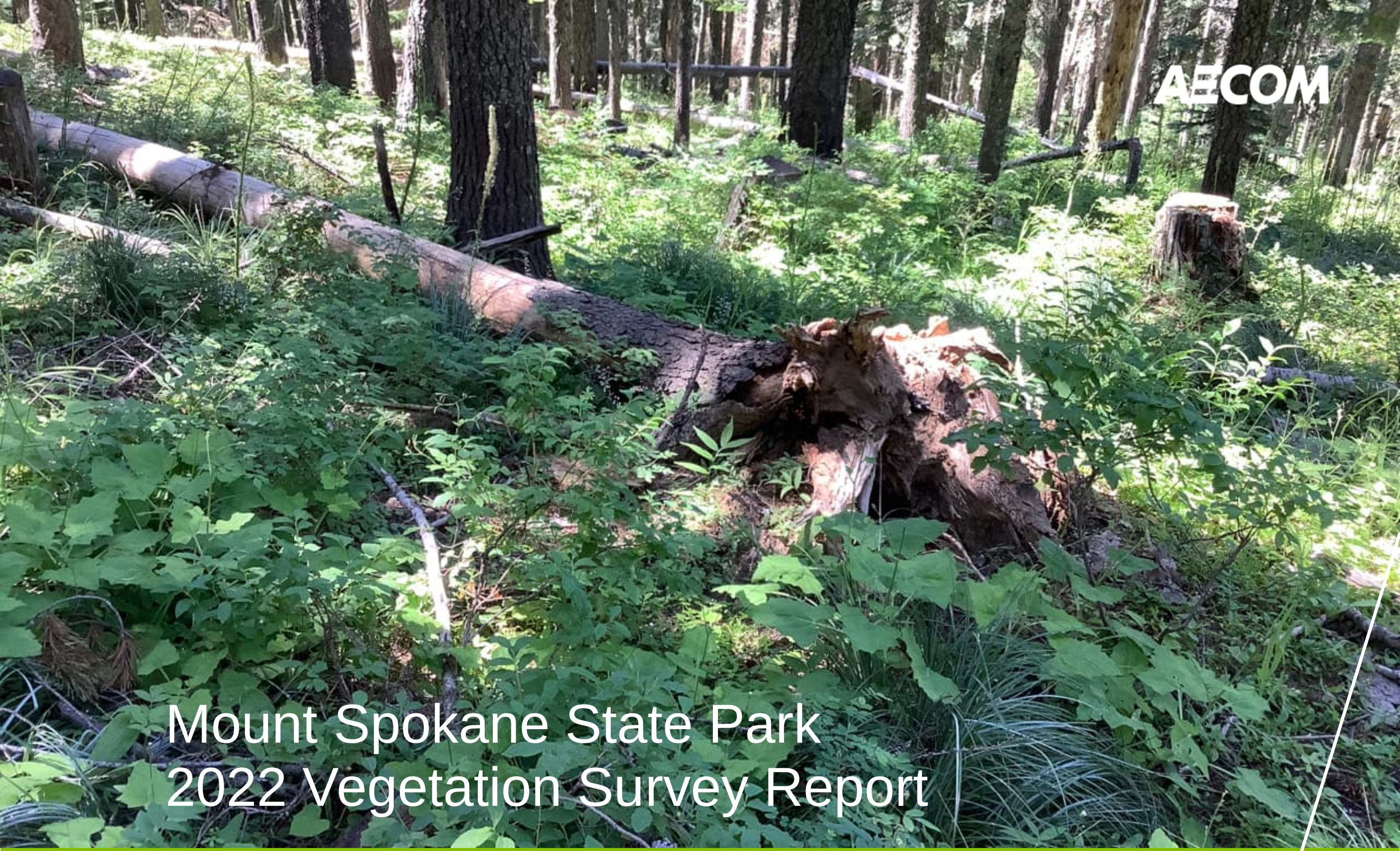

Mount Spokane State Park
2022 Vegetation Survey Report

Spokane County, Washington
Kootenai County, Idaho

Washington State Parks and
Recreation Commission

May 2023

Project Number: 60677080

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Cover photo: Photo showing an example of the Grand fir / Bride's bonnet Forest Association (*Abies grandis / Clintonia uniflora* Forest) in Mount Spokane State Park.

Inset cover photo: Close-up photo of the flower of bride's bonnet (*Clintonia uniflora*).

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1. INTRODUCTION

Mount Spokane State Park (MSSP) is a 12,293-acre camping park in the Selkirk Mountains in Spokane County, Washington, that crosses into a small area of Kootenai County, Idaho (Figure 1). MSSP was officially dedicated in 1927 and was the first Washington State Park west of the Cascade Mountains. The park has over 100 miles of trails and offers year-round recreation like Nordic skiing, snowshoeing, snowmobiling, camping, horseback riding, biking, hiking, and berry picking. Washington State Parks and Recreation Commission (WSPRC) manages all land and activities within the state park. The park is in the Northern Rockies Ecoregion, which is characterized by a series of high, rugged mountain ranges, mostly oriented northwest-southeast, interspersed with intermontane valleys. Elevations in the park range from 3,100 feet to 5,883 feet at the summit of Mount Spokane.

Recent vegetation surveys at MSSP have focused on meadow vegetation (Smith 2009; Walker et al. 2021), which represent a proportionately small area relative to forests. Thus, the need for vegetation surveys is most acute in forested vegetation and in areas of high recreation pressures (e.g., Nordic ski trail expansion, mountain bike trails). In addition, Ecological Integrity Assessments (EIAs) are needed to gather relevant information for planning, restoration, and conservation of vegetation resources on WSPRC properties.

To this end, WSPRC contracted with AECOM Technical Services Inc. (AECOM) and Washington Department of Natural Resources (WDNR), Natural Heritage Program (WNHP) to support the following objectives:

1. Survey and map US National Vegetation Classification (USNVC) plant associations (herein, associations).
2. Conduct noxious weed and rare plant surveys.
3. Conduct EIAs.

This report provides a summary of the vegetation survey and mapping, and EIA work completed to date in MSSP by AECOM and the WNHP.

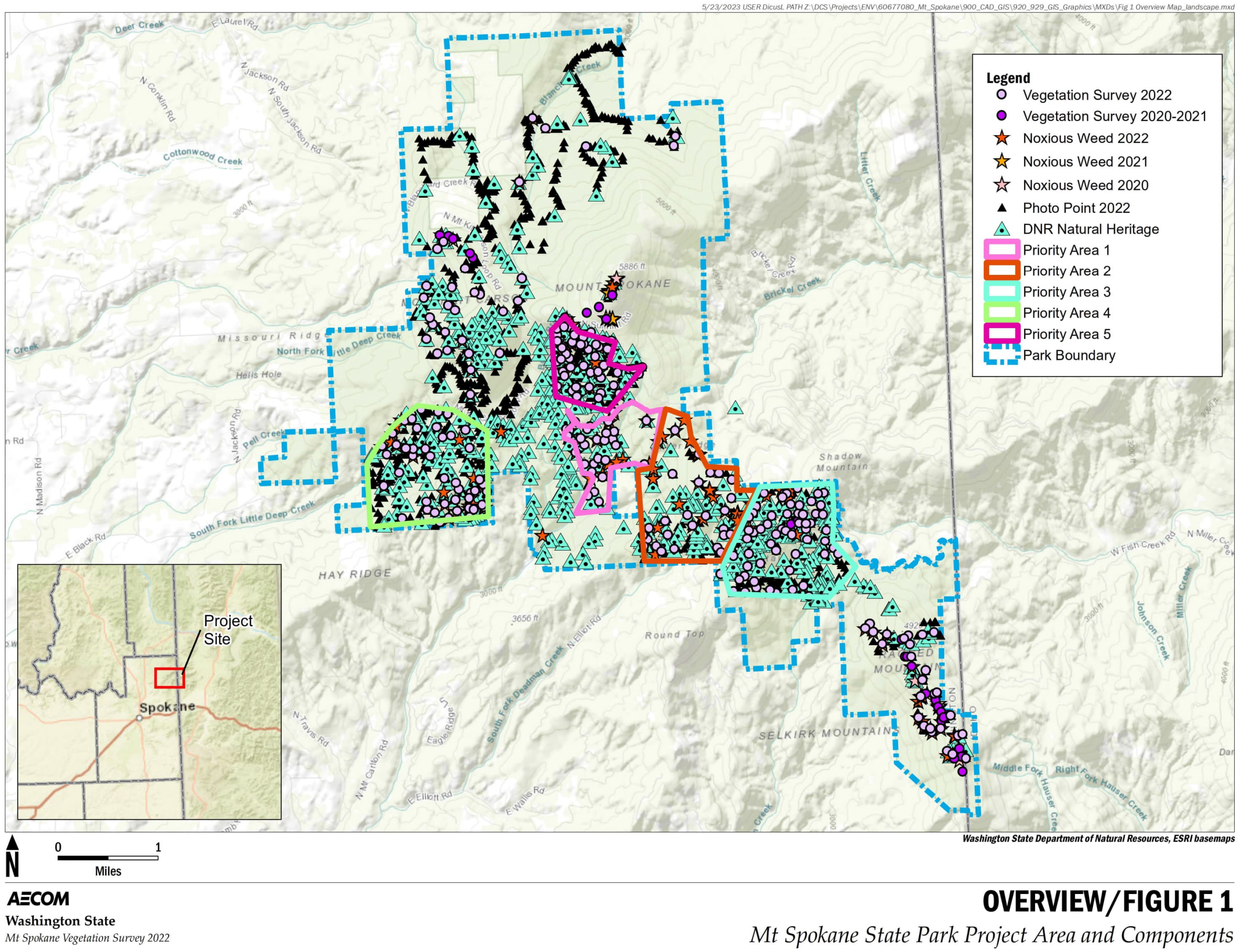


Figure 1. Overview map of Mount Spokane State Park showing the priority areas and vegetation survey, photo, noxious weed, and miscellaneous survey points at Mount Spokane State Park, 2020–2022.

2. METHODS

2.1 Vegetation Surveys and Mapping

In 2020–2021, field surveys were conducted in MSSP at Mount Spokane, Day Mountain, Horse Mountain, and Ragged Ridge by AECOM from August 31 to September 6, 2020, and from June 9 to 13, 2021 (Figure 2). The field data were used to prepare a map of meadow vegetation and to assess tree encroachment into the meadows using a combination of field data and assessment of a time-series of satellite/aerial imagery (Walker et al. 2021). In 2020–2021, a total of 32 vegetation survey points, 104 photo points, and 29 noxious weed survey points, lines, and polygons were collected during field surveys.

Figure 2. Field staff conducting botanical surveys at Mount Spokane State Park in 2022.

In 2022, field surveys were conducted from July 18 to September 29, 2022, in five priority areas on the south side of MSSP and at Ragged Ridge (Figure 1). During July and August, field surveys were conducted in the priority areas and at Ragged Ridge. Field surveys in September were completed primarily in the Blanchard Creek watershed north of the downhill ski area. Field survey methods followed the WSPRC vegetation survey protocols. Field surveys entailed concurrent vegetation mapping field verification surveys, EIAs, and rare plant and noxious weed surveys. In 2022, a total of 269 vegetation survey points, 1,282 photo points, 58 noxious weed survey points, and 639 miscellaneous survey points were completed during field surveys.

2.1.1 Data Management

Field

Field survey teams collected and managed field data using a shared ArcGIS Online (AGOL) account set up by WNHP with an AECOM co-manager. Survey teams used a common geodatabase provided by WSPRC GIS staff to manage data dictionaries and field forms using ESRI Field Maps software. The Field Maps project had several digital field forms (e.g., vegetation survey point) to choose from, and field crews selected the appropriate survey type depending on the type of field survey plot (e.g., vegetation plot) being completed. Vegetation survey points were collected at vegetation plots to record the complete set of data attributes required by WSPRC protocols for vegetation surveys. Photo points were collected at photo locations, and photo metadata were recorded at vegetation plots and at rapid photo points, streamlined vegetation plots designed to quickly capture photos and relevant information for vegetation field verification, e.g., plant association. Noxious weed survey points were collected to record locations of noxious weeds that were not otherwise located at a vegetation plot. When noxious weeds were identified at vegetation plots, the weeds were recorded in the plot species list. Lastly, miscellaneous survey points were taken to record observations that did not fit within any other survey point (e.g., the location of a transition between plant associations or disturbance observations).

AECOM field teams used Apple iPads with a Trimble R1 external GPS (<3-meter accuracy). Field data quality control (QC) checks were performed after completing each plot and at the end of each day. After each plot, the field forms were reviewed for completeness, and any data attributes that were blank were populated. At the end of each day, voucher specimens were evaluated under a dissecting scope and keyed to species using the project taxonomic references. Plot data were then updated with verified species. Each evening, the data were uploaded to the ArcGIS Online project geodatabase.

Office

Following field surveys, AECOM performed QC review of the field data to ensure consistency in association classifications and that only error-free data were used in the analysis, mapping, and reporting. To begin, a copy of the original field data was made to use as a working copy, and original field data were saved for reference. Several data QC checks were performed on the working copy to ensure that only the highest quality data were used in subsequent analyses. First, data completeness for all data attributes was checked. Incomplete data attributes that could be accurately completed in the office (e.g., total shrub cover for a given species as tall shrub cover + low shrub cover) were populated. For all other incomplete data attributes (e.g., those requiring a field measurement), the data attribute was left blank in the project database (text fields) or populated with –999 (numeric fields). Second, species lists for each plot were reviewed for consistency with the species codes assigned in the field. The species codes were standardized to a plant taxonomy domain list maintained by AECOM that follows the second edition of *Flora of the Pacific Northwest* (Hitchcock and Cronquist 2018). Third, the association codes in the PA1–PA5 fields were reviewed for consistency, and the codes were standardized to the WNHP association codes.

Vascular plant voucher specimens were pressed and sent to the Burke Herbarium (BH) at the University of Washington in Seattle (7 specimens) and the Marion Ownbey Herbarium (MOH) at Washington State University in Pullman (64 specimens) for long-term curation. Bryophyte (mosses, liverworts, and hornworts) voucher specimens were sent to expert bryologist and lichenologist David Kofranek for verification and then to MOH for curation. In addition to voucher specimens, photos of plants were taken opportunistically and uploaded to iNaturalist, an online repository for citizen-science biodiversity data (iNaturalist 2023). Observations from 2022 field surveys uploaded to iNaturalist, in addition to observations from the general public, are viewable at the following link: https://www.inaturalist.org/projects/flora-of-mount-spokane-state-park.

2.1.2 Survey Routes and Vegetation Plots

Survey routes were selected based on interpretation of satellite imagery and by reviewing a LiDAR hillshade. Field crews selected routes through each vegetation polygon that traversed a diversity of imagery signatures, slope shapes (e.g., concave), slope gradients and aspects, and elevations. As field crews walked the survey routes, they meandered through the vegetation polygons, stopping in the middle of homogenous imagery signatures or in areas with a distinct combination of elevation, aspect, and slope to record data at vegetation plots. During these meanders through the plant communities, biologists stopped between plots to document transitions between vegetation types and noxious weeds and rare plants encountered along the way.

One vegetation plot per plant association was completed in each vegetation polygon. In vegetation polygons with broad expanses of one plant association, after completing the vegetation plot field crews continued to meander through the same plant association periodically recording photo points, for instance below a slope break, to verify that the plant association had not changed. At each vegetation plot, several community characteristics requested by WSPRC were documented. These characteristics included a complete plant species lists by lifeform, percent cover by vegetation growth form (e.g., grasses), non-vegetative cover characteristics, nonnative species information, plant association(s), and site conditions such as recreation use.

Per the WSPRC protocols, percent cover by plant species was not recorded. As such, plant species in each growth form were listed in rank order by percent cover, starting with the species with the greatest cover first. Appendix A contains a reference sheet for the cover values and other data used in the data dictionary.

2.1.3 Vegetation Classification

The plot-level classification and mapping followed USNVC (2023) associations. Associations are the lowest level in the USNVC hierarchy and reflect existing vegetation and not the eventual or climax community at a site field (Figure 3). Associations are characterized environmentally by soils, climate, geologic substrate, hydrology, and disturbance regimes, and floristically by diagnostic species, usually from multiple growth forms or layers, and narrowly similar composition (USNVC 2022). In some cases, the Washington State USNVC, maintained by the WNHP, was used for associations that are not published at the national level. Lastly, Rocchio et al. (2022) was also used to supplement the USNVC for wetland associations. Field crews used Ramm-Granberg and Weber (2022) to classify plots to association. A field guide to the plant associations of MSSP is included in Appendix B.

Walker et al. (2021) reported on two meadow associations: *Festuca viridula* - *Festuca idahoensis* Meadow and *Calamagrostis rubescens – Carex geyeri – Festuca idahoensis – Pseudoroegneria spicata*, the latter of which is not an official USNVC association. Review of these two associations in the field with WNHP during 2022 field surveys revealed that the latter association fits within the concept of the USNVC association *Festuca idahoensis* - *Eriogonum heracleoides* Grassland, and WNHP recommended revisions to the MSSP association classification. Thus, the classification and meadow mapping were updated by changing the class *Calamagrostis rubescens – Carex geyeri – Festuca idahoensis – Pseudoroegneria spicata* to *Festuca idahoensis – Eriogonum heracleoides* Grassland.

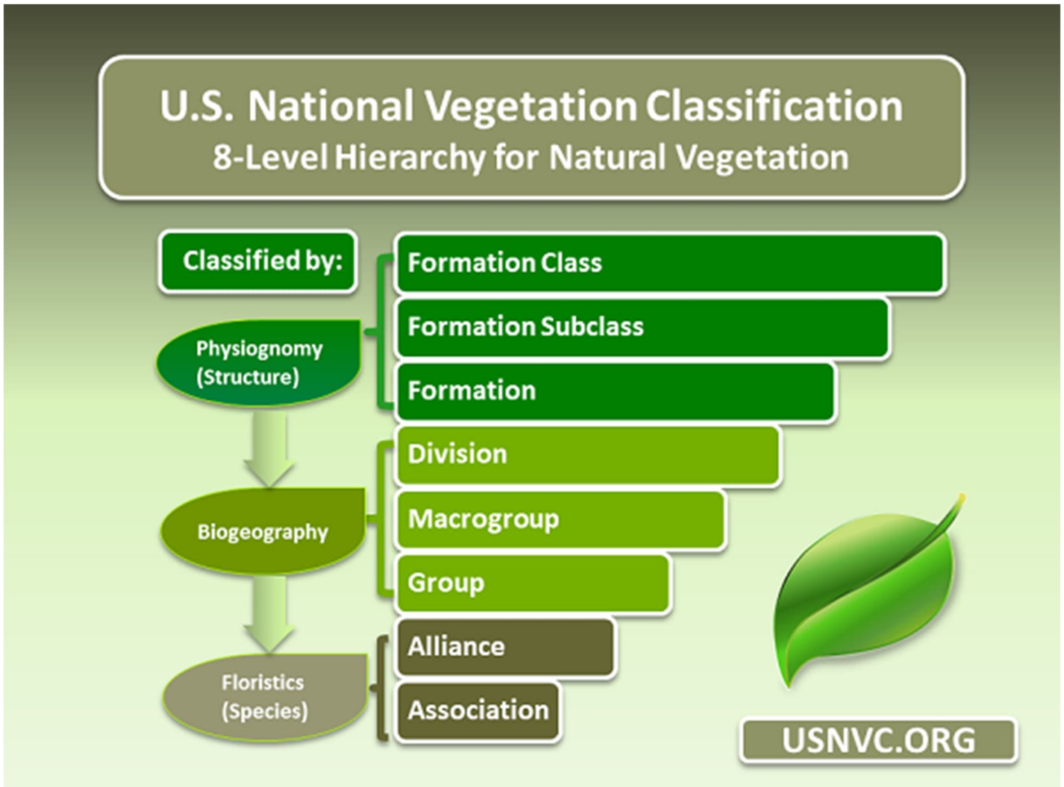


Figure 3. Organization of the US National Vegetation Classification. Image courtesy of https://usnvc.org.

A comprehensive floristic inventory was taken for each vegetation plot, including opportunistic collections of bryophytes (mosses and liverworts). Additionally, when walking between vegetation plots field crews recorded observations of species not previously recorded at a plot. Scientific names for vascular plants in this report follow the second edition of *The Flora of the Pacific Northwest* (Hitchcock and Cronquist 2018) and subsequent on-line taxonomic treatment revisions to the document (Burke Museum 2021). Common names used in this report follow US Department of Agriculture Natural Resources Conservation Service (2023). Past vegetation surveys have reported bluebunch wheatgrass (*Pseudoroegneria spicata*) in the meadows of MSSP. However, this taxon in the MSSP does not feature bunched growth form and is instead rhizomatous. Upon collection of voucher specimens and review of the specimens by David Giblin and Walter Fertig at BH and MOH, respectively, the taxon was determined to be false quackgrass (*Elymus pseudorepens*), a hybrid between thickspike wheatgrass (*E. lanceolatus*) and slender wheatgrass (*E. trachycaulus*). Therefore, AECOM changed *P. spicata* to *E. pseudorepens* in the plot data to reflect the updated identification.

2.1.4 Plant Community Conservation Ranks

The WNHP uses a ranking system to facilitate a rapid assessment of plant community rarity. Each ecosystem is assigned both a global (G) and state (S) rank on a scale of 1 to 5. A rank of G1 indicates critical imperilment on a global basis; the community is at great risk of extirpation. S1 indicates critical imperilment within Washington State, regardless of its status elsewhere. Several factors, such as number and condition of occurrences, total acreage occupied by the ecosystem type, geographic range, and threats contribute to the assignment of global and state ranks for plant communities. Table 1 describes the ranks and definitions.

Table 1.
Global and State Plant Community Ranks and Definitions

Global and State Rank	Definition
1	Critically imperiled
2	Imperiled
3	Vulnerable to extirpation or extinction
4	Apparently secure
5	Demonstrably widespread, abundant, and secure
NR	Not ranked

Source: WNHP 2021

2.1.5 Association Mapping

The association mapping follows from and adds to several previous mapping efforts, including past WDNR mapping, Smith (2009) with revisions by WNHP, and Walker et al. (2021). To begin, AECOM merged the revised Smith (2009) and Walker et al. (2021) meadow mapping with the WDNR mapping of forested vegetation in GIS. AECOM and WNHP then used the QC-reviewed field data to refine the draft mapping in the 2022 priority areas. To ensure continuity in the mapping within and between priority areas, vegetation communities fully or partially occurring in a priority area were delineated. In addition, for EIA purposes, WNHP mapped vegetation communities in the Blanchard Creek watershed north of the downhill ski area. Vegetation communities at Ragged Ridge were not mapped in 2022.

Vegetation polygons were delineated on-screen at a scale of 1:3,000–1:5,000 over National Agriculture Imagery Program (NAIP) aerial imagery from summer 2017 and ESRI World Imagery from June 30, 2021. AECOM also relied on a 2016 LiDAR Digital Terrain Model (DTM) hillshade from the Washington LiDAR Portal (WA DNR 2022). AECOM used a minimum map unit size of 0.40 hectare (1 acre) for forested uplands, 0.20 hectare (0.5 acre) for non-forest uplands, and 0.05 hectare (0.12 acres) for wetlands and riparian areas. The applicable scale of the final map is 1:10,000, which is suitable for landscape-scale planning and analysis.

2.1.6 Data Analysis

Vegetation plot data were used to calculate the average native plant species richness by USNVC group, association, and growth form. The average richness values were then used in R: A language and environment for statistical computing (R Core Team 2023) to prepare stacked bar charts displaying the total richness by association. Vegetation plot data were also aggregated up to the alliance level, and frequency of occurrence (i.e., constancy) was calculated for each species by alliance. Next, a rank value was assigned in increments of one to each species by plot and growth form, starting with 1 for most abundant (i.e., listed first in the field). The scaled inverse rank order was then calculated for each species by plot with a rank value of ≤5, as follows:

$$Rsi = 100 - (rank\_order * 3))/100$$

The resulting values were scaled between zero and 100, with higher values indicating a higher rank (i.e., relatively more abundant). The 10th, 50th, and 90th percentiles of scaled inverse rank order were then calculated for each species by alliance. Relative importance was then calculated for alliance, species, and percentile class as follows:

$$RIp = Constancy * \ Percentile\ Class$$

The results were plotted using dumbbell charts that display the 10th, 50th, and 90th percentiles of relative importance value for the dominant plant species by growth form with a constancy of ≥40% in each alliance. Dumbbell charts were prepared for alliances with >3 vegetation plots.

2.2 Rare Plant Surveys

2.2.1 Review of Existing Literature/Data

Available literature and data were gathered and reviewed prior to conducting the rare plant surveys. AECOM obtained special status plant information from the WSPRC and WNHP to identify all rare plant species with potential to occur within MSSP. In addition, the online Consortium of Pacific Northwest Herbaria (2021) was consulted for any additional rare plant occurrences within park boundaries.

2.2.2 Survey Method

Rare plant surveys were conducted concurrent with vegetation and noxious weed surveys. First, if rare plants were encountered at vegetation plots, they were included in the comprehensive vascular plant species list recorded at each plot. Botanists thoroughly search each plot, including microhabitats (e.g., rock outcrops), to ensure plants with unique habitat requirements were not missed. Second, when walking between plots botanists observed plants along their route. If an unusual habitat was encountered along the route, the botanist used an “intuitive controlled” survey to inspect the area and recorded any new species not previously recorded at a plot. In all cases, if a rare plant was encountered the sites were mapped using a GPS unit, and a WNHP Rare Plant Sighting Form was completed. These site reports contain sensitive information and should remain confidential. To ensure that special status species were not overlooked, a complete species list was kept throughout the survey. The species list recorded every vascular plant species observed within the park (Appendix C). The rare plant survey protocol also met the WNHP's *Suggested Guidelines for Conducting Rare Plant Surveys for Environmental Review* (WNHP 2020).

2.2.3 Rare Plant Status and Ranks

The WNHP uses two ways to classify the rarity of plants: status and ranks. The status for rare plants is determined by the WNHP. The rare plant status definitions for Washington State are shown in Table 2.

Table 2.
Rare Plant Statuses and Definitions

State Status	Definition
E	Endangered. In danger of becoming extinct or extirpated from Washington.
T	Threatened. Likely to become Endangered in Washington.
S	Sensitive. Vulnerable or declining; could become Endangered or Threatened in the state.
X	Possibly extinct or extirpated from Washington
R1	Review Group 1. Of potential concern but needs more field work to assign conservation priority.
R2	Review Group 2. Of potential concern but with unresolved taxonomic questions.

Source: WNHP 2019

The ranking for rare plants is similar to plant communities, as described in Section 2.1.4. A number of factors, such as total number and condition of occurrences, total population size, range and extent of area occupied, and threats contribute to the assignment of global and state ranks for plant species. The global and state ranks and definitions are the same as for plant communities, as listed in Table 1.

2.3 Noxious Weeds Surveys

Noxious weeds are nonnative, invasive species that threaten agriculture, rangelands, waterways, parks, wildlife, property values, public health and safety, and general ecological health and diversity of native ecosystems. Noxious weed infestations are the second leading cause of wildlife habitat degradation. Where observed, AECOM documented noxious weeds as described below.

2.3.1 Noxious Weed Status

The Washington State Noxious Weed Control Board (WSNWCB) identifies lists of noxious weed species that require control, eradication, or monitoring. Class A noxious weeds are nonnative species with a limited distribution within a state and require eradication to reduce the potential of becoming more widespread. Class B noxious weeds are regionally abundant but may have limited distribution in some counties. In regions where a Class B noxious weed is unrecorded or of limited distribution, prevention of seed production is required. In these areas, the weed is a “Class B designate.” However, in regions where a Class B species is already abundant or widespread, control is a local option. Class C noxious weeds are already widely established, but placement on the state list allows counties to enforce local control if desired. The WSNWCB website was reviewed for the latest noxious weed, weed quarantine, and weed monitor lists for the state, which was most recently updated in 2021 (WSNWCB 2021).

In addition to the WSNWCB, the WNHP developed a draft list of invasive weeds, which is used in EIAs. Invasive weeds are those that have the potential to overtake an ecosystem and permanently change the ecology of the system. Thus, AECOM noted if species were on the noxious and/or invasive weed lists and included that information in map figures and on species lists.

2.3.2 Survey Method

The survey for noxious weeds occurred while conducting the vegetation community and rare plant surveys.

2.4 Ecological Integrity Assessments

2.4.1 Description

The WNHP uses EIA, an indicator-based approach developed by NatureServe and the Natural Heritage Network, to assist in identifying ecosystem conservation and restoration priorities. Many of WNHP’s partners have adopted EIA to assist with monitoring and assessment (Crawford et al. 2011; Schroeder et al. 2011; Crawford and Rocchio 2013; Rocchio and Ramm-Granberg 2019).

The EIA method (Faber-Langendoen et al. 2016a, 2016b, 2016c, 2016d, 2019; Rocchio et al. 2020a, 2020b) aims to measure the ecological integrity of an ecosystem occurrence through a standardized and repeatable assessment of current ecological conditions. Condition is assessed relative to expectations for an ecosystem operating within the bounds of natural variation. The EIA enables a user to rapidly assess and communicate the composition, structure, and function of an ecosystem occurrence through an index of ecological integrity, which in turn aids in identifying conservation value, management effects, restoration success, and more. The EIA standardizes expert opinion and existing data up front, enabling the user to apply the EIA in a rapid manner to estimate a site's ecological integrity. The EIA improves the understanding of current ecological conditions, leading to more effective and efficient use of available resources for ecosystem protection, management, and restoration efforts.

The WSPRC uses EIAs to gather relevant information for planning, restoration, and conservation of vegetation resources on their properties. EIAs primarily use assessment areas defined at the group level of the USNVC (2023) in a subset of priority areas identified by the WSPRC.

2.4.2 Overview

EIAs summarize the ecological condition (i.e., ecological integrity) of individual occurrences of ecosystems through consideration of composition, structure, and ecological processes (Faber-Langendoen et al. 2019; Rocchio and Ramm-Granberg 2019). The method can be applied to occurrences as small as 0.05 hectare (0.12 acre) and as large as thousands of hectares. EIAs can be conducted at three different sampling intensities: Level 1 (entirely GIS-based), Level 2 (rapid, mostly qualitative, field-based), and Level 3 (intensive, quantitative, field-based). The EIA is intended to measure current ecological condition as compared to a reference standard via a multi-metric index of biotic and abiotic measures of condition, size, and landscape context. Each metric is rated by comparing measured values with expected values under relatively unimpaired conditions (i.e., the reference standard), and the ratings are aggregated into a total score. The EIA uses a scorecard matrix to communicate individual metric ratings, as well as an overall index of ecological integrity. Altogether, the EIA framework provides a standardized language for assessing and communicating ecosystem integrity across all terrestrial ecosystem types—upland and wetland ecosystems.

The metrics used in wetland/riparian (Appendix D) and upland ecosystems (Appendix E) are presented below. Detailed information on the metrics and the methodology used to score them may be found in Rocchio et al. (Rocchio et al. 2020a, 2020b). Once scored, metrics may be rolled up into major ecological factor scores/ranks (e.g., landscape, buffer/edge, vegetation, hydrology, soils, and size). These major ecological factor scores are in turn rolled up into three primary rank factors: landscape context, condition, and size. Lastly, these three factors may then be integrated to calculate an overall EIA Score/Rank (landscape context + condition) and Element Occurrence (EO) Rank (EIA score + size). These different roll-up procedures are optional and dependent on the project objective. The EIA Rank summarizes the overall current ecological integrity of the stand (useful for prioritizing restoration or management actions). The integration of size into the EO Rank is useful for prioritizing sites for conservation, as larger stands are generally considered more important and more likely to retain their integrity than smaller occurrences. For more targeted insight into management needs, goals, and measures of success, land managers may have more interest in specific metric scores. In the middle ground, primary and/or major ecological factor scores/ranks can be helpful for understanding the current status of primary ecological drivers. For example, a site may score very poorly in vegetation metrics, but have intact hydrology, indicating restoration potential.

2.4.3 Field Work

Field Surveys

WNHP ecologists conducted rapid, field-based EIA assessments (i.e., Level 2 EIAs) of vegetation polygons mapped by AECOM in five priority areas at MSSP. As time allowed, WNHP mapped additional vegetation polygons outside of the priority areas. These mapping efforts supplemented a small number of existing polygons that were mapped during previous survey efforts (Morrison et al. 2007; Smith 2009; Morrison and Wooten 2010; Walker et al. 2021). USNVC association-scale vegetation polygons were usually aggregated to the group level of the USNVC for assessment (Figure 3), except when assessing particularly rare plant associations or in situations in which different polygons (representing the same group) were found to be in substantially different condition. While AECOM (and previous surveyors) assigned ecological condition estimates as part of the vegetation survey process, the EIA provides a more in-depth multimetric assessment.

Within each assessment area (AA), WNHP staff traversed the area to observe the full ecological variation of the stand. Variation was interpreted from aerial photography, LiDAR derivatives, modeled stand age, and other remote sensing data, as well as through observation of ecological variation on-site. After observing an AA’s internal variation, EIA metrics were scored based on protocols and rating criteria in the EIA manuals (Rocchio et al. 2020a, 2020b). For large AAs, discrete assessment points were often established at subjectively chosen locations distributed across the assessment area. Scores for these individual points were then integrated into an overall score. Landscape context and size metrics were finalized via GIS assessments in the office. WNHP used an automated Microsoft Excel EIA workbook to calculate rolled-up major ecological factors, primary rank factors, and overall EIA scores.

Element Occurrences

As time allowed, WNHP ecologists also identified plant association EOs for inclusion in WNHP’s database (WDNR 2023a). EOs are specific sites or stands of a given ecosystem type that have significant conservation value (NatureServe 2023a). Occurrences are prioritized for inclusion in WNHP’s database based on a combination of two ranks: the conservation status rank (CSR) and the EO Rank (WDNR 2023b). The CSR establishes how rare and threatened that *ecosystem* is across its global and subnational (i.e., state) range. The EO Rank integrates the EIA Rank and Size score for a specific *occurrence* of the ecosystem (Rocchio et al. 2020a, 2020b). The EIA and EO Ranks range from “A” (excellent ecological integrity) to “D” (poor ecological integrity). A decision matrix (Table 3) is then used to determine whether the occurrence meets the criteria for an EO. Essentially, most occurrences of rare ecosystem types, regardless of their condition, are considered EOs, while more common ecosystem types must be in good to excellent condition to receive that designation.

Table 3.
Decision Matrix for Identifying WNHP Element Occurrences (EOs)

<table>
<tr><th>EO RANK</th><th>Global Rank
State Rank</th><th>G1S1, G2S1, GNRS1, GUS1</th><th>G2S2, GNRS2, G3S1, G3S2, GUS2</th><th>GUS3, GNRS3, G3S3, G4S1, G4S2, G5S1, G5S2, any SNR</th><th>G4S3, G4S4, G5S3, G5S4, G5S5, GNRS4, GNRS5, GUS4, GUS5</th></tr>
<tr><td colspan="2">A+ (3.8 to 4.0)</td><td>EO</td><td>EO</td><td>EO</td><td>EO</td></tr>
<tr><td colspan="2">A- (3.5 to 3.79)</td><td>EO</td><td>EO</td><td>EO</td><td>EO</td></tr>
<tr><td colspan="2">B+ (3.0 to 3.49)</td><td>EO</td><td>EO</td><td>EO</td><td rowspan="5">Not an Element Occurrence</td></tr>
<tr><td colspan="2">B- (2.5 to 2.99)</td><td>EO</td><td>EO</td><td>EO</td></tr>
<tr><td colspan="2">C+ (2.0 to 2.49)</td><td>EO</td><td>EO</td><td rowspan="3">Not an Element Occurrence</td></tr>
<tr><td colspan="2">C- (1.5 to 1.99)</td><td>EO</td><td rowspan="2">Not an Element Occurrence</td></tr>
<tr><td colspan="2">D (1.0 to 1.49)</td><td>EO</td></tr>
</table>

When rare or high-quality common USNVC plant associations were encountered during field inventories conducted for this project, WNHP ecologists used the standards outlined above to determine whether the polygon met EO criteria. All element occurrences identified by WNHP were assessed at the USNVC plant association scale.

3. RESULTS AND DISCUSSION

3.1 Vegetation Surveys

3.1.1 Plant Species List

AECOM compiled a comprehensive list of plant taxa observed during 2022 field surveys and those observed by Walker et al. (2021) in 2020 and 2021. A total of 333 plant taxa, including 20 bryophytes, were observed across all field surveys (Appendix C). Of this total, 27 are weeds (noxious and/or invasive) and 3 are on special status review lists; these are discussed further in Sections 3.3 and 3.4, respectively. The 10 most observed plant taxa across all associations are the evergreen trees grand fir (*Abies grandis*), Rocky Mountain Douglas-fir (*Pseudotsuga menziesii* var. *glauca*), and subalpine fir (*Abies lasiocarpa* ssp. *bifolia*); the deciduous shrubs thinleaf huckleberry (*Vaccinium membranaceum*) and Douglas maple (*Acer glabrum* var. *douglasii*); the forbs starry false lily of the valley (*Maianthemum stellatum*), bride's bonnet (*Clintonia uniflora*), American trailplant (*Adenocaulon bicolor*), and fragrant bedstraw (*Galium triflorum*); and the grass Columbia brome (*Bromus vulgaris*). These 10 species are common forest plants in MSSP. Figure 4 displays photos of a diversity of plant species across a variety of growth forms that occur in MSSP.

The 10 most observed plant taxa in upland meadows are Rocky Mountain Douglas-fir, the forbs common yarrow (*Achillea millefolium*), Scouler's woollyweed (*Hieracium scouleri*), Rocky Mountain aster (*Ionactis stenomeres*), silky lupine (*Lupinus sericeus*), and spreading phlox (*Phlox diffusa*); the grasses pinegrass (*Calamagrostis rubescens*), Idaho fescue (*Festuca idahoensis*), and greenleaf fescue (*Festuca viridula*); and the sedge Geyer's sedge (*Carex geyeri*). In upland non-forested outside the meadows, the most observed species were Rocky Mountain Douglas-fir and subalpine fir; the deciduous shrubs thimbleberry (*Rubus nutkanus* = *R. parviflorus*), oceanspray (*Holodiscus discolor* var. *discolor*), common snowberry (*Symphoricarpos albus*), Douglas maple, and mallow ninebark (*Physocarpus malvaceus*); the forbs western meadow-rue (*Thalictrum occidentale*), starry false lily of the valley; the graminoids Columbia brome and Geyer's sedge; and the fern hairy brackenfern (*Pteridium aquilinum* var. *pubescens*).

In riparian and wetland areas, the most observed plant taxa were Engelmann spruce (*Picea engelmannii* var. *engelmannii*); the deciduous shrubs Douglas maple, Sitka alder (*Alnus viridis* ssp. *sinuata*); the forbs starry false lily of the valley, arrowleaf ragwort (*Senecio triangularis*), British Columbia wildginger (*Asarum caudatum*), Carolina bugbane (*Trautvetteria caroliniensis*), red baneberry (*Actaea rubra*), common cowparsnip (*Heracleum maximum*), small enchanter's nightshade (*Circaea alpina*), Canby's licorice-root (*Ligusticum canbyi*); the grass drooping woodreed (*Cinna latifolia*); and the fern subarctic ladyfern (*Athyrium filix-femina* ssp. *cyclosorum*).

Figure 4, Page 1 (upper left to lower right): grand fir (*Abies grandis*), subalpine fir (*Abies lasiocarpa*), oceanspray (*Holodiscus discolor*), thinleaf huckleberry (*Vaccinium membranaceum*), bride's bonnet (*Clintonia uniflora*), Rocky Mountain aster (*Ionactis stenomeres*), arrowleaf ragwort (*Senecio triangularis*), common beargrass (*Xerophyllum tenax*), spotted coralroot (*Corallorhiza maculata*).

Figure 4. Photos of diverse native plant species and growth forms that occur in Mount Spokane State Park.

Figure 4, Page 2 (upper left to lower right): Carolina bugbane (*Trautvetteria caroliniensis*), Franciscan broomrape (*Aphyllon franciscanum*), common cowparsnip (*Heracleum maximum*), broad-leaved twayblade (*Neottia convallarioides*), white-vein wintergreen (*Pyrola picta*), pinedrops (*Pterospora andromedea*), sickletop lousewort (*Pedicularis racemosa*), western rattlesnake plantain (*Goodyera oblongifolia*), common swordfern (*Polystichum munitum*).

Figure 4 (con't). Photos of diverse native plant species and growth forms that occur in Mount Spokane State Park.

Two fern species observed in 2022 are noteworthy in that they represent the first reported observations of these taxa in Spokane County. Anderson's hollyfern (*Polystichum andersonii*) and northern hollyfern (*Polystichum lonchitis*) were observed in mesic forests in moist soils near headwater drainages.

3.1.2 Associations

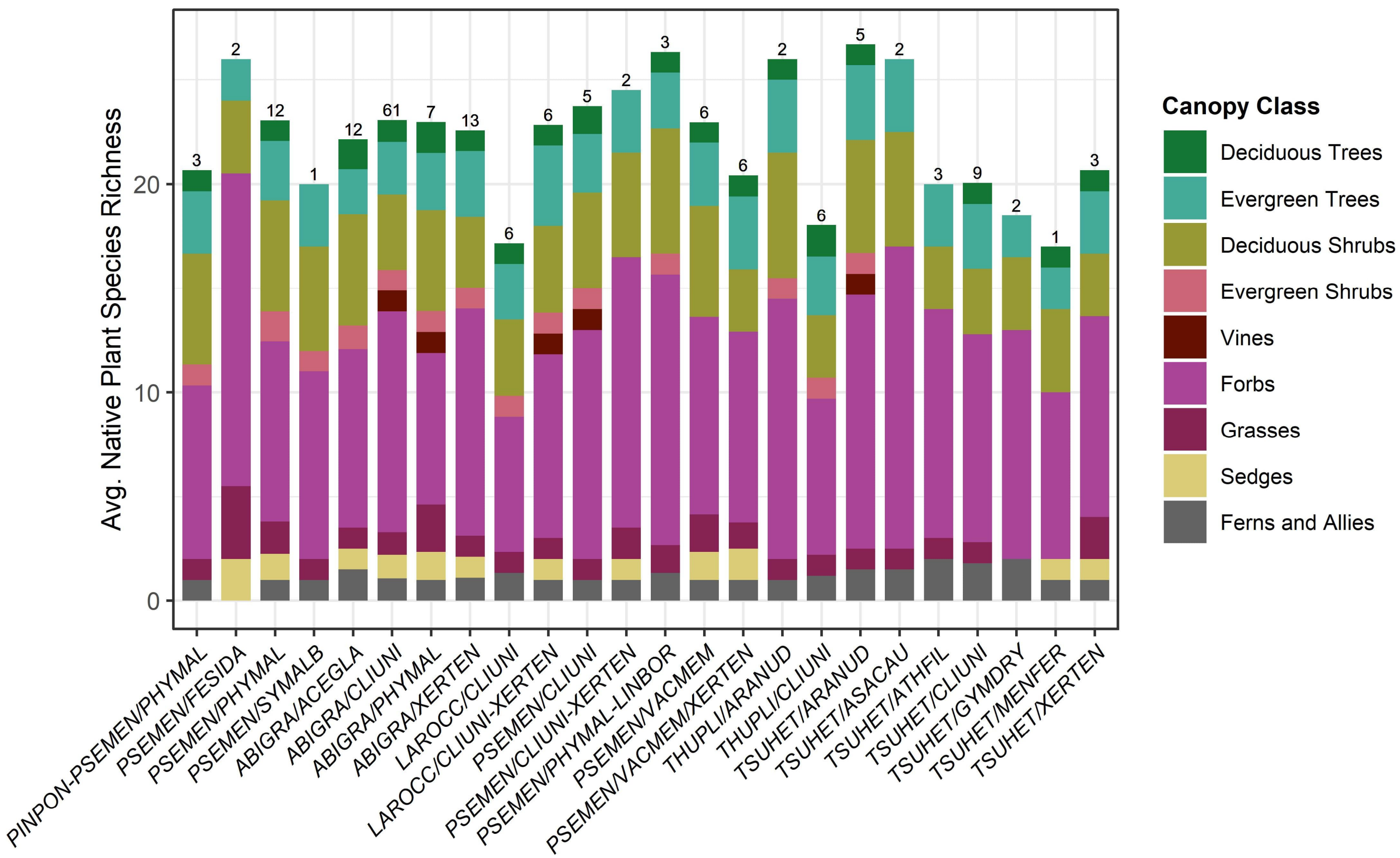
AECOM and WNHP documented 66 associations (Appendix F) and 3 non-vegetated land cover classes (Developed, Roads, Rock Outcrop) across all areas surveyed. The associations are nested within 8 macrogroups, 18 groups, and 26 alliances. Macrogroup, group, and alliance descriptions are available on NatureServe Explore (NatureServe 2023b). However, it should be noted that significant revisions of the descriptions are underway and are expected to be completed in 2024. A dichotomous key to and descriptions of the associations are available in the Field Guide to Plant Associations of Mount Spokane State Park (Appendix B).

