result in disturbance and reduced habitat suitability and nesting success, but standard to protect TES species has minimized impacts on this obvious species and should continue to do so. Outcome should not decline, but only time and off-Forest management can improve it -- concern is regional populations.	D	D	D	D	D
Potamogeton confervoides	N	2 extant; 3 historic	2 extant; 16 historic	Strongly acidic soft-water bogs, lakes, ponds with muddy shores; slow-flowing acidic streams. Water pH is key limiting factor, so anything that increases alkalinity is an additional concern.	WMNF actions should not noticeably alter water chemistry or water levels except rare occasions when existing dams are altered.	B/C	B/C	B/C	B/C	B/C

Table F-02. Species of Concern in Other Habitats (continued).

Species	RFSS ¹	WMNF occurrence ²	Analysis area occurrence ²	Differences from habitat description	Differences in effects	WMNF Viability Outcomes ³				
Salix pellita	N	1 historic	2 extant; 2 historic	Rich alluvium in streambanks, floodplain forest, moist thickets, swamps, and lake/pond shores. Limiting factors are same as for habitat. Single occurrence is a concern, especially since it is historic with one unsuccessful attempt to locate from a general record. However experts indicated this species has been misidentified in some cases, so historic occurrence may not have even been this species – no way to know unless it is relocated. Given rarity, must assume identification was valid. Suitable habitat is limited on the Forest.	Effects are as described for habitat. Uncertainty in current outcome depends on whether historic occurrence is truly historic. To meet goals and viability requirements, Forest will try to relocate historic occurrence. If it is relocated, WMNF will do all that is reasonably possible to protect the known occurrence and maintain at least current level of viability. Even if it is still extant (current C outcome), a future D outcome is possible because preventing the loss of a single occurrence from natural events or recreational use depends on site and species-specific conditions and may be outside the Forest's control.	C/D	C/D	C/D	C/D	C/D
Utricularia resupinata	N	# unknown	1 historic	Clear, acidic waters; needs low water levels to bloom; prefers a slightly higher than average water temperature. Lack of water fluctuation is an added concern.	Effects are as described for habitat. Achieving desired water fluctuations would be difficult for Forest if it does not occur naturally; dams discussed for habitat.	C	C	C	C	C
RIVER AND STREAM SPECIES										
Atlantic salmon	N	Abundant historically; now stocked with adults stopped in MA for hatchery	Abundant historically; now stocked with adults stopped in MA for hatchery	Mostly streams and rivers; landlocked salmon use deep lakes with cold, well-oxygenated water for much of their lives. Commercial fishing, lack of dam passage, and disease are additional concerns for species as a whole.	Additional concerns are not impacted by WMNF management, so effects are as described for habitats. Atlantic salmon are a reintroduced, stocked species on the WMNF. The native strain of this species no longer exists – the stocked strain is non-native. Historic populations of the native strain are completely extirpated, metapopulation dynamics are entirely precluded, and the geographic distribution of the native strain is reduced to nothing. The non-native strain of the species still exists, but as a stocked species that is not allowed to naturally return to spawn. Therefore none of the viability outcomes apply.	N/A	N/A	N/A	N/A	N/A

Table F-02. Species of Concern in Other Habitats (continued).

Species	RFSS ¹	WMNF occurrence ²	Analysis area occurrence ²	Differences from habitat description	Differences in effects	WMNF Viability Outcomes ³				
						Current	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Bald eagle	ESA	No nest sites	1 extant; 1 historic	Large trees near moderate to large-sized fish-bearing ponds, lakes, and rivers. Killing, pesticides, prey loss, low reproduction are additional threats.	Harvest could result in loss of large trees near, but not adjacent to, suitable water bodies. Bald eagles do not nest on the WMNF, nor are concentrated foraging or roosting areas known. Therefore none of the viability outcomes apply.	N/A	N/A	N/A	N/A	N/A
Boulder beach tiger beetle	N	2 historic	6 extant; 45 historic	Along edges of clear, clean permanent streams of mid-sized rivers with some shading.	Mid-sized river habitat is naturally limited on the WMNF. Effects described for habitat. All alternatives would retain most habitat, which is still improving from past conditions.	B/C	B/C	B/C	B/C	B/C
Brown’s ameletid mayfly	N	1 extant	1 extant	Larvae prefer erosional areas in cold, headwater streams that usually are well-oxygenated, of relatively high pH, with canopy cover and rocks or boulders present. Adults typically remain along streambanks near emergence sites. High pH waters are additional limiting factor.	Effects of harvest are unknown. Effects from activities that alter hydrology and water quality are as described for habitat.	B/C	B/C	B/C	B/C	B/C
Southern pygmy clubtail	N	None, but found nearby and considered likely	None, but considered likely	Small, shady, cool spring-fed creeks with clean gravel, sand, or mud, running water, and pancake-sized rocks. Canopy removal and predation are additional limiting factors.	WMNF management would not affect predation risk. Canopy removal is addressed in habitat effects, as are other concerns.	B/C	B/C	B/C	B/C	B/C
Third ameletid mayfly	N	1 extant	6 extant	Larvae are found in small and large streams in secondary depositional areas and on submerged grasses and detritus along margins of riffles and transitional areas. Adults typically remain along streambanks near emergence site. Streams are usually well-oxygenated, of relatively high pH, with canopy cover and rocks or eroding banks present. High pH waters are additional limiting factor.	Effects of harvest are unknown. Effects from activities that alter hydrology and water quality are as described for habitat.	B/C	B/C	B/C	B/C	B/C

Table F-02. Species of Concern in Other Habitats (continued).

