



United States Department of Agriculture
Forest Service

Grasshopper Restoration Project

Botany Report

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for:
Barlow Ranger District
Mt. Hood National Forest

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1.0 Introduction

This report addresses the rare botanical species that are documented or suspected to occur within the general project area. Only those species which may be directly, indirectly, or cumulatively affected by Alternative 1 (also called the Proposed Action) and Alternative 2 (also called the Shelterwood Alternative) are considered. There are no known occurrences of federally listed endangered or threatened botanical species on the Mt. Hood National Forest and the Forest has no habitat recognized as essential for listed plant species recovery under the Endangered Species Act. The actions proposed by both action alternatives would have direct, habitat-disturbing or habitat-enhancing effects to the target species discussed below. Project Design Criteria (PDC) and mitigations would be employed to reduce potentially negative direct effects of these actions to acceptable and potentially beneficial results. This report confirms that the proposed activities are compliant with the Mt. Hood National Forest Land and Resources Management Plan as amended by the Northwest Forest Plan, which is incorporated by reference, and direction provided by all other applicable law and policy.

2.0 – Analysis Framework

2.1 - Resource Indicators and Measures

The purpose of this Specialist Report is to document Forest Service programs or activities in sufficient detail to determine how an action or proposed action may affect any threatened, endangered or sensitive (TES) species and their habitats (FSM 2670.5). The species considered in this report are listed as sensitive by the Pacific Northwest (Region 6) Regional Forester (updated March 2019) as well as species included in the 2001 Record of Decision Amendments to the Survey and Manage Standards and Guidelines (henceforth, the 2001 ROD) (USDA, USDI 2001). These are species for which population viability is of concern, as evidenced by current or predicted downward trends in population numbers or density, or by concerning trends in habitat availability that would reduce a species' distribution. This evaluation is completed to determine whether a proposed action or a lack of action would result in a loss of viability of any native or desired non-native species, or a trend toward those species becoming federally listed.

This specialist report discusses the existing condition and analyzes the effects of the alternatives on sensitive plants within the Grasshopper project area. This report analyzes sensitive species that are documented or suspected to occur within the general biophysical area where the project will occur. Only those species which may be directly, indirectly, or cumulatively affected by the alternatives are considered. Species that are not suspected to occur within the analysis area, or are eliminated from consideration due to other factors, are not described and are not considered in the detailed effects analysis. However, information on these species is available at the district offices of the Mt. Hood National Forest, upon request.

2.2 - Methodology

A pre-field analysis is used to determine the probability that TES species, and/or their respective habitats are located within or adjacent to the project area, and to determine the extent and intensity of previous survey efforts. Information from the pre-field review, in conjunction with the project description, is used to determine the need and intensity of field surveys and, in part, fulfills the standards and procedures for conducting a biological evaluation (FSM 2672.42).

A complete list of previous and historical surveys for sensitive and rare plants in the project area was determined by querying the Forest Service's Natural Resource Manager's Threatened, Endangered, and Sensitive Plant Species database (NRM TESP-IS 2019) and by examining historical survey forms, maps, NEPA records and electronic botanical databases.

The following sources were consulted for the pre-field review:

- Regional Forester's Sensitive Species List (updated March 2019).
- Rare threatened and endangered species of Oregon (Oregon Biodiversity Information Center (ORBIC) August 2016).
- The Forest Service's Geographic Information System (GIS) corporate database: NRM TESP-IS.
- Species Fact Sheets provided by the Interagency Special Status Sensitive Species Program website [<http://www.fs.fed.us/r6/sfpnw/issssp/>] of the Pacific Northwest Region.
- USFS personnel and District botany records.
- Literature, reports, conservation plans, conservation assessments, and species descriptions on file at the Barlow Ranger District Office.

There are no known occurrences of federally listed endangered or threatened plants within the Grasshopper project area. There are over 100 sensitive or rare plant, bryophyte, lichen and fungi species which were determined to have historic known sites or suitable habitat within the project area and adjacent watersheds. See Appendix 1 for the full list of species considered during the pre-field review and the summary of findings.