Upland forests dominate the landscape at MSSP, and the five most frequently sampled associations were upland forest vegetation types: *Abies grandis* / *Clintonia uniflora* Forest (61 vegetation plots), *Abies lasiocarpa – Picea engelmannii* / *Vaccinium membranaceum* / *Xerophyllum tenax* Forest (17), *Abies grandis* / *Xerophyllum tenax* Forest (13), *Pseudotsuga menziesii* / *Physocarpus malvaceus* Forest (12), and *Abies grandis* / *Acer glabrum* Forest (12). Upland non-forest vegetation is most extensive and contiguous in the meadows that occur at the highest elevations throughout MSSP. Walker et al. (2021) and Smith (2009) completed extensive meadow vegetation surveys in MSSP. They found that the most common meadow plant associations were *Festuca viridula – Festuca idahoensis* Meadow and Fe*stuca idahoensis – Eriogonum heracleoides* Grassland. Because past field surveys focused on the meadows, 2022 field surveys focused on forested vegetation and non-forested areas outside the meadows, which typically occurred in small to medium-sized patches (0.2–2.0 hectare [0.5–5 acre]) within the broader forest matrix. The three most frequently sampled upland non-forest associations outside the meadows were *Rubus parviflorus* / *Chamerion angustifolium – Heracleum maximum* Shrubland (6), *Physocarpus malvaceus – Symphoricarpos albus* Shrubland (5), and V*accinium membranaceum* / *Xerophyllum tenax* Shrubland (3).

Riparian and wetlands in MSSP typically occur in small montane seeps and along steep, narrow (<5-meter [16-foot]) drainageways. The three most frequently sampled riparian and wetland associations were *Alnus viridis* ssp. *sinuata* / Mesic Forbs Wet Shrubland (9), *Alnus viridis* ssp. *sinuata* / *Athyrium filix-femina – Cinna latifolia* Wet Shrubland (7), and *Athyrium filix-femina – Gymnocarpium dryopteris* Wet Meadow [Provisional] (3). Forested riparian and wetland associations were also sampled, although sample sizes were generally low (n = 1). The most frequently sampled (3 plots) riparian and wetland forest associations occur within the Subalpine Fir – Engelmann Spruce Swamp Forest Alliance (A3757): *Abies lasiocarpa – Picea engelmannii* / *Streptopus amplexifolius* Riparian Forest (1), *Picea engelmannii* / *Alnus viridis* ssp. *sinuata* Riparian Forest (1), and *Picea engelmannii* / *Athyrium filix-femina* Riparian Woodland (1).

Native Plant Species Richness by Association

Figures 5–8 display stacked bar charts of average native plant species richness by association and growth form sorted by group. The 10 associations with the greatest native plant species richness all had ≥25 plant species. The association *Abies lasiocarpa – Picea engelmannii / Vaccinium membranaceum* Rocky Mountain Forest had the greatest native plant species richness at 29 species (Table 4). However, this association is represented in the dataset by a single vegetation plot and thus may not be representative of this association more broadly. Other associations with high native plant species richness were *Abies lasiocarpa – Picea engelmannii* / *Streptopus amplexifolius* Riparian Forest (27 species), *Tsuga heterophylla* / *Aralia nudicaulis* Forest (27), *Abies lasiocarpa – Picea engelmannii* / *Carex geyeri* Forest (27), and *Tsuga heterophylla* / *Asarum caudatum* Forest (26). Forbs and deciduous shrubs contributed the first and second greatest number of species to most of the associations. The 10 associations with the lowest native plant species richness all had an average native plant richness of <15 and a sample size of <3. Of the associations with the lowest richness, *Pinus contorta* / *Calamagrostis rubescens* Forest and *Abies lasiocarpa* / *Xerophyllum tenax* Forest had <10 species. The low average richness in these plant associations may in part be related to the low sample size. However, in some cases the low species richness may be typical of the association. For instance, the *Abies lasiocarpa* / *Xerophyllum tenax* Forest association is characterized by harsh environmental conditions, occurs on high-elevation north-facing slopes, and experiences heavy snow that lingers into the early summer. The cold temperatures and short growing season are challenging for many plants, resulting in a smaller pool of species that can thrive in this association.



Avg. Native Vascular Plant Species Richness by Association for G210, G211 & G217; Mount Spokane State Park, WA.
*Numbers above bars are sample sizes.

Figure 5. Average native vascular plant species richness by plant association and growth form for associations in G210, G211 & G217.

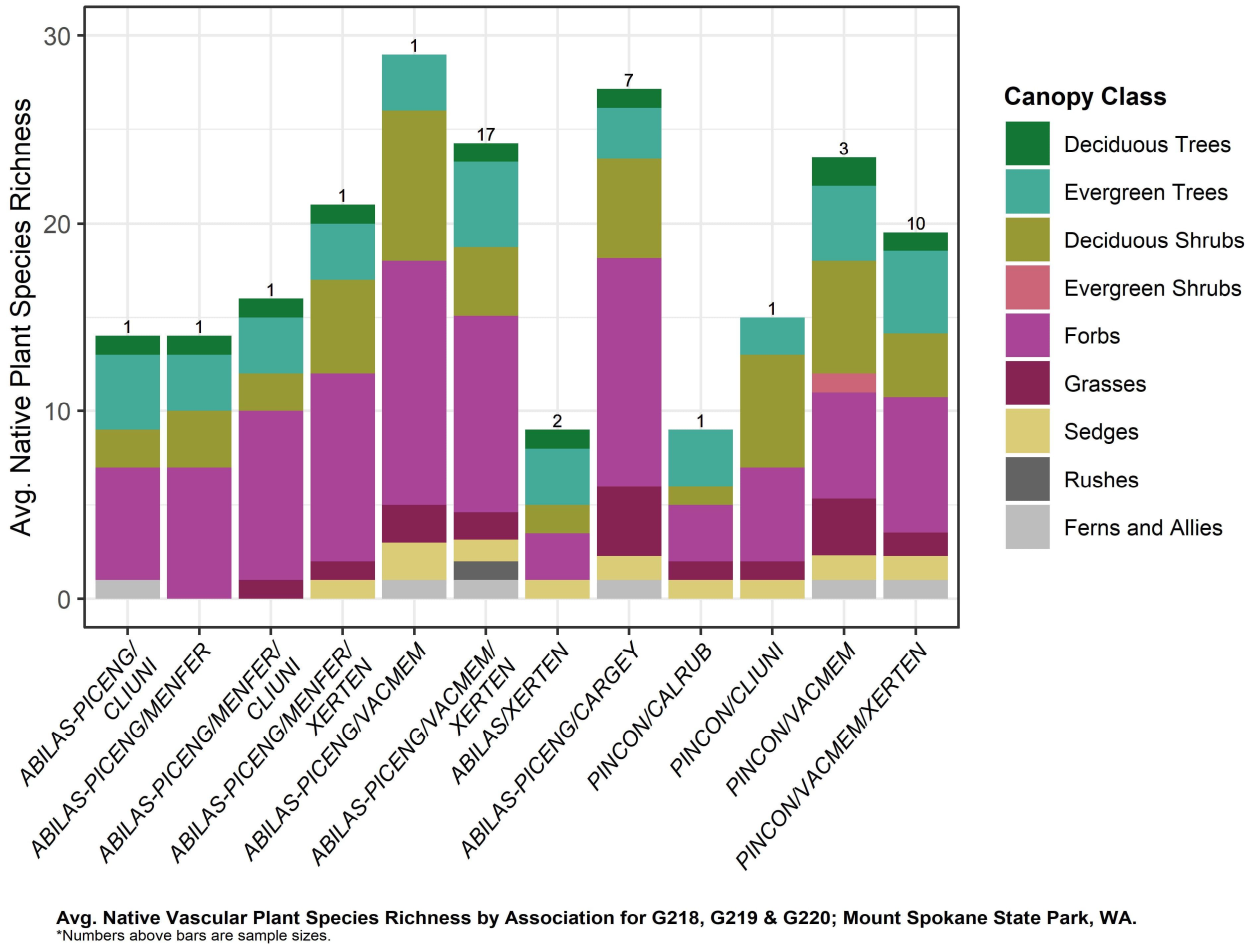
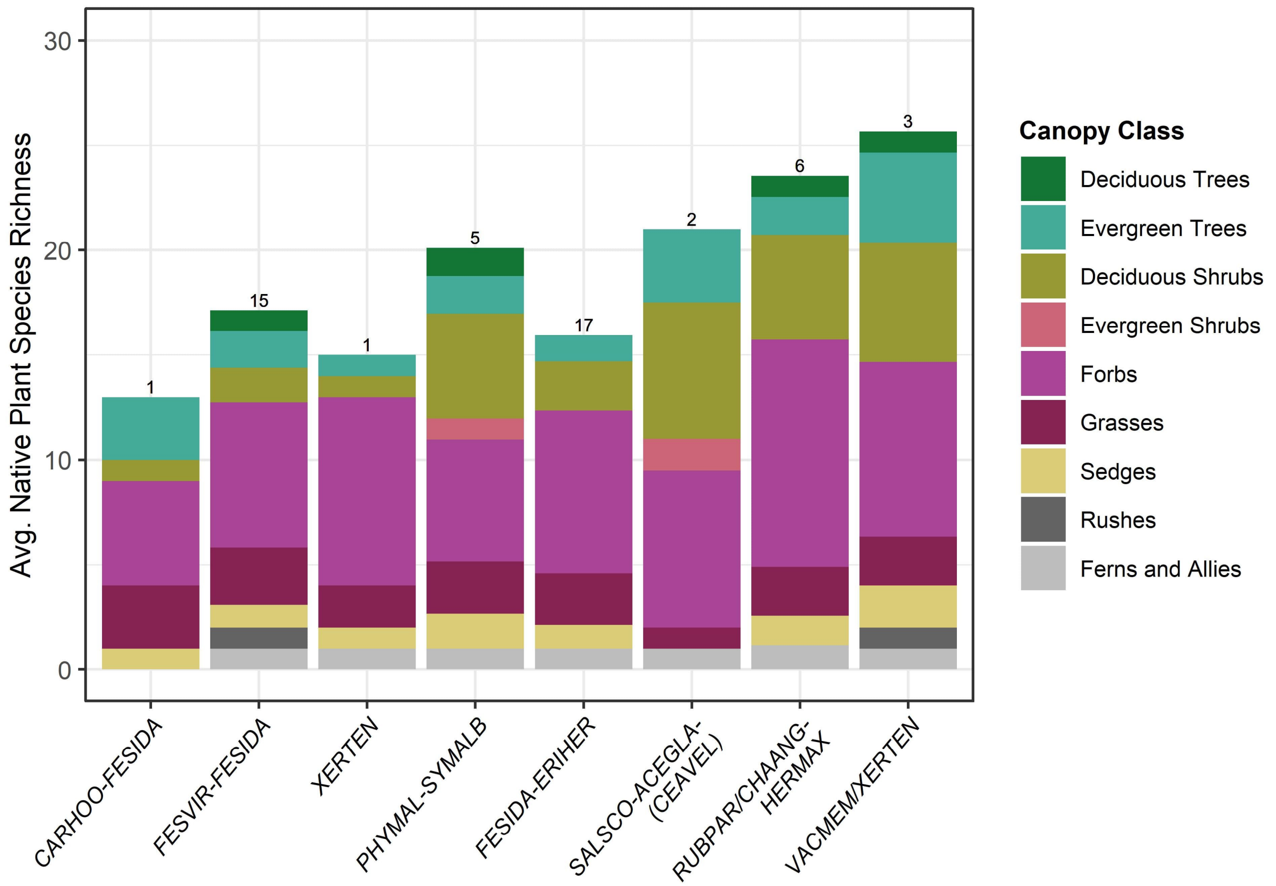


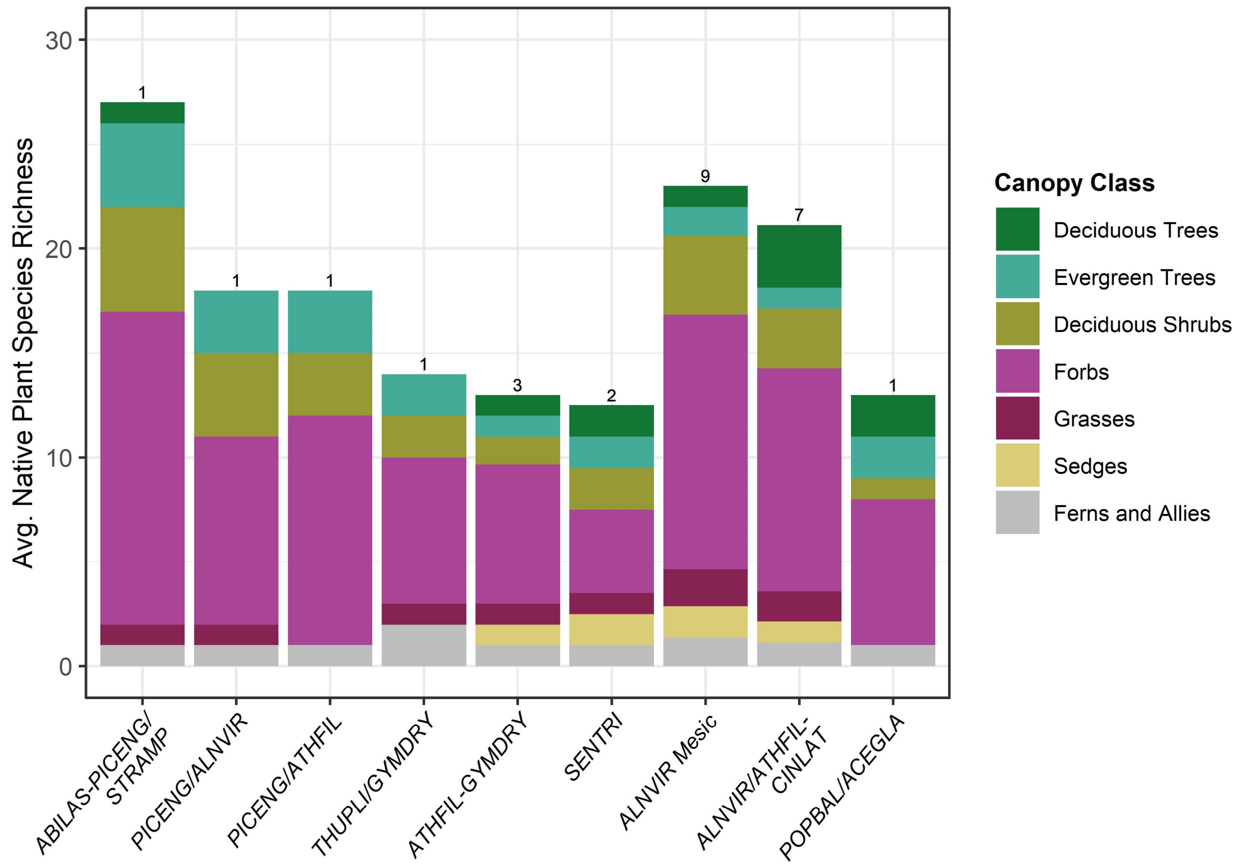
Figure 6. Average native vascular plant species richness by plant association and growth form for associations in groups G218, G219 & G220.



Avg. Native Vascular Plant Species Richness by Association for G267, G271,G272,G273,G282,and G305; Mount Spokane State Park, WA.

*Numbers above bars are sample sizes.

Figure 7. Average native vascular plant species richness by plant association and growth form for associations in groups G267, G271, G272, G273, G28, and G305.



Avg. Native Vascular Plant Species Richness by Association for G506,G521,G527, and G796; Mount Spokane State Park, WA.
*Numbers above bars are sample sizes.

Figure 8. Average native vascular plant species richness by plant association and growth form for associations in groups G506, G521, G527, and G796.

3.1.1 Alliances

USNVC alliances are one level above associations in the hierarchy (Figure 3) and are characterized by regional to subregional climate, substrates, hydrology, moisture/ nutrient factors, and disturbance regimes (USNVC 2022). Floristically, alliances are defined by diagnostic species, including those from dominant growth forms or layers, and are characterized by moderately similar plant species composition. Appendix G displays dumbbell charts showing the 10th, 50th, and 90th percentiles of importance values for the dominant plant species for the 16 alliances with sample sizes >3. Importance value is a measure of both rank order abundance and constancy (the frequency of occurrence of a species in an alliance), with the most important species being those with the highest abundance and constancy. The charts are sorted on the y-axis by importance value with the most important at the top, the species listed are those with at least 40% constancy, and the species are color coded by growth form. The dumbbell charts provide a quick visualization of the 10th, 50th, and 90th percentile of importance for dominant and diagnostic plant species in common alliances at MSSP.

3.2 Vegetation Mapping in Priority Areas

Table 4 and Figures 9–13 display the area of each association and maps of plant associations across the five priority areas, respectively. Of the total 66 associations encountered during field surveys, 46 (74%) were mapped as a dominant association in the priority areas (Table 4). In addition, two (66%) of the three non-vegetated land cover classes present in MSSP (Developed and Roads) were mapped in the priority areas. The priority areas are dominated by forest and woodland vegetation (93.4% of the priority areas), with lesser amounts of shrubland (4.2%) and herbaceous vegetation (0.6%). Roads and developed lands account for the remaining 1.8% of the priority areas. Figure 14 displays representative photos of the three most common plant associations in the priority areas in each of three vegetation physiognomy classes.

Thirty-five forest and woodland associations were mapped in the priority areas. Of the forest and woodland vegetation, the five most common associations were *Abies grandis / Clintonia uniflora* Forest (38.6% of the priority areas), *Tsuga heterophylla / Clintonia uniflora* Forest (14.2%), *Abies grandis / Physocarpus malvaceus* Forest (7.3%), *Abies lasiocarpa – Picea engelmannii / Vaccinium membranaceum / Xerophyllum tenax* Forest (5.1%), and *Thuja plicata / Clintonia uniflora* Forest (4.3%). *Abies grandis / Clintonia uniflora* Forest was the most common vegetation type in the priority area across all physiognomic groups and occurred in large, contiguous forest patches on backslope positions at low- to mid-elevation in MSSP. *Tsuga heterophylla / Clintonia uniflora* Forest and *Thuja plicata / Clintonia uniflora* Forest are common in footslope and toeslope positions. *Abies lasiocarpa – Picea engelmannii / Vaccinium membranaceum / Xerophyllum tenax* Forest is common at higher elevations on backslope and shoulder positions, often on north- and east-aspects. *Abies grandis / Physocarpus malvaceus* Forest was mapped in priority area 4 only and occurs on steep south-facing slopes at mid-elevations.

Table 4.
Average Native Species Richness by Plant Association at Mount Spokane State Park

Group	Association Code	Association Title	Avg. Native Plant Richness	Sample Size
G210	PINPON-PSEMEN/PHYMAL	*Pinus ponderosa* - *Pseudotsuga menziesii* / *Physocarpus malvaceus* Forest	21	3
G210	PSEMEN/FESIDA	*Pseudotsuga menziesii* / *Festuca idahoensis* Woodland	26	2
G210	PSEMEN/PHYMAL	*Pseudotsuga menziesii* / *Physocarpus malvaceus* Forest	23	12
G210	PSEMEN/SYMALB	*Pseudotsuga menziesii* / *Symphoricarpos albus* Forest	20	1
G211	ABIGRA/ACEGLA	*Abies grandis* / *Acer glabrum* Forest	22	12
G211	ABIGRA/CLIUNI	*Abies grandis* / *Clintonia uniflora* Forest	23	61
G211	ABIGRA/PHYMAL	*Abies grandis* / *Physocarpus malvaceus* Forest	23	7
G211	ABIGRA/XERTEN	*Abies grandis* / *Xerophyllum tenax* Forest	23	13
G211	LAROCC/CLIUNI	*Larix occidentalis* / *Clintonia uniflora* Forest	17	6
G211	LAROCC/CLIUNI-XERTEN	*Larix occidentalis* / *Clintonia uniflora* - *Xerophyllum tenax* Forest	23	6
G211	PSEMEN/CLIUNI	*Pseudotsuga menziesii* / *Clintonia uniflora* Forest	24	5
G211	PSEMEN/CLIUNI-XERTEN	*Pseudotsuga menziesii* / *Clintonia uniflora* - *Xerophyllum tenax* Forest	25	2
G211	PSEMEN/PHYMAL-LINBOR	*Pseudotsuga menziesii* / *Physocarpus malvaceus* - *Linnaea borealis* Forest	26	3
G211	PSEMEN/VACMEM	*Pseudotsuga menziesii* / *Vaccinium membranaceum* Forest	23	6
G211	PSEMEN/VACMEM/XERTEN	*Pseudotsuga menziesii* / *Vaccinium membranaceum* / *Xerophyllum tenax* Forest	20	6
G217	THUPLI/ARANUD	*Thuja plicata* / *Aralia nudicaulis* Forest	26	2
G217	THUPLI/CLIUNI	*Thuja plicata* / *Clintonia uniflora* Forest	18	6
G217	TSUHET/ARANUD	*Tsuga heterophylla* / *Aralia nudicaulis* Forest	27	5
G217	TSUHET/ASACAU	*Tsuga heterophylla* / *Asarum caudatum* Forest	26	2
G217	TSUHET/ATHFIL	*Tsuga heterophylla* / *Athyrium filix-femina* Forest	20	3
G217	TSUHET/CLIUNI	*Tsuga heterophylla* / *Clintonia uniflora* Forest	20	9
G217	TSUHET/GYMDRY	*Tsuga heterophylla* / *Gymnocarpium dryopteris* Riparian Forest	19	2

Group	Association Code	Association Title	Avg. Native Plant Richness	Sample Size
G217	TSUHET/MENFER	*Tsuga heterophylla / Menziesia ferruginea* Forest	17	1
G217	TSUHET/XERTEN	*Tsuga heterophylla / Xerophyllum tenax* Forest	21	3
G218	ABILAS-PICENG/CLIUNI	*Abies lasiocarpa* - *Picea engelmannii / Clintonia uniflora* Forest	14	1
G218	ABILAS-PICENG/MENFER	*Abies lasiocarpa* - *Picea engelmannii / Menziesia ferruginea* Forest	14	1
G218	ABILAS-PICENG/MENFER/CLIUNI	*Abies lasiocarpa* - *Picea engelmannii / Menziesia ferruginea / Clintonia uniflora* Forest	16	1
G218	ABILAS-PICENG/MENFER/XERTEN	*Abies lasiocarpa* - *Picea engelmannii / Menziesia ferruginea / Xerophyllum tenax* Forest	21	1
G218	ABILAS-PICENG/VACMEM	*Abies lasiocarpa* - *Picea engelmannii / Vaccinium membranaceum* Rocky Mountain Forest	29	1
G218	ABILAS-PICENG/VACMEM/XERTEN	*Abies lasiocarpa* - *Picea engelmannii / Vaccinium membranaceum / Xerophyllum tenax* Forest	24	17
G218	ABILAS/XERTEN	*Abies lasiocarpa / Xerophyllum tenax* Forest	9	2
G219	ABILAS-PICENG/CARGEY	*Abies lasiocarpa* - *Picea engelmannii / Carex geyeri* Forest	27	7
G220	PINCON/CALRUB	*Pinus contorta / Calamagrostis rubescens* Forest	9	1
G220	PINCON/CLIUNI	*Pinus contorta / Clintonia uniflora* Forest	15	1
G220	PINCON/VACMEM	*Pinus contorta / Vaccinium membranaceum* Rocky Mountain Forest	24	3
G220	PINCON/VACMEM/XERTEN	*Pinus contorta / Vaccinium membranaceum / Xerophyllum tenax* Forest	20	10
G267	CARHOO-FESIDA	*Carex hoodii* - *Festuca idahoensis* Grassland	13	1
G271	FESVIR-FESIDA	*Festuca viridula* - *Festuca idahoensis* Meadow	17	15
G271	XERTEN	*Xerophyllum tenax* Meadow	15	1
G272	PHYMAL-SYMALB	*Physocarpus malvaceus* - *Symphoricarpos albus* Shrubland	20	5
G273	FESIDA-ERIHER	*Festuca idahoensis* - *Eriogonum heracleoides* Grassland	16	17
G282	SALSCO-ACEGLA-(CEAVEL)	*Salix scouleriana* - *Acer glabrum* - *(Ceanothus velutinus)* Shrubland	21	2

Group	Association Code	Association Title	Avg. Native Plant Richness	Sample Size
G305	RUBPAR/CHAANG-HERMAX	*Rubus parviflorus / Chamerion angustifolium* - *Heracleum maximum* Shrubland	24	6
G305	VACMEM/XERTEN	*Vaccinium membranaceum / Xerophyllum tenax* Shrubland	26	3
G506	ABILAS-PICENG/STRAMP	*Abies lasiocarpa* - *Picea engelmannii / Streptopus amplexifolius* Riparian Forest	27	1
G506	PICENG/ALNVIR	*Picea engelmannii / Alnus viridis* ssp. *sinuata* Riparian Forest	18	1
G506	PICENG/ATHFIL	*Picea engelmannii / Athyrium filix-femina* Riparian Woodland	18	1
G506	THUPLI/GYMDRY	*Thuja plicata / Gymnocarpium dryopteris* Riparian Forest	14	1
G521	ATHFIL-GYMDRY	*Athyrium filix-femina* - *Gymnocarpium dryopteris* Wet Meadow [Provisional]	13	3
G521	SENTRI	*Senecio triangularis* Wet Meadow	13	2
G527	ALNVIR Mesic	*Alnus viridis* ssp. *sinuata / Mesic Forbs* Wet Shrubland	23	9
G527	ALNVIR/ATHFIL-CINLAT	*Alnus viridis* ssp. *sinuata / Athyrium filix-femina* - *Cinna latifolia* Wet Shrubland	21	7
G796	POPBAL/ACEGLA	*Populus balsamifera* ssp. *trichocarpa / Acer glabrum Riparian* Woodland	13	1

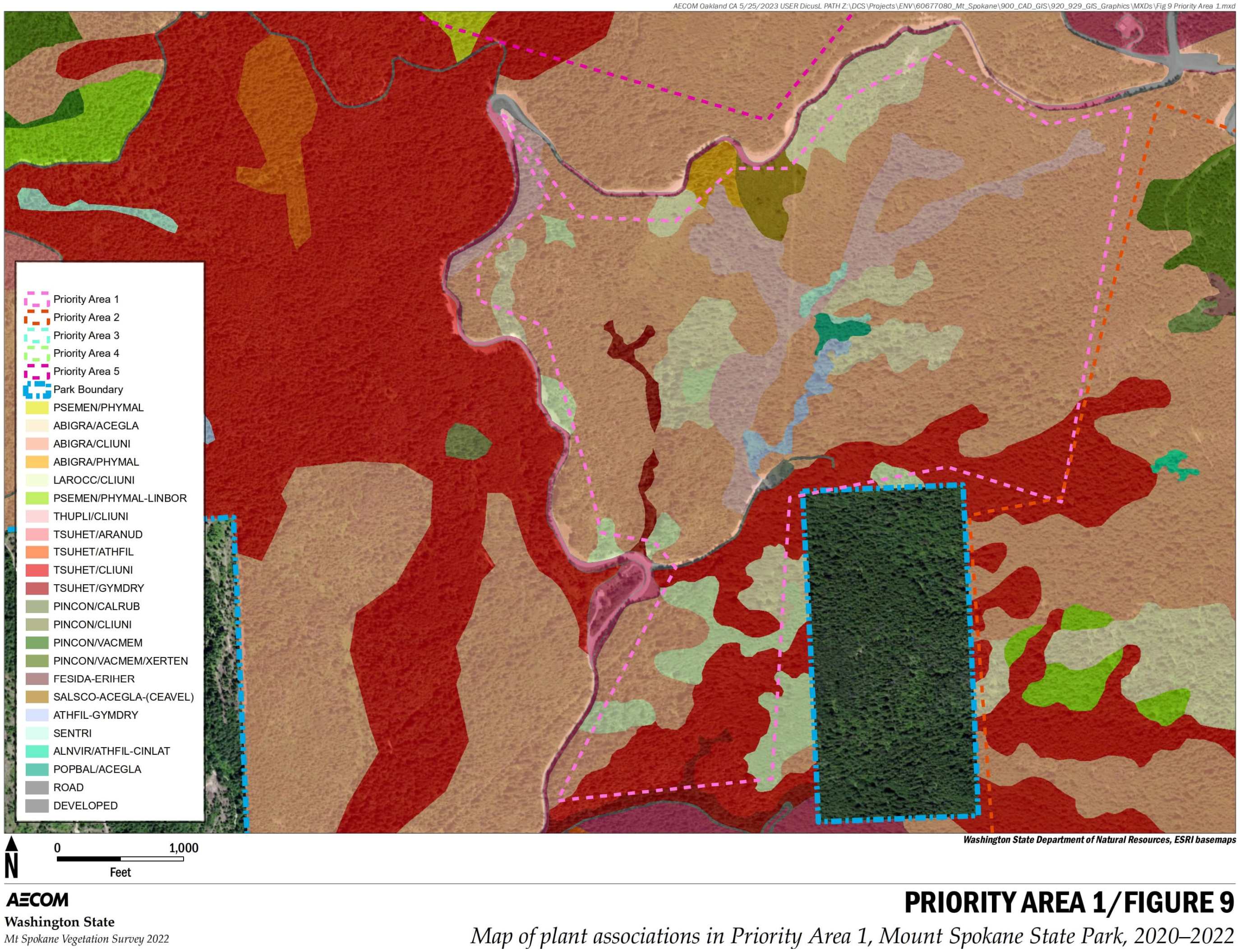


Figure 9. Map of plant associations in Priority Area 1, Mount Spokane State Park, 2020–2022.

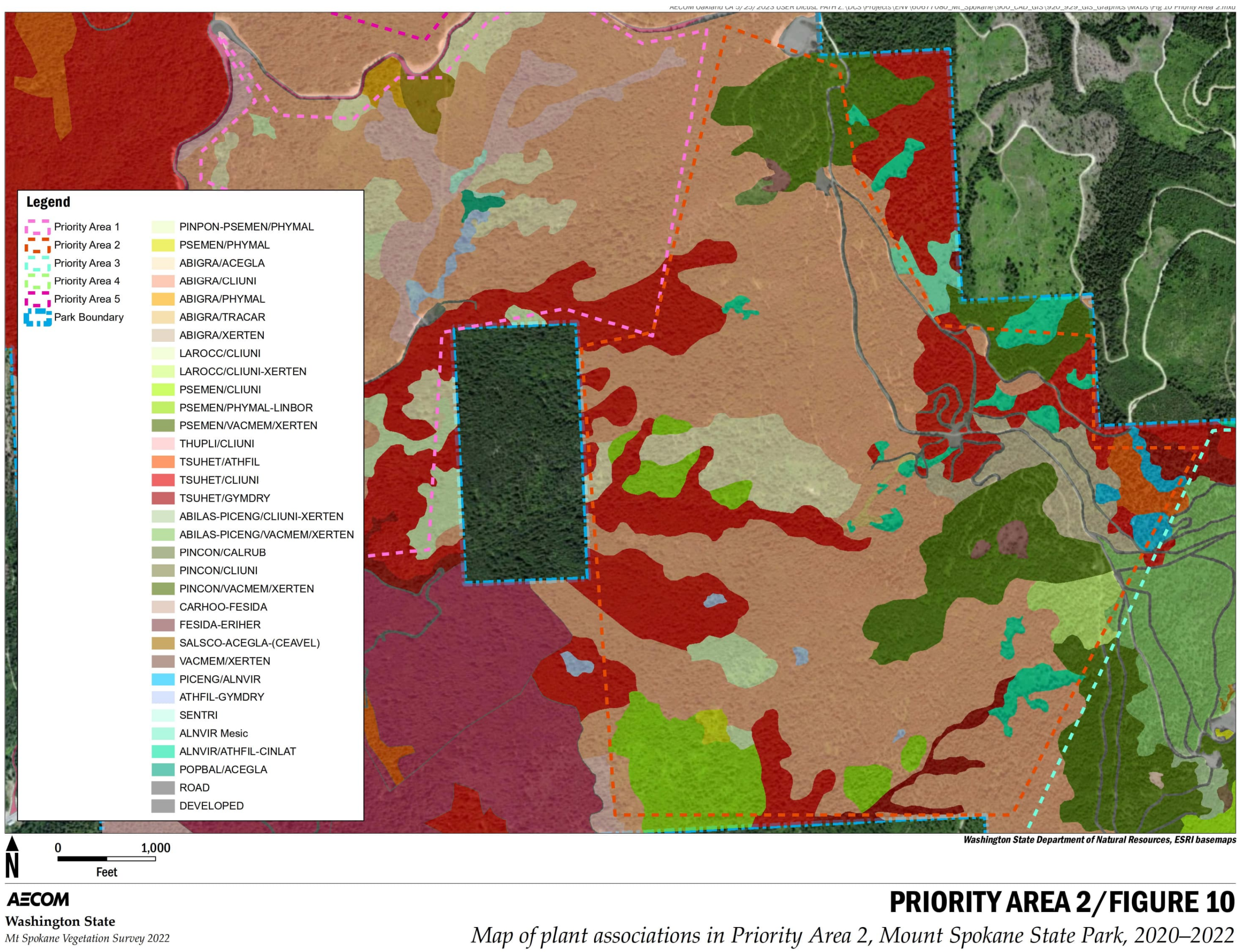


Figure 10. Map of plant associations in Priority Area 2, Mount Spokane State Park, 2020–2022.

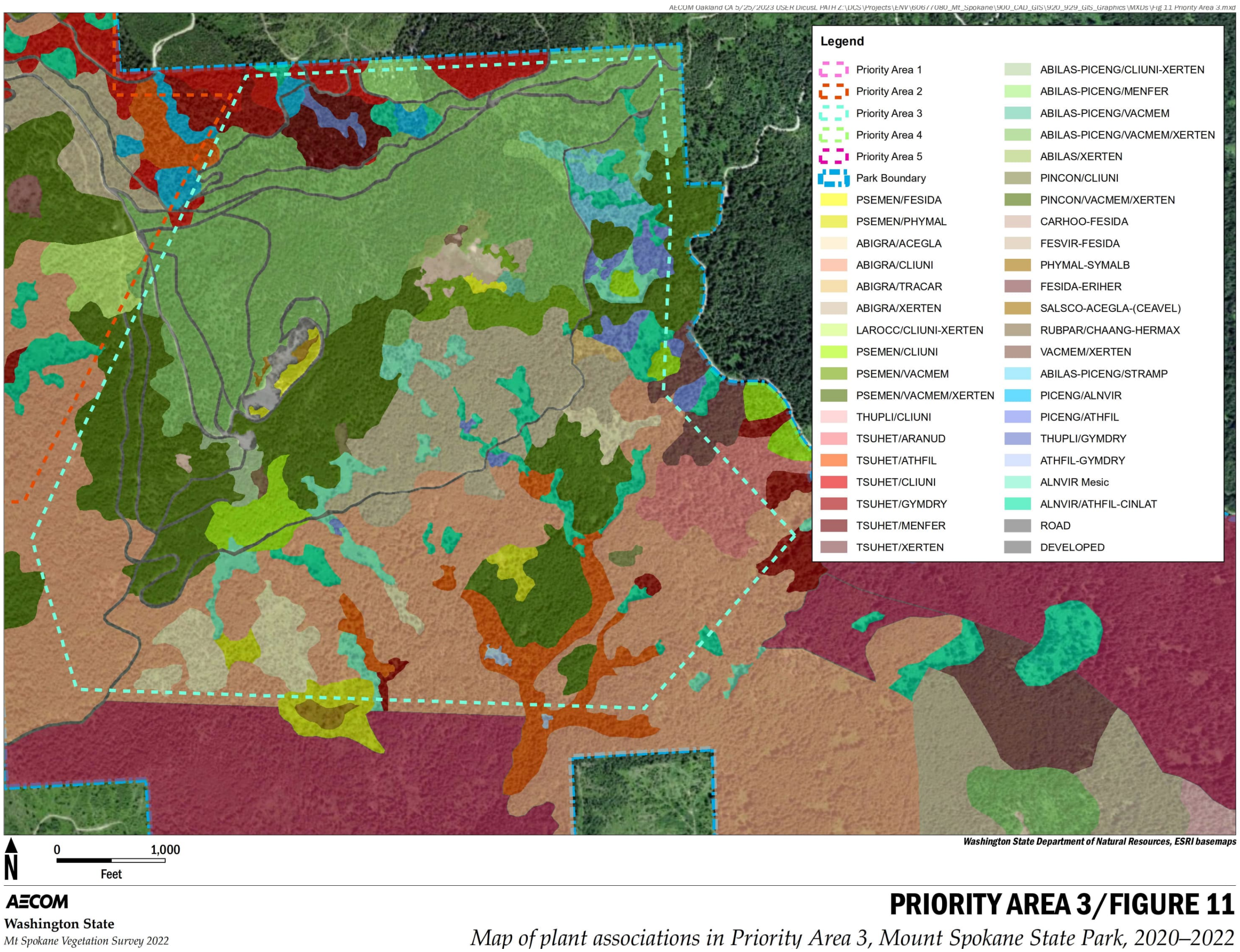


Figure 11. Map of plant associations in Priority Area 3, Mount Spokane State Park, 2020–2022.

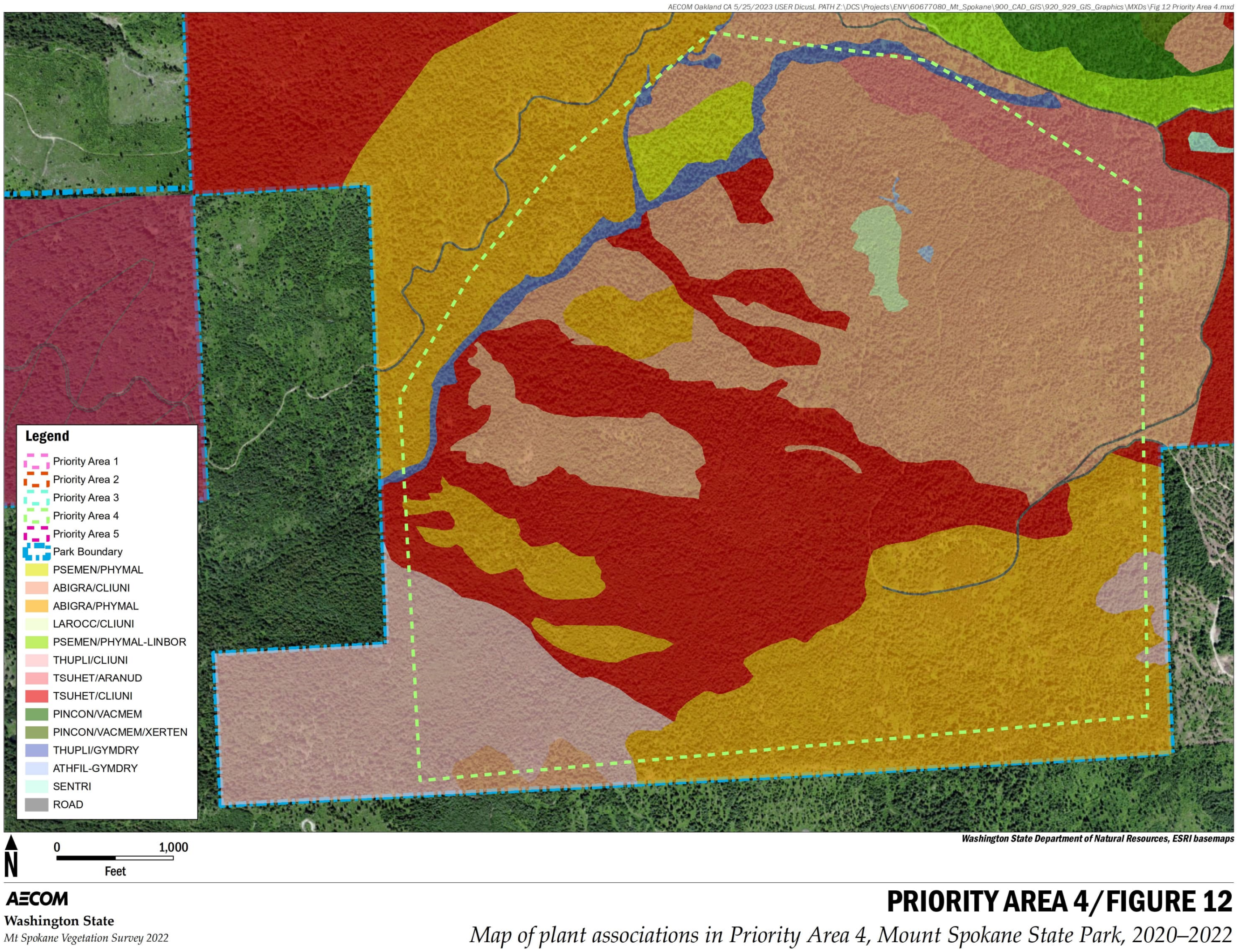


Figure 12. Map of plant associations in Priority Area 4, Mount Spokane State Park, 2020–2022.

