Botanical Resources
Threatened, Endangered, Proposed, Candidate, and Sensitive Plants

INTRODUCTION

Botanical resources include both the abundance and distribution of different vascular and non-vascular plant species. This section presents a more detailed analysis of the rarest elements of the flora—threatened, endangered, proposed, candidate, and sensitive (TEPCS) plant species as well as a discussion of rare and unique communities, and culturally important plant species.

Plant species that are federally listed as threatened or endangered, or that are proposed for listing, are protected under the Endangered Species Act (ESA) and Forest Service regulations, as are candidate species and species of concern (those species with sufficient biological information and existing threats to warrant listing by the Fish and Wildlife Service). Sensitive species are similarly protected under the Regional Forester's Sensitive Species Program. For example, the Forests are required to maintain viable populations within planning areas and to identify and mitigate potential effects to these species from federal land-disturbing actions. In order to comply with the ESA and the Sensitive Species Program, Forest botanists conduct inventories during project planning to locate and protect any TEPCS plants in the project area.

Issues and Indicators

Issue Statement – Forest Plan management strategies may affect TEPCS and watch plant species populations and habitats.

Background to the Issue – Many vascular plant species are endemic to the regions encompassed by the Southwest Idaho Ecogroup (Ecogroup). Of these, many are considered rare by conservation organizations or federal and state agencies (Region 4 Sensitive Species List, Proposed 2000, Idaho Native Plant Society 2000, Idaho Conservation Data Center 2000). Four of these rare endemics are found only on National Forest lands within the Ecogroup area. In addition to these rare species, many of the rare endemics have a large portion of their global distribution found on national forest lands. In contrast, several plant species have wide global distributions but are rare within the Ecogroup area. This section analyzes the potential effects from Forest Plan management strategies by alternative on the rarest vascular and non-vascular plant species within the Ecogroup area.

Indicators – The indicators used to measure potential adverse effects on TEPCS plants are the following activities that would occur to some extent under every management alternative: (1) fire (wildfire and fire use), (2) livestock grazing (herbivory, trampling and associated impacts), (3) recreation, (4) mechanical treatments associated with vegetation management (including road

construction, maintenance, and decommissioning), and (5) noxious weed establishment and spread. These indicators provide a relative measure of the potential for adverse effects on TEPCS plants from ground-disturbing activities that have the highest likelihood of affecting vegetative conditions or reducing populations.

The potential for adverse effects may be reduced or minimized by forest plan management direction that incorporates and implements standards, guidelines, and management area objectives to achieve desired vegetative conditions. Mitigation for all management activities and special protection measures are also discussed related to potential effects on TEPCS plants.

Affected Area

The affected areas for direct and indirect effects on TEPCS plants are the lands administered by the three National Forests. Some Management Areas may be highlighted in discussions, due to the significance of their contributions to Forest-wide populations. This is especially the case with endemic plant populations and plants at the fringe of their natural range. The affected areas for cumulative effects on TEPCS plants include national forest and other ownership lands within the Ecogroup, and also consider the natural ranges of distribution for individual plant species.

CURRENT CONDITIONS

Plant Types Within the Ecogroup

Vascular Plants

The largest and most dominant organisms within each major vegetation type are the vascular plants. They include seed-bearing plants (flowering plants and conifers) and spore-bearing plants such as ferns. They are the primary producers, utilizing photosynthesis to generate carbohydrates, which are consumed by animals and fungi. Additionally, they form the forest structure that provides substrate and habitat for other organisms, they influence microclimates, and they produce litter and decomposing wood that contributes to organic matter and soil development. Many exist in symbiotic relationships with fungi and other vascular plants, enabling some species to be non-photosynthetic, providing the capability to fix nitrogen, and other functions. In addition to their role in ecosystem functions, vascular plants provide many commercially important resources, including timber, paper, medicines, foods, and ornamentals.

Non-vascular Plants

Bryophytes - Bryophytes (mosses, liverworts, and hornworts) are small, green non-vascular plants that reproduce by means of spores instead of seeds. Although small, they play an important role in water and nutrient cycles, and provide seed beds for many plants, including western larch (Steele and Geier-Hayes 1995). Many play crucial roles in the hydrology of meadows and riparian areas. They occur in all types of environments except salt water. On the Boise, Payette, and Sawtooth National Forests, bryophytes on rock outcrops in wet meadows and fens make up a significant proportion of the biomass.

There are approximately 15,000 to 18,000 (Merrill 1995) species of bryophytes worldwide, with 1,320 species of moss (Anderson et al. 1990), and 525 species of liverworts and hornworts (Stotler and Crandall-Stotler 1977) documented in North America. No comprehensive moss flora exists for Idaho. Christy and Harpel (1997) addressed the rare and endemic bryophytes for the Columbia River Basin south of the Canadian border. They noted 50 taxa endemic to western North America. Their study found that about half the total bryoflora had fewer than five known populations. This lack of distribution knowledge hindered the development of rarity rankings and pointed to the need for systematic collecting and taxonomic studies in the interior Northwest.

Bryophyte species usually are more widely distributed than vascular plant species. However, within a broad overall range, they may occur in very localized patterns in ecologically specific habitats. Currently, four species of mosses or their habitats are considered rare on the Boise, Sawtooth, and Payette National Forests. They include: Beautiful bryum (*Bryum calobryoides*), Blandow's helodium (*Helodium blandowii*), Piper's bug-on-a-stick (*Buxbaumia piperi*), and green bug moss (*Buxbaumia viridis*). *Bryum calobryoides* was originally reported growing in springs on the Boise National Forest but attempts to relocate the site have been unsuccessful. *Helodium blandowii*, is found in peatlands and occurs on the Boise, Sawtooth, and Payette National Forests. *Buxbaumia piperi* and *Buxbaumia viridis* are known from the Payette and occur on large, decaying woody debris. *Buxbaumia piperi* was found to be more widespread than originally believed and was dropped from the ICDC rare plant list and from the analysis presented here.

Lichens - Lichens are a unique combination of two different types of organisms, fungus and alga, growing together in a symbiotic relationship. Many are sensitive indicators of air pollution, and play important roles in the cycling of water and nutrients and in relationships with many other plants and animals. Lichens are also important in soil formation. Many lichens fix nitrogen by changing atmospheric nitrogen into a chemical form that plants can use. .

The world's 18,000 to 20,000 lichen species grow on rock, soil, trees, fallen logs, and other surfaces, with about 3,330 species documented for the United States and Canada (Hale and Cole 1988). Rosentreter (1995) addressed the rare and endemic lichens for the Columbia River Basin south of the Canadian border. Herbarium collections have documented over 700 lichen species in the basin. One rare lichen species, pored lungwort (*Lobaria scrobiculata*), occurs on the Payette. It is known from the Salmon River area and occurs on trees, shrubs, and mossy rocks. *Pilophorus acicularis*, nail lichen, is found on acid rocks in sheltered, humid forests. Little is known about the overall distribution of these lichens on the Payette National Forest. It is unknown if potential habitat for these species occurs on the Boise or Sawtooth National Forests at this time.

The Idaho Conservation Data Center tracks occurrences of rare bryophytes and lichens. Moseley and Pitner (1996) list 9 rare mosses, 1 rare liverwort, and 22 rare lichens in Idaho. This list is more dynamic than the vascular rare plant lists due to recent collecting activity by biologists. Management of both lichens and bryophytes would benefit from further ecological studies and distribution data.

Fungi/Cryptogamic Crusts

Fungi - Fungi are members of the plant kingdom that contain no chlorophyll and rely on organic material for nutrition. They play an important role in decomposition and nutrient exchange. Some fungal species, such as the truffles, boletuses, chanterelles, and morels are important for recreational and commercial gatherers. Many fungi form symbiotic relationships, called mycorrhizal associations, with vascular plant roots underground, thus improving the ability of these vascular plants to exploit soil reserves for moisture and nutrients. Lack of knowledge on the role of fungal species in the ecosystem and difficulty of identification hinders development of species-specific management.

Cryptogamic Crusts - Another ecosystem component is the cryptogamic soil crusts, an association of algae, mosses, lichens, liverworts, cyanobacteria, and fungi that play a role in soil stabilization, nutrient cycling, soil moisture, and vascular plant interactions (St. Clair et al 1984, Eldridge 1993, Ladyman and Muldavin 1996, Quigley and Arbelbide 1997). These crusts are generally believed to protect the soil against erosion, and they affect infiltration in semiarid and arid ecosystems (Harper and Pendleton 1993, Eldridge 1993, Ladyman and Muldavin 1996, Quigley and Arbelbide 1997). Crusts are integral components of rangeland systems, and their presence is often indicative of the condition and trend of these systems (Belnap, 1994). Studies such as Kaltenecker and Wicklow-Howard (1994) on microbiotic crusts in sagebrush habitats of southern Idaho will help establish ecosystem relationships and management policies in the future. Cryptogamic crusts are often associated with potential vegetation types that include low sagebrush (includes mesic, mesic with Juniper, and xeric), salt desert shrub, big sagebrush, and juniper (St. Clair et al. 1984, Quigley and Arbelbide 1997).

Based on the analysis of potential vegetation types and cryptogamic crust development potential, completed by ICBEMP (Quigley and Arbelbide 1997), the Sawtooth National Forest has the greatest potential for crust development in the Ecogroup. The role of crusts and their distribution within the Ecogroup has not been examined in detail. To proactively address cryptogamic crusts within the Ecogroup, forest personnel will need to identify and locate areas of crust development, and areas for maintenance and restoration. The Forest Plans for the Boise, Sawtooth, and Payette National Forests (Chapter III, Forest-wide Management Direction, Botanical Resources) have an objective to promote the identification and protection of cryptogamic crusts: *Identify areas of high potential for cryptogamic crust restoration and/or maintenance*. Given the lack of current distribution data and knowledge of crust health in the Ecogroup, cryptogrammic crusts were not analyzed by alternative in this analysis. Forest personnel will be encouraged to document areas of cryptogrammic crust development and maintenance or restoration needs at the project level and in project surveys.

Selection of Species for Analysis

Forest Service botanists compiled existing information of rare or potentially rare plant species from the Intermountain Region Sensitive Species List (current and proposed, 2002), and lists maintained by the Idaho Native Plant Society and Idaho Conservation Data Center (ICDC). Current scientific literature and the ICDC provided extensive information on the biology, demography, and distribution of these plant species.

Botanists evaluated all plant species with a global (G) ranking of G1-G3, or Idaho State ranking of S1-S2. Global rankings are based on a system developed by The Nature Conservancy and used by the Natural Heritage and Conservation Data Center network. These rankings serve as a reflection of the overall status of a species throughout its global range. The system is a one-through-five ranking system, ranging from species considered globally rare (G1-G3) to those rare in Idaho (G4-G5; these are also state ranked S1 or S2). A G1 ranking refers to those species that are critically imperiled globally because of extreme intrinsic rarity or because of some factor of its biology making it vulnerable to extinction. These species typically have fewer than five viable occurrences (Idaho Native Plant Society 2000). G2 species are defined as imperiled globally because of rarity or because other factors may increase their vulnerability to extinction throughout their range (6 to 20 occurrences). G3 are those species that are vulnerable, either due to rarity or vulnerability of other factors (21 to 100 occurrences). G4-G5 species are apparently secure (usually more than 100 occurrences) but typically have concerns for long-term viability. All G1-G3 species were included in the effects analysis, unless documentation could be provided that a given species did not require sensitive status. The State of Idaho, through ICDC and the Idaho Native Plant Society, also assigns state rankings. All species ranked S1-S2 were included in the analysis. The definitions for the state rankings correspond to the global rankings.

Many species were included in the preliminary list of rare species. This list was refined to determine: (1) those species that should be included in the effects analysis, (2) additional species of concern, and (3) those species considered secure enough to drop from a list of "watch" plants. The resulting Ecogroup list (Apppendix G, Tables G-1 and G-2) comprises the best available information on rare plant species that have special management needs to ensure their long-term viability. Species needing special protection on public lands include those: 1) designated as endangered or threatened under the ESA, 2) proposed or candidate species under consideration for designation under the ESA, and 3) on the Regional Forester's Sensitive Species List.

Additional consideration regarding the management of watch species has been given since the forest plans were developed. Watch plants may not meet all criteria for being designated a sensitive species (G rank may be G4 or G5, S rank may be lower than S2), but may need to be tracked by Forests when sufficient population viability concerns exist. Each Forest maintains their own watch species list given viability concerns, high impacts, or evidence of species in decline. This list is meant to be dynamic and to provide an opportunity to track species of concern. The watch species deemed of highest concern by a team of Forest botanists and botany personnel are included in the effects analysis. All current or potential watch species are identified in Appendix G (Table G-1).

The ICDC and the Interior Columbia Basin Ecosystem Management Project (ICBEMP) identify rare and unique plant communities. More details on these communities will be presented below and in Appendix G (Table G-6 and G-7).

Threatened, Endangered, Proposed, and Candidate Plants

Federal land-managing agencies are responsible for implementing the ESA within their authorities. These responsibilities include, but are not limited to, efforts to promote the conservation and recovery of listed species, and provisions to conserve the ecosystems upon

which listed species depend. The U.S. Fish and Wildlife Service (USFWS) monitors and prescribes management for federally listed threatened and endangered plant species. The National Forest Management Act and Forest Service policy require that National Forest System lands be managed to maintain populations of all existing native animal and plant species at or above minimum viable populations levels. A viable population is the maintenance of enough individuals throughout their range to perpetuate the existence of the species in natural, self-sustaining populations.

The Forest Service, in implementing the ESA, must ensure efforts to promote the conservation and recovery of listed species and provisions to conserve the ecosystems upon which listed species depend. Table B-1 provides a list of plants that have state or federal status as threatened, proposed, or candidate species. There are no plants currently listed as endangered within the Ecogroup.

Table B-1. Threatened, Proposed, and Candidate Species in the Ecogroup

Scientific Name	Common Name	Status	National Forest
Botrychium lineare	Slender Moonwort	Candidate	Sawtooth NF – Potential Habitat Boise, Payette, and Sawtooth NFs*
Castilleja christii	Christ's Indian paintbrush	Candidate	Sawtooth NF
Howellia aquatilis	Water Howellia	Threatened	Potential Habitat – Payette NF*
Lepidium papilliferum	Slick Spot Peppergrass	Proposed Endangered	Potential Habitat – Boise NF, Mountain Home District
Mirabilis macfarlanei	MacFarlane's four-o'clock	Threatened	Potential Habitat - Payette NF*
Spiranthes diluvialis	Ute ladies'-tresses	Threatened	Potential Habitat – Boise, Payette, and Sawtooth NFs*
Silene spaldingii	Spalding's Silene	Threatened	Potential Habitat - Payette NF, Boise NF*

* Indicates the USFWS removed these species from bi-annual species lists for the Forests in 2002, and has indicated there are no known occurrences on the three Forests.

Five threatened or proposed endangered species were identified within, or having potential habitat within, the Ecogroup area. These species require special management efforts and conservation needs under Forest Service Handbook guidelines (FSH 2609.25, 1988) and Forest Service Manual directives (FSM 2670), and they are examined separately from the sensitive species. For each species, detailed information regarding status, habitat information, threats, current condition, and management efforts are described below. Threats are defined as those activities, Forest Service or otherwise, or natural conditions that currently or potentially have negative effects on the viability of the TEPCS species or their habitat. Threats listed are not all-inclusive, but focus on those that have the most potential to adversely affect plant and habitat recovery, and the persistence of known populations.

Three additional species have been identified as having "special" status with the USFWS, warranting additional management effort. First, *Castilleja christii* is designated as a candidate species. Based upon its status, this species was analyzed and addressed separately from the

current or proposed sensitive or watch plant species. Candidate species are those for which the USFWS has sufficient information on their biological status and threats to propose them as endangered or threatened under the ESA, but for which development of a proposed listing regulation is precluded by other higher priority listing activities. Candidate species receive no statutory protection under the ESA.

Second, *Botrychium lineare* or slender moonwort, is a candidate species that was recently located on the Sawtooth National Forest. This diminutive fern (generally less than 5 cm tall) was discovered at nearly 3,000 meters on Railroad Ridge, Sawtooth National Recreation Area. Potential habitat may also exist on the Boise and Payette National Forests. Based upon its status, this species was also addressed separately from the current or proposed sensitive or watch plant species.

Third, *Saxifraga bryophora* var. *tobiasiae* is designated a "species of concern". Species of concern, formerly Category 2 candidates, are species identified by USFWS as having needs in land management planning and natural resource conservation efforts that extend beyond the mandates of the ESA. Based on its status, this species was analyzed with the current or proposed sensitive species but was noted here to emphasize its conservation status. The USFWS encourages conservation efforts and the formation of partnerships to preserve such species because they are by definition species that may warrant future protection under the ESA.

Threatened Species

***Mirabilis macfarlanei* (Macfarlane's four-o'clock)-** In 1979, the USFWS listed *Mirabilis macfarlanei* as endangered. In 1996, with reclassification objectives of the 1985 recovery plan met, MacFarlane's four-o'clock was downlisted from endangered to threatened. No known sites or historic sites of this plant occur on the Payette forest, and no Forestlands were designated as critical to the recovery of the plant. *Mirabilis macfarlanei* has been on the Region 4 Sensitive Species List since 1989 because "suitable appearing" habitat was identified in the Hells Canyon area (Moseley 1989). In 1989, the USFWS added *M. macfarlanei* to the Payette National Forest 90-Day Forest-wide Species List, at which time the Forest began addressing the plant in biological assessments and Section 7 consultation. Since 1989, numerous botanical surveys have been conducted within Hells Canyon on the Payette National Forest, but no populations of *Mirabilis macfarlanei* have been located. The closest known population occurs about 35 miles downstream from the Forest boundary. The Payette National Forest is therefore recommending that the plant be removed from the Region 4 Sensitive Species List.

Habitat - This herbaceous perennial of the four-o'clock family is regionally endemic to portions of the Snake, Salmon, and Imnaha River canyons. The plant is typically found in canyon grasslands dominated by bunchgrass and shrub communities from 1,000 to 3,000 feet elevation. Nine populations occur in Idaho and Oregon, with the total population occurring in an area of 30 by 18 miles. Plants grow on all aspects but more commonly on southeast and western exposures in soils ranging from sandy to gravel and cobble. Sites are generally dry and open.

Threats - The revised recovery plan for this species lists a number of threats to habitat and populations. They include: herbicide and pesticide spraying, landslides and flood damage, insects and disease, exotic plant invasion, livestock and wildlife grazing, fire suppression and rehabilitation efforts, recreational trampling, off-road vehicles, road and trail construction and maintenance, collecting, gravel mining, competition for pollinators, and inbreeding depression.

Current Management - The current recovery plan for MacFarlane's four-o'clock does not set forth any management requirements for the Payette. In September 2002, the USFWS removed *Mirabilis macfarlanei* from the Payette National Forest 90-Day Species List and noted that future biological assessments need not address the species because they believe the plant does not occur on the Forest. However, the USFWS is attempting to gain additional information about the species' distribution and has asked that the Payette National Forest continue working with them on further conservation efforts (USFWS 2002, 1-4-02-SP-911).

***Spiranthes diluvialis* (Ute ladies'-tresses orchid)** - Ute ladies'-tresses orchid was named in 1984 and federally listed as threatened on January 17, 1992 under the ESA. *Spiranthes diluvialis* occurs in relatively low-elevation riparian, spring, and lakeside wetland meadows in these general areas of the interior western United States: near the base of the eastern slope of the Rocky Mountains in southeast Wyoming and north-central and central Colorado; in the upper Colorado River Basin; along the Wasatch Front and westward in the eastern Great Basin, in north-central and western Utah, and extreme eastern Nevada. In 1994, the range was expanded north by discoveries in central Wyoming and western Montana, and in 1996, *S. diluvialis* was discovered in southeast Idaho, along the Snake River. Reproduction is strictly sexual, with ground- and log-nesting bumblebees as the primary pollinators (Pierson and Tepedino 2000). Successful conservation of this orchid will require protecting suitable habitat and pollinator habitat in and around orchid populations.

Habitat - *Spiranthes diluvialis* is endemic to moist soils in mesic or wet meadows near springs, lakes, and perennial streams. The elevation range of known habitat is 1500 to 7000 feet. Most of the occurrences are along riparian edges, gravel bars, old oxbows, and moist-to-wet meadows along perennial streams and rivers, although some localities are near freshwater lakes or springs. *S. diluvialis* appears to be well adapted to disturbances caused by water movement through flood plains over time. It often grows on point bars and other recently created riparian habitat. The orchid appears to require permanent sub-irrigation, with the water table holding steady throughout the growing season and into late summer and early autumn. *S. diluvialis* occurs primarily in areas where the vegetation is relatively open and not very dense.

Potential habitat for *Spiranthes diluvialis* can be found throughout the Ecogroup, but no occupied habitat has yet been discovered. Populations appear to fluctuate dramatically from year to year, making it difficult to assess population status and distribution. This has held true during studies conducted on the Idaho population since its discovery. The genus *Spiranthes* also undergoes a dormant period that may last 7-10 years, apparently with no evidence of above ground structures. Nothing is known about the dormancy-triggering mechanisms. In order to locate this species, potential habitat should be surveyed every year, for 7 to10 years, before ground-disturbing activities take place.

Threats – *S. diluvialis* is found infrequently and in scattered locations. Threats include livestock grazing, exotic weed invasion, controlled flooding, dewatering of streams, loss of pollinators, and development. Because it prefers open, early seral riparian areas, its management may be in direct conflict with rare fish habitat management that emphasizes undisturbed climax conditions.

Current Management - The USFWS has prepared a draft recovery plan and developed actions designed to restore populations and remove threats. Ecogroup personnel survey potential habitat every year where ground-disturbing activities are proposed and implement appropriate mitigation measures, including stockpiling and returning topsoil, and protection of high potential habitat. ICDC is currently developing a predictive plant habitat model for the state of Idaho, which will further refine focus areas for future surveys and management. In September 2002, the USFWS removed *Spiranthes diluvialis* from the Boise, Payette, and Sawtooth National Forests' 90-Day Species List Update and noted that future biological assessments need not address the species because they believe the plant does not occur on the on these Forests. However, the USFWS is attempting to gain additional information about the species distribution and has asked that the Forests continue working with them on further conservation efforts (USFWS 2002, 1-4-02-SP-911).

***Silene spaldingii* (Spalding's Catchfly)** - In December 1999, the USFWS proposed to list *Silene spaldingii* as a threatened species. The final rule to list *S. spaldingii* as threatened pursuant to the Endangered Species Act of 1973, as amended, was published in October 2001 (Federal Register, Vol. 66, No. 196, 2001). Critical habitat was not included in the proposed rule. In April 2000, the USFWS proposed that designation of critical habitat was prudent. In the final listing rule (Federal Register, Vol. 66, No. 196, 2001), the US FWS determined that the designation of critical habitat is prudent for *S. spaldingii*; however, the limited budget for listing activities precluded the designation of critical habitat at this time. Potential habitat exists in the Snake River and Salmon River canyon grasslands on the Payette National Forest, and on low-elevation grasslands on the Boise National Forest. No known populations occur on the Payette, Boise, or Sawtooth National Forests.

Habitat – Spalding's catchfly, a perennial herb of the carnation family, is a Pacific Northwest regional endemic plant. The plant is typically found in mesic perennial grasslands and is known to occur in 52 populations in Idaho, Oregon, Washington, and Montana. Populations are often small and isolated. In Idaho, Spalding's catchfly appears restricted to the canyon grasslands dominated by Idaho fescue/prairie junegrass on northern aspects. Soils are generally deep to moderately deep, ranging from granitic to basalt. Most sites contain few or no shrubs or trees, but some sites have large shrub thickets, with scattered ponderosa pine or Douglas fir.

Threats - Section 7 guidelines for Spalding's catchfly list seven management activities that potentially threaten habitat or populations. They are grazing, recreation, fire use, exotic species, pollinator impacts, herbicide and pesticide use, and habitat conversion.

Current Management - Section 7 guidelines and recovery objectives have been followed where potential habitat for Spalding's catchfly occurs on the Payette National Forest. In September 2002, the USFWS removed *Silene spaldingii* from the Payette and Boise National Forests' 90-Day Species List and noted that future biological assessments need not address the species

because they believe the plant does not occur on the on these Forests. However, the USFWS is attempting to gain additional information about the species distribution and has asked that these Forests continue working with them on further conservation efforts (USFWS 2002, 1-4-02-SP-911). .

***Howellia aqualitis* (Water Howellia)** -The USFWS listed *Howellia aquatilis* (Gray) as a threatened species on July 14, 1994 (59 FR 35860). Critical habitat has not been defined or designated for *H. aquatilis* (59 FR 35860) because the USFWS does not feel it is prudent due to a possibility of increased take and vandalism. Populations of this species are currently extant in California, Idaho, Montana, and Washington. These populations are threatened by loss or change of habitat due to natural and human-induced causes. Potential habitat may exist in the oxbows and river meanders on the Payette National Forest. No known populations occur on the Payette, Boise, or Sawtooth National Forests

Habitat - *Howellia aquatilis* lives in shallow vernal freshwater pools of wetlands, edges of larger ponds, or river oxbows that are abandoned or still hydrologically linked to the adjacent river system. The pools are generally less than 1 meter deep, but *H. aquatilis* has been found in pools up to 2 meters in depth. The bottoms of these pools generally consist of firm, consolidated clay and organic sediments, in which *H. aquatilis* is firmly rooted. Drying of the pools in the fall is necessary for germination, and submergence in the spring is necessary for growth and flowering (Federal Register Vol. 61, No. 186, 1996, Roe and Shelly 1992).

Sites are described as being in forest openings but also surrounded by dense forest vegetation. Deciduous trees are usually found at the edges of these wet areas. The elevational range starts from the lowest in Washington at 3 meters and extends to the highest in Montana at 945 meters. *Howellia aquatilis* is not a very competitive species but it survives well in its dynamic habitat where other plants cannot (Federal Register Vol. 61, No. 186, 1996, Roe and Shelly 1992).

Threats - The following threats were documented in the recovery plan of water howellia (Shelly and Gamon 1996): timber harvest (siltation and hydrologic regime alteration), livestock grazing (trampling and soil compaction), non-native plant and noxious weed invasion, conversion of habitat, road construction and maintenance, military activities (in the Puget lowlands), fire effects, and natural conditions (lack of genetic variation, successional changes).

Current Management - Section 7 guidelines and recovery objectives are followed where potential habitat for water howellia occurs on the Payette National Forest. It is believed that little habitat exists for this species on the Payette National Forest. In 2001, the USFWS informed the Payette National Forest that potential habitat may occur on the Forest and added the species to the Bi-annual Forest-wide Species List. The Payette then developed a preliminary map of potential habitat for *Howellia aquatilis* and began surveying, analyzing, and addressing the plant in biological assessments. Surveys in 2001 on the Payette found no *H. aquatilis* populations. In September 2002, the USFWS removed *H. aquatilis* from the Payette National Forest 90-Day Species List and noted that future biological assessments need not address the species because they believe the plant does not occur on the Payette National Forest. However, the USFWS is attempting to gain additional information about the species distribution and has asked that the Payette National Forest continue working with them on further conservation efforts.

Proposed Endangered Species

***Lepidium papilliferum* (Slick Spot Peppergrass) -** Slick spot peppergrass, *Lepidium papilliferum*, was listed as a Candidate species on October 25, 1999 (64 FR 57533). In July 2002, the USFWS proposed to list *L. papilliferum* as endangered pursuant to the Endangered Species Act of 1973, as amended (Federal Register, Vol. 67, No. 135, 2002). The USFWS added slick spot peppergrass to the Mountain Home Ranger District, Boise National Forest 90-day species list in August 2002 (August 29, 2002 90-day species list update). At present, no known populations of slick spot peppergrass are located within the Ecogroup. Potential habitat for this species may exist on the Boise National Forest, specifically in the Lower South Fork Boise River, Arrowrock Reservoir, and Boise Front/Bogus Basin Management Areas.