Multiple surveys were conducted within the project area for botanical species in the R6 Sensitive Species List (2019), and 2001 ROD during the 2019 field season. Field surveys were conducted using the intuitive controlled method. All survey protocols for 2001 ROD species were followed and in compliance with regional guidelines (VanNorman and Huff 2012). The Survey and Manage standards and guidelines (USDA/USDI, 2001) require equivalent-effort surveys for Category B fungal species (rare, pre-disturbance surveys not practical) when habitat-disturbing activities in Old-growth forest are proposed. Old growth forest stands are defined in the standards and guidelines glossary (USDA, USDI 2001) and the Northwest Forest Plan (USDA, USDI 1994). More specific parameters applicable to various species are available in the USFS,

Region 6, 1993 Interim Old Growth Definitions (USDA Region 6 1993). All the stands for which these definitions applied within the project area were surveyed in the spring and fall of 2019. For forests east of the Cascades, one year of spring and fall surveys are needed. It is recommended that surveys consist of two visits, approximately two weeks apart (VanNorman and Huff 2012). Survey timing and completion was dependent on weather and accessibility to the sites.

3.0 – Botanical Resources

3.1 – Existing Condition

The Grasshopper project area includes several plant association types and a variety of habitats, from dry ponderosa pine/Oregon white oak to moist, mid-elevation hemlock. The geographical boundary analyzed during this project was within portions of the Gate Creek, Rock Creek, Threemile Creek, Boulder Creek, and Upper Badger Creek 6th field subwatersheds. Surveys were limited to the project area.

The majority of the project area units were previously managed stands, dominated by younger Douglas-fir and ponderosa pine. This includes plantation stands and sapling thins. The average stand density in these units has resulted in decreased understory diversity, typically dominated by hardy smaller shrubs such as tall snowberry (*Symphoricarpus albus*) and wild rose (*Rosa gymnocarpa*).

Both action alternatives propose management in units which have had minimal management in the past. These units were determined to have stands with an average age over 180 years, dominated by large, legacy Douglas-fir, hemlock and true fir. These stands were located at the west end of the project area, between 4,500 ft and 5,000 ft elevation. The stands have large down woody material and layers of litter or duff. This combination of age and structure components is considered ‘old-growth’ habitat according to the 2001 ROD. Certain stands also have evidence of root rot or other forest health concerns. During surveys, a large diversity of fungal species with both mycorrhizal and saprobic functions were found, suggesting that these areas support a healthy fungal community.

The project area includes land which has been designated as Inventoried Roadless Areas. These included areas did not meet criteria for required surveys, and special habitats or species were not found within these areas. PDC will apply to these areas as with other units of the project. No additional considerations were made for botanical resources in these areas.

The project area includes habitat or known sites for several species of sensitive bryophytes, lichens, fungi and vascular plants. For additional information on any of the species considered, please reference Appendix 1.

3.1.1 – Cypridium species

Cypripedium montanum (mountain lady's-slipper) and *Cypripedium fasciculatum* (clustered lady's slipper) are orchid species endemic to western North America. These orchid species are included in the December 2003 Survey and Manage ROD as Category C species. The guidelines for these species suggest that they are uncommon and pre-disturbance surveys are practical.

Mountain lady's-slipper is a long-lived perennial orchid which grows in open, mixed conifer and conifer/oak plant communities in the montane west. The clustered lady's-slipper grows in similar habitats and is found both west and east of the Cascades. There are no known sites for clustered lady's-slipper in this project area. Populations of mountain lady's-slipper are known adjacent to this area within the Upper Badger Creek watershed. No new sites were discovered during surveys, but suitable habitat occurs within the project area.

3.1.2 – Botrychium species

Common moonwort (*Botrychium lunaria*), gray moonwort (*B. minganense*) and mountain grape-fern (*B. montanum*), are fern relatives typically found in mature coniferous forested wetlands, particularly on banks adjacent to seeps and springs associated with western redcedar (*Thuja plicata*). These species are listed on the Regional Forester's sensitive species list and/or the 2001 ROD. No occurrences of these three species were found during project surveys, but sites for these species are known from within the Boulder Creek, Gate Creek and Upper Badger Creek watersheds. Suitable habitat for these species is included in this project area, however buffers around riparian areas and wetlands should protect these species from the proposed activities.

3.1.3 – Lycopodium complanatum

Ground cedar (*L. complanatum*, now *Diphasiastrum complanatum*), is a species of clubmoss native to dry, open coniferous forests and alpine slopes. It has a circumboreal distribution, but limited sites are known from this region, with most sites on this forest being located in mid-high elevation, conifer forests. No known sites for this species are within the project area, and it was not discovered during surveys. Suitable habitat occurs within the planning area.