Species	RFSS ¹	WMNF occurrence ²	Analysis area occurrence ²	Differences from habitat description	Differences in effects	WMNF Viability Outcomes ³				
Wood turtle	Y	At least 2 extant	At least 2 extant	Summer in a wide variety of habitats within 1000' of streams; need bare, sunny sand/gravel for nest; hibernate in protected portions of permanent, low to moderate gradient waters. Delayed sexual maturity, collection, egg predation, road mortality, and succession are additional limiting factors. In such a long-lived species, loss of just a few adults can cause eventual demise of a population. NH reptile and amphibian database info does not include specific locations, so occurrences uncertain.	WMNF management would not affect sexual maturity. Collection would not be permitted, but could occur illegally. Ease of collection and increased predation as a result of additional recreational sites, roads, and trails could impact populations if activities are not kept well away from populations; surveys of suitable streams within 1000' of projects will be critical, but do not guarantee protection of every individual so decline may occur despite best efforts of WMNF. Habitat management would be allowed in MA 2.1 in all alternatives if needed to prevent succession and maintain suitable habitat. Potential for noticeably more trails, roads, and facilities in Alternatives 1 and 4 means risk of impact is higher and slightly lower outcome may be appropriate	C/D	C-/D	C/D	C/D	C-/D
Calamagrostis pickeringii	N	13 extant; 6-7 historic	19 extant; 6-7 historic	Variety of habitats including alpine ravine headwalls and streams, open wetlands, streambanks, old streambeds, damp openings and roadsides; prefers wet but uses some seasonally dry habitats. Riverbanks and montane sloping fens are primary habitats. River occurrences likely benefit from disturbance, such as flooding or ice scour	Trampling is addressed in habitat effects. Peat mining would be prohibited by Standards and guidelines to protect wetlands. Natural processes would affect succession, and habitat management would be allowed in MA 2.1 in all alternatives if needed to prevent succession and maintain suitable habitat.	B/C	B/C	B/C	B/C	B/C
Calamagrostis stricta ssp. inexpansa	Y	5 extant; 4 historic	8 extant; 5 historic	Cliffs and ledges, river and stream banks, bogs, fens, seeps, and wet alpine. Fire may be beneficial – may have led to increase in one population. Change in hydrology is additional concern	Rock climbing less of a concern for wet cliffs, but may result in trampling on drier habitats, including at least one large population on Forest. Ice climbing occurs at one site, unknown if a concern, but use is likely to increase. Trampling by hikers is addressed in habitat effects. Natural processes would affect succession, and habitat management would be allowed in MA 2.1 if needed to prevent succession and maintain suitable habitat. Other concerns addressed for habitats. Fire use is essentially the same in all alternatives. Acres allowing fire use vary slightly, but not near known occurrences.	B/C	B/C	B/C	B/C	B/C

Table F-02. Species of Concern in Other Habitats (continued).

Species	RFSS ¹	WMNF occurrence ²	Analysis area occurrence ²	Differences from habitat description	Differences in effects	WMNF Viability Outcomes ³				
						Current	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Listera auriculata	Y	2 extant	2 extant; 1 historic	Ice-scoured streambanks, sphagnum bogs, alder thickets, cedar swamps. Trampling, summer motorized trail use, and small populations are additional limiting factors.	WMNF management would not impact risk from small populations. Trampling, summer motorized trail use, and other effects are addressed in habitat effects. Known extant occurrence was affected by ice scour; unknown if it still occurs, is gone, or moved downstream. Panels said species is hard to locate and expects it to occur elsewhere on WMNF.	B	B	B	B	B
Paronychia argyrocoma	Y	9 extant; 3 historic	15 extant; 5 historic	Prefers open, non-calcareous, subalpine rock habitat; can grow on low elevation riverbanks in open to part shade. Succession, trampling, and collection are key threats.	Trampling is addressed in habitat effects. Natural processes would affect succession, and habitat management would be allowed in MA 2.1 if needed to prevent succession and maintain suitable habitat. Collection would not be permitted but could occur illegally with all alternatives.	B/C	B/C	B/C	B/C	B/C
Potamogeton confervoides	N	2 extant; 3 historic	2 extant; 16 historic	Strongly acidic soft-water bogs, lakes, ponds with muddy shores; slow-flowing acidic streams. Water pH is key limiting factor, so anything that increases alkalinity is an additional concern.	WMNF actions should not noticeably alter water chemistry or water levels except rare occasions when existing dams are altered.	B/C	B/C	B/C	B/C	B/C

Table F-02. Species of Concern in Other Habitats (continued).

Species	RFSS ¹	WMNF occurrence ²	Analysis area occurrence ²	Differences from habitat description	Differences in effects	WMNF Viability Outcomes ³				
Pyrola asarifolia	Y	1 extant	1 extant; 3 historic	Rich woods and thickets, especially river terraces, open wetlands, and cedar swamps; often at forest edge. Calcareous habitat availability and trampling are additional limiting factors. NH Natural Heritage Bureau (NHNHB) only tracks one occurrence as on WMNF and suitable habitat is limited, but panelists believe others exist and some occurrences in NHNHB database are very close to, or on, WMNF without certain accuracy so there may be additional WMNF occurrences	WMNF management does not affect calcareous habitat availability. Potential negative impacts from trampling are addressed in wetland habitats. Partial canopy removal, which is more abundant in Alternatives 3 and 4, may be beneficial; impacts from even-aged regeneration harvest are as described for habitat. To meet goals and viability requirements, Forest will do all that is reasonably possible to protect known occurrence and maintain at least current level of viability. If additional occurrences are located or determined to be on the WMNF, future outcome would be C- for Alternative 1 and C for others. As long as only one occurrence is known, D outcome is possible for all alternatives because preventing the loss of a single occurrence from natural events or recreational use depends on site and species-specific conditions and may be outside the Forest's control. Difference in outcomes is because higher even-aged regeneration harvest in northern hardwood habitat in Alternative 1 could decrease suitable habitat on Forest, impact occurrences, and alter dispersal capability.	C	C-/D	C/D	C/D	C/D
Salix pellita	N	1 historic	2 extant; 2 historic	Rich alluvium in streambanks, floodplain forest, moist thickets, swamps, and lake/pond shores. Limiting factors are same as for habitat.	Effects are as described for habitat. Uncertainty in outcome depends on whether historic occurrence is valid and truly historic, but would not change regardless of alternative.	C/D	C/D	C/D	C/D	C/D

Table F-02. Species of Concern in Other Habitats (continued).

