

Lightning Creek Restoration Project

Threatened, Endangered and Sensitive Plants and Forest Species of Concern Report

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Introduction

This report discusses the environmental effects of implementation of the Lightning Creek Restoration Project on threatened, endangered, and sensitive plants, and Forest species of concern (rare plants). A summary of this report is included in the environmental assessment as part of the Affected Environment and Environmental Consequences section.

Regulatory Framework

Federal legislation, regulations, policy, and direction require protection of species and population viability, evaluation and planning-process consideration of threatened, endangered, and other rare plant species. The regulatory framework for these plants includes the Endangered Species Act (1973) as amended; the National Forest Management Act (1976); the National Environmental Policy Act (1969); Forest Service Manual (2672.1-2672.43); Idaho Panhandle National Forests (IPNF) Forest Plan (1987); and direction from the Regional Watershed, Wildlife, Fisheries and Rare Plants (WWFRP) program and Washington Office.

Threatened and Endangered Plant Species

No federally listed endangered plant species are suspected to occur in the Idaho Panhandle National Forests. The U.S. Fish and Wildlife Service lists two threatened species - water howellia (*Howellia aquatilis* Gray) and Spalding's catchfly (*Silene spaldingii* Wats.) as suspected to occur in the IPNF. However, neither species is suspected to occur in Bonner County, Idaho, in which the Lightning Creek Restoration project area occurs (USDI 2008).

Sensitive Plants and Forest Species of Concern

Sensitive species are determined by the Regional Forester as those species for which population viability is a concern, as indicated by a current or predicted downward trend in population numbers or habitat capability, which would reduce the species' existing distribution. Fifty-four species are known or suspected to occur in the Kaniksu portion of the IPNF, which encompasses the Lightning Creek Restoration project area.

In addition, several "Forest species of concern" are addressed in this analysis. A Forest species of concern is generally not at risk on a rangewide, regionwide, or state level, but may be imperiled within a planning area, such as a National Forest. While biological evaluations are not required to address Forest species of concern, these species are addressed in effects analysis to provide for maintenance of populations as directed in NFMA. A list of sensitive species and Forest species of concern is included in this report.

Sensitive plant species and Forest species of concern may be assigned to one or more rare plant guilds. These guilds are artificial assemblages based on similar habitat requirements of two or more rare plant species, and are used for analysis. Rare plant guilds include aquatic, deciduous riparian, peatland, wet forest, moist forest, dry forest, cold forest and subalpine. A list of habitat guild descriptions is included with the attached sensitive species list.

Existing Condition

Methodology

Information on the current status and condition of rare plants in the project area was derived from review of existing vegetation information, Idaho Conservation Data Center (CDC) element

occurrence records, and from results of past field surveys. National Wetlands Inventory maps were also reviewed.

Documented Rare Plants and Suitable Habitat in the Project Area

Rare Plant Occurrences

Triangle moonwort (B. lanceolatum [Gmel.] Angstr.)

Two occurrences of triangle moonwort are documented in the project area. One occurrence in the flood plain of Lightning Creek may have been affected by the November 2006 flood event. The other occurrence was not affected by the flood event and is not in or near any proposed restoration activity areas.

Moonworts are seedless vascular plants that reproduce from spores and underground rhizomes. Western goblin (*Botrychium montanum* Wagner) often occurs with other rare moonworts, usually in wet or moist forest habitat and/or near streams and in soils with well-developed mycorrhizae¹. Mingan moonwort (*B. minganense* Vict.) and triangle moonwort (*B. lanceolatum* [Gmel.] Angstr.) may also occur with other rare moonworts in or adjacent to wet meadows, open disturbed areas, old roads and roadside ditches. All rare moonworts are small in stature and often inconspicuous; in addition, aboveground stalks may not appear every year.

Because rare moonworts have a broader habitat range than other rare plants, and because they can be overlooked even during thorough floristic surveys, these species have the greatest potential for experiencing impacts from project implementation.

Deerfern (Blechnum spicant [L.] Sm.)

One documented population of deerfern occurs in the project area. Most of the population occurs above the flood plain of Lightning Creek and was not affected by the November 2006 flood event. However, the portion of the population occurring within the flood plain may have been affected. This species has been shown to colonize disturbed mineral soils, as evidenced by establishment of several populations on old road prisms (ICDC 2008). Deerfern is a coastal disjunct species - it is quite common in its main range west of the Cascade Mountains in Washington and Oregon, but rare in eastern Washington and north Idaho.

Sitka clubmoss (Diphasiastrum sitchense [Rupr.] Holub)

Two documented populations of this Forest species of concern occur in the project area but were not affected by the November 2006 flood event. Sitka clubmoss occurs at elevations of 2,600 to 6,480 feet, mostly in moist, forested subalpine fir habitats. It is found less frequently on the margins of fens and wet meadows in cedar, hemlock and subalpine fir habitats.

Northern beechfern (Phegopteris connectilis [Michx.] Watt)

One population of northern beechfern is documented in the project area, but it was not affected by the November 2006 flood event. This species inhabits riparian western redcedar forests and shaded, moist cliffs in valley to middle elevations in the mountains. It appears to have a narrow ecological amplitude along the fringe of its range in northern Idaho and northwestern Montana.

¹ Mycorrhizae are symbiotic relationships between fungi and the roots of certain plant species. Although their ecology is poorly understood, it is apparent that mycorrhizal relationships enhance uptake of nutrients by the host plant (Allen 1991).

