

# **Tumbledown Project**

## **Threatened, Endangered and Sensitive Plants and Forest Species of Concern (Rare Plants) Report**

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11 March 2008



## Introduction

This report discusses the environmental effects of implementation of the Tumbledown project on threatened, endangered, and sensitive plants and Forest species of concern (rare plants).

### *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*

There are no federally listed endangered plant species suspected to occur in the Idaho Panhandle National Forests. According to the US Fish and Wildlife Service (USDI 2008), no currently listed threatened plant species are suspected to occur in Bonner County, Idaho, in which the Tumbledown project is located.

### *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 that 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 Tumbledown 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 analyses 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 prefield review of Idaho Conservation Data Center element occurrence records (ICDC 2008), existing vegetation information and from results of field surveys. Queries of the Timber Stand Management Record System (TSMRS) were used to provide a "coarse filter" assessment of suitable rare plant habitat in the project area. Aerial photographs and National Wetlands Inventory maps were also reviewed.

The coarse filter assessment helps to guide rare plant surveys by identifying the areas with the highest potential to support rare plants in the different habitat guilds. Because the query is based on habitat type at the stand level, it tends to overestimate the actual amount of suitable habitat that occurs in an area. Conversely, microsites of suitable habitat are not identified by using the query alone. Review of stand examination plot information, aerial photographs, topographical maps and National Wetlands Inventory maps also help to guide rare plant surveys. Field botanists then use this information to perform “controlled intuitive” surveys of the project area, in which they walk through proposed treatment areas to confirm the habitat assessments of the coarse filter query and identify and thoroughly survey areas of confirmed suitable habitat.

## *Prefield Review*

### Threatened and Endangered Plant Species

As noted above, no listed endangered or threatened plant species are suspected to occur in the IPNF (USDI 2008).

### Sensitive Species and Forest Species of Concern

Table 1 below displays the current extent of suitable rare plant habitat in the project area and in areas proposed for treatment, as indicated by the coarse filter query of existing vegetation information.

**Table 1. Acres of suitable habitat for TES plants and Forest Species of Concern in the project area and within treatment areas under the proposed action.**

| Habitat Guild                    | Project Area | Proposed Action |
|----------------------------------|--------------|-----------------|
| Aquatic                          | 0            | 0               |
| Peatland                         | 0            | 0               |
| Deciduous Riparian               | 0            | 0               |
| Wet Forest                       | 0            | 0               |
| Moist Forest                     | 454          | 25              |
| Dry Forest                       | 0            | 0               |
| <i>Cypripedium fasciculatum*</i> | 1,527        | 224             |
| Subalpine                        | 0            | 0               |
| Cold Forest                      | 0            | 0               |
| No Guild                         | 2,051        | 420             |
| Limited Data**                   | 1,579        | 3               |

\* A separate query is conducted for *Cypripedium fasciculatum* because this species has slightly different habitat affinities from the moist forest and dry forest habitat guilds to which it is assigned. *Orobanche pinorum* occupies habitats similar to *Cypripedium fasciculatum*.

\*\*Stands for which existing vegetation information is not sufficient to assign a habitat guild. All such stands proposed for treatment were field surveyed.

Although the coarse filter query did not identify any wet forest habitat in proposed treatment areas, such habitat may occur in microsites that would be buffered from project activities. Suitable habitat for sensitive moist forest moonworts (*Botrychium* Sw. species) may occur in some proposed treatment areas.

Clustered lady’s slipper (*Cypripedium fasciculatum* Kell.) occurs in a Douglas-fir/ninebark dry forest community approximately five miles south of the project area. Habitat that could support the species may occur in proposed activity areas.

