Appendix F

Draft Biological Evaluation

for RFSS Plants for

SCHOOL TRUST EXCHANGE PROJECT

Botanical Evaluation and Assessment:

Prepared by:_____ Date: _____

Jack Greenlee, Plant Ecologist

Contents

SUMMARY

For Alternative 1, the proposed activities would have no impact on maidenhair spleenwort, swamp beggar-ticks, triangle grapefern, common moonwort, Michigan moonwort, goblin fern, pale moonwort, ternate grapefern, least moonwort, floating marsh-marigold, fairy slipper, New England sedge, Ross' sedge, Douglas' hawthorn, ram's head lady's slipper, linear leaved sundew, neat spike-rush, Appalachian fir club moss, moor rush, American shoregrass, large-leaved sandwort, fall dropseed muhly, dwarf waterlily, Chilean sweet cicely, Canada ricegrass, western Jacob's ladder, Braun's holly fern, Oakes pondweed, small shinleaf, cloudberry, encrusted saxifrage, awlwort, Canada yew, lance-leaved violet, barren strawberry, *Arctoparmelia centrifuga, Arctoparmelia subcentrifuga, Caloplaca parvula, Certraria aurescens, Cladonia wainoi, Frullania selwyniana,* port-hole lichen, *Peltigera venosa, Pseudocyphellaria crocata, Ramalina thrausta, Sticta fuliginosa,* and *Usnea longissima.*

For Alternative 2 or 3, the proposed activities may impact individuals of maidenhair spleenwort, swamp beggar-ticks, triangle grapefern, common moonwort, Michigan moonwort, goblin fern, pale moonwort, ternate grapefern, least moonwort, floating marsh-marigold, fairy slipper, New England sedge, Ross' sedge, Douglas' hawthorn, ram's head lady's slipper, linear leaved sundew, neat spike-rush, Appalachian fir club moss, moor rush, American shoregrass, large-leaved sandwort, fall dropseed muhly, dwarf waterlily, Chilean sweet cicely, Canada ricegrass, western Jacob's ladder, Braun's holly fern, Oakes pondweed, small shinleaf, cloudberry, encrusted saxifrage, awlwort, Canada yew, lance-leaved violet, barren strawberry, *Arctoparmelia centrifuga, Arctoparmelia subcentrifuga, Caloplaca parvula, Certraria aurescens, Cladonia wainoi, Frullania selwyniana,* port-hole lichen, *Peltigera venosa, Pseudocyphellaria crocata, Ramalina thrausta, Sticta fuliginosa,* and *Usnea longissima* but are not likely to cause a trend to federal listing or loss of viability.

INTRODUCTION:

This Biological Evaluation (BE) documents the potential effects to the Region 9 Regional Forester sensitive plant species that could result from the proposed land exchange between the State of Minnesota and the Superior National Forest (SNF).

The BE tiers to the Programmatic Biological Evaluation for the revision of the Forest Plan (USDA Forest Service 2004) and provides more detailed information on site-specific effects of

the project to RFSS species. This BE was prepared in compliance with U.S. Department of Agriculture (USDA) Forest Service Manual sections 2670.3, 2670.5 (3), 2672.4, the Endangered Species Act of 1973 as amended, the National Forest Management Act of 1976, the Superior National Forest Land and Resource Management Plan (Forest Plan), and Recovery Plans and Conservation Assessments and Strategies. The species evaluated in this report include all species on the Region 9 sensitive species list for the SNF (USDA Forest Service 2011).

PROJECT DESCRIPTION

The USDA Forest Service (FS) proposes to exchange federal lands outside the Boundary Waters Canoe Area Wilderness (BWCAW) of equal value from a pool of approximately 39,467 acres for approximately 31,057 acres of State lands in the BWCAW. See Section 1.5 of the EIS for a description of the Modified Proposed Action. Further information about the background of the project is found in Chapter 1 of the EIS.