Suitable Rare Plant Habitat

In addition to documented rare plant occurrences, highly suitable wet and moist forest guild habitat occurs in the Lightning Creek drainage in old growth western hemlock/western redcedar stands. Many of these old growth stands border large streams that were affected by mass failures during the November 2006 flood event. Field observations by the project aquatic specialist indicate that an area of allocated old growth along the East Fork of Lightning Creek approximately 100 feet wide by 1000 feet long (approximately 2.3 acres) was lost to mass failures during the flood. Portions of other old growth stands adjacent to Rattle Creek, lower Porcupine Creek and Lightning Creek may have also been lost.

One stand of ancient cedars in the flood plain of Lightning Creek has historically experienced flooding and alluvial deposits. This stand may also have been affected by the November 2006 flood event.

No harvest of timber in the project area has occurred or been proposed since 1980; accordingly, most suitable habitat in the Lightning Creek drainage has not been surveyed for rare plants, so it is assumed that unsurveyed highly suitable habitat supports at least some rare plant occurrences.

Due to the extreme disturbance caused by the November 2006 flood event and the nature and location of the proposed activities, most areas proposed for treatment currently have low potential to support rare plants. Of the two areas proposed for relocation of FS Road 419, the lower proposed reroute is on private lands, in immature, mixed conifer forest. The upper proposed reroute is in a stand that has been previously harvested (clearcut in 1966) and has low rare plants potential.

Roads proposed for decommissioning generally have lower potential to support rare plants. Some stream crossings where culvert removal is proposed may still have suitable rare plant habitat. In addition, some older roads that have been revegetated to preclude vehicle traffic for many years may support undocumented occurrences of some rare moonwort species (*Botrychium* Sw. species).

Environmental Consequences

Methodology

Analysis was conducted based on current population distribution of rare plant species in the project area, the most current scientific literature, and professional judgment of the project botanist.

The issue indicator for analysis of effects to rare plants is the relative amount of new ground disturbance in and adjacent to documented rare plant occurrences and/or suitable rare plant habitat. The issue indicator was determined based in part on the dependence of rare moonworts on soil mycorrhizae, which may be destroyed during ground-disturbing activities. Although many moist and wet forest rare plants have an affinity for closed canopy conditions, none of the alternatives propose tree canopy reduction in suitable moist or wet forest guild habitat, so this issue indicator is not relevant to the effects analysis.

The cumulative effects area for rare plants is the project area. This area represents the likely limit of effects to rare plant populations from implementation of the action alternatives. Those limits are largely based on the expected distance of spore or seed dispersal and potential for colonization of rare plant populations in areas of suitable habitat. While patterns of dispersal are not known

with certainty for many plant species, in studies of *Botrychium virginianum* most spores fell within three meters of the source plant (Peck et al. 1990). Other sensitive species' seeds that are heavier than *Botrychium* spores might be assumed to have similar if not more restricted dispersal patterns.

Effects to rare plant species and suitable habitat from proposed activities are generally described as very low, low, moderate or high, with the following definitions:

- very low = no measurable effect on individuals, populations or habitat
- low = individuals, populations and/or habitat not likely affected
- moderate = individuals and/or habitat may be affected, but populations would not be affected, and habitat capability would not over the long term be reduced below a level which could support sensitive plant species
- high = populations would likely be affected and/or habitat capability may over the long term be reduced below a level which could support sensitive plant species

The following past, current, ongoing and reasonably foreseeable activities and events apply to the cumulative effects analysis for rare plants. Other activities and events listed in the environmental assessment do not apply to the rare plants cumulative effects analysis either because they would occur outside the cumulative effects analysis area or because they generally did/do not result in disturbance sufficient to impact rare plants or suitable habitat (e.g. County road maintenance, hunting and firewood gathering).

Past Activities and Events

- Timber harvest on NFS lands
- Road and trail construction on NFS lands
- Road decommissioning on NFS lands
- Development on private lands
- Flood events in 1918, 1974, 1980, 1986, 1990-1991, 1996-1997, and 2003-2004

Current and Ongoing Activities

- Helispot maintenance
- Road and trail maintenance

Reasonably Foreseeable Actions

- Noxious weeds monitoring and treatment
- Silver Button mining exploration
- Mortensen Small Tract Act
- Hope Sagle Land Exchange
- Huckleberry Snowmobile Trailhead Expansion
- Forest Road 1022A Bridge Removal

The period for measuring cumulative effects to rare plants and suitable habitat is ten years following completion of harvest and other restoration projects, or, for the No Action alternative, ten years after signing the Decision Notice and FONSI. Beyond ten years, the likelihood of events or activities affecting rare plants and suitable habitat would be difficult to predict.

Design Features, Mitigation and Monitoring

Required Mitigation

The Issues and Alternatives chapter of the environmental assessment includes the following required mitigation for rare plants:

- No restoration activities would occur in or near any currently documented rare plant occurrences.
- If an action alternative is selected and proposed ground disturbance locations change during project implementation, a qualified botanist would review final activity locations as needed and work with other project specialists to reduce or eliminate risks to any newly documented rare plant occurrences.
- If an action alternative is selected and additional areas are proposed for new ground disturbance, rare plant surveys would be conducted as needed, with additional mitigation measures designed to reduce or eliminate risks to newly documented rare plant occurrences.
- A qualified botanist would assist with identification of the proposed SNOTEL OHV access route (Alternative 4 only) to ensure protection of rare plant populations.