Species	RFSS ¹	WMNF occurrence ²	Analysis area occurrence ²	Differences from habitat description	Differences in effects	WMNF Viability Outcomes ³				
						Current	Alt. 1	Alt. 2	Alt. 3	Alt. 4
FORESTED WETLAND SPECIES										
Indiana bat	ESA	1 extant	1 extant	Hibernates in caves and mines; maternity colonies located under loose bark of snags/trees often near forest edge and riparian areas. Hibernaculum availability, harassment at hibernacula, pesticides, collisions with wind turbines and cell towers, and purposeful killing of bats are additional threats.	Harassment, pesticide, and direct killing threats would not occur on WMNF, so no additional effects for those concerns. Snag and wildlife tree Standards and guidelines would reduce the impacts from harvest in all alternatives, minimizing loss of suitable habitat. Indiana bat has never been documented as a breeding species on the WMNF, and is not considered likely to occur regularly on the Forest, so none of the viability outcomes is appropriate.	N/A	N/A	N/A	N/A	N/A
Jefferson salamander	N	1 extant possible	1 extant possible	Prefers vernal and semi-permanent pools; uses other wetlands for breeding; needs mature, closed-canopy hardwood or mixed forest surrounding pool. Hybridization, road mortality, and acidification are concerns.	WMNF management would not affect hybridization, which could result in some population decline. Even-aged regeneration harvest could reduce upland habitat, which could affect breeding pool suitability and reproductive success. Construction of roads, campsites, and summer motorized trails could result in mortality as well as habitat losses, so risk of impacts is higher in Alternatives 1 and 4.	C	C/D	C/C-	C/C-	C/D
Rusty blackbird	N	At least 4 extant	At least 4 extant	Coniferous wetlands and conifer forest near water or wetlands. Beaver eradication, large clearcuts, and pesticides are additional concerns.	All alternatives allow for management to encourage beaver, which could be beneficial. Clearcut size on the WMNF is limited to 30 acres so would not be a concern. The Forest does not attempt to control starling or blackbird populations so pesticides would not be a concern. Harvest in wetlands should not reduce habitat suitability as long as coniferous wetland habitat remains.	B/C	B/C	B/C	B/C	B/C
Three-toed woodpecker	N	At least 4 extant	At least 4 extant	Montane conifer forest; may prefer wet areas for nest sites; prefers extensive mature forest but may use younger if snags are abundant; needs dead and dying conifers.	Snag and wildlife tree Standards and guidelines would help maintain necessary snag habitat in harvested lands. Most MAs would maintain mature forest and aging would result in more snags and cavities with time in all alternatives. Potential for impact to individuals, but probably not populations unless large-scale natural disturbance occurs and salvage harvest follows.	B	B	B	B	B

Table F-02. Species of Concern in Other Habitats (continued).

Species	RFSS ¹	WMNF occurrence ²	Analysis area occurrence ²	Differences from habitat description	Differences in effects	WMNF Viability Outcomes ³				
						Current	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Wood turtle	Y	At least 2 extant	At least 2 extant	Summer in a wide variety of habitats within 1000' of streams; need bare, sunny sand/gravel for nest; hibernate in protected portions of permanent, low to moderate gradient waters. Delayed sexual maturity, collection, egg predation, road mortality, and succession are additional limiting factors. In such a long-lived species, loss of just a few adults can cause eventual demise of a population. NH reptile and amphibian database info does not include specific locations, so occurrences uncertain.	WMNF management would not affect sexual maturity. Collection would not be permitted, but could occur illegally. Ease of collection and increased predation as a result of additional recreational sites, roads, and trails could impact populations if activities are not kept well away from populations; surveys of suitable streams within 1000' of projects will be critical, but do not guarantee protection of every individual so decline may occur despite best efforts of WMNF. Habitat management would be allowed in MA 2.1 in all alternatives if needed to prevent succession and maintain suitable habitat. Potential for noticeably more trails, roads, and facilities in Alternatives 1 and 4 means risk of impact is higher and slightly lower outcome may be appropriate	C/D	C-/D	C/D	C/D	C-/D
Carex baileyi	Y	1 historic	2 historic	Wet meadows, fens, wet swamp woods, mixed woods, riverside seeps, and along roadsides and ditches. Limiting factors unknown. Single historic occurrence is a concern, but similarity to common species means it may be underreported and more common.	Potential effects are assumed to be as described for habitats. To meet goals and viability requirements, Forest will do all that is reasonably possible to protect single known occurrence and maintain at least current level of viability. If additional occurrences are located, future outcome would be B/C for all alternatives because, given array of habitats used, there is no reason to believe its status is changing. However as long as only one occurrence is known, future D outcome is possible because preventing the loss of a single occurrence from natural events or recreational use depends on site and species-specific conditions and may be outside the Forest's control.	B/C	B/D	B/D	B/D	B/D
Carex wiegandii	Y	5 extant	5 extant; 1 historic	Prefers open peatlands; uses conifer swamps, lakeshores, wet meadows, ditches.	Harvest of all types can be beneficial if it slows succession or understory development and maintains hydrology. Other effects are as described for habitats.	B/C	B/C	B/C	B/C	B/C

Table F-02. Species of Concern in Other Habitats (continued).

Species	RFSS ¹	WMNF occurrence ²	Analysis area occurrence ²	Differences from habitat description	Differences in effects	WMNF Viability Outcomes ³				
						Current	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Cypripedium parviflorum var. pubescens	N	Possibly 1 extant	3 extant; 5 historic; plus Maine	Any rich mesic forest, including forested wetlands, with a closed to somewhat open canopy. Collection, herbivory, and genetics are additional concerns. Experts indicated it is likely to occur elsewhere, so single occurrence not identified as a concern.	WMNF management would not affect genetic concerns. Collection permits restricted in all alternatives under standard to protect TES species. Alternatives would not change overall herbivore populations, but even-aged regeneration harvest could concentrate populations, changing the risk of herbivory nearby. Difference in outcomes is because higher even-aged regeneration harvest in northern hardwood habitat in Alternative 1 could decrease suitable habitat on Forest, impact occurrences, and reduce dispersal capability.	C	C-	C	C	C
Dryopteris goldiana	Y	7 extant; 1 historic	17 extant; 10 historic	Occurs in rich, mesic hardwood and mixedwood forests, seeps, and swamp edges. May tolerate more open canopy if moist. Availability of circumneutral habitat and collection are additional limiting factors.	WMNF management does not affect habitat availability. Collection permits restricted in all alternatives under standard to protect TES species. Spring protection would mitigate some potential impacts, but other seep habitats lack specific protection. Other effects as described for habitats. Difference in outcomes is because higher even-aged regeneration harvest in northern hardwood habitat in Alternative 1 could decrease suitable habitat on Forest, impact occurrences, and dispersal capability.	B	B-	B	B	B
Galium kamtschaticum	N	5 extant; 9-14 historic	5 extant; 19-12 historic	Prefers somewhat rich seep habitats with non-channelized flowing surface water; uses cool, wet hardwood, mixed, or conifer woods, swamps, and streamsidess.	Not tracked until recently, so may be more common than indicated. Spring protection would mitigate some potential impacts, but other seep habitats lack specific protection. Seeps can be hard to detect, so harvest and trail construction may occur near these habitats. This risk leads to potential for decline in outcome with all alternatives.	B	B/C	B/C	B/C	B/C
Juglans cinerea	Y	Known to occur; # unknown	# unknown	Also in floodplain forest and calcareous talus habitats; open canopy required; Disease is primary threat; succession also limits it, so logging probably not a concern.	Timber harvest may be beneficial as species needs open canopy, not closed. Therefore despite increased risk from development, alternatives with more acres of harvest (1 and 4) could provide more suitable habitat. WMNF management cannot alter spread of disease, which is likely to continue causing decline regardless of habitat availability.	C	D	D	D	D