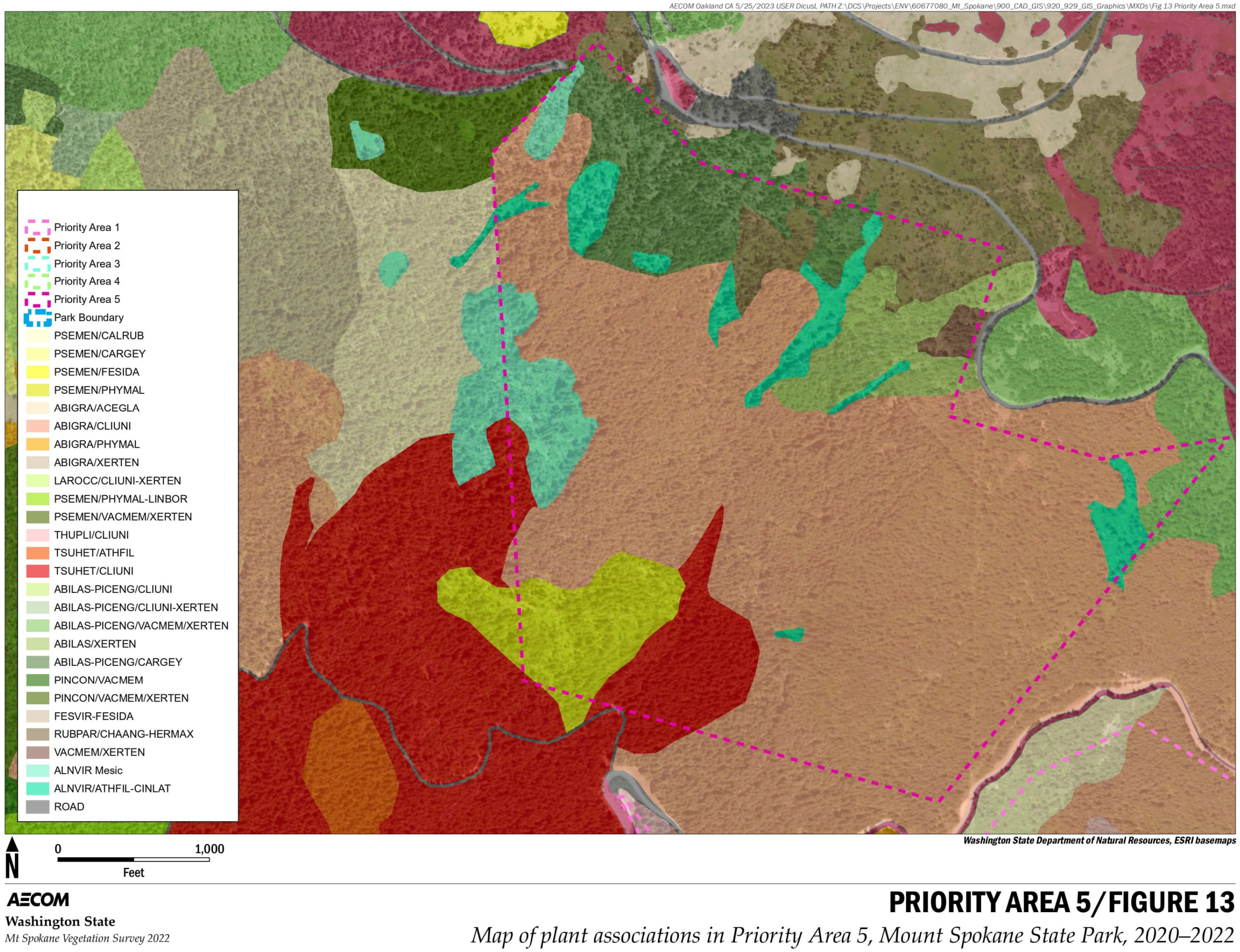


Figure 13. Map of plant associations in Priority Area 5, Mount Spokane State Park, 2020–2022.

Six shrubland associations were mapped in the priority areas. The three most common shrubland associations were *Alnus viridis* ssp. *sinuata / Athyrium filix-femina – Cinna latifolia* Wet Shrubland (1.8% of the priority areas), *Alnus viridis* ssp. *sinuata* / Mesic Forbs Wet Shrubland (1.3%), and *Rubus parviflorus / Chamerion angustifolium – Heracleum maximum* Shrubland (0.8%). *Alnus viridis* ssp. *sinuata / Athyrium filix-femina – Cinna latifolia* Wet Shrubland and *Alnus viridis* ssp. *sinuata* / Mesic Forbs Wet Shrubland often co-occurred, with the former occurring in wetlands along narrow drainageways and at montane seeps, and the latter occurring in adjacent areas in slight drier soils. *Rubus parviflorus / Chamerion angustifolium – Heracleum maximum* Shrubland occurred at higher elevations in the subalpine zone, most commonly in priority area 5.

Five herbaceous associations were mapped in the priority areas. The three most common herbaceous associations were *Athyrium filix-femina – Gymnocarpium dryopteris* Wet Meadow (0.2% of the priority areas), *Festuca viridula – Festuca idahoensis* Meadow (0.1%), and *Festuca idahoensis – Eriogonum heracleoides* Grassland (0.1%). *Athyrium filix-femina – Gymnocarpium dryopteris* Wet Meadow typically occurs in small patches along montane seeps and headwater streams. *Festuca viridula – Festuca idahoensis* Meadow (0.1%) and *Festuca idahoensis – Eriogonum heracleoides* occur on summits and shoulder positions. The two associations often occur adjacent to one another, with the former occurring on north- and east-facing slope aspects, and the latter occurring on south- and west-facing slope aspects. In the priority areas, these associations were most prominent on Horse Mountain and on the south end of Linder Ridge, just west of the Nova Hut.

Figure 14. Representative photos of the three most common plant associations in the priority areas in each of three vegetation physiognomy classes, Mount Spokane State Park, WA. Top row (left to right): *Abies grandis / Clintonia uniflora* Forest, *Tsuga heterophylla / Clintonia uniflora* Forest, *Abies grandis / Physocarpus malvaceus* Forest. Middle row (left to right): *Alnus viridis* ssp*. sinuata / Athyrium filix-femina – Cinna latifolia* Wet Shrubland, *Alnus viridis* ssp*. sinuata* / Mesic Forbs Wet Shrubland, *Rubus parviflorus / Chamerion angustifolium – Heracleum maximum* Shrubland. Bottom Row (left to right): *Athyrium filix-femina – Gymnocarpium dryopteris* Wet Meadow [Provisional], *Festuca viridula – Festuca idahoensis* Meadow, *Festuca idahoensis – Eriogonum heracleoides* Grassland.

Table 5.
Area (Acres) of Plant Associations Mapped in Five Priority Areas in Mount Spokane State Park, Washington, 2022

Physiognomy	Association Code	Association Title	Area (ha [acres])	% Total area
Forest & Woodland			1,352.7 [3,342.5]	**93.4%**
	PINPON-PSEMEN/PHYMAL	*Pinus ponderosa – Pseudotsuga menziesii / Physocarpus malvaceus* Forest	1.0 [2.5]	0.1%
	PSEMEN/PHYMAL	*Pseudotsuga menziesii / Physocarpus malvaceus* Forest	20.1 [49.7]	1.4%
	PSEMEN/FESIDA	*Pseudotsuga menziesii / Festuca idahoensis* Woodland	0.3 [0.7]	0.0%
	LAROCC/CLIUNI-XERTEN	*Larix occidentalis / Clintonia uniflora - Xerophyllum tenax* Forest	4.4 [10.8]	0.3%
	LAROCC/CLIUNI	*Larix occidentalis / Clintonia uniflora* Forest	15 [37]	1.0%
	ABIGRA/ACEGLA	*Abies grandis / Acer glabrum* Forest	39 [96.3]	2.7%
	ABIGRA/CLIUNI	*Abies grandis / Clintonia uniflora* Forest	559.6 [1,382.7]	38.6%
	ABIGRA/PHYMAL	*Abies grandis / Physocarpus malvaceus* Forest	105.8 [261.5]	7.3%
	ABIGRA/TRACAR	*Abies grandis / Trautvetteria caroliniensis* Forest	1.3 [3.2]	0.1%
	ABIGRA/XERTEN	*Abies grandis / Xerophyllum tenax* Forest	31.4 [77.5]	2.2%
	PSEMEN/CLIUNI	*Pseudotsuga menziesii / Clintonia uniflora* Forest	6.6 [16.4]	0.5%
	PSEMEN/PHYMAL-LINBOR	*Pseudotsuga menziesii / Physocarpus malvaceus - Linnaea borealis* Forest	19.5 [48.2]	1.3%
	PSEMEN/VACMEM/XERTEN	*Pseudotsuga menziesii / Vaccinium membranaceum / Xerophyllum tenax* Forest	47.9 [118.3]	3.3%
	PSEMEN/VACMEM	*Pseudotsuga menziesii / Vaccinium membranaceum* Forest	4.2 [10.4]	0.3%
	TSUHET/CLIUNI	*Tsuga heterophylla / Clintonia uniflora* Forest	206 [509.1]	14.2%
	TSUHET/MENFER	*Tsuga heterophylla / Menziesia ferruginea* Forest	3.7 [9.1]	0.3%
	TSUHET/XERTEN	*Tsuga heterophylla / Xerophyllum tenax* Forest	4.3 [10.7]	0.3%
	THUPLI/CLIUNI	*Thuja plicata / Clintonia uniflora* Forest	62.6 [154.8]	4.3%
	TSUHET/ARANUD	*Tsuga heterophylla / Aralia nudicaulis* Forest	25.7 [63.5]	1.8%
	TSUHET/ATHFIL	*Tsuga heterophylla / Athyrium filix-femina* Forest	14.3 [35.3]	1.0%
	TSUHET/GYMDRY	*Tsuga heterophylla / Gymnocarpium dryopteris* Riparian Forest	15.3 [37.7]	1.1%

Physiognomy	Association Code	Association Title	Area (ha [acres])	% Total area
	ABILAS-PICENG/CLIUNI-XERTEN	*Abies lasiocarpa – Picea engelmannii / Clintonia uniflora - Xerophyllum tenax* Forest	1.4 [3.4]	0.1%
	ABILAS-PICENG/MENFER	*Abies lasiocarpa – Picea engelmannii / Menziesia ferruginea* Forest	2.5 [6.2]	0.2%
	ABILAS-PICENG/VACMEM/XERTEN	*Abies lasiocarpa – Picea engelmannii / Vaccinium membranaceum / Xerophyllum tenax* Forest	74.5 [184.1]	5.1%
	ABILAS-PICENG/VACMEM	*Abies lasiocarpa – Picea engelmannii / Vaccinium membranaceum* Rocky Mountain Forest	0.3 [0.8]	0.0%
	ABILAS/XERTEN	*Abies lasiocarpa / Xerophyllum tenax* Forest	8.1 [19.9]	0.6%
	ABILAS-PICENG/CARGEY	*Abies lasiocarpa – Picea engelmannii / Carex geyeri* Forest	12.1 [29.9]	0.8%
	PINCON/CALRUB	*Pinus contorta / Calamagrostis rubescens* Forest	0.6 [1.5]	0.0%
	PINCON/CLIUNI	*Pinus contorta / Clintonia uniflora* Forest	0.3 [0.8]	0.0%
	PINCON/VACMEM/XERTEN	*Pinus contorta / Vaccinium membranaceum / Xerophyllum tenax* Forest	44.6 [110.3]	3.1%
	ABILAS-PICENG/STRAMP	*Abies lasiocarpa – Picea engelmannii / Streptopus amplexifolius* Riparian Forest	2.3 [5.7]	0.2%
	PICENG/ALNVIR	*Picea engelmannii / Alnus viridis ssp. sinuata* Riparian Forest	3.8 [9.5]	0.3%
	PICENG/ATHFIL	*Picea engelmannii / Athyrium filix-femina* Riparian Woodland	3.8 [9.3]	0.3%
	THUPLI/GYMDRY	*Thuja plicata / Gymnocarpium dryopteris* Riparian Forest	9.8 [24.2]	0.7%
	POPBAL/ACEGLA	*Populus balsamifera* ssp. *trichocarpa / Acer glabrum* Riparian Woodland	0.6 [1.5]	0.0%
Shrubland			60.7 [150]	**4.2%**
	PHYMAL-SYMALB	*Physocarpus malvaceus – Symphoricarpos albus* Shrubland	0.8 [2]	0.1%
	SALSCO-ACEGLA-(CEAVEL)	*Salix scouleriana – Acer glabrum - (Ceanothus velutinus)* Shrubland	2.5 [6.3]	0.2%
	RUBPAR/CHAANG-HERMAX	*Rubus parviflorus / Chamerion angustifolium – Heracleum maximum* Shrubland	10.9 [27]	0.8%
	VACMEM/XERTEN	*Vaccinium membranaceum / Xerophyllum tenax* Shrubland	1.4 [3.4]	0.1%
	ALNVIR/ATHFIL-CINLAT	*Alnus viridis* ssp. *sinuata / Athyrium filix-femina - Cinna latifolia* Wet Shrubland	25.6 [63.3]	1.8%
	ALNVIR Mesic	*Alnus viridis* ssp. *sinuata / Mesic Forbs* Wet Shrubland	19.4 [48]	1.3%
Herbaceous			8.5 [21]	**0.6%**

Physiognomy	Association Code	Association Title	Area (ha [acres])	% Total area
	CARHOO-FESIDA	*Carex hoodii – Festuca idahoensis* Grassland	1.4 [3.5]	0.1%
	FESVIR-FESIDA	*Festuca viridula – Festuca idahoensis* Meadow	1.7 [4.3]	0.1%
	FESIDA-ERIHER	*Festuca idahoensis – Eriogonum heracleoides* Grassland	1.7 [4.3]	0.1%
	ATHFIL-GYMDRY	*Athyrium filix-femina – Gymnocarpium dryopteris* Wet Meadow [Provisional]	3 [7.5]	0.2%
	SENTRI	*Senecio triangularis* Wet Meadow	0.6 [1.4]	0.0%
Anthropogenic Development			26.5 [65.6]	**1.8%**
	ROAD	NULL	23.3 [57.5]	1.6%
	DEVELOPED	NULL	3.3 [8.1]	0.2%
TOTAL			1,448.4 [3,579.1]	100.0%

3.3 Rare and Special Status Plants

Rare plant surveys focused on three rare plant or review list taxa that were identified by WNHP as potentially occurring in MSSP: western goldthread (*Coptis occidentalis*), Nevada pea (*Lathyrus lanszwertii* var. *bijugatus*), and whitebark pine (*Pinus albicaulis*). Three review group species and no rare plant species were observed in MSSP during vegetation surveys. The rare plant survey results are consistent with WNHP data that contain no current or historical records of rare plant occurrences within MSSP (WNHP 2007).

Western goldthread, a Review Group 1 species in Washington as designated by WNHP, was commonly found in mesic forests throughout the survey area, and the occurrences were reported to the WNHP rare plant botanist. Given how common this taxon is in MSSP, its conservation status will be reevaluated over the next year or two.

Northern green orchid (*Platanthera aquilonis*) is another Review Group 1 species in Washington and was found in a montane seep in the headwaters of Deadman Creek. A voucher specimen was collected by WNHP and sent to MOH for verification. The specimen was determined to be either *P. huronensis* or *P. aquilonis*. However, these species are poorly differentiated in Washington, and taxonomic classification of the two requires additional work (W. Fertig, pers. comm, Jan. 18, 2023). The voucher specimen was curated at the MOH for future reference.

Seliger's herzogiella moss (*Herzogiella seligeri*) was collected on dead down wood along a headwater stream in a grand fir forest in the upper reaches of Deadman Creek. This moss is on the Washington Mosses Review Group 1 list. The voucher specimen was curated at the MOH for future reference.

Lastly, whitebark pine, a high-elevation five-needle pine, was recently designated by US Fish and Wildlife Service (USFWS) as threatened under the Endangered Species Act. Whitebark pine surveys were conducted in 2022 in potential whitebark habitat in the priority areas (e.g., Horse Mountain) during which whitebark pine was not observed. The closest known populations of whitebark pine are approximately 50–55 kilometers (32-34 miles) to the east in the Coeur d’Alene mountain of Idaho (Smith and Collingwood 2014). Given the distance to the nearest known population, it is possible that whitebark pine does not occur in MSSP.

3.4 Noxious Weeds

AECOM compiled a comprehensive list of weeds observed during 2022 field surveys and those observed by Walker et al. (2021) in 2020 and 2021. A total of 27 weed species were observed across all years (Table 6, Appendix C). This list includes noxious weeds and species considered “invasive” as part of the EIA analysis.

Table 6.
List of Noxious Weeds with Rankings

Scientific Name	Common Name	Weed Rankings	Mapped?	# Obs.
Agrostis capillaris	colonial bentgrass	Invasive	No	1
Agrostis gigantea	redtop	Invasive	Yes	1
Agrostis stolonifera	creeping bentgrass	Invasive	Yes	1
Anchusa officinalis	common bugloss	Class B & Quarantine	Yes	2
Bromus inermis	smooth brome	Invasive	Yes	1
Bromus tectorum	cheatgrass	Invasive	Yes	2
Centaurea diffusa	diffuse knapweed	Class B Noxious, Invasive & Quarantine	No	1
Centaurea stoebe ssp. *australis*	spotted knapweed	Class B Noxious, Invasive & Quarantine	Yes	15
Cirsium arvense	Canada thistle	Class C Noxious & Invasive	Yes	7
Cirsium vulgare	bull thistle	Class C Noxious & Invasive	Yes	1
Convolvulus arvensis	field bindweed	Class C Noxious	Yes	1
Elymus repens	quackgrass	Invasive	Yes	3
Hieracium aurantiacum	orange hawkweed	Class B & Quarantine	Yes	13
Hypericum perforatum ssp. *perforatum*	common St. Johnswort	Class C Noxious & Invasive	Yes	49
Jacobaea vulgaris	tansy ragwort	Class B Noxious, Invasive & Quarantine	Yes	3
Leucanthemum vulgare	oxeye daisy	Class C Noxious, Invasive & Quarantine	Yes	1
Linaria dalmatica ssp. *dalmatica*	Dalmatian toadflax	Class B Noxious, Invasive & Quarantine	Yes	8
Lysimachia nummularia	creeping jenny	Monitor List	Yes	1
Mycelis muralis	wall-lettuce	Monitor List	Yes	46
Phleum pratense	timothy	Invasive	Yes	1
Poa bulbosa	bulbous bluegrass	Invasive	No	1
Poa pratensis	Kentucky bluegrass	Invasive	No	1
Ranunculus repens	creeping buttercup	Invasive	Yes	1
Schedonorus arundinaceus	tall fescue	Invasive	No	1
Tanacetum vulgare	common tansy	Class C Noxious & Invasive	Yes	7
Trifolium pratense	red clover	Invasive	Yes	1
Trifolium repens	white clover	Invasive	Yes	1

Figure 15 shows photos of some of the noxious weeds observed in MSSP in 2020–2022. Of the total species, 22 are on the WNHP draft invasive weed list. None of the observed weeds are

Class A Noxious weeds, six are Class B, and six are Class C. Seven weed species are on the Washington weeds quarantine list, and two are on the Washington weeds monitor list. Plants on the quarantine list are prohibited from transport, purchase/sale, or distribution of plants or plant parts into or within the state of Washington. Plants on the monitor list are not noxious weeds in Washington state. Rather, the purpose of the monitor list is to gather more information on suspect weeds, as well as monitor for occurrence or spread.

Figure 15. Examples of some of the noxious weeds observed in Mount Spokane State Park, 2020–2022. Clockwise (upper left to lower right): common St. Johnswort, wall-lettuce, spotted knapweed, orange hawkweed, common bugloss, and firecracker penstemon.

A total of 22 of the 27 weed species were mapped, for a total of 166 observations across all years (Figure 16). Of the species that were mapped, the five most observed were common St.

Johnswort (*Hypericum perforatum* ssp. *perforatum*), wall-lettuce (*Mycelis muralis*), spotted knapweed (*Centaurea stoebe* ssp. *australis*), orange hawkweed (*Hieracium aurantiacum*), and Dalmatian toadflax (*Linaria dalmatica* ssp. *dalmatica*). Common St. Johnswort was observed throughout MSSP in meadows, open forests, and woodlands and along trails and roads in very small to small patches (0.05–0.20 hectare [0.12–0.50 acre]). Common St. Johnswort is on the WNHP draft invasive species list and is a Class C noxious weed and thus control of this species should be a priority. However, given the number of populations observed and relative remoteness of many of these populations control of this species will be challenging at present, and weed control resources may be better prioritized elsewhere in the near term to slow the spread of other weed species. The exception to this recommendation is common St. Johnswort populations in grasslands in montane meadows and immediately adjacent forest and woodlands. These areas should be prioritized for exotic species control to maintain/enhance the ecological integrity of the grasslands. Wall-lettuce was observed throughout most mid- to low-elevation forested areas at low density and abundance. This species was often found growing along game trails in the forests, an indicator that deer and moose are common agents of dispersal for seeds of this species. Wall-lettuce is on the Washington weeds monitor list and thus control measures for this species are not recommended at this time. Instead, this species should be monitored in the future to determine if it shows indicators of becoming an invasive species, for instance, were this species to continue to spread and create dense patches at the exclusion of native forbs.

The remaining weeds observed in MSSP typically occurred along roads and trails. For instance, orange hawkweed and tansy ragwort (*Jacobaea vulgaris*) were commonly observed along Nordic ski trails, and spotted knapweed was observed most often along the main, paved road into MSSP. Future weed control efforts should focus on invasive and Class B and C noxious weeds that occur along roads and trails. Access to these areas is relatively easy compared to areas further from roads and trails, thus reducing travel time and costs for application of control measures and allowing for larger areas to be treated. Common bugloss (*Anchusa officinalis*) is a perennial Class B weed that was observed in 2022 at the park entrance and at the summit of Mount Spokane. In all cases, the observations were of a single plant, which was pulled out of the ground after the observation was documented. Park staff should monitor for additional occurrences of this species to eradicate it before it spreads and potentially becomes established in the park. Lastly, firecracker penstemon (*Penstemon eatonii* var. *eatonii*) was observed at the summit overlook at Mount Spokane; AECOM believes this may be the first documentation of this species in a natural area in Washington state. The species is native to deserts in the southwest US but may be found in roadside seed mixes distributed beyond its native range. This collection may represent a waif and is not thought to be invasive.

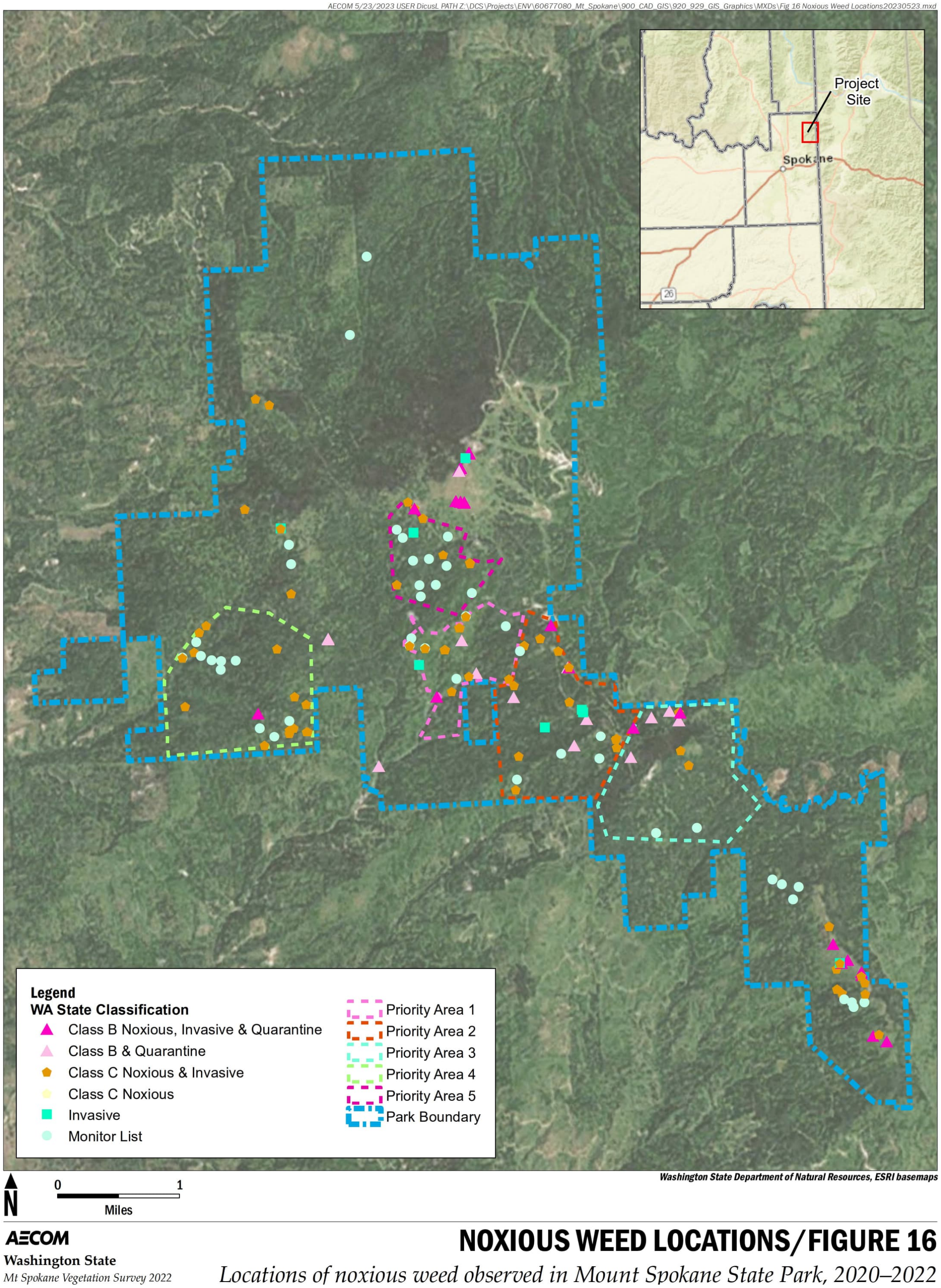


Figure 16. Locations of noxious weed observed in Mount Spokane State Park, 2020–2022.

3.5 Ecological Integrity Assessments

WNHP surveyed 629 vegetation polygons covering 2,605 hectares (6,437 acres; 53% of the undeveloped area of MSSP) (Figure 17). These polygons were aggregated into 161 assessment areas, representing 18 USNVC groups and 55 different plant associations. With small exceptions, wall-to-wall assessments were completed for all five priority areas. Additional assessments were conducted in non-priority areas as time allowed (or when rare/imperiled plant associations were encountered) (Table 7). The following section summarizes broad trends in the ecological integrity of surveyed areas at MSSP. For metric ratings, ranks, and comments pertaining to specific assessment areas and/or vegetation polygons, see Appendix H. Metric ratings, major ecological factors, primary rank factors, EIA Ranks/scores, EO Ranks/scores, and EO locations (to date) are also included in the geospatial data accompanying this report. EO information is stored in WNHP's internal database and publicly accessible via the WNHP Data Explorer (https://www.dnr.wa.gov/NHPdataexplorer).

Table 7.
US National Vegetation Classification Groups Assessed at Mount Spokane State Park in 2022

Group Code	Group	Area Surveyed (ha [acres])
G210	Central Rocky Mountain Dry Mixed Conifer Forest & Woodland	148 [366]
G211	Central Rocky Mountain-Interior Mesic Grand Fir – Douglas-fir – Western Larch Forest	1,287 [3,180]
G217	Central Rocky Mountain-Interior Cedar – Hemlock Forest	668 [1651]
G218	Rocky Mountain Subalpine Moist-Mesic Spruce – Fir Forest	172 [425]
G219	Rocky Mountain Subalpine Dry-Mesic Spruce – Fir Forest	13 [32]
G220	Rocky Mountain Lodgepole Pine Forest & Woodland	157 [388]
G267	Central Rocky Mountain-Interior Montane Grassland	2 [5]
G271	Rocky Mountain-North Pacific Subalpine-Montane Mesic Grassland & Meadow	40 [99]
G272	Central Rocky Mountain Montane-Foothill Shrubland	15 [37]
G273	Central Rocky Mountain Lower Montane, Foothill & Valley Grassland	13 [32]
G282	Western North American Montane Chaparral	2 [5]
G305	Central Rocky Mountain-North Pacific High Montane Mesic Shrubland	12 [30]
G505	Rocky Mountain-Great Basin Swamp Forest	3 [7]
G506	Rocky Mountain-Great Basin Montane Riparian Forest	20 [49]
G521	Vancouverian-Rocky Mountain Montane Wet Meadow & Marsh	7 [17]
G527	Western Montane-Subalpine Riparian & Seep Shrubland	45 [111]
G796	Central Rocky Mountain Lowland & Foothill Riparian Forest	1 [2]
	Total	**2,605 [6,437]**

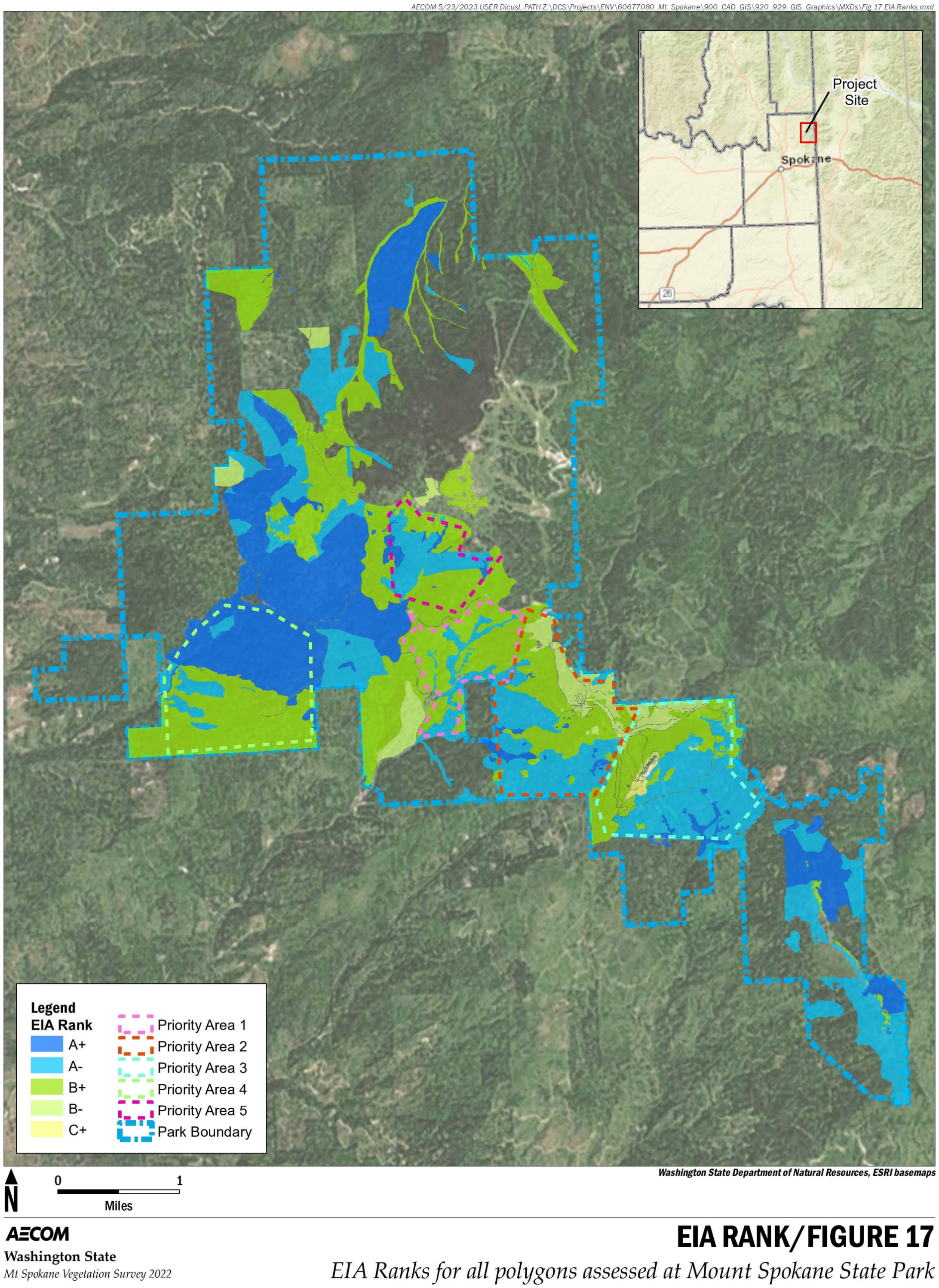


Figure 17. EIA Ranks for all polygons assessed at Mount Spokane State Park. EIA Rank is an assessment of landscape context + condition and does not factor in size.

Figure 18 shows the breakdown of EIA Ranks by area in the portions of the park that were surveyed. EIA Rank incorporates the landscape context and on-site condition of the assessment area. Approximately 2,575 hectares (6,362 acres) of the assessed land area (99%) had EIA Ranks of B+/B- or higher, meaning “good” integrity. This is the threshold WNHP uses to determine if the ecosystems present are “within the natural range of variability.”

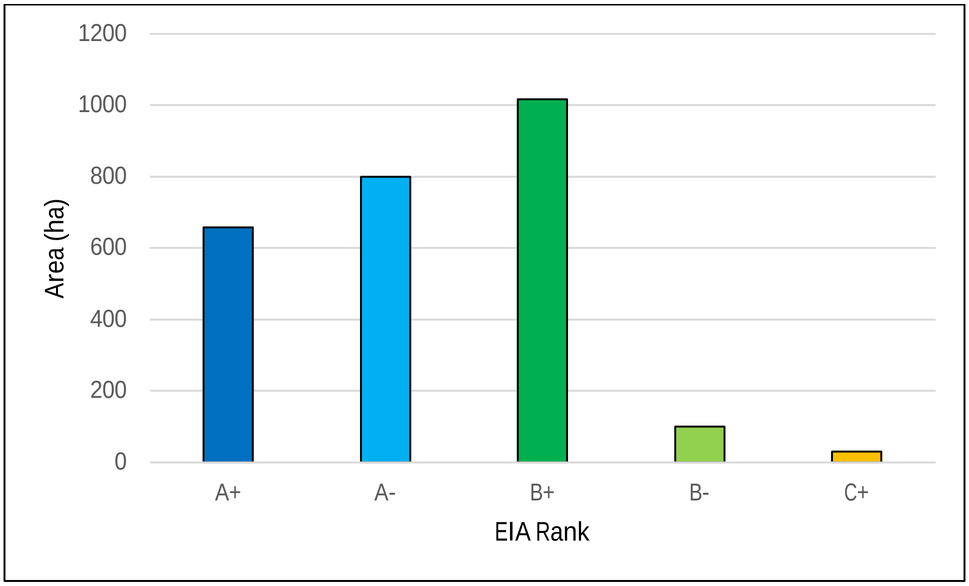


Figure 18. EIA Ranks by area, Mount Spokane State Park.

Table 8 shows the breakdown of individual metric ratings by area. For metric ratings of specific assessment areas and/or vegetation polygons, see Appendix H.

Table 8.
Summary of EIA Metric Ratings by Area (hectare [acres]) at Mount Spokane State Park

	Metric Rating			
Metric	**A/A-**	**B**	**C**	**C-/D**
Landscape Context				
LAN1	1335 [3297]	868 [2144]	368 [909]	34 [84]
LAN2	599 [1480]	1598 [3947]	408 [1008]	0
BUF1	1314 [3247]	994 [2455]	297 [734]	0 [0]
BUF2	1520 [3756]	806 [1991]	257 [635]	22 [54]
BUF3	1633 [4035]	935 [2309]	37 [91]	0 [0]
Condition				
VEG1	2573 [6358]	32 [79]	0 [0]	0 [0]
VEG2	2020 [4992]	586 [1447]	0 [0]	0 [0]
VEG3	2230 [5510]	334 [825]	42 [104]	0 [0]
VEG4	1813 [4480]	700 [1729]	76 [188]	16 [40]
VEG5	2284 [5644]	148 [366]	39 [96]	0 [0]
VEG6	2029 [5014]	254 [627]	218 [538]	6 [15]
HYD1	78 [193]	0 [0]	0 [0]	0 [0]
HYD2	57 [141]	21 [52]	0 [0]	0 [0]
HYD3	60 [148]	18 [44]	0 [0]	0 [0]
SOI1	1239 [3062]	1160 [2865]	199 [492]	8 [20]

EIA metric ratings are discussed below, grouped by the three primary rank factors that make up an EIA: landscape context, on-site condition, and size (Appendix D, Appendix E)

3.5.1 Landscape Context

Landscape context metrics address the “outer workings” of an ecosystem. while on-site condition metrics measure the “inner workings” of an ecosystem. Figure 19 through Figure 23 show the distribution in ratings for each of the landscape context metrics.

Contiguous Natural Land Cover (LAN1)

Contiguous Natural Land Cover (LAN1) is a measure of connectivity based on the percent of natural cover adjacent to the AA (to a distance of 500 meters) (Figure 19). This metric serves as a proxy measure of the capacity for natural disturbances to occur on the landscape (e.g., fire) and for mobile species to move in and out of the AA. Unpaved roads and ski runs were the most common fragmenting features. Trails were generally too narrow to be considered fragmenting features. The park is almost surrounded by natural land cover.

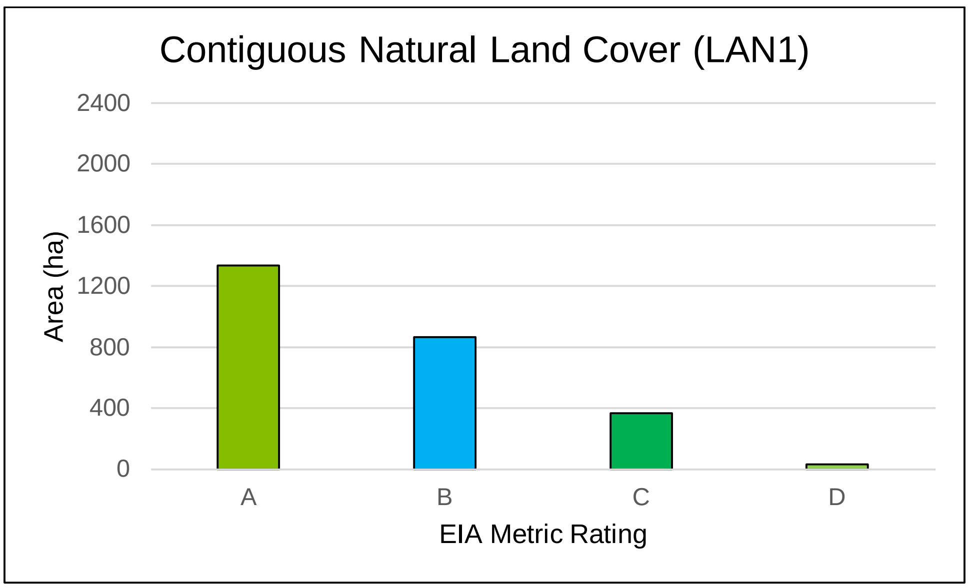


Figure 19. Contiguous Natural Land Cover (LAN1) metric ratings, by area, in Mount Spokane State Park.

Land Use Index (LAN2)

Land Use Index (LAN2) measures the intensity and proportions of different human land uses in the landscape surrounding each AA (to 500 meters) (Figure 20). This is the only metric where the most frequent rating (by area) was lower than an “A” (Table 8). Land uses for the entire park (not just AAs) and the surrounding 500 meters included the following:

- Managed for natural vegetation (3,391 hectares, land use coefficient = 10)

- Heavy logging, all of which was outside park boundaries (2,817 hectares, land use coefficient = 5)
- Light recreation, including low-use trails, berry picking, etc. (1,281 hectares)
- Moderate recreation (high-use trails, including those with high horse or bike traffic) and mature old fields or other fallow lands with natural composition (156 hectares, land use coefficient = 7)
- Clearcuts, ski runs, and utility rights of way (127 hectares, land use coefficient = 3)
- Unpaved roads and dirt parking areas (119 hectares, land use coefficient = 1)
- Paved roads, buildings, quarries (30 hectares, land use coefficient = 0)

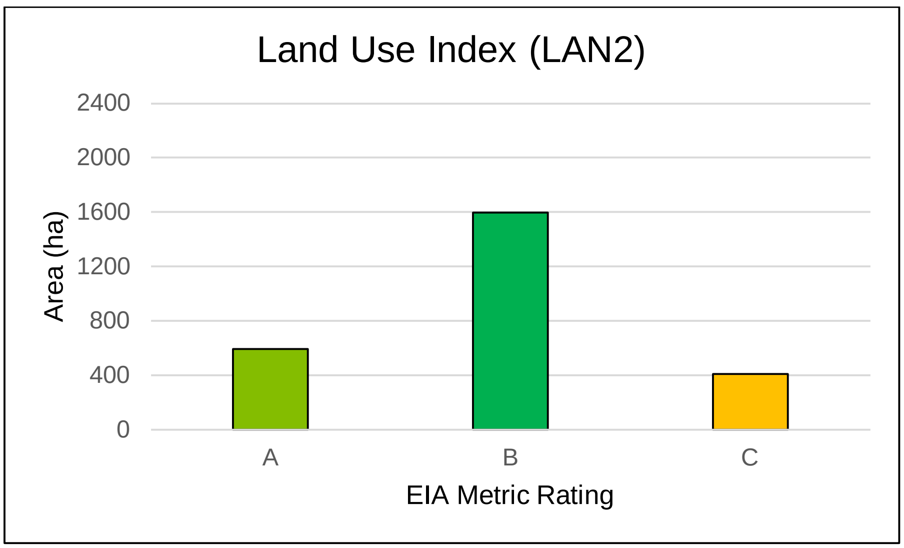


Figure 20. Land Use Index (LAN2) metric ratings, by area, in Mount Spokane State Park.

Perimeter with Natural Edge/Buffer (EDG1/BUF1)

Perimeter with Natural Edge/Buffer (EDG1/BUF1) assesses the percentage of the perimeter of each AA that is directly adjacent to natural land cover (Figure 21). Edge effects are major drivers of change in fragmented landscapes by influencing air temperature, light intensity, soil moisture, wind throw, and other key drivers (Turner et al. 2001). Buffers are particularly important to the biotic and abiotic aspects of wetlands (Environmental Law Institute 2008). Most AAs at MSSP had 100% natural (“A”) or 75-99% natural (“B”) perimeters.

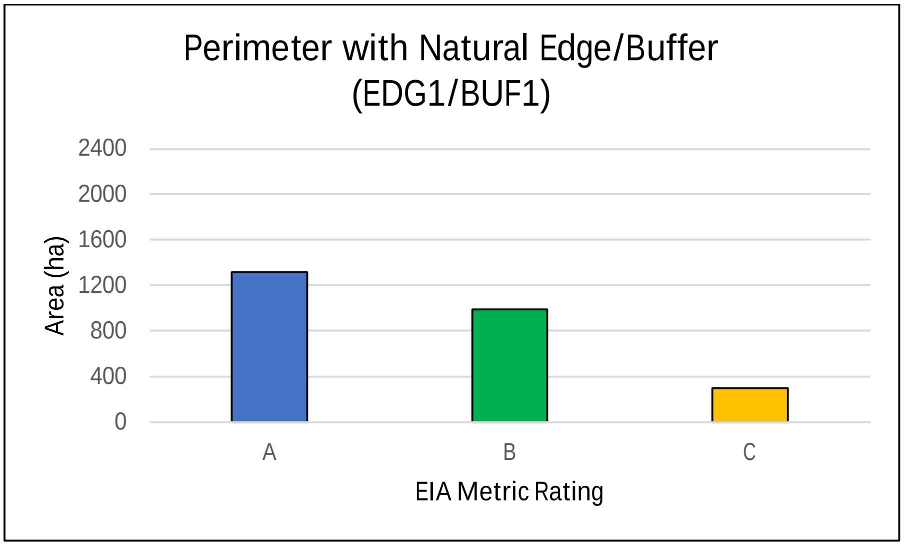


Figure 21. Perimeter with Natural Edge/Buffer (EDG1/BUF1) metric ratings, by area, in Mount Spokane State Park.