3.1.4 – Bryophytes and Lichens

No TES bryophyte or lichen species were known from historic sites within the planning area, and no new sites were found during surveys. The majority of species suspected from this project area are limited to riparian areas, seeps or springs. Suitable habitat is present for these species, however these habitats would be protected by riparian area buffers. Other target species are limited to rocky scree or talus slopes. These features have been removed from treatment units, and these species will not be discussed further. The remaining target bryophyte and lichen species are terrestrial or epiphytic. These species were surveyed for during 2019 survey efforts.

Target terrestrial bryophytes and lichens are typically associated with large, decaying downed wood or the bases of large conifer trees, or are found with other mosses in moist sites. These species are found in old-growth forests both east and west of the Cascades. Species considered

during this analysis are: *Blepharostoma arachnoideum*, *Brotherella roellii*, *Tetraphis geniculata*, *Cladonia norvegica*, *Lobaria linita*, and *Peltigera pacifica*.

The target epiphytic species are all lichens. Epiphytic lichens grow in the furrowed bark of large conifers or hardwood trees, or hang loosely from the bark or branches. The species considered were: *Bryoria subcana*, *Calicium abietinum*, *Calicium adpersum* var. *adspermum*, *Cetrelia cetrarioides*, *Chaenotheca chrysocephala*, *Chaenotheca ferruginea*, *Chaenotheca furfuracea*, *Chaenotheca subroscida*, *Chaenothecopsis pusilla*, *Dendrisocaulon intricatum*, *Hypogymnia vittata*, *Leptogium burnetiae*, *Leptogium cyanescens*, *Leptogium teretiusculum*, *Microcalicium arenarium*, *Nephroma bellum*, *Nephroma isidiosum*, *Nephroma occultum*, *Pannaria rubiginosa*, *Platismatia lacunosa*, and *Ramalina pollinaria*.

3.1.5 - Fungi

There were no historic sites for TES fungal species within the Grasshopper project area. This project area has potential habitat for almost 80 fungal species within stands which were determined to be over 180 years of age. There is a reasonable likelihood that these species occur in the project area, but habitat requirements for the majority of those listed are poorly understood or are too broad. The known or potential species are either litter/wood saprobes or form beneficial mycorrhizal associations with living trees. To analyze these habitats, equivalent-effort surveys for fungi were conducted on over 1,000 acres within the planning area, where habitat-disturbing activities were proposed in forested stands over 180 years of age and were required according to 2001 ROD direction. During these surveys, new sites were discovered for *Albatrellus ellisii*, *Clavariadelphus ligula*, *Clavariadelphus truncata*, *Polyzellus multiplex*, and possible sites for *Mycena overholstii* and multiple *Ramaria* species.

Litter and wood saprobes feed on dead and decaying organic material. This plays a crucial role of decomposition in ecosystems. These fungi require downed woody material of varying size and decay classes or leaf/needle and twig litter to grow and sustain themselves. Wood saprobes may be limited in distribution to the particular source of decaying wood, but litter saprobes may extend over a larger area via mycelial networks. See Appendix 1 for a list of known or suspected fungi species which may occur in these forested habitats east of the Cascades.

Mycorrhizal fungal species form mutually beneficial symbiotic associations with the roots of plants and trees. This connection allows fungi to absorb carbohydrates from the host plant, while the host receives minerals from the fungi. The increased surface area formed around the plant's roots by the fine fungal network also allows for increased water absorption. Many plants rely upon these fungi for nutrient and water uptake. The species considered here are known to be associated with members of the pine family such as ponderosa pine, Douglas-fir, and western redcedar. Others are often associated with oak species. See Appendix 1 for a list of known or suspected fungi species which may occur in these forested habitats east of the Cascades.

3.2 - Environmental Consequences for Botanical Resources

3.2.1 – Effects of No Action

The No Action alternative would have no direct effects to any of the target sensitive species. Under this alternative, none of the thinning or connected actions (such as temporary roads) would take place. The forest stands within the project area would remain as described above. There are potential indirect effects to these species as a result of no action. Stands with dense growth will continue to experience reduced plant diversity. This could also affect suitable habitats. The dense growth of the trees in much of this area results from a lack of natural disturbance and from human fire suppression. As such, there is a high risk of a catastrophic wildfire occurring within this area. Please see the fuels report which is incorporated by reference for more information on this risk. If a high intensity fire were to burn through this system, the effects to the species described above could be substantial. For all the species of concern, loss of individuals and habitat are likely. Many areas would be returned to early-seral stand conditions, which do not favor the sensitive species of concern and may promote the growth of invasive weed species.