Table F-02. Species of Concern in Other Habitats (continued).

Species	RFSS ¹	WMNF occurrence ²	Analysis area occurrence ²	Differences from habitat description	Differences in effects	WMNF Viability Outcomes ³				
Listera auriculata	Y	2 extant	2 extant; 1 historic	Ice-scoured streambanks, sphagnum bogs, alder thickets, cedar swamps. Trampling, summer motorized trail use, and small populations are additional limiting factors. Panels said species is hard to locate and expects it to occur elsewhere on WMNF.	WMNF management would not impact risk from small populations. Trampling, summer motorized trail use, and other effects are addressed in habitat effects. Known extant occurrence was affected by ice scour; unknown if it still occurs, is gone, or moved downstream.	B	B	B	B	B
Listera convallarioides	Y	5 extant; 2 historic	5 extant; 4 historic plus unknown # in ME and VT	Wet, shaded woods, cedar swamps, and seeps. Trampling and herbivory are additional limiting factors.	Spring protection would mitigate some potential impacts at seeps, but other seep habitats lack specific protection. Seeps can be hard to detect, so harvest and trail construction may occur near these habitats despite survey efforts. This risk leads to potential for decline in outcome with all alternatives. Alternatives would not change overall herbivore populations, but regeneration harvest could attract deer, etc., changing the risk of herbivory nearby; Alternative 1 has most, 2 and 4 have slight increase from current, and Alternative 3 has least regeneration habitat.	B/C	B/C-	B/C-	B/C-	B/C-
Listera cordata	Y	7 extant; 6 historic	9 extant; 10 historic	Mossy ground, including seeps, in cool, wet, coniferous woods and swamps (high elevation in NH), shrub swamps, bogs, and on some outcrops. Trampling, trail maintenance, and herbivory are additional threats.	Some seep habitats, which are used by this species, do not have specific protection. Seeps can be hard to detect, so harvest and trail construction may occur near these habitats despite survey efforts. This risk leads to potential for decline in outcome with all alternatives. Standard to protect known TES species should minimize impacts from trail maintenance. Alternatives would not change overall herbivore populations, but regeneration harvest could attract deer, etc., changing the risk of herbivory nearby; Alternative 1 has most, 2 and 4 have slight increase from current, and Alternative 3 has least regeneration habitat.	B/C	B/C-	B/C-	B/C-	B/C-

Table F-02. Species of Concern in Other Habitats (continued).

Species	RFSS ¹	WMNF occurrence ²	Analysis area occurrence ²	Differences from habitat description	Differences in effects	WMNF Viability Outcomes ³				
						Current	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Ophioglossum pusillum	N	At least 1 extant	At least 1 extant	Variety of early-successional, seasonally moist to wet habitats, including open fens, bogs, marsh edges, pastures, old fields, grassy shores, wet thickets, cedar and hardwood swamps, floodplain woods, wet swales, damp sand, and roadside ditches. Succession, trampling, herbivory, and possibly genetics are additional concerns. Not tracked previously in NH so occurrences uncertain, but considered unlikely/rare for WMNF by local experts despite potential for it to be under-reported. One occurrence found recently on Forest.	Alternatives would not change overall herbivore populations, but regeneration harvest could attract deer, etc., changing the risk of herbivory nearby. No alternative should alter herbivore populations enough to affect plant populations Forest-wide. Potential for increased trampling is addressed for habitat. WMNF management does not affect genetic issues. Opening maintenance would be allowed in all alternatives. To meet goals and viability requirements, Forest will do all that is reasonably possible to protect known occurrence and maintain at least current level of viability. If additional occurrences are located or determined to be on the WMF, future outcome would be for all alternatives. As long as only one occurrence is known, D outcome is possible for all alternatives because preventing the loss of a single occurrence from natural events or recreational use depends on site and species-specific conditions and may be outside the Forest's control.	B/C	B/D	B/D	B/D	B/D
Petasites frigidus var. palmatus	Y	2 extant	2 extant; 1 historic	Moist woods, fens, and swamps, especially cedar swamps and forests with calcareous seeps. May prefer somewhat open habitat. Calcareous habitat availability, trampling, herbivory, and possibly reproductive issues are additional concerns.	WMNF management does not affect calcareous habitat availability, which may be key limitation, or reproductive concerns. Spring protection would mitigate some impacts at seeps, but other seep habitats lack specific protection. Seeps can be hard to detect, so harvest and trail construction may occur near these habitats despite survey efforts. This risk leads to potential for decline in outcome with all alternatives. Alternatives would not change overall herbivore populations, but regeneration harvest could attract deer, etc., changing the risk of herbivory nearby; Alternative 1 has most, 2 and 4 have slight increase from current, and Alternative 3 has least regeneration habitat. None should alter herbivore populations enough to affect plant populations Forest-wide.	B/C	B/C-	B/C-	B/C-	B/C-

Table F-02. Species of Concern in Other Habitats (continued).