Width of Natural Edge/Buffer (EDG2/BUF2

Width of Natural Edge/Buffer (EDG2/BUF2) is simply that: a measure of the average width of the natural edge or buffer surrounding the AA, to a maximum distance of 100 meters (Figure 22). Most AAs at MSSP had natural edges/buffers that were at least 100 meters wide ("A") or 75-99 meters wide ("B") on average.

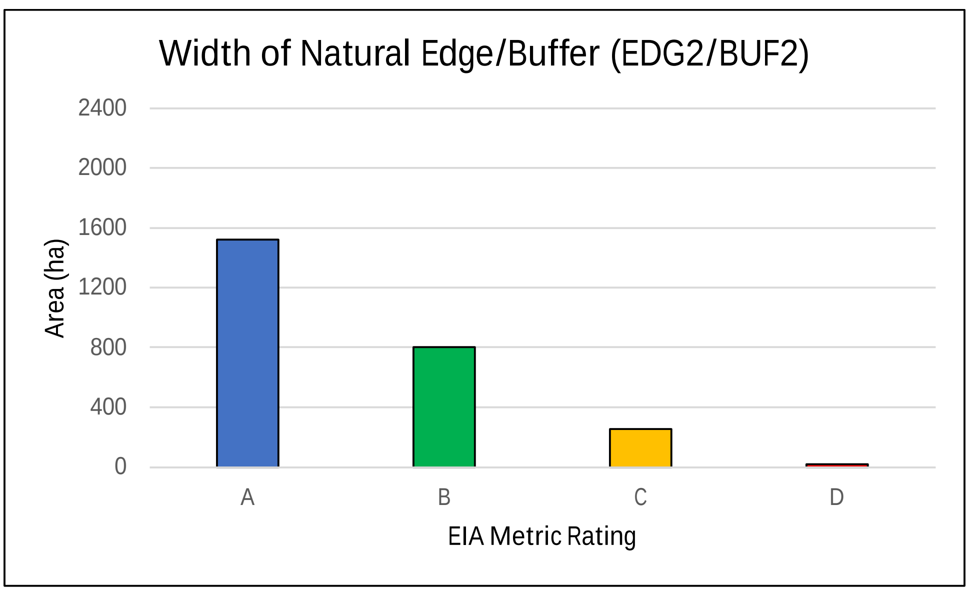


Figure 22. Width of Natural Edge/Buffer (EDG2/BUF2) metric ratings, by area, in Mount Spokane State Park.

Condition of Natural Edge/Buffer (EDG3/BUF3)

Condition of Natural Edge/Buffer (EDG3/BUF3) is based on the percent cover of native vegetation, disruption to soils, signs of reduced water quality, amount of trash or refuse, land use, and intensity of human visitation/recreation within the natural edge/buffer (Figure 23). Most AAs at MSSP received "A" ratings for this metric. "B" ratings were generally reserved for AAs near intensive recreation or on the edges of the park adjacent to heavy/frequent logging disturbance—but even those areas usually had few exotic species or signs of hydrologic impacts.

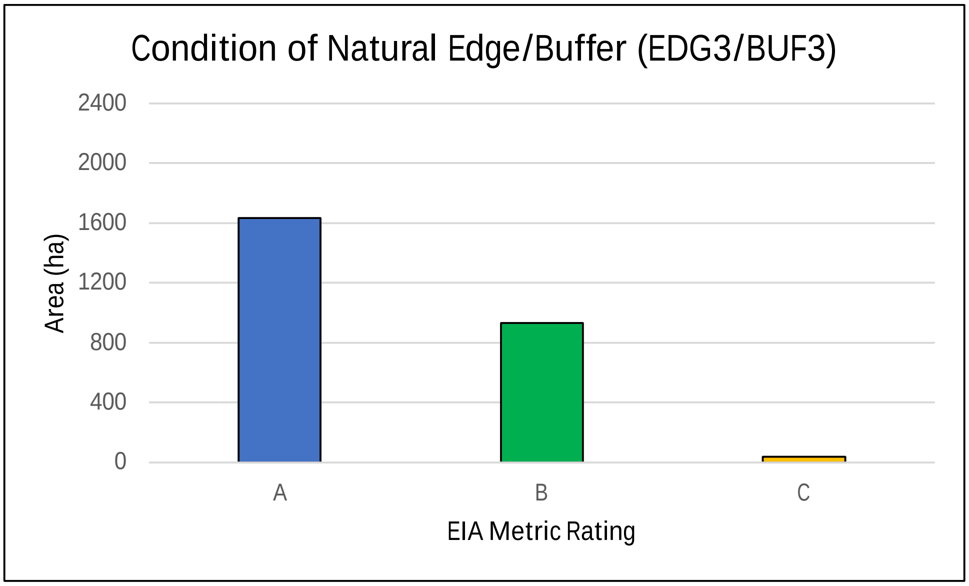


Figure 23. Condition of Natural Edge/Buffer (EDG3/BUF3) metric ratings, by area, in Mount Spokane State Park.

3.5.2 Condition

On-site condition metrics measure the "inner workings" of an ecosystem. Figure 24 through Figure 33 show the distribution in ratings for each of the condition metrics.

Native Plant Species Cover (VEG1)

Native Plant Species Cover (VEG1) assesses the relative percent cover of all plant species in the AA that are native to the region. None of the areas assessed scored lower than a "B" (85-94% relative native plant cover) (Figure 24).

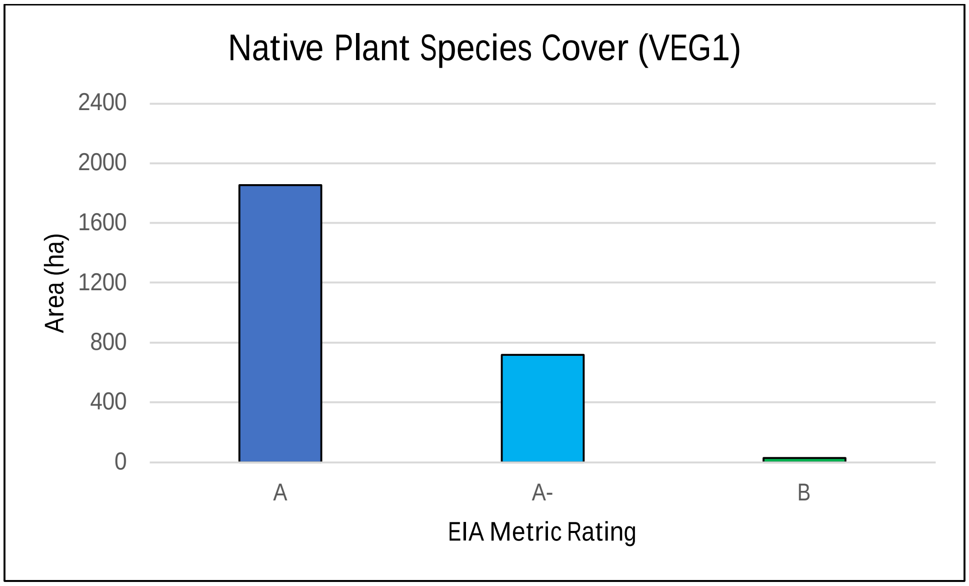


Figure 24. Native Plant Species Cover (VEG1) metric ratings, by area, in Mount Spokane State Park.

Invasive Nonnative Plant Species Cover (VEG2)

Some exotic species are more deleterious to ecological integrity than others. An invasive species may be defined as "a species that is nonnative to the ecosystem under consideration and whose introduction causes or is likely to cause environmental harm…" (Executive Order No. 13312, 1999; Richardson et al. 2000). Invasive Nonnative Plant Species Cover (VEG2) assesses the absolute cover of such species. Table 9 lists the invasive plant species identified within assessment areas. None of the areas assessed scored lower than a "B" (1-4% absolute cover of invasives) (Figure 25).

Table 9.
Invasive Plant Species Observed in MSSP AAs

Species	WNHP Code	AECOM Code
Agrostis capillaris	AGRCAP	agrcap1
Agrostis gigantea	AGRGIG	agrgig1
Bromus inermis	BROINE	broine1
Centaurea diffusa	CENDIF	cendif1
Centaurea stoebe ssp. *australis*	CENSTO	censtosa1
Cirsium arvense	CIRARV	cirarv1
Elymus repens	ELYREP	elyrep1
Hieracium aurantiacum	HIEAUR	hieaur1
Hypericum perforatum	HYPPER	hypper1

Species	WNHP Code	AECOM Code
Linaria dalmatica ssp. *dalmatica*	LINDAL	lindalsd1
Phleum pratense	PHLPRA	phlpra1
Schedonorus arundinaceus	SCHARU	scharu1
Tanacetum vulgare	TANVUL	tanvul1
Trifolium repens	TRIREP	trirep1

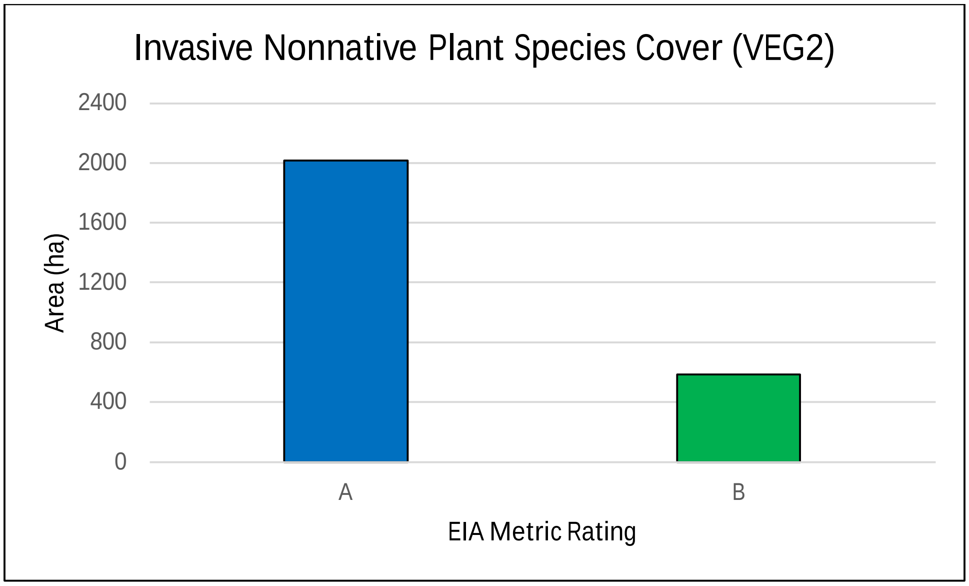


Figure 25. Invasive Nonnative Plant Species Cover (VEG2) metric ratings, by area, in Mount Spokane State Park.

Native Plant Species Composition (VEG3)

Native Plant Species Composition (VEG3) is divided into four submetrics: (1) diagnostic species, (2) diversity, (3) native increasers, and (4) native decreasers. Diagnostic species are native plant species whose relative constancy or abundance differentiates one vegetation type from another, including character species (strongly restricted to a type), differential species (higher constancy or abundance in a type as compared to others), constant species (typically found in a type, whether or not restricted), and dominant species (high abundance or cover) (FGDC 2008). As with all metrics, diversity is assessed relative to the reference conditions for that ecosystem (e.g., grasslands are typically more diverse than closed-canopy, mature forests). Native increasers (a.k.a., "native invasives," aggressive natives, successful competitors) are native species whose dominance is indicative of degraded ecological conditions, such as heavily grazed or browsed occurrences (Daubenmire 1968, 1970). Native increasers often have Floristic Quality Assessment (FQA) coefficients of conservatism ≤ 3 (see Rocchio and Crawford 2013 and https://www.dnr.wa.gov/NHP-FQA). Native decreasers are those species that decline rapidly in response to stressors (i.e., species sensitive to human-induced disturbance or those species with FQA coefficients of conservatism ≥ 7). Only 41 hectares (101 acres; 2% of the area assessed) had native plant species composition outside the natural range of variability (“C” or lower) (Figure 26).

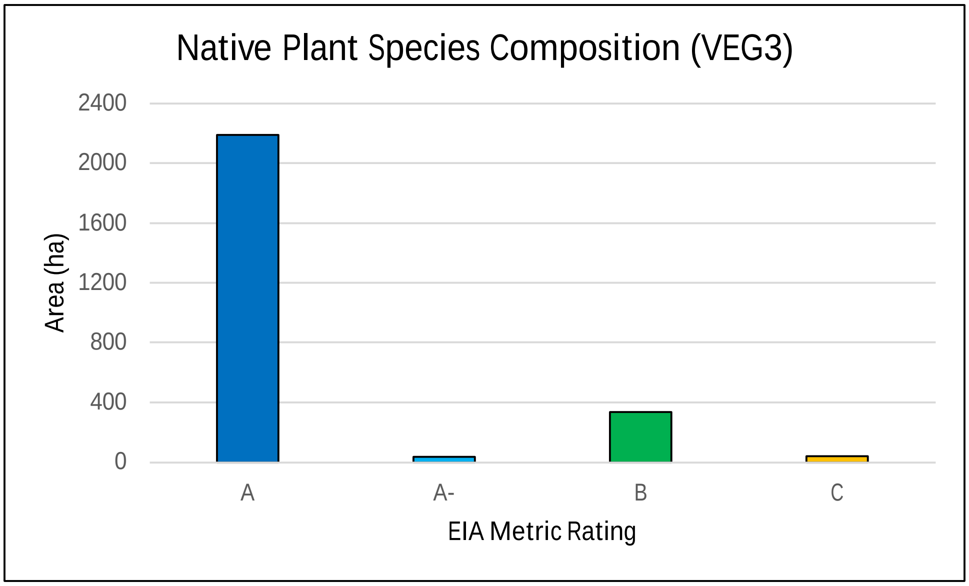


Figure 26. Native Plant Species Composition (VEG3) metric ratings, by area, in Mount Spokane State Park.

Vegetation Structure (VEG4)

Vegetation Structure (VEG4) assesses the overall structural complexity of vegetation layers and growth forms relative to the natural range of variability for the ecosystem, including development of multiple strata and the age and structural complexity of the canopy layer. Vegetation structure provides evidence of the integrity of natural disturbance regimes, such as fire, avalanche, windthrow, mass wasting, and disease, as well as deleterious non-natural disturbances such as logging. Submetrics vary by ecosystem. Only 96 hectares (237 acres; 4% of the area assessed) had vegetation structure outside the natural range of variability (“C” or lower) (Figure 27). In forests, structure was most frequently marked down for long-term historical logging impacts (removal of large trees, simplified structure). Note that young stands developing after *natural* disturbances were not marked down in this metric. Some grassland areas received reduced marks due to woody encroachment or associated conversion from bunchgrass dominance to rhizomatous forest graminoids.

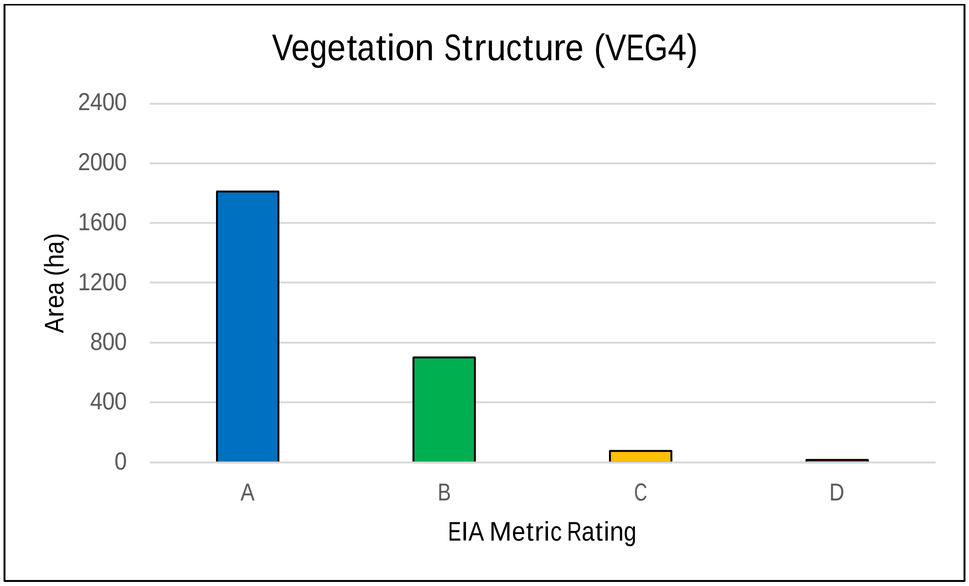


Figure 27. Vegetation Structure (VEG4) metric ratings, by area, in Mount Spokane State Park.

Woody Regeneration (VEG5)

Woody Regeneration (VEG5) combines both structural and compositional information about young, native, woody species. Woody regeneration serves as one of the proxy measures for natural disturbance, particularly fire regime. Most assessment areas received excellent scores (“A”) for this metric (Figure 28). Some AAs of forested ecosystems that rely on more frequent fire regimes—such as Central Rocky Mountain Dry Mixed Conifer Forest & Woodland (G210)—were marked down due to an increased proportion of fire intolerant tree species (mainly grand fir).

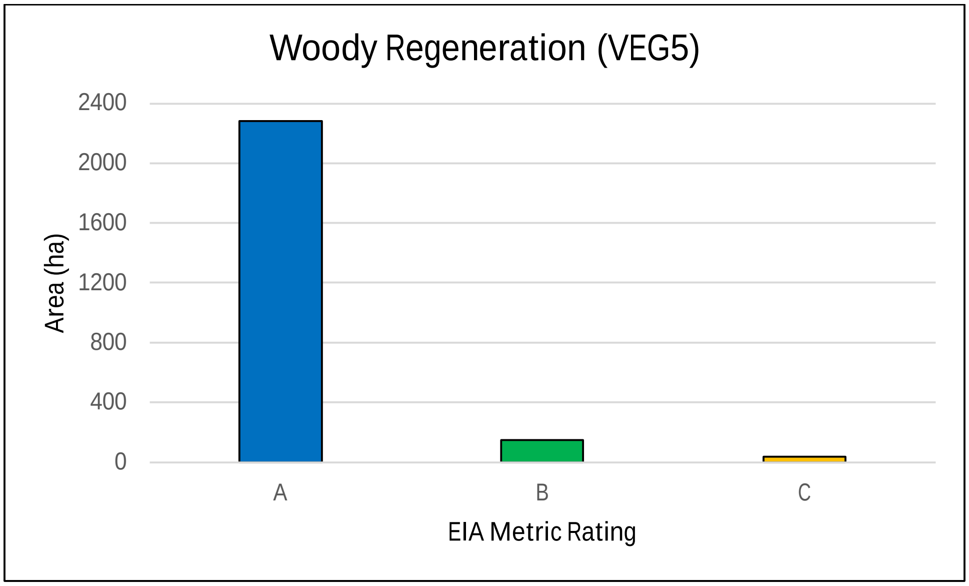


Figure 28. Woody Regeneration (VEG5) metric ratings, by area, in Mount Spokane State Park. Not scored for all plant communities.

Coarse Woody Debris, Snags, and Litter (VEG6)

Coarse Woody Debris, Snags, and Litter (VEG6) assesses the amount, quality, and nativity of dead plant matter in the stand. Particularly in forested systems, woody debris (including snags) plays a critical role in a variety of ecosystem processes. It is a primary driver of carbon and other nutrient cycles (Harmon and Hua 1991; North et al. 1997; Luyssaert et al. 2008) and influences soil moisture (Marra and Edmonds 1996) and seedling establishment success (Christy and Mack 1984). Woody debris provides habitat for invertebrates, fungi, and bryophytes (Marra and Edmonds 1998), in addition to birds and small mammals (Bull 2002). Coarse woody debris (CWD) also varies based on the stand development stage and natural disturbance history (Franklin et al. 2002). In general, altered levels of CWD may indicate a history of logging or other woody vegetation removal, overgrazing, invasive plant colonization, and altered fire regimes. Only 224 hectares (554 acres; 9% of the area assessed) had CWD, snags, and/or litter outside the natural range of variability (“C” or lower) (Figure 29). These were generally assessment areas with a more recent or pervasive logging or mining history.

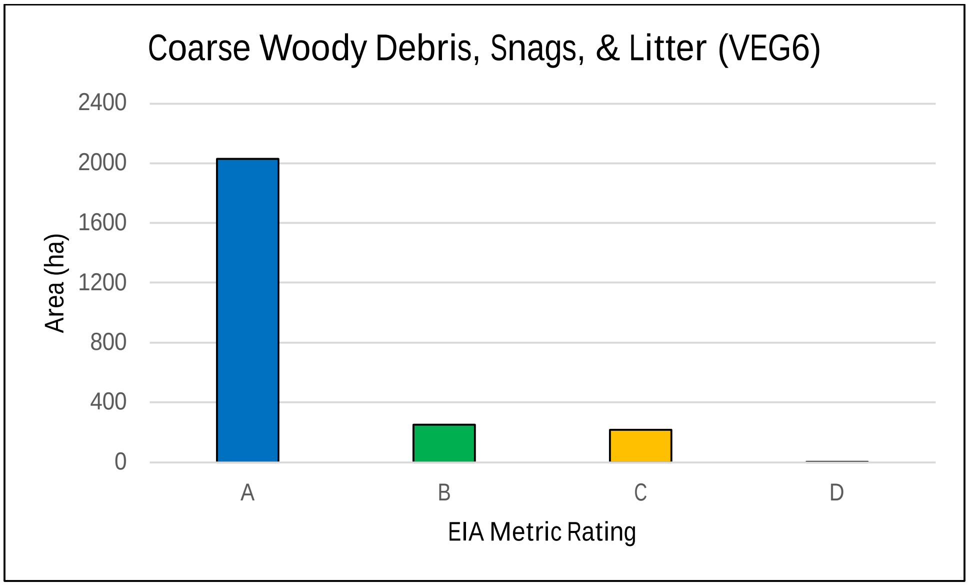


Figure 29. Coarse Woody Debris, Snags, & Litter (VEG6) metric ratings, by area, in Mount Spokane State Park. Not scored for all plant communities.

Water Source (HYD1), Hydroperiod (HYD2), and Hydrologic Connectivity (HYD3)

Water Source (HYD1), Hydroperiod (HYD2), and Hydrologic Connectivity (HYD3) are only scored in wetlands. These metrics assess the direct input of water into, or diversion away from, wetlands (HYD1), the frequency and duration of inundation/saturation (HYD2), and the ability of water to flow into or out of the wetland, or to inundate adjacent areas (HYD3). All of the wetlands assessed had entirely natural water sources (Figure 30). All wetlands were also within the natural range of variability for hydroperiod (Figure 31) and hydrologic connectivity (Figure 32). These metrics were most frequently impacted by nearby roads and/or inadequate culverts.

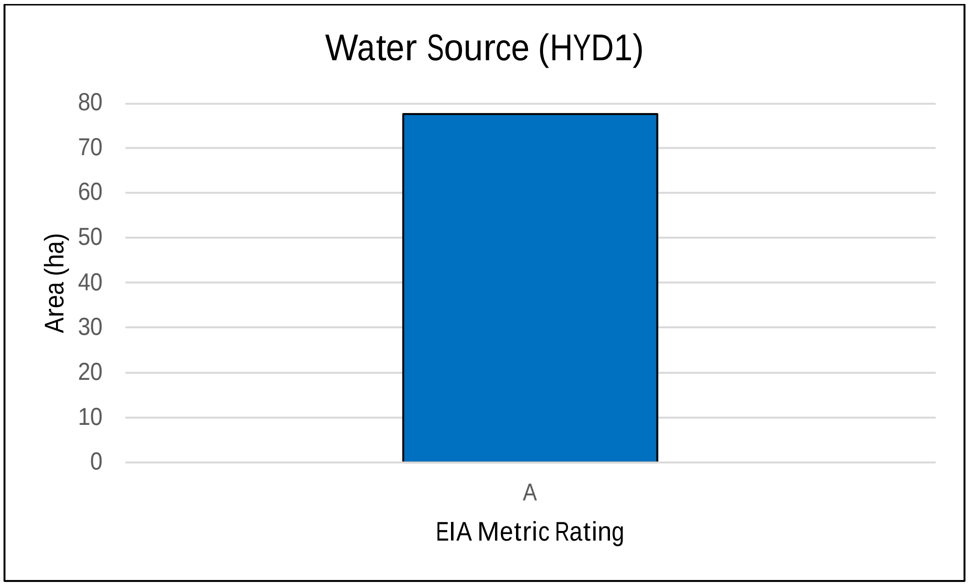


Figure 30. Water Source (HYD1) metric ratings, by area, in Mount Spokane State Park. Only scored in wetlands.

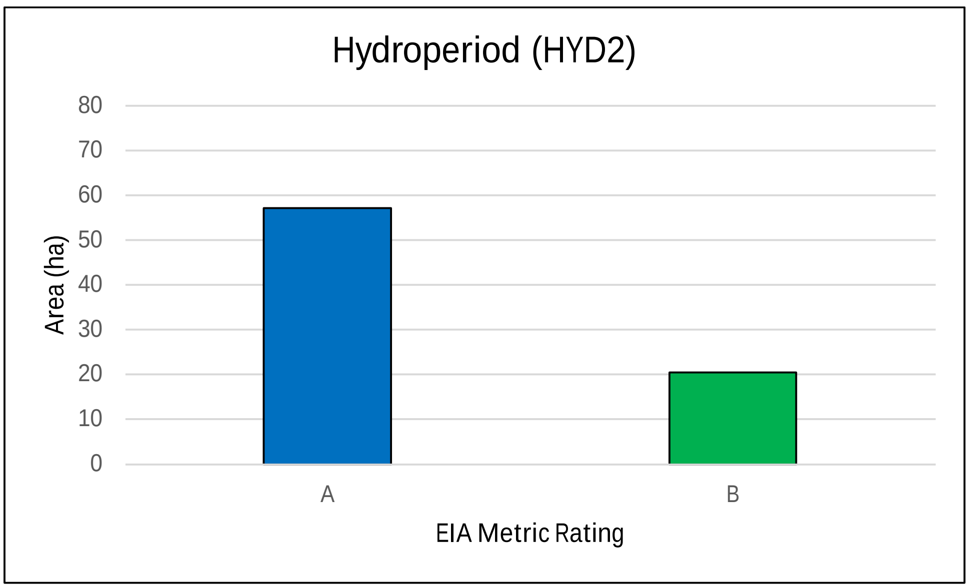


Figure 31. Hydroperiod (HYD2) metric ratings, by area, in Mount Spokane State Park. Only scored in wetlands.

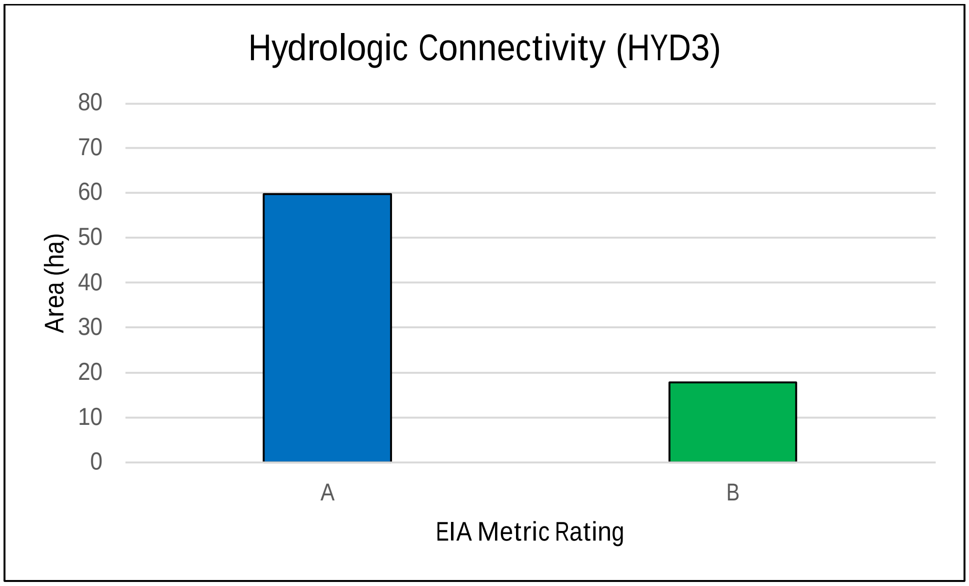


Figure 32. Hydrologic Connectivity (HYD3) metric ratings, by area, in Mount Spokane State Park. Only scored in wetlands.

Soil Condition (SOI1)

Within a level 2 EIA, the Soil Condition metric (SOI1) is a very rapid assessment of soil condition that is primarily dependent on visible, surficial disturbance. This metric was most frequently marked down due to relictual skid trails and other logging disturbance, old roads, mining activity, or occasionally for social trail proliferation and trampling (Figure 33).

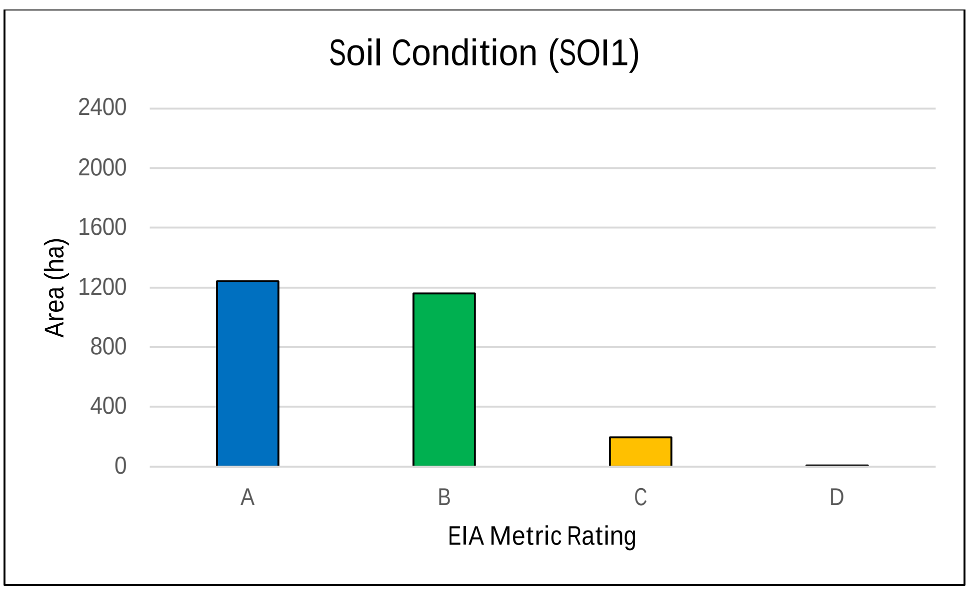


Figure 33. Soil Condition (SOI1) metric ratings, by area, in Mount Spokane State Park.

3.5.3 Size

The role of patch size in assessing ecological integrity is not as straightforward as landscape context and condition. For some ecosystem types, patch size can vary widely for entirely natural reasons (e.g., a forest type may have very large occurrences on rolling landscapes and be restricted in other landscapes to small occurrences on north slopes or ravines). Thus, smaller sites are not necessarily a result of degradation in ecological integrity. On the other hand, size overlaps with landscape context as a factor, where the more fragmented the landscape surrounding an occurrence is, the more size becomes important in reducing edge effects or buffering the overall occurrence.

While EIA ratings may be developed for vegetation, soil, and landscape metric ratings based on ecological considerations (e.g., by establishing the ecological criteria that make natural buffers effective), it is more difficult to do so for size. Instead, size is used as an additional factor to help prioritize sites for conservation actions. In the context of this project, size was only considered when identifying plant association EOs (see Section 3.5.4). Size ratings and the EO Ranks for individual assessment areas (Appendix H) may largely be ignored for other applications, because the assessment areas used in this project are artificially smaller than the true size of the ecosystem occurrence as a whole (some of which span the extent of the park). For more detail, see Rocchio et al. (2020a, 2020b).

3.5.4 Element Occurrences

When evaluating potential EOs, EIAs are foundational, but more is needed to determine the practical conservation value of an ecosystem. Size plays a more substantial role in this process because, for many conservation purposes, larger occurrences are considered more important and more likely to retain their integrity than smaller occurrences. For some types, diversity of animals or plants may be higher in larger occurrences than in smaller occurrences that are otherwise similar. Larger occurrences often have more microhabitat features and are more resistant to hydrologic stressors or invasion by exotics, because they buffer their own interior portions. Thus, size can serve as a readily measured proxy for some ecological processes and for the diversity of interdependent assemblages of plants and animals. This involves adding or subtracting points from the EIA score based on the size of the occurrence relative to the spatial pattern of that ecosystem (e.g., small-patch, large-patch, matrix). For more details, see Rocchio et al. (2020a, 2020b)

At this time, EOs have been identified for 13 different USNVC plant associations in 8 different groups (Table 10, Figure 34). As many as 29 additional EOs may be identified as additional spatial analyses and total size assessments are completed.

Table 10.
Summary of Element Occurrences Identified to Date at Mount Spokane State Park

EL Code	NVC Plant Association	Conservation Status Rank	EO Ranks
CEGL000272	*Abies grandis / Clintonia uniflora* Forest	G5/S3	A+
CEGL000336	*Abies lasiocarpa - Picea engelmannii / Streptopus amplexifolius* Riparian Forest	G4/S2S3	A+
CEGL001156	*Alnus viridis ssp. sinuata / Athyrium filix-femina - Cinna latifolia* Wet Shrubland	G4/S3	A- to A+
CEGL006657	*Alnus viridis ssp. sinuata* / Mesic Forbs Wet Shrubland	GNR/S4S5	A+
CWWA000313	*Athyrium filix-femina - Gymnocarpium dryopteris* Wet Meadow [Provisional]	GNR/SNR	A+
CEGL001595	*Carex hoodii - Festuca idahoensis* Grassland	G2/S2	B-
CEGL001616	*Festuca idahoensis - Eriogonum heracleoides* Grassland	G2/S2	B+
CEGL001633	*Festuca viridula - Festuca idahoensis* Meadow	G2?Q/S1S2	A-
CWWA000377	*Picea engelmannii / Alnus viridis ssp. sinuata* Riparian Forest	GNR/SNR	A-
CWWA000183	*Picea engelmannii / Athyrium filix-femina* Riparian Woodland	GNR/SNR	A+
CEGL000466	*Pseudotsuga menziesii / Vaccinium membranaceum* Forest	G5?/S3S5	B+
CEGL001987	*Senecio triangularis* Wet Meadow	G5?/S3	A+
CEGL000473	*Thuja plicata / Athyrium filix-femina* Swamp Forest	G3G4/SNR	A+

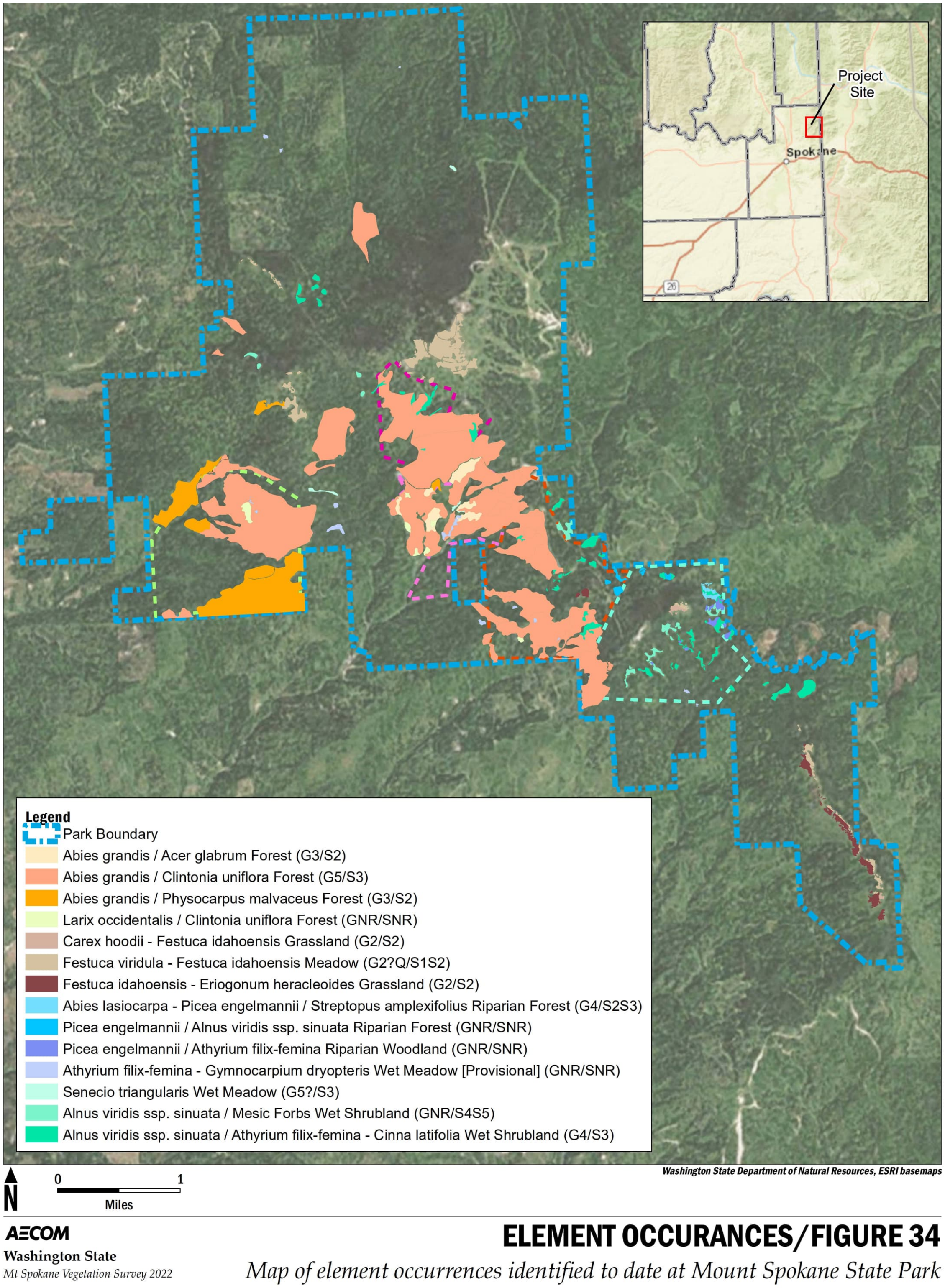


Figure 34. Map of element occurrences identified to date at Mount Spokane State Park.

3.5.5 EIA Summary and Discussion

Overall, the landscape context of MSSP is favorable to the long-term viability of the ecosystems within the park. Timber management is the primary land use outside of the park and exurban residential development has been increasing slowly over time (Chappell and Crawford 1992; Morrison et al. 2007). Despite these impacts, the park remains connected to extensive tracts of natural vegetation to the north and east. Additionally, as a relatively consolidated tract, the outer portions of the park serve to buffer the interior.

Most of MSSP was found to be in good-to-excellent on-site condition. It is important to note, however, that surveys focused on relatively high-elevation areas. After assessment was completed within the priority areas delineated by the WSPRC, the remainder of WNHP’s surveys focused on areas most likely to be EOs (which could serve to inflate aggregated condition scores). Approximately 47% of the undeveloped area of the park has yet to be assessed.

Nearly all assessed areas scored well in vegetation metrics. Exotic/invasive species (VEG1, VEG2) were largely restricted to the immediate fringe of trails and roads. Nonnative species rarely pose significant threats in the forested ecosystems that form such extensive stands at MSSP. Aside from early seral stands, these communities are characteristically resistant to exotic/invasive species, which often thrive in sunnier and/or more disturbed environments. Most wetlands and upland shrublands/grasslands also scored well in these metrics. St. Johnswort was the only species found to form extensive patches away from roads and trails.

More than 94% of the area assessed at MSSP is covered with montane and subalpine forests; the remainder of this section will focus on those elements. Some areas were intensively logged in the early 1900s, prior to establishment of the park. Logged areas were often burned post-harvest, and there were also fires of natural origins (Morrison et al. 2007). Much of the park appears to have burned repeatedly, and there are few legacies remaining of previous stands. The composition and structure of forests at MSSP are undoubtedly influenced by these historical disturbance events, but the degree to which anthropogenic impacts persist to the present day is unclear. No old-growth *stands* were identified in the field, although isolated individual old-growth trees were found (most frequently in refugia along riparian zones). Even in stands that were definitively logged (stumps remain), Native Plant Species Composition (VEG3) has recovered to within the natural range of variability. Such areas *were* marked down when more marketable tree species had been high-graded from the stand (reducing diversity and/or diagnostic species). When stumps, skid trails, and other logging evidence could not be found, stands were assumed to have natural origins.

When considering Vegetation Structure (VEG4), Woody Regeneration (VEG5), and Coarse Woody Debris, Snags, and Litter (VEG6) of the forests at MSSP, it is important to distinguish between the six forested upland USNVC groups that were assessed (Figure 35).

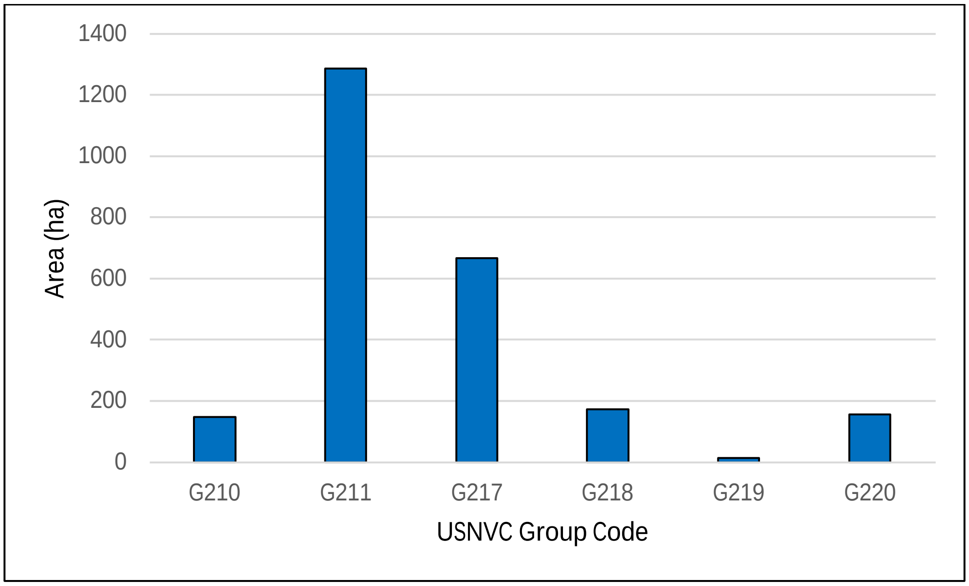


Figure 35. Area of forested upland USNVC groups assessed at Mount Spokane State Park in 2022.