## *Field Survey Results*

Field surveys for rare plants were completed in 2005. The surveys targeted all areas proposed for treatment. Populations of clustered lady's slipper (*Cypripedium fasciculatum*), yellow lady's slipper (*C. parviflorum* Salisbury var. *pubescens* [Wildenow] O.W. Knight) and pine broomrape (*Orobanche pinorum* Geyer) were found in areas originally proposed for treatment; these areas have been dropped from the project and would be protected by site-specific buffers that have been established by the project botanists. Some proposed activity areas contain suitable habitat for clustered lady's slipper and pine broomrape. Potential for occurrence of rare moonworts was found to be low throughout most of the project area. The surveys confirmed that there is no suitable aquatic, peatland, dry forest, subalpine or cold forest habitat in or near proposed treatment areas. Complete results of the field surveys are in the project file.

Treatment areas were found to have very low potential to support any rare species other than clustered lady's slipper or pine broomrape.

## *Rare Plants and Suitable Habitat in the Project Area*

### *Pine Broomrape (Orobanche pinorum Geyer)*

Pine broomrape is a non-chlorophyllous member of the family Orobanchaceae. While once believed to be parasitic on the roots of various conifers (Hitchcock et al. 1959), recent research (Ellis et al. 1999) and anecdotal field observations suggest instead that the exclusive host plant is oceanspray (*Holodiscus* spp., in particular *Holodiscus discolor* [Pursh] Maxim.). Pine broomrape is endemic to western North America, where it occurs in scattered locations from northern California through Oregon, and in central and northeastern Washington and extreme north Idaho. It is found in mesic to dry grand fir and Douglas-fir habitats. Little is known about the species' ecology or the mechanism of parasitism between it and its host. Although the occurrences of this Forest species of concern in the project area would be buffered from all project activities, suitable habitat does occur in most proposed treatment units.

### *Clustered Lady's Slipper (Cypripedium fasciculatum Kell.)*

This rare orchid occurs in two disparate habitats – moist cedar/hemlock forest and dry Douglas-fir/grand fir forest. In the Tumbledown project area, the highest potential habitat for the species is in Douglas-fir/grand fir forest. Although the occurrences of this sensitive species in the project area would be buffered from all project activities, unoccupied suitable habitat does occur in several proposed treatment units.

### *Yellow Lady's Slipper (Cypripedium parviflorum Salisbury var. pubescens [Wildenow] O.W. Knight)*

This perennial orchid occurs in moist woods, riparian habitats, in fens and on the margins of peatlands. It is considered rare in the Pacific Northwest. Like other members of the family Orchidaceae, yellow lady's slipper requires the presence of soil mycorrhizae for seed germination (Dressler 1981). Potential threats include direct disturbance of plants through trampling or herbivory, and soil disturbance or fire of sufficient intensity to destroy soil mycorrhizae. The documented occurrence of this species in its riparian habitat would be protected from all project activities.

## Environmental Consequences

### *Methodology*

Analysis was conducted using results of rare plant surveys, current distribution and condition of rare plant species in habitats similar to those found in the proposed treatment areas, current knowledge of the ecology of rare species known or suspected within the project area, and professional judgment.

The issue indicator for analysis of effects to rare plants is the relative amount of canopy opening and/or 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 affinity of clustered lady's slipper for relatively closed-canopy (tree or shrub layer) conditions (ICDC 2006) and the dependence of clustered and yellow lady's slipper on soil mycorrhizae, which may be destroyed during ground-disturbing activities.

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.

Cumulative 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 period for measuring short-term cumulative effects to rare plants and suitable rare habitat is ten years following completion of harvest and other restoration projects, or, in the event of implementation of no action, ten years after the date of the signing of the Decision Memo. Beyond ten years, the likelihood of events or activities affecting rare plants and suitable habitat would be difficult to predict.

### *Mitigation and Monitoring*

#### Required Mitigation

The proposal includes the following required design features for rare plants:

1. Any changes to the proposed action that may occur during layout would be reviewed, and rare plant surveys would be conducted as necessary prior to project implementation.