3.2.2 - Direct and Indirect Effects of Alternative 1 and Alternative 2

This report analyzes two Alternatives: Alternative 1 (also called the Proposed Action) and Alternative 2 (also called the Shelterwood Alternative). Please see section 2.0 of the Environmental Analysis for a description of the activities proposed by each alternative. The majority of activities proposed by Alternative 1 and Alternative 2 are identical. The differences between the alternatives regard silvicultural and fuels treatments on the same 289 acres. These acres are east of Forest System Road 4860-000. Alternative 1 proposes Variable Density Thinning from below (VDT) whereas Alternative 2 proposes shelterwood treatments. Alternative 2 would also reduce surface fuels more than Alternative 1. Both alternatives would have similar impacts to botanical resources and are analyzed together. The alternatives include timber removal, piling of slash and associated actions, such as temporary road construction and road maintenance. These elements have direct negative or beneficial impacts on targeted species. Alternative 2 could have a higher short-term impact on botanical resources within these 289 acres since it proposes more removal of overstory trees. Project design criteria are included to reduce negative effects on known sensitive species or avoid habitats. The same project design criteria would apply to each alternative.

The major threats that could result from the proposed activities to these species are the direct loss of populations due to ground disturbing activities such as timber harvest and temporary road construction, direct removal of host trees for epiphytic species, or harvesting activities and application of fire that disturb litter and soil.

The alternatives may have beneficial effects on species. By returning disturbance to this area, improving the stand structure and removing excess fuels, many species may see long-term habitat benefits.

The proposed action elements may also have indirect effects on species. The use of equipment or vehicles during project implementation has a risk of invasive weed introductions, which can

alter or degrade sensitive species habitat. Project design criteria are in place to try and prevent the introduction of invasive or undesired species. For more details on this topic please refer to the Invasive Species Report which is incorporated by reference.

Cypripedium species

Monitoring of other populations of *C. montanum* on the Barlow Ranger District showed that the most successful populations of mountain lady's-slipper appeared in areas with protection by shrub cover and also with overstory openings. Areas with closed canopies had reduced vigor over subsequent years. This suggests that an effective means of preserving this species involves leaving residual patches of vegetation while opening up the tree canopy to between 35 and 50 percent (Helliwell 1990, 1991). This is supported by other findings where plant survival and spread was higher in shelterwood cuts rather than clear-cut or uncut forests (Huber 2002, Kaye 1999).

Research is not clear on the role that fire plays with these species. It is certain that fire suppression has resulted in dense stand conditions which do not favor lady's-slipper and may be an important factor in their decline. While some studies found that mountain lady's-slipper emerged immediately following fire (Pappalardo 1997), others found it to be fire-intolerant (Harrod et al 1997). Post-fire survival depends on the survival of the root crown and also on the recovery of shrubs and other understory plants which provide necessary shade and protection (Knorr and Martin 2003). Timber harvest activities would directly impact these plants through the removal of individuals and the disturbance of soil and litter. Prescribed fire has the potential to also remove individuals if the fire burns hot enough to destroy the root crown and underground rhizomes. Prescribed fire would also disturb soil and litter and may damage the mycorrhizal soil fungi the mountain lady's-slipper is associated with if it burns at a high intensity. These species' slow growth rate, complex symbiotic relationships with other organisms, and exposure to possibly frequent wildfires, suggest that recolonization of lady's-slipper throughout their historic range is unlikely (USDA Forest Service and USDI Bureau of Land Management 1994a).

Botrychium species

These species are associated with seeps, springs, wetlands, and riparian edges along streams or rivers. The proposed treatments will avoid and buffer moist habitats and riparian areas and will minimize soil disturbance and compaction to meet forest standards.

Lycopodium complanatum

Ground cedar habitat is within forested or open areas and could potentially be impacted by ground disturbing activities or application of fire. No individuals were found during botanical surveys.

Bryophytes and Lichens

For terrestrial species, the removal or destruction of dead and decaying logs and large conifers by timber harvest, road or trail construction, or fire are all direct effects and would remove both individuals and habitat. For epiphytic species, the removal of standing snags or large, living conifers has the same effect.