Estimated Effectiveness: High; the above measures would reduce the risk to suitable rare plant habitat or newly documented rare plant occurrences.

Required Monitoring

In addition to mitigation, Chapter II of the environmental assessment contains required monitoring.

IPNF Forest Plan Monitoring

IPNF direction is to inventory and manage sensitive plants so that no new species have to be listed as threatened or endangered. Suitable sensitive plant habitat in project areas is surveyed and projects modified as necessary to achieve this objective. Sensitive plants are protected according to site-specific management plans developed by Forest and zone botanists.

Project Monitoring

Monitoring of rare plant populations where the proposed activity was modified by buffering to avoid adverse effects would be conducted to validate the effectiveness of mitigation measures during and following the activity.

Effects Common to All Alternatives

Direct, Indirect and Cumulative Effects

Threatened and Endangered Species

There are no listed endangered plant species suspected to occur in the IPNF and no listed threatened plant species suspected to occur in Bonner County (USDI 2008). No direct, indirect or cumulative effects to any federally listed plant species would occur with implementation of any alternative.

Sensitive Plants and Forest Species of Concern

Under all alternatives, there would be no direct, indirect or cumulative impacts to suitable rare plant habitat either not found in the project area or not affected by the 2006 flood event or proposed activities. This includes the aquatic, peatland, deciduous riparian, dry forest, cold forest and subalpine habitat guilds, as well as the documented occurrence of Sitka clubmoss and suitable habitat for clustered lady's slipper (*Cypripedium fasciculatum*).

Alternative 1 – No Action

Direct and Indirect Effects

Under this alternative, no measures to restore access to the Lightning Creek drainage would be implemented. Current access by OHV and limited passenger vehicle access would be maintained. No direct effects to rare plants or suitable rare plant habitat would occur.

Indirectly, the road prisms affected by the 2006 flood events would be more vulnerable to future damage if left unrepaired (see Hydrology report in the project file). Future mass wasting could result in the loss of more old growth forests adjacent to streams in the project area, thus impacting suitable moist and wet forest guild habitat and the documented occurrences of deerfern, northern beechfern and triangle moonwort. However, the future occurrence of flood events and the extent of their impact to rare plant populations and suitable rare plant habitat cannot be predicted with certainty.

Cumulative Effects

When combined with the above listed past, current, ongoing and reasonably foreseeable actions, implementation of No Action could result in a low, moderate or high level of cumulative effects to rare plants and suitable moist and wet forest guild habitat.

Effects Common to Alternatives 3 and 4

Direct and Indirect Effects

While the action alternatives would restore road and trail access to the Lightning Creek drainage to differing degrees, the effect to rare plants and suitable rare plants habitat is predicted to be essentially the same under either action alternative.

Given the current distribution of rare plants in the project area and the design features described above, no direct impacts to any documented rare plant occurrences would be expected to occur from restoration activities as proposed under either action alternative. Most of the proposed activities would occur in areas with low potential to support rare plants - either because of natural habitat characteristics or severe disturbance from the 2006 flood event.

No direct or indirect impacts to the documented occurrences of deerfern, northern beechfern, Sitka clubmoss or triangle moonwort would occur, since no activities are proposed in or near those occurrences. The proposed restoration activities may impact undetected individuals or marginally suitable habitat for rare moonworts, but this is unlikely, given the high level of soil disturbance in proposed activity areas that serves as the baseline for this analysis. Proposed road decommissioning may also impact undetected individual rare moonworts.

Cumulative Effects

Past timber harvest, road construction, road decommissioning, development on private lands and periodic flood events in the Lightning Creek drainage have very likely impacted rare plant populations and suitable rare plant habitat. The extent of those impacts is unknown, however, because most of those disturbances occurred before the IPNF began to survey for and manage rare plant populations.

Current and ongoing road, trail and helispot maintenance have been reviewed for their effects to rare plants and would not be expected to contribute cumulative effects to rare plants or suitable rare plant habitat when combined with either action alternative.

The reasonably foreseeable noxious weeds monitoring and treatment, Silver Button mining exploration, Mortensen Small Tract Act, Hope Sagle Land Exchange, Huckleberry Snowmobile Trailhead Expansion and Forest Road 1022A Bridge Removal either have been or will be evaluated for their impacts to rare plants and/or suitable rare plants habitat. None of these projects would impact documented rare plant occurrences.

Given the above analysis, and in consideration of design features described in Chapter II and the above past, current, ongoing and reasonably foreseeable events and actions, cumulative effects from implementation of either action alternative would be very low (no measurable effects) to low (effects not likely) for most rare plants. Cumulative effects to undetected rare moonworts and marginally suitable moist and wet forest habitat would be moderate (individuals and/or habitat may be affected, with no loss of population or species viability or trend to federal listing expected).

Consistency with the Forest Plan and Other Regulatory Direction

A Forest Plan management goal is to “manage habitat to maintain populations of identified sensitive species of animals and plants” (Forest Plan, II-1). A Forest Plan standard for sensitive species is to “manage the habitat of species listed in the Regional Sensitive Species List to prevent further declines in populations which could lead to federal listing under the Endangered Species Act” (Forest Plan, II-28). This standard meets the requirements of the National Forest Management Act (NFMA) of 1976, Section 6(g)(3)(B), by providing for diversity of plant communities based on the suitability and capability of the specific land area.

The Forest Plan also identifies the need to “determine the status and distribution of threatened, endangered and rare (sensitive) plants on the IPNF” (Forest Plan, II-18). All alternatives would meet Forest Plan direction and provide for the viability of populations.