Habitat - Slick spot peppergrass occurs in semi-arid sagebrush-steppe habitats on the Snake River Plain, Owyhee Plateau, and adjacent foothills in southern Idaho. Slick spot peppergrass is restricted to small depositional microsites similar to vernal pools (generally known as slick spots, mini-playas, or natric sites) that range from less than 1 square meter (m^2) (10 square feet (ft^2) to about 10 m^2 (110 ft^2) in diameter within communities dominated by other plants (Mancuso et al. 1998). These sparsely vegetated microsites are characterized by relatively high concentrations of clay and salt, and reduced levels of organic matter and nutrients compared to the surrounding shrubland vegetation. Associated species include Wyoming big sagebrush, basin big sagebrush, and bluebunch wheatgrass. The restricted distribution of the species is likely a product of the scarcity of these extremely localized, specific edaphic conditions, and the loss and degradation of these habitat areas throughout southwestern Idaho.

Threats - Slick spot peppergrass is threatened primarily by fire, the invasion of exotic plant species, livestock grazing (trampling and uprooting plants), urban development, habitat conversion, and off-road vehicle use. Because the majority of populations are extremely small, and agricultural conversion, fire, grazing, roads, and urbanization fragment existing habitat, local extirpation is a threat to this species. The limited extent of high-quality habitat for this species may not be adequate to ensure the long-term persistence of slick spot peppergrass.

Current Management - The most recent 90-day species list update from USFWS (dated Sept. 30, 2002) lists slick spot peppergrass on only the Mountain Home Ranger District for the Boise National Forest. Botanists are currently surveying areas of high potential habitat for this rare species.

Candidate Species

***Castilleja christii* (Christ's Indian Paintbrush) -** John Christ first collected Christ's Indian paintbrush in 1950, although it was not recognized as a new species until 1973. *Castilleja christii* is endemic to subalpine meadow and sagebrush habitats in the Albion Mountains of Idaho. After a thorough search of all potential habitats, only one population is known to exist. In 1990, the USFWS named *C. christii* as a candidate species for listing under the ESA. The Forest Service maintains it on the Regional Forester's Sensitive Species List. Steele (1980) suggested that it be listed as endangered. Moseley (1993) of the ICDC recommended *C. christii* for listing as threatened. In September 1999, *C. christii* was petitioned for listing because of immediate threats from cattle grazing.

Habitat - *Castilleja christii* occurs with three other rare plants in 200 acres restricted to the top of Mount Harrison in the Albion Mountains, Cassia County, Idaho. It occurs in three communities or cover types: snow bed, grassland, and sagebrush. As the density of sagebrush increases, the numbers of *C. christii* decrease. Christ's Indian paintbrush is the only yellow or yellow-orange flowered paintbrush on Mt. Harrison. It is also the only Indian paintbrush occurring in the moist snow bed and grassland communities of the summit plateau. *Castilleja christii* reproduces by seed; but nothing is known about seed dispersal or viability. It occurs almost exclusively on gentle, northerly-facing slopes underlain with quartzite of Harrison Summit and quartzite of Dayley Creek, in deep and gravelly soils.

Threats - *Castilleja christii* is found in only one location at the top of Mount Harrison. An estimated 23 percent of the population occurs in the Mt Harrison Research Natural Area. The largest direct loss of paintbrush habitat can be attributed to the construction of several roads, which may have affected up to 20 acres of habitat. Off-road vehicles are currently the greatest threat to the plants and the population. ORVs are restricted to the established roads, and barriers have been erected to discourage vehicles from leaving the main roads, but some off-road use still occurs. Trampling by hikers and cattle and incidental grazing by cattle are also a threat, because the stems of *C. christii* are extremely brittle during flowering, and the host species and seed dispersal mechanisms are unknown.

Current Management - The single known population is managed entirely by the Minidoka Ranger District of the Sawtooth National Forest. The Sawtooth National Forest signed a Conservation Assessment and Strategy in April 2002 (Pierson 2002). This agreement outlines the conservation action items to be completed by the District and partners over the next 5 years. The finalized plan will establish the Mount Harrison Botanical Special Interest Area that will incorporate the remaining 77 percent of the population and two remaining remnants of the tall forb community. The Forest Service and the USFWS are currently working together to develop and implement a Conservation Agreement that will outline the protection needs, action items, and conservation priorities for this rare species for the next 10-year period. Additionally, the USFWS is assisting the Minidoka Ranger District with an interpretive plan to increase awareness of the rare species and to promote protection and conservation among users on Mount Harrison. The main road to the lookout, which roughly bisects the population, has recently been paved. Permanent study plots adjacent to the newly paved roadway have been in place for two growing seasons and show immediate loss of individual plants next to the roadbed. Continued monitoring over the next 5 years will determine effects of increased visitor numbers, as well as the paving.

The ICDC has maintained permanent monitoring plots since 1996 and the results show a stable population until the main road was paved in 1998. The Forest Service assisted the ICDC in 2002 to learn the monitoring protocol and to install additional monitoring plots. The Forest Service has committed to completing the established monitoring for the next 5 years. Using these same plots, population stability will be monitored into the future by Sawtooth National Forest botany personnel.

***Botrychium lineare* (Slender Moonwort) -** In July 1999, the USFWS was petitioned to add the slender moonwort, *Botrychium lineare*, to the List of Threatened and Endangered Plant Species. The Service published the 90-day petition finding and initiated a 12-month status review in May

2000. In June 2001, the USFWS published a finding that supported listing of the species but listing was precluded by work on higher priority listing actions, and the Service placed the species on the candidate species list (Federal Register, Vol. 66, No. 109, 2001).

In 2002, the Sawtooth Forest sent five samples for identification and species confirmation to Dr. Farrar at Iowa State University. Dr. Farrar informed the Sawtooth Botanists (Farrar 2002) that the samples morphologically look like *B. lineare* but genetically they are somewhat different than *B. lineare* known from other sites. Farrar reports that similar findings were made in a collection taken from southern Nevada in 2002. Farrar believes the Forest Service and FWS should treat them as *Botrychium lineare* but plans to do more work with this species in the future to clarify its taxonomy. *Botrychium lineare* taxonomy appears to be problematic because different sites are proving to be substantially different genetically, much more than other species of *Botrychium.* Farrar suggests the genetic variation may be attributed to the fact that they are rare and isolated. However, Farrar suggests it may also be possible that they represent different origins or possibly that they may represent more than one species. The other specimens sent in with the *B. lineare* samples were identified as *B. minganense,* not *B. lunaria* as previously believed. The unknown specimens were also identified as *B. minganense.* In 2003, Dr. Farrar hopes to visit this site and to further examine the *Botrychiums* in this area.

This population occurs on open, rocky alpine slopes of Railroad ridge at nearly 3,000 meters. This diminutive fern was located on sparsely vegetated rocky outcrops and ridgelines. Associated species included goldenrod, gooseberry, green gentian, oat grass, stonecrop, flax, silvery lupine, littlebunch lupine, mat milkvetch, little flower Penstemon, whiteleaf phacelia, prickly sandwort, paintbrush, yarrow, and sagewort.

No additional populations of this species have been located on the Boise, Sawtooth, or Payette National Forests. Potential habitat does exist on these Forests however, and efforts to examine potential habitat have been undertaken by all three Forests. In 2002, contract botanists and Forest botanists laboriously surveyed over 500 acres of potential habitat, but no new populations were located.

Habitat - The habitat for the slender moonwort has been described as "deep grass and forbs of meadows, under trees in woods, and on shelves on limestone cliffs, mainly at higher elevations" (Wagner and Wagner 1994), but they also state that to describe a typical habitat for this species would be problematic since the known sites are so different. Also, its current and historically disjunct distribution ranges from sea level in Quebec to nearly 3,000 meters (9,840 ft) in Boulder County, Colorado. *Botrychium* spores are small and lightweight enough to be carried by air currents. This dispersal mechanism may explain the broad and often disjunct distribution patterns exhibited by moonworts (Vanderhorst 1997).

This species is found in a variety of montane forest or meadow habitats. Three of the known Montana slender moonwort populations occur on roadsides in early seral habitat (i.e., open habitat dominated by low-growing forbs rather than shrubs or trees). Other slender moonwort sites occur in grass- to forb-dominated openings in forests characterized by cone-bearing trees such as pine, spruce, and fir species (Brooks 2000).

Threats – There are many threats that have been documented for the slender moonwort. They include impacts associated with recreational activities (trampling by hikers, off-road vehicle use, or pack animals), road construction, maintenance, use, and decommissioning, habitat succession, fire suppression, livestock grazing (primarily trampling and soil compaction), and non-native plant invasion. Few threats have been documented in the population of slender moonwort located on the Sawtooth National Forest. Livestock use and mining operations pose the greatest potential impacts to this population.

Current Management - Section 7 guidelines are followed where potential habitat for slender moonwort on the Boise, Payette, and Sawtooth National Forests exists. In 2001, the USFWS asked the Boise, Sawtooth, and Payette National Forests to consider *B. lineare* in our planning but the species was not added to the 90-Day Update of Forest Wide Species List because the distribution and habitat description were "problematic". In response to the Service's concern for *Botrychium lineare*, the Payette National Forest, along with the USFWS, hosted a *Botrychium* training on the Payette. Initial surveys found Least moonwort (*Botrychium simplex*) and Lance-leaved moonwort (*Botrychium lanceolatum*) on the Forest, but no *Botrychium lineare*.

In December of 2001, *Botrychium lineare* was added to 90-Day Update of Forest Wide Species Lists from the USFWS, and the Forests began addressing the species in biological assessments and consultation. In March 2002, the USFWS removed *B. lineare*, from the 90-Day Species Lists and noted that future biological assessments need not address the species under section 7 a1. However, the USFWS is attempting to gain additional information about the species distribution and has asked that the Forests continue working with them on further conservation efforts. In 2002, the Sawtooth, Payette, and Boise National Forests completed intensive surveys in areas of high potential habitat. Given the laborious and technical nature of such surveys, a large portion of the potential habitat remains unsurveyed.

Sensitive, Proposed Sensitive, and Watch Species

Plant species are designated "sensitive" by the Regional Forester because their populations or habitats are trending downward, or because little information is available on their population or habitat trends. A six-step process is now used to determine whether a plant is designated as sensitive (USDA Forest Service 1999). The primary purpose of the Sensitive Species Program is to maintain species viability and to conserve or restore habitat conditions for these species, in order to prevent them from becoming federally listed.

The initial Intermountain Region Sensitive Plant Species List was published in 1988-1989, and later updated in 1995. New information about sensitive plant habitats, occurrence, successional relationships, potential threats, and disturbance response has become available in the last 10 years. Another revision of the list is expected in mid-2003. The list is likely to expand the number of plant species that potentially occupy habitat on the Ecogroup Forests. The number of endemics is also expected to increase. Endemic plants are defined as those that are restricted to a specific locality or region.

For the Ecogroup, 79 current or proposed sensitive species, watch species, and species of concern are identified as occurring on, or having potential habitat within, the three Ecogroup Forests. These 79 species represent the set of current or proposed sensitive species for the effects analysis presented here. Table B-2 summarizes the endemism of these species. The lifeform and taxonomic groupings of these species (along with the seven TEPC species) are summarized in Table B-3. Appendix G, Table G-1 provides a complete list of these species, their global and state status, global distribution and current and proposed forest status. Appendix G, Table G-2 provides information on habit, lifeform, population trend, and habitat.

Table B-2. Endemism and Distribution of Threatened, Proposed, Candidate, Sensitive (current and proposed) and Watch Plant Species

Endemism and Distribution	Number of Species
Endemic to National Forest Lands (all populations on FS lands)	4
Endemic to Hells Canyon, Snake and Salmon River Corridors	4
Endemic to Big Camas Prairie	2
Endemic to West Salmon River Mountains	2
Endemic to the White Cloud Mountains	1
Endemic to the Owyhee uplands and Blue Mountain Province	2
Endemic to the Stanley Basin	3
Endemic to the Raft River Mountains	2
Endemic to the Albion Mountain Range	2
Endemic to Goose Creek Drainage	2
Endemic to the Palouse Prairie	1
Endemic to the Pioneer Mountains	1
Endemic to the Rainbow Peaks	1
Found on 2 or more national forests	6

Table B-3. Lifeform and Taxonomic Groupings of Threatened, Proposed and Sensitive (current and proposed) Plant species

Lifeform and Taxonomic Grouping	Number of Species
Vascular Plants	81
Ferns	5
Perennial Herbs	48
Annual and Biennial Herbs	5
Shrubs	9
Cactus	1
Aquatic herb	1
Perennial sedge, rush,	8
Perennial grass	2
Non-vascular Plants	5
Lichens	2
Mosses	3

Several species analyzed in the draft EIS have been dropped from analysis in the final EIS. The reasons for their omissions are taxonomic changes or distributional updates. Shasta daisy (*Macheranthera shastensis*) was determined to be an invalid taxon and not rare as such. Idaho subalpine maidenhair fern (*Adiantum aleucticum*) was also determined to be an invalid taxon. Piper's bug-on-a-stick (*Buxbaumia piperi*) was found to be much more widespread that originally believed. Bronze sedge (*Carex aenea*), many-stalked clover (*Trifolium longipes*), and salmon-flowered desert parsley (*Lomatium salmoniflorm*) occurrences were misreported as occurring on the Payette National Forest. Wilcox's primrose (*Primula wilcoxiana*) is currently under evaluation for taxonomic validity.

Threats

Threats are defined as those activities, Forest Service or otherwise, or natural conditions that currently or potentially have negative effects on the viability of the TEPCS species or their habitat. To adequately address the current or potential threats to the viability of each species, they were split into three categories: (1) impacts to plants, (2) alteration of ecological factors, and (3) habitat reduction. This categorization system is adapted from the Region 4 viability module (USDA Forest Service 1999). Within each category, primary threats have been identified. For each category, a finding of no information (we found no current information of viability or threats) or no known threats (the species is not threatened by anything within that threat category) is possible.

Impacts to Plants - This category represents those activities, Forest Service or otherwise, that may have direct or indirect negative effects on current or proposed sensitive species:

- *Livestock grazing activities*, which include livestock trampling, livestock herbivory, livestock congregation, and soil disturbance and compaction, increased potential for the spread of noxious weeds, the introduction of exotic species, and changes in species composition and species density. The most significant of these documented impacts to plants due to grazing activities appears to be trampling by livestock.

- *Recreational activities*, which include hiking and associated trampling, horseback riding, hot spring use, rock climbing, ORV use, and dispersed camping;

- *Chemical treatment***,** which includes application of herbicides and pesticides to manage undesired species, herbicide drift from agricultural communities, and pollinator loss due the application of insecticides;

- *Timber harvest*, which includes logging and its associated activities such log yarding, equipment storage, road construction, trailing or skidding, ground disturbance, soil compaction, micro-site alteration, and increased erosion;

- *Collection and harvesting*, both for personal and commercial use,

- *Fire suppression*, which includes both beneficial or harmful impacts to TEPCS species (Hessl and Spackman 1995) by maintaining open habitat (Jacobson et al. 1991), encouraging sexual and asexual reproduction (Popovich and Pyke 1997), reducing competition of

aggressive plant species; or by preventing ecological processes necessary for TEPCS species survival, or introducing activities associated with fire suppression; for example, firelines, concentration of personnel in areas, or roads.

- *Wildlife Impacts*, which include trampling or herbivory by wildlife such as elk, deer, or bighorn sheep. Wildlife impacts have been documented as threatening several sensitive or watch species on the Forests. For example, heavy elk damage has been documented at Bowery Guard Station hot springs, one of two known sites of *Primula incana* that occur on the Sawtooth National Forest.

Appendix G, Table G-3 summarizes the impacts to plants and their associated magnitude (low, moderate, high) that are currently or potentially impacting these species.

Alteration of Ecological Factors - This category represents the conditions or activities, Forest Service or otherwise, that directly or indirectly affect the natural ecology and associated interactions of the current or proposed sensitive species:

- *Fire exclusion,* including alteration of historical fire regimes (Hessl and Spackman 1995);

- *Fire inclusion,* including direct fire impacts to species, i.e., mortality of populations;

- *Genetic impurity and genetic uniformity,* which can render populations more susceptible to disease epidemics (Falk and Hoslinger 1991), make such populations less likely to survive moderate to large-scale disturbances (Gaston 1994), and increase the potential for hybrid speciation or genetic assimilation in spatially isolated or island populations (Arnold 1997);

- *Alterations to the natural hydrologic regime,* which can range from small-scale activities such as livestock congregation to large-scale activities such as water diversions or dams;

- *Insects and diseases*, including reduction in fecundity along with insect herbivory of seeds, leaves, and stems (Silvertown 1985);

- *Loss of pollinators,* which may be needed for sexual reproduction and seed set (Tepedino et al. 1997), due to pollinator habitat reduction, pesticides, parasites, and disease;

- *Non-native species,* including competition from invasive non-native species and noxious weeds, loss of habitat, loss of pollinators, and decreased species viability;

- *Natural conditions,* for example, greater risk of extinction due to small population size, or an increase in susceptibility to stochastic events (Gilpin and Soule 1986);

- *Pollution,* including ground water contamination, air quality, and acid rain;

- *Seed bank depletion*, due to reduced fecundity, insect herbivory, loss of genetic variation, and natural catastrophic events; and

- *Succession*, including gradual changes in components, structures, processes, and their functions through successional pathways, alteration of successional pathways due to fire suppression, timber harvesting, and other land management activities, and loss of required seral stages for species survival.

Appendix G, Table G-4 summarizes the alteration of ecological factors and the magnitude associated with such changes (low, moderate, high) that are currently or potentially negatively affecting the habitat or potential of these plant species.

Habitat Reduction - The following activities may change the total availability or quality of actual or potential habitat:

- *Agriculture conversion*, including conversion of native grasslands, woodlands, or shrublands for agricultural use;

- *Energy development*, including oil and gas exploration;

- *Facilities*, including construction and maintenance of campgrounds, livestock corrals, and backcountry airstrips;

- *Military exercises*, including bombing ranges and military activities,

- *Mining*, including direct and indirect impacts associated with mining activities,

- *Road construction and road maintenance;*

- *Ski areas*, including construction and seasonal use, maintenance, expansion, and snowmaking;

- *Transmission lines*, including installation of power lines, digital cable lines, and phone lines;

- *Trail construction*,

- *Timber harvest*, including those activities that directly reduce habitat, and

- *Urban development.*

Appendix G, Table G-5 summarizes the habitat-reducing activities and their magnitude (low, moderate, high) that are currently or potentially negatively affecting the habitat or potential of these plant species.

Aggregating Threatened, Proposed, Candidate, Sensitive, Proposed Sensitive, and Watch Species by Habitat and Population Trend Groups

The 86 TEPC, current or proposed sensitive, and watch species inhabit a diverse array of habitats, vary in their distribution across the landscape, and range widely in population density. Additionally, these species are faced with a variable range of threats and differ in the degree to

which Forest Service management has affected their status. The amount of current scientific information available also varies greatly among species, thus often limiting the depth of interpretation of effects of alternatives on the long-term viability of such species. To examine this wide range of species and their associated threats, species were aggregated into two logical subsets: (1) habitat groups, and (2) current population trend groups.

Habitat Groups -Forest Service botanists grouped TEPCS species into habitat groupings or habitat associations. These groupings were alpine, subalpine, forest, riparian, woodland, shrubland, grassland, and rock. Within these habitat groupings, subgroups were assigned as follows (Table B-4):

- Riparian – bogs, fens, peatlands; seasonally or vernally wet, seeps, streamside, lakeside, hot springs, aquatic;
- Forest – open gap species and understory species;
- Grasslands – high elevation, low elevation;
- Rock – cliffs, high and low elevation, talus/scree slopes, crevices or ledges, outcrops.

Table B-4. Distribution of Threatened, Proposed, and Sensitive Plant Species by Habitat Groups

Habitat Group	Number of Species*
Alpine	11
Subalpine Forest/Non-forest	11
Montane Forest	12
Open gap species	5
Understory species	7
Woodland	5
Shrubland	13
Grassland	17
High elevation	5
Low elevation	13
Riparian	23
Meadows and seeps	12
Vernally or seasonally wet	4
Bogs, fens, peatlands	7
Streamside and lakeside	5
Hot springs	2
Aquatic plants	1
Rock	19
Cliffs	4
Talus, scree, or unstable slopes	3
Crevices or ledges	5
Decomposed granitic outcrops	5
High Elevation	9
Low Elevation	10

*Species may occur in more than one habitat group, thus the total numbers within habitat groups are cumulatively greater than the total of current or proposed sensitive species.

Threats, their intensity, and the references used to determine them are presented for each species in Appendix G, Tables G-3, G-4, and G-5. Documented threats to habitat groupings and the number of species potentially impacted are summarized below in tables for each habitat group. All potential threats are not addressed here; only those documented from the current literature, professional observation, and botanical expertise are included in the tables below.

Modeled Habitat Groups - In the draft EIS, habitat groups were analyzed by using known element occurrences of sensitive, proposed sensitive, or watch species to represent the effects by alternative for each respective habitat group. This process underestimated the potential impacts that may occur within the identified habitat groups and did not truly represent the habitats that occur throughout the Ecogroup. To more adequately address the habitat groups and the potential effects by alternative in this Final EIS, vegetation and land cover classification systems using remote sensing were used to create a map of the habitat groups and their distribution on the Ecogroup. For each habitat group, the acres of classified vegetation and land cover were totaled for the Ecogroup. These habitat group acres were then examined for potential effects by alternative using a process described below in the *Measures And Factors To Assess Effects* section.

The 1998 Central Idaho Classification Project (CICP) developed at the University of Montana (Redmond et al. 1998) constructed a digital map of the existing vegetation and land cover across nearly 19.8 million acres in central Idaho based on the classification of six Landsat Thematic Mapper scenes. The CICP did not include areas south of the Snake River (Minidoka Ranger District). The Idaho Cover Classification developed by Utah State University (Homer 1998a) was used to classify the vegetation and land cover for the Minidoka Ranger District, with the exception of the Raft River Mountains, which occur in Utah. To capture the Utah vegetation and land cover data, the Utah Cover Classification developed by Utah State University (Homer 1998b) was used for the habitat groups for the Raft River Division.

Available classification categories and cover types from all data sources described above were used to create these habitat groups. A classification system was created to assign the satellite imagery to major cover types. The CICP mapped cover types into one of three levels: general group (i.e., forest), parent group (i.e., altered herbaceous grasslands), and subcode groups (i.e., non–native grasslands). The Idaho and Utah classification data (Homer 1998a, b) had much more detailed cover types, which listed principle species and many prevalent associated species. A crosswalk to ensure that appropriate cover types from each data source were placed in the appropriate habitat groups can be found in the Botanical Resources technical report (2003). The Botanical Resources technical report also includes a detailed map of the habitat groups selected and a list of the general groups, parent groups, and subgroups used to generate the habitat group acres.

Alpine (11 species) - Alpine habitats are defined as the areas above tree line in high mountains. Rocky or gravelly terrain is generally prevalent. Grasses and sedges often form thick sod-like mats in meadows. Most alpine plant species have unique adaptations to survive the harsh conditions (intense UV light, extreme temperature fluctuation, short growing season) of this

habitat (Billings 1974). Many plants grow in mats or cushions. Perennials predominate in the alpine flora, as the growing season is often too short for annuals to complete their life cycles (Strickler 1990).

Although CICP (Redmond et al. 1998) included an alpine cover type (areas above tree line and alpine meadows), no acres were classified as such in the Ecogroup area. To address the alpine acres that are known to occur within this area, an alpine group was created using the following criteria: (1) areas above 2900 meters in elevation, (2) exclusion of subalpine forest/non-forestland and woodland groups that may occur above 2900 meters, and (3) exclusion of high-elevation lakes. The Idaho classification (Homer 1998a) and the Utah Classification (Homer 1998b) included high-elevation vegetation including grasses, forbs, sedges, and shrubs. The total number of alpine acres using all available data is 47,950 for the Ecogroup area.

Table B-5. Threats to the Alpine Habitat Group

Threat	Number of Species Affected (of 11)
Grazing - trampling by livestock	5
Roads	2
Mining	2
Recreation – mountain biking, hiking	2
Natural conditions (small population)	3
ORV Use	2
Non-native Plants	2

Trampling by livestock, mining, recreation (including ORV use), natural conditions, non-native plants, and roads appear to be the primary threats common to the alpine habitat group (Appendix G, Tables G-3, G-4, and G-5).

Subalpine Forest/Non-forest (11 species) - Subalpine habitats are often defined as the transitional zone between montane forests and treeless alpine regions. These regions can be sparsely forested, grasslands, shrublands, or rock regions. The subalpine flora begins about 6,000 to 6,500 feet in elevation in northern Idaho and western Montana, while much higher (9,000 to 10,500) in Colorado and Northern Utah (Strickler 1990). Subalpine forest stands often grow in patches interspersed with open meadows.

The following groups were included from the CICP for the subalpine habitat group: mesic montane parklands, subalpine meadows-grasslands; white bark pine, subalpine fir, and mixed subalpine forest (Redmond et al. 1998). The Idaho and Utah vegetation cover types included in the subalpine habitat group are alpine fir (dominated by subalpine fir) and alpine fir/lodgepole pine (Homer 1998a, b). The amount of subalpine grasslands on the Minidoka District is under-estimated here, given the classification system, but is included in the grassland habitat group. The total number of subalpine forest and non-forested acres using all available data is 1,190,707 for the Ecogroup area.

Trails/hiking (associated trampling), roads, ORV use, trampling by livestock, natural conditions, fire effects, and mining appear to be the dominant threats to the subalpine habitat group (Appendix G, Tables G-3, G-4, and G-5).

Table B-6. Threats to the Subalpine Forest/Non-forest Habitat Group

Threat	Number of Species Affected (of 11)
Grazing- trampling by livestock	6
Mining	3
Roads	5
Trails/hiking	4
ORV use	3
Fire inclusion	2
Fire exclusion	2
Non-native species	2
Plant collectors	1
Logging	1
Depletion of seed bank	2
Natural conditions	4
Trail construction	1
Genetic purity	1
Hydrologic changes	1
Urban development	1
Recreational uses-hangliding, etc.	1
Transmission lines	1

Montane Forest - The montane forest habitat group was divided into two subgroups based upon the physiognomy and disturbance dependence/tolerance of the respective species.

Montane Forest Open-gap Species (5 species) – Montane forest gap species are defined as those species that occur in natural and artificial gaps or openings within forested habitats. These species are often followers of disturbance. Many do not respond well to uncharacteristic disturbances (e.g., floods, landslides, wildfire), but do increase with infrequent, small-scale disturbances, which create small patches throughout the landscape. Species in this group thrive with periodic disturbance followed by stable conditions. Disturbance events may allow for increased light to penetrate the forest gaps and create favorable conditions for new seedling establishment. Once established, stable conditions promote the growth of the seedlings to maturity and associated reproduction. This habitat group includes forest edge species or open canopy species that occur along artificial forest margins (e.g., stabilized roadsides, skid trails).