Mid-Montane Forested Upland USNVC Groups

- **G210 Central Rocky Mountain Dry Mixed Conifer Forest & Woodland:** These are dry mixed conifer forests dominated by Rocky Mountain Douglas-fir and/or ponderosa pine (*Pinus ponderosa*) in the canopy and lacking the key mesic understory species characteristic of moister forests. G210 covers large swathes of the montane zone in eastern Washington but represents only 6% of the forested area assessed at MSSP. These communities are likely more common at lower elevations in the park (where less sampling occurred). These are the forested communities in the park that are most sensitive to shifts in fire regime toward less frequent and more intense fire (i.e., fire exclusion/suppression). Note: Stands that were dominated by other conifer species were also assessed relative to G210 reference conditions when relict old Rocky Mountain Douglas-fir and/or ponderosa pine were found and mesic species such as grand fir appeared to have encroached due to a shift in fire regime. Similarly, stands were assessed relative to G210 reference conditions when stumps indicated that mesic conifer dominance was due to high-grade logging of dry conifers.
    - Vegetation Structure (VEG4): In addition to clear logging impacts (large stumps), G210 AAs were marked down for Vegetation Structure (VEG4) when shade-tolerant mesic conifers formed multilayered canopies beneath dry conifers (i.e., when structure was vertically complex rather than horizontally complex). Reference conditions for this group are shaped by low- to mixed-severity fire regimes, favoring low tree density, clumped tree distribution, light/patchy fuel loads, simple canopies, and fire-tolerant species composition (Agee 1993; Hessburg et al. 2005; Van Pelt 2008; Rocchio and Crawford 2015). However, most stands assessed at MSSP were found on dry, convex landforms and south- to west-facing upper slopes where mesic species are unlikely to establish.

Such stands generally had good to excellent structure relative to their stand development stage.

- Woody Regeneration (VEG5): G210 AAs were marked down for Woody Regeneration (VEG5) based on the proportion of seedlings/saplings of fire-sensitive species like grand fir, indicating lack of recent fire. As noted above, most G210 AAs had relatively little establishment of these species due to harsh site conditions. All tree establishment appeared to be natural (not planted).

- Coarse Woody Debris, Snags, & Litter (VEG6): For G210 AAs, fire suppression can result in more infrequent, higher intensity fires, leading to greater accumulation of fuels (including snags). Increased CWD production and tree mortality can also be related to increased tree density (Rocchio et al. 2020a). With that said, fuels were rarely observed to be outside the natural range of variability for the stand development stages of the stands that were assessed.

- **G211 Central Rocky Mountain-Interior Mesic Grand Fir – Douglas-fir – Western Larch Forest:** These are mixed conifer forests occurring in mesic land positions and cooler aspects dominated by grand fir, Rocky Mounty Douglas-fir, and/or western larch (*Larix occidentalis*) in the canopy (ponderosa pine is absent or merely incidental). Understory herbs include key mesic indicators (bride's bonnet, threeleaf foamflower [*Tiarella trifoliata*], etc.). Fire was historically much less frequent and more intense than in G210 stands. This group represents 53% of the forested area assessed at MSSP. Grand fir has a poor reputation in eastern Washington because of its relatively undesirable lumber and the "live fast and die young" life history traits that make it susceptible to fire and pathogens. As noted in Morrison et al. (2007), however, MSSP does not represent the "dry forests" found elsewhere in eastern Washington. MSSP is within the "inland rainforest zone" and upper slopes receive >100 centimeters of precipitation annually (PRISM Climate Group 2019). Within that context, one should *not* assume that stands dominated by grand fir in the canopy or regeneration inherently have low ecological integrity. At times, G211 stands may be difficult to distinguish from G210 occurrences that are being encroached upon by fire exclusion. As noted above, care was taken to assess stands relative to G210 reference conditions whenever such encroachment could be deduced.
  - Vegetation Structure (VEG4): In addition to clear logging impacts (large stumps), G211 AAs were marked down for Vegetation Structure (VEG4) when anthropogenic management or disturbance had resulted in vertically simplified, homogeneous canopies. Reference conditions for this group are shaped by stand-replacement fires at 150- to 500-year return intervals and moderate-severity fire intervals of 50-100 years (Williams et al. 1995). These long historical fire return intervals naturally produce reduced patch/seral diversity, relative to G210, although that is somewhat complicated by the prevalence of windthrow at MSSP—one of the first peaks that prevailing winds hit as they pick up speed across the Columbia Basin.

- <u>Woody Regeneration (VEG5)</u>: Woody regeneration was within the natural range of variability in all G211 AAs, except for a few small areas where intensive fuel reduction activities have taken place. All tree establishment appeared to be natural (not planted).

- <u>Coarse Woody Debris, Snags, & Litter (VEG6)</u>: The primary stressors considered when assessing G211 AAs were logging history and (to a lesser extent) landscape fragmentation. As with G210, logging reduces large CWD and snags, with additional fuel impacts dependent on harvesting practices. Additionally, landscape fragmentation can cause increased windthrow due to edge effects. Fuels were rarely observed to be outside the natural range of variability for the stand development stages of the stands that were assessed. In some areas, relatively fine fuels were increased by recent management activities apparently aimed to reduce ladder fuels near the main entrance road. Nearly all western larch observed in the park had drab orange, shabby needles in the summer of 2022. This may have been needle cast caused by the native fungus *Meria laricis* (and promoted by the cool, wet spring) or a late spring freeze may have been to blame (Hagle 2004). Other potential agents include *Hypodermella laricis* (Larch Needle Blight) and nonnative *Coleophora laricella* (Larch Casebearer) (Hagle 2004; Ward et al. 2021). Western larch are usually resilient to these impacts.

- **G217 Central Rocky Mountain-Interior Cedar – Hemlock Forest:** These forests are dominated by western hemlock (*Tsuga heterophylla*) and western red cedar (*Thuja plicata*) and have many compositional and structural affinities to similar forests west of the Cascade Crest. This group represents 27% of the forested area assessed at MSSP. The presence of this group at Mount Spokane is the strongest indicator that the park lies within the maritime-influenced "inland rainforest" zone of the Rocky Mountains. Within the park, stands are primarily found on northern aspects and in cool riparian drainages. The exact boundaries between G211 and G217 stands were often hazy. Fire frequencies were historically similar to G211 and G217 AAs received very similar VEG4, VEG5, and VEG6 ratings as neighboring G211 AAs. Unlike G211, however, G217 communities do not appear to invade sites occupied by G210 stands under altered fire regimes, greatly simplifying the interpretation of EIA metrics.

<u>Upper Montane to Subalpine Forested Upland USNVC Groups</u>

- **G218 Rocky Mountain Subalpine Moist-Mesic Spruce – Fir Forest & G219 Rocky Mountain Subalpine Dry-Mesic Spruce – Fir Forest**: These are subalpine forests dominated by subalpine fir and/or Engelmann spruce found at the highest elevations of the park, as well as in cold air drainages. This group represents 8% of the forested area assessed at MSSP. Stands historically experienced high-severity/low-frequency stand replacement fire regimes (Agee 1993; Rocchio and Crawford 2015), while windthrow and insect outbreaks are more frequent disturbance events. Few stressors were observed to impact the Vegetation Structure (VEG4), Woody Regeneration (VEG5), or Coarse Woody Debris, Snags, and Litter (VEG6). There *were* a large proportion of dead subalpine firs observed across the park, but the driver was not clear. Previous surveyors attributed some of the mortality to *Armillaria*

(Root Rot) (Smith 2009), but *Scolytus ventralis* (Fir Engraver) and drought stress are some of the other potential agents. Mortality did not appear to be anthropogenic in nature.

- **G220 Rocky Mountain Lodgepole Pine Forest & Woodland:** These are upper montane to subalpine forests dominated by lodgepole pine (*Pinus contorta*) and NOT codominated by western larch (stands with codominant western larch are considered part of G211). G220 can be an extensive "matrix" ecosystem in areas with shorter stand-replacing fire intervals, but at MSSP it functions as a large-patch ecosystem, primarily successional to G218 communities. This group represents 6% of the forested area assessed at MSSP. Very few anthropogenic stressors were observed in these stands—VEG4, VEG5, and VEG6 ratings were similar to G218/G219 AAs and nearly all were within the natural range of variability. CWD (= fuels) can naturally be quite high in these stands as short-lived lodgepole pine die.

3.5.6 Recommendations for Enhancing / Maintaining Ecological Integrity

The ecosystems surveyed at MSSP are largely operating within the natural range of variability. Looking forward, there are a few actions that park managers may consider to enhance and/or maintain ecological integrity:

- **Invasive species control:** Currently, invasive plants are primarily restricted to road edges and trail margins, and the total extent is miniscule relative to the total area of the park. The amount of vehicle traffic into the park makes complete eradication unlikely, but regular treatment will reduce the potential for existing and new infestations to spread into natural vegetation. St. Johnswort should be the primary target for treatment, as this was the only species observed to form large patches away from development.

- **Meadow / grassland restoration:** The grasslands occurring on or near summits are some of the most important conservation features within the park. These should be prioritized for exotic species control (most St. Johnswort patches were found within these communities, or within nearby woodlands [G210]). Off-trail travel within the grasslands should be strongly discouraged, and any remaining ATV use in the Ragged Ridge Natural Area should be blocked. The grasslands are largely maintained by droughty soils and/or late-lying snow drifts that inhibit tree establishment, but tree removal may be necessary to slow encroachment. Ideally, prescribed fire would be used to reduce woody encroachment. If fire is not practical, trees may be physically cut down, but care should be taken not to pile or mulch trees into the meadows.

- **Avoid wetlands:** Nearly all of the wetlands assessed at MSSP have significant conservation value (Table 10, Figure 34). Most of these EOs occur in springs and seeps that dot the slopes of the park. The hydrologic integrity of these occurrences is particularly notable. Any trail development within the park should be routed away from these wetlands, although many are dominated by dense shrubs and hold little enticement to recreators as they are.

- **Reducing wildfire hazard does not always increase ecological integrity:** Thinning to reduce wildfire hazard may be necessary in areas close to human infrastructure or in those areas most altered by past logging or mining. However, many of the forest types at MSSP historically developed with relatively infrequent moderate, mixed, or high-severity fire regimes. If the goal is to maintain ecological integrity, such mesic forests (particularly stands dominated by western hemlock and western red cedar) should be allowed to develop complex, multi-layered subcanopies. The mature, unfragmented G217 stands at MSSP are significant conservation targets—these productive forest types have been degraded by intensive timber management across much of their range.

- **Minimize additional forest fragmentation:** One of the best predictors of on-site condition and long-term viability for matrix ecosystems—like many of the forest types that dominate at MSSP—is size. Where possible, any roads that do not serve a specific management purpose may be decommissioned to reduce fragmentation with the park. Additionally, broad trails that were formerly roads may be narrowed (or allowed to revegetate). Narrow hiking and mountain biking trails within these forests are not likely to be significant stressors. Relatively large, unfragmented stands with particularly excellent integrity are found in the Blanchard Creek headwaters, on the southeast face of Quartz Mountain/Horse Mountain, and on Ragged Ridge.

- **"Grow the core":** Any opportunities to acquire inholdings or expand the proportion of "core" within the park are encouraged. In particular, the corridors connecting Ragged Ridge Natural Area with other high-integrity areas to the north are narrow and have some of the highest density of roads, trails, and off-trail recreational use within the park. Forest lands surrounding the park have been regularly harvested and are not significant conservation targets on their own. However, they could serve to buffer the interior of the park from edge effects. They might also be appropriate areas for recreational infrastructure.

3.5.7 EIA Conclusions

The EIA data presented here and in accompanying documents may inform the planning process, as staff seek to find appropriate locations for facilities and public access, identify restoration possibilities, or delineate areas of high priority for conservation. Indeed, the WSPRC has a stated goal of maintaining those lands they manage for natural vegetation in "good" condition (an EIA Rank of "B: or higher). A commendable 99% of the assessed land area at MSSP cleared that threshold in the 2022 surveys.

The EIA is a metric-based approach, and the component data may be used at multiple scales. If land managers are interested in a particular ecological facet of a specific vegetation polygon/assessment area, the metric ratings estimate the degree of deviation from the natural range of variability (Appendix D, Appendix E). If a slightly coarser approximation of ecological integrity is needed, those metrics can be rolled up into six "major ecological factors": Landscape, Buffer/Edge, Vegetation, Hydrology, Soil, and Size. In turn, the major ecological factors are aggregated into three primary rank factors: Landscape Context, Condition, and Size. Landscape Context and Condition are integrated to reach the EIA Rank. For some applications, land managers may not be interested in landscape context, because there may be little they can do about it. It is perfectly reasonable to focus on the condition primary rank factor, so long as the manager understands that the landscape context will still have an impact on the long-term viability of the stand and on the success of potential restoration efforts (e.g., the landscape may be a vector for invasive species or a source of polluted runoff). Users of the EIA data are encouraged to read the comments associated with each metric rating (Appendix H) to get a more complete understanding of the stressors and ecological processes considered by the surveyor.

4. Summary and Recommendations

4.1 General Recommendations

Based on the field surveys and the results and discussion presented here, AECOM recommends the following actions to gather additional information for planning, restoration, and conservation of vegetation resources at MSSP:

- Consider additional field surveys at Ragged Ridge to collect field verification data for mapping forest and woodland associations in that area of MSSP.

- Control invasive plant species with either hand-pulling or herbicide application. Invasive plant species eradication should be focused on controlling invasive species along roads (both paved and dirt), buildings, parking lots, and the ski lift. Increase information at the site regarding the importance of avoiding transport of weed seeds while recreating. Continue to encourage visitors to remain on trails wherever possible. For instance, consider posting signs at parking lots and points of trail entry and/or investing in PlayCleanGo® (https://playcleango.org/) infrastructure (e.g., boot brush stations).

- Whitebark pine surveys were conducted in 2022 in potential whitebark habitat in the priority areas (e.g., Horse Mountain) during which whitebark pine was not observed. Consider performing whitebark pine surveys in areas of the park above approximately 1,524 meters (5,000 feet) in MSSP outside the priority areas (e.g., Mount Spokane summit area).

- Consider conducting a comprehensive bryophyte inventory of MSSP. The MOH is compiling a moss checklist for Washington (pers. comm., W. Fertig, 7 Nov. 2022), and a bryophyte inventory of MSSP would be an important contribution to this work. This is because the inland-maritime climate and proximate location to the Rocky Mountains places MSSP in an area of floristic convergence between the Pacific Northwest and Rocky Mountain flora, making a MSSP a potential hotspot for bryophyte species richness. In addition, the observation of a Washington Mosses Review Group 1 list species (Seliger's herzogiella moss) in MSSP may warrant additional investigation to determine the extent of occurrence and habitat preferences of this species.

- Consider updating the WSPRC geodatabase and field forms to allow for plant species list at vegetation plots to be recorded in long format (species as rows), with the option to record percent foliar cover and canopy class data by species. Entering species as rows would allow the use of a domain for the plant species list, thus improving efficiency when recording data in the field and reducing data entry errors (e.g., typos when recording species codes) and time necessary for data QC. Adding the option to record percent foliar cover and canopy class by species would increase the utility of the data for applications such as vegetation and ecosystem classification. The data would also be saved in a flexible format; for instance, following field surveys, species lists could be generated from the long format data to populate the dominant species columns (e.g., dom_trees) in the WSPRC geodatabase.

- Consider following the recommendations in Section 3.5.6 for enhancing/maintaining ecological integrity of ecosystems in MSSP.

- Consider continuing EIA surveys in the remaining 47% of MSSP that has not been assessed.

4.2 Summary

MSSP is a 12,293-acre camping park in the Selkirk Mountains in Spokane County, Washington, that crosses into a small area of Kootenai County, Idaho. Recent vegetation surveys at MSSP have focused on meadow vegetation (Smith 2009; Walker et al. 2021), which represent a proportionately small area relative to forests. Thus, the need for vegetation surveys is most acute in forested vegetation and in areas of high recreation pressures. To this end, WSPRC contracted with AECOM and WNHP to conduct vegetation surveys and mapping, noxious weed and rare plant surveys, and EIAs.

Field surveys were conducted August 31–September 6, 2020, June 9–13, 2021, and July 18–September 29, 2022. Surveys in 2020 and 2021 focused on grasslands in montane meadows, while 2022 surveys focused on forest, woodland, shrubland, and wetland vegetation. Field methods followed WSPRC protocols for vegetation and noxious weed surveys, and the EIA methods followed Rocchio et al. (2020a, 2020b). Rare plant surveys were conducted concurrent with vegetation and noxious weed surveys. Vegetation plots were thoroughly searched, including microhabitats. Additionally, when walking between plots, botanists observed plants along their route. In all cases, if a rare plant was encountered, the sites were mapped using a GPS unit, and a WNHP Rare Plant Sighting Form was completed.

A total of 333 plant taxa, including 20 bryophytes, were observed across all field surveys. Of this total, 27 are weeds (noxious and/or invasive), and 3 are on special status review lists: western goldthread, northern green orchid, and Seliger's herzogiella moss. No rare plants were found. AECOM and WNHP documented 66 associations (Appendix F) and 3 non-vegetated land cover classes (Developed, Roads, Rock Outcrop) across all areas surveyed. The associations are nested within 8 macrogroups, 18 groups, and 26 alliances. Of the total 66 associations encountered during field surveys, 46 (74%) were mapped as a dominant association in the priority areas (Table 4). In addition, two (66%) of the three non-vegetated land cover classes present in MSSP (Developed and Roads) were mapped in the priority areas. The priority areas are dominated by forest and woodland vegetation (93.4% of the priority areas), with lesser amounts of shrubland (4.2%) and herbaceous vegetation (0.6%). Roads and developed lands account for the remaining 1.8% of the priority areas. Thirty-five forest and woodland associations were mapped in the priority areas. Of the forest and woodland vegetation, *Abies grandis / Clintonia uniflora* Forest (38.6% of the priority areas) was the most common and was found on mesic backslope and footslope positions at moderate elevations in MSSP. Six shrubland associations were mapped in the priority areas, of which *Alnus viridis* ssp. *sinuata* / *Athyrium filix-femina – Cinna latifolia* Wet Shrubland (1.8% of the priority areas) was the most common and occurred in wetlands along narrow drainageways and at montane seeps. Five herbaceous associations were mapped in the priority areas, of which *Athyrium filix-femina – Gymnocarpium dryopteris* Wet Meadow (0.2% of the priority areas) was the most common and occurred in wetlands along narrow drainageways and at montane seeps.

A total of 22 of the 27 weed species were mapped, for a total of 166 observations across all years. Of the species that were mapped, the five most observed were common St. Johnswort, wall-lettuce, spotted knapweed, orange hawkweed, and Dalmatian toadflax. Most of the weeds observed in MSSP were along roads and trails with a few exceptions. Common St. Johnswort was observed throughout MSSP in meadows, open forests, and woodlands and along trails and roads in very small to small patches. Wall-lettuce was observed throughout most mid- to low-elevation forested areas at low density and abundance. This species was often found growing along game trails in the forests. Future weed control efforts should focus on invasive and Class B and C noxious weeds that occur along roads and trails, and Common St. Johnswort in montane grasslands. Access to these areas is relatively easy compared to areas further from roads and trails, thus reducing travel time and costs for application of control measures and allowing for larger areas to be treated.

The results of the EIA surveys found that most of MSSP was in good-to-excellent on-site condition. Nearly all assessed areas scored well in vegetation metrics. Exotic/invasive species (VEG1, VEG2) were largely restricted to the immediate fringe of trails and roads. The grasslands occurring on or near summits are some of the most important conservation features within the park. These should be prioritized for exotic species control (most St. Johnswort patches were found within these communities, or within nearby woodlands). Nearly all the wetlands assessed at MSSP have significant conservation value and future trail development within the park should be routed away from these wetlands. Thinning to reduce wildfire hazard may be necessary in areas close to human infrastructure or in those areas most altered by past logging or mining. However, many of the forest types at MSSP historically developed with relatively infrequent moderate, mixed, or high-severity fire regimes. If the goal is to maintain ecological integrity, such mesic forests (particularly stands dominated by western hemlock and western red cedar) should be left to develop complex, multi-layered subcanopies without human intervention. One of the best predictors of on-site condition and long-term viability for matrix ecosystems—like many of the forest types that dominate at MSSP—is size. Where possible, any roads that do not serve a specific management purpose may be decommissioned to reduce fragmentation within the park. Additionally, broad trails that were formerly roads may be narrowed (or allowed to revegetate). Any opportunities to acquire inholdings or expand the proportion of “core” within the park are encouraged. In particular, the corridors connecting Ragged Ridge Natural Area with other high-integrity areas to the north are narrow and have some of the highest density of roads, trails, and off-trail recreational use within the park. The EIA is a metric-based approach, and the component data may be used at multiple scales. The EIA data presented here and in accompanying documents may inform the planning process, as staff seek to find appropriate locations for facilities and public access, identify restoration possibilities, or delineate areas of high priority for conservation. EIA surveys were completed in 53% of MSSP in 2022, and the remaining 47% of the undeveloped area of the park has yet to be assessed.

Lastly, general recommendations were provided for future work at MSSP, including additional field surveys at Ragged Ridge and immediately adjacent areas, invasive weed control, whitebark pine surveys, a comprehensive bryophyte inventory, and updates to the WSPRC geodatabase and field forms to allow for plant species lists at vegetation plots to be recorded in long format (species as rows) with the option to record percent foliar cover and canopy class data by species. In addition, recommendations were provided for enhancing/maintaining ecological integrity at MSSP, including continuing EIA surveys in the future in unassessed areas of the park.

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Appendix A
Plant Community Data Reference Sheets

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Plant Community Data Reference Sheet

This reference sheet contains the definitions and guidelines used to collect the plant community data. The data plot summaries are found in Appendix C.

Park Name

Region

Eastern
Northwest
Southwest

Contractor

Observer

Date of Survey

Survey Intensity

High = walked or saw >67% of polygon interior Moderate
= walked or saw 33-67% of polygon interior Low
= walked perimeter or saw <33% of polygon interior
Remote = photo interpretation or other remote survey

Acres

Slope Categorize the average angle of the slope in the polygon.

0 = 0-20%
1 = 20-35%
2 = 35-50%
3 = 50-70%
4 = 70-90%
5 = >90%

Aspect Categorize the overarching aspect of the polygon.

N = north
NE = northeast
E = east
SE = southeast
S = south
SW = southwest
W = west
NW = northwest

Total Vegetation Cover (%) (Includes all vascular plants, mosses, lichens and foliose lichens [crustose lichens excluded they are considered rock]; this <u>never</u> exceeds 100%. Space between leaves/branches is included in “cover”.)

0
<1
1-5
5-10
10-25
25-50
50-90
>90

Total Tree Cover (%) Same cover classes as used for total vegetation cover.

Dominant Tree Species

Stand Age

1 = very young, 0-40 years
2 = young, 40-90 years
3 = mature, 90-200 years
4 = old growth, 200+ years
5 = young with scattered old trees (2-10 trees/ac)
6 = mature with scattered old trees
7 = young and mature

Median Diameter at Breast Height (DBH) of Dominant/Co-Dominant Trees

Categorize the median diameter at breast height (DBH), or the diameter at 4.5 feet, for dominant/co-dominant trees in the canopy of the polygon.

0 = <10”
1 = 10-20”
2 = 20-30”
3 = 30-40”
4 = 40-50”
5 = 51-60”
6 = >60”

Median Dominant/Co-Dominant Tree Height Categorize the median height of dominant/co-dominant trees in the canopy of this polygon.

0 = <10’
1 = 10-25’
2 = 25-50’
3 = 50-75’
4 = 75-100’
5 = 100-150’
6 = 150-200’
7 = 200+’

Number of Vegetative Strata

0 = No vegetation
1 = Only one distinct layer of vegetation in the polygon

2 = Two distinct layers of vegetation in the polygon
3 = Three distinct layers of vegetation in the polygon
4 = Four or more distinct layers of vegetation in the polygon

Where…
0 = No vegetation in polygon.
1 = Only one distinct layer of vegetation in the polygon. Usually applies to polygons with a herbaceous understory layer only, but it could be a dense shrub layer with little herbaceous understory or even a dense cohort of trees with no vegetation occurring below the canopy level.
2 = Two distinct layers of vegetation in the polygon. This can include an understory and a tree canopy, a shrub layer and a herbaceous understory, or some other combination.
3 = Three distinct layers of vegetation in the polygon. This can include any three of the following in a variety of combinations: herbaceous understory understory, shrub layer, subcanopy, and/or tree canopy strata.
4 = Four or more distinct layers of vegetation in the polygon. This usually includes an understory, shrub layer, subcanopy, and tree canopy.

Canopy Base Height Categorize the minimum gap between the top of the understory and the base of the tree canopy that occurs across the polygon, and which occurs across at least 10% of the area occupied by the understory-canopy gap.

0 = 0 (branches touching ground)-2’
1 = 2-5’
2 = 5-8’
3 = 8-11’
4 = 11-14’
5 = 14-17’
6 = 17-20’
7 = >20’

Understory Vegetation/Surface Fuels Categorize the median height of understory vegetation. At least 10% of the understory should occupy the category that you choose.

0 = 0-6’
1 = 6-9’
2 = 9-12’
3 = 12-15’
4 = 15-18’
5 = 18-20’
6 = 20+’

Total Shrub Cover (%) Same cover classes as used for total vegetation cover.

Dominant Shrub Species

Tall >1.5ft Shrub Cover (%) Same cover classes as used for total vegetation cover.

Small <1.5ft Shrub Cover (%) Same cover classes as used for total vegetation cover.

Total Graminoid Cover (%) Same cover classes as used for total vegetation cover.

Dominant Graminoid Species

Perennial Graminoid Cover (%) Same cover classes as used for total vegetation cover.

Annual Graminoid Cover (%) Same cover classes as used for total vegetation cover.

Total Forb Cover (%) Same cover classes as used for total vegetation cover.

Dominant Forb Species

Perennial Forb Species (%) Same cover classes as used for total vegetation cover.

Annual Forb Species (%) Same cover classes as used for total vegetation cover.

Ferns Total Cover (%) Same cover classes as used for total vegetation cover.

Fern Species

Evergreen Fern Cover (%) Same cover classes as used for total vegetation cover.

Deciduous Fern Cover (%) Same cover classes as used for total vegetation cover.

Total Exotics Cover (%) Same cover classes as used for total vegetation cover.

Perennial Exotics Cover (%) Same cover classes as used for total vegetation cover.

Annual Exotics Cover (%) Same cover classes as used for total vegetation cover.

Noxious Species 1-8 (text or drop down menu as in weed survey database)

Noxious Species 1-8 Cover (%) Same cover classes as used for total vegetation cover.

Other Exotic Species

Water Cover (%) Note whether water is seasonal or perennial in notes.

Hydrology-Riparian Condition
None – No hydrologic features
A = Excellent
B = Very Good
C = Good
D = Fair
E = Poor

Where…

None - No hydrologic features	No hydrologic features in polygon
A - Excellent	Slight evidence of human disturbance (<1% of polygon impacted); natural processes appear to be at work (includes presence of natural disturbance events like beaver dams and channel migration)

B - Very Good	Low evidence of human disturbance (1-5% of polygon impacted); natural processes appear to be at work (includes presence of natural disturbance events like beaver dams and channel migration)
C - Good	Moderate evidence of human disturbance (5-10% of polygon impacted); natural processes generally appear to be at work (includes presence of natural disturbance events like beaver dams and channel migration)
D - Fair	High evidence of human disturbance (10-25% of polygon impacted by dams, ditches, dikes, culverts, grazing impacts, etc.); natural processes may or may not be properly functioning
E - Poor	Severe evidence of human disturbance (>25% of polygon impacted by dams, ditches, dikes, culverts, grazing impacts, etc.); natural processes unlikely to be properly functioning

Rock Outcrop Cover (%) Exposed bedrock including detached boulders over 1 yard across. Same cover classes as used for total vegetation cover.

Gravel/Cobble Cover (%) Large fragments between sand and boulder.

Bare Ground Cover (%) Bare ground = exposed mineral soil.

Moss and Lichen Cover (%) Mosses/lichens = nonvascular plant cover on soil.

Litter Cover (%) Litter = includes logs, branches, and basal area of plants.

Talus Cover (%) Same cover classes as used for total vegetation cover.

Cave Cover (%) Same cover classes as used for total vegetation cover.

Mines Cover (%) Same cover classes as used for total vegetation cover.

Logging
0 = non-applicable
1 = unlogged or very limited cutting
2 = selectively logged
3 = heavily logged with natural regeneration
4 = tree plantation

Where…
1 = unlogged, no evidence of past logging or occasional cut stumps not part of systematic harvest of trees, no or very little impact on stand composition
2 = selectively logged: frequent cut stumps but origin of dominant or co-dominant cohort appears to be natural disturbance
3 = heavy logging disturbance with natural regeneration: many cut stumps that predate the dominant or co-dominant cohort with no tree planting
4 = tree plantation: dominant cohort appears to be planted after clearcutting

Agriculture
0 = non-applicable
1 = active annual cropping
2 = active perennial herbaceous cropping
3 = active woody plant cultivation
4 = fallow, plowed no crops this yr
5 = Federal CRP
6 = other

Livestock
1 = active heavy grazing (most forage used, soil disturbance)
2 = active moderate grazing (25-75% forage used)
3 = active light grazing (lots of last yr's litter left)
4 = no current, heavy past grazing
5 = no currently, light past grazing
6 = no obvious sign of grazing

Development
1 = actively used facilities
2 = roads
3 = established trails
4 = abandoned facilities
5 = none obvious
6 = multiple types (detail in comments)

Wildlife
1 = heavy ungulate use
2 = moderate ungulate use
3 = light to no ungulate use
4 = burrowing animals
5 = active beaver
6 = active porcupine
7 = other (list animal in comments)

Recreation Use Severity
0 = no evidence of recreational use impacts
1 = heavy, abundant soil and vegetation displacement
2 = moderate, frequent soil and vegetation displacement
3 = light use, little sign of activity off trail/road

Recreation Use Primary Type

0 = no evidence of recreational use
1 = wheeled
2 = hoofed
3 = pedestrian
4 = combination of above
5 = other (detail in comments)

Plant Association (PA) 1-5 List all PAs encountered in polygon survey, in comments list source of name if not on provided key. NOTE: Contractor is required to consult with the WNHP to obtain the most current classification and condition ranking information available.

G Rank (text) NOTE: Contractor is required to consult with the WNHP to obtain the most current Global Ranking for the plant associations.

S Rank (text) NOTE: Contractor is required to consult with the WNHP to obtain the most current State Rankings for the plant associations.

Ecological Condition Rank

A = Excellent ecological condition
A/B = Good-excellent ecological condition
B = Good ecological condition
B/C = Good-fair ecological condition
C = Fair ecological condition
C/D = Fair-poor ecological condition
D = Poor ecological condition
Developed

Where…
A (Excellent) = Vegetation structure and composition, soil status, and hydrological function appear well within natural ranges of variation. Non-native species are essentially absent or have negligible negative impact.
B (Good) = Vegetation structure and composition, soil status, and/or hydrological function appear to deviate slightly from the natural ranges of variation. Non-native species are present, but the impacts are minimal.
C (Fair) = Vegetation structure and composition, soil status, and/or hydrological function appear to deviate substantially from the natural ranges of variation. Non-native species may be abundant.
D (Poor) = Vegetation structure and composition, soil status, and/or hydrological function deviate dramatically from the natural ranges of variation. Non-native species may be abundant. The association is so severely altered that restoration may not be possible.

PA 1-5 Cover (%) Percent coverage of polygon. Same cover classes as used for total vegetation cover.

Pattern 1-5 Pattern reflects how PA is distributed in polygon
1 = matrix (most of polygon)
2 = large patches
3 = small patches
4 = clumped, clustered, contiguous
5 = scattered, more or less evenly repeating
6 = linear
7 = other

Appendix B

Field Guide to Plant Associations of Mount Spokane State Park

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Field Guide to Plant Associations of Mount Spokane State Park

March 23, 2023

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Introduction

This key is intended to aid in the identification of U.S. National Vegetation Classification (USNVC) plant associations at Mount Spokane State Park. AECOM and Washington Natural Heritage Program (WNHP) field crews used and modified draft versions of this key as part of vegetation mapping and Ecological Integrity Assessments (EIA) in the park. This version represents a final synthesis following the completion of field work in 2022.

The Association is the finest unit of the USNVC and has been used by the Washington Department of Natural Resources, Natural Heritage Program (WNHP) as the primary unit for identifying element occurrences (i.e., ecosystem occurrences of significant conservation value). The Association is defined based on a characteristic range of species composition, diagnostic species occurrence, habitat conditions, and physiognomy (Jennings et al., 2002, 2009). Associations reflect topo-edaphic climate, substrates, hydrology, and disturbance regimes.

Methods

We first compiled a list of plant associations previously identified at Mount Spokane State Park (MSSP) (Chappell & Crawford, 1992; Morrison et al., 2007; Morrison & Wooten, 2010; AECOM unpublished field work, 2020). These were synonymized to current USNVC taxonomy (USNVC, 2022) to form the basis of the classification. We added additional associations from the USNVC Groups represented by those previously documented types, along with additional Groups that may occur based on elevation and biogeography. No additional quantitative analysis was completed for this key. Associations not documented during the 2022 field season—nor by previous surveys—were then removed for this final draft. Differential species and the structure of the key borrow greatly from previous regional classifications (Steele et al., 1981; Williams & Lillybridge, 1983; Cooper et al., 1991; Williams et al., 1995; Rocchio & Crawford, 2015; Ramm-Granberg et al., 2021).

The association descriptions provided below are, in most cases, pulled directly from NatureServe's characterization abstracts (publicly available at https://explorer.natureserve.org and usnvc.org). Provisional associations and Washington state types (those with EL codes beginning with 'CTWA' or 'CWWA') do not have global descriptions because they have not yet been published in the national classification. A few other associations have been accepted in the USNVC, but do not yet have published descriptions. While it was outside the scope of this project to synthesize full descriptions of these associations, we have provided brief concept summaries of each and references to the relevant source material.

Aside from headwater riparian—and potentially xeroriparian—forests, wetlands cover only a minor proportion of MSSP. Marginally riparian/wetland communities that may be confused with upland ecosystems are included in this key, along with the few wetland associations documented in 2022 and by previous surveys. However, users should refer to Rocchio et al. (2022) in any circumstance in which they know they are in a wetland or riparian stand. Descriptions are not provided in this document for the many hundreds of wetland plant associations that may potentially be encountered at MSSP. Users should consult https://explorer.natureserve.org, usnvc.org, and the references in Rocchio et al. (2022) for descriptions of wetland associations.

Key to Plant Associations of Mount Spokane State Park

Instructions

1. To key a stand of interest, select a relatively uniform area of vegetation and topography within the stand.
    a. Confirm that the site does not consist of cultural vegetation (vegetation structure / composition determined by regular human activity such as planting, tilling, cropping, mowing, and/or irrigating)
2. This key is not dichotomous. If the stand or plot meets the criteria in a line, read to the right, or (if blank) to the next indented line down. If the stand or plot does not meet the criteria, skip to the next line that is not indented from the current line.
    a. Each key break is also preceded by a code indicating its position within the key. For example, key break 1a.1 ("Forests dominated by *Pinus contorta*…") is the first key break under 1a ("Subalpine forests dominated by *Abies lasiocarpa*, *Picea engelmannii*, or *Pinus contorta*"), which in turn is the first break under key break 1 ("Upland Conifer Forests and Woodlands"). Therefore, any subsequent key break code that starts with "1a.1" is a subalpine conifer forest or woodland dominated by *Pinus contorta*.
3. Some associations may be distinguished by multiple characteristics—these associations may be reached via more than one path in the key.
4. Percentage values refer to crown cover—the vertical projection below the entire crown of the plant. Do not subtract for spaces between leaves and branches.
5. "Present" species are typically found in a representative plot (they regularly occur in the stand, but may be absent in degraded stands).
6. "Prominent" species are common within most plots (generally 3-15% cover) but do not make up the dominant vegetation.
7. "Dominant" and "Codominant" species are diagnostic species that have the greatest cover within their physiognomic strata (tree/shrub/herb)
8. "+" = add the crown cover of each of the species indicated (e.g., 7+22 = 29% cover). Overlap between species is counted twice. Any one species may be absent.
9. Each plant association includes the name and element code (EL Code, in the USNVC) as demonstrated below:

    NAME: ....*Pinus contorta / Calamagrostis rubescens Forest*
    EL CODE — DESCRIPTION PAGE NUMBER: .... CEGL005916 —p.25

10. ***The key is not the classification***. After keying a stand, always consult the linked descriptions for additional details on vegetation composition, geographic distribution, and the typical environmental setting. If the description fits in most regards, you have likely made an accurate identification. If there are multiple inconsistencies between the stand and the description, consider trying the key again following slightly different leads or by increasing the flexibility of your cover estimates. Alternatively, the stand might represent an undocumented association, an expansion of an existing association concept, or an occurrence of an existing association that has been degraded by anthropogenic stressors.

Key to Physiognomic Classes

Stand occurs on a landform where groundwater discharge, impounded surface water, and/or overbank flooding heavily influences vegetation composition (e.g. seeps/springs, depressions, riparian areas, aquatic vegetation)..

see **Field Guide to Wetland and Riparian Plant Associations of Washington State**
[Wetland associations encountered in 2022 are also included in the appropriate physiognomic sections below].

Trees ≥ 10%, or stand is a tree island in subalpine parkland. Stands with 10-25% tree cover may also be assessed with the shrubland keys below, particularly in areas that have burned or otherwise experienced significant natural disturbance.

1 Key to Forests and Woodlands.. p. 11

Shrubs, dwarf-shrubs, or shrub-form trees (krummholz/subalpine scrub) ≥ 10%. Upland habitat.

2 Key to Shrublands... p. 20

Herbaceous Vegetation > 10%

3 Key to Herbaceous Types.. p. 21

Herbaceous Vegetation < 10%

.... Nonvascular or sparse vascular community not represented in this key

4 The stand does not key to an existing association.. p. 21

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1 Key to Forests and Woodlands

***********************Important Note for Keying Conifer Forests*************************

The current USNVC classification of eastern Washington forest communities is built on a great wealth of regional—or specific National Forest—classifications published over the last half-century (Pfister et al., 1977; Steele et al., 1981, 1983; Williams & Lillybridge, 1983; Cooper et al., 1991; Williams et al., 1995; and many others). Most of these classifications use a "Potential Natural Vegetation" and/or habitat type approach to classification that does not perfectly align with the current USNVC focus on *existing* vegetation (Jennings et al., 2009; Faber-Langendoen et al., 2014, 2016). Keep this in mind when consulting the association descriptions below. Some abstracts may describe, for example, *Abies grandis* associations with little or no *Abies grandis* in the canopy (just dominating regeneration).

Also be sure to think about the difference between classification and EIA. It can be difficult to determine if, for example, *Abies grandis* is codominant because it is an *Abies grandis* association, or because fire suppression has degraded the integrity of the stand and allowed that shade-tolerant, fire-intolerant species to invade a *Pseudotsuga menziesii* or *Pinus ponderosa* community.

****

1a. **Subalpine forests dominated by *Abies lasiocarpa*, *Picea engelmannii*, or *Pinus contorta***

1a.1 Forests dominated by *Pinus contorta*. *Populus tremuloides*, *Abies lasiocarpa* and *Picea engelmannii* may be present but are generally < 25% of tree canopy; dominance of Pinus contorta is related to fire history. Includes those stands which may succeed to spruce-fir forests.

1a.1a *Vaccinium membranaceum* ≥ 5%

1a.1a.1 *Xerophyllum tenax* ≥ 5% ....
<u>*Pinus contorta / Vaccinium membranaceum / Xerophyllum tenax* Forest</u>
CEGL005913—p.115

1a.1a.2 *Xerophyllum tenax* absent or minor; warm/dry indicators such as *Calamagrostis rubescens*, *Carex geyeri*, or *Arnica cordifolia* present....................
<u>*Pinus contorta / Vaccinium membranaceum* Rocky Mountain Forest</u>
CEGL000169—p.117

1a.1b *Calamagrostis rubescens* ≥ 5% ..... <u>*Pinus contorta / Calamagrostis rubescens* Forest</u>
CEGL000139—p.110

1a.1c *Clintonia uniflora* + *Tiarella trifoliata* ≥ 1%. Mesic sites ....
<u>*Pinus contorta / Clintonia uniflora* Forest</u>
CEGL005916—p.112

1a.2 *Abies lasiocarpa* and/or *Picea engelmannii* dominant, sometimes with *Pinus contorta* codominant.

1a.2a *Lysichiton americanus* ≥ 5%...
<u>*Picea engelmannii - Tsuga heterophylla / Lysichiton americanus* Swamp Forest</u>
CWWA000376—p.119

1a.2b *Alnus viridis* ssp. *sinuata* ≥ 25% AND *Athyrium filix-femina* usually < 5%.................
<u>*Picea engelmannii / Alnus viridis* ssp. *sinuata* Riparian Forest</u>
CWWA000377—p.128

1a.2c *Trautvetteria caroliniensis* ≥ 5%. Floodplains. ....
<u>*Abies lasiocarpa / Trautvetteria caroliniensis* Swamp Forest</u>
CEGL000339—p.127

1a.2d *Athyrium filix-femina* ≥ 10%. Riparian settings

1a.2d.1 *Abies lasiocarpa* ≥ 10% ....
Abies lasiocarpa / Athyrium filix-femina Riparian Woodland
CWWA000002—p.126

1a.2d.2 *Picea engelmannii* ≥ 10% ....
Picea engelmannii / Athyrium filix-femina Riparian Woodland
CWWA000183—p.129

1a.2e *Rhododendron albiflorum* ≥ 5%

1a.2e.2 *Rhododendron menziesii* (= *Menziesia ferruginea*) dominant; *Xerophyllum tenax* ≥ 5%...
Abies lasiocarpa - Picea engelmannii / Menziesia ferruginea / Xerophyllum tenax Forest
CEGL005895—p.98

1a.2e.3 *Picea engelmannii*, *Vaccinium scoparium*, or *Vaccinium myrtillus* ≥ 1%; *Senecio triangularis* and other moist forbs, if present, restricted to small seeps or rivulets ....
Abies lasiocarpa - (Picea engelmannii) / Rhododendron albiflorum Forest
CEGL008286—p.85

1a.2f *Rhododendron menziesii* (= *Menziesia ferruginea*) ≥ 5% (typically much higher)

1a.2f.1 *Clintonia uniflora* + *Tiarella trifoliata* + *Heracleum maximum* + *Galium triflorum* + *Senecio triangularis* + *Anemone piperi* ≥ 5%.......................................
Abies lasiocarpa - Picea engelmannii / Menziesia ferruginea / Clintonia uniflora Forest
CEGL005893—p.95

1a.2f.2 *Xerophyllum tenax* ≥ 5% ....
Abies lasiocarpa - Picea engelmannii / Menziesia ferruginea / Xerophyllum tenax Forest
CEGL005895—p.98

1a.2g *Streptopus amplexifolius* + *Senecio triangularis* + *Ligusticum canbyi* + *Pectiantia breweri* + *Gymnocarpium dryopteris* + *Trautvetteria caroliniensis* + *Galium triflorum* + *Actaea rubra* + *Maianthemum stellatum* ≥ 3%. Benches and lower slopes ....
Abies lasiocarpa - Picea engelmannii / Streptopus amplexifolius Riparian Forest
CEGL000336—p.123

1a.2h *Clintonia uniflora* present throughout (not restricted to microsites)

1a.2h.1 *Rhododendron menziesii* (= *Menziesia ferruginea*) or *Rhododendron albiflorum* ≥ 5%..
Abies lasiocarpa - Picea engelmannii / Menziesia ferruginea Forest
CEGL000319—p.93

1a.2h.2 *Vaccinium membranaceum* patchy and generally <15% cover.