Across the Forest, suitable habitat for sensitive plant species appears to be well distributed. Approximately 705,000 acres have been identified as having the potential to support sensitive plant species in a wide array of plant communities. To date, approximately 122,000 acres (about 17 percent) of suitable habitat had been surveyed for sensitive plants.

In 1998, sensitive species trends across the Forest were qualitatively assessed (USDA 1998b, pp. 112-116). Of the sensitive plant species assessed, 11 species were considered to have fairly secure populations with stable trends and few observed threats; 28 species had mostly stable populations with some concerns and threats; and for 16 species there was a serious concern. Estimates for this assessment were based on the best information available, including known population size, distribution and threats. The trend for deerfern (*Blechnum spicant*) and northern

beechnut (*Phegopteris connectilis*) was identified as "some concern" for potential decline of some population segments, populations or habitat through time.

The trends for sensitive moonworts ranged from stable (*Botrychium lanceolatum* ssp. *lanceolatum* [S.G. Gmelin] Angstrom) to serious concerns for population and habitat decline over time (*B. montanum* W.H. Wagner). A conservation assessment for sensitive moonworts in the IPNF has been prepared (Evans and Associates 2005). A conservation strategy for sensitive moonworts in the IPNF is being prepared.

Since implementation of the Forest Plan in 1987, impacts to highly suitable habitat for many sensitive plant species have diminished with the implementation of laws and policies protecting riparian areas, wetland and peatland habitats and policies designed to maintain old growth forests.

At the project level, and in accordance with Forest Service Manual (FSM) 2672.1-2672.43 and NFMA Section 6(g)(3)(E)(ii), suitable habitat has been identified and surveyed and the appropriate level of analysis conducted.

There are no federally listed threatened or endangered species suspected to occur in Bonner County, Idaho (USDI 2008). Therefore, the project is consistent with the Endangered Species Act (1973) as amended.

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KANJIUS THREATENED, SENSITIVE AND FOREST SPECIES OF CONCERN, BY
HABITAT GUILD

Status and Species	Common Name	Rare Plant Guild
Threatened*		
<i>Howellia aquatilis</i> (Kootenai County)	water howellia	Aquatic
<i>Silene spaldingii</i> (Kootenai County)	Spalding's catchfly	Dry grassland
Sensitive**		
<i>Andromeda polifolia</i>	bog rosemary	Peatland
<i>Asplenium trichomanes</i> ssp. <i>trichomanes</i>	maidenhair spleenwort	Rock seeps in Moist / Wet Forest
<i>Symphytotrichum boreale</i>	rush aster	Peatland
<i>Astragalus microcystis</i>	least bladderly milkvetch	Dry Forest
<i>Betula pumila</i> v. <i>glandulifera</i>	dwarf birch	Peatland / Deciduous Riparian
<i>Blechnum spicant</i>	deerfern	Wet Forest / Moist Forest
<i>Botrychium ascendens</i>	upswept moonwort	Wet Forest
<i>Botrychium crenulatum</i>	dainty moonwort	Wet Forest
<i>Botrychium lanceolatum</i>	triangle moonwort	Wet Forest / Moist Forest
<i>Botrychium lineare</i>	linear-leaved moonwort	Moist Forest/ Wet Forest
<i>Botrychium minganense</i>	Mingan moonwort	Wet Forest / Moist Forest
<i>Botrychium montanum</i>	western goblin	Wet Forest
<i>Botrychium paradoxum</i>	peculiar moonwort	Wet Forest / Moist Forest
<i>Botrychium pedunculatum</i>	stalked moonwort	Wet Forest
<i>Botrychium pinnatum</i>	northwestern moonwort	Wet Forest / Moist Forest
<i>Botrychium simplex</i>	least moonwort	Wet Forest / Moist Forest
<i>Buxbaumia aphylla</i>	leafless bug-on-a-stick	Subalpine
<i>Buxbaumia viridis</i>	green bug-on-a-stick	Wet Forest
<i>Carex buxbaumii</i>	Buxbaum's sedge	Peatland
<i>Carex chordorrhiza</i>	string-root sedge	Peatland
<i>Carex comosa</i>	bristly sedge	Peatland
<i>Carex flava</i>	yellow sedge	Peatland
<i>Carex leptalea</i>	bristle-stalked sedge	Peatland
<i>Carex livida</i>	pale sedge	Peatland
<i>Carex magellanica</i> ssp. <i>irrigua</i>	poor sedge	Peatland
<i>Cicuta bulbifera</i>	bulb-bearing water hemlock	Aquatic / Peatland
<i>Cypripedium fasciculatum</i>	clustered lady's slipper	Moist Forest / Dry Forest
<i>Drosera intermedia</i>	spoon-leaved sundew	Peatland
<i>Dryopteris cristata</i>	crested shield fern	Peatland
<i>Epilobium palustre</i>	swamp willow-weed	Peatland
<i>Epipactis gigantea</i>	giant helleborine	Peatland / Seeps
<i>Eriophorum viridicarinatum</i>	green-keeled cotton grass	Peatland
<i>Gaultheria hispidula</i>	creeping snowberry	Wet Forest / Peatland
<i>Grimmia brittoniae</i>	Britton's dry rock moss	Calcareous rock substrate
<i>Hookeria lucens</i>	clear moss	Wet Forest
<i>Hypericum majus</i>	large Canadian St. John's wort	Peatland
<i>Iris versicolor</i>	blue flag iris	Peatland
<i>Lycopodiella inundata</i>	northern bog clubmoss	Peatland
<i>Lycopodium dendroideum</i>	ground pine	Wet/Moist/Cold Forest / Deciduous Riparian