A diversity of downed woody materials would be maintained on-site to meet the standards for soil protection and sensitive mollusk species habitat. This would serve to protect an acceptable amount of habitat for terrestrial bryophytes and lichens. Alternative 1 proposes the removal of trees to achieve multiple age classes and emphasizes leaving the most vigorous trees of all sizes. Alternative 2 proposes the removal of the mature stand allowing regeneration under partial forest canopy or shelterwood. Both alternatives may remove host trees for epiphytic species. Alternative 2 would have a higher impact on these species, since it proposes the removal of more habitat for these species. The majority of snags would be retained to protect wildlife habitat but may be impacted by prescribed fire.

Fungi

Threats to fungi occur at many levels, from direct impacts to the substrates on which fungi grow to larger-scale, indirect impacts such as global climate change or pollution. The requirements for fungal habitat are not well understood. In addition to providing a food source for saprobic fungi, down woody debris and litter may function to retain moisture and provide refugia for fungal species, especially in dry sites. In addition, the size of this down woody material is important. Having a wide size range of material, from large logs to small twigs, and a variety of decay classes would decrease the homogeneity of the site and increase the fungal diversity. Management actions which threaten fungi include intense removal of hosts, woody material and litter, or management of a site which changes the microclimate. The fungal organism can be directly destroyed when machinery churns and breaks up the soil where these species reside. The mushroom is only a fruiting body. Each fungi persists as a thread-like network of fungal mycelia within the soil. Regional effects to fungi, and mitigation measures to minimize these effects were considered during the 2000 Final Supplemental Environmental Impact Statement for Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines (USDA/USDI, 2001) and are discussed below.

The Mt. Hood National Forest Plan was amended by the 2001 Survey and Manage Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines (USDA/USDI, 2001). The 2001 Survey and Manage ROD is based upon the 2000 Final SEIS. The 2000 Final SEIS analyzed the effects of applying Survey & Manage mitigation measures during habitat disturbing activities.

The effects of the proposed alternatives to fungi species tiers to the analysis in the 2000 Final SEIS. Management of these species under the 2001 ROD includes the protection of known sites, "equivalent-effort surveys" for Category B fungi in proposed habitat-disturbing projects in old-growth forests, and "Strategic surveys". Although these mitigations will still result in a moderate level of uncertainty that there will be adequate habitat to maintain these species, this management is intended to "provide a reasonable assurance of species persistence" within the

Northwest Forest Plan area of Oregon, Washington, and northern California. As described below, the alternatives are consistent with the 2001 ROD and are not expected to have effects on Category B fungi, beyond those already analyzed in the 2000 Final SEIS.

Effects to the known and potential fungi species within this project area were analyzed on pages 241 - 252 in the 2000 Final SEIS. For many of these species the analysis concluded that “while there is a moderate level of uncertainty due to the rarity of the species, and the lack of knowledge of species population biology and the unpredictable nature of disturbance events, all alternatives considered in the Final SEIS would provide inadequate habitat (including known sites) to maintain these species.” That analysis is incorporated here by reference.

As described below, there is no new information or changed circumstances that would substantially change the effects anticipated in the 2000 Final SEIS. The alternatives apply all mitigation measures for this type of project as expected in the 2000 Final SEIS and adopted in the 2001 ROD.

The predicted rate of habitat disturbance on federal lands in the Northwest Forest Plan area is within that analyzed in the 2000 Final SEIS. The predicted rate of habitat loss (i.e. late-successional forest) due to management activities is described on Pages 180-181 in the 2000 Final SEIS: "...the likelihood that an activity modifying late-successional forest will occur within the range of a truly rare or localized species population must be viewed in light of the relatively conservative degree of modification of late-successional forest projected to occur within the Northwest Forest Plan Area. For example, management activities (timber harvest and prescribed fire) are projected to modify approximately 3 percent of the late-successional forest within the area over the next decade."

The Northwest Forest Plan 15-year Monitoring Report on Status and Trends of Late-Successional and Old-Growth (LSOG) Forests (Moeur et al. 2011) concluded that LSOG areas decreased on federal lands by an estimated 1.9 percent plan-wide over the monitoring period (1994 – 2008). This loss of habitat was from all sources, but mostly wildfire. Actual losses from management activities were <0.5%. This is substantially less than the 3% predicted in the 2000 Final SEIS. The effects to these species are well within what was anticipated in the 2000 FSEIS, even with the impacts from this project. Since the objective of the Survey and Manage mitigation is related to the Forest Service viability provision to provide for viable populations across the planning area, management consistent with the Survey and Manage Standards and Guidelines would also meet Forest Service Sensitive species policies to not result in a trend towards listing or a loss of species viability.