ALTERNATIVES

There are three alternatives:

1. Alternative 1 – No Action: there would be no changes to the existing land ownership of the parcels. See Section 2.2.1 of the EIS for more information on Alternative 1.

2. Alternative 2 –Modified Proposed Action: Approximately 39,467 acres of candidate federal parcels outside the BWCAW would be exchanged for approximately 31,057 acres of School Trust parcels in the BWCAW. See Section 1.5 of the EIS for more information on Alternative 2.

3. Alternative 3: Approximately 23,136 acres of candidate federal parcels outside the BWCAW would be exchanged for approximately 31,057 acres of School Trust parcels in the BWCAW. See Section 2.2.3 of the EIS for more information on Alternative 3.

PURPOSE AND NEED

See Section 1.4 of the EIS for the purpose and need of this project.

ANALYSIS FRAMEWORK FOR THE PROJECT

See Section 3.1 of the EIS for the overall analysis framework of the project, including management policies and potential future uses of lands proposed for exchange.

DESCRIPTION OF AFFECTED SPECIES

The species evaluated include all plants on the Region 9 Regional Foresters Sensitive Species (RFSS) Plants list for the Superior National Forest (USDA Forest Service 2011). Table 1 displays all RFSS plants known or expected to occur on the Superior National Forest. The Minnesota DNR's Rare Features Database (MNDNR 2015) and a Forest Service database (USDA Forest Service 2015) were used to evaluate species habitat and presence/absence for this analysis. Species listed in Table 1 that do not have potential habitat present and are not known to occur within the project area will not receive further discussion in this BE.

Table 1. RFSS Species Known Or Suspected to Occur in School Trust Exchange Project Area			
Scientific name **Common name**	**Potential Habitat Present in project area (Federal/NonFederal)**	**Known Species Presence in project area (Federal/NonFed)**	**Habitat Summary**
SENSITIVE SPECIES: Vascular Plants (Note: Unless cited otherwise, habitat descriptions are derived from information provided by the Minnesota Natural Heritage and Non-game Research Program [MNDNR 2015])			
Moschatel *Adoxa moschatellina*	No/No	No/No	Shaded damp cliffs and slopes in upland mature northern hardwood forest on North Shore
Long-leaved arnica *Arnica lonchophylla*	No/No	No/No	Cool & moist cliffs and ledges on North Shore. Arctic disjunct
Maidenhair spleenwort *Asplenium trichomanes*	Yes/Yes	No/No	In crevices of moist, mostly east-facing cliffs, ledges, and talus, often Rove formation
Alpine milkvetch *Astragalus alpinus*	No/No	No/No	Sandy, gravelly fluctuating shorelines with sparse vegetation. Inland strand beach - sparse vegetation
Swamp beggar-ticks *Bidens discoidea*	Yes/Yes	No/No	Wet habitats: silty shores, hummocks in floating mats and swamps, partly submerged logs
Triangle grape-fern *Botrychium lanceolatum* var *angustisegmentum*	Yes/No	No/No	Northern hardwood forest, old fields, old logging roads, trails
Common moonwort *Botrychium lunaria*	Yes/No	No/No	Open habitats such as old log landings, sawmill sites, old building sites
Michigan moonwort *Botrychium michiganense (hesperium)*	Yes/No	No/No	Open habitats such as old log landing, old dirt roads, gravel pits, power line corridors, and borrow pits. Also, beach ridges, old fields, trails, and dredge spoil dumps (Walton, 2000)
Goblin fern *Botrychium mormo*	Yes/No	No/No	Mesic northern hardwood forest with thick leaf litter layer
Pale moonwort *Botrychium pallidum*	Yes/No	No/No	Open, disturbed habitats, log landings, roadsides, dunes, sandy gravel pits.
Ternate grape-fern *Botrychium rugulosum (=ternatum)*	Yes/No	No/No	Generally open habitats, such as old log landings and edges of trails.
Least moonwort *Botrychium simplex*	Yes/No	No/No	Generally open habitats, such as old log landings, roadside ditch, trails, open fields, base of cliff, railroad rights of way
Floating marsh-marigold *Caltha natans*	Yes/Yes	No/No	Perennial herb; shallow water of pools, ditches, sheltered lake margins, slow moving creeks, sloughs and oxbows, pools in shrub swamps
Fairy slipper *Calypso bulbosa*	Yes/Yes	No/No	Hummocks in northern white cedar swamps, moist to wet lowland