Newly documented occurrences would be evaluated, with specific protection measures implemented to protect population viability. Such measures could include the following:

- Dropping units from harvest activity
- Modifying unit boundaries to provide adequate buffers around documented occurrences, as determined by the project botanist and based on topography, extent of contiguous suitable habitat for documented occurrences and the type of treatment proposed
- Modifying harvest methods, fuels treatment or logging systems to protect TES plants and their habitats
- Implementing, if necessary, Timber Sale Contract provisions B6.24, Protection Measures Needed for Plants, Animals, Cultural Resources, and Cave Resources; C6.24#- Site Specific Special Protection Measures; and B8.33, Contract Suspension and Modification.

### Required Monitoring

In addition to the above design features, the proposal 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 Alternatives 1 and 2*

#### Direct and Indirect Effects

There would be no effect to any federally listed plant species, since none are suspected to occur in Bonner County, Idaho. There is no **aquatic, peatland, subalpine, dry forest** or **cold forest** guild habitat in proposed treatment areas. No direct or indirect impacts would occur to habitat or species of these guilds whether or not the proposed action is implemented. **Moist forest** habitat identified in the coarse filter query was found to have low potential to support any rare moist forest plant species. No direct or indirect impacts to species of this guild would occur.

#### Cumulative Effects

The following past activities and events, current and ongoing activities, and reasonably foreseeable actions result in the same cumulative effects with either the proposed action or No Action:

#### *Past Activities and Events*

Because most past activities and events in the project area occurred before the advent of rare plant surveys and protection (i.e. before 1990), a quantitative assessment of the effects of those activities is not possible. In addition, activities associated with the Packsaddle EIS occurred

before clustered lady's slipper and pine broomrape were designated as sensitive; as a result, their Douglas-fir/grand-fir habitats were not surveyed for that EIS. It is therefore assumed that past timber harvest and road construction and past wildfires negatively affected some suitable habitat and/or occurrences of clustered lady's slipper, yellow lady's slipper and pine broomrape.

### *Current and Ongoing Activities*

Road maintenance activities would occur in areas with low suitability as rare plant habitat. Therefore, no effects to rare plants or suitable habitat are expected to occur.

### *Reasonably Foreseeable Actions*

Weed treatment and monitoring would follow guidelines established in the Sandpoint Noxious Weed Control Project EIS (USDA 1998). Effects to rare plant species were analyzed in that document. No effects to rare plants beyond those described in that EIS are expected to occur.

Timber stand improvement activities in the project area would occur in areas with low potential to support rare plants. No effects to rare plants or suitable habitat are expected to occur.

### *Determination of Cumulative Effects*

When combined with the above past, current and ongoing and reasonably foreseeable activities and events, implementing or not implementing the proposed action would have very low cumulative effects (i.e. no measurable effects) to most rare plants. No cumulative effects would occur to any federally listed plant species, as none are suspected to occur in Boner County, Idaho. No cumulative impacts to rare plants and habitat in the **aquatic, peatland, subalpine, dry forest** and **cold forest** guilds would occur, since these habitats were not found in proposed treatment areas. No impacts to moist rare plants and habitat in the **moist forest** guild would occur, since all such habitat was determined to have low potential to support any rare plant species.

## *Alternative 1 - No Action*

### **Direct and Indirect Effects**

Management activities would not change from current levels, and current vegetation trends would be expected to continue. No direct effects to any rare plants would occur from not implementing the proposed action.

Indirectly, the continued increase in fuel loading could pose a threat to suitable rare plant habitat in the context of a higher risk of stand replacing fires. Such fires could extirpate the populations of clustered lady's slipper, yellow lady's slipper and pine broomrape in the project area. Habitat suitability for clustered lady's slipper and yellow lady's slipper may be reduced if fire intensity is sufficient to destroy soil mycorrhizae on which these species depend (Allen 1991). In addition, oceanspray, the preferred host plant for pine broomrape, could be at least temporarily reduced in cover by a high-intensity fire (Crane and Fischer 1986).