Table B-7. Threats to the Montane Forest Open-gap Habitat Group

Threat	Number of Species Affected (of 5)
Fire exclusion	2
Roads	3
Trails/hiking	2
Herbicide drift	2
Timber harvest	3
Non-native species invasion	2
Succession	3
Fire suppression	4
Depletion of seed bank	1
Grazing-trampling by livestock	1
ORV use	1
Fire inclusion	1

Montane Forest Understory Species (7 species) – The montane forest understory habitat group is comprised of species that require protected microclimates with shade, undisturbed substrates, and associated moisture. Species are often susceptible to disturbance and are poor recruiters after disturbance. These species are often adversely affected by fragmentation, edge effects, changes in the moisture regime, and other microclimate alterations (USDA Forest Service 2000)

Table B-8. Threats to the Montane Forest Understory Habitat Group

Threat	Number of Species Affected (of 7)
Fire inclusion	4
Timber harvest	6
Alteration of hydrologic regime	1
Pollution	1
Insect/disease	1
Fire suppression	1
Succession	3
Roads-maintenance, construction	4
Grazing-trampling by livestock	2
ORV use	1
Collection/harvesting	1
Genetic purity	1
Mining	1

For the spatial analysis of the forest habitat group it was necessary to combine the forest understory group and the forest open-gap group. Given the scale of the vegetation classification using remote sensing, it was too difficult to accurately identify the fine gaps and forest openings needed for these species. The following groups were included from the CICP for the forestland habitat group: single conifer species stands (Engelmann spruce, lodgepole pine, ponderosa pine, grand fir, Douglas-fir); two-conifer species stands (Douglas-fir/lodgepole pine, Douglas-

fir/grand fir, Douglas-fir/ponderosa pine); mixed whitebark pine forest; mixed mesic forest; mixed xeric forest; mixed broadleaf and conifer forest; and standing burnt or dead forest (moderate and high intensity) (Redmond et al. 1998). From the Idaho and Utah classification data the following were included: mixed lodgepole/subalpine fir, Douglas-fir, lodgepole pine (including saplings), mixed conifer/aspen, mixed spruce/fir, and mountain fir (Homer 1998a, b). The total number of forest acres using all available data is 2,685,045 for the Ecogroup area.

The threats common to the two forest habitat groups include: timber harvest, road construction and maintenance, succession, fire suppression, fire inclusion, grazing – trampling by livestock, ORV use, and fire (Tables B-7 and B-8, Appendix G, Tables G-3, G-4, and G-4).

Woodland (5 species) - Woodland habitat is defined here as the pinyon pine/juniper (*Pinus monophylla/Juniperus occidentalis*) communities found in the southern portion of the Ecogroup. The species within this habitat group are all found in open gaps interspersed within the woodland communities. These habitats are at low to mid elevations. Another woodland category, although not represented by any TEPCS occurrences, is the quaking aspen (*Populus tremuloides*) community.

The aspen group was included from the CICP in the woodland habitat group (Redmond et al. 1998). The Idaho classification data used to create the woodland habitat group included: Utah juniper, pinyon/juniper, and aspen (Homer 1998a). The Utah classification data used to create the woodland habitat group included: juniper (Rocky Mountain and Utah junipers), pinyon (Colorado and single-leaf pinyon), pinyon-juniper, and aspen (Homer 1998b). The total number of woodland acres using all available data is 180,393 for the Ecogroup.

Table B-9. Threats to the Woodland Habitat Group

Threat	Number of Species Affected (of 5)
Grazing - trampling by livestock	3
Roads	4
Mining	2
Herbicide drift	2
Non-native species invasion	3
Fire suppression	1
Seed bank	1
Collection/harvesting	1
Loss of pollinators	1
Insects/disease	1
ORV use	1
Alteration of hydrologic regime	1
Fire exclusion	1

The threats common to the woodland habitat group include: trampling by livestock, roads (construction and maintenance), non-native species invasion, mining, and herbicide drift (Appendix G, Tables G-3, G-4, and G-5).

Shrubland (13 species) - The shrubland habitat group is defined as those regions with less than 10 percent forest cover and greater than 15 percent shrub cover (Redmond et al. 1997). Mesic or xeric shrubs can dominate these regions. This habitat group includes portions of the sagebrush steppe and the Great Basin sagebrush desert (Taylor 1992). The shrubland habitat group encompasses a range of elevational distribution and may occur on a variety of substrates.

The following groups were included from the CICP for the shrubland habitat group: mesic shrubs and xeric shrubs (mountain mahogany, bitterbrush, big sagebrush steppe)(Redmond et al. 1998). The Idaho classification data used to create the shrubland habitat group included: mountain mahogany, big sagebrush, bitterbrush, low sagebrush, mountain shrub (serviceberry, chokecherry, snowbrush, currant, snowberry, scholars willow), mountain big sage, mountain low sage, and salt desert shrub (Homer 1998a). The Utah classification data used to create the shrubland habitat group included: mountain mahogany, mountain shrub (bitterbrush, serviceberry, buckbrush, chokecherry, and snowberry), sagebrush, sagebrush/perennial grass, and greasewood (Homer 1998b). The total number of shrubland acres using all available data is 1,233,648 for the Ecogroup area.

Table B-10. Threats to the Shrubland Habitat Group

Threat	Number of Species Affected (of 13)
Grazing - trampling by livestock	11
Roads	8
Mining	5
ORV use	5
Herbicide drift	7
Non-native species invasion	10
Seed bank	2
Trails/hiking	1
Insect/disease	3
Conversion to agricultural lands	4
Urban development	4
Plant collectors	3
Timber harvest	2
Fire inclusion	4
Facilities	1
Alteration of hydrologic regime	2
Fire exclusion	3
Succession	2
Genetic purity	1
Natural Conditions	1
Fire suppression	1
Military exercises	1

The threats common to the shrubland habitat group include: trampling by livestock, roads (construction, reconstruction, and maintenance), mining, ORV use, conversion of habitat to agricultural lands, urban development, plant collectors, fire inclusion and exclusion, succession, non-native species invasion, and herbicide drift (Appendix G, Tables G-3, G-4, and G-5).

Grassland (17 species) - The grassland habitat is generally defined as open and continuous area dominated primarily by many types of grass species. Grasslands are defined as regions with less than 10 percent forest cover and less than 15 percent shrub cover, with herbaceous cover greater than 15 percent (Redmond et al. 1997). Grassland habitats were divided into 2 subgroups: high-elevation and low-elevation grasslands.

Low-elevation Grasslands (13 species) – Much of the rich, low-elevational, native grasslands have been converted to agricultural lands. The remaining grasslands have many native species of the interior basin; however, many non-native species and noxious weeds have spread throughout these areas.

Table B-11. Threats to Low-elevation Grassland Habitat Groups

Threat	Number of Species Affected (of 13)
Grazing - trampling by livestock	9
Roads	8
Mining	3
Timber harvest – associated activities	5
Herbicide drift	6
Non-native species invasion	7
Conversion to agricultural lands	4
Insect/disease	3
Seed bank	1
Plant collectors	3
Urban development	2
ORV use	4
Succession	1
Fire suppression	4
Fire inclusion	3
Fire exclusion	2
Hiking/trampling	2
Natural conditions	3
Loss of genetic purity	1
Alteration of hydrologic condition	3
Loss of pollinators	1

High-elevation Grasslands (5 species) – In high-elevation grasslands, drainage patterns and moisture regimes allow for the establishment of many species not found in lower-elevation grasslands. The vegetation can differ greatly from drier, lower sites and include many species of

sedges, grasses, rushes, and tall forbs. These high-elevation areas are often used for grazing livestock later in the growing season, which may overlap with plants that are phenologically active later in the year.

Table B-12. Threats to the High-elevation Grassland Habitat Group

Threat	Number of Species Affected (of 5)
Grazing - trampling by livestock	3
Alteration of hydrologic regime	2
Timber harvest – associated activities	3
Fire suppression	1
Roads	3
Fire exclusion	1
ORV use	2
Succession	1
Recreational use- ie. Hang-gliding	1
Hiking/trampling	2
Fire inclusion	4
Transmission lines	1
Natural conditions	1
Non-native plants	3
Herbicide drift	1

Given the large spatial scale of the vegetation classification, the high-elevation and low-elevation grassland groups were aggregated for this analysis. Many of the grassland and meadows included in this habitat group are surrounded by forest vegetation or encroaching forest vegetation; therefore some of the threats associated with timber harvest and mechanical activities are presented here. The following groups were included from the CICP for the grassland habitat group: upland grasslands and altered herbaceous grasslands (Redmond et al. 1998). The Idaho classification data used to create the grassland habitat group included: annual grass/forb, dry meadow, perennial grasslands (dominated by seeded grass species, e.g., crested wheatgrass), perennial grass slope (e.g., bluebunch wheatgrass, Idaho fescue, junegrass), and perennial grass montane (Homer 1998a). The Utah classification data used to create the grassland habitat group included: grassland (perennial and annual grassland), dry meadow, wet meadow, and desert grassland (Homer 1998b). The total number of grassland acres using all available data is 172,006 for the Ecogroup area.

The threats common to the two grassland habitat groups include: trampling by livestock, roads (construction, reconstruction, and maintenance), activities associated with timber harvest, non-native plants, fire (inclusion and exclusion), ORV use, hiking/trampling, herbicide drift, succession, fire exclusion and inclusion, alteration of hydrologic condition, and insect/disease (Tables B-11 and B-12; Appendix G, Tables G-3, G-4, and G-5).

Riparian (22 species) - Riparian habitats are generally defined as those regions connected with or immediately adjacent to banks of streams, rivers, or other bodies of water, or having a moisture regime that promotes the establishment of species adapted to such environmental conditions. The riparian habitat was divided into several subgroups to adequately address the threats unique to each group. The riparian species fall into Riparian Conservation Areas (RCA), which are site-specifically determined corridors along streams (forested, non-forested, intermittent), and lakeshores, and include ponds, reservoirs, and wetlands. These RCAs are specially managed to protect aquatic and riparian resources.

Meadows and Seeps (11 species) - Meadows and seeps are wet openings that contain grasses, sedges, rushes, and herbaceous forbs that thrive under saturated or moist conditions. These habitats can occur on a variety of substrates and may be surrounded by grasslands, forests, woodlands, or shrublands (Skinner and Pavlick 1994).

Table B-13. Threats to the Meadow and Seep Habitat Group

Threat	Number of Species Affected (of 11)
Grazing - trampling by livestock	8
Alteration of hydrology	9
Roads	3
Mining	1
ORV use	1
Fire exclusion	1
Non-native species invasion	3
Herbicide drift	2
Conversion to agricultural lands	3
Fire inclusion	1
Loss of genetic purity	2
Loss of pollinators	1
Recreational uses	1
Timber harvest –associated activities	1
Urban activities	1

Vernally Wet (4 species) - Vernally or seasonally wet habitats are depressions or swales with relatively impermeable soil that accumulate seasonal precipitation and run-off. These areas slowly dry up as temperatures increase through the season. Vernal pools and depressions in sagebrush scrub communities are included in this habitat. Annual herbs and grasses adapted to saturated conditions and early growth under water are predominant (Skinner and Pavlick 1994).

Table B-14. Threats to the Vernally Wet Habitat Group

Threat	Number of Species Affected (of 4)
Grazing - trampling by livestock	4
Alteration of hydrology	4
Roads	2
Timber harvest – log decks	2
Urban development	1
Herbicide drift	2
Conversion to agricultural lands	2
Fire inclusion	1
Loss of genetic purity	2
Natural conditions	3
Non-native plants	3
Loss of pollinators	1
Seed bank	1
Succession	1

Bogs, Fens, and Peatlands (6 species) – Bogs and fens are wetlands that typically have sub-irrigated cold water sources. Peatlands are generally defined as wetlands with waterlogged substrates and at least 30 centimeters of peat accumulation (Moseley et al. 1994). The vegetation within these habitats is often dense and dominated with low-growing perennial herbs (Skinner and Pavlick 1994). The Forest Service manages a high proportion of the valley peatlands in Idaho, primarily in the Sawtooth Valley.

Table B-15. Threats to the Bog and Fen Habitat Group

Threat	Number of Species Affected (of 6)
Grazing - trampling by livestock	5
Alteration of hydrology	5
Roads	1
Facilities	1
Plant collectors	2
Wildlife impacts	1
Timber harvest	1
Fire suppression	1

Streamside and Lakeshore (4 species) - The streamside and lakeshore habitat group includes those species that grow in open habitats along the margins of streams, natural lakes, and reservoirs, and can occur within grasslands, shrublands, woodlands, and forested regions. Species in this group are vulnerable to recreation and livestock impacts to these water sources.

Table B-16. Threats to the Streamside and Lakeshore Habitat Group

Threat	Number of Species Affected (of 4)
Grazing - trampling by livestock	3
Alteration of hydrology	4
Recreation – hiking/trampling	2
Roads	2
Non-native species	2
Fire exclusion	1
Herbicide drift	2
ORV use	1
Conversion to agricultural lands	1
Urban development	1
Loss of pollinators	1
Recreational uses	1
Timber harvest	1
Facilities	1
Insect/disease	1

Hot springs (2 species) – Many naturally occurring hot springs occur throughout the Ecogroup area. These hot spring communities are generally comprised of hummocks of vegetation that are perennially moist from contact with a constant flow and temperature of clean water. Such hot spring habitats are generally localized along larger watercourses with various types of riparian vegetation (Mancuso 1991). Species in this group are vulnerable to recreation due to hot springs use, wildlife impacts, and livestock impacts to these water sources. Human use of hot springs has greatly increased in the past few years. All three Forests have documented disturbance and impacts to plant in the populations that occur in the natural hot springs.

Table B-17. Threats to the Streamside and Lakeshore Habitat Group

Threat	Number of Species Affected (of 2)
Grazing - trampling by livestock	2
Alteration of hydrology	2
Recreation – hiking/trampling	1
Roads	1
Non-native species	1
Wildlife impacts	1
Facilities	2
Insect/disease	1
Collection/harvesting	1
Timber harvest	1
Recreational uses	1

Aquatic plant species (1 species) – Aquatic plant species can occur in shallow vernal freshwater pools of wetlands, edges of larger ponds, or river oxbows that are abandoned or still hydrologically linked to the adjacent river system. Species in this group are vulnerable to recreational impacts due to changes in hydrologic regime, successional changes, and trampling by livestock and wildlife. Soil compaction in aquatic systems can prevent aquatic species from establishing and surviving.

Table B-18. Threats to the Aquatic Plant Habitat Group

Threat	Number of Species Affected (of 1)
Grazing - trampling by livestock	1
Alteration of hydrology	1
Roads	1
Non-native species	1
Loss of genetic purity	1
Natural conditions	1
Seed bank depletion	1
Succession	1

Aquatic (Open water) - The CICP (Redmond et al. 1998), Idaho classification (Homer 1998a) and Utah classification (Homer 1998b) data included cover types for water throughout the Ecogroup. The water cover type from the CICP was included for the aquatic habitat group. The open water cover types were included from the Idaho and Utah classification data. The total number of aquatic (open water) acres using all available data is 29,626 for the Ecogroup area. The effects to the aquatic habitat subgroup are aggregated with the riparian habitat group to more accurately reflect activities that may impact aquatic plants.

Given the large scale of the classification data, the six riparian habitat types were aggregated into one riparian habitat group for spatial analysis. The following parent groups were included from the CICP for the riparian habitat group: conifer-dominated riparian, broadleaf-dominated riparian, mixed tree riparian, graminoid and forb-dominated riparian, and shrub-dominated riparian (Redmond et al. 1998). The Idaho classification data used to create the riparian habitat group included: deciduous tree riparian, riverine riparian (mixed conifer and shrub dominated), herbaceous riparian (sedges and forb species), shrub riparian, deep marsh, shallow marsh, and mud flat (Homer 1998a). The Utah classification data used to create the riparian habitat group included: mountain riparian (above 5500 feet) and lowland riparian (below 5500 feet) (Homer 1998b). The total number of riparian acres using all available data is 119,846 for the Ecogroup. The threats common to the six riparian habitat types include: trampling by livestock, alteration of hydrology, and roads (construction, reconstruction, and maintenance) (Tables B-13, B-14, B-15, B-16, B-17, and B-18; Appendix G, Tables G-3, G-4, and G-5).

Rock (19 species) - A variety of rock habitats occur throughout the region. The Ecogroup area overlies a major portion of the Idaho Batholith. Thus, many species are endemic to the rock outcrops and talus slopes created by this geological formation (Ertter and Moseley 1992). The

rock habitat group has been divided into four main subgroups: cliffs; talus, scree, or unstable slopes; rock crevices and ledges; and decomposing granitic outcrops. Each of the main subgroups has been divided into high- and low-elevation groupings.

Cliff (4 species) – Cliff habitats are defined as steep rock faces, with fissuring, drainage, and aspect characteristics that support plant establishment and growth. Species within this habitat group can be found on a wide range of rock types and elevations. Of the cliff species, three occur at low elevations and one occurs at high elevation.

Table B-19. Threats to the Cliff Habitat Group

Threat	Number of Species Affected (of 4)
Mining	1
Roads (reconstruction, construction)	3
Recreational uses	1
Rock climbing	1
Pollution – dust from recreational roads	1
Insects/disease	1
Herbicide drift	2
Non-native plants	1
Natural conditions	1

Talus, Scree, and Unstable Slopes, (5 species) – Talus slopes are defined as topographic irregularities covered with coarse gravel or boulders. These slopes tend to be unstable thus favoring the establishment of a particular combination of plants. The moisture regime for these rocky habitats is generally dependent upon channeling of precipitation and melt-water run-off.

Low-elevation Talus, Scree, and Unstable Slopes (3 species) – In this rock habitat subgroup, elevation ranges from 1900 feet in the Hells Canyon area to just below 6,500 feet. These areas can be affected by road construction and are sometimes used for roadbed or log deck material, borrow pits, and landscape rock.

High-elevation Talus, Scree, and Unstable Slopes (2 species) – In this rock habitat subgroup, elevation ranges from 6, 500 to upwards of 10,000 feet. These areas are often adversely affected by recreational activities, high elevation livestock use when plants are phenologically active, and natural conditions.

Table B-20. Threats to the Talus, Scree, and Unstable Slopes Habitat Groups

Threat	Number of Species Affected (of 5)
No Information currently on threats	5

Decomposed Granitic Outcrops (5 species) - Rock outcrop habitats are composed of unweathered or slightly weathered bedrock with plants establishing in small pockets of soil or between rock crevices. Three of the granitic outcrop species occur at low elevation and all are endemic to the Stanley Basin. The other two granitic outcrop species occur at high elevation.

Table B-21. Threats to the Decomposed Granitic Outcrop Habitat Group

Threat	Number of Species Affected (of 5)
Grazing - trampling by livestock	4
Roads (construction, reconstruction)	3
Hiking/trampling	3
Urban development	3
ORV Use	2
Herbicide drift	2
Mountain biking	2
Seed bank	2
Fire inclusion	1
Natural conditions	2

Rock Crevices and Ledges (6 species) - Five of the rock crevice and ledge species occur at high elevation, and one occurs at low elevation. Rocky areas and ledges can be of sedimentary, igneous, or metamorphic rock. These species are usually adapted to high ultra violet light, rapid spring runoff, and temperature extremes.

Table B-22. Threats to the Rock Crevice and Ledge Habitat Group

Threat	Number of Species Affected (of 6)
Grazing - trampling by livestock	1
Natural conditions	1
Mining	1

Given the fine scale of the rock habitat types and the large scale of the classification data, the four rock habitat types were aggregated into the rock habitat group for spatial analysis. The following groups were included from the CICP for the rock habitat group: rock dominated sites (exposed tock) and barren areas (Redmond et al. 1998). The rock cover type (rock or talus with less than 5 percent vegetative cover) was included from Idaho classification data (Homer 1998a). The Utah classification data used to create the grassland habitat group included: barren cover type (sand, rock, salt flats, playas, and lava) and pickleweed barrens (mosaic of sparsely vegetated and barren playa flats) (Homer 1998b). The total number of rock habitat acres using all available data is 274,755 for the Ecogroup area.

The threats common to the four rock habitat types include: mining, roads (construction, reconstruction, and maintenance), herbicide drift, natural conditions, and recreation (Tables B-19, B-20, B-21, and B-22; Appendix G, Tables G-3, G-4, and G-5).

Population Trends

Current population trends were assessed from existing scientific literature, data maintained by the ICDC, and botanical expertise. Population trend information was organized into four categories: (1) stable on National Forest System (NFS) lands, (2) declining on NFS lands, (3) increasing on NFS lands, or (4) population trend unknown. Forests are required to supply trend data as part of the six-factor evaluation form for revising the Regional Sensitive Species List (USDA Forest Service 1999). The population trend of the 79 sensitive (current or proposed) or watch species and 7 threatened, proposed, and candidate species was determined through literature searches, expert advise, scientific reports, conversations with ICDC, and professional experience and judgment with these species. Currently, 47 species (55 percent of the total current and proposed sensitive plant species) are thought to have stable population trends on NFS or other lands (Appendix G, Table G-2). Table B-23 summarizes those species (13 species) that are apparently declining on NFS or other lands and the habitat group or groups to which they belong. Appendix G, Tables G-3, G-4, and G-5 summarize those current or potential threats or factors (natural, management, or otherwise) that may be contributing to the decline of these populations. No TEPCS species were found to have an increasing trend.

Table B-23. TEPCS Plant Species with a Declining Trend on NFS Lands

Species Name	Common Name	Habitat Group(s)
Astragalus anserinus	Goose Creek Milkvetch	Woodlands - open-gap species
Astragalus atratus var. *inceptus*	Mourning Milkvetch	Shrublands
Bryum calobryoides	Beautiful Bryum	Riparian
Ceanothus prostratus var. *prostratus*	Mahala-mat Ceanothus	Forest – open-gap species
Crepis bakeri spp. *paddoensis*	Idaho Hawksbeard	Grassland, alpine
Eatonella nivea	White eatonella	Shrubland
Epipactis gigantea	Giant Helliborne orchid	Aquatic/riparian – seeps/springs
Lepidium papiliferum	Slickspot Peppergrass	Shrubland - low elevation
Phacelia minutissima	Least Phacelia	Shrubland, Woodland, riparian
Primula incana	Silvery/Jones' primose	Riparian – meadow, seeps
Rhynchospora alba	White beakbrush	Riparian – bogs, fens
Salix farriae	Farr's willow	Riparian – streamside, subalpine
Silene spaldingii	Spalding's silene	Grasslands

For many of the sensitive species, little to no current information is known concerning biology, threats, or population trends. Table B-24 summarizes those species (26 species) in which too little is currently known about the species or its populations to determine its trend on NFS lands.

Table B-24. TEPCS Plant Species for Which Population Trend is Currently Unknown

Species Name	Common Name	Habitat Group(s)
Arabis falcatoria	Grouse Creek rockcress	Rock – rock outcrops, talus
Argemone munita	Armed prickly poppy	Woodland – open-gap species
Astragalus aquilonius	Lemhi milkvetch	Rock
Astragalus paysonii	Payson's milkvetch	Forest – open-gap species
Astragalus vexilliflexus *var.* nublis	White Cloud milkvetch	Subalpine
Botrychium campestre	Prairie moonwort	Grasslands
Botrychium lanceolatum	Lance-leaf moonwort	Forest-understory
Botrychium lineare	Slender moonwort	Alpine, grassland, talus, Forest
Buxbaumia viridis	Green's bug-on-a-stick	Forest – understory species
Carex aboriginum	Indian Valley sedge	Riparian-wet meadow, sagebrush
Carex buxbaumii	Buxbaum's sedge	Riparian-meadow
Cryptantha propria	Malheur cryptantha	Grasslands
Cypripedium fasciulatum	Clustered lady's-slipper	Forest-understory
Draba incerta	Yellowstone draba	Subalpine/alpine
Eriogonum desertorum	Desert buckwheat	Rock – outcrops
Howellia aquatilis	Water Howellia	aquatic
Pilophorus acularis	Nail lichen	Rock-talus
Poa abbreviata ssp. marshii	Marsh's bluegrass	Alpine
Polystichum krukebergii	Sword fern	Rock, subalpine
Salix glauca	Gray willow	Riparian – streamside, subalpine
Sanicula graveolens	Sierra sanicle	Rock - outcrops
Sedum borschii	Borch's stonecrop	Rock – talus/scree slopes
Silene uralensis spp. *montana*	Petal less campion	Alpine
Sphaeromeria potentillodies	Cinquefoil tansy	Riparian - wet meadow
Stylocline fiaginea	Stylocline	Grasslands
Triantha occidentalis ssp. *brevistyla*	Short-style tofeldia	Riparian – meadows, seeps

Rare and Unique Communities

A plant community is recognized as a repeating assemblage or grouping of plant species on the landscape (Winward 2000). Some classification systems refer to a plant community as the existing vegetation that currently occupies a site, whereas others use the potential vegetation that reflects the climax community at that site. Classifications based on existing vegetation may describe different seral stages as different communities, whereas those based on potential vegetation may include a variety of disturbance-induced or seral plant communities, but the climax community remains the same (Steele et al. 1981). The list of rare and unique communities within the Ecogroup was generated through lists developed by the ICBEMP and the ICDC, and included review and input by botanists and ecologists from the National Forests and State of Idaho. Because these different sources use different methods for defining a community, we did not distinguish between existing and potential communities to ensure that we could compile the most comprehensive list. In all, 42 rare communities that occur within the Ecogroup boundaries were identified.

Global rankings are assigned by the network of Natural Heritage Programs and Conservation Data Centers. All global rankings of G1-G3 were included on our list. These rankings were described above.

As mentioned above, some of these communities are intrinsically rare, whereas others may be affected by other factors, or some combination of the two. For example, the grand fir/ pacific yew (*Abies grandis/Taxus brevifolia*) community is an example of a community that has been reduced due to management activities and alteration of successional pathways. This late-seral forest community is a relatively uncommon community that naturally depends upon a long fire return interval and has been reduced by logging and harvesting of yew bark. There are currently fewer than 200 occurrences in the Western United State (Reid et al. 1999). Another example is the ponderosa pine/snowberry (*Pinus ponderosa/Symophoricarpos oreophilis*) community. This community is locally abundant with the Ecogroup but few quality, representative stands are known outside of this region. In addition to the western Boise mountains of Idaho, there are a few, highly dispersed and geographically separated, stands in the Seven Devils and the Aquarius Plateau and Abajo Mountains of Utah. This community is declining due to landscape-scale disruption of natural fire disturbance patterns and process (Reid et al. 1999).

Threats to the 42 identified communities (Appendix G, Table G-6) include management activities such as timber harvest, road construction, exotic species introduction, landscape fragmentation, livestock grazing, hiking, and altered fire disturbance regimes. Of the 42 rare communities identified for the Ecogroup, 11 currently have declining trends on NFS lands (Appendix G, Table G-6). For 22 rare communities, the trend is currently unknown within the Ecogroup (Appendix G. Table G-6). The remaining 9 communities have stable trends on NFS Lands (Appendix G. Table G-6).

The complete list of the 42 rare and unique communities identified for the Ecogroup, the global and state rankings, rarity class, most prevalent threats, trends, and distribution on National Forest lands within the Ecogroup are presented in Appendix G, Table G-6. An additional table has been added in this final EIS to explain the reasons for the rarity ranking and distribution information in Appendix G, Table G-7. Also, those communities found within Research Natural Areas (RNAs) are listed in Appendix G, Table G-6.