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			conifer swamps, and to lesser extent in upland coniferous forests (Smith, 1993)
New England sedge *Carex novae-angliae*	Yes/No	Yes/No	Moist woods with sugar maple, also with birch, aspen, tall shrubs; yellow birch and white spruce dominated forest
Ross' sedge *Carex rossii*	Yes/No	No/No	Rocky summits, dry exposed cliff faces, rocky slopes, in east Border Lakes subsection
Douglas's hawthorn *Crataegus douglasii*	Yes/No	Yes/No	North Shore rocky, gravelly streambeds/banks and open areas; and rocky borders of woods
Ram's-head lady's slipper *Cypripedium arietinum*	Yes/Yes	No/No	Wide variety of forests, both upland and lowland, but in MN predominantly in white cedar swamps; also in forests dominated by jack pine, red pine, or white pine
Linear leaved sundew *Drosera linearis*	Yes/Yes	No/No	Minerotrophic water tracks in patterned peatlands
Neat spike-rush *Eleocharis nitida*	Yes/Yes	No/No	Mineral soil of wetlands, often w/ open canopy and disturbance, such as logging roads/ditches through wetlands
Appalachian fir club moss *Huperzia appalachiana*	Yes/Yes	No/No	Shelves and crevices on cliff/talus/rock outcrops, and shrub dominated talus piles
Moor rush *Juncus stygius*	Yes/Yes	No/No	Shallow pools in non-forested peatlands, often in a sedge-dominated community
Creeping rush *Juncus subtilis*	No/No	No/No	Sandy lakeshore – only known occurrence in BWCAW (Gerdes, 2005a)
Auricled twayblade *Listera auriculata*	No/No	No/No	On alluvial or lake-deposited sands or gravels, with occasional seasonal flooding, associated with riparian alder or spruce/fir forest
American shore-grass *Littorella uniflora*	Yes/Yes	No/Yes	Shallow margins of nutrient-poor lakes, seepage lakes, sandy substrate, may have fine gravel/organic soil. Fluctuating water level up to about one meter.
Large-leaved sandwort *Moehringia macrophylla*	Yes/Yes	No/No	Cliffs/rock outcrops, talus, conifer sites on shallow soils, pine plantation with rocky outcrops; usually semi-open shrub or tree canopy
Fall dropseed muhly *Muhlenbergia uniflora*	Yes/Yes	No/No	Wet sandy beaches, floating peat mats