Status and Species	Common Name	Rare Plant Guild
<i>Meesia longiseta</i>	meesia	Peatland
<i>Phegopteris connectilis</i>	northern beechfern	Wet Forest
<i>Polystichum braunii</i>	Braun's holly fern	Wet Forest
<i>Rhizomnium nudum</i>	naked mniium	Wet Forest
<i>Rhynchospora alba</i>	white beakrush	Peatland
<i>Salix candida</i>	hoary willow	Peatland / Deciduous Riparian
<i>Salix pedicellaris</i>	bog willow	Peatland
<i>Scheuchzeria palustris</i>	pod grass	Peatland
<i>Scirpus hudsonianus</i>	Hudson's bay bulrush	Peatland
<i>Schoenoplectus subterminalis</i>	water clubrush	Aquatic
<i>Sphagnum mendocinum</i>	Mendocine peatmoss	Peatland
<i>Streptopus streptopoides</i>	krushea	Wet Forest / Cold Forest
<i>Triantha occidentalis</i>	short-styled sticky Tofieldia	Peatland
<i>Trientalis europaea</i>	northern starflower	Peatland
<i>Vaccinium oxycoccos</i>	bog cranberry	Peatland
Forest Species of Concern***		
<i>Arnica alpina</i> var. <i>tomentosa</i>	alpine arnica	Subalpine
<i>Botrychium lunaria</i>	moonwort	Wet Forest
<i>Botrychium "michiganense"</i>	Michigan moonwort	Mesic to dry meadows
<i>Cetraria sepincola</i>	bog birch lichen	Peatland
<i>Cladonia bellidiflora</i>	toy soldiers	We t forest
<i>Collema curtisporum</i>	short-spored jelly lichen	Deciduous Riparian
<i>Cypripedium pubescens</i> v. <i>pubescens</i>	yellow lady's slipper	Peatland / Deciduous Riparian
<i>Diphasiastrum sitchense</i>	Sitka clubmoss	Subalpine / Cold Forest
<i>Ivesia tweedyi</i>	Tweedy's ivesia	Subalpine
<i>Lobaria scrobiculata</i>	textured lungwort	Rock cliffs in Dry Forest
<i>Maianthemum dilatatum</i>	beadruby	Peatland
<i>Muhlenbergia glomerata</i>	marsh muhly	Peatland
<i>Orobanche pinorum</i>	pine broomrape	Dry Forest
<i>Oxalis trilliifolia</i>	trillium-leaved wood-sorrel	Wet Forest
<i>Pentagramma triangularis</i>	goldback fern	Wet Forest
<i>Petasites sagittatus</i>	arrowleaf coltsfoot	Peatland
<i>Pilophorus clavatus</i>	tapered matchstick	Wet Forest
<i>Pinus albicaulis</i>	Whitebark pine	Subalpine
<i>Romanzoffia sitchensis</i>	Sitka mistmaiden	Subalpine
<i>Rubus spectabilis</i>	salmonberry	Wet Forest
<i>Tripterocladium leucocladulum</i>	tripterocladium moss	Granite / basalt rock substrate
<i>Ulota megalospora</i>	large spore ulota moss	Wet Forest
<i>Viola selkirkii</i>	Selkirk's violet	Wet Forest

* based on US Fish and Wildlife Service Species List for IPNF, 1-9-08-SP-0067, dated April 9, 2008

** based on Northern Regional Forester's Sensitive Species List, October 2004

*** As directed by the Species of Concern Protocol (Region One Planning Peer Group, Task Group 19, March 1997), species of concern are considered to be secure at the global, Regional and state levels, but may be at risk at the Forest planning level.

HABITAT GUILD DESCRIPTIONS

Subalpine Guild

Includes certain plant communities found at high elevation sites, generally above about 5,000 feet, mostly on ridges, subalpine parklands (subalpine grass and sedge communities), exposed rock outcrops and the following harsh, high elevation communities:

- *Abies lasiocarpa* (subalpine fir) *krummholtz*
- *Abies lasiocarpa* / *Rhododendron albiflorum* (subalpine fir/white rhododendron)
- *Salix commutata* (undergreen willow)
- *Abies lasiocarpa* / *Vaccinium scoparium* (subalpine fir/grouse whortleberry)
- *Abies lasiocarpa* / *Luzula hitchcockii* (subalpine fir/smooth woodrush)
- *Larix lyallii* (subalpine larch) / *Pinus albicaulis* (whitebark pine)

It also includes the harshest (cold and dry) phases of *Abies lasiocarpa* / *Menziesia ferruginea* (subalpine fir / menziesia) and *Abies lasiocarpa* / *Xerophyllum tenax* (subalpine fir / beargrass) plant communities. Rare species found in this guild include *Buxbaumia aphylla* (leafless bug-on-a-stick moss), and *Cetraria subalpina* (Iceland-moss lichen).