Potential Habitat

The Ecogroup has defined desired conditions for vegetation, based on an array of potential vegetation groups (PVGs) for forested vegetation (See *Vegetation Diversity* section). PVGs, which are groupings of habitat types, share similar environmental characteristics and site productivity. Within each PVG, a historical range of variability (HRV) is described, which represents the range of naturally occurring composition, structure, density, and ecological processes. This will vary for different PVGs because of the differences in environmental characteristics and site productivity. For non-forested vegetation (shrublands and grasslands), desired conditions are based on the density and size class elements of cover types. Cover types are based on the existing vegetation that occupies the site at this time, which may approximate the dominant climax vegetation. It is inclusive of variations due to management activities in those types. Community types describe riparian areas, which are consistently under the

influence of disturbance processes. These community types represent existing community structure and composition, with no indication of successional status or relationship to temporal setting (Padgett et al. 1989). They can be aggregated into broader life form categories more applicable to analysis at Forest-wide levels. Therefore, for different vegetation groups, the desired conditions are based on the HRV for those groups.

There may be TEPCS or rare plants that exist on the Forest, but their actual occurrences and spatial locations are unknown at this time. However, by providing vegetation components at amounts and distributions similar to those that existed historically, and by maintaining or restoring the ecological processes that support these vegetation components, overall biological diversity should also be provided to sustain rare individuals.

Traditional and Cultural Species of Interest to American Indians

Throughout history, native plants have developed cultural significance with many human groups. Plants provide food, fiber, medicine, ceremonial, commercial, and other uses, many of which remain important today. The cultural uses of native plants and their associated communities often contributed to settlement and land use patterns. The users of these products hold considerable natural resource knowledge, including a variety of management techniques to foster the production and quality of certain plants. This knowledge continues to gain important recognition in managing public lands. Appendix G, Table G-8 contains a list of plant species known to have cultural significance to Native American Indians and other users of the Ecogroup. This list was compiled using a variety of sources including ICBEMP (Croft et al. 1997), sources from other National Forests, the Nez Perce Tribe, and consultation with Forest Archeologists.

Special Forest Products

Special forest products are defined as "non-timber, renewable, vegetative natural resources that can be utilized either for personal or commercial use." They include mosses, lichens, ferns, pine cones, Christmas boughs, Oregon grape, wildflowers, mushrooms, huckleberries, osha (*Ligusticum*), St. John's wort (*Hypericum*), beargrass (*Xerophyllum tenax*), cacti, sagebrush, balsam root (*Balsamorhiza sagittata*), parts of woody plants, and many more medicinal and ornamental species. The term "miscellaneous forest products" is reserved for timber-related products.

There is increasing recognition of the economic value of special forest products and their potential role in supporting diversification of forest-product dependent communities. The long-term strength of the industry depends on the sustainability of the resources being harvested, so this issue is closely linked to ecosystem health. Many National Forests across the United States have established Forest-wide direction for special forest products in order to ensure sustainable harvest, to track demand for these products, and to monitor impacts of harvest.

In the past, collection of special forest products on a commercial scale in the Ecogroup has been limited primarily to mushroom harvest after wildfire. However, increasing demand nation-wide for a variety of species has led to an increasing number of inquiries about commercially desirable species available on Ecogroup lands. These include seeds of native species, roots and leaves of native and exotic species for medicinal purposes, and species used in the floral industry.

Unregulated or excessive harvest of special forest products could remove plants at a rate that exceeds growth and reproductive capabilities, resulting in declining species abundance and viability, overall impacts to the ecosystem, and a shift in plant communities and species diversity across the landscape.

ENVIRONMENTAL CONSEQUENCES

Effects Common to All Alternatives

Resource Protection Measures

Laws, Regulations, and Policies - Threatened, endangered, proposed, or candidate species have special management requirements for all Forest Service management activities. Conservation Assessments, Strategies, and Agreements, along with Recovery plans (described above), currently established for the these plant species within the Ecogroup will be met and upheld to ensure the viability and conservation of these species.

For sensitive species, management efforts to ensure their population viability and preservation are already in place. The Forest Service management policy (FSH 2609.25, 1.25, 1988 and FSM 2670) ensures that for all TEPCS plant species, the following measures will be taken: (1) biological evaluations will be written for all activities that may affect sensitive species and their habitat, (2) "effects" of activities will be determined as similar to those for threatened, endangered, or proposed species, and (3) special management emphasis will be included in all management activities to ensure the viability of the Sensitive species and to preclude trends toward endangerment that would result in the need for federal listing. This Forest Service management policy will be employed at a species level in all alternatives to ensure its mandates are achieved and that sensitive species are conserved.

Forest Plan Direction and Implementation - Determining the overall effects of management activities on TEPCS plant species and rare plant communities at the Ecogroup level has inherent risks and uncertainty. Many of the species analyzed in the effects analysis presented here may be beneficially or detrimentally affected by the activities emphasized by each MPC for each alternative. Rare communities, not unlike rare species, may also increase or decrease in abundance or quality based upon activities associated with alternative emphasis or prescription categories. To ensure the viability and conservation of all plant species, the following mitigation measures would be implemented at the appropriate scale for all action alternatives. These measures, including specific standards and guidelines, are to be used in analysis, implementation, and monitoring of projects, for determinations of the effects of management actions on TEPCS species. Additionally, these measures strive to maintain or restore the distribution of native plant communities and special habitat features within the Ecogroup.

Detailed goals, standards, and guidelines for botanical resources that focus on maintaining population viability, ecological processes, and native plant communities are outlined in the Botanical Resources section of the Forest-wide Management Direction in Chapter III of the revised Forest Plan for each Forest of the Ecogroup.

TEPCS Species Protection - For all TEPCS plant species within the Ecogroup, Forest-wide management direction has been developed and would be implemented under all action alternatives, except alternative 1b. The No Action Alternative—1B—would be implemented under current plan direction, not revised direction. Additional revised direction to the current plans to would have to be added to ensure an equivalent level of protection. This direction is in Chapter III of the revised Forest Plans and includes the following:

- Globally rare plants (plants identified as the Natural Heritage Program as G1, G2, and G3 and/or S1 and S2 species) will be maintained and restored, along with provisions for their continued compositional and functional integrity for those species for which we have habitat.

- Conservation and recovery of all federally listed species, Region 4 sensitive (current or proposed), Forest "watch" plants and species at risk where quantity and quality of habitat needed to support viability is a concern.

- Management actions that occur within occupied TEPSC plant species habitat will incorporate measures to ensure habitat is maintained where it is within desired conditions, or restored where degraded

- Surveys will be conducted according to Forest Service Handbook guidelines in FSH 2609.25 (1988) and Forest Service Manual (FSM 2670) prior to completion of NEPA analysis.

- Sensitive species habitat will be identified and prioritized for opportunities to restore degraded Sensitive species habitat during fine scale analyses.

- Signed Conservation Assessments, Strategies, Agreements and Forest Service approved portions of approved Recovery Plans will be implemented for TEPCS species.

- Collection of TEPCS plant species will be for research or scientific purposes only, and conducted under the direction of the Forest or Regional Botanist.

- Forest Botanists should prepare Conservation Assessments, Agreements, and Strategies to maintain or restore habitats of sensitive plant species, as a means of proactive management.

- Suitable occupied and unoccupied habitat should be defined for TEPCS plant species by mapping locations and describing the habitat requirements necessary for the maintenance of viable populations. Rationale for not conducting surveys for other species will be documented in the project record.

- Integrated weed management should be used to maintain or restore habitats for TEPCS plants and other native species of concern where they are threatened by noxious weeds or non-native plants.

- Mitigation will be designed and implemented for projects that have degrading effects on TEPSC plant species – e.g. application of insecticides, herbicides, fungicides, or rodenticides.

- Forest botanist shall be consulted to ensure appropriate species are used in revegetation and seeding projects in occupied TEPSC plant habitat.

Rare Plant Communities - Globally rare communities should be surveyed and mapped when and where possible. This information will be coordinated with the ICDC (Chapter III, revised Forest Plans). Botanical Special Interest Areas (areas that include unique habitat features, rare plant communities, and high-quality unique vegetation) should be identified and recommended for establishment (Chapter III, revised Forest Plans). Throughout the Forests, unique assemblages of rare plant species, valley peatlands, tall forb communities, etc. should be maintained or restored (Chapter III, revised Forest plans).

Plant Communities - Plant community habitats (i.e., riparian, wetland, and upland forest, shrub, valley peatlands, and grassland habitats) should be managed to provide for the desired amount, quality, and distribution of habitats, reduced fragmentation within habitats, juxtaposition and connectivity to other habitats, and ecosystem processes that shape habitat (Chapter III, revised Forest Plans).

Non-Vascular Plants - Surveys should be conducted for bryophytes, lichens, and fungi with poorly known ranges to determine distributions, abundance, threats, and when necessary, appropriate levels of protections. Additionally, those areas with high quality cryptogamic soil crusts with lichens, bryophytes and fungi should be identified and recommended for establishment as Botanical Special Interest Areas (Chapter III, revised Forest Plans).

Pollination – Specific goals and guidelines have been designed to address pollination ecology and to attempt to reduce pollinator losses. Habitats for plants that provide nectar and pollen will be maintained throughout the season when pollinator species are active, with emphasis on rare plant species (Chapter III, Forest Plans). To minimize harm to TEPCS plant species, the Forest Botanist should review annual insecticide or herbicide spray plans and prescribed burning plans (Chapter III, revised Forest Plans). Examples of additional mitigation efforts include: (1) no application of insecticides and herbicides during the flowering period of any known TEPCS plant populations and surrounding areas and (2) the seasonality of prescribed burning plans should be reviewed by Forest botanists to minimize harm to TEPCS species and their pollinators. Research efforts for Sensitive plant species to determine habitat dynamics, seral conditions, pollination ecology, phenology, distribution, and susceptibility to impacts will be coordinated with Idaho Conservation Data Center, universities, and Forest Service Research Stations (Chapter III, revised Forest Plans). Many conservation assessments and recovery plans of TEPCS species also include detailed guidelines for the preservation of pollinator habitats and resource needs.

Inventory and Monitoring - Suitable occupied and unoccupied habitat should be defined for TEPCS plant species by mapping locations and describing the habitat requirements necessary for the maintenance of viable populations. Surveys will be conducted by Forest botanists, or botanical personnel under their direction, to identify TEPCS plant species and their habitats. Surveys and mapping efforts for rare communities will also be completed when possible. Information will be incorporated in a GIS database and will be shared with the ICDC (Chapter III, revised Forest Plans).

Conservation Assessments, Agreements, Strategies, and Recovery Plans often include very detailed inventory and monitoring schedules and guidelines for TEPCS plant species. These inventory and monitoring plans will be met and upheld in the implementation of all current and future Conservation Assessments, Agreements, Strategies and Forest Service approved portions of Recovery Plans.

Monitoring and evaluation programs for Botanical Resources are outlined in Chapter III of the revised Forest Plans. Inventory and monitoring activities are essential to provide information that will allow managers to maintain and promote the biological and ecological needs of TEPCS plant species and to ensure the viability of these populations.

Traditional and Cultural Species of Interest to American Indians - The gathering of plants for American Indian ceremonial or medicinal uses are provided for through the existing treaties with the U.S. Government and will be coordinated through the Forest Supervisor (Chapter III, Forest Plans). Additionally, Forest botanists should identify those plants associated with traditional uses (sustenance, medicine, ceremony, etc.) along with those areas that are culturally significant to Native American communities (Chapter III, revised Forest Plans).

Collection and Harvesting - Specific standards and guidelines in the revised Forest Plans have been designed to address the impacts of collecting and harvesting. As stated above, collection of TEPCS plant species will be for research or scientific purposes only under Forest Service direction. In cases where collecting permits are issued, digging or physically removing whole plants will be discouraged in favor of collecting seeds or cuttings (Chapter III, revised Forest Plans).

Revegetation - The need to utilize native plants in revegetation and restoration projects is emphasized. Forest personal will cooperate with researchers, ecologists, geneticists and other interested parties to develop seed zones or breeding zones for native plants (Chapter III, revised Forest plans). Land managers will be encouraged to collect seeds of native plants to be used in rehabilitation and restoration activities. Seeds will be collected in accordance with seed zones or breeding zones. Additionally, work to develop long-term storage facilities for collected seeds such as the seed bank at the Lucky Peak Nursery will be conducted (Chapter III, revised Forest plans). When available and not cost-prohibitive, seeds and plants used for seedings and plantings in revegetation projects should originate from genetically local sources of native species. When project objectives justify the use of non-native plant materials, documentation explaining why non-natives are preferred should be part of the project planning process (Chapter III, revised Forest plans).

Education – Native and rare plant conservation efforts can be greatly benefited through education programs and outreach efforts. Efforts to enhance public awareness of the fundamental importance of plants to society through educational programs about native plants, plant conservation, biological diversity, ecological processes, and noxious weeds will be made (Chapter III, revised Forest plans). Forests will also attempt to enhance public awareness of the fundamental importance of plants to society through educational programs about native plants, plant conservation, biological diversity, ecological processes, and noxious weeds (Chapter III, revised Forest plan).

General Effects

Threats to TEPCS plants were identified previously in this section. These threats are assessed below for their direct and indirect effects to plant populations and habitats. Impacts were grouped into five management actions that have the most potential to affect plants: (1) fire (wildfire and fire use), (2) livestock grazing activities, (3) recreational activities, (4) mechanical activities, and (5) noxious weed invasion. The intensity and spatial extent of the management actions would vary by alternative; however, the general impacts to plants associated with each of the management actions are described below.

Fire (Wildland Fire and Fire Use) - All of the alternatives would use fire as a tool to accomplish management goals and objectives. Each alternative has different management emphasis areas and as such the use and emphasis of fire will vary by alternative. For example, alternative 5 has more of a commodity emphasis than other alternatives. Fire will not be a major vegetation management tool due to the desire to provide forest products. Many areas will require mechanical preparation of fuels before fire can be re-introduced as a management tool. As the potential for spring burning increases to meet fire use goals, the potential impacts to many plants increase. Most plants are not adapted to fire at this time of year. Spring burning interferes with flowering, fruiting, and other physiological impacts, and could affect life history patterns with pollinators. However, these risks need to be weighed against the risks of uncharacteristic wildfire and long-term habitat loss of plant species. Several of the TEPCS plants thrive in the openings created by fires (Appendix G, Table G-4); therefore, fire use to restore the historic fire regime would benefit these species in the long term.

Wildfires can pose risks to some of the TEPCS plants, particularly when the fires are uncharacteristic. As an example, an entire population of *Saxifraga bryophora var. tobiasiae* was recently lost due to uncharacteristic wildfire. In general, most plant species would benefit by the restoration of more historical fire regimes. There are also direct and indirect impacts to plants associated with wildfire suppression activities, such as fire line construction and other mechanical activities, salvage logging, reforestation following fire, and the increased potential for the spread of noxious weeds.

Livestock Grazing Activities - Various direct and indirect impacts are associated with livestock grazing. Direct impacts include livestock trampling, herbivory, congregation and associated soil disturbances, and ORV use by range riders. Indirect impacts are more varied. These include the increased potential for the spread of noxious weeds and associated herbicide spraying, the introduction of exotic species, and changes in species composition and density of grasslands, shrublands, and woodland environments. These changes often affect the habitat available for

TEPCS species. Livestock often utilize and congregate in riparian areas and meadows, which can also alter species composition and change the habitat available to TEPCS species. Additionally, changes in vegetation and bank stability can affect hydrological cycles, further stressing plants that depend on stable hydrological conditions. On the other hand, plants in the Intermountain West have evolved with herbivory by insects, rodents, and wildlife species (elk, deer, big horn sheep and possibly antelope), thus some plants may benefit from grazing at appropriate intensity levels (Burkhardt 1995).

Recreational Activities - The most important direct impact related to recreation is trampling, both by hikers and ORV use (Liddle 1975, 1991). These types of activities particularly threaten many TEPCS species. Road building and the development of campgrounds and other facilities used by recreationists also contribute to plant impacts, as these developments make more areas accessible and concentrate use. Dispersed camping and recreation have similar impacts, which are more difficult to monitor. Parking areas, particularly undesignated areas, pose similar impacts to plants. An example of the recreational impacts to plants is illustrated by *Castilleja christii*. After a road bisecting the population was paved, ORV use, dispersed recreation, and user accessibility increased. Plants next to the roadbed were lost. The long-term impacts of bisecting the population to functions such as reproduction and dispersal are still unknown. Other recreational impacts include ORV use, which can also disturb soil, affecting both habitat and potential habitat. Roads and trails for recreational use can contribute to the spread of noxious weeds, and increase the accessibility of areas to native ungulates and livestock, which can increase the impacts of trampling, herbivory, and congregation.

Mechanical Activities - Mechanical activities include vegetation management treatments, whether for restoration or to meet growth and yield objectives. Activities such as logging can have impacts to plants and plant habitat through canopy removal, soil disturbance and erosion, and stream sedimentation. In addition, mechanical activities for vegetation treatment may require road building. Roads increase access to and fragment habitat and provide an avenue for weed invasion. They can be placed on ridgetops, in riparian areas, or through scree slopes, which are important habitats for a number of species. Reconstruction and maintenance of existing roads can directly or indirectly affect plant populations by introducing competitive weeds and altering availability of light, nutrients, and moisture. Sudden changes in seral stage, or an abundance of early seral stages, also reduce the available habitats for those plants that require mid-late seral stages. However, those species that prefer openings, early-seral stages, or some ground disturbance, could benefit from moderate levels of mechanical activities. Changing patch dynamics across the landscape could also have effects to TEPCS plant species. As discussed above in fire, the restoration of historical fire regimes and restoration of conditions towards HRV with a range of seral stages for different potential vegetation groups may benefit some TEPCS species in the long term.

Noxious Weed Invasion - Noxious weeds directly affect plants and plant populations through competitive displacement. Indirect impacts include herbicide spraying and mechanical ground disturbance to control noxious weeds once they gain a foothold. Competition from invasive non-native species and noxious weeds can result in the loss of habitat, loss of pollinators, and decreased TEPCS species viability. Roads, trails, livestock, and canopy reduction can provide ideal pathways for the introduction of exotic and non-native species. Indirectly, herbicide

spraying can destroy populations of native pollinators by contaminating nesting materials and pollen resources (Pierson and Tepedino 2000), further decreasing the viability and reproductive success of TEPCS species. Some species of non-native plants will alter hydrological regimes, changing and reducing the habitat available to TEPCS plants.

Evaluation of Risk and Uncertainty

When assessing effects for the entire Ecogroup area, there are limitations in determining the impacts of the complex set of management emphases under each alternative for the 76 current or proposed sensitive species (threatened, proposed, and candidate species were analyzed separately). Causes of rarity can vary greatly for individual species. Species may be intrinsically rare or rare as a result of anthropogenic interference (Kruckeberg and Rabinowitz 1985). Other plant species may be rare due to their population ecology, evolutionary history, or basic reproductive biology. Historical or current anthropogenic activities may also contribute to the current distribution of these rare species. It is assumed in this analysis that certain management actions may promote or detract the potential long-term viability of TEPCS plant species, or may increase or decrease the availability or quality of habitats that support these TEPCS plant species.

Degree of Active Management by MPC - The potential impacts of each management prescription category (MPC) were ranked as low, moderate, or high based on the definitions and objectives for each prescription category (see Chapter 2). The potential impacts to the TEPCS species were ranked for the five management actions (fire, livestock grazing activities, recreational activities, mechanical activities, noxious weed invasion) that have the most potential impacts to plants. These rankings are displayed in Table B-25. The justification for each impact ranking is also included below.

Table B-25. Rating of Potential Impacts on TEPCS Species and Habitats by MPC

MPC	Fire Use	Grazing	Recreation	Mechanical	Noxious Weeds
1.1	High	None to low	Low	None	Low to moderate
1.2	High	Low to moderate	Low	None	Low to moderate
2.0/2.1	Low	Low to moderate	Low to moderate	Low to moderate	Low to moderate
2.2	Low	Low	Low	None	Low to moderate
2.4	Low	None to low	Moderate	Moderate	Moderate
3.1	Low to moderate	None to low	Low to moderate	None to low	Moderate
3.2	Moderate	Low to moderate	Low	Low to moderate	Moderate to high
4.1a	High	Moderate	Low	None to low	Low *
4.1b	High	Moderate	Low	Low	Low to moderate*
4.1c	High	Moderate	Low	Low to moderate	Low to moderate*
4.2	Low to moderate	Low to moderate	Moderate to High	Moderate	High
4.3	Low to moderate	None to low	High	Low to Moderate	Moderate to high
5.1	Moderate	Low to moderate	Low to Moderate	Moderate to high	Moderate to high
5.2	Low	Low to moderate	Moderate	High	Moderate to high
6.1	Moderate	Moderate to high	Moderate to High	Moderate to high	Moderate to high
6.2	Moderate	Moderate to high	Moderate to High	High	Moderate to high
8.0	Low to moderate	Moderate	Moderate	High	Moderate to high

*Low in Alternatives 1B through 5, and 7. None to low in Alternative 6.

Existing Wilderness and Recommended Wilderness, MPCs 1.1 and 1.2 - The potential impacts of fire to TEPCS plant species are high. Fire use is the only vegetative management tool allowed in these MPCs. Wildland fire use for resource benefits is currently the primary fire use. Management actions, including wildland fire use and prescribed fire, must be designed and implemented in a manner that maintains wilderness values, as defined in the Wilderness Act (MPC standard). The potential impacts from grazing are none to low in MPC 1.1 and low to moderate in MPC 1.2. These areas generally have lower stocking and use levels where livestock are permitted. The levels of livestock use are controlled primarily by utilization standards, particularly in riparian areas. The potential impacts from recreational activities are relatively low. Trampling effects are high within trail corridors and around popular destinations but the overall impact is low when areas outside of corridors and destination sites are considered. Impacts are also limited by absence of (1.1) or generally low levels of (1.2) motorized vehicle traffic. These areas provide primitive and semi-primitive recreation experiences that are generally lower levels and concentrations of use. There are no potential impacts from mechanical activities because timber harvest, road building, and mining are generally not allowed. Road construction and reconstruction can only occur where needed to provide access related to reserved or outstanding rights and to respond to a statue or treaty (MPC standard). The potential impacts of noxious weed invasion are low to moderate in these MPCs. Dispersal of noxious weed seed is generally limited to along the trail systems and river corridors. Monitoring and detection of infestation is often infrequent in wilderness areas, thus allowing for noxious weeds to establish and expand prior to discovery. Increased uncharacteristic wildfire under these MPC could also create new opportunities for weed establishment.

Wild and Scenic Rivers, MPC 2.1 - This management prescription includes areas that have been Congressionally designated as Wild, Scenic, or Recreational rivers and their associated land corridors, which extend an average of 0.25 mile from each bank. These designations are made to protect free-flowing waters and "outstanding remarkable values". These areas will be administered under a management plan that will provide standards and guidelines designed to help protect and promote the continued viability of TEPCS species. All potential impacts are low to moderate as a result, except low impacts from fire use. In scenic or recreational corridors, mechanical treatments may be used as long as Outstanding Remarkable Values (ORVs) are maintained within the river corridor. Noxious weeds may be slightly higher along river courses as a result of heavier recreational activity. Prescribed fire and wildland fire may be used in any river corridor as long as the ORVs are maintained (MPC guideline).

Research Natural Areas, MPC 2.2 – This prescription applies to areas that have been administratively established as Research Natural Areas (RNAs). Management emphasis in RNAs is to protect and preserve their intrinsic qualities, and vegetation manipulation is only allowed where activities perpetuate the protected ecosystems. The potential impacts of fire on TEPCS species and their habitats are low. Suppression efforts are generally used to protect RNAs, and management plans generally do not include fire use. Prescribed fire and wildland fire may only be used to maintain vegetative values for which the areas were established or to achieve objectives consistent with the RNA establishment record or management plan (MPC standard). The potential impacts of grazing on TEPCS plant species and their associated habitats are low. Impacts from grazing are incidental because grazing is discouraged within MPC 2.2 and measures to prevent incidental livestock use within these areas are employed where needed.

The overall potential impacts of recreational activities are low within RNAs. Most RNAs have low use, motorized recreation is typically restricted, and recreation is generally limited to trails. Mechanical activities pose little to no threat, as timber harvest and salvage harvest may only be used to maintain vegetative values for which areas were established or to achieve objectives consistent with the RNA establishment record or management plan (MPC standard). Road construction and reconstruction can only occur where needed to provide access related to reserved or outstanding rights and to respond to a statue or treaty, or to maintain the values for which the RNA was established (MPC standard). Potential impacts from noxious weeds are low to moderate within RNAs. There is little to no management disturbance and the potential for exotic seed dispersal from roads or trails within these areas is low.

Boise Basin Experimental Forest, 2.3 - This area (8,740 acres) has been established to provide for vegetation management research of ponderosa pine (*Pinus ponderosa*). This area is designated for research purposes, and activities are designed and implemented to meet research objectives. Potential impacts of fire to TEPCS plant species and their habitat are low in this MPC. Wildland fire use is prohibited (MPC standard), and prescribed fire may occur as part of planned research, provided that research objectives are not compromised (MPC guideline). Grazing poses little to no threat to TEPCS plant species because livestock grazing is prohibited unless prescribed as a management tool to achieve research objectives (MPC standard). Recreational activities pose a moderate threat to TEPCS plants species and habitat. An extensive road network has been built within the forest to accomplish the research objectives. Popular trails within the area are highly used by motorcyclists and other off-road vehicle users. The potential impacts of mechanical activities are moderate within this MPC as well. Mechanical treatments of vegetation may occur as part of planned research activities or to achieve other objectives, provided that research objectives are not compromised (MPC guideline). Salvage harvest may occur as part of planned research activities (MPC guideline). Noxious weeds pose a moderate level of potential impacts within this area. The large system of roads and trails and the high use of the area increase the potential threat of invasion of noxious weeds and exotic species.

Passive Restoration and Maintenance of Aquatic, Terrestrial, and Hydrologic Resources, MPC 3.1 - Management intent is to minimize temporary risks and to avoid short- and long-term risks from management actions to soil/hydrologic conditions and aquatic, botanical, and terrestrial habitats. The potential impacts from fire to TEPCS plant species are low to moderate. Wildland fire and prescribed fire may only be used where they maintain or restore water quality needed for fish species or where they maintain or restore habitat for native and desired non-native wildlife and plant species (MPC standard). The primary emphasis of fire use will likely be prescribed fire to control fuel and density levels. These types of projects will require site-specific surveys and mitigation when necessary. Livestock grazing poses low to no potential impacts to TEPCS species and their habitat. This MPC emphasizes low stocking and use levels where livestock are permitted. The level of use is controlled by utilization standards, particularly in riparian areas. The potential impacts of recreational activities to TEPCS plants and habitat are low to moderate. The potential impacts of mechanical treatments are none to low. Mechanical vegetative treatments, excluding salvage harvest, may only occur where wildland fire use or prescribed fire would result in unreasonable risk to public safety and structures, investments, or undesirable resource affects; and they maintain or restore water quality needed to fully support beneficial uses and habitat for native and desired non-native fish species; or they maintain or restore habitat

for native and desired non-native wildlife and plant species (MPC standard). Road construction and reconstruction can only occur where needed to provide access related to reserved or outstanding rights and to respond to a statue or treaty, or to address immediate response situations, where if the action is not taken, unacceptable impacts to hydrologic, aquatic, riparian, or terrestrial resources, or health and safety, would occur (MPC standard). The potential impacts of noxious weeds to TEPCS species and habitats are moderate. The frequency of prescribed fire and wildland fire that is lethal will likely enhance conditions for noxious weed establishment. The amount of monitoring and detection may decrease, thus allowing for increases in establishment. This may be balanced, however, by the decrease in road densities, thus reducing the risk of new establishment.