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Dwarf water-lily *Nymphaea leibergii*	Yes/Yes	No/No	Slow moving streams, rivers, beaver impoundments 1-2 m deep. Occurs at outer margin of emergent vegetation.
Chilean sweet cicely *Osmorhiza berteroi*	Yes/No	No/No	Northern hardwood forest dominated by sugar maple on North Shore.
Sticky locoweed *Oxytropis borealis* var *viscida*	No/No	No/No	Slate cliffs and talus slopes in east Border Lakes subsection. Arctic/alpine disjunct
Canada Rice Grass *Piptatherum canadense*	Yes/Yes	No/No	Sandy/gravelly soil; red pine/jack pine plantations, borders, edges, trailsides, openings (Gerdes, 2005)
Western Jacob's ladder *Polemonium occidentale ssp. lacustre*	Yes/No	No/No	Primarily white cedar swamps, also mixed conifer swamps; thrives in openings (Carlson and Sather, 2001)
Braun's holly fern *Polystichum braunii*	Yes/No	No/No	Cool, shady cliffs and slopes in northern hardwoods in North Shore Highlands subsection
Oakes pondweed *Potamogeton oakesianus*	Yes/Yes	No/No	Quiet, acidic waters of bogs, ponds, and lakes
Rough-fruited fairy bells *Prosartes trachycarpa*	No/No	No/No	Semi-open jack pine forest with aspen, birch, shallow rocky soils, in east Border Lakes subsection
Lesser wintergreen or Small shinleaf *Pyrola minor*	Yes/Yes	No/No	Black spruce swamps, and ecotone between uplands and lowland alder/conifer swamp, prefers closed canopy.
Cloudberry *Rubus chamaemorus*	Yes/Yes	No/No	Black spruce/sphagnum forest, acidic. SNF at southern edge of species range
Nodding saxifrage *Saxifraga cernua*	No/No	No/No	Cliffs, ledges, diabase cliff (calcium based feldspars). Arctic/alpine disjunct. One location in MN on open cliff.
Encrusted saxifrage *Saxifraga paniculata*	Yes/No	No/No	Cliffs, sheltered crevices, and ledges of north-facing cliffs; Arctic/alpine disjunct
Awlwort *Subularia aquatica*	Yes/Yes	No/No	Beach zone of sandy nutrient-poor lakes. Shallow lake margins. Submerged or emerged, or stranded. 15-45 cm deep water, but can occur deeper. Can flower while stranded or under other conditions.
Canada yew *Taxus canadensis*	Yes/Yes	Yes/Yes	Wide variety of uplands and lowlands, including cedar/ash swamps, talus and cliffs, northern hardwoods, aspen/birch forest (USDA Forest Service, 2015)

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Scientific name **Common name**	**Potential Habitat Present in project area (Federal/NonFederal)**	**Known Species Presence in project area (Federal/NonFed)**	**Habitat Summary**
False-asphodel *Tofieldia pusilla*	No/No	No/No	Sedge mats at edges of shoreline rock pools along Lake Superior. Arctic disjunct.
Lance-leaved violet *Viola lanceolata*	Yes/Yes	No/No	Sandy to peaty lakeshores; borders of marshes and bogs, damp sand ditches (USDA Forest Service, 2004g)
Barren strawberry *Waldsteinia fragarioides*	Yes/Yes	No/No	Upland coniferous and deciduous forests, in recently harvested areas, established plantations, and areas with no recent harvest
Smooth woodsia *Woodsia glabella*	No/No	No/No	Moist, north-facing cliffs along Lake Superior. Arctic disjunct.
SENSITIVE SPECIES: Lichens and bryophytes (Habitat information taken from USDA Forest Service 2000a, and Wetmore 2000 and 2001, and as cited below)			
A lichen sp. *Arctoparmelia centrifuga*	Yes/Yes	No/No	Lichen; Sunny rocks and open talus slopes (USDA Forest Service, 2002a)
A lichen sp. *Arctoparmelia subcentrifuga*	Yes/Yes	No/No	Lichen; Sunny rocks and open talus slopes
a lichen sp. *Caloplaca parvula*	Yes/Yes	No/No	Smooth bark of young black ash in moist, humid old growth black ash stand (USDA Forest Service, 2002c)
a lichen sp. *Cetraria aurescens*	Yes/Yes	No/No	Conifer bark in lowland conifer swamps (old cedar/black spruce - USDA Forest Service, 2002d)
a lichen sp. *Cladonia wainoi (= pseudorangiformis)*	Yes/Yes	No/No	On rock outcrops and thin soil – exposed sites with lots of light (USDA Forest Service, 2002e)
A liverwort sp. *Frullania selwyniana*	Yes/Yes	Yes/No	Lowland cedar swamps on bark of white cedar (Janssens, 2002)
Port-hole lichen *Menegazzia terebrata*	Yes/Yes	No/No	Cedar swamps, especially old growth; base of cedar trees (USDA Forest Service, 2002h)
a Dog lichen *Peltigera venosa*	Yes/Yes	No/No	Soil and moist cliffs, exposed root wads (USDA Forest Service, 2002i)
a lichen sp. *Pseudocyphellaria crocata*	Yes/Yes	Yes/No	Mossy rocks, trees in partially shaded, moist, frequently foggy habitats (USDA Forest Service, 2002j)
A lichen sp. *Ramalina thrausta*	Yes/Yes	Yes/No	Cedar swamps, especially old growth (USDA Forest Service, 2002k)
a lichen sp. *Sticta fuliginosa*	Yes/Yes	Yes/No	On hardwoods in humid, old growth cedar or ash bogs (USDA Forest Service, 2002l)
a lichen sp. *Usnea longissima*	Yes/Yes	Yes/No	On old conifers in moist situations, often in or near a conifer or