Validated sites for sensitive fungi which are located within the project boundaries would be managed according to management recommendations within existing protocol and the 2007 Conservation Assessment for Fungi in Regions 5 and 6 (Cushman and Huff, 2007). These sites would be incorporated into patch retention areas and would be buffered from ground disturbing activity, including skid trails, landings, and piling. In the short term, both alternatives may reduce habitat for sensitive mycorrhizal fungi due to host tree removal and a reduction in moisture retention capabilities due to the drying effect of overstory removal (Amaranthus et.al.

1989). To meet habitat concerns for all other areas and species, a diversity of downed woody materials would be maintained on-site to meet the standards for soil protection and sensitive mollusk species habitat. Soil disturbance is also limited by the forest plan standards for soil protection. This disturbance remains a risk for species. Soil compaction resulting from harvesting equipment or the creation of temporary roads and landings can reduce tree root growth and availability for fungi (Amaranthus and Perry 1994). There is also an optimal amount of organic debris and of moisture and too little or too much of either can be detrimental (Harvey, et.al. 1981; O'Dell, et.al. 1993). If mastication or chipping methods are applied in these areas, it would still maintain the large down woody material, and would be scattered to avoid excessive deposition. If pile burning is applied, the known sites for fungi would be avoided.

Alternative 2 may have higher impacts to mycorrhizal fungi species than Alternative 1, since it proposes the removal of more mature trees. These mature trees may be hosts to the target fungi species. The removal of this additional canopy may also create dryer soil conditions, which could impact the growth of all target fungi. Project design criteria are in place to protect known sites for target species within skips or buffers. These will serve to protect diversity and allow establishment.

3.2.3 - Cumulative Effects

Past, Present, and Reasonably Foreseeable Activities Relevant to Cumulative Effects Analysis

Cumulative effects are impacts on the environment that result from the incremental impact of an action when it is added to other past, ongoing, and reasonably foreseeable future actions. A cumulative effects analysis for each resource considers activities relevant to the resource which overlap in time and space. If proposed activities would have little or no effect on a given resource element, a more detailed cumulative effects analysis is not necessary because there are no effects to cumulate.

The interdisciplinary team listed projects and activities that should be considered in the cumulative effects analysis. This information is included in the project record. The area analyzed for cumulative effects to botanical species includes the project area boundary, designated haul routes and directly adjacent lands 100 feet from the project boundary within private ownership, federal ownership and designated wilderness that would be affected by the alternatives. The areas where direct botanical sensitive species could be impacted are only within treatment units. Areas 100 feet adjacent to these units could also experience edge effects from the change in stand conditions. This cumulative effects analysis area serves to include the appropriate habitats for Barlow Ranger District, Mt. Hood National Forest target sensitive species as well as the habitats targeted for improvement with the alternatives.

The temporal scale considered during this cumulative effects analysis included past and ongoing timber harvest and fuels reduction projects. These actions have a long-lasting impact on vegetation including both desirable botanical species and invasive species. Other past or ongoing resource management, maintenance, recreational use, special use or permitted use (such as grazing) were also considered, since these activities may introduce invasive species or

locally impact species habitat. The conditions created by past actions have been incorporated into the existing condition of the Botany and Invasive Species reports and serve as a baseline for the effects determination.

The harvest of timber and activities associated with this project may contribute slightly to cumulative effects on undetected rare plants, fungi, bryophytes and lichens. While there may be future thinning or other management within the analysis area, there are no current proposals with sufficient site specificity to conduct an analysis. Project Design Criteria are in place to protect known sites and sensitive habitats associated with wetlands. Other sensitive habitats, such as meadows and talus slopes have been removed from project consideration and will be buffered from activities. It is also important to recognize that invasive species could have a cumulative effect on botanical resources. Invasive species are primarily limited to road shoulders and will be affected by road improvement activities, hauling, and other vectors, but can degrade forested habitats when introduced through disturbance. Please see the Invasive Species report for a consideration of invasive species risks. Cumulative effects would not be substantial and would not result in a loss of species viability.

3.3 - Consistency with Management Direction

Alternative 1 and Alternative 2 are consistent with the following Forest Service Policy, laws and regulation, and other documents.