Species	RFSS ¹	WMNF occurrence ²	Analysis area occurrence ²	Differences from habitat description	Differences in effects	WMNF Viability Outcomes ³				
						Current	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Pyrola asarifolia	Y	1 extant	1 extant; 3 historic	Rich woods and thickets, especially river terraces, open wetlands, and cedar swamps; often at forest edge. Calcareous habitat availability and trampling are additional limiting factors. NH Natural Heritage Bureau (NHNHB) only tracks one occurrence as on WMNF and suitable habitat is limited, but panelists believe others exist and some occurrences in NHNHB database are very close to, or on, WMNF without certain accuracy so there may be additional WMNF occurrences	WMNF management does not affect calcareous habitat availability. Potential negative impacts from trampling are addressed for wetland habitats. Partial canopy removal, which is more abundant in Alternatives 3 and 4, may be beneficial; impacts from even-aged regeneration harvest are as described for habitat. To meet goals and viability requirements, Forest will do all that is reasonably possible to protect known occurrence and maintain at least current level of viability. If additional occurrences are located or determined to be on the WMF, future outcome would be C- for Alternative 1 and C for others. As long as only one occurrence is known, D outcome is possible for all alternatives because preventing the loss of a single occurrence from natural events or recreational use depends on site and species-specific conditions and may be outside the Forest's control. Difference in outcomes is because higher even-aged regeneration harvest in northern hardwood habitat in Alternative 1 could decrease suitable habitat on Forest, impact occurrences, and alter dispersal capability.	C	C-/D	C/D	C/D	C/D
Salix pellita	N	1 historic	2 extant; 2 historic	Rich alluvium in streambanks, floodplain forest, moist thickets, swamps, and lake/pond shores. Limiting factors are same as for habitat.	Effects are as described for habitat. Uncertainty in outcome depends on whether historic occurrence is valid and truly historic, but would not change regardless of alternative.	C/D	C/D	C/D	C/D	C/D

Table F-02. Species of Concern in Other Habitats (continued).

Species	RFSS ¹	WMNF occurrence ²	Analysis area occurrence ²	Differences from habitat description	Differences in effects	WMNF Viability Outcomes ³				
OPEN WETLAND SPECIES										
Ebony boghaunter	N	1 historic	1 historic	Larvae develop in shallow pools in low elevation sphagnum bogs and fens. Adults perch in small clearings in adjacent conifer or mixed forest. Extensive clearing of forest adjacent to breeding wetlands is additional limiting factor. Single occurrence not a big concern because so little surveying has been done.	Timber harvest would impact the greatest number of acres, and therefore have greatest potential for impact, under Alternative 4, then 1, then 3, and Alternative 2 would have harvest on the fewest acres. However management would be geared toward increasing conifers on the landscape, so clearing of lowland conifer forest would likely be limited to group selection harvests with minimal impact in all alternatives. Therefore overall impacts to these species should be limited under all alternatives.	B/C	B/C	B/C	B/C	B/C
Forcipate emerald	N	1 extant; 1-2 historic on or near WMNF	1 extant; 3 historic	Larvae develop in small, boggy, spring-fed streams, shallow puddles in bogs, small pools associated with flowing groundwater, and fen-like habitats upstream of beaver dams and similar impoundments. Adult males often in the partially shaded lagg zone between open peatlands and uplands, indicating breeding use of this habitat. Forest clearing may be an additional concern. Few occurrences not a big concern because so little surveying has been done.	See ebony boghaunter for potential effects from timber harvest.	B/C	B/C	B/C	B/C	B/C
Northern bog lemming	Y	1 extant; 1-2 historic	1 extant; 2 historic	Prefers moist conditions with dense ground cover in mixed or conifer forest, sphagnum bogs; uses burrows below ground and shallow runways on the surface; away from streams they are likely below ground and not easily found. Threats unknown. Single extant occurrence not a concern because species is difficult to survey for and has been known on Forest for over a century. Experts believe it is more common than numbers indicate.	Threats are largely unknown, so effects are uncertain. Potential for compaction of burrows from logging (year-round) in all alternatives, though greatest in 4 and 1, which affect most total acres. Riparian Standards and guidelines would help protect bogs and local hydrology.	B*	B	B	B	B

Table F-02. Species of Concern in Other Habitats (continued).

Species	RFSS ¹	WMNF occurrence ²	Analysis area occurrence ²	Differences from habitat description	Differences in effects	WMNF Viability Outcomes ³				
Pied-billed grebe	N	# unknown	# unknown	Mid-sized or larger wetlands with open water and ponds with dense emergent vegetation. Pollution, siltation, acid rain, and human disturbance are additional concerns.	WMNF would not affect acid precipitation. Pollution and siltation are addressed for habitats. Human disturbance likely to increase under all alternatives as recreation use increases, but more potential for effects under Alternatives 4 and 1, which have greatest increase in facilities and could bring people to new areas.	C?	C	C	C	C
Calamagrostis pickeringii	N	13 extant; 6-7 historic	19 extant; 6-7 historic	Variety of habitats including alpine ravine headwalls and streams, open wetlands, streambanks, old streambeds, damp openings and roadsides; prefers wet but uses some seasonally dry habitats. Riverbanks and montane sloping fens are primary habitats.	Peat mining would be prohibited by Standards and guidelines to protect wetlands. Impacts from invasives and water withdrawal are discussed for riparian habitats. Other effects are as discussed for habitat.	B/C	B/C	B/C	B/C	B/C
Calamagrostis stricta ssp. inexpansa	Y	5 extant; 4 historic	8 extant; 5 historic	Cliffs and ledges, river and stream banks, bogs, fens, seeps, and wet alpine. Succession and trampling are additional concerns.	Rock climbing less of a concern for wet cliffs, but may result in trampling on drier habitats, including at least one large population on Forest. Ice climbing occurs at one site, unknown if a concern, but use is likely to increase. Trampling by hikers is addressed in habitat effects. Natural processes would affect succession, and habitat management would be allowed in MA 2.1 if needed to prevent succession and maintain suitable habitat. Other concerns addressed for habitats. Fire use is essentially the same in all alternatives. Acres allowing fire use vary slightly. Allocation for one known occurrence would vary among alternatives – not allowing the use of prescribed fire in Alternative 3.	B/C	B/C	B/C	B/C	B/C
Carex baileyi	Y	1 historic	2 historic	Wet meadows, fens, wet swamp woods, mixed woods, and along roadsides and ditches. Limiting factors unknown.	Potential effects are assumed to be as described for habitats. Single historic occurrence is a concern, but may be underreported and more common. Given array of habitats used, there is no reason to believe its status is changing	B/C	B/C	B/C	B/C	B/C

Table F-02. Species of Concern in Other Habitats (continued).