Table 1. RFSS Species Known Or Suspected to Occur in School Trust Exchange Project Area			
Scientific name **Common name**	**Potential Habitat Present in project area (Federal/NonFederal)**	**Known Species Presence in project area (Federal/NonFed)**	**Habitat Summary**
			hardwood swamp (USDA Forest Service, 2002m)

ANALYSIS AREA AND METHODS

A combination of indicators and qualitative analysis are used to assess the effects of the School Trust Exchange alternatives on RFSS plants and their habitat. The indicator that is used is number of RFSS plant occurrences on exchange lands. This indicator is good at highlighting differences between alternatives because the number of RFSS plant occurrences is a good representation of the amounts of different RFSS habitats present.

For Regional Forester Sensitive (RFSS) Plants, the area covered by the analysis of direct and indirect effects includes all of the national forest lands and all of the state lands proposed for exchange. This analysis area was selected because this is where the land exchange activities will occur which could potentially cause the direct and indirect effects to RFSS plants. The area covered by the cumulative effects analysis includes lands of all ownerships within recent and reasonably foreseeable land exchange and acquisition projects. This cumulative effects analysis area was selected because other land exchange projects would likely have similar effects on RFSS plants as the School Trust Exchange.

The timeframe selected for direct, indirect, and cumulative effects is 154 years from the time of the land exchange. This is because potential real estate development on candidate federal parcels identified as 'highest and best use' for real estate are assumed to be complete in this timeframe (see Section 3.1 of the EIS for more information on this point). This time period would allow for completion of associated projects that could affect RFSS plants on exchange lands.

EXISTING CONDITION

Based on the Minnesota DNR's Rare Features Database (MNDNR 2015) and a database of RFSS plants that are not tracked by the MNDNR (USDA FS 2015), there are 8 known RFSS plant species on the federal parcels and 2 known RFSS plant species on state parcels (Table 1). As shown in Table 1, the federal parcels have a wider range of rare plant habitats than the non-federal parcels. The federal parcels have a limited amount of northern hardwoods habitat, as well as ample non-forested wetlands (e.g. open peatlands, marshes, shallow water lakeshore), rock outcrop/cliff, upland disturbed habitats, forested wetlands (e.g. cedar, black ash, and black spruce), and mature upland forest. The state parcels have no northern hardwoods or upland disturbed habitat, but they do have ample non-forested wetlands, rock outcrop/cliff, forested wetlands (e.g. cedar, black ash, and black spruce), and mature upland forest.

No sensitive plant surveys were performed for this project.

Table 2. Number of RFSS plant occurrences on exchange lands			
Indicator	**Alt. 1**	**Alt. 2**	**Alt. 3**
1. Number of RFSS plant occurrences on exchange lands	0 acres	Federal lands: 14 State lands: 8	Federal lands: 1 State lands: 8

DIRECT AND INDIRECT EFFECTS TO VASCULAR PLANTS, LICHENS, AND BRYOPHYTES

ALTERNATIVE 1 NO ACTION

Candidate Federal Parcels

In Alternative 1, the candidate federal parcels would remain in Forest Service ownership and future uses such as forestry and mineral development could occur. The management would be directed by the Forest Plan, so any effects to RFSS plants or their habitat would be considered during environmental analyses and minimized. No real estate development would occur. Because there are no specific actions proposed under Alternative 1, there would be no effects of Alternative 1 on RFSS plants.