1a.2h.2a *Xerophyllum tenax* ≥ 1% ....
<u>*Abies lasiocarpa - Picea engelmannii / Clintonia uniflora – Xerophyllum tenax* Forest</u>
CEGL005892—p.86

1a.2h.2b *Xerophyllum tenax* absent or minor ....
<u>*Abies lasiocarpa - Picea engelmannii / Clintonia uniflora* Forest</u>
CEGL005912—p.88

1a.2i *Xerophyllum tenax* ≥ 5%

1a.2i.1 *Vaccinium membranaceum* ≥ 10%; *Arnica latifolia*, *Carex geyeri*, *Osmorhiza berteroi*, *Orthilia secunda*, *Thalictrum occidentale*, and/or *Viola orbiculata* usually present. ....
<u>*Abies lasiocarpa - Picea engelmannii / Vaccinium membranaceum / Xerophyllum tenax* Forest</u>
CEGL005917—p.101

1a.2i.2 Usually depauperate besides *Vaccinium membranaceum* and *Xerophyllum tenax* .... <u>*Abies lasiocarpa / Xerophyllum tenax* Forest</u>
CEGL000346—p.105

1a.2j *Carex geyeri* dominates herb layer and >> *Vaccinium* spp. *Abies lasiocarpa* + *Picea engelmannii* > *Pseudotsuga menziesii* ....
<u>*Abies lasiocarpa - Picea engelmannii / Carex geyeri* Forest</u>
CEGL000304—p.108

1a.2k *Vaccinium membranaceum* ≥ 5%

1a.2k.1 *Xerophyllum tenax* ≥ 5%..
<u>*Abies lasiocarpa - Picea engelmannii / Vaccinium membranaceum / Xerophyllum tenax* Forest</u>
CEGL005917—p.101

1a.2k.2 *Calamagrostis rubescens* or *Carex geyeri* usually ≥ 1% ....
<u>*Abies lasiocarpa - Picea engelmannii / Vaccinium membranaceum* Rocky Mountain Forest</u>
CEGL000341—p.103

1a.2l *Luzula hitchcockii* ≥ 5% (often far greater). Few other herbs present.......................
<u>*Abies lasiocarpa - Picea engelmannii / Luzula glabrata* var. *hitchcockii* Woodland</u>
CEGL000317—p.91

1a.2m *Calamagrostis rubescens* ≥ 5% ....
<u>*Abies lasiocarpa - Picea engelmannii / Calamagrostis rubescens* Forest</u>
CEGL000301—p.106

1a.2n *Carex geyeri* ≥ 5%...........*Abies lasiocarpa - Picea engelmannii / Carex geyeri* Forest
CEGL000304—p.108

1b. Montane forests (closed canopy) above lower tree line; canopies dominated by a combination of the following species: *Pinus ponderosa*, *Pseudotsuga menziesii*, *Abies grandis*, *Tsuga heterophylla*, *Thuja plicata*, *Picea engelmannii*, *Larix occidentalis*, *Pinus monticola*, and *Pinus contorta*.

1b.1 Forests dominated by *Pinus contorta* and NOT codominated by *Larix occidentalis*. *Populus tremuloides*, *Abies lasiocarpa* and *Picea engelmannii* may be present but are generally < 25% of tree canopy; dominance of *Pinus contorta* is related to fire history. Includes those stands which may succeed to spruce-fir forests.

....Go to *Pinus contorta*-dominant section (1a.1), above

1b.2 Mixed forests occurring in mesic land positions and cooler aspects dominated by *Abies grandis*, *Tsuga heterophylla*, or *Thuja plicata* in the canopy. *Pseudotsuga menziesii* commonly shares the canopy, and *Pinus monticola*, *Pinus contorta*, *Taxus brevifolia*, and *Larix occidentalis* are major associates. *Pinus ponderosa* absent or merely incidental. Key mesic understory species include *Asarum caudatum*, *Clintonia uniflora*, *Coptis occidentalis*, *Prosartes* spp., *Gymnocarpium dryopteris*, *Tiarella trifoliata*, *Lysimachia latifolia*, *Trillium ovatum*, *Viola glabella*, and *Linnaea borealis*.

1b.2a *Tsuga heterophylla* and/or *Thuja plicata* dominant (or codominant with other conifers). If other conifers have high cover, try this key break first, particularly if *Tsuga heterophylla* or *Thuja plicata* dominate the subcanopy and understory regeneration.

1a.2a.1 *Lysichiton americanus* ≥ 5% ....
Picea engelmannii - Tsuga heterophylla / Lysichiton americanus Swamp Forest
CWWA000376—p.119

1b.2a.2 *Rhododendron menziesii* (= *Menziesia ferruginea*) ≥ 10%........................
Tsuga heterophylla / Menziesia ferruginea Forest
CEGL000496—p.71

1b.2a.3 *Athyrium filix-femina* ≥ 5%

1a.2a.3a *Tsuga heterophylla* ≥ 25%...
Tsuga heterophylla / Athyrium filix-femina Forest
CEGL000491—p.80

1a.2a.3b *Thuja plicata* ≥ 25%..
Thuja plicata / Athyrium filix-femina Swamp Forest
CEGL000473—p.120

1b.2a.4 *Gymnocarpium dryopteris* ≥ 5%

1a.2a.4a *Tsuga heterophylla* ≥ 25%...
Tsuga heterophylla / Gymnocarpium dryopteris Riparian Forest
CEGL000494—p.82

1a.2a.4b *Thuja plicata* ≥ 25% ....
<u>*Thuja plicata / Gymnocarpium dryopteris* Riparian Forest</u>
CEGL000476—p.130

1b.2a.5 *Asarum caudatum* + *Viola glabella* ≥ 1% and not restricted to microsites
<u>*Tsuga heterophylla / Asarum caudatum* Forest</u>
CEGL000490—p.79

1b.2a.6 *Vaccinium membranaceum* ≥ 10%
1b.2a.6a *Tsuga heterophylla* ≥ 25%; *Xerophyllum tenax* ≥ 1% ....
<u>*Tsuga heterophylla / Xerophyllum tenax* Forest</u>
CEGL000499—p.72

1a.2a.6b *Thuja plicata* ≥ 25%; *Clintonia uniflora* or *Tiarella trifoliata* present...
<u>*Thuja plicata / Clintonia uniflora - Xerophyllum tenax* Forest</u>
CEGL005930—p.68

1b.2a.7 *Aralia nudicaulis* + *Clintonia uniflora* + *Galium triflorum* + *Maianthemum stellatum* + *Tiarella trifoliata* + *Prosartes* spp. + other mesic forbs ≥ 10%
1a.2a.7a *Tsuga heterophylla* ≥ 25%...
<u>*Tsuga heterophylla / Aralia nudicaulis* Forest</u>
CEGL000488—p.77

1a.2a.7b *Thuja plicata* ≥ 25%........<u>*Thuja plicata / Aralia nudicaulis* Forest</u>
CEGL000471 — p.66

1b.2a.8 *Xerophyllum tenax* ≥ 5%
1a.2a.8a *Tsuga heterophylla* ≥ 25%...
<u>*Tsuga heterophylla / Xerophyllum tenax* Forest</u>
CEGL000499—p.72

1a.2a.8b *Thuja plicata* ≥ 25% ....
<u>*Thuja plicata / Clintonia uniflora - Xerophyllum tenax* Forest</u>
CEGL005930—p.68

1b.2a.9 *Clintonia uniflora*, *Tiarella trifoliata*, *Coptis occidentalis*, or *Adenocaulon bicolor* present. Relatively depauperate herb layer.
1a.2a.9a *Tsuga heterophylla* ≥ 25%...
<u>*Tsuga heterophylla / Clintonia uniflora* Forest</u>
CEGL000493—p.64

1a.2a.9b *Thuja plicata* ≥ 25% ...... <u>*Thuja plicata / Clintonia uniflora* Forest</u>
CEGL000474—p.75

1b.2b *Larix occidentalis* clearly dominant; many other conifers may be present, but generally combine to form < 25% of tree canopy OR *Larix occidentalis* is codominant and forms an emergent stratum of larger trees.

1a.2b.1 *Xerophyllum tenax* ≥ 5% .... <u>*Larix occidentalis / Clintonia uniflora - Xerophyllum tenax* Forest</u>
CEGL005881—p.35

1a.2b.2 *Clintonia uniflora* + *Tiarella trifoliata* ≥ 1% .... <u>*Larix occidentalis / Clintonia uniflora* Forest</u>
CEGL005880—p.38

1b.2c *Abies grandis* dominant or codominant in the canopy. If *Tsuga heterophylla* or *Thuja plicata* are codominant, return to key break 1b.2a.

1a.2c.1 *Trautvetteria caroliniensis* ≥ 5%. Floodplains or headwater, v-shaped drainages................................. <u>*Abies grandis / Trautvetteria caroliniensis* Forest</u>
CEGL000285—p.61

1a.2c.2 *Vaccinium membranaceum* or *Acer glabrum* ≥ 5%

1a.2c.2a *Acer glabrum* ≥ 5%. *Symphoricarpos albus* usually ≥ 10%. *Alnus viridis*, *Athyrium filix-femina*, and/or *Steptopus amplexifolius* often present. Primarily occurs adjacent to riparian vegetation or in concave/moist landscape positions .... <u>*Abies grandis / Acer glabrum* Forest</u>
CEGL000267—p.51

1a.2c.2b *Clintonia uniflora* + mesic indicators such as *Bromus vulgaris*, *Adenocaulon bicolor*, *Maianthemum stellatum*, *Coptis occidentalis*, and *Prosartes* spp. *≥ 5%*. Found across large swathes of Mount Spokane State Park..................................<u>*Abies grandis / Clintonia uniflora* Forest</u>
CEGL000272—p.54

1a.2c.2c *Xerophyllum tenax* ≥ 5%... <u>*Abies grandis / Xerophyllum tenax* Forest</u>
CEGL000293—p.63

1a.2c.2d *Lonicera utahensis* usually present .... <u>*Abies grandis / Vaccinium membranaceum* Forest</u>
CEGL008736—p.62

1a.2c.3 *Physocarpus malvaceus* or *Holodiscus discolor* ≥ 5%................................ <u>*Abies grandis / Physocarpus malvaceus* Forest</u>
CEGL000277—p.57

1a.2c.4 *Xerophyllum tenax* ≥ 5%........... *Abies grandis / Xerophyllum tenax* Forest
CEGL000293—p.63

1a.2c.5 *Symphoricarpos albus* dominates shrub layer. Floodplains, terraces, trough-shaped valleys......................*Abies grandis / Symphoricarpos albus* Forest
CEGL000282—p.59

1a.2c.6 *Carex geyeri* ≥ 5%.........................*Abies grandis / Carex geyeri* Woodland
CEGL000917—p.53

1a.2c.7 *Clintonia uniflora* + mesic indicators such as *Bromus vulgaris*, *Adenocaulon bicolor*, *Maianthemum stellatum*, *Coptis occidentalis*, and *Prosartes* spp. present throughout..........*Abies grandis / Clintonia uniflora* Forest
CEGL000272—p.54

1a.2d *Pseudotsuga menziesii* dominant in the canopy

1a.2d.1 *Populus trichocarpa* codominant in the canopy; *Symphoricarpos albus* ≥ 5% and *Rosa woodsii* usually present. Riparian settings......................................
Populus balsamifera (ssp. trichocarpa, ssp. balsamifera) / Symphoricarpos (albus, oreophilus, occidentalis) Riparian Forest
CEGL000677—p.131

1a.2d.2 *Physocarpus malvaceus* or *Holodiscus discolor* ≥ 5%

1a.2d.2a *Linnaea borealis* or *Larix occidentalis* ≥ 5%. Often on somewhat sheltered, concave micro-relief ....
Pseudotsuga menziesii / Physocarpus malvaceus - Linnaea borealis Forest
CEGL000448—p.46

1a.2d.2b *Linnaea borealis* absent. *Pinus ponderosa* may be present. Slightly more exposed/convex/xeric than above....................................
Pseudotsuga menziesii / Physocarpus malvaceus Forest
CEGL000447—p.26

1a.2d.3 *Vaccinium membranaceum* or *V. myrtillus* ≥ 5%

1a.2d.3a *Xerophyllum tenax* ≥ 10% ....
Pseudotsuga menziesii / Vaccinium membranaceum / Xerophyllum tenax Forest
CEGL005852—p.47

1a.2d.3b *Xerophyllum tenax* < 10% ....
Pseudotsuga menziesii / Vaccinium membranaceum Forest
CEGL000466—p.50

1a.2d.4 *Symphoricarpos albus* ≥ 5% ....
Pseudotsuga menziesii / Symphoricarpos albus Forest
CEGL000459—p.27

1a.2d.5 *Xerophyllum tenax* ≥ 5% ....
Pseudotsuga menziesii / Clintonia uniflora - Xerophyllum tenax Forest
CEGL005854—p.41

1a.2d.6 *Clintonia uniflora* + *Tiarella trifoliata* ≥ 1% ....
Pseudotsuga menziesii / Clintonia uniflora Forest
CEGL005850—p.43

1b.3 Dry mixed forests dominated by *Pseudotsuga menziesii* and *Pinus ponderosa* in the canopy (there can be one without the other); *Pinus contorta*, *Pinus monticola*, *Larix occidentalis*, and *Abies grandis* are sometimes present. Lacking the key mesic understory species listed above. *Calamagrostis rubescens* and *Carex geyeri* are common understory species.

1b.3a *Populus trichocarpa* codominant in the canopy; *Symphoricarpos albus* ≥ 5% and *Rosa woodsii* usually present. Riparian settings. ....
Populus balsamifera (ssp. trichocarpa, ssp. balsamifera) / Symphoricarpos (albus, oreophilus, occidentalis) Riparian Forest
CEGL000677—p.131

1b.3b *Festuca idahoensis* ≥ 5%. *Pseudoroegneria* spicata often prominent......................
Pseudotsuga menziesii / Festuca idahoensis Woodland
CEGL000900—p.33

1b.3c *Pinus ponderosa* ≥ 10%; *Physocarpus malvaceus* ≥ 5%...
Pinus ponderosa - Pseudotsuga menziesii / Physocarpus malvaceus Forest
CEGL000213—p.24

1b.3d *Physocarpus malvaceus* ≥ 5%...
Pseudotsuga menziesii / Physocarpus malvaceus Forest
CEGL000447—p.26

1b.3e *Holodiscus discolor* ≥ 5%; *Calamagrostis rubescens* ≥ 5%.......................................
Pseudotsuga menziesii / Holodiscus discolor / Calamagrostis rubescens Forest
CEGL008268—p.25

1b.3f *Symphoricarpos albus* ≥ 5% .. *Pseudotsuga menziesii / Symphoricarpos albus* Forest
CEGL000459—p.27

1b.3g *Calamagrostis rubescens* ≥ 5% ....
Pseudotsuga menziesii / Calamagrostis rubescens Woodland
CEGL000429—p.29

1b.3h *Carex geyeri* ≥ 5%. *Abies lasiocarpa* may be prominent to codominant in transitional areas.. *Pseudotsuga menziesii / Carex geyeri* Forest
CEGL000430—p.31

1b.4 Populus tremuloides dominant. Upland settings. Undescribed provisional type. ....
Populus tremuloides Forest [Provisional]
MTSP_PROV1

2 Key to Shrublands

2a *Alnus viridis* ≥ 10%

2a.1 *Athyrium filix-femina* ≥ 10% and *Gymnocarpium dryopteris* usually ≥ 5%..............................
Alnus viridis ssp. *sinuata / Athyrium filix-femina - Cinna latifolia* Wet Shrubland
CEGL001156—p.153

2a.2 *Thalictrum occidentale* + *Viola glabella* + *Heracleum maximum* + other mesic forbs ≥ 5% AND *Athyrium filix-femina* and other ferns absent or minor. *Sambucus racemosa*, *Rubus nutkanus*, and *Sorbus* spp. usually present...
Alnus viridis ssp. *sinuata* / Mesic Forbs Wet Shrubland
CEGL006657—p.156

2b *Alnus incana* ≥ 10%; *Athyrium filix-femina* and/or *Dryopteris* spp. ≥ 5% AND > *Equisetum* spp. ....
Alnus incana / Athyrium filix-femina Wet Shrubland
CEGL002628—p.158

2c *Rubus nutkanus* (= *parviflorus*) dominant; *Chamaenerion angustifolium* or *Pteridium aquilinum* ≥ 1%...
Rubus parviflorus / Chamerion angustifolium - Heracleum maximum Shrubland
CEGL001127—p.141

2d *Vaccinium membranaceum* ≥ 15% AND *Xerophyllum tenax* ≥ 5% ....
Vaccinium membranaceum / Xerophyllum tenax Shrubland
CEGL005891—p.143

2e *Physocarpus malvaceus* dominant OR *Prunus emarginata*, *P. virginiana*, *Holodiscus discolor*, or *Symphoricarpos albus* dominant and *Physocarpus malvaceus* present..
Physocarpus malvaceus - Symphoricarpos albus Shrubland
CEGL001171—p.136

2f *Salix scouleriana* and/or *Acer glabrum* dominant; *Amelanchier alnifolia* and/or *Paxistima myrsinites* usually prominent to codominant. Dry upland settings..
Salix scouleriana - Acer glabrum - (Ceanothus velutinus) Shrubland
CEGL008236—p.145

2g *Acer glabrum* var. *douglasii* ≥ 25%. Restricted to intermittent or ephemeral drainages.......................
Acer glabrum var. *douglasii - (Symphoricarpos albus)* Wet Shrubland
CWWA000282—p.138

3 Key to Herbaceous Types

3a *Calamagrostis canadensis* ≥ 25%..............................*Calamagrostis canadensis* Western Wet Meadow
CEGL001559—p.147

3b *Heracleum maximum* dominant..*Heracleum maximum* Wet Meadow
CEGL005857—p.149

3c *Athyrium filix-femina* and/or *Gymnocarpium dryopteris* ≥ 10%..
Athyrium filix-femina - Gymnocarpium dryopteris Wet Meadow [Provisional]
CWWA000313—p.152

3d *Senecio triangularis* ≥ 5%...*Senecio triangularis* Wet Meadow
CEGL001987—p.150

3e *Festuca viridula* ≥ 10% .... *Festuca viridula - Festuca idahoensis* Meadow
CEGL001633—p.134

3f *Festuca idahoensis* ≥ 10%

3f.1 *Danthonia intermedia* + *Carex hoodii* + *C. geyeri* + *Koeleria macrantha* ≥ 5%. Relatively mesic sites...*Carex hoodii - Festuca idahoensis* Grassland
CEGL001595—p.133

3f.2 *Eriogonum* spp. ≥ 5%. Relatively dry sites...
Festuca idahoensis - Eriogonum heracleoides Grassland
CEGL001616—p.139

3g *Xerophyllum tenax* ≥ 15% and *Vaccinium membranaceum* ≥ 10%

Vaccinium membranaceum / Xerophyllum tenax Shrubland
CEGL005891—p.143

3h *Calamagrostis rubescens* or *Carex geyeri dominant* ....
Return to top of Herb Key (3a) and rekey using next most abundant herbs OR relax tree cover criteria and rekey using Dry Forest Section (1b.3)

4 The stand does not key to an existing association

4a Relax cover estimate cutoffs and try again ....Return to the top of the key

4b Stand is dominated by nonnative plants OR dominated by an assemblage of native plants that is the result of anthropogenic disturbance and does not have a known natural analogue ....
Undescribed Ruderal Plant Association
*Or a described association that was not included in this provisional key

4c Stand is dominated by native plants AND anthropogenic disturbance is absent or minor ....
Undescribed Native Plant Association

*Or a described association that was not included in this provisional key. Take copious notes on the community and begin by searching for additional USNVC types that may describe the community you observed. If no described community fits your observed community, be sure to record dominant/codominant species, estimated cover, ecological setting, and take photos. Send this information to WNHP staff.

Plant Associations of Mount Spokane State Park

The following descriptions are, in most cases, pulled directly from NatureServe's characterization abstracts (publicly available at https://explorer.natureserve.org and usnvc.org). For associations without synthesized abstracts, we have provided brief summaries based on the relevant source material. Fields are defined in Table 1 (note that most plant associations do not have information available for every field).

Table 1. Field definitions for plant association descriptions.

Field	Definition
Scientific Name	Scientific name of the plant association
EL Code — WNHP Abb	The element code used to track this association in the US National Vegetation Classification and in NatureServe/WNHP databases, followed by the abbreviation used by WNHP when referring to the association. Abbreviations are created by taking the first three letters of the genus and species of each plant species used in the name (e.g., Pinus ponderosa - Pseudotsuga menziesii / Physocarpus malvaceus Forest = PINPON-PSEMEN/PHYMAL).
CSR	The conservation status rank (https://explorer.natureserve.org/AboutTheData/Statuses)
Ecological System	The most likely ecological system (https://www.dnr.wa.gov/NHPecologicalsys) in which this plant association occurs at Mount Spokane
Element Summary	Concept summary for the plant association
Distribution	Geographic distribution of the plant association
Environment	Typical ecological setting for the plant association
Physiognomy	Description of the structure and growth forms of the plant association
Vegetation	Floristic summary for the association
Dynamics	Summary of information on the important dynamic processes associated with the plant association, including natural disturbance regimes, successional status, and temporal dynamics
Adjacent Types	Other plant associations commonly found nearby, often representing an environmental or successional gradient
Classification Comments	General WNHP comments about the degree of confidence in the association concept, proposed classification changes that have not yet been made in the USNVC, whether the association has previously been documented at Mount Spokane, or other relevant information regarding the classification history of the plant association

1.B.2.Nb Rocky Mountain Forest & Woodland

G210 Central Rocky Mountain Dry Mixed Conifer Forest & Woodland

A3392 Pseudotsuga menziesii - Pinus ponderosa Dry-mesic Central Rocky Mountain Forest & Woodland Alliance

Scientific Name	Pinus ponderosa - Pseudotsuga menziesii / Physocarpus malvaceus Forest
EL Code — WNHP Abb	CEGL000213 — PINPON-PSEMEN/PHYMAL
CSR	GNRQ/S2
Ecological System	CES306.805 Northern Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest
Element Summary	[Adapted from Hall (1973)] Pseudotsuga menziesii dominates the canopy and Pinus ponderosa may codominate. Physocarpus malvaceus may be the only obvious shrub. Graminoids (mainly Calamagrostis rubescens and Carex geyeri) occupy the soil surface in density related to shrub and tree cover density; with 40% tree and 20% shrub cover, grasses may reach 70% crown cover. Symphoricarpos spp. are frequently prominent, with 5-20% cover.
Distribution	--
Environment	--
Physiognomy	--
Vegetation	--
Dynamics	--
Adjacent Types	--
Classification Comments	There seems to be minimal distinction between this community and Pseudotsuga menziesii / Physocarpus malvaceus Forest (CEGL000447). Not previously identified at MSSP.

Scientific Name	Pseudotsuga menziesii / Holodiscus discolor / Calamagrostis rubescens Forest
EL Code — WNHP Abb	CEGL008268 — PSEMEN/HOLDIS/CALRUB
CSR	GNR/S3S4Q
Ecological System	CES306.805 Northern Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest
Element Summary	These open to moderately closed forests and woodlands occur at low- to mid-montane elevations (400-1000m) east of the Cascade Crest, on rocky and typically moss-covered soil. Pseudotsuga menziesii is the dominant overstory species. The variable density tall-shrub layer is dominated by Holodiscus discolor. Shorter shrubs are also variable in their cover and usually include Spiraea lucida (= betulifolia), Paxistima myrsinites, Mahonia aquifolium and Rosa gymnocarpa. Arctostaphylos uva-ursi and Lonicera ciliosa may be prominent. The herb layer is dominated by Calamagrostis rubescens. Stands occur on moderately steep (26° mean slope), frequently south-facing aspects (171° average), in dry topographic positions. Evidence of past fire is often present.
Distribution	This association has been documented near Ross and Diablo Lakes and in the Stehekin River watershed at North Cascades National Park. It may also occur elsewhere in the East Cascades.
Environment	These forests and woodlands occur at low- to mid-montane elevations (400-1000m) east of the Cascade Crest, on rocky and typically moss-covered soil. Stands occur on moderately steep (26° mean slope), frequently south-facing aspects (171° average), in dry topographic positions. Evidence of past fire is often present.
Physiognomy	These needle-leaved conifer forests have moderately open canopies (average canopy cover = 45%). Of that, broad-leaved trees average 1% cover in the canopy. The shrub layer averages 37% cover (with an additional 9% from subshrubs), while the herbaceous layer (primarily graminoids) averages 20% cover.
Vegetation	Pseudotsuga menziesii is the dominant overstory species. The variable density tall-shrub layer is dominated by Holodiscus discolor. Shorter shrubs are also variable in their cover and usually include Spiraea lucida (= betulifolia), Paxistima myrsinites, Mahonia aquifolium and Rosa gymnocarpa. Arctostaphylos uva-ursi and Lonicera ciliosa may be prominent. The herb layer is dominated by Calamagrostis rubescens.
Dynamics	Evidence of past fire is usually present in these stands. Sites appear to be too dry for succession to shade tolerant associations dominated by Tsuga heterophylla, etc.
Adjacent Types	--
Classification Comments	A “PSME/HODI” association was previously documented at MSSP (Morrison & Wooten, 2010). That association may be equivalent to this or to Pseudotsuga menziesii / Holodiscus discolor / Carex geyeri Forest (CEGL000437).

Scientific Name	Pseudotsuga menziesii / Physocarpus malvaceus Forest
EL Code — WNHP Abb	CEGL000447 — PSEMEN/PHYMAL
CSR	G5/S4
Ecological System	CES306.805 Northern Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest
Element Summary	[Adapted from Cooper et al. (1991)] Pseudotsuga menziesii dominates the tree canopy and Pinus ponderosa may be prominent. Some sites, mostly from the Clearwater National Forest and north, are capable of supporting Larix occidentalis. Physiognomy of the overstory is relatively closed forest, with canopy cover ranging from 70 percent to over 100 percent. The understory shrub layer is dominated by Physocarpus malvaceus and/or Holodiscus discolor, which singly or combined generally have a canopy coverage of 25 percent to much greater than 100 percent. Other commonly found shrubs in this association are Amelanchier alnifolia, Philadelphus lewisii, Rosa gymnocarpa, Spiraea lucida (=betulifolia), and Symphoricarpos albus. This association has greater cover of Moehringia macrophylla, Arnica cordifolia, Fragaria spp., and Bromus vulgaris compared to similar Pseudotsuga menziesii-dominant types. For additional information, see Cooper et al. (1991), Mauk and Henderson (1984), and Williams and Lillybridge (1983).
Distribution	This is the most widely occurring Pseudotsuga menziesii association in northern Idaho, according to Cooper et al. (1991).
Environment	PSEMEN/PHYMAL generally occurs on southeast to west aspects of low to moderate slopes at elevations between 2,000 and 3,700 ft (600 to 1,130 m), but is not restricted to these environments.
Physiognomy	--
Vegetation	--
Dynamics	--
Adjacent Types	On a moisture gradient, this community is moister than PSEMEN/SYMALB and drier than ABIGRA/PHYMAL and ABIGRA/CLIUNI.
Classification Comments	Currently in the USNVC in G215, but that Group by definition should not occur in WA. Treat this association as part of G210. There seems to be minimal distinction between this community and Pinus ponderosa - Pseudotsuga menziesii / Physocarpus malvaceus Forest (CEGL000213). The absence of Larix occidentalis is supposed to be an indicator for this community relative to PSEMEN/PHYMAL-LINBOR. However, Cooper et al. (1991) also states that some stands in the Clearwater National Forest do support Larix occidentalis.

Scientific Name	Pseudotsuga menziesii / Symphoricarpos albus Forest
EL Code — WNHP Abb	CEGL000459 — PSEMEN/SYMALB
CSR	G5/S4
Ecological System	CES306.805 Northern Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest
Element Summary	This widespread forest association occurs in the central and northern Rocky Mountains from the mid montane zone down to upper foothill zone on cool aspects. Sites are warm and relatively dry to moist, gentle to steep, mid to lower slopes, benches, and terraces. Stands are found on southerly or easterly aspects throughout much of its range, but may occur on any aspect. Substrates are variable and may be very gravelly or not, with soil textures ranging from sandy loam to silt derived from alluvium, glacial till and outwash. Ground surface has high cover of litter, sometimes significant cover of rock, and low cover of bare soil. The vegetation is characterized by a moderately dense to dense (40-90% cover) evergreen needle-leaved tree canopy, dominated or codominated by Pseudotsuga menziesii with the short shrub Symphoricarpos albus dominating or codominating the understory. Mature Pinus ponderosa often codominates the tree canopy, but does not regenerate. Other mature seral tree species present to codominant may include Pinus contorta, Pinus flexilis, Larix occidentalis, Juniperus spp., or Populus tremuloides. Understory trees are almost exclusively Pseudotsuga menziesii. The short-shrub layer is dominated or codominated by the rhizomatous Symphoricarpos albus and other short shrubs such as Juniperus communis, Mahonia repens, Paxistima myrsinites, Ribes cereum, Rosa spp., Spiraea lucida (=betulifolia), and Symphoricarpos oreophilus. Scattered tall shrubs such as Amelanchier alnifolia, Prunus virginiana, or Sorbus scopulina may form an open tall-shrub layer. A low cover to moderately dense herbaceous layer is present and is composed of diverse forbs with the graminoids Calamagrostis rubescens, Carex geyeri, Festuca idahoensis or Pseudoroegneria spicata present to codominant.
Distribution	This widespread montane forest association occurs in the central and northern Rocky Mountains from southeastern Idaho and northwestern Wyoming, Montana, Idaho and eastern Oregon and Washington, extending into southern Alberta and British Columbia.
Environment	This widespread forest association occurs in the central and northern Rocky Mountains from the mid montane zone down to upper foothill zone on cool aspects. Elevations range 820-2260 m (2700-7400 feet) in the central and northern Rocky Mountains and down to 680-1700 m (2230-5575 feet) in eastern Oregon and Washington. Sites are warm and relatively dry to moist, gentle to steep, mid to lower slopes, benches, and terraces. Stands are found on southerly or easterly aspects throughout much of its range, but may occur on any aspect. Substrates are variable and may be very gravelly or not, with soil textures ranging from sandy loam to silty clay derived from alluvium, glacial till and outwash. Parent materials include loess, various calcareous and noncalcareous sedimentary rock, andesite, argillite, basalt, gneiss, granite, limestone, quartzite, quartz monzonite, rhyolite, sandstone or schist. Ground surface has high cover of litter 4-8 cm deep, sometimes significant cover of rock, and low cover of bare soil.
Physiognomy	--

Vegetation	This Rocky Mountain conifer association is characterized by a moderately dense to dense (40-90% cover). evergreen needle-leaved tree canopy dominated or codominated by Pseudotsuga menziesii with the short shrub Symphoricarpos albus dominating or codominating the understory. Mature Pinus ponderosa often codominates tree canopy, but does not regenerate. Other mature seral tree species present to codominant may include Pinus contorta, Pinus flexilis, Larix occidentalis, Juniperus scopulorum, Juniperus occidentalis (eastern Oregon and Washington), or Populus tremuloides. Understory trees are almost exclusively Pseudotsuga menziesii. The short-shrub layer is open (patchy) to moderately dense (25-50% cover) and is dominated or codominated by the rhizomatous Symphoricarpos albus and other short shrubs such as Juniperus communis, Mahonia repens, Paxistima myrsinites, Ribes cereum, Rosa spp., Spiraea lucida (=betulifolia), Spiraea splendens, Shepherdia canadensis, and Symphoricarpos oreophilus. Scattered tall shrubs such as Amelanchier alnifolia, Prunus virginiana, or Sorbus scopulina may form an open tall-shrub layer, but it does not dominate the undergrowth. A low cover to moderately dense herbaceous layer is present and is composed of diverse forbs with the graminoids Calamagrostis rubescens, Carex geyeri, Festuca idahoensis or Pseudoroegneria spicata present to codominant. Forb species may include Achillea millefolium, Moehringia macrophylla (= Arenaria macrophylla), Arnica cordifolia, Balsamorhiza sagittata, Fragaria spp., Hieracium spp., Osmorhiza berteroi (= Osmorhiza chilensis), Penstemon wilcoxii, Poa nervosa, Maianthemum racemosum ssp. amplexicaule, and Thalictrum occidentale.
Dynamics	--
Adjacent Types	--
Classification Comments	Currently in the USNVC in G215, but revisions pending to move to G210/A3392. Not previously identified at MSSP.

G210 Central Rocky Mountain Dry Mixed Conifer Forest & Woodland

A3395 Pseudotsuga menziesii - Pinus ponderosa Dry Central Rocky Mountain Woodland Alliance

Scientific Name	Pseudotsuga menziesii / Calamagrostis rubescens Forest
EL Code — WNHP Abb	CEGL000429 — PSEMEN/CALRUB
CSR	G5/S5
Ecological System	CES306.805 Northern Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest
Element Summary	This lower to mid montane woodland association occurs in the central and northern Rocky Mountains from western Montana to northeastern Washington and British Columbia, and south to western Wyoming, Idaho and eastern Oregon. Elevations range from 825 to 2400 m (2700-7900 feet). Stands occur on cool, dry sites on mid to upper slopes and benches on all aspects at middle elevations. At lowest elevations stands are restricted to north aspects, and at upper elevations stands are found on warm and dry southerly exposures. Substrates are variable (sandy to clayey), but are generally well-drained, coarser-textured gravelly soils and derived from a variety of noncalcareous, acidic parent materials. Surface rock usually is low to moderate, and litter cover high. The typically open tree canopy is dominated by Pseudotsuga menziesii alone or codominated by Pinus ponderosa or Larix occidentalis. Large Pinus albicaulis or Pinus contorta trees may be present in the upper tree canopy. The subcanopy is Pseudotsuga menziesii. Scattered shrubs such as Amelanchier alnifolia, Paxistima myrsinites, Sorbus scopulina, and Symphoricarpos oreophilus and dwarf-shrubs such as Arctostaphylos uva-ursi and Mahonia repens may also be present. The dense to moderately dense (20-60% cover) perennial graminoid layer characteristically dominates the understory. Calamagrostis rubescens typically is the dominant, with Carex geyeri, Festuca idahoensis, and Pseudoroegneria spicata often present to codominant. There is often a high diversity of forbs, but typically all have low cover. Forb species present are highly variable, but the most common forbs species are Achillea millefolium, Antennaria spp., Arnica cordifolia, Balsamorhiza sagittata, Eurybia conspicua, Fragaria virginiana, Geranium viscosissimum, and Geum triflorum.
Distribution	This lower to mid montane woodland association occurs in the central and northern Rocky Mountains from western Montana to northeastern Washington and British Columbia, and south to western Wyoming, Idaho and eastern Oregon.
Environment	This lower to mid montane woodland association occurs in central and northern Rocky Mountains. Elevations range from 825 to 2400 m (2700-7900 feet). Stands occur on cool, dry sites on mid to upper slopes and benches on all aspects at middle elevations. At lowest elevations stands are restricted to north aspects, and at upper elevations stand are found on warm and dry southerly exposures. Substrates are variable (sandy to clayey) but are generally well-drained, coarser-textured gravelly soils and derived from a variety of noncalcareous, acidic parent materials including andesite, basalt, granites, quartzite, quartz monzonite, and glacial drift. Surface rock usually is low to moderate, and litter cover is high. Some stands can have up to 30% exposed bedrock.
Physiognomy	--

Vegetation	This association typically has an open tree canopy that is dominated by Pseudotsuga menziesii alone or codominated by Pinus ponderosa or Larix occidentalis. Large Pinus albicaulis or Pinus contorta trees may be present in the upper tree canopy. The subcanopy is Pseudotsuga menziesii. Scattered shrubs such as Amelanchier alnifolia, Paxistima myrsinites, Sorbus scopulina, and Symphoricarpos oreophilus and dwarf-shrubs such as Arctostaphylos uva-ursi and Mahonia repens may also be present. The dense to moderately dense (20-60% cover) perennial graminoid layer characteristically dominates the understory. Calamagrostis rubescens typically is the dominant, with Carex geyeri, Festuca idahoensis, and Pseudoroegneria spicata often present to codominant. Although some stands may have only Calamagrostis rubescens. There is often a high diversity of forbs, but typically all have low cover. The most common forbs species are Achillea millefolium, Antennaria spp., Arnica cordifolia, Balsamorhiza sagittata, Eurybia conspicua, Fragaria virginiana, Geranium viscosissimum, and Geum triflorum.
Dynamics	--
Adjacent Types	--
Classification Comments	Pinus ponderosa - Pseudotsuga menziesii / Calamagrostis rubescens Woodland (CEGL000210) is indistinguishable from this type and should be archived.

Scientific Name	Pseudotsuga menziesii / Carex geyeri Forest
EL Code — WNHP Abb	CEGL000430 — PSEMEN/CARGEY
CSR	G4?/S1
Ecological System	CES306.805 Northern Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest
Element Summary	This association has been found in the montane zone of the Rocky Mountains of Colorado, Idaho, Montana, Oregon and Washington. Stands occur at lower montane elevations of these mountainous regions, on sites typically drier than most other Pseudotsuga menziesii associations. Site slope and aspect vary greatly. Slopes where this association is found in Colorado are reported to be steep to very steep (45-80%). Parent materials include granitic, conglomerates, sandstones, basalts, and shales. Exposed bare ground is low (less than 30%), and litter/duff is relatively thin, usually less than 5 cm deep. Vegetation is characterized by the dominance of Pseudotsuga menziesii, with a relatively closed canopy, as well as stands that are more open or have a mixed conifer tree canopy. Pseudotsuga is self-regenerating in this association. Several other conifers may be present to codominant, including Pinus ponderosa or Juniperus scopulorum in southern Rocky Mountain stands, and Abies lasiocarpa, Pinus albicaulis, Pinus contorta, or Populus tremuloides in stands farther north. These species are typically present only in early-seral stands of this association. There is no shrub layer, although several shrub species are typically present with low cover. These include the evergreen needle-leaved Juniperus communis and the broad-leaved cold-deciduous Amelanchier alnifolia, Lonicera utahensis, Mahonia repens, Paxistima myrsinites, Purshia tridentata, Spiraea lucida (=betulifolia), Vaccinium membranaceum, Vaccinium scoparium, and Symphoricarpos occidentalis or Symphoricarpos oreophilus. The herbaceous layer is dominated by the perennial sedge Carex geyeri (averaging 35% cover). No other herbaceous species are well-represented, but many different forbs can occur in low amounts.
Distribution	This association has been found in the montane zone throughout much of the Rocky Mountains from Colorado to Montana, and west into Oregon and Washington.
Environment	This association has been found throughout much of the Rocky Mountains. Stands occur at lower montane elevations of these mountainous regions, on sites typically drier than most other Pseudotsuga menziesii associations. Elevations range from 1480-1500 m (4854-4920 feet) in Alberta, to 1860-2315 m (6100-7600 feet) in southern Montana, 2315-2800 m (7600-9200 feet) in central Colorado, and from 1125-2650 m (3700-8700 feet) in Idaho. Slope and aspect of sites vary greatly. Slopes vary from gentle to very steep (3-80%) but are generally moderate to steep (20-45%). Parent materials include granitic, conglomerates, sandstone, siltstone, rhyolite, basalt, and shale. Soils are rapidly drained loamy sand to silty clay loams. Exposed bare ground is low (less than 30%), and litter/duff is relatively thin, usually less than 5 cm deep.
Physiognomy	--

Vegetation	This is an association dominated by the evergreen needle-leaved tree Pseudotsuga menziesii, with a relatively closed canopy. Pseudotsuga is self-regenerating in this association. Several other canopy trees may be present, including Pinus ponderosa, Juniperus scopulorum, and Populus tremuloides, with Pinus albicaulis, Pinus contorta, Pinus flexilis, or Abies lasiocarpa more typical in stands further north. These species are typically present only in early-seral stands of this association (Steele et al., 1981). It is reported that in some Idaho stands the canopy may be more open, with larger, more widely spaced trees in late-seral stands. There is no shrub layer, although several shrub or dwarf-shrub species are typically present with low cover. These include the evergreen needle-leaved Juniperus communis and the broad-leaved, cold-deciduous Amelanchier spp., Dasiphora fruticosa ssp. floribunda, Lonicera utahensis, Mahonia repens, Paxistima myrsinites, Prunus virginiana, Purshia tridentata, Spiraea lucida (=betulifolia), Symphoricarpos occidentalis, or Symphoricarpos oreophilus depending on geographic region. The herbaceous layer is dominated by the perennial sedge Carex geyeri. Typically, no other herbaceous species are well-represented, but many different forbs can occur in low amounts, including Fragaria spp., Arnica cordifolia, Achillea millefolium, Antennaria parvifolia, Osmorhiza spp., and Astragalus spp. Other graminoids can include Poa spp., Bromus porteri, Carex siccata (= Carex foenea), and Calamagrostis rubescens.
Dynamics	--
Adjacent Types	--
Classification Comments	Previous surveyors identified ABLA-(PSME)/CAGE (Morrison & Wooten, 2010; AECOM unpublished field work, 2020), which WNHP believes to be a transitional/ecotonal phase of this association.

Scientific Name	Pseudotsuga menziesii / Festuca idahoensis Woodland
EL Code — WNHP Abb	CEGL000900 — PSEMEN/FESIDA
CSR	G4/S2
Ecological System	CES306.805 Northern Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest
Element Summary	This lower montane woodland association occurs in the central and northern Rocky Mountains from western Montana to northeastern Washington and south to western Wyoming. Elevations range from 915 to 2440 m (3000-8000 feet). Stands occur on mid to low slopes and benches on all aspects near lower tree line or on warm and dry sites at higher elevations. Soils are variable and range from silty loam to gravelly sandy loam derived from a variety of calcareous and noncalcareous parent materials. Surface rock usually is less than 10% but may be as high as 30% cover. The typically open tree canopy is dominated by Pseudotsuga menziesii alone or codominated by Pinus ponderosa. The tree canopy varies from savanna to closed and may include scattered Juniperus scopulorum, Pinus contorta, or Pinus flexilis trees. Artemisia tridentata shrubs are often prominent, but seldom have over 10% cover. Scattered Amelanchier alnifolia and Ribes cereum are often present. The dense to moderately dense perennial graminoid layer characteristically dominates the understory. Festuca idahoensis and Pseudoroegneria spicata codominate with Carex geyeri, Carex rossii, or Leucopoa kingii sometimes prominent. There is often a high diversity of forbs, but typically all have low cover except Balsamorhiza sagittata. The most common forbs species are Achillea millefolium, Antennaria microphylla, Arnica cordifolia, Fragaria virginiana, and Geum triflorum.
Distribution	This lower montane woodland association occurs in the central and northern Rocky Mountains from western Montana to northeastern Washington and south to western Wyoming.
Environment	This lower montane woodland association is known from the central and northern Rocky Mountains. Elevations range from 300 to 2440 m (3000-8000 feet). Stands occur on a mid to low slopes and benches on all aspects near lower tree line or on warm and dry sites at higher elevations. Soils are variable and range from silty loam to gravelly sandy loam derived from a variety of calcareous and noncalcareous parent materials including granites, quartzite, various volcanic and sedimentary rock. Surface rock usually is less than 10% but may be as high as 30% cover.
Physiognomy	--
Vegetation	This woodland association typically has an open tree canopy that is dominated by Pseudotsuga menziesii alone or codominated by Pinus ponderosa. The tree canopy varies from savanna to closed and may include scattered Juniperus scopulorum, Pinus contorta, or Pinus flexilis trees. Artemisia tridentata shrubs are often prominent, but seldom have over 10% cover. Scattered Amelanchier alnifolia and Ribes cereum are often present. The dense to moderately dense perennial graminoid layer characteristically dominates the understory. Festuca idahoensis and Pseudoroegneria spicata codominate with Carex geyeri, Carex rossii, or Leucopoa kingii (= Festuca kingii) sometimes prominent. There is often a high diversity of forbs, but typically all have low cover except Balsamorhiza sagittata.