Active Restoration and Maintenance of Aquatic, Terrestrial, and Hydrologic Resources, MPC 3.2 – The management intent is to minimize temporary and short-term risks and to avoid long-term risks from management actions to soil/hydrologic conditions and aquatic, botanical, and terrestrial habitats. The management emphasis is to actively restore or maintain aquatic, terrestrial, and hydrologic conditions through a combination of natural processes and management activities (noxious weed treatment, thinning, prescribed fire, watershed restoration, and wildland fire for resource benefit). The potential impacts from fire are moderate. A mix of fire use and mechanical treatment can be used to reduce long-term risks and ensure sustainability of habitat and aquatic/riparian objectives. Site-specific analysis for fire use and prescribed fire will allow for the incorporation of mitigation and will help reduce the impacts of fire to TEPSC species. Livestock grazing poses low to moderate potential impacts to TEPCS species and their habitats. Grazing practices, stocking, management systems, durations, timing, and use levels are adjusted or planned with the intent to meet specific management area objectives and standards for wildlife, aquatic, and vegetative resources. The potential impacts of recreational activities to TEPCS plants and habitat are low. There are moderate to high levels of control for travel and dispersed recreation. The potential impacts of mechanical treatments to TEPCS plants species are low to moderate due to restoration activities that may occur in localized areas. The potential impacts of noxious weeds to TEPCS species and habitats are moderate to high. Vegetation is managed through a mix of fire and mechanical treatment to control stand density levels. Soil disturbance may occur with active restoration activities. The extent of treatment in the short term may depend upon the desired objectives.

Undeveloped Recreation: Maintain Inventoried Roadless Areas, MPC 4.1a – This prescription applies to lands where dispersed and undeveloped recreation uses are the primary emphasis. Providing dispersed recreation opportunities in an inventoried roadless area is the primary objective. The potential impacts of fire to TEPCS plants and habitats are high. Fire use is the primary vegetation management tool, although the opportunity or the ability to utilize fire as a management tool may be low. The potential impacts from grazing to TEPCS plant species are moderate. These areas generally have low stocking and use levels where livestock are permitted. Recreational activities pose low potential impacts. The trampling effects are higher along trails and in popular destinations, but the overall impacts of recreation are low when compared with the amount of area assigned to this MPC. Both motorized and non-motorized recreation opportunities may be provided. Other resource uses are allowed to the extent that they do not compromise recreation resource values. The potential impacts of mechanical activities are none to low. Road construction and reconstruction can only occur where needed to provide access

related to reserved or outstanding rights and to respond to a statue or treaty (MPC standard). Mechanical treatments are limited. The potential impacts of noxious weeds on TEPCS plants and habitats are none to low. Motorized travel is allowed in some areas, thus increasing the potential for invasion. Dispersal of exotic seed, however, is generally limited to trails and river corridors. Monitoring and detection may be less frequent; therefore the potential for infestation or establishment is increased. Species habitat and recreational uses are generally compatible, although recreation uses may be adjusted to protect listed, proposed, or sensitive species.

Undeveloped Recreation: Maintain Undeveloped Character with Allowance for Salvage Harvest, MPC 4.1b - This prescription applies to lands where dispersed recreation uses are the primary emphasis. Providing dispersed recreation opportunities in an undeveloped landscape is the predominant objective. The potential impacts of fire to TEPCS plants and habitats are high. Fire use is the primary vegetation management tool, although the opportunity or the ability to utilize fire as a management tool may be low. The potential impacts from grazing to TEPCS plant species are moderate. These areas generally have low stocking and use levels where livestock are permitted. Recreational activities pose low potential impacts. The trampling effects are higher along trails and in popular destinations, but the overall impacts of recreation are low when compared with the amount of area assigned to this MPC. Both motorized and non-motorized recreation opportunities may be provided. Other resource uses are allowed to the extent that they do not compromise recreation resource values. The potential impacts of mechanical activities are low. Road construction and reconstruction can only occur where needed to provide access related to reserved or outstanding rights and to respond to a statue or treaty (MPC standard). Management actions allowed in MPC 4.1b—including salvage harvest, wildland fire use, prescribed fire, and special-use authorizations—must be designed and implemented in a manner that does not adversely compromise the area's undeveloped character in the temporary, short term, and long term (MPC standard). The potential impacts of noxious weeds on TEPCS plants and habitats are low to moderate. Motorized travel and salvage harvest area allowed in some areas, thus increasing the potential for invasion. Dispersal of exotic seed, however, is generally limited to trails and river corridors. Monitoring and detection may be less frequent; therefore the potential for infestation or establishment is increased. .

Undeveloped Recreation: Maintain Unroaded Character with Allowance for Restoration Activities, MPC 4.1c - This prescription applies to lands where dispersed recreation uses are the primary emphasis. Providing dispersed recreation opportunities in an unroaded landscape is the predominant objective. The potential impacts of fire to TEPCS plants and habitats are high. Fire use is the primary vegetation management tool, although the opportunity or the ability to utilize fire as a management tool may be low. The potential impacts from grazing to TEPCS plant species are moderate. These areas generally have low stocking and use levels where livestock are permitted. Recreational activities pose low potential impacts. The trampling effects are higher along trails and in popular destinations, but the overall impacts of recreation are low when compared with the amount of area assigned to this MPC. Both motorized and non-motorized recreation opportunities may be provided. Other resource uses are allowed to the extent that they do not compromise recreation resource values. The potential impacts of mechanical activities are low to moderate. Management actions allowed in MPC 4.1c—including mechanical vegetation treatments, salvage harvest, wildland fire use, prescribed fire, special use authorizations, and road maintenance—must be designed and implemented in a manner that

would be consistent with the identified Management Area Recreation Opportunity Spectrum (ROS) objectives in the temporary, short term, and long term (MPC standard). Within IRAs, road construction and reconstruction may only occur where needed to provide access related to reserved or outstanding rights, or to respond to statute or treaty (MPC standard). Outside IRAs, road construction and reconstruction may only occur where needed: to provide access related to reserved or outstanding rights, or to respond to statute or treaty, or to provide transportation systems that support accomplishment of Management Area Recreation Resource Opportunity Spectrum objectives (MPC standards). The potential impacts of noxious weeds on TEPCS plants and habitats are low to moderate. Motorized travel, mechanical vegetation treatments, fire use, and salvage harvest area allowed in some areas, thus increasing the potential for invasion. Dispersal of exotic seed, however, is generally limited to trails and river corridors. Monitoring and detection may be more frequent in restoration project and therefore the potential for infestation or establishment is decreased.

Roaded Recreation Emphasis, MPC 4.2 - This MPC promotes a predominately natural-appearing environment and an emphasis on recreation resources. A wide range of recreational activities and developments occurs. Potential fire impacts to TEPCS plant species and habitats are moderate to low. These areas have a suited timber base with greater emphasis on mechanical treatment, though prescribed fire may be used to meet vegetation management objectives, to restore fire as a process, and to reduce the risk of uncharacteristic vegetation due to insects, diseases, and fire on recreation settings and development. Vegetation management actions, including wildland fire use, prescribed fire and mechanical treatments, may be used to maintain or restore desired vegetation and fuel conditions provided they do not prevent achievement of recreation resource objectives (MPC guideline). The potential impacts of livestock grazing are low to moderate. Livestock stocking in forested areas will be lower in order to provide flexibility to meet specific management area objectives. Grazing is allowed to the extent that it does not compromise recreation resource values. Recreational activities pose moderate to high potential impacts. Human use and presence are generally obvious. Concentrated and fairly high levels of recreation use occur in road corridors and around developed recreation sites. A more extensive road system (both classified and user-created) is likely in MPC 4.2 than in MPC 4.1, thus creating greater accessibility and increasing potential impacts to plant species. Mechanical activities pose moderate impacts to TEPCS plants and their habitats. Suited acres for timber harvest exist but vegetation management is used to meet recreation objectives. The potential impacts of noxious weeds are high. The risk of spread is high due to the extent of motorized use, range of uses, the management activities allowed, and the likelihood of low to moderate levels of detection and monitoring.

Concentrated Recreation, MPC 4.3 – This prescription applies to lands where developed recreation uses are the primary emphasis. These areas are typically characterized by substantial recreation-related infrastructure and capital investment. The potential impacts of fire to TEPCS plants and their habitats are low to moderate due to the urban interface and high social-economic values of these areas that will limit the amount of fire used as a vegetation management tool. Vegetation management actions, including prescribed fire and mechanical treatments, may be used to manage fuel conditions and support recreation resource objectives (MPC guideline). Livestock grazing poses little to no potential impacts, as grazing is extremely limited in this MPC. Grazing is allowed to the extent that it does not compromise recreation resource values.

Potential impacts of recreational activities are high. These areas are highly roaded and developed. Human use and presence are obvious and the area may have a substantially modified natural environment. Facilities are maintained, and both motorized and non-motorized recreation may be provided. Concentrated and very high levels of recreation use occur in road corridors and around developed recreation sites. Mechanical activities pose low to moderate impacts to the TEPCS plant species. Vegetation management is likely limited due to social constraints. The potential impacts from noxious weeds are moderate to high. Soil disturbance is relatively high in this MPC. Monitoring and detection are high within this MPC and financial sources for rehabilitation and treatment are high.

Restoration and Maintenance Within Forested Landscapes, MPC 5.1 – This prescription applies to predominantly forested lands where management activities are designed to restore or maintain vegetation and other biophysical conditions. Management emphasis is on maintaining and restoring forest ecosystem integrity, improving long-term resilience of resources to disturbance events, and attaining sustainable resource conditions in forested landscapes. Potential impacts of fire to TEPCS plant species and habitat are moderate. There is a greater emphasis on restoring vegetation and returning fire as a process in this MPC than in other MPCs. Livestock grazing poses low to moderate potential impacts. Livestock stocking in forested areas will be lower in order to provide flexibility to meet specific management area objectives. Potential impacts of recreational activities are low to moderate. There are available road networks within this MPC, although obstacles, including terrain and vegetation, limit the range of ORV use and associated recreational impacts. Mechanical activities pose moderate to high potential impacts. On suited acres, vegetation management is used to meet biodiversity and restoration objectives. Commodity production is allowed, but achievement of high timber growth and yield is not the primary purpose. There is less road construction and reconstruction than in MPC 5.2 (see MPC 5.1 guidelines). In this MPC, there would be a relatively high level of mechanical disturbance compared to most other MPCs, however, the intent of the MPC is to restore or maintain vegetative diversity. Thus, the long-term benefits of this restoration or maintenance may outweigh the short-term impacts within rare plant habitat. As such, the long-term effects may be moderate but short-term risks would still be moderate to high. The potential impacts of noxious weeds are moderate to high. Soil disturbance associated with mechanical activities (i.e., ground disturbance associated with vegetation management or fire use) could increase the risk of invasion. Travel management may be controlled with seasonal or yearlong road closures, thus reducing the risk of spread.

Commodity Production within Forested Landscapes, MPC 5.2 - The management emphases are on sustainable resource conditions while maintaining and restoring forest ecosystem health to reduce the potential for long-term degrading effects from uncharacteristic disturbance events. Potential impacts of fire are low. There is a greater emphasis on mechanical treatment of vegetation, and fire use will be limited to activity fuels treatment (See MPC guidelines). Wildand fire use is prohibited (MPC standard). Livestock grazing poses low to moderate potential impacts. Livestock stocking may be slightly lower in order to provide flexibility to meet forest productivity objectives. Potential impacts of recreational activities to TEPCS species are moderate. There are available road networks within this MPC, but with higher road densities allowing more widespread recreation access. However, there are more obstacles to cross-country vehicle travel, including terrain and vegetation, compared to 6.1 and 6.2. Mechanical activities

pose high potential impacts. In suited acres, vegetation management is used to meet growth and yield objectives. This MPC has the highest potential for road construction and greatest potential for emphasis on mechanical, ground-disturbing equipment in forested environments. The potential impacts of noxious weeds to TEPCS plant species and habitat are moderate to high. Soil disturbance is moderate to high due to the level and frequency of mechanized activities, and motorized use and road density may be high. The level of monitoring and detection activity will be high, as will the ability to prevent, contain, control, and eradicate new infestations. Funding for such efforts will be higher due to contract and permit clauses.

Restoration and Maintenance Within Shrubland and Grassland Landscapes, MPC 6.1 - This prescription applies to landscapes that are predominantly (>50 percent) shrubland and grassland. Management activities are designed to maintain or restore desired vegetation conditions, improve long-term resilience of resources to disturbance events, and achieve sustainable resource conditions in non-forested landscapes. Potential impacts of fire are moderate. Emphasis is on restoring vegetation and returning fire as a process in this MPC. Livestock grazing poses moderate to high potential impacts. Shrublands provide a more balanced level of age class and density that results in a balanced mixture of seral conditions. Pasture use durations may be longer in some situations. Trampling, along with flower and seed development disruption, may occur in early season pastures. The potential impacts of recreational activities are moderate to high. Available road networks, gentle terrain, and the lack of vegetation obstacles may allow for increased impacts from ORVs. Mechanical activities pose moderate to high potential impacts. As in MPC 5.1, MPC 6.1 would have a relatively high level of mechanical disturbance compared to most other MPCs, however, the intent of the MPC is to restore or maintain vegetative diversity. Thus, the long-term benefits of this restoration or maintenance may outweigh the short-term impacts within rare plant habitat. As such, the long-term effects may be moderate but short-term risks would still be moderate to high. In suited acres, vegetation management is used to meet biodiversity and restoration objectives. However, there is less road construction and reconstruction than in MPC 6.2. The potential impacts of noxious weeds are moderate to high. Soil disturbance associated with restoration and recreational activities could increase the risk of invasion.

Commodity Production within Shrubland and Grassland Landscapes, MPC 6.2 - This prescription applies to landscapes that are predominantly (>50 percent) shrubland and grassland. Management emphasis is on achieving sustainable resource conditions for commodity and non-commodity outputs while maintaining and restoring ecosystem health to reduce potential for long-term effects from uncharacteristic disturbance events. Management emphasis is on providing suitable grazing lands for forage production of livestock. The potential impacts of fire to TEPCS plant species and habitat are generally moderate, although they tend to be higher in forested vegetation than non-forested vegetation. Prescribed fire is used more frequently to sustain shrublands in early to mid seral conditions (See MPC standards). Wildland fire levels are moderate due to suppression. Livestock grazing poses moderate to high potential impacts to TEPCS plant species and habitat. A majority of the shrublands will be maintained in early seral and mid seral conditions through prescribed fire and livestock management. Trampling, along with flower and seed development disruption, may occur in early season pastures. The potential impacts of recreational activities are moderate to high. Available road networks, gentle terrain, and the lack of vegetation obstacles allow for increased impacts of ORVs. Mechanical activities

pose high potential impacts. Vegetation management is used to meet forage production for livestock. As a result, this MPC has a high potential for road construction and for emphasis on mechanical, ground-disturbing equipment in non-forested environments. The potential impacts of noxious weeds to are moderate to high. Soil disturbance associated with restoration activities could increase the risk of invasion. Additionally, fire use levels may create more opportunities for spread.

Concentrated Development Areas, MPC 8.0 - This prescription includes lands managed for concentrated development and use. Uses and facilities dominate the landscape and often require extensive site alterations. Management activities may include mining, limited timber harvest, road building, limited motorized recreation, and limited fire use and suppression. Wildland fire is prohibited (MPC standard).

Amount of MPC by Alternative - The relative amount of each MPC by alternative was calculated from the proportion of acres assigned to an MPC divided by the total acres within the Ecogroup (See Chapter 2 for individual acreage by MPC). These data are displayed in Table B-26 below.

Table B-26. Percent of MPC by Alternative for the Ecogroup

MPC	Alt. 1B	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
1.1	14.9	14.9	14.9	14.9	14.9	14.9	14.9
1.2	10.0	10.0	10.0	38.4	0.0	10.0	10.0
2.0/2.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2.2	0.4	0.4	0.4	0.4	0.4	0.4	0.4
2.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1
3.1	0.0	1.4	3.0	10.2	0.0	0.5	9.8
3.2	Trace	10.9	20.2	16.7	1.3	3.5	12.8
4.1a	Trace	0.1	0.3	1.0	3.3	38.9	1.3
4.1B	18.1	16.7	0.0	0.0	0.0	13.8	0.0
4.1c	0.8	4.4	8.7	5.6	8.5	0.7	17.9
4.2	10.6	4.9	5.3	2.2	8.2	1.5	3.2
4.3	Trace	Trace	Trace	Trace	Trace	Trace	Trace
5.1	13.5	19.4	25.2	4.7	17.6	8.9	11.7
5.2	19.7	5.6	0.0	0.0	31.2	3.6	9.8
6.1	0.3	7.6	10.0	5.8	3.5	1.9	8.0
6.2	10.9	3.6	1.7	0.0	10.6	1.3	0.0
8.0	0.5	0.0	0.0	0.0	0.4	0.0	0.0

Assumptions and Limitations

As with most broad-scale analyses, there are inherent limitations and assumptions that must be considered. These limitations and assumptions are often unavoidable given the large scale of the analysis area, the large number of species included, and the fine scale nature of rare plant species

analysis. Despite the limitations and assumptions detailed below, we believe that this analysis is the most detailed and meaningful analysis we could complete given the nature of the programmatic scale of the proposed action.

Limitations of Using Habitat Groups - The habitat group methodology employed in this effects analysis may overlook key features of plant habitat and ecology. Ecological interrelationships such as pollinators and their viability requirements, or mycorrhizal associations, are often important features that are necessary for the continued survival and viability of TEPCS plant species. Such factors may not be accounted for by using broad habitat categories to classify TEPCS plant species. In natural ecological systems, the factors that contribute to the physiognomy and distribution of species often occur as a continuum, not as discrete categories named habitat groups. Soil moisture, soil type, microsite moisture conditions, canopy closure, temperature, and light conditions often occur along a gradient. Individuals or populations of TEPCS plant species occur along this gradient in a wide range of conditions. The use of habitat groupings is an attempt to begin capturing this variation of ranges and to bring like species together. The scale we are using to bring together these associations cannot possibly capture all of the environmental characteristics and intrinsic features necessary for the successful establishment and continued viability of TEPCS plant species.

Limitations of Using Population Trend Categories - The estimation of trend is often a qualitative judgment made by Forest Service botanists and ecologists and researchers for a given TEPCS plant species. For many of the TEPCS species in the Ecogroup, the population trend is currently unknown because most surveys and monitoring have been limited to those populations where projects are proposed (Table B-21). Additionally, for a large majority of the TEPCS species within the Ecogroup, little demographic or biological information is known. Long-term demographic monitoring and research has only been conducted for a small portion of the TEPCS plant species found within the Ecogroup.

Limitations of Using MPCs for Broad-scale Analysis - In this analysis, potential adverse effects to botanical resources from recreation, mechanical, grazing, and fire activities are linked to the Management Prescription Categories that are assigned across the three Forests. Indirectly, the susceptibility of noxious weeds and non-native plant establishment are also tied to the MPCs assigned to each area. This linkage may be generally acceptable for a broad-scale assessment but would not be appropriate for fine-scale analysis.

The linkage between MPC assignment and recreation effects is limited for the following reasons:

- The ability to characterize impacts is much easier and accurate with some MPCs than others. For example, it's obvious that areas assigned to 4.3 are likely to be heavily affected by recreation activities since these areas are highly concentrated, high recreation use zones and would be somewhat homogenous. In contrast, areas assigned to 5.1 are much more varied in terms of recreation uses, concentrations, use levels, locations across the landscape, etc.

- Recreation uses and activities do not occur as a result of MPC assignment. Management of recreation activities is likely to be influenced by the MPC assignment but management is probably more influenced by many other local factors, which cannot be fully assimilated in a

programmatic analysis. Recreation activities occur for the most part where there are attractive features in the landscape—such as lakes, streams, or scenic settings—as well as where facilities have been constructed that provide for recreation opportunities, such as campgrounds, trails, roads, boat ramps, etc. These attractive features and facilities tend to be fixed in location whereas MPC assignment varies by alternative. Potential impacts from recreation to botanical resources in a highly used recreation corridor, such as along State Highway 21, would not be likely to vary much purely as a result of MPC assignment.

- Linkage to MPCs does not incorporate existing recreation controls where they currently exist or the lack of controls. Important factors, such as travel management regulations, can only be included broadly by assumption and don't reflect actual areas on the three Forests.

Limitations of Extrapolating Effects Analysis for TEPCS Species to the Ecogroup Flora - The habitat group concept is based upon the habitat requirements of the 79 current or proposed sensitive or watch species identified within the Ecogroup. The habitat distribution of these rare plant species are not representative of the entire flora of southwestern Idaho, and should not be treated as such. Many of the 86 TEPCS species have rather unique habitat requirements, such as edaphic characteristics, microsite limitations, or ecological associations. Many species may be intrinsically rare, newly evolved, or may be relicts. An additional limitation of this analysis is based on the limited spatial data for potential habitat of TEPCS plant species. Only those species with known element occurrences within the Ecogroup were included in the analysis. Spatial data of potential habitat for most TEPCS species is not currently available. An analysis of the entire Ecogroup flora has not been designed or attempted at this time.

Assumptions of Implementation of Standards, Guidelines, and Forest Service Directives - The viability of the 86 TEPCS plant species and their respective habitats will be promoted with implementation of standards and guidelines, inventory and monitoring, and adherence to Forest Service directives for threatened, endangered, proposed, and sensitive plant species. Consistent implementation of standards and guidelines and adherence to Forest Service Management Policy across the Ecogroup for all alternatives is mandatory for TEPCS plant species conservation.

Measures and Factors to Assess Effects on TEPCS Species

The current and potential threats to each individual threatened, endangered, or proposed (including candidate) species were determined from current scientific literature and professional botanical knowledge and expertise (summarized in Appendix G Tables G-3, G-4, and G-5; and above, under Current Conditions). Using GIS technology, a map with an overlay of MPCs and the most current distribution information for element occurrences of TEPSC plant species (ICDC 2002) was created for each alternative. The ratings of potential impacts (Table B-25) for TEPC species and habitats by MPC were then used to determine the overall effects of the MPCs for each individual TEPC species by alternative. For those species with only potential habitat within the Ecogroup, the MPCs that would most likely impact the habitat were compared by alternative. Specific project areas and models were generated for TEPC species and are summarized by species below.

Threatened Species

***Mirabilis macfarlanei* (Macfarlane's four-o'clock) -** Potential habitat for *Mirabilis macfarlanei* may exist on the Payette National Forest in the Hells Canyon Management area. To examine the potential effects to potential habitat, the Hells Canyon Management Area was selected as the project area. The MPCs assigned to the Hells Canyon Management Area by alternative were examined for potential impacts to potential habitat. The MPCs that would allow the type and intensity of management activities that could potentially threaten habitat or populations of this species are 3.2, 4.1a, 4.1b, 4.1c, and 6.1. The five potential impacts and their potential magnitude from Table B-25 (fire use, grazing, recreation, mechanical, noxious weeds) were considered by MPC. Because noxious-weeds and exotic plant invasion, fire use and suppression, livestock trampling, ORV use, and road construction have been documented as major threats for *M. macfarlanei* populations, the MPCs that had moderate to high potential impacts for these indicators were considered riskier than those with less potential impacts.

***Spiranthes diluvialis* (Ute ladies'-tresses orchid) -** To address the potential impact to *S. diluvialis* potential habitat by alternative, the riparian habitat group created from CICP data (Redmond et al. 1998), Idaho classification data (Homer 1998a) and Utah classification data (Homer 1998b) was used a surrogate to determine potential habitat within the Ecogroup (see Affected Environment for covertypes used to create this habitat group). Riparian habitat above 7000 feet was included; thus the impacts to potential habitat for *S. diluvialis* may be over-estimated.

RCAs have been determined for the Ecogroup. Within the RCAs, certain standards and guidelines have been developed to prevent degradation within riparian areas. The management objectives, standards, and guides for RCAs are similar across all alternatives except alternative 1b. In Alternative 1B, the RCAs are actually RHCAs that are protected by Pacfish/Infish direction, which is even more restrictive than the revised Forest Plan direction but does address restoration impacts as directly as other alternatives.

The MPCs assigned to the modeled potential habitat for *Spiranthes diluvialis* by alternative were examined for potential impacts to the potential habitat. The MPCs that would allow the type and intensity of management activities that could potentially threaten habitat or populations of this species are 3.1, 3.2, 5.1, 5.2, and 6.2. The five potential impacts and their estimated magnitude from Table B-25 (fire use, grazing, recreation, mechanical, noxious weeds) were considered by MPC. Noxious-weeds and livestock trampling have been documented as major threats for *S. diluvialis* populations thus the MPCs that had moderate to high potential impacts for these indicators were considered riskier than those with more conservative potential impacts.

***Silene spaldingii* (Spalding's Catchfly) -** The Payette National forest has developed a model to predict potential habitat for Spalding's catchfly. The following criteria were used to define the potential habitat for *Silene spaldingii*: (1) elevation from 0-5100 feet, (2) canopy coverages of <40 percent for shrubs, Douglas fir, and Ponderosa pine types, (3) land cover types (upland grassland, altered grasslands, mesic montane parklands and subalpine meadows, mesic

shrublands, Ponderosa pine, Douglas-fir/Ponderosa Pine) (LANDSAT data Redmond et al. 1998), and (4) Bailey's Ecoregions (Palouse prairie section, Blue Mountain section, Idaho batholith section). Using this model, a total of 2740 acres of potential habitat was predicted for the Payette and Boise National Forests.

The MPCs assigned to the modeled potential habitat for *Silene spaldinigii* by alternative were examined for potential impacts to the potential habitat. The MPCs that would allow the type and intensity of management activities that could potentially threaten habitat or populations of this species are 3.2, 5.1, 5.2, and 6.1. The five potential impacts and their estimated magnitude from Table B-25 (fire use, grazing, recreation, mechanical, noxious weeds) were considered by MPC. Because livestock grazing, fire suppression, roads (construction, reconstruction, and maintenance), non-native plant invasion, fire use and suppression, and ORV use have been documented as major threats for *S. spaldingii* populations, the MPCs that had moderate to high potential impacts for these indicators were considered riskier than those with more conservative potential impacts.

***Howellia aquatilis* (Water Howellia) -** As with *Spiranthes diluvialis*, the riparian habitat group created from CICP data (Redmond et al. 1998), Idaho classification data (Homer 1998a) and Utah classification data (Homer 1998b) was used a surrogate to determine potential habitat within the Ecogroup (see Affected Environment for covertypes used to create this habitat group). Because known *Howellia aquatilis* populations have not been located above 5000 feet, the riparian habitat group used to estimate potential effects by alternative overestimates the amount of potential habitat and the likelihood of potential impacts.

The MPCs assigned to the modeled potential habitat for *Howellia aqualitis* by alternative were examined for potential impacts to the potential habitat. The MPCs that would allow the type and intensity of management activities that could potentially threaten habitat or populations of this rare species are 3.1, 3.2, 5.1, 5.2, and 6.2. The five potential impacts and their estimated magnitude from Table B-25 (fire use, grazing, recreation, mechanical, noxious weeds) were considered by MPC. Mechanical activities (siltation and hydrologic regime alteration associated with vegetation management), livestock grazing (trampling and soil compaction), non-native plant and noxious weed invasion, road construction and maintenance and fire effects have been documented as major threats for *H. aqualitis* populations. Those MPCs that had moderate to high potential impacts for these indicators were considered riskier than those with more conservative potential impacts.

Proposed Endangered

***Lepidium papilliferum* (Slick Spot Peppergrass) -** No occupied habitat for this species has been located on National Forest System lands, but potential habitat may exist on the Mountain Home Ranger District, Boise National Forest. To estimate the potential effects to *L. papilliferum* potential habitat by alternative, three management areas (Arrowrock, Boise Front/Bogus Basin, and Lower South Fork Boise River) were examined for MPC assignment below 5300 feet. Using this method, an estimated 205,891 acres of potential habitat of *L. papilliferum* were identified on the Boise National Forest.