### **Cumulative Effects**

When combined with the following past, current and ongoing activities and events, implementing the No Action alternative has potential cumulative effects to rare plants that differ from those of the proposed action.

## Past Activities and Events

Past wildfire suppression in the project area has increased the risk of severe stand-replacing fires. If the No Action alternative were implemented, these accumulated fuels would not be addressed.

## Current and Ongoing Activities

Ongoing wildfire suppression in the project area would increase the probability of severe stand-replacing fires. Implementing the No Action alternative would contribute to the continued accumulation of fuels in the project area.

### *Determination of Cumulative Effects*

When combined with the effects of past and ongoing fire suppression, implementing the No Action alternative would further increase the risk of severe stand replacing fires. Should such a fire occur, it may impact populations and/or reduce habitat suitability for **clustered lady's slipper**, **yellow lady's slipper** and **pine broomrape**, at least temporarily. Failure to implement the proposed action could have low, moderate, or high cumulative effects to these species and/or suitable habitat, depending on where a fire occurs and how severe it is. However, the occurrence and intensity of a future wildfire in suitable habitat for these species would be difficult to predict.

## *Alternative 2 - Proposed Action*

### Direct and Indirect Effects

#### *Sensitive Species and Forest Species of Concern*

No occurrences of **clustered lady's slipper** or **pine broomrape** were found in any proposed activity areas. No direct, indirect or cumulative impacts to these species would occur.

Approximately 224 acres of suitable habitat for these two species would be treated under the proposed action, with 47 acres of irregular shelterwood harvest (ISW), 36 acres of commercial thinning (CT), 133 acres of combined ISW and CT treatments, and eight acres of fuel breaks proposed. In addition, temporary road construction and/or reopening of closed road to access Units 7, 9 and 30 would occur in suitable habitat for these species.

The proposed silvicultural treatments are consistent with natural disturbance regimes in the Douglas-fir/ninebark habitats that support **clustered lady's slipper** in northern Idaho. Stand structure and landscape pattern in regions where the species occurs in Idaho and Montana have historically been determined by fire. In Montana, clustered lady's slipper occurs primarily in Douglas-fir/ninebark and grand fir/ninebark habitat types that historically experienced low- to moderate-intensity surface fires on an interval of ten to thirty years (Lichthardt 2003). Following fifty or more years of fire suppression, stands in these habitat types are now more densely stocked and have greater canopy closure, increasing the probability of severe, stand-replacing fires that could reduce the availability of suitable habitat, both in terms of canopy removal and adverse soil and ground-layer effects (Lichthardt 2003). The proposed action would, to some degree, reintroduce low-intensity fire to dry site ecosystems in the project area and would reduce the risk of large, stand-replacing fires.

The impacts of the proposed treatments to suitable habitat for **pine broomrape** cannot be predicted with certainty because the species' ecology is poorly understood. However, the proposed treatments would likely enhance oceanspray, which is the preferred host species. Oceanspray is considered to be well adapted to disturbance by fire, usually responding to a low-intensity burn by root crown and rhizome sprouting (Young 1983). The beneficial effects of

proposed burning to oceanspray would likely also benefit pine broomrape, at least in the long term, because the host species would be maintained.

There would be no direct or indirect impact to populations of or suitable habitat for **yellow lady's slipper**, since all such habitat was excluded from proposed activities.

Under the proposed action, approximately 25 acres of **moist forest guild habitat** identified in the coarse filter query would be potentially affected by combined ISW and CT treatments; however, field surveys found that habitat potential in proposed activity areas was very low for moist forest rare plant species. There would be no direct or indirect impacts to any species of the moist forest guild.

## Cumulative Effects

### *Past Activities and Events*

Past wildfire suppression in the project area may have increased the risk of severe stand-replacing fires. The proposed treatments would reduce the current fuel loading, thereby reducing the risk of stand-replacing fires.