School Trust Lands Inside BWCAW

In Alternative 1, the school trust parcels in the BWCAW would continue to be managed as wilderness. No specific projects are proposed under Alternative 1, so there would be no effects of Alternative 1 on RFSS plants.

ALTERNATIVE 2 PROPOSED ACTION

Candidate Federal Parcels

For Alternative 2, Indicator 1 shows that there are 14 RFSS plant occurrences on candidate federal parcels (Table 2). As this indicator suggests, this alternative will have greater impacts to RFSS plants than either Alternatives 1 or 3. When the three potential future uses of the federal candidate parcels are considered, real estate development presents the greatest risk of impacts because this potential future use would not occur under Forest Service management, but may occur under MDNR management of school trust lands. For minerals management, there is not a substantial and reasonably foreseeable difference between alternatives (see section 3.6 of the EIS for more information). Forest management may emphasize shorter rotation ages under MDNR management for School Trust lands than Forest Service management of national forest lands.

Some types of RFSS plant habitat would have a higher likelihood of impacts. For example, mature upland forest and northern hardwoods forest each provide habitat for a suite of RFSS plants; forestry or real estate development on federal parcels could cause ground disturbance (e.g. home construction or timber harvest) that would impact either individual RFSS plants or their suitable habitat.

In the same way, the suite of RFSS plants that use forested wetlands as habitat would also be at risk for being impacted from the future uses of federal candidate parcels. The risk of impact to this suite of plants is lower than for species that use upland forests. RFSS plants that use upland disturbed areas (e.g. old log landings, old roadbeds, etc.) are at about the same risk as the

forested wetland RFSS plants for being impacted from the future uses of the federal candidate parcels.

For Alternative 2 the RFSS plants at the lowest risk of being impacted by the future uses of the federal candidate parcels are those species that use rock/cliff habitat and those that use non-forested wetland habitat. Arguably, real estate development is the greatest risk for these two groups of RFSS plants. Real estate development on rock outcrops or shoreline development impacts to non-forested shoreline wetlands could have adverse effects for these species or their habitat.

State management of the federal parcels after the land exchange would likely lead to some impacts to RFSS plants in the future. These potential impacts would be considered during the state's Environmental Assessment Worksheet process when considering any site specific project, and impacts would be minimized by following the best management practices outlined in Voluntary Site-level Guidelines (MFRC 2005).

School Trust Lands Inside BWCAW

For Alternative 2, Indicator 1 shows that there are 8 RFSS plant occurrences on school trust lands in the BWCAW (Table 2). In the future these lands would be managed as wilderness once they enter federal ownership, and very little ground disturbance would be anticipated for RFSS plants or their habitat. Alternative 2 would cause few impacts to RFSS plants on school trust lands in the BWCAW and would not differ from the impacts expected on school trust lands under Alternatives 1 or 3.

ALTERNATIVE 3

Candidate Federal Parcels

For Alternative 3, Indicator 1 shows that there is 1 RFSS plant known from candidate federal parcels (Table 2). As this indicator suggests, the impacts of Alternative 3 to RFSS plants would be less than Alternative 2 but more than Alternative 1. Fewer acres of candidate federal parcels are included in Alternative 3 which means that less habitat would be subject to ground disturbance than Alternative 2. Furthermore, no real estate development would occur in Alternative 3, thus further reducing the risk for ground disturbance and subsequent impacts to RFSS plants. For minerals management, there is not a substantial and reasonably foreseeable difference between alternatives (see section 3.6 of the EIS for more information).
Potential impacts from forestry could still occur and cause impacts to the different suites of RFSS plants and the habitats they use. These potential impacts would be considered during the state's Environmental Assessment Worksheet process, and impacts would be minimized by following the best management practices outlined in Voluntary Site-level Guidelines (MFRC 2005).