Forest Service Policy

- FSM 2672.1 - Sensitive Species Management. "Sensitive species of native plant and animal 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. There must be no impacts to sensitive species without an analysis of the significance of adverse effects on the populations, its habitat, and on the viability of the species as a whole. It is essential to establish population viability objectives when making decisions that would significantly reduce sensitive species numbers."
- FSM 2670.22(2) - "Maintain viable populations of all native and desired non-native wildlife, fish and plant species in habitats distributed throughout their geographic range on National Forest System lands."

Mt. Hood National Forest Land and Resource Management Plan (Forest Plan) Direction

- FW-148, 149 and 150 – "Management activities shall preserve and enhance the diversity of plant and animal communities, including endemic and desirable naturalized plant and animal species. The diversity of plants and animals shall be at least as that which would be expected in a natural forest; the diversity of tree species shall be similar to that existing naturally in the allotment area (36 CFR 219.27)."

- FW-162 – “Habitat management should provide for the maintenance of viable populations of existing native and desired non-native wildlife, fish (36 CFR 219.19) and plant species (USDA Regulation 9500-4) well distributed throughout their current geographic range within the National Forest System.
- FW-174 - “Threatened, endangered and sensitive plants and animals shall be identified and managed in accordance with the Endangered Species Act (1973), the Oregon Endangered Species Act (1987), and FSM 2670.”
- FW-175 – “Habitat for threatened, endangered, and sensitive plants and animals shall be protected and/or improved.”
- FW-176 – “Biological Evaluations (FSM 2672.4) shall be prepared for all Forest Service planned, funded, executed, or permitted programs and activities for possible effects on endangered, threatened or sensitive species.”

Alternative 1 and Alternative 2 are consistent with the 2001 Survey and Manage Record of Decision. All surveys included consideration of botanical species in table C-3 of the 2001 Survey and Manage Record of Decision.

NFMA Implementing Regulations

- 36 CFR 219.19 - “Fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area. For planning purposes, a viable population shall be regarded as one which has the estimated numbers and distribution of reproductive individuals to insure its continued existence is well distributed in the planning area. In order to insure that viable populations would be maintained, habitat must be provided to support, at least, a minimum number of reproductive individuals and that habitat must be well distributed so that those individuals could interact with others in the planning area.”

The 1983 USDA Departmental Regulation 9500-4 provides further direction to the Forest Service, expanding the viability requirements to include plant species:

“Habitats for all existing native and desired non-native plants, fish, and wildlife species would be managed to maintain at least viable populations of such species. In achieving this objective, habitat must be provided for the number and distribution of reproductive individuals to ensure the continued existence of a species throughout its geographic range . . . Monitoring activities would be conducted to determine results in meeting population and habitat goals.”

3.4 – Summary of Effects

Under the existing conditions, species would continue to adapt and respond to changing stand dynamics. There will continue to be a slow loss of stand diversity across this landscape, but it would not contribute toward the listing of species. No timber harvest or associated activities

would occur. This would have no impact on sensitive vascular plants, bryophytes, lichens and fungi. Existing stand conditions could contribute to increased wildfire risk, which could have more substantial effects on individuals and habitat.

Alternative 1 (the Proposed Action) may directly impact individuals or habitat for sensitive plants, bryophytes, lichens and fungi, but would not lead toward federal listing or loss of viability. There could be beneficial impacts to certain species as a result of the stand density and accumulated fuel reduction.

Alternative 2 (the Shelterwood Alternative) may directly impact individuals or habitat for sensitive plants, bryophytes, lichens and fungi. This Alternative may remove more habitat for these species than the Proposed Action within 289 acres of proposed shelterwood treatments, but these treatments would not lead toward federal listing or loss of species viability. There could be beneficial impacts to certain species as a result of the stand density and accumulated fuel reduction.

Table 1. Summary Comparison¹

Resource Element	Existing Condition	Alternative 1 (Proposed Action)	Alternative 2 (Shelterwood Alternative)
TES Vascular Plants	NI	MIIH	MIIH
TES Bryophytes and Lichens	NI	MIIH	MIIH
TES Fungi	NI	MIIH	MIIH

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¹ NI = No impact; MIIH = May impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species; WOFV = Will impact individuals or habitat with a consequence that the action may contribute to a trend towards federal listing or cause a loss of viability to the population or species.

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