Cold Forest Guild

Includes the more productive and mesic phases of *Abies lasiocarpa* / *Menziesia ferruginea* (subalpine fir/menziesia) and *Abies lasiocarpa*/*Xerophyllum tenax* (subalpine fir/beargrass) community types, mostly above 4,800 feet; however, they can occur below 4,800 feet in cold, north-facing drainages. Sensitive species found in this guild are *Cetraria subalpina* (Iceland-moss lichen) and sometimes *Lycopodium dendroideum* (groundpine); the Forest species of concern *Diphasiastrum sitchense* (Sitka clubmoss) also occurs on this guild. This includes cold riparian areas that can extend well below 4,000 feet and are dominated by cold and wet *Abies lasiocarpa* / *Calamagrostis canadensis* (subalpine fir / bluejoint reedgrass) and *Abies lasiocarpa* / *Streptopus amplexifolius* (subalpine fir/twisted stalk) communities. These cold riparian communities can also contain a mosaic of peatland communities and species, and a few rare species generally found in warmer western hemlock communities, such as *Streptopus streptopoides* (krushea).

Wet Forest Guild

This guild is found in wet, generally riparian, often mid- to late-successional western redcedar and wet western hemlock plant communities, including most identified 'ancient cedar groves' found scattered throughout the northern subbasins, generally at less than 4,000 feet. Certain plant communities within these systems, including *Thuja plicata* / *Oplopanax horridum* (cedar/devil's club), *Thuja plicata* / *Athyrium filix-femina* (cedar/ladyfern), *Thuja plicata* / *Adiantum aleuticum* (cedar/maidenhair fern), *Tsuga heterophylla* / *Gymnocarpium dryopteris* (western hemlock/oakfern) and *Thuja plicata* / *Gymnocarpium dryopteris* (cedar/oakfern), have a high potential to support rare plants. Many species within this guild are rare coastal disjuncts such as *Blechnum spicant* (deerfern), *Hookeria lucens* (clear moss), and *Polystichum braunii* (Braun's holly fern). Clear moss is associated with seeps and "boggy" areas in wet cedar forests. The sensitive species *Buxbaumia viridis* (green bug-on-a-stick moss) is found in this guild on decomposing cedar logs.

Other rare species are boreal disjuncts or boreal peripherals such as *Streptopus streptopoides* (krushea), *Phegopteris connectilis* (northern beech fern) and *Lycopodium dendroideum*

(groundpine). Certain scattered rare species like the *Botrychium* species (moonworts), especially *Botrychium montanum* (western goblin), *B. minganense* (Mingan moonwort), *B. pedunculatum* (stalked moonwort), *B. paradoxum* and *B. ascendens* (upswept moonwort) occur in these communities on riparian benches or other shallow-sloped microsites. *Asplenium trichomanes* (maidenhair spleenwort) can be found in wet, rock seeps in wet forest guild habitats. Wet forest communities can also contain, or intergrade into, peatland communities such that Peatland Guild species and Wet Forest Guild species can overlap across the landscape. Some of the Wet Forest Guild species can also be found in Moist Forest Guild habitats.

Moist Forest Guild

This guild is found in moist *Thuja plicata* (western redcedar) and *Tsuga heterophylla* (western hemlock) plant communities, generally in mid- to late-successional stages below 4,800 feet. A few species can also be found in moist *Abies grandis* / *Asarum caudatum* (grand fir / ginger) and *Abies grandis* / *Clintonia uniflora* (grand fir / queencup beadlily) communities. Certain members of the Wet Forest Guild can also be found in these more mesic upland plant communities. This guild contains the following plant communities: *Tsuga heterophylla* / *Asarum caudatum* (hemlock/wild ginger), *T. heterophylla* / *A. caudatum* - *Aralia nudicaulis* (hemlock/ginger - wild sarsaparilla), *T. heterophylla* / *Clintonia uniflora* (hemlock / beadlily), *T. heterophylla* / *C. uniflora* - *Aralia nudicaulis* (hemlock / beadlily - wild sarsaparilla), *T. heterophylla* / *C. uniflora* - *Menziesia ferruginea* (hemlock / beadlily - fool's huckleberry), *Thuja plicata* / *Asarum caudatum* (cedar/ginger) and *Thuja plicata* / *Clintonia uniflora* (cedar/beadlily). Some rare species occur in small, moist microsites within these mesic communities, like *Asplenium trichomanes* (maidenhair spleenwort), which is found on seepy rock outcrops. Rare and uncommon plant species such as the coastal disjunct *Blechnum spicant* (deerfern) are found in moist forest habitats. Rare *Botrychium* species (moonworts), especially *Botrychium minganense* (Mingan moonwort), *B. lanceolatum* (triangle moonwort) and *B. pinnatum* (northwestern moonwort), can be found in shallow-sloped microsites. The boreal species *Lycopodium dendroideum* (ground pine) can also occur in these more mesic communities.

Dry Forest Guild

This guild encompasses dry, open sites in *Pinus ponderosa* (ponderosa pine), *Pseudotsuga menziesii* / *Physocarpus malvaceus* (Douglas-fir / ninebark), *P. menziesii* / *Calamagrostis rubescens* - *Arctostaphylos uva-ursi* (Douglas-fir / pinegrass - kinnikinnick) and *P. menziesii* / *Festuca idahoensis* (Douglas-fir / Idaho fescue) or / *Agropyron spicatum* (bluebunch wheatgrass) communities, generally below 4,500 feet. *Astragalus microcystis* (least bladderly milkvetch), the only sensitive species of this guild to occur in the Kaniksu zone, is found on rock cliffs above Lake Pend Oreille and on gravelly banks above the Pend Oreille River.