School Trust Lands Inside BWCAW

For Alternative 3, Indicator 1 shows that there are 8 RFSS plant occurrences on school trust lands in the BWCAW (Table 2). Little ground disturbance and hence few effects to RFSS plants or their habitat would be expected in the BWCAW. Alternative 3 would have the same magnitude of effects on RFSS plants as Alternatives 1 or 2.

CUMULATIVE EFFECTS

For Alternative 1, other ongoing or completed land exchanges or land acquisitions (Cook County Land Exchange, Northmet Land Exchange, School Trust Land Acquisition, Gunflint Land Acquisition, and Bushmen Land Acquisition) could cause minor to moderate cumulative effects. Lands exchanged out of Forest Service ownership could be managed in a variety of ways (mine development, municipal development, communications tower, etc.) that could cause a range of impacts to RFSS plants and their habitat. These impacts were or are being considered in the environmental analyses for these projects and would cause minor to moderate cumulative effects to RFSS plants.

For Alternative 1, lands acquired by the Forest Service through ongoing or completed land exchanges or acquisitions would be managed according to Forest Plan direction. Future Forest Service projects on these lands would be analyzed and effects to RFSS plants would be considered and minimized. Alternative 1 would have minimal cumulative effects to RFSS plants on lands that are acquired by the Forest Service.

The cumulative effects of Alternative 2 on RFSS plants and their habitat would be moderate, and the cumulative effects of Alternative 3 on these species would be somewhat less. On lands that leave federal ownership and enter state ownership, effects would be minimized somewhat by following best management practices outlined in the Voluntary Site-level Guidelines (MFRC 2005), and applicable federal and state law. On lands that enter federal ownership, management practices would be directed by the Forest Plan and effects to RFSS plants and their habitat would be considered during environmental analyses, and this would help limit cumulative effects.

Determination

For Alternative 1, the proposed activities would have no impact on maidenhair spleenwort, swamp beggar-ticks, triangle grapefern, common moonwort, Michigan moonwort, goblin fern, pale moonwort, ternate grapefern, least moonwort, floating marsh-marigold, fairy slipper, New England sedge, Ross' sedge, Douglas' hawthorn, ram's head lady's slipper, linear leaved sundew, neat spike-rush, Appalachian fir club moss, moor rush, American shoregrass, large-leaved sandwort, fall dropseed muhly, dwarf waterlily, Chilean sweet cicely, Canada ricegrass, western Jacob's ladder, Braun's holly fern, Oakes pondweed, small shinleaf, cloudberry, encrusted saxifrage, awlwort, Canada yew, lance-leaved violet, barren strawberry, *Arctoparmelia centrifuga, Arctoparmelia subcentrifuga, Caloplaca parvula, Certraria aurescens, Cladonia wainoi, Frullania selwyniana,* port-hole lichen, *Peltigera venosa, Pseudocyphellaria crocata, Ramalina thrausta, Sticta fuliginosa,* and *Usnea longissima.*

For Alternative 2 or 3, the proposed activities may impact individuals of maidenhair spleenwort, swamp beggar-ticks, triangle grapefern, common moonwort, Michigan moonwort, goblin fern, pale moonwort, ternate grapefern, least moonwort, floating marsh-marigold, fairy slipper, New England sedge, Ross' sedge, Douglas' hawthorn, ram's head lady's slipper, linear leaved sundew, neat spike-rush, Appalachian fir club moss, moor rush, American shoregrass, large-leaved sandwort, fall dropseed muhly, dwarf waterlily, Chilean sweet cicely, Canada ricegrass, western Jacob's ladder, Braun's holly fern, Oakes pondweed, small shinleaf, cloudberry, encrusted saxifrage, awlwort, Canada yew, lance-leaved violet, barren strawberry, *Arctoparmelia*

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