Species	RFSS ¹	WMNF occurrence ²	Analysis area occurrence ²	Differences from habitat description	Differences in effects	WMNF Viability Outcomes ³				
						Current	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Carex exilis	N	1 extant	1 extant	Poor to rich bogs and fens with Sphagnum moss, at a range of elevations. Year-round soil saturation appears to be primary habitat preference; competition results when saturation is insufficient and is an additional limiting factor. Bogs and fens on Forest not well surveyed, so there may be additional populations	Given need for groundwater near the surface year-round, activities that alter hydrology would be even greater concern than for habitat in general. As discussed for habitat, standards and guidelines should minimize impacts. To meet goals and viability requirements, Forest will do all that is reasonably possible to protect known occurrence and maintain at least current level of viability. If additional occurrences are located, future outcome would be B/C for all alternatives. As long as only one occurrence is known, D outcome is possible because preventing the loss of a single occurrence from natural events or recreational use depends on site and species-specific conditions and may be outside the Forest's control.	B/C	B/D	B/D	B/D	B/D
Carex wiegandii	Y	5 extant	5 extant; 1 historic	Prefers open peatlands; uses conifer swamps, lakeshores, wet meadows, ditches.	Timber harvest of all types can be beneficial in conifer swamps if it slows succession or understory development and maintains hydrology. Other effects are as described for habitats	B/C	B/C	B/C	B/C	B/C
Geocaulon lividum	Y	2 extant; 4 historic	12 extant; 5 historic	Bogs and moist coniferous woods; in woods, does best in late-successional forest. Identification difficulty and timber harvest in conifer habitat are added limiting factors.	Three of four known sites are along trails, so trampling is a key concern. Impacts from harvest are addressed for conifer forest habitat.	B	B	B	B	B
Listera auriculata	Y	2 extant	2 extant; 1 historic	Ice-scoured streambanks, sphagnum bogs, alder thickets, cedar swamps. ATV use and small populations are additional limiting factors.	WMNF management would not impact risk from small populations. Trampling, ATV use, and other effects are addressed in habitat effects. Known extant occurrence was affected by ice scour; unknown if it still occurs, is gone, or moved downstream. Panel said species is hard to locate and expects it occurs elsewhere on WMNF.	B	B	B	B	B

Table F-02. Species of Concern in Other Habitats (continued).

Species	RFSS ¹	WMNF occurrence ²	Analysis area occurrence ²	Differences from habitat description	Differences in effects	WMNF Viability Outcomes ³				
Ophioglossum pusillum	N	At least 1 extant	At least 1 extant	Variety of early-successional, seasonally moist to wet habitats, including open fens, bogs, marsh edges, pastures, old fields, grassy shores, wet thickets, cedar and hardwood swamps, floodplain woods, wet swales, damp sand, and roadside ditches. Trampling, herbivory, and possibly genetics are additional concerns. Not tracked previously in NH so occurrences uncertain, but considered unlikely/rare for WMNF by local experts despite potential for it to be under-reported. One occurrence found recently on Forest.	Alternatives would not change overall herbivore populations, but regeneration harvest could attract deer, etc., changing the risk of herbivory nearby. No alternative should alter herbivore populations enough to affect plant populations Forest-wide. Potential for increased trampling is addressed for habitat. WMNF management does not affect genetic issues. Opening maintenance would be allowed in all alternatives. To meet goals and viability requirements, Forest will do all that is reasonably possible to protect known occurrence and maintain at least current level of viability. If additional occurrences are located or determined to be on the WMF, future outcome would be for all alternatives. As long as only one occurrence is known, D outcome is possible for all alternatives because preventing the loss of a single occurrence from natural events or recreational use depends on site and species-specific conditions and may be outside the Forest's control.	B/C	B/D	B/D	B/D	B/D
Potamogeton confervoides	N	2 extant; 3 historic	2 extant; 16 historic	Strongly acidic soft-water bogs, lakes, ponds with muddy shores; slow-flowing acidic streams. Water pH is key limiting factor, so anything that increases alkalinity is an additional concern.	WMNF actions should not noticeably alter water chemistry or water levels except rare occasions when existing dams are altered.	B/C	B/C	B/C	B/C	B/C

Table F-02. Species of Concern in Other Habitats (continued).

Species	RFSS ¹	WMNF occurrence ²	Analysis area occurrence ²	Differences from habitat description	Differences in effects	WMNF Viability Outcomes ³				
Pyrola asarifolia	Y	1 extant	1 extant; 3 historic	Rich woods and thickets, especially river terraces, open wetlands, and cedar swamps; often at forest edge. Calcareous habitat availability and trampling are additional limiting factors. NH Natural Heritage Bureau (NHNHB) only tracks one occurrence as on WMNF and suitable habitat is limited, but panelists believe others exist and some occurrences in NHNHB database are very close to, or on, WMNF without certain accuracy so there may be additional WMNF occurrences	WMNF management does not affect calcareous habitat availability. Potential negative impacts from trampling are addressed for wetland habitats. Partial canopy removal, which is more abundant in Alternatives 3 and 4, may be beneficial; impacts from even-aged regeneration harvest are as described for habitat. To meet goals and viability requirements, Forest will do all that is reasonably possible to protect known occurrence and maintain at least current level of viability. If additional occurrences are located or determined to be on the WMF, future outcome would be C- for Alternative 1 and C for others. As long as only one occurrence is known, D outcome is possible for all alternatives because preventing the loss of a single occurrence from natural events or recreational use depends on site and species-specific conditions and may be outside the Forest's control. Difference in outcomes is because higher even-aged regeneration harvest in northern hardwood habitat in Alternative 1 could decrease suitable habitat on Forest, impact occurrences, and alter dispersal capability.	C	C-/D	C/D	C/D	C/D
Sphagnum andersonianum	N	1 extant	2 extant	Low hummocks in very poor ericaceous fens. Peat mining is an additional limiting factor. Surveys have been limited, so lack of many occurrences is not a big concern.	Peat mining would be prohibited by Standards and guidelines to protect wetlands.	C	C	C	C	C
Sphagnum angermanicum	N	1 extant	1 extant; 1 unknown timeframe	Poor fens, including those at edges of ponds. Peat mining is an additional limiting factor. Surveys have been limited, so lack of many occurrences is not a big concern.	Peat mining would be prohibited by Standards and guidelines to protect wetlands.	C	C	C	C	C
Sphagnum brevifolium	N	1 historic	1 historic	Poor to intermediate fens; seems to use a variety of locations within peatlands. In NH, so far only known from alpine. Peat mining is an additional limiting factor. Surveys have been limited, so lack of recent occurrences is not a big concern.	Peat mining would be prohibited by Standards and guidelines to protect wetlands.	B/C	B/C	B/C	B/C	B/C

Table F-02. Species of Concern in Other Habitats (continued).