The MPCs assigned to the potential habitat for *Lepidium papilliferum* by alternative were examined for potential impacts. The MPCs that would allow the type and intensity of management activities that could potentially threaten habitat or populations of this species are 5.1, 5.2, and 6.2. The five potential impacts and their estimated magnitude from Table B-25 (fire use, grazing, recreation, mechanical, noxious weeds) were considered by MPC. Because fire effects, invasion of exotic plant species, livestock grazing (trampling and uprooting plants), and ORV use have been documented as major threats for *L. papilliferum* populations, the MPCs that had moderate to high potential impacts for these indicators were considered riskier than those with more conservative potential impacts.

Candidate Species

***Castilleja christii* (Christ's Indian Paintbrush) -** The population boundary for the only known population of C*astilleja christii* was digitized using GIS technology (see Botanical Resources Technical report for map). The MPCs assigned to the population boundary by alternative were examined for their potential effects. The MPCs that would allow the type and intensity of management activities that could potentially threaten habitat or populations of this species are 4.2, 6.1, and 6.2. The five potential impacts and their estimated magnitude from Table B-25 (fire use, grazing, recreation, mechanical, noxious weeds) were considered by MPC. Recreational uses and activities, ORV use, livestock use (unauthorized), and non-native plant invasion have been documented as major threats for the only known *Castilleja christii* population. Thus, the MPCs that had moderate to high potential impacts for these indicators were considered riskier than those with more conservative potential impacts.

***Botrychium lineare* (Slender Moonwort) -** In 2002, the estimated population boundary of the *Botrychium lineare* population on Railroad Ridge was mapped using a handheld GPS unit and digitized into a GIS layer. The MPCs assigned to the population by alternative were examined. Given the relatively small area occupied by *B. lineare*, only one MPC per alternative was assigned. The five potential impacts and their estimated magnitude from Table B-25 (fire use, grazing, recreation, mechanical, noxious weeds) were considered by MPC. Few threats have been documented in the population of slender moonwort located on the Sawtooth National Forest, however ORV use, road construction, maintenance, use, and decommissioning, fire suppression, livestock grazing (primarily trampling and soil compaction), and non-native plant invasion have been documented for other populations. Thus, the MPCs that had moderate to high potential impacts for these indicators were considered riskier than those with more conservative potential impacts.

The population of *Botrychium lineare* located on the SNRA is atypical given the habitat descriptions from other known sites. In other areas, the habitat for the slender moonwort has been described as "deep grass and forbs of meadows, under trees in woods, and on shelves on limestone cliffs, mainly at higher elevations" (Wagner and Wagner 1994), but they also state that to describe a typical habitat for this species would be problematic since the known sites are so different. Populations range in elevation from sea level in Quebec to nearly 3,000 m (9,840 ft) in Boulder County, Colorado. The potential habitat for this Candidate species is therefore difficult to estimate and analyze. It is believed that potential habitat exists within the three Forests and that it may be much different from the isolated population found on the SNRA. As such, a

surrogate to represent the potential habitat (occupied habitat presented above) the forestland, grassland, and alpine habitat groups (using satellite classification data) were used estimate effects to the potential habitat for *B. lineare.* The measures used to evaluate the habitat groups are described below.

Measures Used to Evaluate Effects on Habitat Groups - To examine the potential effects to the sensitive species, habitat groupings or habitat associations were determined for the 86 TEPSC plant species. The threats common to each habitat group were then determined from current literature and professional botanical knowledge (summarized in Appendix G, Tables G-3, G-4, and G-5). The acres of habitat groups were calculated using Central Idaho Classification Project (CICP) data (Redmond et al. 1998), Idaho classification data (Homer 1998a), and Utah classification data (Homer 1998b). The percentages of each MPC assigned to the habitat groups were compared by alternative. Those MPCs with the greatest potential impact were determined for each habitat grouping as well, by comparing known population occurrences within MPC distribution. Dominant threats that may be affected or increased for the TEPSC species by MPC and the magnitude of their potential impact (Table B-25) were compared for each habitat group by alternative. The MPCs that had moderate to high potential impacts for the dominant threats and corresponding indicators were considered riskier than those with more conservative potential impacts.

Measures for the Alpine Habitat Group - The MPCs that would allow the type and intensity of management activities that could potentially affect the alpine habitat group or its TEPCS populations are 1.2, 4.1c, 4.2, and 5.1. The five potential impacts and their estimated magnitude from Table B-25 (fire use, grazing, recreation, mechanical, noxious weeds) were considered by MPC. Livestock grazing, roads, recreation, ORV use, and non-native plants appear to be the dominant threats (Table B-5) to the alpine habitat group. Because these current threats may be affected or increased by MPC, they were considered when estimating the potential impacts by MPC by alternative along with the associated indicators. Those MPCs that had moderate to high potential impacts for these indicators (Table B-25) were considered riskier than those with lower potential impacts.

Measures for the Subalpine Habitat Group - The MPCs that would allow the type and intensity of management activities that could potentially affect the subalpine habitat group or its TEPCS populations are 4.1a, 4.1b, 4.1c, 4.2, and 5.2. The five potential impacts and their estimated magnitude from Table B-25 (fire use, grazing, recreation, mechanical, noxious weeds) were considered by MPC. Livestock grazing, roads, recreational uses, fire (inclusion and exclusion), ORV use, and non-native plants appear to be the dominant threats (Table B-6) to the subalpine habitat group. Because these dominant threats could be affected or increased by MPC, they were considered when estimating the potential impacts by MPC by alternative along with the associated indicators. Those MPCs that had moderate to high potential impacts for these indicators (Table B-25) were considered riskier than those with more conservative potential impacts.

Measures for the Forest Habitat Group - The MPCs that would allow the type and intensity of management activities that could potentially affect the forest habitat group or its TEPCS populations are 3.2, 4.1a, 4.1b, 4.1c, 5.1, and 5.2. The five potential impacts and their estimated

magnitude from Table B-25 (fire use, grazing, recreation, mechanical, noxious weeds) were considered by MPC. Fire (inclusion and exclusion), timber harvest, roads (construction, reconstruction, and maintenance), activities associated with fire suppression, ORV use, and grazing-trampling by livestock appear to be the dominant threats (Tables B-7 and B-8) to the forest habitat group. Because these dominant threats could be affected or increased by MPC, they were considered when estimating the potential impacts by MPC by alternative along with the associated indicators. Those MPCs that had moderate to high potential impacts for these indicators (Table B-25) were considered riskier than those with more conservative potential impacts.

Measures for the Woodland Habitat Group - The MPCs that would allow the type and intensity of management activities that could potentially affect the forest habitat group or its TEPCS populations are 4.1a, 4.1b, 4.1c, 5.1, 6.1, and 6.2. The five potential impacts and their estimated magnitude from Table B-25 (fire use, grazing, recreation, mechanical, noxious weeds) were considered by MPC. Grazing, roads (construction, reconstruction, and maintenance), and non-native plants appear to be the dominant threats (Table B-9) to the woodland habitat group. Because these current threats could be affected or increased by MPC, they were considered when estimating the potential impacts by MPC by alternative along with the associated indicators. Those MPCs that had moderate to high potential impacts for these indicators (Table B-25) were considered riskier than those with more conservative potential impacts.

Measures for the Shrubland Habitat Group - The MPCs that would allow the type and intensity of management activities that could potentially affect the shrubland habitat group or its TEPCS populations are 4.2, 5.2, 6.1, and 6.2. The five potential impacts and their estimated magnitude from Table B-25 (fire use, grazing, recreation, mechanical, noxious weeds) were considered by MPC. Livestock grazing, roads (construction, reconstruction, and maintenance), ORV use, fire (inclusion and exclusion), and non-native plants appear to be the dominant threats (Table B-10) to the shrubland habitat group. Because these current threats could be affected or increased by MPC, they were considered when estimating the potential impacts by MPC by alternative along with the associated indicators. Those MPCs that had moderate to high potential impacts for these indicators (Table B-25) were considered riskier than those with more conservative potential impacts.

Measures for the Grassland Habitat Group - The MPCs that would allow the type and intensity of management activities that could potentially affect the forest habitat group or its TEPCS populations are 5.1, 5.2, 6.1, and 6.2. The five potential impacts and their estimated magnitude from Table B-25 (fire use, grazing, recreation, mechanical, noxious weeds) were considered by MPC. Livestock grazing, roads (construction, reconstruction, and maintenance), mechanical activities associated with timber harvest (in surrounding forested vegetation), ORV use, fire (inclusion and exclusion), and non-native plants appear to be the dominant threats (Tables B-11 and B-12) to the grassland habitat group. Because these current threats could be affected or increased by MPC, they were considered when estimating the potential impacts by MPC by alternative along with the associated indicators. Those MPCs that had moderate to high potential impacts for these indicators (Table B-25) were considered riskier than those with more conservative potential impacts.

Measures for the Riparian Habitat Group – RCAs have been determined for the Ecogroup. Within the RCAs, certain standards and guidelines have been developed to prevent degradation within riparian areas. The management objectives, standards, and guidelines for RCAs are similar across all alternatives except alternative 1b. In Alternative 1B, the RCAs are actually RHCAs that are protected by Pacfish/Infish direction, which is even more restrictive than the revised Forest Plan direction but does address restoration impacts as directly as other alternatives.

Given the RCA standards and guidelines, the MPCs that would allow the type and intensity of management activities that could potentially affect the riparian habitat group or its TEPCS populations are 3.1, 3.2, 5.1, 5.2, and 6.2. The five potential impacts and their estimated magnitude from Table B-25 (fire use, grazing, recreation, mechanical, noxious weeds) were considered by MPC. Livestock grazing and exotic weed invasion have been documented as dominant threats for this habitat group. Because these current threats could be affected or increased by MPC, they were considered when estimating the potential impacts by MPC by alternative along with the associated indicators. Those MPCs that had moderate to high potential impacts for these indicators (Table B-25) were considered riskier than those with more conservative potential impacts.

Measures for the Rock Habitat Groups - The MPCs that would allow the type and intensity of management activities that could potentially affect the rock habitat groups or its TEPCS populations are 4.1a, 4.1b, 4.1c, 5.1, 5.2, and 6.2. The five potential impacts and their estimated magnitude from Table B-25 (fire use, grazing, recreation, mechanical, noxious weeds) were considered by MPC. Roads (construction, reconstruction, and maintenance), livestock grazing, ORV use, and recreational uses appear to be the dominant threats for the rock habitat group (Tables B-19, B-20, B-21, and B-22). Because these current threats could be affected or increased by MPC, they were considered when estimating the potential impacts by MPC by alternative along with the associated indicators. Those MPCs that had moderate to high potential impacts for these indicators (Table B-25) were considered riskier than those with more conservative potential impacts.

Direct and Indirect Effects by Alternative

Threatened Species

***Mirabilis macfarlanei* (Macfarlane's Four-o'clock)** - Currently, the only potential habitat that may exist for *Mirabilis macfarlanei* is found along the Snake River on the Payette National Forest in the Hells Canyon Management Area. The entire management area was analyzed for this rare species. Thus, the amount of potential habitat for *Mirabilis macfarlanei* is overestimated. Forested, shrubland, and woodland habitats were included in this management area, as well as the grassland habitats that are actual potential habitat.

The potential for moderate to high levels of impacts to all grassland species exists for all alternatives (as described above). Alternative 5 poses the highest risk to the potential habitat for *M. macfarlanei*. In this alternative, the major proportion (92 percent) of the potential habitat area is assigned to MPC 6.1, and a minor portion (8 percent) is assigned to MPC 5.2. Noxious weeds, mechanical effects, recreation and livestock use would have moderate to high potential impacts

to the *M. macfarlanei* potential habitat. Fire use would be moderate. All of these potential impacts have been identified, currently, as posing the highest threats to this threatened species (see above and Appendix G, Tables G-3, G-4, and G-5), thus making this alternative the riskiest of the seven. Alternatives 3, 2, and 1B would have intermediate levels of potential impacts to the potential habitat for this threatened species. The portions of the potential habitat assigned to MPC 6.1 are much less in these alternatives, and there is no 6.2. Additionally, these alternatives have portions of the area assigned to MPC 4.1b or 4.1c. Although the risk of fire is high and livestock use is moderate, potential impacts from recreation, mechanical activities, and noxious weeds are low to moderate. Given the current threats from noxious weeds, mechanical activity, and recreation to *M. macfarlanei* populations, the potential habitat would benefit from alternatives in which these threats are lower. Alternatives 7 and 6 have low potential impacts to the potential habitat for *M. macfarlanei* due to the large portions assigned to undeveloped and semi-primitive recreation (MPCs 4.1a, 4.1c). These MPCs have lower potential impacts for noxious weeds, livestock use, and mechanical activities, while the risk of fire use is still high. Alternative 4 would have the least potential impact to the potential habitat for *M. macfarlanei.* In this alternative, a significant portion (76 percent) of the management area is assigned to recommended wilderness. This MPC has low potential impacts for most indicators (no mechanical treatments allowed) except fire, which is high). The remaining portion is assigned to MPC 3.2 (restoration and maintenance of aquatic, terrestrial, and hydrologic conditions) with low to moderate potential impacts for livestock use, recreation (low), and mechanical activities. Fire use and noxious weeds have moderate to high potential impacts.

***Spiranthes diluvialis* (Ute Ladies'-tresses Orchid) and *Howellia aquatilis* (Water Howellia) -** RCAs will provide certain standards and to prevent degradation within riparian areas. The management objectives, standards, and guidelines for RCAs are similar across all alternatives except Alternative 1b. In Alternative 1B, the RCAs are actually RHCAs that are protected by Pacfish/Infish direction, which is even more restrictive than the revised Forest Plan. All alternatives would have moderate to high impacts for the riparian habitat group. Of these, Alternative 5 presents the most potential for adverse impacts to *S. diluvialis* and *H. aquatilis* potential habitat. A substantial proportion (66 percent) of the potential habitat for these species is assigned to MPC 5.1, which has moderate or moderate to high potential impacts for all indicators (low to moderate for grazing and recreation). Given the current documented threats (Appendix G, Tables G-3, G-4, and G-5) and the moderate to high-risk form noxious weeds and mechanical activities in potential habitat for these species, Alternative 5 presents the greatest potential impacts. Alternative 3 and 2 had slightly higher impacts with the high proportions of MPC 3.2 (71 percent - 3, 63 percent - 2) would increase the potential for impacts, including those that are documented as threats currently. Livestock grazing and, mechanical activities would pose low to moderate impacts, while fire use would be moderate, recreational impacts would be low, and noxious weeds would pose moderate to high potential impacts in these alternatives. Alternative 7 has moderate potential impact for *S. diluvialis* and *H. aquatilis* potential impact. The amount of MPC 3.1 (48 percent) would have lower potential impacts than MPC 3.2 for most indicators, though recreation may slightly higher in 5.1 (Table B-25). Portions of potential habitat are assigned to MPC 3.2 (15 percent) and 4.1c (23 percent) in this alternative, thus making it more risky than Alternative 1B (MPC 3.1 – 63 percent, 4.1B – 17 percent). Alternative 1B with the application of RHCAs and Pacfish/Infish requirements poses intermediate risks to the riparian habitat and to *S. diluvialis* and *H. aquatilis.* Alternative 4 and 6

present the lowest potential impacts to the potential habitat for these rare species. Alternative 4 has slightly more risk than Alternative 6. Alternative 4 has a greater risk from fire use than Alternative 6 because of the large amount of recommended wilderness (MPC 1.2 – 33 percent). Alternative 6 has the majority of the *S. diluvialis* and *H. aquatilis* potential habitat acres assigned to MPC 3.1 (86 percent). This MPC has low potential impacts for most indicators, although impact potential from noxious weeds is moderate.

***Silene spaldingii* (Spalding's Catchfly) -** Potential habitat for *Silene spaldingii* exists in the Snake River and Salmon River canyon grasslands on the Payette National Forest and low elevation grasslands on the Boise National Forest. In the final listing rule (Federal Register, Vol. 66, No. 196, 2001), the USFWS determined that the designation of critical habitat is prudent for *S. spaldingii*. However, the limited budget for listing activities precluded the designation of critical habitat for *S. spaldingii* at this time. The final designation of critical habitat would help protect the habitat of this rare species. Approximately, 24 percent of the modeled habitat for *S. spaldingii* falls in existing wilderness (Frank Church--River on No Return). The management emphasis for existing wilderness does not change by alternative. All indicators (Table B-25) are low except fire use, which is high.

While all alternatives pose moderate to high level impacts to the potential habitat of *S. spaldingii*, Alternative 5 poses the greatest potential impacts based the high proportion of the potential habitat area assigned to MPCs 5.1 (10 percent), 5.2 (28 percent), 6.1 (4 percent), and 6.2 (25 percent). These MPCs have moderate to high potential risks from noxious weed and exotic species invasion, mechanical effects, and livestock use (except 5.2 and 5.1, which are low to moderate). Section 7 guidelines for *S. spaldingii* have listed these as management activities that potentially threaten existing or potential habitat and/or populations (see above and Appendix G, Tables G-3, G-4, and G-5). Alternative 1B would be similar to Alternative 5, with moderate to high threats for most indicators, although fire use would be low and grazing would be low to moderate (MPC 5.2 - 57 percent of habitat). One of the greatest threats to *Silene spaldingii* populations is habitat changes associated with fire suppression (Federal Register, Vol. 66, No. 196, 2001). In areas where the fire regime has been altered or excluded, shrubs and trees have encroached on grasslands and have contributed to a build-up in liter layer that inhibits *S. spaldingii* seed germination. Prescribed fire may have a positive effect on *S. spaldingii* by removing litter and creating habitat for recruitment (Lesica 1999). There is no 6.2 in Alternative 1B, thus making it slightly less risky than Alternative 5.

Alternatives 7, 3, and 2 would have intermediate effect on the potential habitat for *S. spaldingii.* These alternatives have large portions (48 – 60 percent) of the modeled habitat assigned to MPC 5.1 and 6.1 combined. These MPCs have moderate or moderate to high potential impacts for most indicators (Table B-25), although recreation and livestock use may be lower in MPC 5.1. Increases in noxious weeds and mechanical disturbance in this MPC may cause short-term risks to the potential habitat for *S. spaldingii* but the MPC is intended to restore or maintain vegetative diversity and may allow for long-term improvement of the habitat. Alternative 6 has less potential for impacts to S. spaldingii potential habitat than the previous alternatives. Less of the modeled habitat falls into MPCs 5.1, 5.2, and 6.1, and a large portion (21 percent) is assigned to MPC 4.1b, which would have more prescribed fire (may be beneficial) and moderate to low impacts for other indicators. Alternative 4 may have the least potential short-term impacts to the

potential habitat for *S. spaldingii*; however, long-term impacts due to increased uncharacteristic disturbance (wildfire and disease) may be higher under this alternative. Half of the proposed habitat in Alternative 4 would be assigned to MPC 3.2, which has low to moderate potential for most of the indicators, although noxious weed invasion potential is moderate to high. Less than 1 percent of the potential habitat is assigned to MPC 5.1, and no potential habitat was assigned to MPCs 5.2, 6.1, or 6.2.

Proposed Endangered Species

***Lepidium papilliferum* (Slick Spot Peppergrass)**

All alternatives pose moderate to high-level impacts to the potential habitat of *Lepidium papilliferum.* Alternative 5 poses the greatest potential impacts based on the high proportion of the potential habitat area assigned to MPCs 6.2 (74 percent) and 5.2 (18 percent). MPC 6.2 would have moderate to high potential for all indicators (Table B-25). Given the known threats (grazing, fire inclusion, noxious weed invasion, mechanical disturbance, and ORVs - Appendix G, Tables G-3, G-4, and G-5) for *L. papilliferum*, this alternative would have potentially severe impacts for this rare species. Alternative 2 would be similar to Alternative 5, with moderate to high threats for most indicators because of the large portions of MPC 6.2 (40 percent of potential habitat) and MPC 5.1 (15 percent). Alternative 3 also presents moderate to high potential impacts for *L. papilliferum* given the portions of MPC 6.2 (33 percent), 6.1 (23 percent), and 5.1 (22 percent). Alternative 1B has slightly lower risks to the potential habitat for *L. papilliferum.* Although a major portion (34 percent) is assigned to MPC 5.2 and 5.1 (22 percent), the reduced risk of fire use in this MPC 5.2 and much smaller proportion assigned to MPC 6.2 (12 percent) make this alternative slightly less risky. Alternative 6 poses lower threats to potential habitat than previous alternatives due to the major portion of habitat assigned to MPCs 4.1a (43 percent) and 4.1B (31 percent), which have low to moderate impacts for all indicators but fire. A small portion of this alternative is also assigned to MPC 6.2 (13 percent), making it slightly riskier than Alternatives 4 and 7, which have no MPC 6.2. Alternative 4 has a major portion (52 percent) of the potential habitat for *L. papilliferum* assigned to MPC 6.1. This MPC has moderate to high risks for all indicators, but the major theme of this prescription is grassland and shrubland maintenance and restoration. Areas identified as potential habitat could be benefited in the long term by such activities. Alternative 7 may have the least potential impacts for the estimated habitat of *L. papilliferum.* There are no acres assigned to MPC 6.2 and much less assigned to 6.1 (23 percent) than in Alternative 4. Additionally, a large portion of the potential habitat is assigned to MPC 4.1c (37 percent), which has low to moderate potential impacts for all indicators but fire use, which is high. There are many threats that have been documented for *L. papilliferum* (Appendix G, Tables G-3, G-4, and G-5) including habitat destruction, noxious weeds, fire inclusion and livestock grazing. Despite the higher fire risk for potential habitat in Alternative 7, the reduction in all other potential effects make this alternative the best for *L. papilliferum* potential habitat.

Candidate Species

***Castilleja christii* (Christ's Indian Paintbrush) -** Of the total population, 23 percent (90 acres) occurs in the Mt. Harrison Research Natural Area, which falls under MPC 2.2**.** The management emphasis for RNAs does not change by alternative. Timber harvesting, road building, grazing, and mining are not allowed under this MPC, thus reducing the overall potential impacts for this portion of the population (See MPC 2.2 standards and guidelines).

The remaining portion of the *Castilleja christii* population, however, could be adversely affected by management activities that vary by alternative. Alternative 1B would pose the greatest potential impacts to this population due to MPCs 4.2 (50 percent of population) and 6.2 (31 percent of population). Moderate to high potential impact levels of recreational activities, noxious weeds, and mechanical activities are associated with these management prescriptions. Moderate impact levels of livestock use and fire use are associated with this alterative; however, the summit of Mt. Harrison is administratively closed to grazing and full fire suppression within the population will be emphasized (MA guideline). Alternative 5 poses the second highest potential impacts to the *C. christii* population. A substantial portion the population is assigned to MPCs 6.1 (31 percent) and 6.2 (34 percent), which pose moderate or moderate to high potential impacts for all indicators (Table B-25), and the remainder (16 percent) of the population is assigned to MPC 4.2, which has moderate to high recreational and noxious weed impacts. Also, higher levels of mechanical activities can occur in MPC 6.2. Alternatives 2, 3, and 7 would be similarly intermediate in terms of potential impacts (65 percent MPC 6.1 and 16 percent MPC 4.2 in each alternative). While these MPCs have moderate to high potential impacts for most indicators, fire use, grazing, and mechanical activities (current threats) will be much lower in MPC 4.2 than in alternatives with MPC 6.2. Alternatives 6 and 4 would pose the least potential impact to the population. Both alternatives have large portions of undeveloped or semi-primitive recreation (MPCs 4.1a and 4.1c), which have low recreational impacts, and low to moderate mechanical and noxious weed impacts for *C. christii* population. Alternative 6 would have more recreational impacts but lower risks from livestock and fire use, while Alternative 4 has more potential impact from livestock and fire use. It is important to note that in all alternatives the signed Conservation Assessment and Strategy will be implemented. This strategy ensures the only known population of *C. christii* is protected, and risks and threats are minimized.

***Botrychium lineare* (Slender moonwort) –** For *Botrychium lineare* occupied habitat, Alternative 1B would pose the greatest potential impacts to this population due to MPC 4.2 in the East Fork Salmon River/White Clouds Management area. Moderate to high potential impacts levels of recreational activities, noxious weeds, and mechanical activities may occur within these management prescriptions. This population is located in an open, rocky alpine region and will likely not be impacted by mechanical activities associated with vegetation treatments, but road-building impacts and off-road use could be significantly higher. Low to moderate of livestock use and fire use are associated with the MPCs under this alterative. Alternative 5 poses the second highest potential impacts to the *B. lineare* population. In this alternative, MPC 5.1 is assigned to the management area, which poses moderate fire use, low to moderate grazing and recreation impacts, and moderate to high impacts for mechanical activities and noxious weeds. Alternatives 2, 3, and 6 would be similarly intermediate in terms of potential impacts (3.2 in each alternative). Moderate to high noxious weed impacts and moderate fire use impacts are associated with 3.2, while grazing, recreation (low), and

mechanical activities have low to moderate potential impacts. Alternatives 7 and 4 would have the least impact on the *B. lineare* population area. In these alternatives, MPC 3.1 has been assigned to portion of the MA that includes the population area. Fire use, livestock use, and recreation could have low to no impacts on the population. Fire use could have low to moderate impacts. Noxious weed impacts are likely to be moderate.

Potential habitat for *Botrychium lineare* is believed to exist on the Boise, Payette, and Sawtooth National Forests. To examine the effects of the alternatives on the potential habitat for *B. lineare*, the forestland, alpine, and grassland habitat groups were examined. Full discussions of the habitat group comparisons and MPC applications are found below in the alpine, montane forest, and grassland habitat groups. In summary, (based upon these 3 habitat groups) Alternatives 5 and 1B pose the greatest threats to the potential habitat of *B. lineare* that may exist within the three habitat groups. These alternatives have substantial amounts of MPC 5.1, 5.2, 6.1, and 6.2. These MPCs pose a variety of threats (Table B-25) but the moderate to high or high impacts from noxious weeds and mechanical activities would pose the most impact to the potential habitat. In the alpine and montane forest habitat groups, Alternatives 2, 3, and 7 have intermediate impacts for the potential habitat of *B. lineare*, while Alternative 6 replaces 7 in intermediate effects in the grassland group. This intermediate rating is based upon the mix of MPCs applied within these habitat groups. Alternative 6 and 4 (except grassland, which is 7 and 4) would have the least impact to the potential habitat of *B. lineare*. This low rating is based upon the large amounts of MPC 1.2, MPC 4.1a, b, or c, and/or MPC 3.2. Although fire may be moderate or high (Table B-25) in these MPCs, other indicators range from none to moderate depending on the MPC and are much lower in potential impacts than other MPCs described above.

Habitat Group Analysis

Commonalities Between Alternatives (Wilderness, RNAs, RCAs) - All 7 alternatives have several features in common which would pose the same potential impacts for the 86 TEPC, current or proposed sensitive species, and watch species. This includes the existing designated Wilderness (MPC 1.1), Research Natural Areas (MPC 2.2), and Boise Basin Experimental Forest (MPC 2.3). These administrative designations and their management prescriptions will remain the same across the range of alternatives. RCAs or RHCAs would also provide similar management direction for the seven alternatives. In these areas, any proposed action would be implemented to either maintain current conditions or to achieve desired conditions for soil, water, riparian, or aquatic resources. Only those actions that would benefit riparian resources over the long-term would be permitted.