	The most common forbs species are Achillea millefolium, Antennaria microphylla, Arnica cordifolia, Eriogonum spp., Fragaria virginiana, and Geum triflorum.
Dynamics	--
Adjacent Types	--
Classification Comments	--

G211 Central Rocky Mountain-Interior Mesic Grand Fir - Douglas-fir - Western Larch Forest

A0275 Larix occidentalis Central Rocky Mountain Forest Alliance

Scientific Name	Larix occidentalis / Clintonia uniflora - Xerophyllum tenax Forest
EL Code — WNHP Abb	CEGL005881 — LAROCC/CLIUNI-XERTEN
CSR	GNR/SNR
Ecological System	CES306.837 Northern Rocky Mountain Western Larch Savanna
Element Summary	This wholly seral, large-patch to matrix type occupies the relatively cold and dry environments across a number of climax tree series and associated geographic regions; the species defining these series include, but are not limited to, Thuja plicata, Tsuga heterophylla, Tsuga mertensiana, Abies grandis, Abies lasiocarpa, and Picea engelmannii. Thus, this mesic type is found throughout the northern Rocky Mountains and may extend as far west as the Cascade Crest on environments characterized as foothills and montane to lower and even mid-subalpine. This association's possible elevation range is from 915 to 1800 m (3000-5900 feet), and regardless of the climax series in which it is found, it consistently occurs on south- through west-facing exposures. The range of parent materials is, with the exception of highly unusual substrates like serpentine, literally as great as possible types occurring in the northern Rocky Mountains and northernmost middle Rocky Mountains and may include some ultramafics east of the Cascade Crest. It is difficult to characterize the soils as well, but they are uniformly well-drained and have a low coarse-fragment content, except those sites within the lower to mid-subalpine zone. The overstory is dominated by Larix occidentalis with a whole host of tree species capable of playing a subordinate role; on warmer sites these include Thuja plicata, Tsuga heterophylla, Abies grandis, and on colder or higher elevation sites are found Abies lasiocarpa, Tsuga mertensiana, and Picea engelmannii. However, the most frequent canopy codominants or associates are the seral species Larix occidentalis, Pinus contorta, and in a restricted portion of the type's range, Pinus monticola. The tall-shrub component is relatively unimportant, only Alnus viridis ssp. sinuata and Amelanchier alnifolia approach 50% constancy (and have low cover values). The short-shrub layer exhibits greater cover and diversity than the other shrub components with Vaccinium membranaceum, Paxistima myrsinites, Rosa gymnocarpa, Rubus parviflorus, and Spiraea lucida (=betulifolia) being consistently present. Linnaea borealis and Chimaphila umbellata have high constancy in the dwarf-shrub layer. Bromus vulgaris (or Bromus ciliatus) are the only graminoids of note. The diagnostic forbs Clintonia uniflora, Xerophyllum tenax, and Tiarella trifoliata naturally have high constancy and/or cover; however, a number of other forbs also exhibit high constancy, including Arnica latifolia, Aralia nudicaulis, Adenocaulon bicolor, Coptis occidentalis, Cornus canadensis, Galium triflorum, Goodyera oblongifolia, Maianthemum stellatum, Osmorhiza berteroi, Pedicularis racemosa, Orthilia secunda, Thalictrum occidentale, Trillium ovatum, and Viola orbiculata.

Distribution	This association occurs from the Blue, Wallowa and Seven Devils mountains of northeastern Oregon and southern portion of the Idaho Batholith of central Idaho northward to the Colville National Forest of northeastern Washington, across northern Idaho and into western Montana (almost exclusively west of the Continental Divide). Given the opportunity for more complete crosswalking, this type might well be documented from British Columbia and the east slope of the Cascades; Lillybridge et al. (1995) do document both Clintonia uniflora and Larix occidentalis as common forest components from the eastern slope of the Cascades, but the two species do not uniquely overlap in space.
Environment	This wholly seral, large-patch to matrix type occupies the relatively cold and dry environments across a number of climax tree series and associated geographic regions; the species defining these series include, but are not limited to, Thuja plicata, Tsuga heterophylla, Tsuga mertensiana, Abies grandis, Abies lasiocarpa, and Picea engelmannii. Thus this mesic type is found throughout the northern Rocky Mountains and may extend as far west as the Cascade Crest on environments characterized as foothills and montane to lower and even mid-subalpine. This association's possible elevation range is from 915 to 1800 m (3000-5900 feet). Regardless of the climax series in which it is found, it consistently occurs on south- through west-facing exposures. The range of parent materials is, with the exception of highly unusual substrates like serpentine, literally as great as possible types occurring in the northern Rocky Mountains and northernmost middle Rocky Mountains and may include some ultramafics east of the Cascade Crest. It is difficult to characterize the soils as well, but they are uniformly well-drained and have a low coarse-fragment content, except those sites within the lower to mid-subalpine zone.
Physiognomy	--
Vegetation	The overstory is dominated by seral Larix occidentalis with a whole host of tree species capable of playing a subordinate role; on warmer sites these include Thuja plicata, Tsuga heterophylla, Abies grandis, and on colder or higher elevation sites are found Abies lasiocarpa, Tsuga mertensiana, and Picea engelmannii. However, the most frequent canopy codominants or associates are the seral species Pseudotsuga menziesii, Pinus contorta, and in a restricted portion of the type's range, Pinus monticola. The tall-shrub component is relatively unimportant, only Alnus viridis ssp. sinuata and Amelanchier alnifolia approach 50% constancy (and have low cover values). The short-shrub layer exhibits greater cover and diversity than the other shrub components with Vaccinium membranaceum, Paxistima myrsinites, Rosa gymnocarpa, Rubus parviflorus, and Spiraea lucida (=betulifolia) being consistently present. Linnaea borealis and Chimaphila umbellata have high constancy in the dwarf-shrub layer. Bromus vulgaris (or Bromus ciliatus) are the only graminoids of note. The diagnostic forbs Clintonia uniflora and Tiarella trifoliata between them are 100% constant though their cover seldom exceeds 10% singly or in combination. See Classification Comments for a more in-depth exposition on the reasons both Vaccinium membranaceum and Xerophyllum tenax are used as alternative indications of a particular subset of plots (and distinct environment) than characterized by Clintonia uniflora or Tiarella alone; in any given locality this type should be located at higher elevations and on warmer slopes with better drained soils than say Larix occidentalis / Clintonia uniflora. A

	number of other forbs also exhibit high constancy include Arnica latifolia, Aralia nudicaulis, Adenocaulon bicolor, Coptis occidentalis, Cornus canadensis, Galium triflorum, Goodyera oblongifolia, Maianthemum stellatum, Osmorhiza berteroi (= Osmorhiza chilensis), Pedicularis racemosa, Orthilia secunda, Thalictrum occidentale, Trillium ovatum, and Viola orbiculata. Within local landscapes some forbs exhibit high constancy not recorded in other regions, e.g., in northern Idaho Anemone piperi and Pyrola asarifolia are nearly always present.
Dynamics	This association is sufficiently mesic to support a host of tree species more shade-tolerant than Larix occidentalis (perhaps least shade-tolerant of western conifers, excepting those of considerably more xeric environments) and therefore the association is wholly a seral community type. Larix occidentalis is a long-lived species (in excess of 700 years in the northern Rocky Mountains) and thus stands fitting this concept are themselves long-persisting; the life of Larix-dominated stands probably does not much exceed 250 years due to various mortality sources and the ingrowth of shade-tolerant species. It has been noted in northern Idaho that following disturbance (particularly logging) in this type Larix occidentalis does not necessarily succeed itself, the first tree-dominated successional stages being dominated by Pseudotsuga menziesii, Pinus contorta, or less frequently by more shade-tolerant species (Cooper et al., 1991); this response is a consequence of the episodic nature of favorable cone crop years in Larix occidentalis.
Adjacent Types	--
Classification Comments	Not previously identified at MSSP.

Scientific Name	Larix occidentalis / Clintonia uniflora Forest
EL Code — WNHP Abb	CEGL005880 — LAROCC/CLIUNI
CSR	GNR/SNR
Ecological System	CES306.837 Northern Rocky Mountain Western Larch Savanna
Element Summary	Broadly distributed throughout the northern Rocky Mountains and adjacent terrain, this large-patch to matrix seral community occupies relatively moist (mesic) and warm to cool sites having free air drainage and lacking frost pocket conditions. Elevations range in the north from760 to 1585 m (4500-5200 feet) (extreme outliers at 1710 m (5600 feet)), whereas to the south it ranges from 1060 to 1710 m (3500-5600 feet). It occurs on slopes of all degrees of steepness and aspect orientation, though it is more likely to occur from toeslope through midslope positions (predominantly collecting positions). At the dry extreme of its distribution it is more strongly associated with protected positions such as concave slopes, moist depressions on gentle slopes or plateaus, stringers along perennial stream bottoms, toeslopes and northeastern aspects. Though sites are mesic, verging on hygric, they are inferred to be only briefly or seasonally influenced, if at all, by a high water table; Larix occidentalis occurrence is strongly associated with well-drained positions. A wide variety of parent materials are represented, including those as disparate as granite and limestone, including all manner of glacial-fluvial material. In northern Idaho and northwestern Montana, it is routinely found on ash caps, ranging from 3 to 60 cm in depth. The soil textures are predominantly loams and silt loams (reflecting in part the volcanic ash); soils typically have less than 15% coarse fragment content and are well-drained. This mesic seral association is characterized by Larix occidentalis dominating the upper canopy, though other tree species occur with lesser cover, including both other species considered almost exclusively seral Pinus contorta and Pinus monticola and those capable of functioning as both seral and climax species, including those from warmer environments, Pinus ponderosa (very limited representation), Pseudotsuga menziesii, Thuja plicata, and Tsuga heterophylla and those of colder environments, Abies lasiocarpa, Abies grandis, and Picea engelmannii. The shrub layer may be highly diverse with tall shrubs (e.g., Acer glabrum, Taxus brevifolia, Amelanchier alnifolia), short shrubs (Symphoricarpos albus, Paxistima myrsinites, Rubus parviflorus, Spiraea lucida (=betulifolia)), and dwarf-shrubs (e.g., Chimaphila umbellata, Linnaea borealis, Mahonia repens) abundantly represented. The graminoid component is inconspicuous with no one species exhibiting high constancy, though Bromus vulgaris, Bromus ciliatus, and Calamagrostis rubescens are more consistently present and with greater cover than other graminoids. The cover of the diagnostic forbs Clintonia uniflora and Tiarella trifoliata is greatest when this type occurs in the zones potentially dominated by Thuja plicata and Tsuga heterophylla, up to 30% canopy cover (can even be a dominant forb), whereas in the colder environments characterized by Abies lasiocarpa, Abies grandis, and Picea engelmannii potential dominance cover of these diagnostics and all forbs is generally less. Other forbs of high constancy, at least in some portion of this association's considerable range, are Aralia nudicaulis, Adenocaulon bicolor, Coptis occidentalis, Cornus canadensis, Galium triflorum, Goodyera oblongifolia,

	Maianthemum stellatum, Osmorhiza berteroi, Orthilia secunda, Thalictrum occidentale, Trillium ovatum, Viola glabella (or Viola canadensis), and Viola orbiculata.
Distribution	This association occurs from the Blue, Wallowa and Seven Devils mountains of northeastern Oregon and southern portion of the Idaho Batholith of central Idaho northward to the Colville National Forest of northeastern Washington, across northern Idaho and into western Montana (almost exclusively west of the Continental Divide). Given the opportunity for more complete crosswalking, this type might well be documented from British Columbia and the east slope of the Cascades; Lillybridge et al. (1995) do document both Clintonia uniflora and Larix occidentalis as common forest components from the eastern slope of Cascades, but the two species do not uniquely overlap in space.
Environment	Broadly distributed throughout the northern Rocky Mountains and adjacent Okanogan Highlands of Washington, Blue Mountains of northeastern Oregon, and Wallowa and Seven Devils uplifts of northeastern Oregon and central Idaho, this large-patch to matrix seral community occupies relatively moist (mesic) and warm to cool sites having free air drainage, and lacking frost pocket conditions. Elevations range in the north from 760 to 1585 m (4500-5200 feet) (extreme outliers at 1710 m (5600 feet)), whereas to the south it ranges from 1060 to 1710 m (3500-5600 feet). It occurs on slopes of all degrees of steepness and aspect orientation, though it is more likely to occur from toeslope through midslope positions (predominantly collecting positions). At the dry extreme of its distribution it is more strongly associated with protected positions such as concave slopes, moist depressions on gentle slopes or plateaus, stringers along perennial stream bottoms, toeslopes and northeastern aspects. Though sites are mesic, verging on hygric, they are inferred to be only briefly or seasonally influenced, if at all, by a high water table; Larix occidentalis occurrence is strongly associated with well-drained positions. A wide variety of parent materials are represented, including those as disparate as granite and limestone, including all manner of glacial-fluvial material. In northern Idaho and northwestern Montana, it is routinely found on ash caps, ranging from 3 to 60 cm in depth. The soil textures are predominantly loams and silt loams (reflecting in part the volcanic ash); soils typically have less than 15% coarse fragment content and are well-drained.
Physiognomy	--
Vegetation	This mesic seral association is characterized by the dominance of Larix occidentalis in the upper canopy, though other tree species occur with lesser cover, including both species considered almost exclusively seral, Pinus contorta and Pinus monticola, and those capable of functioning as both seral and climax species, including those from warmer environments, Pinus ponderosa (very limited representation), Pseudotsuga menziesii, Thuja plicata, and Tsuga heterophylla and those of colder environments, Abies lasiocarpa, Abies grandis, and Picea engelmannii. The shrub layer may be highly diverse with tall shrubs (e.g., Acer glabrum, Taxus brevifolia, Amelanchier alnifolia), short shrubs (Symphoricarpos albus, Paxistima myrsinites, Rubus parviflorus, Spiraea lucida (=betulifolia)), and dwarf-shrubs (e.g., Chimaphila umbellata, Linnaea borealis, Mahonia repens) abundantly represented. The graminoid component is inconspicuous with no one species exhibiting high constancy, though Bromus vulgaris, Bromus ciliatus, and

	Calamagrostis rubescens are more consistently present and with greater cover than other graminoids. The cover of the diagnostic forbs Clintonia uniflora and Tiarella trifoliata is greatest when this type occurs in the zones potentially dominated by Thuja plicata and Tsuga heterophylla, up to 30% canopy cover (can even be a dominant forb), whereas in the colder environments characterized by Abies lasiocarpa, Abies grandis, and Picea engelmannii potential dominance cover of these diagnostics and all forbs is generally less. Other forbs of high constancy, at least in some portion of this association's considerable range, are Aralia nudicaulis, Adenocaulon bicolor, Coptis occidentalis, Cornus canadensis, Galium triflorum, Goodyera oblongifolia, Maianthemum stellatum, Osmorhiza berteroi (= Osmorhiza chilensis), Orthilia secunda , Thalictrum occidentale, Trillium ovatum, Viola glabella (or Viola canadensis), and Viola orbiculata.
Dynamics	This association is sufficiently mesic to support a host of tree species more shade-tolerant than Larix occidentalis (perhaps least shade-tolerant of western conifers, excepting those of considerably more xeric environments) and therefore the association is wholly a seral community type. Larix occidentalis is a long-lived species (in excess of 700 years in the northern Rocky Mountains) and thus stands fitting this concept are themselves long-persisting; the life of Larix-dominated stands probably does not much exceed 250 years due to various mortality sources and the ingrowth of shade-tolerant species. It has been noted in northern Idaho that following disturbance (particularly logging) in this type that Larix occidentalis often does not succeed itself, the first tree-dominated successional stages being dominated by Pseudotsuga menziesii, Pinus contorta, or less frequently by more shade-tolerant species (Cooper et al. 1987); this response is a consequence of the episodic nature of favorable cone crop years in Larix occidentalis.
Adjacent Types	--
Classification Comments	Not previously identified at MSSP.

G211 Central Rocky Mountain-Interior Mesic Grand Fir - Douglas-fir - Western Larch Forest

A3362 Abies grandis - Pseudotsuga menziesii Central Rocky Mountain Forest & Woodland Alliance

Scientific Name	Pseudotsuga menziesii / Clintonia uniflora - Xerophyllum tenax Forest
EL Code — WNHP Abb	CEGL005854 — PSEMEN/CLIUNI-XERTEN
CSR	G4/SNR
Ecological System	CES306.802 Northern Rocky Mountain Mesic Montane Mixed Conifer Forest
Element Summary	This is a seral, mesic, large-patch to matrix type found in the foothills and montane to lower and even mid-subalpine, relatively cold and dry environments throughout the northern Rocky Mountains and may extend as far west as the Cascade Crest. The associations' possible elevation range is from 915 to 1800 m (3000-5900 feet), and regardless of the climax series in which it is found, it consistently occurs on south- through west-facing exposures. The range of parent materials is, with the exception of highly unusual substrates like serpentine, literally as great as possible types occurring in the northern Rocky Mountains and northernmost middle Rocky Mountains and may include some ultramafics east of the Cascade Crest. It is difficult to characterize the soils as well, but they are uniformly well-drained and have a low coarse-fragment content, except those sites within the lower to mid-subalpine zone. The overstory is dominated by Pseudotsuga menziesii with a whole host of tree species capable of playing a subordinate role; on warmer sites these include Thuja plicata, Tsuga heterophylla, Abies grandis, and on colder or higher elevation sites are found Abies lasiocarpa, Tsuga mertensiana, and Picea engelmannii. However, the most frequent canopy codominants or associates are the seral species Larix occidentalis, Pinus contorta, and in a restricted portion of the type's range, Pinus monticola. The tall-shrub component is relatively unimportant, only Alnus viridis ssp. sinuata and Amelanchier alnifolia approach 50% constancy (and have low cover values). The short-shrub layer exhibits greater cover and diversity than the other shrub components with Vaccinium membranaceum, Paxistima myrsinites, Rosa gymnocarpa, Rubus parviflorus, and Spiraea lucida (=betulifolia) being consistently present. Linnaea borealis and Chimaphila umbellata have high constancy in the dwarf-shrub layer. Bromus vulgaris (or Bromus ciliatus) are the only graminoids of note. The diagnostic forbs Clintonia uniflora, Xerophyllum tenax, and Tiarella trifoliata naturally have high constancy and/or cover, however, a number of other forbs also exhibit high constancy, including Arnica latifolia, Aralia nudicaulis, Adenocaulon bicolor, Coptis occidentalis, Cornus canadensis, Galium triflorum, Goodyera oblongifolia, Maianthemum stellatum, Osmorhiza berteroi, Pedicularis racemosa, Orthilia secunda, Thalictrum occidentale, Trillium ovatum, and Viola orbiculata.
Distribution	This association occurs from the Blue and Wallowa mountains of northeastern Oregon and southern portion of the Idaho Batholith of central Idaho northward to the Colville National Forest of northeastern Washington, across northern Idaho and into western Montana, predominantly west of the Continental Divide, and as far east as southwestern Alberta. Given opportunity for more complete crosswalking, this type could well be documented from British Columbia and the

	east slope of the Cascades (the fact that a different subspecies of Pseudotsuga menziesii is distributed west of the Cascades argues for considering those communities as different.
Environment	This seral, large-patch to matrix type occupies the relatively cold and dry environments across a number of climax tree series and associated geographic regions; the species defining these series include, but are not limited to, Thuja plicata, Tsuga heterophylla, Tsuga mertensiana, Abies grandis, Abies lasiocarpa, and Picea engelmannii. Thus this mesic type is found throughout the northern Rocky Mountains and may extend as far west as the Cascade Crest on environments characterized as foothills and montane to lower and even mid subalpine. The associations possible elevation range is from 915 to 1800 m (3000-5900 feet), and regardless of the climax series in which it is found, it consistently occurs on south- through west-facing exposures. These are generally more shedding than collecting positions, occurring in any ridge or hillslope system from midslope up to ridge crest, including level terrain of ridge summits. The range of parent materials is, with the exception of highly unusual substrates like serpentine, literally as great as possible types occurring in the northern Rocky Mountains and northernmost middle Rocky Mountains and may include some ultramafics east of the Cascade Crest. It is difficult to characterize the soils as well, but they are uniformly well-drained and have a low coarse-fragment content, except those sites within the lower to mid-subalpine zone.
Physiognomy	--
Vegetation	The overstory is dominated by Pseudotsuga menziesii with a whole host of tree species capable of playing a subordinate role; on warmer sites these include Thuja plicata, Tsuga heterophylla, Abies grandis, and on colder or higher elevation sites are found Abies lasiocarpa, Tsuga mertensiana, and Picea engelmannii. However, the most frequent canopy codominants or associates are the seral species Larix occidentalis, Pinus contorta, and in a restricted portion of the type's range, Pinus monticola. The tall-shrub component is relatively unimportant, only Alnus viridis ssp. sinuata and Amelanchier alnifolia approach 50% constancy (and have low cover values). The short-shrub layer exhibits greater cover and diversity than the other shrub components with Vaccinium membranaceum, Paxistima myrsinites, Rosa gymnocarpa, Rubus parviflorus, and Spiraea lucida (=betulifolia) being consistently present. Linnaea borealis and Chimaphila umbellata have high constancy in the dwarf-shrub layer. Bromus vulgaris (or Bromus ciliatus) are the only graminoids of note. The diagnostic forbs Clintonia uniflora, Xerophyllum tenax, and Tiarella trifoliata naturally have high constancy and/or cover, however, a number of other forbs also exhibit high constancy including Arnica latifolia, Aralia nudicaulis, Adenocaulon bicolor, Coptis occidentalis, Cornus canadensis, Galium triflorum, Goodyera oblongifolia, Maianthemum stellatum, Osmorhiza berteroi (= Osmorhiza chilensis), Pedicularis racemosa, Orthilia secunda , Thalictrum occidentale, Trillium ovatum, and Viola orbiculata.
Dynamics	--
Adjacent Types	--
Classification Comments	Not previously identified at MSSP.

Scientific Name	Pseudotsuga menziesii / Clintonia uniflora Forest
EL Code — WNHP Abb	CEGL005850 — PSEMEN/CLIUNI
CSR	G4/SNR
Ecological System	CES306.802 Northern Rocky Mountain Mesic Montane Mixed Conifer Forest
Element Summary	Broadly distributed throughout the northern Rocky Mountains and adjacent terrain, this large-patch to matrix seral community occupies relatively moist (mesic) and warm to cool sites having free air drainage and lacking frost-pocket conditions. It occurs on slopes of all degrees of steepness and aspect orientation, though it is more likely to occur from toeslope through midslope positions (predominantly collecting positions). At the dry extreme of its distribution it is more strongly associated with protected positions such as concave slopes, moist depressions in gently sloping plateau areas, stringers along perennial stream bottoms, toeslopes and northeastern aspects. In the north it ranges from 760 to 1585 m, whereas to the south it ranges from 1060 to 1710 m (3500-5600 feet). A wide variety of parent materials are represented, including those as disparate as granite and limestone, including all manner of glacial-fluvial material. In northern Idaho and northwestern Montana, it is routinely found on ash caps, ranging from 3 to 60 cm in depth. The soil textures are predominantly loams and silt loams; soils typically have less than 15% coarse-fragment content and are well-drained. This mesic seral association is characterized by Pseudotsuga menziesii dominating the upper canopy, though other tree species occur with lesser cover, including Larix occidentalis, Pinus contorta, and Pinus monticola and including those from warmer environments, Pinus ponderosa, Thuja plicata, and Tsuga heterophylla, and those of colder environments, Abies lasiocarpa, Abies grandis, and Picea engelmannii. The shrub layer may be highly diverse with tall shrubs (e.g., Acer glabrum, Taxus brevifolia, Amelanchier alnifolia), short shrubs (e.g., Symphoricarpos albus, Paxistima myrsinites, Rubus parviflorus, Spiraea lucida (=betulifolia)), and dwarf-shrubs (e.g., Chimaphila umbellata, Linnaea borealis, Mahonia repens) abundantly represented. The graminoid component is inconspicuous with no one species exhibiting high constancy, though Bromus vulgaris, Bromus ciliatus, and Calamagrostis rubescens are more consistently present and with greater cover than other graminoids. The cover of the diagnostic forbs Clintonia uniflora and Tiarella trifoliata is greatest when this type occurs in the zones potentially dominated by Thuja plicata and Tsuga heterophylla, up to 30% canopy cover (can even be a dominant forb), whereas in the colder environments characterized by Abies lasiocarpa, Abies grandis, and Picea engelmannii, potential cover of these diagnostics and all forbs is generally less. Other forbs of high constancy, at least in some portion of this association's considerable range, are Aralia nudicaulis, Adenocaulon bicolor, Coptis occidentalis, Cornus canadensis, Galium triflorum, Goodyera oblongifolia, Maianthemum stellatum, Osmorhiza berteroi, Orthilia secunda, Thalictrum occidentale, Trillium ovatum, Viola glabella (or Viola canadensis), and Viola orbiculata.

Distribution	This association occurs from the Blue and Wallowa mountains of northeastern Oregon and southern portion of the Idaho Batholith of central Idaho northward to the Colville National Forest of northeastern Washington, across northern Idaho and into western Montana, predominantly west of the Continental Divide, and southwestern Alberta. Given the opportunity for more complete crosswalking, this type could well be documented from British Columbia and the east slope of the Cascades (the fact that a different subspecies of Pseudotsuga menziesii is distributed west of the Cascades argues for considering those communities as different).
Environment	This broadly distributed, large-patch to matrix seral community occupies relatively moist (mesic) and relative warm to cool sites having free air drainage and lacking frost-pocket conditions. It occurs on slopes of all degrees of steepness and aspect orientation, though it is more likely to occur from toeslope through midslope positions (predominantly collecting positions). At the dry extreme of its distribution it is more strongly associated with protected positions such as concave slopes, moist depressions in gently sloping plateau areas, stringers along perennial stream bottoms, toeslopes and northeastern aspects. In the north it ranges from760 to 1585 m (450-5200 feet) (extreme outliers at 1710 m (5600 feet)), whereas to the south it ranges from 1060 to 1710 m (3500-5600 feet). A wide variety of parent materials are represented, including those as disparate as granite and limestone, including all manner of glacial-fluvial material. In northern Idaho and northwestern Montana, it is routinely found on ash caps, ranging from 3 to 60 cm in depth. The soil textures are predominantly loams and silt loams (reflecting in part the volcanic ash); soils typically have less than 15% coarse-fragment content and are well-drained.
Physiognomy	--
Vegetation	This mesic seral association is characterized by Pseudotsuga menziesii dominating the upper canopy, though other tree species occur with lesser cover, including both other species considered almost exclusively seral Larix occidentalis, Pinus contorta, and Pinus monticola, and those capable of functioning as both seral and climax species, including those from warmer environments, Pinus ponderosa, Thuja plicata, and Tsuga heterophylla, and those of colder environments, Abies lasiocarpa, Abies grandis, and Picea engelmannii. The shrub layer may be highly diverse with tall shrubs (e.g., Acer glabrum, Taxus brevifolia, Amelanchier alnifolia), short shrubs (e.g., Symphoricarpos albus, Paxistima myrsinites, Rubus parviflorus, Spiraea lucida (=betulifolia)), and dwarf-shrubs (e.g., Chimaphila umbellata, Linnaea borealis, Mahonia repens) abundantly represented. The graminoid component is inconspicuous with no one species exhibiting high constancy, though Bromus vulgaris, Bromus ciliatus, and Calamagrostis rubescens are more consistently present and with greater cover than other graminoids. The cover of diagnostic forbs Clintonia uniflora and Tiarella trifoliata is greatest when this type occurs in the zones potentially dominated by Thuja plicata and Tsuga heterophylla, up to 30% canopy cover (can even be a dominant forb), whereas in the colder environments characterized by Abies lasiocarpa, Abies grandis, and Picea engelmannii, potential dominance cover of these diagnostics and all forbs is generally less. Other forbs of high constancy, at least in some portion of this association's considerable range, are Aralia nudicaulis, Adenocaulon bicolor, Coptis

	occidentalis, Cornus canadensis, Galium triflorum, Goodyera oblongifolia, Maianthemum stellatum, Osmorhiza berteroi (= Osmorhiza chilensis), Orthilia secunda , Thalictrum occidentale, Trillium ovatum, and Viola orbiculata.
Dynamics	This association is sufficiently mesic to support a host of tree species more shade-tolerant than Pseudotsuga and therefore the association is a seral community type. Pseudotsuga is a long-lived species (in excess of 500 years in the northern Rocky Mountains), and thus stands fitting this concept are themselves long-persisting. It has been noted in northern Idaho that following disturbance in this type Pseudotsuga often does not succeed itself, the first tree-dominated successional stages being dominated by Larix occidentalis, Pinus contorta, or less frequently by more shade-tolerant species.
Adjacent Types	--
Classification Comments	Not previously identified at MSSP.

Scientific Name	Pseudotsuga menziesii / Physocarpus malvaceus - Linnaea borealis Forest
EL Code — WNHP Abb	CEGL000448 — PSEMEN/PHYMAL-LINBOR
CSR	G4/S4
Ecological System	CES306.802 Northern Rocky Mountain Mesic Montane Mixed Conifer Forest
Element Summary	[Adapted from Williams et al. (1995)] This association is very similar to the PSEMEN/PHYMAL association that occurs on apparently slightly more xeric habitats. This association is separated by the presence of western larch and/or Linnaea borealis. These species indicate a moister environment and a different successional pathway (Arno et al., 1985). Douglas-fir is normally dominant. Ponderosa pine is less common in these stands as compared to PSEMEN/PHYMAL. Western larch and lodgepole pine are more important on the moister sites within the type. Shrubs are common and Physocarpus malvaceus is typically the most abundant species. Holodiscus discolor may be locally abundant and is used as an alternate indicator species for these sites. Spiraea lucida (= betulifolia), Paxistima myrsinites, Amelanchier alnifolia, Acer glabrum, Mahonia spp., Symphoricarpos albus, and Rosa gymnocarpa are other shrubs that may be abundant. Calamagrostis rubescens is the most common and abundant herb but other common species include Prosartes trachycarpa, Arnica cordifolia, Fragaria spp., and Eurybia spectabilis. For additional information, see Williams et al. (1990).
Distribution	--
Environment	This association occupies warm, xeric habitats primarily on lower and mid-slope positions on a variety of aspects. At elevations nearer the lower forest margin, it may be on sheltered north slopes, draws and swales while at higher elevations it is usually found on southeast to west-facing aspects. Elevations range from 2,000 to 5,000 ft.
Physiognomy	--
Vegetation	--
Dynamics	--
Adjacent Types	--
Classification Comments	The presence of Larix occidentalis is supposed to be an indicator for this community relative to PSEMEN/PHYMAL. However, the description for PSEMEN/PHYMAL also states that some stands of that association in the Clearwater National Forest also support Larix occidentalis. Not previously identified at MSSP.

Scientific Name	Pseudotsuga menziesii / Vaccinium membranaceum / Xerophyllum tenax Forest
EL Code — WNHP Abb	CEGL005852 — PSEMEN/VACMEM/XERTEN
CSR	G4/SNR
Ecological System	CES306.802 Northern Rocky Mountain Mesic Montane Mixed Conifer Forest
Element Summary	This large-patch to matrix type is manifested as both a seral and climax type from central Idaho north to northern Idaho, eastern Washington, western Montana and southwestern Alberta, and it very probably will be identified for British Columbia. As a climax type this association is most prominent in west-central and central Montana forests. This association's elevation range is rather broad, ranging from 1030 to 2015 m (3100-6600 feet). Virtually the whole of this appreciable elevation range can be realized in a given geographic area due to the type's presence as both a seral and late-successional type. It occupies primarily south- through west-facing, moderate to steep slopes and is usually found on midslope to slope-shoulder positions. It also occurs on benches associated with broad ridges. Soils are well-drained and derived from a broad spectrum of parent materials, including glacial till and drift, both calcareous and noncalcareous sedimentary types, intrusive and extrusive igneous rock and metamorphic types, particularly quartzite. Ground surfaces have little or no bare soil or rock exposed. The canopy structure ranges from moderately open to closed (>60% cover) with Pseudotsuga menziesii being the dominant canopy tree, often joined by lesser amounts of Larix occidentalis and Pinus contorta (sites are beyond the cold limits of Pinus ponderosa for the most part). At its mid to upper elevation limits Abies grandis, Abies lasiocarpa, and Picea engelmannii may be minor components of the overstory and major components of the subcanopy. A tall-shrub layer is absent and even scattered individuals are rare. The short-shrub layer dominates the undergrowth with Vaccinium membranaceum being dominant, often exceeding 50% canopy cover. Spiraea lucida (=betulifolia), Lonicera utahensis, Paxistima myrsinites, Amelanchier alnifolia, and Rosa gymnocarpa are the other high-constancy species of this layer. Dwarf-shrub layer species that occur with consistence include only Vaccinium scoparium and Mahonia repens. The herbaceous layer is generally relatively depauperate with the diagnostic species Xerophyllum tenax being strongly dominant (average cover reported by various studies ranging from 25 to 61%). Only two graminoids occur consistently and are well-represented in cover, Calamagrostis rubescens and Carex geyeri. Other forbs with moderate to high constancy include Arnica cordifolia, Arnica latifolia, Chimaphila umbellata, Orthilia secunda, Thalictrum occidentale, and Viola orbiculata; not all of these forbs have high constancy throughout the range of the type.
Distribution	This large-patch to matrix type is found from central Idaho north to northern Idaho, eastern Washington, western Montana and southwestern Alberta, and it very probably will be identified for British Columbia with additional crosswalking.

Environment	This large-patch to matrix type is manifested as both a seral and climax type from central Idaho north to northern Idaho, eastern Washington, western Montana and southwestern Alberta, and it very probably will be identified for British Columbia. As a climax type this association is most prominent in west-central and central Montana forests. This association's elevation range is rather broad ranging from 1030 to 2015 m (3100-6600 feet). Virtually the whole of this appreciable elevation range can be realized in a given geographic area due to type's presence as both a seral and climax type (within the Abies grandis and Abies lasiocarpa - Picea engelmannii Series). It occupies primarily south- through west-facing, moderate to steep slopes, usually found on midslope to slope-shoulder positions. It also occurs on benches associated with broad ridges. Soils are well-drained and derived from a broad spectrum of parent materials, including glacial till and drift, both calcareous and noncalcareous sedimentary types, intrusive and extrusive igneous rock and metamorphic types, particularly quartzite. In one study soil texture ranged from gravelly sandy loams to silts, and a yet greater range in texture can be expected across the type's distribution. Ground surfaces have little or no bare soil or rock exposed.
Physiognomy	--
Vegetation	The canopy structure ranges from moderately open to closed (>60% cover) with Pseudotsuga menziesii being the dominant canopy tree, often joined by lesser amounts of Larix occidentalis and Pinus contorta (sites beyond the cold limits of Pinus ponderosa for most part). At its mid to upper elevational limits Abies grandis, Abies lasiocarpa, Tsuga mertensiana, and Picea engelmannii may be minor components of the overstory and major components of the subcanopy. A tall-shrub layer is absent and even scattered individuals are rare. The short-shrub layer dominates the undergrowth with Vaccinium membranaceum being dominant, often exceeding 50% canopy cover; Spiraea lucida (=betulifolia), Lonicera utahensis, Paxistima myrsinites, Amelanchier alnifolia, and Rosa gymnocarpa are the other high-constancy species of this layer. Dwarf-shrub layer species that occur with consistency include only Vaccinium scoparium and Mahonia repens (= Berberis repens). The herbaceous layer is generally relatively depauperate with the diagnostic species Xerophyllum tenax being strongly dominant (average cover reported by various studies ranging from 25 to 61%). Only two graminoids occur consistently and are well-represented, Calamagrostis rubescens and Carex geyeri. Other forbs with moderate to high constancy include Arnica cordifolia, Arnica latifolia, Chimaphila umbellata, Orthilia secunda , Thalictrum occidentale, and Viola orbiculata; not all of these forbs have high constancy throughout the range of the type.
Dynamics	Some stands of this type will, in the absence of disturbance, succeed to Abies lasiocarpa, Abies grandis or Picea engelmannii dominance in the upper canopy; in other examples of the type (where Pseudotsuga menziesii is the potential climax dominant), stands currently Larix occidentalis- and Pinus contorta-dominated will succeed to Pseudotsuga menziesii dominance, albeit at a very slow pace and not within the 100- to 300-year fire-return interval cited for this type (Arno & Petersen, 1983).
Adjacent Types	--

Classification Comments	Not previously identified at MSSP.

Scientific Name	Pseudotsuga menziesii / Vaccinium membranaceum Forest
EL Code — WNHP Abb	CEGL000466 — PSEMEN/VACMEM
CSR	G5?/S3S5Q
Ecological System	CES306.802 Northern Rocky Mountain Mesic Montane Mixed Conifer Forest
Element Summary	This association occurs in the mountains of northern and eastern Idaho, western and central Montana, and western Wyoming. It occurs from 1310 to 2286 m (4300-7500 feet) in elevation on mostly north-facing slopes but can occur on any aspect; slopes are moderately steep to steep (12-82%). Soils are well-drained, generally acidic, with gravelly sandy loam to gravelly silty loam textures. These tall forests are dominated by mature Pseudotsuga menziesii. Other conifers often present in the subcanopy include Pinus contorta, Abies lasiocarpa, Picea engelmannii, Abies grandis, Pinus albicaulis, Pinus ponderosa, and Larix occidentalis. Pinus contorta is the most common co-associate. The understory is relatively open; the short- (1-3 feet tall) and dwarf-shrub layers (<1 foot tall) are dominated by Vaccinium membranaceum. Other shrubs that may be present include Spiraea lucida (=betulifolia), Lonicera utahensis, Paxistima myrsinites, Sorbus scopulina, Acer glabrum, and Mahonia repens. In the northern part of the range, Vaccinium membranaceum may be replaced by V. myrtillus. Calamagrostis rubescens is the most common graminoid in the herbaceous undergrowth.
Distribution	This association is known to occur in northern and eastern Idaho, western and central Montana, western Wyoming, and possibly Washington.
Environment	It occurs from 1310 to 2286 m (4300-7500 feet) in elevation on mostly north-facing slopes but can occur on any aspect; slopes are moderately steep to steep (12-82%). Soils are well-drained, generally acidic, with gravelly sandy loam to gravelly silty loam textures.
Physiognomy	--
Vegetation	These tall forests are dominated by mature Pseudotsuga menziesii. Other conifers often present in the subcanopy include Pinus contorta, Abies lasiocarpa, Picea engelmannii, Abies grandis, Pinus albicaulis, Pinus ponderosa, and Larix occidentalis. Pinus contorta is the most common associate. The understory is relatively open; the short-(1-3 feet tall) and dwarf-shrub layers (<1/2 foot tall) are dominated by Vaccinium membranaceum. Other shrubs that may be present include Spiraea lucida (=betulifolia), Lonicera utahensis, Paxistima myrsinites, Sorbus scopulina, Acer glabrum, and Mahonia repens. In the northern part of the range, Vaccinium membranaceum may be replaced by V. myrtillus. Calamagrostis rubescens is the most common graminoid in the herbaceous undergrowth.
Dynamics	--
Adjacent Types	--
Classification Comments	Not previously identified at MSSP.

Scientific Name	Abies grandis / Acer glabrum Forest
EL Code — WNHP Abb	CEGL000267 — ABIGRA/ACEGLA
CSR	G3/S2
Ecological System	CES306.802 Northern Rocky Mountain Mesic Montane Mixed Conifer Forest
Element Summary	These conifer forests are native to the Blue Mountains and Wallowa mountains of northeastern Oregon, southeastern Washington and Idaho's Payette National Forest. This forest association is typified by a rich shrub layer, and occurs both on mid-slopes and riparian corridors at elevations of 1000-1950 m (3300-6400 feet). Sites occur on all aspects and a wide variety of slopes. Soils tend to be silt loam and sand over residuum, colluvium, and alluvium of igneous rock with an ash mantle. The tree canopy is dominated by Abies grandis. Occasional codominants are Picea engelmannii, Pseudotsuga menziesii, and Larix occidentalis. The shrub cover is composed of Acer glabrum, Vaccinium membranaceum, and Rosa gymnocarpa. Cover of common herbaceous species includes Arnica cordifolia, Galium triflorum, Osmorhiza berteroi, Thalictrum occidentale, and Bromus vulgaris. Codominating tree species tend to be less common in the Wallowa and Seven Devils mountains.
Distribution	This forest association is native to the Blue and Wallowa mountains of northeastern Oregon's and central Idaho's Payette National Forest.
Environment	This association is found between 1070 and 1950 m (3500-6400 ft). It is typically found on mid to lower slopes facing north to east. It often extends down drainages, occurring in narrow bands above riparian vegetation on steep slopes directly above riparian vegetation of narrow V-canyon streams (Johnson and Simon 1985). According to Steele et al. (1981), soil parent materials are mainly basalt, granitic, and occasionally quartz diorite. Textures vary from clay loam to sandy loam with pH ranges averaging 6.1. Areas of bare rock or bare soil seldom exceed 5%. Litter depths average 10 cm. This is a moist type (Johnson & Simon, 1987). No precise climatic data are available for this type. However, its location in Idaho and Oregon subjects it to a maritime climate during winter and early spring which moderates its temperature and environment for plant growth through prolonged, gentle rainfall interspersed with periods of fog and heavy cloud cover. In late spring, the maritime influence diminishes and is replaced by a continental climate characterized by warm days and cold nights. Small amounts of precipitation are delivered in brief downpours. This results in plant species tolerating greater summer drought and severely fluctuating temperatures.
Physiognomy	--

Vegetation	In the tree layer, Abies grandis is dominant, averaging 42% cover. There are two main seral dominants, Pinus ponderosa (18% cover) and Pseudotsuga menziesii (17% cover). Small amounts of Larix occidentalis (10%), Picea engelmannii, and Abies lasiocarpa do occur. Acer glabrum (10%) dominates the shrub layer in old-growth stands. Common shrubs are Physocarpus malvaceus, Symphoricarpos albus, Spiraea lucida (=betulifolia), Sorbus scopulina, Lonicera utahensis, Rosa gymnocarpa (4%), Vaccinium membranaceum (7%), and Paxistima myrsinites. In the herbaceous layer, shade-tolerant forbs such as Adenocaulon bicolor and Prosartes trachycarpa help indicate this association, especially when the tree canopies become dense and the shrubs become depauperate. Cover of common herbaceous species includes Arnica cordifolia (6%), Galium triflorum (3%), Osmorhiza berteroi (= Osmorhiza chilensis) (3%), Thalictrum occidentale (4%), and Bromus vulgaris (2%). Calamagrostis rubescens also occurs in the herbaceous layer.
Dynamics	Damping-off fungus takes a heavy toll on Abies grandis seedlings during wet seasons, and insolation and drought cause mortality during the dry summer months. Seedlings are well established by the third year. Fire hazard is normally low to moderate under normal weather conditions (Fischer & Bradley, 1987). Although this type does not occur in Fischer and Bradley's study, this type is equivalent to their Group Eleven - warm, moist grand fir, western red-cedar, and western hemlock habitat types. The threat of fire is highest in the summer, when the moist maritime climate no longer prevails. During severe summer drought, heavy fuel loading from high plant productivity can set the stage for severe, widespread fires. Stands are replaced and sites revert to pioneer species. Summertime fuel moisture conditions in young stands are not nearly as high as in older, denser stands, and the effects of fire are often more severe than they are in older stands. Surface fires often scar the base of the grand fir, creating favorable entry points for decay organisms. The initial floral component, seeds stored on site, and the accidents of natural seeding and seedling establishment may structure the community following the fire more than the characteristics of the fire itself. Although generally true for all fire groups, it is more pronounced in this fire group. The use of fire for site preparation will usually result in increased spring and summer browse for big game in addition to successful regeneration of seral tree species.
Adjacent Types	This association intertwines with the warmer and drier Pseudotsuga menziesii / Physocarpus malvaceus Forest (CEGL000447) and Abies grandis / Spiraea betulifolia Forest (CEGL000281). It is found above riparian communities along drainages.
Classification Comments	--

Scientific Name	Abies grandis / Carex geyeri Woodland
EL Code — WNHP Abb	CEGL000917 — ABIGRA/CARGEY
CSR	G3/S3
Ecological System	CES306.802 Northern Rocky Mountain Mesic Montane Mixed Conifer Forest
Element Summary	[Adapted from Clausnitzer (1993)] This association (along with ABIGRA/CALRUB) represents the warmest and driest conditions among Abies grandis association. It is described from the Blue Mountains of northeastern Oregon and southeastern Washington. Carex geyeri frequently dominates the herb layer beneath a multi-stoned canopy of Abies grandis and Pseudotsuga menziesii. Symphoricarpos spp. are occasionally well-represented along with Chimaphila umbellata and Mahonia repens. The forb layer is often composed of Arnica cordifolia, Hieracium albiflorum, and Moehringia macrophylla. For additional information, see Topik et al. (1988).
Distribution	--
Environment	Occurs on mid and upper elevation slopes and ridges (4,650 to 6,750 feet), principally on residual soils.
Physiognomy	--
Vegetation	--
Dynamics	--
Adjacent Types	--
Classification Comments	Not previously identified at MSSP.