### *Current and Ongoing Activities*

While wildfire suppression would continue in order to protect adjacent private property values, water quality and other resource values, the proposed treatments would increase the ability to safely use prescribed fire, periodically reducing fuel loads, and to suppress unwanted wildfires. When combined with implementation of the proposed action, ongoing wildfire suppression would decrease the probability of severe stand-replacing fires. There would therefore be a lower risk of severe fire effects to occurrences of and/or suitable habitat for clustered lady's slipper, pine broomrape and yellow lady's slipper than if the proposed action were not implemented.

### *Determination of Cumulative Effects*

Cumulative impacts to **clustered lady's slipper** and **pine broomrape** would be very low to low since these species do not occur in proposed treatment areas. The proposed treatments are compatible with natural disturbance regimes in these species' habitat (see above). By reducing the risk of stand-replacing wildfires, implementation of the proposed action may have long term benefits to habitat for these species. No cumulative impacts to populations of or suitable habitat for **yellow lady's slipper** would occur, since all such habitat has been excluded from proposed activities.

### *Compliance 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" (USDA 1987, p. 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" (USDA 1987, p. II-28). The Forest Plan also identifies the need to "determine the status and distribution of Threatened, Endangered and Rare (sensitive) plants on the IPNF" (USDA 1987, p. II-18). Implementation of the proposed action would meet Forest Plan direction, as well as NFMA requirements for maintaining population and species viability. Not implementing the proposed action would also meet Forest Plan direction and NFMA requirements, at least in the short term.

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 122,003 acres (about 17 percent) of suitable habitat have been surveyed for sensitive plants.

In 1998, sensitive species trends across the Forest were qualitatively assessed (USDA 1998a, 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.

Since implementation of the Forest Plan in 1987, impacts to highly suitable habitat for many rare 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.

For clustered lady's slipper, where proposed activities in the IPNF may impact the species, formal monitoring plots have been established (USDA 2003). A conservation strategy for the species in the Northern Region has been prepared (Lichthardt 2003).

At the project level, to prevent further declines in populations of rare plant species, suitable habitat has been identified and surveyed, and documented rare plant occurrences buffered from project activities. Proposed treatments under the proposed action are consistent with management recommendations in the conservation strategy for clustered lady's slipper (Lichthardt 2003).

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## KANIKSU THREATENED, SENSITIVE AND FOREST SPECIES OF CONCERN, BY HABITAT GUILD

| Status and Species                                   | Common Name                    | Rare Plant Guild                           |
|--|--------------------------------|--|
| <b>Threatened*</b>                                   |                                |  |
| <i>Howellia aquatilis</i> (Kootenai County)          | water howellia                 | Aquatic                                    |
| <i>Silene spaldingii</i> (Kootenai County)           | Spalding's catchfly            | Dry grassland                              |
| <b>Sensitive**</b>                                   |                                |  |
| <i>Andromeda polifolia</i>                           | bog rosemary                   | Peatland                                   |
| <i>Asplenium trichomanes</i> ssp. <i>trichomanes</i> | maidenhair spleenwort          | Rock seeps in Moist / Wet Forest           |
| <i>Symphyotrichum 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 pedunculosum</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 |
| <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              |

| Status and Species                       | Common Name                   | Rare Plant Guild                |
|--|-------------------------------|---------------------------------|
| <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                        |
| <b>Forest Species of Concern***</b>      |                               |                                 |
| <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                  | Wet forest                      |
| <i>Collema curtisporum</i>               | short-spored jelly lichen     | Deciduous Riparian              |
| <i>Cyripedium pubescens v. 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 trillifolia</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 Biannual Forest-wide Species List FWS dated January 10, 2008 (105.0000)

\*\* 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 bladdery 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 parviflorum* (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 shreberi* (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 hispidula* (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 parviflorum* (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.