Species	RFSS ¹	WMNF occurrence ²	Analysis area occurrence ²	Differences from habitat description	Differences in effects	WMNF Viability Outcomes ³				
Sphagnum flavicomans	N	1 historic	2 extant; 1 historic	Medium to tall hummocks in bogs and poor fens. Peat mining is an additional limiting factor. Surveys have been limited, so lack of recent occurrences is not a big concern.	Peat mining would be prohibited by Standards and guidelines to protect wetlands.	C	C	C	C	C
Sphagnum lindbergii	N	2 extant	2 extant	In New Hampshire, restricted to alpine and subalpine peatlands; forms carpets in heath balds and bogs with full sun, low-medium nutrient levels, and pH of 4.0-6.0. Peat mining is an additional limiting factor. Surveys have been limited, so lack of many occurrences is not a big concern.	Peat mining would be prohibited by Standards and guidelines to protect wetlands. Recreation development, roads, and dams would not impact alpine/subalpine habitats, so increased use of existing facilities is only potential impact.	B	B	B	B	B
Sphagnum majus ssp norvegicum	N	1 extant	2 extant; 1 historic	Lawns in poor sedge fens and pond margins. Peat mining is an additional limiting factor. Surveys have been limited, so lack of many occurrences is not a big concern.	Peat mining would be prohibited by Standards and guidelines to protect wetlands.	B/C	B/C	B/C	B/C	B/C
Sphagnum pylaesii	N	1 extant; ? historic	2 extant; 2 historic	Forms mats over moist or wet rock or is submerged in fen pools. Peat mining is an additional limiting factor. Surveys have been limited, so lack of many occurrences is not a big concern.	Peat mining would be prohibited by Standards and guidelines to protect wetlands. Rock climbing not likely to affect most wet rock species.	B/C	B/C	B/C	B/C	B/C
Utricularia resupinata	N	# unknown	1 historic	Clear, acidic waters at pond, lake, and bog edges; needs low water levels to bloom; prefers a slightly higher than average water temperature. Lack of water fluctuation is an added concern.	Effects are as described for habitat. Achieving necessary water fluctuation would be difficult for Forest if it does not occur naturally; dams discussed for habitat.	C	C	C	C	C

¹ Is this a Regional Forester’s Sensitive Species: N = No; Y = Yes; ESA = Federally listed as Endangered or Threatened

² Number of documented occurrences within the White Mountain National Forest or the analysis area (see habitat description for definition). Analysis area occurrences include WMNF occurrences. Extant = last documented as existing within last 20 years; Historic = last documented as existing more than 20 years ago or known to no longer exist; Unconfirmed = reported by credible person, but not yet documented or verified; # unknown = species is known to occur in the analysis area, but documented occurrences are not track by any State heritage program or town information was not provided.

³ Outcomes are based on current population and habitat conditions and opinions of expert panelists (if a panel was held).

Outcome A: Habitat is distributed broadly across the taxon’s historic range and is of sufficient quality to support the type and degree of intrademe and metapopulation interactions that the taxon would characteristically engage in if it were not habitat limited.

Outcome B: Habitat across the taxon’s historic range is reduced in quality or quantity. Local demes may be extirpated. Metapopulation interactions are adversely altered, but the taxon generally retains the geographic extent typical of the historic distribution.

Outcome C: Habitat across the taxon’s historic range is reduced in quality or quantity. Local demes have been extirpated. Metapopulation interactions are adversely altered throughout most or in significant portions of the taxon’s range. The geographic extent of the taxon is reduced.

Table F-02. Species of Concern in Other Habitats (continued).

Outcome D: Habitat across the taxon’s historic range is much reduced in quality or quantity. A majority of the historic populations have been extirpated. Metapopulation interactions are essentially precluded. The geographic extent of the taxon is significantly reduced.

Outcome E: Habitat across the taxon’s historic range is much reduced in quantity and quality. A majority of the historic populations have been extirpated. Metapopulation interactions are essentially precluded. The geographic extent of the taxon is reduced so much that the taxon would benefit from the protections of the Endangered Species Act.

Outcome N/A: None of the other outcome descriptions apply. The basis for this outcome varies with species. See the effects column for each species for the reason for this outcome.

Table F-03. Habitat Preferences for Species of Concern.

Taxonomic Group Species	Alpine ¹	Enriched hardwood forest ²	Rock and cliff	Conifer forest	Land- scape level	Hardwood and mixed- wood forest	Lakes and ponds	Rivers and streams	Forested wetland	Open wetland
Amphibians and Reptiles										
Jefferson salamander						X			X	
Wood turtle				X		X		X		
Birds										
American peregrine falcon			X							
Bald eagle							X	X		
Bay-breasted warbler				X						
Bicknell's thrush				X						
Common loon							X			
Pied-billed grebe										X
Rusty blackbird				X					X	
Three-toed woodpecker				X					X	
Fish										
Atlantic salmon							X	X		
Insects										
a big-headed fly						X				
Black lordithon rove beetle						X				
Boulder beach tiger beetle								X		
Brown's ameletid mayfly								X		
Ebony boghaunter										X
Forcipate emerald										X

White Mountain National Forest – Final Environmental Impact Statement

Table F-03. Habitat Preferences for Species of Concern (continued).