Deciduous Riparian

Broad-leaved deciduous forests occur on islands and margins of lowland major rivers in the Kaniksu zone such as the Kootenai, lower Clark Fork, Pend Oreille and lower Priest rivers, and along the shores of Pend Oreille Lake and Priest Lake. These forests are most commonly dominated by *Populus trichocarpa* (black cottonwood), with lesser amounts of introduced *P. deltoides* (plains cottonwood) and escaped hybrid poplars (*Populus trichocarpa* X), which were planted for streambank stability. Cottonwood communities often are adjacent to shrub-carr communities and can form an indistinguishable mosaic. Deciduous riparian communities provide potential habitat for *Betula pumila* v. *glandulifera* (dwarf birch), *Collema curtisporum* (short-spored jelly lichen), *Cypripedium pubescens* v. *pubescens* (yellow lady's slipper) and *Salix candida* (hoary willow).

Stands of *Populus tremuloides* (quaking aspen) are also present and are associated with higher gradient streams or moist seeps. *P. tremuloides* (quaking aspen), *Betula papyrifera* (paper birch) and *Betula occidentalis* (water birch) also occur as secondary components in lowland conifer-dominated forests throughout northern Idaho. *Alnus rubra* (red alder) is an uncommon but sometimes locally abundant coastal disjunct. It can be a codominant in moist forests in lower elevation riparian zones and meadow margins along Lake Pend Oreille and the lower Priest River in the Kaniksu zone, as well as in Coeur d'Alene Lake, the lower Coeur d'Alene River and the lower St. Joe River. It is also found in patches in drainages in the Little North Fork of the Clearwater River.

Aquatic Guild

This guild occurs generally in littoral (< 2 meters) zones of vernal pools, small ponds and lakes throughout northern Idaho, generally at lower elevations. *Potamogeton natans* (floating-leaved pondweed), *Myriophyllum* species (water-milfoil), *Utricularia* species (bladderworts), and other *Potamogeton* species occur alone or in combination in shallow littoral zones. *Nuphar polysepalum* (yellow pond lily) and *Brasenia schreberi* (water-shield) are frequently present as monocultures in deeper littoral zones. *Potamogeton amplifolius* (large-leaved pondweed), *Potamogeton praelongus* (white-stalked pondweed), and *Potamogeton richardsonii* (Richardson's pondweed) are common in deep limnetic zones (> 2 meters) of many northern Idaho lakes.

The rare species *Cicuta bulbifera* (bulb-bearing water hemlock) and *Scirpus subterminalis* (water clubrush) are members of this aquatic guild. A single population of the rare *Nymphaea leibergii* (pygmy waterlily) was historically known from Granite Lake and is believed to be extinct in Idaho. The listed threatened species *Howellia aquatilis* (water howellia) was historically known to occur in the Pend Oreille subbasin and has likely also been extirpated. Only one other population is known in Idaho near Harvard, along the Palouse River; however, populations occur to the west in Spokane County, Washington. No other populations have been found to date in northern Idaho, even though high quality habitat exists.

Peatland Guild

Peatlands by definition are habitats whose soil substrate is composed of organic material, where deposition of organic material exceeds decomposition. In north Idaho, peatland habitats are found mostly in the northern three subbasins (Priest, Kootenai and Pend Oreille). This guild can be divided into five distinct sub-guilds, each containing different plant communities and species, substrates, pH and abiotic processes:

- poor fen
- intermediate/rich fen
- ombrotrophic bog
- paludified forest
- shrub carr

Poor fens occur in glacial scours, kettle holes, isolated oxbows, old lake beds, and at or near the heads of drainages where inflow is limited. Thick layers of *Sphagnum* peat have accumulated since the end of continental glaciation, about 6,000 - 7,000 years ago. Poor fens are minerotrophic, receiving nutrients from water percolating through mineral soil or bedrock, and are quite acidic (pH values 4-6). These communities are characterized by a solid mat of *Sphagnum* moss with scattered stems of vascular plants, including rare plants such as *Carex*

comosa (bristly sedge) and *Carex chordorrhiza* (string-root sedge). Poor fens support the oldest plant communities in northern Idaho and have changed little since the end of glaciation 6,000-7,000 years ago (Bursik and Moseley 1995; Moseley 1998). These communities are often erroneously referred to as 'bogs', especially when they occur on floating mats in seepage lakes.

Ombrotrophic bog ('true bog') communities occur in glacial scours, kettle holes, isolated oxbows, old lake beds, and at or near the heads of drainages where inflow is limited. Unlike poor fens, the thick mats of peat accumulate upwards forming hummocks, often at the base of shrubs or downed logs, and are above the influence of the water table. Incoming water and nutrients (from precipitation) are held above the water table, primarily by the low hydraulic conductivity of the Sphagnum peat. Vascular species are few or absent and are restricted to those tolerant of acidic conditions (poor fen species). Rare plants like *Andromeda polifolia* (bog rosemary), *Carex chordorrhiza* (string-root sedge), *Gaultheria hispida* (creeping snowberry), *Rhynchospora alba* (white beak rush) and *Vaccinium oxycoccos* (bog cranberry) are adapted to these harsh environments. The pH values are very acidic, ranging from pH 3- pH 4. Compared to rich fens (pH 6 - 7.5) the pH difference is equal to the difference between vinegar and salt water (Crum 1992).