Alternative Effects by Habitat Group – The following is an analysis of the effects on the different habitat groups by alternative.

Alpine - Effects from the alternatives do not vary greatly for the alpine habitat. An estimated 8 percent of the alpine acres exist in designated wilderness (MPC 1.1), which would not change between the alternatives. Livestock grazing, recreation, roads, ORV use, and non-native plants were documented (Table B-5) as current threats. Those alternatives with MPCs that would increase these threats or uses were considered to be more threatening than more conservative alternatives. Alternative 5 would have the most potential effects to botanical alpine habitat

group and TEPSC or watch species due to the number of MPCs with threats to alpine plants 4.1c (46 percent), 4.2 (24 percent), 5.1(7 percent) and the higher amounts of TEPSC or watch species populations in MPCs 6.1 (11 percent) and 6.2 (2 percent). Most of these impacts would be moderate to high in intensity. Livestock use and noxious weeds (current threats) were the primary potential impacts in Alternative 5, as reflected by the MPCs. Additionally, unlike all other alternatives, Alternative 5 has no alpine acres assigned to MPC 1.2. The other alternatives range from 69–91 percent of acres assigned to MPC 1.2. In MPC 1.2, all indicators, with the exception of fire use, are none to moderate (majority are low). Fire use is high under MPC 1.2 but alpine species will likely receive little impact from wildland fire given the sparse fuels and rocky nature of the habitat. Alternative 1B would present the next greatest risk to the alpine habitat group. Despite the large portion assigned to MPC 1.2 (69%), the portions assigned to MPCs 4.2 (9 percent) and 6.2 (5 percent) would have moderate to high impacts for all indicators (Table B-25) except fire use and livestock grazing in MPC 4.2, which would be low to moderate. Alternatives 3, 7, and 2 would have intermediate impacts to the alpine habitat groups. Large portions of the alpine acres are assigned to MPCs 1.2 (69 – 73 percent), which would likely result in low impacts to the alpine groups (see fire discussion above). Alternative 2 (2 percent) has less MPC 4.1c than Alternatives 7 (14 percent) and 3 (11 percent), while they all have similar amounts of MPCs 3.1 (3 percent) and 3.2 (3 percent). Alternative 6 poses lower impacts to the alpine habitat group than previous groups due to the large portions of the acres assigned to MPC 1.2 (70 percent) and MPC 4.1a (22 percent). These MPCs have low impacts for most indicators with the exception of fire. As discussed previously, fire would likely have little impact on the alpine habitat group. Alternative 4 poses the least impact to plants in the alpine habitat, with the majority of the alpine acres assigned to recommended wilderness (MPC 1.2 - 91 percent).

Subalpine Forest/Non-Forest – Effects from the alternatives would vary greatly for the subalpine habitat group. An estimated 21 percent of the subalpine acres exist in designated wilderness (MPC 1.1). The management emphasis in these designated areas will not change between the alternatives. Recreational uses, livestock grazing, roads, ORVs use, fire (inclusion and exclusion) and non-native plants were documented (Table B-5) as current threats for the subalpine habitat group. Those alternatives with MPCs that would increase these threats or uses were considered to be more threatening than more conservative alternatives. Both Alternatives 5 and 3 have the highest potential impacts to the subalpine habitat group and the TEPSC or watch. In Alternative 5, high amounts of MPCs 4.1c (16 percent), 4.2 (11 percent), 5.1 (19 percent), and 5.2 (20 percent) all have relatively moderate or high potential impacts from livestock use, recreational impacts (low in 4.1c), and noxious weed invasion. Mechanical activities could also impact subalpine species and their habitat. In Alternative 3, MPC 3.2 (25 percent) would occur across larger amounts of acreage than in other alternatives. MPC 3.2 poses low recreational impacts, moderate impacts from fire, low to moderate livestock use and mechanical effects and moderate to high potential impacts from noxious weeds. MPCs 5.1 (13 percent), 1.2 (19 percent) and 4.1c (12 percent) also pose risk to the subalpine species in this alternative due to moderate (5.1) to high (1.2 and 4.1c) fire use. Many of these impacts may be short term due to management activities associated with active restoration. Alternatives 1B, 2, and 7 would have intermediate impacts on the subalpine habitat group. Alternative 1B has no MPC 3.2 but does have a large portion of MPCs 5.1 (11 percent), 5.2 (6 percent), and 6.2 (4 percent), which have moderate to high impacts for many of the indicators (fire is low and grazing is low to moderate

in MPC 5.2, grazing and recreation are low to moderate in 5.1). Alternatives 2 and 7 have a moderate portion of MPC 3.2 (14 percent and 15 percent, respectively) but Alternative 2 has more MPC 5.1 (9 percent vs. 5 percent). All three alternatives have a moderate portion of MPC 4.1b (1B – 26 percent, 2 – 25 percent) or 4.1c (7 - 20 percent). These undeveloped recreation MPCs pose low to moderate potential impacts for all indicators except fire, which is high. Alternatives 4 and 6 demonstrate the least potential to affect the subalpine habitat group. In Alternative 6, less of the total subalpine acres are assigned to MPC 1.2 (19 percent), with the majority of acres assigned to 4.1a (47 percent). Fire impacts may be high and livestock use impacts may be moderate. Alternative 4 may have the lowest potential impacts to the subalpine habitat group of all alternatives. Alternative 4 has a major portion of the subalpine acres (59 percent) assigned to recommended wilderness (MPC 1.2) and a small portion (6 percent) assigned to MPC 3.2. While the potential impacts from grazing, mechanical, and recreation are none to moderate, fire and noxious weed impacts may be moderate to high.

Montane Forest – The potential effects to the forest group would vary widely between alternatives. An estimated 17 percent of the montane forest acres exist in designated wilderness (MPC 1.1). The management emphasis in these designated areas will not change between the alternatives. Fire (inclusion and exclusion), timber harvest, livestock grazing, roads, fire suppression, and were documented (Tables B-7 and B-8) as current threats for the montane forest group. Those alternatives with MPCs that would increase these threats or uses were considered to be more threatening than more conservative alternatives. Alternative 5 would have the most potential for impacts to the montane habitat group and TEPSC or watch species due to the large number of acres assigned to MPCs 5.2 (40 percent) and 5.1 (20 percent). Moderate to high potential impacts from mechanical activities and noxious weeds pose the greatest threats to the species in this alternative. Alternative 1B also poses high potential impacts for the montane forest group due to large portions of acres assigned to MPC 5.2 (27 percent), 5.1(17 percent), and 4.2 (9 percent). Noxious weeds, recreation (low to moderate in 5.1) and mechanical impacts are moderate to high for these MPCs, while livestock use and fire use are moderate to low. Alternative 3 poses the next highest potential for impacts to these species through MPC 5.1 (35 percent) and MPC 3.2 (23 percent). Noxious weeds have moderate or moderate to high potential impacts, fire use would have moderate impacts, and mechanical activities would have low to high impacts depending on MPC (Table B-25). Alternative 3 may not pose as many long-term risks, as it seeks to restore ecosystems to a desired historic range of natural variability. However, risks in the short term would be moderate to high due to the increased management associated with restorative activities. It is important to note however, that fire and disturbance events may allow for increased light to penetrate the forest gaps and create favorable conditions for new seedling establishment for those species that require open gaps within forested habitat groups (Table B-7). Alternative 2 and 7 are very similar in terms of intermediate effects to the montane forest habitat group. Both have a wide mix of MPCs assigned to the habitat group, including MPC 4.1a, 4.1b, 4.1c, 5.1, 5.2 and 6.1 (each less than 26 percent of acres). Alternative 7 does have more MPC 3.1 (13 percent) than Alternative 2 (2 percent). Grazing and mechanical impacts would be none to low in this MPC, while fire use and recreation are low to moderate. Noxious weeds would pose a moderate risk in MPC 3.1. Alternatives 4 and 6 propose the least amount of potential impacts to the montane habitat group. In both of these alternatives, the intensity of the risks posed by the combination of MPC's is less than in the other alternatives (Table B-25). Alternative 6 may pose slightly more risks to montane forest group. While a large

portion of the forest acres are assigned to MPC 4.1a (36 percent) and 4.1b (14 percent) (low to moderate impacts except fire, which is high), more of the acres are assigned to MPCs 5.1 (13 percent) and 5.2 (5 percent), which have moderate to high impacts for all indicators except livestock grazing and fire, which are low to moderate. Alternative 4 has large portions assigned to recommended wilderness (36 percent MPC 1.2), MPC 3.2 (20 percent), and MPC 3.1 (12 percent). Both of these alternatives pose high risk of uncharacteristic wildfire, however, to known populations of current or proposed sensitive species occurring in MPCs 1.2 and 4.1. Although the short-term risk is low in MPC 1.2 and 4.1, the longer-term risk of uncharacteristic wildfire is a potential threat. It should also be mentioned that existing wilderness (MPC 1.1) poses high risk for all alternatives in the forest habitat, again due to the threats of uncharacteristic wildfire and the decreased ability to detect new infestations and establishment of noxious weeds (low to moderate in Table B-25).

Woodland - The potential effects to the woodland group do not vary widely between alternatives. Large portions of MPC 6.1 and 6.2 were assigned in most alternatives. Only a small portion (4 percent) of the woodland habitat group exists in designated wilderness (MPC 1.1). The management emphasis in these designated areas will not change between the alternatives. Livestock grazing, roads, and non-native plants were documented (Table B-9) as current threats in the woodland habitat group. Those alternatives with MPCs that would increase these threats or uses were considered to be more threatening than more conservative alternatives. Alternatives 1B and 5 pose the greatest potential impacts to the woodland habitat group based on moderate to high levels of livestock use, recreation, mechanical disturbance and noxious weeds. Alternative 5 has over 81 percent of the acres assigned to MPCs 5.1, 5.2, 6.1, and 6.2. These MPCs all have moderate to high risk for all indicators (Table B-25) except fire, which is low only in MPC 5.2 (30 percent in Alternative 5). Alternative 1B also has high potential impacts through MPC 6.2 (37 percent), 5.2 (16 percent), and 4.2 (18 percent), in which recreation, mechanical activities, and noxious weeds pose moderate, moderate to high, or high risks. Fire use may be lower in this alternative than others (low in 5.2, low to moderate in areas with 6.2 and 4.2). Alternatives 3, 2, and 7 were rated intermediately in the woodland habitat group; each would pose threats in MPC 6.1 (37, 28, and 30 percent respectively) due to the distribution of TEPSC or watch species occurrence and the moderate or moderate to high potential threats associated with this MPC. Alternatives 3 and 7 have more MPC 3.2, which may have higher threats from fire and noxious weeds. As with all discussions with Alternative 3 and 7, many impacts may be short term, but the potential to increase habitats beneficial to the sensitive species and the habitat group would be improved in the long term. The ability to detect weeds in such projects may offset the moderate to high (Table B-25) threat associated with this MPC. Alternative 4 has lower potential impacts to the woodland group than the previous alternatives. The major MPCs assigned in this alternative (1.2 – 28 percent, 3.2 – 20 percent, and 6.1-23 percent) have a wide range of potential impacts but noxious weeds and fire will likely have moderate to high impacts. Alternative 6 would pose the least potential impact to the woodland habitat group. A large portion of the woodland acres in this alternative are assigned to MPC 4.1a (42 percent) and 4.1B (23 percent), which have low to moderate potential impacts for all indicators but fire. In aspen woodland habitat, fire can be beneficial for recruitment and population vigor. Pinyon-juniper

communities, however, may be slow to recover from wildland fire and therefore fire use may pose more threats to the group. Noxious weeds, a dominant threat for this group, could pose a problem in all alternatives, given the large portions of each alternative assigned to MPCs with moderate to high potential impact for weed infestation and spread.

Shrubland - All of the alternatives have the potential for moderate to high level of impacts to shrubland species, based on MPC assignments. As with the woodland group, large portions of MPC 6.1 and 6.2 were assigned in most alternatives. Only a small portion (4 percent) of the shrubland habitat group exists in designated wilderness (MPC 1.1). Livestock grazing, roads, ORV use, fire (exclusion and inclusion) and non-native plants were documented (Table B-10) as current threats in the shrubland habitat group. Those alternatives with MPCs that would increase these threats or uses were considered to be more threatening than more conservative alternatives. The large amount of MPC 6.2 (35 percent) and 5.2 (26 percent) in Alternatives 5, and MPCs 6.2 (36 percent) and 5.2 (17 percent) in Alternative 1B, make these alternatives risky for the shrubland habitat group, given the moderate to high risk for all indicators (fire use low in 5.2) and the current threats documented in this habitat group. Alternative 3 follows closely behind: MPC 6.1 (32 percent), 5.1 (21 percent) and 4.1c(10 percent). Potential impacts from livestock use, recreation, mechanical activities; fire use and noxious weeds would be moderate or moderate to high in MPC 6.1 and 5.1 (grazing low to moderate). MPC 4.1c has high potential impact from fire, moderate impacts associated with livestock grazing, and low or low to moderate impacts for recreation, mechanical activities, and noxious weeds. Alternative 2 and 7 pose similar threats to the shrubland group. Alternative 6 has lower potential impacts for the shrubland group than previous alternatives. MPCs 4.1a (41 percent) and 4.1B (23 percent) are dominant in this alternative and have lower impacts for most indicators except fire and livestock use. Alternative 4 has the least potential for affecting the species in shrublands. Large portions of the shrubland acres are assigned to MPC 1.2 (25 percent) and 3.2 (20 percent), which have lower impacts from recreation, livestock grazing, and mechanical activities, which have been documented as dominant threats (Table B-10). Fire may be higher than in other alternatives but many of the shrubland species are threatened by the lack of fire and could be benefited by fire use (Appendix G, Tables G-3, G-4, and G-5). It is important to note that this habitat group has a higher potential for impacts than other habitat groups. This is mainly due to the potential impacts from relatively high amounts of MPCs 6.2, 6.1 and 5.2 in all of these alternatives.

Grassland - Potential effects to the grassland group appear to vary widely between alternatives. An estimated 12 percent of the montane forest acres exist in designated wilderness (MPC 1.1). The management emphasis in these designated areas will not change between the alternatives. Livestock grazing, roads, mechanical activities associated with timber harvest (in surrounding forest vegetation), fire (inclusion and exclusion), ORV use, and non-native plants were documented (Table B-11 and B-12) as current threats in the grassland habitat group. Those alternatives with MPCs that would increase these threats or uses were considered to be more threatening than more conservative alternatives. Alternative 5 has a high level of potential impacts associated with MPCs 5.1 (15 percent), 5.2 (34 percent), and 6.2 (26 percent), making it the riskiest for the species in grassland environments. Noxious weeds, mechanical effects (moderate to high), and livestock use (low to moderate – 5.1 and 5.2) were most prevalent among the threats from management activities in these MPCs and have been documented as dominant threats in this habitat group. Alternative 1B and 3 also pose moderate to high potential

threats to the grassland habitat group. High levels of MPCs 5.2 (47 percent -1B) and 5.1 (38 percent - 3) pose the greatest threats to the grassland species in addition to MPC 6.2 (9 percent - 1B, 7 percent -3). Impacts from current threats and management activities could be increased as a result of MPC assignment. Noxious weeds and mechanical activities could be moderate to high in these alternatives along with moderate fire use, low to high impacts from livestock grazing (5.1 and 5.1 low to moderate, 6.2 moderate to high) and low to high recreation (5.1 low to moderate, 5.1 moderate, 6.2 moderate to high). Alternatives 2 and 6 would have intermediate effects on the grassland habitat group. Both have a mix of MPCs 3.2, 4.1a or 4.1b, 5.1, 5.2, and 6.1 (each less than 27 percent of total). Alternative 2 also has 11 percent of the grassland acres assigned to MPC 6.2, which has moderate, moderate to high, or high impacts for all indicators (Table B-25). Alternatives 7 and 4 may have lower potential impacts because no acres are assigned to MPC 6.2, which may increase the current threats given the management activities and emphases allowed in this MPC. Alternative 7 does have 18 percent of the acres assigned to MPC 5.2 and 21 percent assigned to MPC 6.1, which have moderate to high impacts for most indicators (fire and livestock use are low and low to moderate respectively in MPC 5.2). Although Alternative 4 has a large proportion assigned to MPC 3.2 (38 percent) and MPC 1.2 (19 percent), which have moderate to high potential impacts from fire and noxious weeds, the impacts from recreation, livestock grazing, and mechanical activities are much lower than they would be in Alternative 7.

Riparian - RCAs will provide certain standards and to prevent degradation within riparian areas. The management objectives, standards, and guidelines for RCAs are similar across all alternatives except alternative 1b. In Alternative 1B, the RCAs are actually RHCAs that are protected by Pacfish/Infish direction, which is even more restrictive than the revised Forest Plan. Livestock grazing and non-native plants were documented (Tables B-13, B-14, B-15, B-16, B-17, and B-18) as dominant current threats in the riparian habitat group. Those alternatives with MPCs that would increase these threats or uses were considered to be more threatening than more conservative alternatives.

All alternatives would have moderate to high impacts for the riparian habitat group. Of these, Alternative 5 presents the most potential for adverse impacts to the riparian habitat group. A substantial proportion (66 percent) of the potential habitat for these species is assigned to MPC 5.1, which has moderate or moderate to high potential impacts for all indicators (low to moderate for grazing and recreation). Given the current documented threats (Tables B-13, B-14, B-15, B-16, B-17, and B-18) and the moderate to high-risk form noxious weeds and mechanical activities in MPC 5.1, Alternative 5 presents the greatest potential impacts to the riparian group and the TEPSC or watch species that occur there. Alternative 3 and 2 had slightly higher impacts with the high proportions of MPC 3.2 (71 percent - 3, 63 percent - 2) would increase the potential for impacts, including those that are documented as threats currently. Livestock grazing and, mechanical activities would pose low to moderate impacts, while fire use would be moderate, recreational impacts would be low, and noxious weeds would pose moderate to high potential impacts in these alternatives. Alternative 7 has moderate potential impact for the riparian habitat group. The amount of MPC 3.1 (48 percent) would have lower potential impacts than MPC 3.2 for most indicators, though recreation may slightly higher in 5.1 (Table B-25). In this alternative, riparian habitats are assigned to MPC 3.2 (15 percent) and 4.1c (23 percent), thus making it more risky than Alternative 1B (MPC 3.1 – 63 percent, 4.1B – 17 percent).

Alternative 1B with the application of RHCAs and Pacfish/Infish requirements poses intermediate risks to the riparian habitat. Alternative 4 and 6 present the lowest potential impacts to the riparian habitat group and TEPSC or watch species. Alternative 4 has slightly more risk than Alternative 6. Alternative 4 has a greater risk from fire use than Alternative 6 because of the large amount of recommended wilderness (MPC 1.2 – 33 percent). Alternative 6 has the majority of the *S. diluvialis* and *H. aquatilis* potential habitat acres assigned to MPC 3.1 (86 percent). This MPC has low potential impacts for most indicators, although impact potential from noxious weeds is moderate.

Rock – The effects to the rock habitat group varied by alternative. A major portion of the rock habitat acres (34 *percent*) exists in designated wilderness (MPC 1.1). The management emphasis in these designated areas will not change between the alternatives. As with the grassland group, the MPC assignment is based upon the dominant vegetation. Many of the rock outgroups or groupings occur within forested, grassland, woodland, and shrubland habitats. Impacts to the rock habitat group by MPC may therefore be overestimated. Roads, livestock grazing, ORV use, and recreation uses were documented (Tables B-19, B-20, B-21, and B-22) as current threats in the rock habitat group. Those alternatives with MPCs that would increase these threats or uses were considered to be more threatening than more conservative alternatives. In all alternatives but 5, a substantial proportion is assigned to recommended wilderness (MPC 1.2 – 19 *percent* in 1B, 2, 3, 6, - 48 *percent* in 4). MPC 1.2 has low to moderate (mechanical none) potential impacts for most indicators. Fire use is high under this MPC but given the nature of this habitat group, fire is not a likely threat. Alternative 5 has no MPC 1.2, and has portions assigned to 5.1 (14 *percent*) and 5.2 (14 *percent*). Impacts associated with forested vegetation treatment may pose threats to portion of the rock habitat group. Logging decks and associated timber harvest disturbance have been documented in the decomposed granitic outcrop group because many of these outcrops are flat, and open in nature (Table B-21). Alternatives 1B, 2, and 3 were intermediate in potential effects. Each had a portion assigned to undeveloped recreation (MPCs 4.1a, b, and c) and varying amounts of MPC 5.1, 5.2, 6.1, and 6.2 (no 5.2 in Alternative 3). In MPC 4.1(a, b, c), grazing would be moderate and recreation, mechanical activities, and noxious weeds would be low to moderate. As with recommended wilderness (MPC 1.2), the risk from fire is high. Wildland fire and prescribed fire should have little impact on the species in this habitat group if staging areas and suppression activities do not occur within TEPSC rock species habitat. Moderate to high impacts from mechanical activities and noxious weeds may occur in MPCs 5.1, 5.2, 6.1, and 6.2. Recreation, grazing, and fire use vary by alternative and magnitude of impact based upon the MPC standards and guidelines and MPC themes. Alternatives 6, 7, and 4 have the lowest potential impacts for the rock habitat group. Alternative 6 has a major portion (34%) assigned to MPC 4.1a, which will have low to moderate impacts for all indicators except fire, which is high (although fire is not as risky for this habitat type). Alternative 7 and 4 have portions assigned to MPC 3.1 (10 and 6 percent, respectively), which have none to low potential impacts from livestock grazing and mechanical activities, low to moderate impacts for fire use and recreational activities, weeds, which are moderate. All alternatives will likely pose lower threats for this habitat group than other groups given the nature of the habitat. Activities associated with surrounding vegetation and disturbance will be the main cause of potential impact for these species.

Long-term vs. Short-term Benefits and Impacts by Alternative

In all alternatives, short-term and long-term risks and impacts are inherent with all land management activities and objectives. The habitat group discussions above focus on the apparent short-term and long-term risks and impacts of each alternative. However, the long-term and short-term benefits of each activity weighed against these impacts are not addressed in depth. We attempt here to outline the benefits and impacts to the 86 TEPC, current or proposed sensitive or watch species by alternative.

Alternative 1B is the No Action Alternative and has intermediate short-term and long-term benefits and impacts to the 86 TEPC, current or proposed sensitive, or watch species. Management activities are low to moderate in watersheds with listed aquatic species, and vegetation restoration is limited due to the short-term impacts to watershed, riparian, and aquatic resources. The short-term benefits of low to moderate activity must be weighed against the potential long-term impacts in these areas, which include increased levels of uncharacteristic wildfire and insect and disease outbreaks. Outside of watersheds with listed fish species, management for growth and yield and rangeland utilization is emphasized, thus posing greater short-term impacts to the current or proposed sensitive species. These high levels of management activity, however, are designed to provide the long-term benefits that include minimization of insect, disease, and uncharacteristic wildfire. Currently, under this management direction, 13 of the 86 TEPC, current or proposed sensitive, or watch species (Table B-23) have threats that are contributing to a declining population trend on National Forest System lands or other lands and the habitat group or groups to which they belong (Appendix G, G-3, G-4, and G-5). Temporary or short-term disturbance in these areas may allow these populations to recover or move successional conditions to appropriate levels to support the viability of these species. It is important to consider however, that some short-term risks if not properly mitigated could severly impact plant populations.

Alternative 2 addresses the need for change, and allows a mixture of uses and restoration activities, and not unlike Alternative 1B, provides intermediate short-term and long-term benefits and impacts to the 86 TEPC, current or proposed sensitive, or watch species. Resources with low resiliency and integrity are restored within a range of desired conditions. Thus, short-term risks to the TEPC, current or proposed sensitive, or watch species due to restoration activities are high but may be offset by the long-term benefits of reducing risk to uncharacteristic disturbance. Although some of the TEPCS or watch species are adapted to natural fire conditions or are currently threatened due to fire exclusion (Appendix G, Table G-4, fire exclusion threat), uncharacteristic fire may severely impact all populations of plant species. Conversely, those resources that are resilient or resistant to disturbance are not treated or receive only custodial maintenance. The forest open gap species (Table B-7) could benefit from additional forest disturbance and may have less optimal habitat conditions at the custodial or maintenance level. The short-term benefit of low to moderate levels of management activity reduces short-term impacts to the TEPC, current or proposed sensitive, or watch species, but long-term risks increase due to the unpredictability of uncharacteristic disturbance (wildlife and insect/disease). The magnitude and severity of such uncharacteristic disturbance events, once they occur, will also increase over time.

Alternative 3 may not pose as many long-term risks as other alternatives, as it seeks to restore ecosystems to a desired historic range of natural variability. Though the risks in the short-term are high due to the increased management associated with restorative activities, these activities should improve the habitat for the TEPC, current or proposed sensitive, or watch species in the long-term. Several species (9 of 86 TEPC, current or proposed sensitive, or watch species, Appendix G, Table G-4, fire exclusion threat) would benefit from restoration of historical fire regimes and the creation of open patches across the landscape. Other species (8 of the 86 TEPC, current or proposed sensitive, or watch species) suffer from insects and disease threats (Appendix G, Table G-4) that could be addressed and minimized through the restoration activities of Alternative 3. Currently, 18 of 86 (21 percent) of the TEPC, current or proposed sensitive, or watch plant species currently are impacted by changes in the hydrologic regime. Restoration of riparian resources could benefit these species and their habitat as well. Perhaps the greatest common threat within the Ecogroup is noxious weed infestation and establishment. At present, 22 of the 86 (26 percent) of the TEPC, current or proposed sensitive species are impacted by non-native plant invasion and/or noxious weed invasion. Restoration activities may help reduce noxious/non-native plant invasion in the long-term but may contribute to their establishment in the short-term.

Alternative 5 emphasizes production of goods and services with the sustainable limits of the Ecosystem, including growth and yield on suited timberlands and livestock forage. The short-term risks to the 86 TEPC, current or proposed sensitive, or watch species are greatest under this alternative. Currently, 46 of the 86 (53 percent) TEPC, current or proposed sensitive, or watch species are impacted by activities associated with grazing (Appendix G, Table G-3, grazing threat). Recreational activities currently impact 25 of the 86 (29 percent) TEPC, current or proposed sensitive or watch species (Appendix G, Table G-3). In addition, 20 of the 86 (23 percent) TEPC, current or proposed sensitive, or watch species (Appendix G, Table G-3, logging threat) are currently impacted by timber harvest activities. Increased levels of all these activities along with other management activities pose extreme short-term risks to all the TEPC, current or proposed sensitive, or watch species. These management activities may, however, promote long-term benefits, which include decreased risk of tree mortality, and other negative impacts from uncharacteristic disturbance (insect, disease, and wildfire).

Alternatives 4 and 6, while benefiting TEPC, current or proposed sensitive, or watch species in the short-term due to minimal management activity, pose the greatest long-term threats due to uncharacteristic wildfire, increased incidence of insects and disease, and increased susceptibility to uncharacteristic disturbance. Species in the montane understory habitat group (Table B-8, Appendix G, Tables G-2, G-4) would be at greatest risk from uncharacteristic wildlife, due to their increased susceptibility to uncharacteristic disturbance. As stated above, several species (8 of the 86 TEPC, current or proposed sensitive, or watch species) are adversely affected by insects and disease. In addition, many of the TEPC, current or proposed sensitive, or watch species have extremely small populations (Appendix G, Table G-2, G-4), thus making them more susceptible to natural conditions and stochastic events, such as disease outbreak (Appendix G, Table G-4, natural conditions threat). With no intervention or restoration efforts to combat disease or insect outbreaks, several species could be at a greater risk of extinction under these alternatives.