Taxonomic Group Species	Alpine ¹	Enriched hardwood forest ²	Rock and cliff	Conifer forest	Land- scape level	Hardwood and mixed- wood forest	Lakes and ponds	Rivers and streams	Forested wetland	Open wetland
Southern pygmy clubtail								X		
Third ameletid mayfly								X		
White Mountain butterfly	X									
White Mountain fritillary	X									
Mammals										
American marten					X					
Canada lynx					X					
Eastern cougar					X					
Eastern small-footed bat			X							
Indiana bat						X			X	
Northern bog lemming				X						X
Timber wolf					X					
Plants										
Arabis missouriensis		X	X							
Arctostaphylos alpina	X									
Arnica lanceolata	X									
Betula minor	X									
Calamagrostis pickeringii								X		X
Calamagrostis stricta ssp. inexpansa			X					X		X
Cardamine bellidifolia	X									

Table F-03. Habitat Preferences for Species of Concern (continued).

Taxonomic Group Species	Alpine ¹	Enriched hardwood forest ²	Rock and cliff	Conifer forest	Land- scape level	Hardwood and mixed- wood forest	Lakes and ponds	Rivers and streams	Forested wetland	Open wetland
Cardamine concatenata		X								
Carex backii		X	X							
Carex baileyi									X	
Carex capillaris	X									
Carex capitata ssp. arctogena	X									
Carex cumolata						X				
Carex exilis										X
Carex scirpoidea			X							
Carex wiegandii									X	
Castilleja septentrionalis	X									
Chenopodium foggii			X							
Corallorhiza odontorhiza						X				
Cynoglossum virginianum var. boreale		X								
Cypripedium parviflorum var. pubescens		X							X	
Dicentra canadensis		X								
Dryopteris goldiana		X							X	
Epilobium anagallidifolium	X									
Euphrasia oakesii	X									

White Mountain National Forest – Final Environmental Impact Statement

Table F-03. Habitat Preferences for Species of Concern (continued).

Taxonomic Group Species	Alpine ¹	Enriched hardwood forest ²	Rock and cliff	Conifer forest	Land- scape level	Hardwood and mixed- wood forest	Lakes and ponds	Rivers and streams	Forested wetland	Open wetland
<i>Festuca prolifera</i>	X									
<i>Galium kamtschaticum</i>				X		X			X	
<i>Geocaulon lividum</i>				X						X
<i>Geum peckii</i>	X									
<i>Harrimanella hypnoides</i>	X									
<i>Isotria medeoloides</i>						X				
<i>Juglans cinerea</i>		X							X	
<i>Listera auriculata</i>								X	X	X
<i>Listera convallarioides</i>				X		X			X	
<i>Listera cordata</i>				X		X			X	
<i>Loiseleuria procumbens</i>	X									
<i>Luzula confusa</i>	X									
<i>Minuartia glabra</i>			X							
<i>Nabalus (Prenanthes) bootii</i>	X									
<i>Oligoneuron album</i>			X							
<i>Omalothea supina</i>	X									
<i>Ophioglossum pusillum</i>									X	X
<i>Osmorhiza berteroi</i>		X								
<i>Oxyria digyna</i>	X									
<i>Panax quinquefolius</i>		X								
<i>Paronychia argyrocoma</i>			X					X		

Table F-03. Habitat Preferences for Species of Concern (continued).

Taxonomic Group Species	Alpine ¹	Enriched hardwood forest ²	Rock and cliff	Conifer forest	Land- scape level	Hardwood and mixed- wood forest	Lakes and ponds	Rivers and streams	Forested wetland	Open wetland
<i>Pericarica vivipara</i>	X									
<i>Petasites frigidus</i> var. <i>palmatus</i>									X	
<i>Phleum alpinum</i>	X									
<i>Pinus banksiana</i>			X							
<i>Piptatherum</i> (<i>Oryzopsis</i>) <i>canadense</i>			X							
<i>Poa laxa</i> ssp. <i>fernaldiana</i>	X									
<i>Poa pratensis</i> ssp. <i>alpigena</i>	X									
<i>Polygonum douglasii</i>		X	X							
<i>Potamogeton</i> <i>confervoides</i>							X	X		X
<i>Potentilla robbinsiana</i>	X									
<i>Pyrola asarifolia</i>		X						X	X	X
<i>Rhinanthus minor</i> ssp. <i>groenlandicus</i>	X									
<i>Rhododendron</i> <i>lapponicum</i>	X									
<i>Salix argyrocarpa</i>	X									
<i>Salix herbacea</i>	X									
<i>Salix pellita</i>							X	X	X	
<i>Sanicula trifoliata</i>		X								
<i>Saxifraga paniculata</i> ssp. <i>neogaea</i>			X							

Table F-03. Habitat Preferences for Species of Concern (continued).

Taxonomic Group Species	Alpine ¹	Enriched hardwood forest ²	Rock and cliff	Conifer forest	Land- scape level	Hardwood and mixed- wood forest	Lakes and ponds	Rivers and streams	Forested wetland	Open wetland
<i>Saxifraga rivularis</i>	X									
<i>Sibbaldia procumbens</i>	X									
<i>Silene acaulis</i> var. <i>exscapa</i>	X									
<i>Solidago calcicola</i>		X	X							
<i>Sphagnum</i> <i>andersonianum</i>										X
<i>Sphagnum</i> <i>angermanicum</i>										X
<i>Sphagnum brevifolium</i>										X
<i>Sphagnum flavicomans</i>										X
<i>Sphagnum lindbergii</i>	X									
<i>Sphagnum majus</i> ssp <i>norvegicum</i>										X
<i>Sphagnum pylaesii</i>			X							X
<i>Spiraea septentrionalis</i>	X									
<i>Symphyotrichum</i> <i>ciliolatum</i>						X				
<i>Triphora trianthophora</i>						X				
<i>Utricularia resupinata</i>							X			X
<i>Vaccinium boreale</i>	X									
<i>Vahlodea atropurpurea</i>	X									

¹ Only those species that are restricted to the alpine zone are identified for this habitat type; species that use another habitat type both within and outside the alpine zone are only identified for the given habitat type, not “alpine.”

² Only those species that select for nutrient rich hardwoods are identified for this habitat type; species that use hardwood or mixed hardwood-softwood habitats regardless of nutrient richness are included in the “hardwood and mixed forest” habitat, but not in “rich hardwood forest.”