Intermediate and rich fens are *Sphagnum*-poor peatlands with vascular plants contributing the majority of cover and composition. Most people usually refer to these communities as marshes, wet meadows or swamps. Fen soils are organic, usually with little to no decomposition of organic material, while true marshes have mineral soils and usually high rates of decomposition. Intermediate fens have equal dominance by bryophytes (*Sphagnum* species and true mosses) and vascular plant species, especially sedges, while rich fens have few (if any) *Sphagnum* species present. Organic soils of rich fens are formed by accumulation of sedge, grass and brown moss peat (*Aulacomnium* and *Calliergon* species). *Carex utriculata* (beaked sedge), *Carex lasiocarpa* (slender sedge), *Carex aquatilis* (water sedge), *Scirpus microcarpus* (small-fruited bulrush), *Typha latifolia* (cattails), *Calamagrostis canadensis* (bluejoint reedgrass), *Spiraea douglasii* (hardhack), *Betula glandulosa* (bog birch) and willow (*Salix* species)-dominated community types may occur as rich fens.

Rich fens in subalpine habitat are characterized by *Carex scopulorum* (Holm's mountain sedge), *Carex aquatilis* (water sedge), *Calamagrostis canadensis* (bluejoint reedgrass), *Deschampsia cespitosa* (tufted hairgrass), *Kalmia microphylla* (bog laurel) and *Betula glandulosa* (bog birch). Several rare species are found in rich fens, including *Carex leptalea* (bristle-stalked sedge), *Carex magellanica* ssp. *irrigua* (poor sedge) and *Trientalis europaea* (northern starflower). Rich fens are the most floristically diverse of the peatland types. Like poor fens, intermediate and rich fen communities can occur on floating or fixed organic mats. Floating mats contain some of the most ecologically stable communities occurring in north Idaho peatlands because they adjust to fluctuating water levels annually, maintaining constant contact with water and never becoming inundated like fixed (shore) mats. The pH values for intermediate and rich fens can vary from pH 6 - 7.5.

Paludified forests typically occur on the margins of closed peatland basins and often form a mosaic with poor fen, rich fen, or shrub-carr communities. These communities occur with the expansion of peatlands and result from a rise in the water table from peat accumulation. Paludification is thought to precede the formation of poor fen and true bog (ombrotrophic) habitats (Crum 1992). Paludified forests are characterized by an overstory of conifers, usually *Pinus contorta* (lodgepole pine) and *P. monticola* (white pine), with lesser amounts of *Abies lasiocarpa* (subalpine fir), *A. grandis* (grand fir), *Picea engelmannii* (Engelmann spruce), *Thuja*

plicata (western redcedar) or *Tsuga heterophylla* (western hemlock), with a soil that is *Sphagnum* peat. The understory is dominated by *Sphagnum* moss species and some vascular plants, including some rare species found in poor fens and ombrotrophic bogs. One species, *Maianthemum dilatatum* (beadruby) has been found in a single location in northern Idaho in a paludified forest.

Shrub-carr habitats include moist shrubland riparian communities. Habitats dominated by willows and other shrubs occur in nearly impenetrable patches along low gradient channels, as stringers or on narrow flood plains along high gradient streams, as mosaic patches within riparian forests, and on margins of meadows and fen communities. Most commonly, one or more shrubs dominate vast areas of moist to wet, seasonally flooded fens or riparian zones. Shrub-carrs often contain willow-dominated shrub lands associated with low gradient meandering channels or fens, and are characterized by *Salix drummondiana* (Drummond's willow) with lesser amounts of or codominance by *Salix geyeriana* (Geyer's willow) and *S. sitchensis* (Sitka willow); they may also contain *S. bebbiana* var. *bebbiana* (Bebb's willow), *Spiraea douglasii* (hardhack), *Alnus incana* (thinleaf alder), or *Betula glandulosa* (bog birch) community types.

The rare willows *Salix candida* (hoary willow) and *Salix pedicellaris* (bog willow) can be found in shrub-carrs and in shrub/fen mosaics. *Betula pumila* (dwarf birch), a rare species in northern Idaho, can be found in shrub-carrs in the Moyie and Kootenai river systems. One rare lichen, *Cetraria sepincola* (bog-birch lichen), is found exclusively on the branches of bog and dwarf birches. Rare hybrids between *Betula pumila* (dwarf birch) and *Betula glandulosa* (bog birch) - known as *Betula X sargentii* - occur in the Priest River drainage (Johnson 1995).

Willows are frequently absent or a minor component of shrub lands associated with higher gradient streams. *Alnus incana* (thinleaf alder), *Alnus sinuata* (Sitka alder), *Cornus sericea* (red-osier dogwood) and *Rhamnus alnifolia* (alder buckthorn) occur as community dominants along higher gradient streams. Patches of *Cornus sericea* (red-osier dogwood), *Salix bebbiana* var. *bebbiana* (Bebb's willow), *Crataegus douglasii* (Douglas hawthorn) and *Crataegus suksdorfii* (Suksdorf's hawthorn) are common in association with cottonwood forests on larger stream systems. *Crataegus columbiana* (Columbia hawthorn) is only found in warm, lower elevation drainages like the St. Joe, Coeur d'Alene, Kootenai and lower Pend Oreille. Channel bars are frequently vegetated with *Salix exigua* (coyote willow).

Rare plant species found in shrub-carr communities include *Cypripedium pubescens* v. *pubescens* (yellow lady's slipper), *Carex leptalea* (bristle-stalked sedge), *Carex magellanica* ssp. *irrigua* (poor sedge), *Dryopteris cristata* (crested shield-fern), *Lycopodium dendroideum* (groundpine), *Petasites sagittatus* (arrowleaf coltsfoot) and *Gaultheria hispidula* (creeping snowberry). Rare *Botrychium* species (moonworts) can also be found on the margins of these communities.