Alternative 7 may provide intermediate impacts to TEPC, current or proposed sensitive, or watch species as this alternative attempts to provide for the undeveloped character of inventory roadless areas (IRAs), while moving toward desired future conditions through restoration for aquatics, riparian, terrestrial, and vegetational conditions and to provide for sustainable levels of goods and services on the roaded portions of the National Forests. This alternative protects plant, animal, and aquatic species that are listed or proposed for listing under the ESA by providing management direction that has been developed specifically to reduce temporary, short-term, or ongoing impacts to these species, while providing for long-term maintenance or improvement of their habitats. An ecosystem-based management is used which balances ecological conditions, social desires, and economic considerations. Management goals are the basis for determining the mix of management actions, which moves towards DFC. Currently, 36 of the 86 (42 percent) TEPC, current or proposed sensitive, or watch species are impacted by activities associated with roads, road construction, and/or road maintenance (Appendix G, Table G-3, road threat). These species could be benefited through restoration or maintenance. Additional populations could be protected in unroaded areas by providing for the undeveloped characters of the IRA. Other threats from recreational activities (29 percent of TEPCS or watch species) and timber harvest and associated activities (23 percent TEPCS or watch species) could be reduced or prevented as part of the management activities under this alternative (Appendix G, Table G-3, recreation, logging threats). Conversely, these threats could be increased in areas in which good and services are emphasized and short-term risks are high. Site-specific mitigation will be used to attempt to offset adverse effects in all management activities.

Summary of Alternatives Effects for 86 TEPSC Plant Species

In summary, Alternative 5 has the most potential for overall impacts to the 86 TEPC, current or proposed sensitive or watch plant species. It was rated as one of the highest alternatives for effects for seven of the eight habitat groups. Alternatives 1B and 3 closely followed this, due to the short-term risks associated with these alternatives. The alternative which appears to have the least potential impact to the 86 TEPC, current or proposed sensitive, or watch species is Alternative 4, which rated as one of the lowest alternatives for effects in eight of the eight habitat groups. Alternative 6 closely followed this (seven of eight habitat groups). As stated above in the discussion, many of the impacts in Alternatives 3 or 7 are considered short-term risks, to improve habitat conditions in the long-term through restoration and maintenance of vegetative communities. Conversely, Alternative 6 and 4 were rated as lower in immediate short-term impacts, but the longer-term outlook is less predictable, particularly regarding uncharacteristic wildfire effects, and increased susceptibility to disturbance events. Alternatives 1B and 2 were generally considered as intermediate in effects across all habitat groups. Table 3-24 summarizes the alternatives by habitat groupings.

Table B-27. Summary of Potential Impacts of Alternatives for the Identified Habitat Groups

Habitat Group	Alternative with the MOST Potential Impact	Alternatives with INTERMEDIATE Potential Impact	Alternative with the LEAST Potential Impact
Alpine	5, 1B	2, 7, 3	6, 4
Subalpine Forest/Non-forest	5, 3	2, 1B, 7	6, 4
Montane Forest	5, 1B	2, 3 = 7	6, 4
Woodland	1B = 5	2, 3, 7	4, 6
Shrubland	5, 1B	3, 2, 7	6, 4
Grassland	5, 1B	3, 2, 6	7, 4
Riparian	5, 3	2, 7, 1B	4, 6
Rock	5, 1B	2, 3, 6	7, 4

Rare and Unique Communities

Rare and unique communities found in the Ecogroup are listed in Appendix G, Tables G-6 and G-7. Forest-wide management direction includes long-term goals that promote habitat restoration and maintenance of rare and unique communities. These goals include restoring ponderosa pine communities (6 of the identified rare and unique communities are ponderosa pine types), and sagebrush (*Artemisia sp.*) communities (5 of the 36 identified communities). Again, some of the alternatives would accomplish this more effectively, particularly those providing for more restoration activities (Alternatives 3 and 2). Furthermore, by providing vegetation components at amounts and distributions similar to those that existed historically, and by maintaining or restoring the ecological processes that support these vegetation components, the theory is that Forest land managers will also be providing the overall biological diversity necessary to sustain both individual species of concern and rare communities. The amounts and distributions of vegetation components would vary by alternative, depending upon the prescriptions. Those alternatives that require more active types of management (Alternatives 1B, 2, 3, and 5) would have more controlled and targeted changes to vegetation. These represent higher short-term risks to rare and unique communities. Alternatives 2, 7, and 3, with an emphasis on restoration, may have higher potential short-term impacts, but can improve the potential habitat for some of these communities in the long term. Those alternatives that rely more on natural processes (Alternatives 4 and 6) pose fewer short-term risks to the potential habitat of rare communities, but the longer-term outlook for uncharacteristic disturbance to communities may be more random and stochastic, in both space and time.

Some of these rare and unique communities are plant associations, representing the entire range of seral stages, others may be existing vegetation types. Therefore, the desired conditions for the Forest providing for a mix of seral stages, based on HRV for each type, will contribute to the variation across the landscape that would have existed historically, including potential habitat for rare and unique community types. Fire exclusion and timber harvest have decreased the mid-seral stands of many of these community types; therefore, creating a range of seral stages across the landscape would improve this condition. Furthermore, the coarse filter approach to maintain or restore potential habitat in the landscape affords some level of protection for those rare and unique communities that are as yet unsurveyed.

Potential Habitat

The amounts and distributions of vegetation components would vary by alternative, depending upon the objectives of the MPC. All of the alternatives, except Alternative 5, have vegetation desired conditions that fall within the HRV. Some are on the higher end of this range, particularly for components such as large trees (Alternatives 4, 6, and 3), whereas others fall on the lower side of the HRV (Alternative 1B; Alternative 2 falls within the middle of the range). Those alternatives that require more active types of management (Alternatives 1B, 2, 3, 7, and 5) would have more controlled and targeted changes to vegetation. These represent higher short-term risks to TEPCS or rare plants, and would therefore, require more intensive monitoring. Alternatives 2 and 3, with an emphasis on restoration, may have higher short-term impacts, but can improve the potential habitat for some of these species in the long term. Those alternatives that rely more on natural processes (Alternatives 4 and 6) provide for less short-term risks to the potential habitat of TEPCS or rare plants, but the longer-term outlook may be more random and stochastic, in both space and time.

Improvements in inventory technology—such as LANDSAT mapping, GIS databases, etc.—will assist with the monitoring of vegetation conditions, so that the Forests know whether vegetation components are within or moving towards DFCs. Within the Forest-wide guidelines, it is stated that suitable occupied and unoccupied habitat should be defined for TEPCS plants. Additionally to meet NEPA requirements, TEPCS plant surveys are to be conducted by botanical personnel prior to conducting land management activities. Surveys should be conducted, when possible, for species of vascular plants, bryophytes, lichens, and fungi with poorly known ranges to determine distributions and abundance. This monitoring, at both the coarse and fine scales, should have the overall beneficial effect of identifying potential habitat for TEPCS plants under all alternatives.

Cumulative Effects

Cumulative effects are defined as those impacts on the environment that result from the incremental effects of an action when it is added to past, present, and foreseeable future actions, regardless of the parties, government agencies or otherwise, responsible.

The alternatives provide land and resource management direction for those lands within the Ecogroup that are administered by the Forest Service. Forest Service botanists and ecologist will continue to coordinate with American Indian tribes, other federal agencies, state and local agencies, university researchers, ICDC, and other resource advisory councils to further minimize or avoid adverse cumulative effects for all TEPCS species, rare and unique communities, and potential habitat.

Threatened Species

***Mirabilis macfarlanei* (Macfarlane's Four-o'clock) -** *Mirabilis macfarlanei* populations are endemic to low-elevation grasslands within in three distinct areas: the Snake River unit, Idaho County, Idaho and Wallowa County, Oregon; the Salmon River unit, Idaho County, Idaho; and Imnaha River unit, Wallowa County, Oregon. Ten populations are located within Hells Canyon National Recreation Area (NRA) and four are at least partly on lands administered by the BLM's Cottonwood Resource Area. No known populations occur within the Ecogroup, though potential

habitat may exist along the Snake River on the Payette National Forest. Maintenance of potential habitat may serve for recovery or for population expansion. Management actions--including livestock grazing, herbicide application, fire suppression, recreational activities, road and trail construction and maintenance, and reservoir level and river flow management by other agencies, organizations, and private individuals--may have detrimental effects on the populations and habitat of *M. macfarlanei.*

The USFWS (USDI FWS1999) has a current recovery plan for *Mirabilis macfarlanei*, which outlines the management actions and directives needed for the recovery of this threatened species. The guidelines, objectives, and management directives of the recovery plan will be met and upheld for all Forest Service actions under all alternatives to ensure the continued viability of existing populations and to maintain potential habitat conditions. In September 2002, the USFWS removed *Mirabilis macfarlanei* from the Payette National Forest 90-Day Species List and noted that future biological assessments need not address the species because they believe the plant does not occur on the Forest. However, the USFWS is attempting to gain additional information about the species' distribution and has asked that the Payette National Forest continue working with them on further conservation efforts (USDI FWS 2002, 1-4-02-SP-911).

***Spiranthes diluvialis* (Ute Ladies'-tresses Orchid) -** *Spiranthes diluvialis* populations are randomly interspersed throughout relatively low-elevation riparian, vernally wet, and lakeside wetlands throughout the interior western United States. Known populations have been located on a variety of land ownerships including, Forest Service lands, BLM lands, and private ownership. Potential habitat is found throughout the Ecogroup, but no occupied habitat has yet been discovered. *Spiranthes diluvialis* prefers open, early seral riparian areas for establishment, thus restoration efforts for aquatic resources may be in direct conflict with management efforts for this threatened plant species. Additional human-caused activities that may contribute to the cumulative effects for this threatened species include mining, timber harvest, livestock grazing, flood events, prescribed natural fire, reservoir level and river flow management, and road construction activities.

The USFWS (USDI FWS 1999) has prepared a Draft Recovery Plan, which outlines the management actions and directives needed to restore populations and reduce current threats. The guidelines, objectives, and management directives of the draft and final recovery plan will be met and upheld for all Forest Service actions under all alternatives to ensure the continued viability of existing populations and to maintain potential habitat conditions. Efforts to streamline recovery actions with aquatic species conservation will be made to prevent conflicts in management activities and to most effectively preserve viability of all TEPCS species.

In September 2002, the USFWS removed *Spiranthes diluvialis* from the Boise, Payette, and Sawtooth National Forests' 90-Day Species List Update and noted that future biological assessments need not address the species because they believe the plant does not occur on the on these Forests. However, the USFWS is attempting to gain additional information about the species distribution and has asked that the Forests continue working with them on further conservation efforts (USDI FWS 2002, 1-4-02-SP-911).

***Silene spaldingii* (Spalding's Catchfly) -** Throughout its range, most occurrences of *Silene spaldingii* are located on private land. A few of the populations are managed by state agencies, tribal land, and the Nature Conservancy. No known populations of *S. spaldingii* occur within the Ecogroup, though potential habitat does exist in the Snake River and Salmon River canyon grasslands on the Payette National Forest. The cumulative effects to this rare species may include: habitat destruction and fragmentation from agricultural and urban development, livestock grazing and trampling, native and introduced herbivores, herbicide treatment and herbicide drift, competition from non-native species, and loss of pollinators due to insecticide application and destruction of pollinator habitat.

Section 7 guidelines and recovery objectives were followed where potential habitat for *Silene spaldingii* occurs on the Boise and Payette National Forest. In September 2002, the USFWS removed *Silene spaldingii* from the Boise and Payette National Forests' 90-Day Species List Update and noted that future biological assessments need not address the species because they believe the plant does not occur on the on these Forests. However, the USFWS is attempting to gain additional information about the species distribution and has asked that the Forests continue working with them on further conservation efforts (USDI FWS 2002, 1-4-02-SP-911).

***Howellia aqualitis* (Water Howellia)**

The USFWS listed *Howellia aquatilis* (Gray) as a threatened species on July 14, 1994 (59 FR 35860). Critical habitat has not been defined or designated for *H. aquatilis* (59 FR 35860) because the USFWS does not feel it is prudent due to a possibility of increased take and vandalism. *Howellia aquatilis* has been found in Idaho, historically, in Kootenai County in 1892. It was observed in Latah County in 1968, and is still considered extant in that local (Roe and Shelly 1992). Montana has the largest population of *H. aquatilis* known in the world: 101 occurrences have been found to date all occurring in the Swan River Drainage, spanning Lake County and Missoula County and on the Flathead National Forest. Fifty-four occurrences of *H. aquatilis* are found in Washington in Spokane County, Clark County and Pierce County. In Washington, *H. aquatilis* habitat ranges from the lowlands west of the Cascades to the channeled scablands of eastern Washington (Federal Register Vol. 61, No. 186, 1996). In 1996, this species was rediscovered at five sites in Mendocino National Forest, near the original collection (Federal Register Vol. 61, No. 186, 1996). There are no extant sites in Oregon but *H. aquatilis* is historically known from four sites (Federal Register Vol. 61, No. 186, 1996) however, all attempts to relocate these historical sites have been unsuccessful. Currently, no populations of *H. aquatilis* have been located within the Ecogroup. Potential habitat for *H. aquatilis* is found in limited areas throughout the Payette National Forest. The cumulative effects to this rare species may include: habitat destruction and fragmentation from agricultural and urban development, livestock grazing and trampling, seed bank destruction, native and introduced herbivores, herbicide treatment and herbicide drift, competition from non-native species, and loss of pollinators due to insecticide application and destruction of pollinator habitat.

In September 2002, the USFWS removed *Howellia aquatilis* from the Payette National Forest 90-Day Species List and noted that future biological assessments need not address the species because they believe the plant does not occur on the Forest. However, the USFWS is attempting to gain additional information about the species' distribution and has asked that the Payette National Forest continue working with them on further conservation efforts (USDI FWS 2002, 1-4-02-SP-911).

Proposed Endangered Species

***Lepidium papilliferum* (Slick Spot Peppergrass)**

Slick spot peppergrass occurs in semi-arid sagebrush-steppe habitats on the Snake River Plain, Owyhee Plateau, and adjacent foothills in southern Idaho. There are 88 known occurrences. Of these, 70 are currently extant, 13 are considered extirpated (extinct), and five are historic (i.e., have not been relocated) (Moseley 1994, Mancuso 2000). The number of individuals at each occurrence ranges from one to 2,000 (Mancuso 2000). The total amount of occupied slick spot peppergrass habitat is less than 78.4 acres (31.8 hectares), and the amount of high-quality occupied habitat for this species is less than 3.3 acres (1.3 ha) (Mancuso et al. 1998). The documented extirpation rate for this taxon is the highest known of any Idaho rare plant species (Moseley 1994).

At present, no populations of slick spot peppergrass are located within the Ecogroup. Potential habitat for this species may exist on the Boise National Forest, specifically in the Lower South Fork Boise River, Arrowrock Reservoir, and Boise Front/Bogus Basin Management Areas. The cumulative effects to this rare species may include: habitat destruction and fragmentation from agricultural and urban development, livestock grazing and trampling, native and introduced herbivores, herbicide treatment and herbicide drift, competition from non-native species, fire and fire rehabilitation, loss of pollinators due to insecticide application, destruction of pollinator habitat, gravel mining, and irrigated agriculture. The most recent 90-day species list update from USFWS (dated Sept. 30, 2002) lists slick spot peppergrass on the Mountain Home Ranger District for the Boise National Forest. Botanists on the Boise National Forest will follow section 7 guidelines for *Lepidium papilliferum* for conducting surveys and evaluating project effects (USDI FWS 2002).

Candidate Species

***Castilleja christii* (Christ's Indian Paintbrush)** - The only known population of *Castilleja christii* is found on Mt. Harrison on the Sawtooth National Forest. Impacts from livestock grazing, recreational activities, and road maintenance activities have been an historical concern for the population viability of this species. In 2002, the Sawtooth National Forest developed and signed a Conservation Assessment and Strategy for *Castilleja christii* (Pierson 2002). They Conservation Assessment documents all of the baseline data and conservation actions for Christ's Indian paintbrush to date. The Strategy outlines the Minidoka District's action plan for conservation and protection for the next five-year period. The strategy has five main conservation emphasis areas: (1) examination of geographic distribution of Christ's Indian paintbrush, (2) prevention and alleviation of negative impacts to the population, (3) continue monitoring and initiate research of the population, ecology, and biology, (4) coordination with agencies and academic institutions, and (5) formation of an oversight technical team to oversee the effectiveness of the conservation measures and implementation. Specific action items are

designated for each fiscal year and will be implemented as funding and resources are available. The Conservation Assessment and Strategy will be implemented under all seven alternatives. Additionally, the Sawtooth Forest is currently collaborating with the USFWS to produce a signed Conservation Agreement that would outline conservation action items for the next 10-year period. Under this agreement, the USFWS would retain Christ's Indian paintbrush as a Candidate species and would reevaluate the need for listing upon implementation of the Agreement.

The cumulative effects to this rare species may include: habitat destruction, unauthorized livestock grazing and trampling, native and introduced herbivores, herbicide drift, competition from non-native species, loss of pollinators due to insecticide application, destruction of pollinator habitat, recreational impacts, and potential ski facility expansion. However, the implementation of the Conservation Strategy, Forest-wide management direction, Forest Plan standards and guidelines for the three management areas, and continued efforts with USFWS will ensure that all possible measures will be taken to protect the *Castilleja christii* population from adverse affects of management activities and uses.

***Botrychium lineare* (Slender Moonwort)** - The habitat for the slender moonwort has been described as "deep grass and forbs of meadows, under trees in woods, and on shelves on limestone cliffs, mainly at higher elevations" (Wagner and Wagner 1994), but they also state that to describe a typical habitat for this species would be problematic since the known sites are so different. In the United States, the slender moonwort is currently known from a total of ten populations: three in Colorado (El Paso and Lake counties), two in Oregon (Wallowa County), three in Montana (Glacier County), one in Washington (Ferry County), and one on the Sawtooth National Forest. The USFWS is currently waiting for genetic confirmation of this rare species before they will place it on the Sawtooth Forest's 90-day species list. The Sawtooth National Forest is currently waiting for confirmation of this species as well. Samples were sent to Iowa State University, where Dr. Farrar (a *Botrychium* expert) is genetically analyzing this species. There are four historic slender moonwort population sites in the United States and two in Canada. Populations previously known from Idaho (Boundary County), Montana (Lake County), California (Fresno County), Colorado (Boulder County), and Canada (Quebec and New Brunswick), have not been seen for at least 20 years (Wagner and Wagner 1994).

The cumulative effects to this rare species may include: habitat destruction and fragmentation from agricultural and urban development, livestock grazing and trampling, native and introduced herbivores, herbicide treatment and herbicide drift, competition from non-native species, recreational impacts, habitat modifications, fire effects, successional effects, and stochastic events. If the taxonomic identity of the *Botrychium* specimens is confirmed to be *Botrychium lineare*, the Sawtooth Forest will follow section 7 guidelines for *B. lineare* for conducting surveys and evaluating project effects (USDI FWS 2002). The Boise and Payette National Forests will also continue to survey for this diminutive species and will collaborate with USFWS on all findings.

Current or Proposed Sensitive or Watch Species

The 79 current or proposed sensitive or watch species inhabit a diverse array of habitat and vary in their distribution across the landscape. These species are faced with a variable range of threats and differ in the degree to which Forest Service management and other management may affect their status. The amount of current scientific information and distribution data available also varies greatly among species, thus often limiting the assessment of the cumulative effects of all management activities and environmental effects on the long-term viability of such species.

Distribution on the Landscape - Greater than 32 percent of the current or proposed sensitive or watch species (25 species) are locally endemic to the regions encompassed by the Ecogroup (Table B-2). The three National Forests within the Ecogroup are responsible for a large majority of the populations of these species. Indeed, four species are found only on these National Forest System lands (Appendix G, Table G-1). Management activities--including livestock grazing, fire use, mechanical treatments such as timber harvest and road construction, and noxious weed invasion--may pose potential impacts to these species. The Forest Service endemic and local endemic species (Appendix G, Table G-1) have been identified for each specific Management Area (Chapter III, revised Forest Plans) to further ensure that project level management and planning incorporate and protect these narrowly distributed species.

Twenty percent of the current or proposed sensitive or watch species (16 species) are regionally endemic, encompassing areas of southwestern Idaho, eastern Oregon, and southeastern Washington (Appendix G, Table G-1). These species are often distributed on a variety of land ownerships including Forest Service land, BLM land, Hells Canyon National Recreation Area, State lands, and privately owned lands. There are a wide range of current and potential impacts to these species from management activities and development (Appendix G, Tables G-3, G-4, and G-5). Conversion of habitat to agriculture and urban development, road building, and herbicide drift pose the greatest threat to viability for the majority of these species. As with the Forest Service endemic and local endemic species, regionally endemic species have been identified for each specific Management Area (Chapter III, revised Forest Plans) in which they occur to further ensure that project level management and planning incorporate and protect these regionally distributed species.

Sixteen of the current or proposed sensitive or watch species (20 percent) have disjunct distributions (Appendix G, Table G-1) within the Ecogroup, meaning that these populations are substantially separated geographically from the remainder of the species' range and/or populations. The land ownership, responsible managers, threats, and viability vary widely for these species across their total distributions (Appendix G, Tables G-3, G-4, and G-5). Management Areas (Chapter III, revised Forest Plans) with these disjunct populations and species have been identified to ensure project –level management and protection.

Only a small fraction (8 percent, 6 species) of the total current and proposed sensitive or watch species have scattered distribution within Ecogroup (Appendix G, Table G-1). These species have wide overall geographic ranges (e.g., the western states) but are sparsely distributed throughout the landscape. As with the disjunct species, land ownership, threats, management

responsibility, and viability vary widely for these species across their total distributions (Appendix G, Tables G-3, G-4. and G-5). The management areas in which these randomly distributed populations occur have been identified (Chapter III, revised Forest Plans) for project –level management to ensure their protection.

Some (11 percent, 9 species) of the total current and proposed sensitive or watch species have widespread distribution but are rare within the Ecogroup (Appendix G, Table G-1). These species may be distributed over a wide range of land ownerships (private, State lands, BLM, and USFS) and may be faced with varying threat levels and impacts that may affect the overall species viability (Appendix G, Table G-3, G-4, and G-5). Within the Ecogroup, the responsibility for ensuring the viability of these species, as with all other TEPCS plant species, is high. To ensure protection of these species and their habitat, project-level planning and protection is necessary. These species have been identified in the Management Area plans (Chapter III, revised Forest Plan) to ensure they are incorporated and conserved at this level.

The remaining seven species (9 percent) have circumboreal distribution (Appendix G, Table G-1). These plant species are widespread in the higher latitudes of the Northern Hemisphere, occurring in both North America and Eurasia. These species are sometimes referred to as circumpolar. The land management, threats, viability, and protection efforts can vary immensely for these species on a global level (Appendix G, Table G-3, G-4, and G-5). As with all TEPCS plant species in the Ecogroup, the Forest Service responsibility for protection is high. The Management Areas in which these populations occur have been identified (Chapter III, revised Forest Plans) to ensure their protection during project–level management.

Trends - All TEPC, current or proposed sensitive, or watch species and their habitats could be potentially impacted, positively or negatively, by the activities of management agencies, private landowners, state agencies, and human impacts. However, several species may be more susceptible to these potential impacts (fire, grazing, recreation, mechanical treatments, noxious weed invasion) given their population trend. Currently, 13 TEPCS species (Table B-23) are known to have declining population trends. These species would be at greater risk of loss or habitat destruction from the impacts of all management and human activities than those with stable (Appendix G, Table G-2) or increasing (none currently within the Ecogroup) trends. For many of the sensitive species, little to no current information is known concerning biology, threats, or population trends, thus making the estimation of cumulative effects difficult. Within the Ecogroup, 26 species (Table B-24) have little research or information to determine their population trend on National Forest lands. The remaining 47 species (55 percent of the total current and proposed sensitive plant species) are currently stable on National Forest System lands (Appendix G, Table G-2). Efforts to increase information concerning trends, biology, and viability, and to preserve existing populations will be made for all TEPCS species.

Mitigation - Management efforts are already in place in an attempt to offset the cumulative effects that may occur under management activities. The National Forest Service (FSM 2670 and FSH 2609.25, 1.25) Management Policy ensures that for all TEPCS plant species, declining or otherwise, the following measures will be taken: (1) biological evaluations will be written for all activities that may impact sensitive species and their habitat, (2) "effects" of activities will be determined as similar to those for threatened, endangered or proposed species, and (3) sensitive

species must receive special management emphasis to ensure their viability and to preclude trends toward endangerment that would result in the need for federal listing. This National Forest Service Management Policy will be employed at a species level in all alternatives to ensure its mandates are achieved and that sensitive species are conserved.

In the previous forest plans, little if any management direction was provided for TEPCS or watch species. Indeed, only the Payette National Forest had a single standard that required that "ground disturbing activities will be surveyed for TEP species". Chapter III of each of the Forest Plans has two main areas that increase protection, conservation, and management direction significantly from the previous plans. The first major area of improved Forest-wide direction is the TEPC section, which outlines very specific protection and management requirements for TEPC plant species. This section is designed to protect "occupied" habitat of TEPC plants and will ensure that adequate protection is in place if new populations of TEPC plant species are located within the Ecogroup. Additionally, the management direction is written to anticipate the dynamic nature of the 90-day species lists provided by US FWS. If new TEPC species (not currently analyzed or presented here) are found within the Ecogroup, the Forests will have sufficient management direction to protect these species as well. The second major area of improved Forest-wide direction is the Botanical Resources section (Chapter III – Forest Plans). Goals, objectives, standards, and guideline (major themes presented above in the Forest Plan Direction and Implementation section) provide much improved direction for surveys, habitat protection, noxious weed prevention, pollination, adverse affects, and research direction. The substantial change in management direction for botanical resources in the revised plan greatly improves TEPC, sensitive, and watch species protection and conservation.

Additionally, management area specific standards, guidelines, goal, and objectives have been defined for specific species. Each management area has a characterization that provides information about the TEPCS or watch species that are known to occur there and their habitat descriptions. Additionally, guidelines promote the need to maintain or restore habitats of sensitive species. Standards are written to ensure that specific Conservation Agreements and Strategies will be implemented and that projects will meet the requirements of the agreements and strategies.

Rare and Unique Communities

The rare and unique communities found in the Ecogroup are listed in Appendix G, Table G-6. However, the actual spatial locations and numbers of occurrences of these communities are unknown in many cases. Forest-wide guidelines specifically state that globally rare plant communities should be surveyed and mapped, and this information will be coordinated with the ICDC (Botanical Resources section, Chapter III, revised Forest Plans). In addition, guidelines state that Botanical Special Interest Areas should be identified and recommended for establishment; and these areas may include rare plant communities. Therefore, the process of locating these rare and unique communities is ongoing. Sixteen of the identified rare and unique communities are already present in RNAs, which afford a high level of protection. Other communities are riparian types, which would fall into RCAs or RHCAs, where any activities proposed must be designed to either maintain current conditions or to achieve desired conditions for riparian and aquatic resources. Activities that would benefit riparian resources over the long-term would also likely benefit rare riparian communities.

Potential Habitat

Desired conditions for the Forest will provide for a mix of seral stages, based on HRV for each type, again providing for the variation across the landscape that would have existed historically. This coarse filter approach should help maintain or restore potential habitat that may exist for TEPCS or rare plants that are as yet unsurveyed. Additional protection for vegetation is provided by the standards and guidelines at both the Forest-wide and Management Area levels (Chapter III, revised Forest Plans), by the State of Idaho Best Management Practices, and by Forest Service Manual and Handbook direction.