Scientific Name	Abies grandis / Clintonia uniflora Forest
EL Code — WNHP Abb	CEGL000272 — ABIGRA/CLIUNI
CSR	G5/S3
Ecological System	CES306.802 Northern Rocky Mountain Mesic Montane Mixed Conifer Forest
Element Summary	This association is found in northern Idaho, western Montana, eastern Washington, and northeastern Oregon at between 610 and 1860 m (2000-6100 feet) elevation. It represents a moist extreme of Abies grandis forests and usually occupies moist, well-drained slopes, benches, and stream terraces that are protected from extreme sun and wind on all aspects. This type is most often found on concave to undulating surface relief, receiving additional moisture and nutrients from the surrounding, more elevated landscape. Parent materials are usually basalt or granitic. Stands in this association are predominantly uneven-aged. Abies grandis is the indicated climax tree species and dominates both the overstory and understory in old-growth stands. Pseudotsuga menziesii and Picea engelmannii act as secondary seral dominants, with spruce in virtually all age classes in old-growth stands. Pinus ponderosa, Larix occidentalis, and Pinus contorta are the primary invaders of severely disturbed sites. In the shrub layer, Vaccinium membranaceum or Acer glabrum dominate the undergrowth. Vaccinium membranaceum (twice as abundant in early-seral stands), Rosa gymnocarpa, Lonicera utahensis, and Linnaea borealis are often abundant in this type. Clintonia uniflora accompanies a mixture of moist-site forbs in the herbaceous layer. Some moist-site indicators commonly present are Bromus vulgaris, Adenocaulon bicolor, Maianthemum stellatum, Coptis occidentalis, and Prosartes trachycarpa.
Distribution	This association is found in northern Idaho, western Montana, eastern Washington, and northeastern Oregon.
Environment	This association is found between 610 and 1860 m (2000-6100 feet) elevation. It represents a moist extreme of Abies grandis forests and usually occupies moist, well-drained slopes, benches, and stream terraces that are protected from extreme sun and wind on all aspects (Pfister et al., 1977). This type is most often found on concave to undulating surface relief, receiving additional moisture and nutrients from the surrounding, more elevated landscape. Parent materials are usually basalt or granitic. Soil pH averages 5.9, and areas of bare soil and bare rock are normally less than 1%. Average litter depth is at least 5 cm (Steele et al. 1981). Soils are typically dark brown to dark yellowish brown in color and greater than 100 cm (40 inches) in depth. Johnson and Simon (1987) and Williams et al. (1995) describe the soils for this type as formed in ash over older buried soil materials. In general, they may be rather poorly developed. Surface ash-soils have silt loam textures with less than 15% to less than 5% rock fragments by volume. Rock fragments are predominantly gravel-sized throughout all soil layers, although cobbles tend to increase in subsoils (Johnson & Simon, 1987). This is a cool, moist type. Weather data from Trout Creek, Montana, show a mean monthly temperature at 64°F for July and 23°F for January. There is an average of 4 frosts between June and August, a mean annual snowfall of 230 cm (90 inches),

	and a mean annual precipitation of 76 cm (30 inches). The location of this type in Idaho, Montana, Washington, and Oregon subjects it to a maritime climate during winter and early spring which moderates its temperature and environment for plant growth through prolonged, gentle rainfall interspersed with periods of fog and heavy cloud cover. In late spring, the maritime influence diminishes and is replaced by a continental climate characterized by warm days and cold nights. Small amounts of precipitation are delivered in brief downpours. This results in plant species tolerating greater summer drought and severely fluctuating temperatures.
Physiognomy	--
Vegetation	Stands in this association are predominantly uneven-aged. Abies grandis is the indicated climax tree species and dominates both the overstory and understory in old-growth stands (Johnson & Simon, 1987). Pseudotsuga menziesii and Picea engelmannii act as secondary seral dominants, with spruce in virtually all age classes in old-growth stands. Pinus ponderosa, Larix occidentalis, and Pinus contorta are the primary invaders of severely disturbed sites. Seral tree success is related to region and phase (Cooper et al., 1991). By the time a pole-sized stand has developed, Abies grandis is generally the only tree species that continues to reproduce beneath the forest canopy (Pfister et al., 1977). In the shrub layer, Vaccinium membranaceum or Acer glabrum dominate the undergrowth. Vaccinium membranaceum (twice as abundant in early-seral stands), Rosa gymnocarpa, Lonicera utahensis, and Linnaea borealis are often abundant in this type. Clintonia uniflora accompanies a mixture of moist-site forbs in the herbaceous layer. Common moist-site indicators include Bromus vulgaris, Adenocaulon bicolor, Maianthemum stellatum, Coptis occidentalis, and Prosartes trachycarpa. Other species components are Carex rossii, Galium triflorum, Fragaria vesca, Thalictrum occidentale, Orthilia secunda , and Viola orbiculata.
Dynamics	Damping-off fungus takes a heavy toll on Abies grandis seedlings during wet seasons, and insolation and drought cause mortality during the dry summer months. Indian paint fungus (Echinodontium tinctorium) may be very common on grand fir within this type (Pfister et al., 1977). Larix occidentalis can be subject to attack by the dwarf mistletoe parasite. Fire hazard is normally low to moderate under normal weather conditions (Fischer & Bradley, 1987). Although this type does not occur in Fischer and Bradley's study, this type is equivalent to their Group Eleven - warm, moist grand fir, western red-cedar, and western hemlock habitat types. The threat of fire is highest in the summer, when the moist maritime climate no longer prevails. During severe summer drought, heavy fuel loading from high plant productivity can set the stage for severe, widespread fires. Stands are replaced and sites revert to pioneer species. Summertime fuel moisture conditions in young stands are not nearly as high as in older, denser stands, and the effects of fire are often more severe than they are in older stands. Surface fires often scar the base of the grand fir, creating favorable entry points for decay organisms. The initial floral component, seeds stored on site, and the accidents of natural seeding and seedling establishment may structure the community following the fire more than the characteristics of the fire itself. Although generally true for all fire groups, it is more pronounced in

	this fire group. The use of fire for site preparation will usually result in increased spring and summer browse for big game in addition to successful regeneration of seral tree species. Severe disturbance by fire may result in dense homogeneous stands of lodgepole pine, Douglas-fir, and larch. More frequently, Douglas-fir and larch invade disturbed sites as small fire seral communities within relict grand fir stands. Spruce and Douglas-fir often form a fire sere prior to grand fir dominance. Vaccinium membranaceum, Spiraea lucida (= betulifolia), Calamagrostis rubescens, Carex geyeri, and Fragaria spp. will all increase on these sites following fire. These rhizomatous plants may compete with regenerating trees though not detrimentally in this type (Johnson & Simon, 1987).
Adjacent Types	--
Classification Comments	Many different phases of this association are described in the literature. Previous surveyors documented ABGR/ACGL/CLUN2, ABGR/ACGLD/CLUN, ABGR/CLUN2, ABGR/VAME/CLUN2, and ABGR/VAME/CLUN associations, which all appear to be synonymous with this USNVC type (Morrison et al., 2007; Morrison & Wooten, 2010).

Scientific Name	Abies grandis / Physocarpus malvaceus Forest
EL Code — WNHP Abb	CEGL000277 —ABIGRA/PHYMAL
CSR	G3/S2
Ecological System	CES306.802 Northern Rocky Mountain Mesic Montane Mixed Conifer Forest
Element Summary	This forest association occurs within the maritime-influenced climatic region of the northern Rocky Mountains from eastern Washington and Oregon to Montana. Ecoregional sections include the Okanogan Highlands, Bitterroot Mountains, Idaho Batholith, and Blue Mountains. This association occurs at 730-1310 m (2400-4300 feet) elevation on southeast- to west-facing slopes. Soils are loams and silt loams derived predominantly from granite and mica schist parent materials. Abies grandis dominates in the canopy, but Pseudotsuga menziesii and Pinus ponderosa are often codominant in relatively young stands. These fire-resistant species persist in the forest overstory and provide important large diameter stem structure in mid- and late-seral stands. Stands are characterized by the presence of a well-developed shrub layer. Physocarpus malvaceus is dominant. Holodiscus discolor and Acer glabrum are often associated. Common forbs include Maianthemum stellatum, Osmorhiza berteroi, and Adenocaulon bicolor. Calamagrostis rubescens is often well-represented and may be abundant in early-seral stands. Historic disturbance regimes in these stands were primarily frequent low- to moderate-intensity fire.
Distribution	This association is found in northern Idaho into northeastern Oregon and eastern Washington. It occurs within the maritime-influenced climatic region of the northern Rocky Mountains. The range includes the northwestern portion of the Idaho Batholith, northeastern corner of the Blue Mountains, western portion of Bitterroot Mountains, and the eastern portion of the Okanogan Highlands ecoregional section.
Environment	This association is found between 670 and 1707 m (2200-5600 feet) elevation and is usually located on steep, southeast- and southwest-facing, mid to lower slopes on convex to undulating sites. The dominant parent materials are granite and mica schist. Ash layers in the soil are rare. Most soils are loams and silt loams of fine texture. Gravel content varies, with only trace amounts of surface rock and bare soil. This is one of the driest and warmest mid-elevation grand fir types (Cooper et al., 1991). No precise climatic data are available for this type. However, its location in Washington, Idaho and Oregon subjects it to a maritime climate during winter and early spring which moderates its temperature and environment for plant growth through prolonged, gentle rainfall interspersed with periods of fog and heavy cloud cover. In late spring, the maritime influence diminishes and is replaced by a continental climate characterized by warm days and cold nights. Small amounts of precipitation are delivered in brief downpours. This results in plant species tolerating greater summer drought and severely fluctuating temperatures.
Physiognomy	--

Vegetation	The principal late-successional tree species is Abies grandis, which dominates in the canopy, but Pseudotsuga menziesii and Pinus ponderosa are often codominant in relatively young stands. Physocarpus malvaceus dominates the undergrowth with either Acer glabrum or Holodiscus discolor, with other shrubs such as Symphoricarpos albus, Rosa gymnocarpa, and Spiraea lucida (=betulifolia) also occurring with high covers and constancies. Cooper et al. (1991) remark that the occurrence of these shrubs declines with increasing stand age and tree cover. Common forbs include Maianthemum stellatum, Osmorhiza berteroi (= Osmorhiza chilensis), and Adenocaulon bicolor. Calamagrostis rubescens is often well-represented and may be abundant in early-seral stands.
Dynamics	This type has not been classified into a fire group for its area of occurrence. Because it is a dry type, it is more susceptible to fire than other Abies grandis types. After a severe fire, stands in an early-successional stage have no grand fir in the tree overstory, become dominated by Douglas-fir, and contain as much as three times greater cover by ninebark beneath more open tree canopies (Johnson & Simon, 1987). Heavy domestic and wild ungulate disturbance in the understories will increase the occurrence of Arnica cordifolia, Moehringia macrophylla, and Thalictrum occidentale.
Adjacent Types	On drier slopes, this type is adjacent to Pseudotsuga menziesii / Physocarpus malvaceus Forest (CEGL000447). On moist or cooler sites it adjoins Abies grandis / Xerophyllum tenax Forest (CEGL000293), Abies grandis / Spiraea betulifolia Forest (CEGL000281), and Abies grandis/Clintonia uniflora (CEGL000272), according to Cooper et al. (1991). Johnson and Simon (1987) note that Abies grandis / Physocarpus malvaceus Forest (CEGL000277) occurs as pockets or transition zones between Pseudotsuga menziesii/Physocarpus malvaceus and Abies grandis/Vaccinium membranaceum communities.
Classification Comments	--

Scientific Name	Abies grandis / Symphoricarpos albus Forest
EL Code — WNHP Abb	CEGL000282 —ABIGRA/SYMALB
CSR	G3?/SNR
Ecological System	CES306.802 Northern Rocky Mountain Mesic Montane Mixed Conifer Forest
Element Summary	This forest community type of Oregon and Washington has been sampled on the Wallowa-Whitman and Malheur national forests of the eastern Blue Mountains Ecoregion. Geomorphic surfaces are floodplains and terraces in narrow to moderately steep, moderately wide, V-, flat- and trough-shaped valleys with moderately steep side slopes. Valley aspects range from southwest- to north- and northwest-facing. Overstory vegetation is characterized by shade-tolerant Abies grandis; common seral tree species include Picea engelmannii, Pseudotsuga menziesii, Pinus ponderosa, Pinus contorta, and Populus balsamifera ssp. trichocarpa. Symphoricarpos albus dominates the shrub layer, with Ribes lacustre, Alnus incana, Acer glabrum, Rubus parviflorus, Amelanchier alnifolia, Philadelphus lewisii, Cornus sericea, Spiraea lucida (=betulifolia), and Crataegus douglasii occasionally associated. Herbaceous species commonly encountered include Arnica cordifolia, Circaea alpina, Adenocaulon bicolor, Maianthemum stellatum, Achillea millefolium, Elymus glaucus, and Festuca occidentalis.
Distribution	This forest community type occurs in Oregon and Washington.
Environment	This community type was sampled on the Wallowa-Whitman and Malheur national forests of the eastern Blue Mountains Ecoregion (Crowe et al., 2004). Geomorphic surfaces are floodplains and terraces in narrow to moderately steep, moderately wide, V-, flat- and trough-shaped valleys with moderately steep side slopes. Valley aspects range from southwest- to north- and northwest-facing. Rosgen (1996) stream types associated with sites sampled are B3, C4, C5 and E4.
Physiognomy	--
Vegetation	Overstory vegetation is characterized by shade-tolerant Abies grandis; common seral tree species include Picea engelmannii, Pseudotsuga menziesii, Pinus ponderosa, Pinus contorta, and Populus balsamifera ssp. trichocarpa. Symphoricarpos albus dominates the shrub layer with Ribes lacustre, Alnus incana, Acer glabrum, Rubus parviflorus, Amelanchier alnifolia, Philadelphus lewisii, Cornus sericea, Spiraea lucida (=betulifolia), and Crataegus douglasii occasionally associated. Herbaceous species commonly encountered include Arnica cordifolia, Circaea alpina, Adenocaulon bicolor, Maianthemum stellatum, Achillea millefolium, Elymus glaucus, and Festuca occidentalis. The height of the shrub layer averages 0.6 m, and the height of the herbaceous layer averages 30 cm.
Dynamics	The major species of this association, Abies grandis and Symphoricarpos albus, are probably self-perpetuating given a lack of moderate to severe fires. Other associated tall shrubs, Acer glabrum, Amelanchier alnifolia, and Cornus sericea, will decrease in abundance with increasing shade by the overstory Abies grandis and Picea engelmannii canopy. Moderate to severe fires will generally kill the Abies grandis and Picea engelmannii seedlings, saplings and mature trees, and generally leave mature Pinus ponderosa trees on the site. All of the common shrubs characteristic of this association will resprout from root crowns and/or rhizomes following fires and persist over time.

Adjacent Types	Adjacent upland vegetation types on side slopes are Abies grandis / Carex geyeri (CEGL000917), Pinus contorta - (Abies grandis) / Vaccinium membranaceum / Calamagrostis rubescens (uncertain USNVC equivalent), Abies grandis / Calamagrostis rubescens (CEGL000916), and Festuca idahoensis - Pseudoroegneria spicata (CEGL001624).
Classification Comments	Not previously identified at MSSP.

Scientific Name	Abies grandis / Trautvetteria caroliniensis Forest
EL Code — WNHP Abb	CEGL000285 — ABIGRA/TRACAR
CSR	G3/S1S2
Ecological System	CES306.802 Northern Rocky Mountain Mesic Montane Mixed Conifer Forest
Element Summary	This association is found at moderate elevations in the northeastern section of the Blue Mountains ecoregion of Oregon and in Washington. Geomorphic surfaces are floodplains in moderate- to high-gradient, narrow to wide, V- and trough-shaped valleys with gentle to steep side slopes. Soils are mineral, although an organic or organic-rich surface horizon is often present. Coarse fragments are shallow in the horizon, and the water table is high during the growing season. Adjacent Rosgen stream reach types were A3, A4, B3 and B4. Abies grandis is the tree overstory dominant, although Picea engelmannii can sometimes be codominant. Shrub cover is generally sparse, but occasionally a few species may be abundant. Trautvetteria caroliniensis forms a carpet in the herbaceous understory. Other herbaceous species are scattered, generally at low cover. The most commonly occurring herbs are Maianthemum stellatum, Osmorhiza berteroi, Viola glabella, Fragaria vesca, Thalictrum alpinum, Galium triflorum, and Arnica cordifolia. Height of shrub layer averages 1.8 m, ranging from 0.9-3.7 m. Height of the herbaceous layer averages 51 cm, ranging from 31 to 91 cm. Moderate fires will kill Abies grandis and Picea engelmannii on sites. The other common shrubs and herbs will survive fire and re-sprout or re-seed. Shrub cover may become more unless competition from Trautvetteria caroliniensis plants prevents shrub seedlings from becoming established.
Distribution	This association is found at moderate elevations in the northeastern section of the Blue Mountains ecoregion of Oregon and in Washington.
Environment	--
Physiognomy	--
Vegetation	--
Dynamics	--
Adjacent Types	Upland vegetation types adjacent to sites sampled are Abies grandis associations.
Classification Comments	Not previously identified at MSSP.

Scientific Name	Abies grandis / Vaccinium membranaceum Forest
EL Code — WNHP Abb	CEGL008736 — ABIGRA/VACMEM
CSR	GNR/S3
Ecological System	CES306.802 Northern Rocky Mountain Mesic Montane Mixed Conifer Forest
Element Summary	This forest association occurs within the maritime-influenced climatic regions of the northern Rocky Mountains of Idaho and is centered in the Idaho Batholith and Blue Mountains ecoregional sections. Stands are located on moist, north- to east-facing slopes and benches at 1370-1980 m (4500-6500 feet) elevation. Loam soils are derived from basalt and granitic parent materials. The association represents the coolest extreme of sites with potential for Abies grandis establishment. Abies grandis dominates in the canopy, with Pinus contorta, Pseudotsuga menziesii, and Picea engelmannii predominant seral species. Vaccinium membranaceum forms a patchy medium shrub sward. Lonicera utahensis is usually present and often well-represented. Relatively constant forbs include Arnica cordifolia, Thalictrum occidentale, Carex rossii, Moehringia macrophylla, Chimaphila umbellata, Orthilia secunda, and Trillium ovatum.
Distribution	This northern Rocky Mountain association occurs in Idaho and is known from the eastern and western portions, respectively, of the Blue Mountains and Idaho Batholith ecoregion sections.
Environment	This forest association occurs within the maritime-influenced climatic regions of the northern Rocky Mountains of Idaho and is centered in the Idaho Batholith and Blue Mountains ecoregional sections. Stands are located on moist, north- to east-facing slopes and benches at 1370-1980 m (4500-6500 feet) elevation. Loam soils are derived from basalt and granitic parent materials. The association represents the coolest extreme of sites with potential for Abies grandis establishment.
Physiognomy	--
Vegetation	Abies grandis dominates in the canopy, with Pinus contorta, Pseudotsuga menziesii, and Picea engelmannii predominant seral species. Vaccinium membranaceum forms a patchy medium shrub sward. Lonicera utahensis is usually present and often well-represented. Relatively constant forbs include Arnica cordifolia, Thalictrum occidentale, Carex rossii, Moehringia macrophylla, Chimaphila umbellata, Orthilia secunda, and Trillium ovatum.
Dynamics	--
Adjacent Types	--
Classification Comments	This association represents a merger of Abies grandis / Vaccinium membranaceum Forest (CEGL000290) & Abies grandis / Vaccinium membranaceum Rocky Mountain Forest (CEGL000289), which had no floristic or ecological differentiation, overlapped in geography, and shared many of the same references. The description here was adapted from CEGL000289.

Scientific Name	Abies grandis / Xerophyllum tenax Forest
EL Code — WNHP Abb	CEGL000293 — ABIGRA/XERTEN
CSR	G4/SU
Ecological System	CES306.802 Northern Rocky Mountain Mesic Montane Mixed Conifer Forest
Element Summary	[Adapted from Cooper et al. (1991)] Abies grandis dominates the canopy and most other conifers besides Tsuga heterophylla and Thuja plicata may be prominent. Xerophyllum tenax and (usually) Vaccinium membranaceum dominate the undergrowth. For additional information, see Cooper et al. (1991) and Steele et al. (1981).
Distribution	Occurs mainly on the eastern Nez Perce and southeastern Clearwater NF's and extends into contiguous portions of Montana and central Idaho. It is very sporadically distributed as far north as the southern Kaniksu NF.
Environment	Occurs from 4,200 to 6,500 ft (1,280 to 1,980 m), predominantly on east- to west-facing slopes.
Physiognomy	--
Vegetation	--
Dynamics	--
Adjacent Types	--
Classification Comments	Previous surveyors identified an ABGR/VAME/XETE association at MSSP (Morrison & Wooten, 2010), which is synonymous with this USNVC type.

G217 Central Rocky Mountain-Interior Cedar - Hemlock Forest

A3612 Tsuga heterophylla - Thuja plicata Cool-Mesic Central Rocky Mountain Forest Alliance

Scientific Name	Tsuga heterophylla / Clintonia uniflora Forest
EL Code — WNHP Abb	CEGL000493 — TSUHET/CLIUNI
CSR	G4/S4
Ecological System	CES306.802 Northern Rocky Mountain Mesic Montane Mixed Conifer Forest
Element Summary	This association is known from northeastern Washington, northern Idaho and northeastern Montana. This is the most widespread type of the interior Tsuga heterophylla forests and is considered one of the driest of the interior western hemlock communities. In the western part of its range, it typically occurs on uplands, generally the upper one-third of a slope. In northwestern Montana, at the easternmost extent of its range, it occurs on lower slopes, valley bottoms, and stream terraces. Elevations range from 550 to 1585 m (1800-5200 feet). Slopes range from gentle to steep (2-58%). Soils are silty clay loams, silt loams to sandy loams. Parent materials are generally quartzite, siltite, glacial till and outwash, sandstone and metasediments with an ash cap. Late-seral stages of this type are dense, shady stands dominated by Tsuga heterophylla and Thuja plicata. However, only about 10% of all stands sampled are older than 200 years, so most stands have a complex, variable mixed canopy. Most stands have Pseudotsuga menziesii, Larix occidentalis, Abies grandis, Pinus contorta, and/or Pinus monticola, but not all of these species are present in all stands. Note that Tsuga heterophylla and Thuja plicata are always present at least in the tree subcanopy, if not in the overstory canopy. Early-seral stages can be very similar to Thuja plicata types; however, these generally lack Tsuga heterophylla and have a lower conifer diversity. The shrub and herbaceous layers are species-rich. Most stands have Lonicera utahensis, Paxistima myrsinites, Rosa spp., and Linnaea borealis. Clintonia uniflora, Tiarella trifoliata, Viola orbiculata, Prosartes hookeri, and Goodyera oblongifolia are typical forbs. Clintonia uniflora is the most abundant (5%) and most highly constant species in an otherwise highly variable herbaceous layer. Total biomass can be sparse with dense canopies. Other herbaceous species that can be abundant are Arnica latifolia, Calamagrostis rubescens, and Coptis occidentalis.
Distribution	This association is known from northeastern Washington, northern Idaho and northeastern Montana. Very similar forest types have been described from the south-central eastern Cascades of Washington.
Environment	This is the most widespread type of the interior Tsuga heterophylla forests described from northeastern Washington, northern Idaho, and northwest Montana. This type is considered one of the driest of the interior western hemlock communities. It occurs on a broad range of elevations, slopes, and aspects. In the western part of its range, it typically occurs on uplands, generally the upper one-third of a slope. In northwestern Montana, at the eastward most extent of its range, it occurs on lower slopes, valley bottoms, and stream terraces. It occurs at elevations from 555 to 1560 m (1800-5200 feet). Slopes range from gentle to steep

	(2-58%). Soils are silty clay loams, silt loams to sandy loams. Coarse fragment content ranges from 5 to 60%. Parent materials are generally quartzite, siltite, sandstone and metasediments with an ash cap. Other parent materials include glacial till and outwash.
Physiognomy	--
Vegetation	Late-seral stages of this type are dense, shady stands dominated by Tsuga heterophylla (average cover 20-53%) and Thuja plicata (average cover 25-37%). However, only about 10% of all stands sampled are older than 200 years, so most stands have many other conifer species included in the complex canopy of this widespread type. Most stands have, on average, 10% cover of Pseudotsuga menziesii, Larix occidentalis, Abies grandis, Pinus contorta, and/or Pinus monticola. Not all of these species are present in all stands, in fact conifer composition is highly variable. The time since, and intensity of, past disturbance (fire) and seed source will determine the abundance of seral conifer species. Intense fires favor Pinus contorta, moderate fires favor Larix occidentalis or Pinus monticola. Note that Tsuga heterophylla and Thuja plicata are always present at least in the tree subcanopy, if not in the overstory canopy. Early-seral stages can be very similar to Thuja plicata types; however, these generally lack Tsuga heterophylla and have a lower conifer diversity. The shrub and herbaceous layers are species-rich. Most stands have Lonicera utahensis, Paxistima myrsinites, Rosa spp., and Linnaea borealis. Clintonia uniflora, Tiarella trifoliata, Viola orbiculata, Prosartes (=Disporum) hookeri, and Goodyera oblongifolia are typical forbs. Clintonia uniflora is the most abundant (5%) and most highly constant species in an otherwise highly variable herbaceous layer. Total biomass can be sparse with dense canopies. Other herbaceous species that can be abundant are Arnica latifolia, Calamagrostis rubescens, and Coptis occidentalis.
Dynamics	--
Adjacent Types	--
Classification Comments	--

Scientific Name	Thuja plicata / Aralia nudicaulis Forest
EL Code — WNHP Abb	CEGL000471 — THUPLI/ARANUD
CSR	G2/S2
Ecological System	CES306.802 Northern Rocky Mountain Mesic Montane Mixed Conifer Forest
Element Summary	This is a late-seral evergreen conifer forest found in the mid elevations in the Okanogan Highlands east of the Kettle Mountain crest in Washington and British Columbia, with outliers in Montana. It appears on stream terraces representing xeroriparian conditions and on lower slopes and benches, mostly below 1065 m (3500 feet) in Washington and 1220 m (4000 feet) in Montana. Its name reflects a potential vegetation. The existing vegetation is dominated by a closed canopy of Picea engelmannii, Thuja plicata, and Pseudotsuga menziesii trees. The undergrowth can contain scattered tall deciduous shrubs such as Acer glabrum and Alnus viridis ssp. sinuata. The short and dwarf-shrub layers have both greater diversity and cover than the tall-shrub layer, with Linnaea borealis and Cornus canadensis being the most constant and having appreciable coverages. The herbaceous component is characterized by a rich assortment of mesic site forbs, such as Aralia nudicaulis, Clintonia uniflora, Galium triflorum, Maianthemum stellatum, Tiarella trifoliata, and Prosartes hookeri; graminoids, with the exception of the highly constant Bromus vulgaris (or Bromus ciliatus), are a minor element.
Distribution	This association is restricted to the eastern portion of the Okanogan Highlands and penetrates into northwestern Montana extending as far east as the Continental Divide (beyond which Thuja plicata does not extend); it has not been recognized for northern Idaho, but this may be due to the omnipresence of Tsuga heterophylla, which was given precedence, even in trace amounts in the seedling layer, over Thuja in potential-based vegetation keys.
Environment	This is a late-seral evergreen conifer forest found in the mid elevations in the Okanogan Highlands east of the Kettle Mountain crest in Washington and British Columbia, with outliers in northwestern Montana as far east as the Continental Divide. It appears on stream terraces representing xeroriparian conditions and on lower slopes and benches, mostly below 1070 m (3500 feet) in Washington and 1220 m (4000 feet) in Montana. Sites are postulated to be relatively warm and moist. Soils have fine-textured upper horizons, often with a high concentration of volcanic ash, overlying coarse-textured alluvium or glacial outwash and drift; thus soils are expected to be nutrient-rich and well-drained.
Physiognomy	--
Vegetation	The existing vegetation is dominated by a relatively closed canopy of Thuja plicata, Picea engelmannii, and Pseudotsuga menziesii; throughout all but the easternmost extent of the type, Abies grandis often contributes the greatest canopy cover. The undergrowth can contain scattered tall deciduous shrubs, such as Acer glabrum and Amelanchier alnifolia. The short-shrub layer is often moderately dense, though not highly diverse with the most constant species being Rubus parviflorus, Symphoricarpos albus, Spiraea lucida (=betulifolia), and Rosa gymnocarpa. In the dwarf-shrub layer Chimaphila umbellata, Linnaea borealis, and Cornus canadensis have the highest constancy and cover. A rich assortment of mesic-site forbs consistently includes Aralia nudicaulis, Asarum caudatum, Clintonia uniflora,

	Prosartes (=Disporum) hookeri, Galium triflorum, Gymnocarpium dryopteris, Maianthemum stellatum, Tiarella trifoliata, Trillium ovatum, and Viola orbiculata. Bromus vulgaris is the only graminoid with greater than 50% constancy. Though some would include stands with relatively high cover of Gymnocarpium dryopteris, Athyrium filix-femina, Asarum caudatum, and Cornus canadensis in this type, from all indications these species would reflect other, more mesic environments (and types).
Dynamics	Some stands of Pinus contorta / Shepherdia canadensis Forest (CEGL000163) occur on sites environmentally similar to those supporting Thuja plicata / Aralia nudicaulis Forest (CEGL000471) leading Williams et al. (Williams et al., 1995) to speculate that such areas have burned intensively one or more times. Subsequently, nutrient pools and organic matter concentrations have declined such that sites have not fully recovered. Similar vegetation patterns are expressed on sites that have been cleared as fields due to gentle slopes, low elevations (relatively warm) and deep soils; Pinus contorta usually colonizes these abandoned homesteads and fields (contrary to the course of succession following natural disturbance, i.e., patchy underburns or spotty crown fires).
Adjacent Types	--
Classification Comments	--

Scientific Name	Thuja plicata / Clintonia uniflora - Xerophyllum tenax Forest
EL Code — WNHP Abb	CEGL005930 — THUPLI/CLIUNI-XERTEN
CSR	G4?/SNR
Ecological System	CES306.802 Northern Rocky Mountain Mesic Montane Mixed Conifer Forest
Element Summary	This is a small- to large-patch forested community found in the northern Rocky Mountains of western Montana west into northeastern Washington. This type generally occupies the highest elevation Thuja plicata communities, representing relatively cold and dry environments. Its known elevational range is 790 to 1675 m (2600-5500 feet). This type is very heterogeneous, occurring across a broad range of habitat conditions; it occurs from toeslope positions to the tops of ridges and on all degrees of slope and all aspects. Parent materials are variable, with loess and ash caps deposited over glacial outwash and till in some areas. The upper soil horizons are well- to excessively drained and coarse-textured (in some areas sandy soils predominate). Glacial compression is invoked as the reason many of the soil profiles have a compacted subsoil, which results in shallow rooting and accounts in part for the more xeric nature of these sites. The canopy cover of this forest type is usually in excess of 60%, with Thuja plicata comprising at least 25% of the total. Because seral tree species occupy these sites readily following disturbance, Pseudotsuga menziesii, Larix occidentalis, Pinus contorta, and Picea engelmannii commonly occur across the range of this type, but in northern Idaho Abies grandis often shares dominance with Thuja. Sites transitional to subalpine occasionally have appreciable cover of Abies lasiocarpa. The understory, in which Thuja is 100% constant, gives every indication that these stands will be Thuja-dominated late in the sere. The tall-shrub component is mostly dispersed clumps, and no one species has high constancy, though Acer glabrum, Alnus viridis ssp. sinuata, Amelanchier alnifolia, and Sorbus scopulina may have 5-10 % cover, singly or in the aggregate. The short-shrub layer is dominant with the indicator Vaccinium membranaceum nearly 100% constant and generally exhibiting greater than 15% cover. Other regularly occurring short shrubs include Paxistima myrsinites, Spiraea lucida (=betulifolia), Rosa gymnocarpa, Rubus parviflorus, and Lonicera utahensis. The dwarf-shrub Linnaea borealis is always present and its cover can approach 20%. Bromus vulgaris is often the only graminoid represented. In the forb layer Clintonia uniflora and Tiarella trifoliata are reflective of relative mesic conditions, whereas Xerophyllum tenax (considered an indicator when having 5% or greater cover) is indicative of Thuja at its cold, dry extremes, transitional to subalpine habitats. In the northwestern portion of this type's distribution, Xerophyllum appears to be sporadically distributed and Vaccinium is relied on as the alternative indicator.
Distribution	This is a small- to large-patch forested community found eastward from the Kettle Mountain Crest of northeastern Washington, throughout northern Idaho, and northwestern Montana to just west of the Continental Divide.

Environment	This type generally occupies the highest elevations within the Thuja plicata series, representing relatively cold and dry environments. The extremes of its known elevation range are 790 to 1675 m (2600-5500 feet), but in most landscapes its expressed range is narrower, between 1000 to 1400 m (3300-4600 feet). This type is very heterogeneous, occurring across a broad range of habitat conditions; it occurs from toeslope positions to the tops of ridges and on all degrees of slope and all aspects. Parent materials are mostly granitic, quartzite, siltite, and sandstone with loess and ash caps deposited over glacial outwash and till extensive in some areas. The upper soil horizons are well- to excessively drained as a consequence of being primarily coarse-textured (in some areas sandy soils predominate). Glacial compression is invoked as the reason many of the soil profiles have a compacted subsoil, which results in shallow rooting and accounts in part for the more xeric nature of these sites. Soil reaction ranges between pH 5.5 and 6.6, and rooting depth (of forbs and shrubs) is mostly less than 50 cm (20 inches) and as shallow as 20 cm (8 inches).
Physiognomy	--
Vegetation	The canopy cover of this forest type is usually in excess of 60%, with Thuja plicata comprising at least 25% of the total tree cover in the mature canopy. Because seral tree species occupy these sites readily following disturbance (to comprise a vast majority of the canopy), this community should be considered a later successional stage. The understory, in which Thuja is 100% constant (occasionally constituting as much as 20% cover), gives every indication that these stands will be Thuja-dominated late in the sere. Pseudotsuga menziesii, Larix occidentalis, Pinus contorta, and Picea engelmannii are the primary seral trees across the range of this type, but in northern Idaho Abies grandis often shares dominance with Thuja. Indicating these sites are transitional to subalpine habitats is the occasionally appreciable cover of Abies lasiocarpa (to 25%). The tall-shrub component is mostly dispersed clumps, and no one species has high constancy, though Acer glabrum, Alnus viridis ssp. sinuata, Amelanchier alnifolia, and Sorbus scopulina may have 5-10% cover, singly or in the aggregate. The short-shrub layer is dominant with the indicator Vaccinium membranaceum nearly 100% constant and generally exhibiting greater than 15% cover. Other regularly occurring components of this layer are Paxistima myrsinites, Spiraea lucida (=betulifolia), Rosa gymnocarpa, Rubus parviflorus, and Lonicera utahensis. Dwarf-shrubs are consistently represented by Linnaea borealis and Chimaphila umbellata; Linnaea cover can approach 20%. Bromus vulgaris is often the only graminoid represented, and it seldom occurs with greater than a trace of cover. In the forb layer Clintonia uniflora and Tiarella trifoliata are reflective of relative mesic conditions, whereas Xerophyllum tenax (considered an indicator when having 5% or greater cover) is indicative of Thuja at its cold, dry extremes, transitional to subalpine habitats. In the northwestern portion of this type's distribution, Xerophyllum appears to be sporadically distributed and Vaccinium is relied on as the alternative indicator. Other forbs with moderate to high constancy in at least a portion of this type's range include Anemone piperi, Arnica latifolia, Coptis occidentalis, Goodyera oblongifolia, Pyrola asarifolia, and Viola orbiculata.

Dynamics	This type occupies that part of the landscape considered to experience primarily stand-replacing fire (though fires may burn in a manner creating a mosaic of burned and unburned vegetation), rather than underburns or partial burns. Much of this type would be considered expressions of a later successional sequence. In the environments where this type predominates (as opposed to say where Thuja plicata / Aralia nudicaulis Forest (CEGL000471) or Thuja plicata / Clintonia uniflora Forest (CEGL000474) dominate the landscape), seral tree species quickly colonize disturbed sites so that an appreciable passage of time is required before mortality takes the seral species and favors the long-lived and shade-tolerant Thuja and it becomes part of the overstory.
Adjacent Types	--
Classification Comments	Previous surveyors (Morrison et al., 2007) identified a THPL/VAME association at MSSP. We follow Williams et al. (1990) in considering Thuja plicata / Vaccinium membranaceum Forest (CEGL000487) to be included within THUPLI/CLIUNI-XERTEN (Vaccinium membranaceum has nearly 100% constancy and >15% cover).

Scientific Name	Tsuga heterophylla / Menziesia ferruginea Forest
EL Code — WNHP Abb	CEGL000496 — TSUHET/MENFER
CSR	G2/S2S3
Ecological System	CES306.802 Northern Rocky Mountain Mesic Montane Mixed Conifer Forest
Element Summary	This regionally endemic plant association is described as a unit of potential natural vegetation from stands located in the Selkirk Mountains of Washington and Idaho, within the eastern-most portion of the Okanogan Highlands ecoregional section. The association occurs between 1370 and 1585 m (4500-5200 feet) elevation on cool, moist sites on gentle, south-facing slopes and ridgelines. It is the highest elevation Tsuga heterophylla association; frost and high snowpacks are common. Soils are silt loams to loams. In the Okanogan mountains, soils are derived from volcanic ash over mixed colluvium or glacial till. The structure of stands of this evergreen, needle-leaved forest can vary greatly, depending on stand age. Mature stands will generally have an open appearance, with 75-95% canopy cover and large Tsuga heterophylla dominating. Younger, seral stands are codominated by dense canopies of Abies lasiocarpa, Picea engelmannii and Tsuga heterophylla. The understory is very species-poor, consisting of a deciduous shrub layer with cover over 50%. Characteristic shrubs include Rhododendron menziesii (= Menziesia ferruginea), Rhododendron albiflorum and Vaccinium membranaceum. Herbs are very sparse, with only Goodyera oblongifolia showing any constancy.
Distribution	The regionally endemic plant association is known only from the Selkirk Mountains of Washington and Idaho, within the eastern-most region of the Okanogan Highlands ecoregional section.
Environment	Tsuga heterophylla has a somewhat restricted ecological amplitude and in this region occupies moist (but not wet), moderate temperature sites. The region has an "inland maritime" climate regime, with wet, relatively mild winters and dry summers. This association occurs from 1373-1740 m (4500-5700 feet) elevation, generally on gentle slopes and ridgetops. It appears to be the highest elevation Tsuga heterophylla association; frost and high snowpacks are common. Soils are silt loams to loams; or volcanic ash over mixed colluvium or glacial till.
Physiognomy	--
Vegetation	Structure of stands of this evergreen needle-leaved forest can vary greatly, depending on stand age. Mature stands will generally have an open appearance, with 75-95% canopy cover and large Tsuga heterophylla dominating. Younger, seral stands are codominated by dense canopies of Abies lasiocarpa, Picea engelmannii, and Tsuga heterophylla. The understory is very species-poor, consisting of a deciduous shrub layer with cover over 50%. Characteristic shrubs include Rhododendron menziesii (= Menziesia ferruginea), Rhododendron albiflorum, and Vaccinium membranaceum. Herbs are very sparse, with only Goodyera oblongifolia showing any constancy.
Dynamics	--
Adjacent Types	--
Classification Comments	--

Scientific Name	Tsuga heterophylla / Xerophyllum tenax Forest
EL Code — WNHP Abb	CEGL000499 — TSUHET/XERTEN
CSR	G2/S2
Ecological System	CES306.802 Northern Rocky Mountain Mesic Montane Mixed Conifer Forest
Element Summary	[Adapted from archived USNVC description] This association occupies some of the driest and coldest sites capable of supporting Tsuga heterophylla. These forests occupy topographically dry sites, on steep, straight, mid to upper slopes, with cold soils. Elevations average 1460 m in northern Idaho. Soils are shallow, well-drained and highly permeable; rock outcrops are common. Stands in the Okanogan Highlands and northern Idaho have little to no Pseudotsuga. Other important conifers can include Thuja plicata, Pinus monticola, Abies lasiocarpa, and Picea engelmannii. The shrub layer is not particularly abundant (typically <20% total cover of shrubs), but Vaccinium membranaceum may exceed 15% cover. The low-growing Paxistima myrsinites or Linnaea borealis are common. The herbaceous layer is dominated by Xerophyllum tenax (averaging 30% cover), a perennial forb with dense tufts of grasslike leaves and stout rhizomes. Other forb species contribute little cover, and grass species are uncommon. Ground mosses and lichens average 10% cover, and epiphytic species are uncommon.
Distribution	WNHP recognize this association as occurring from the Colville National Forest, in eastern Washington, to northern Idaho.
Environment	This association is found in a zone of inland maritime climate, with moderate winter and summer temperatures. Annual precipitation is high and occurs primarily during winter and spring months as rain. Snow accumulations are low. It occupies topographically dry sites, on steep, straight, mid to upper slopes, with cold soils. Elevations average 1460 m in northern Idaho. Soils are shallow, well-drained and highly permeable; rock outcrops are common. This association occupies some of the driest sites in the Tsuga heterophylla zones.
Physiognomy	--
Vegetation	This evergreen needle-leaved forest is dominated by Tsuga heterophylla with little to no Pseudotsuga. Other important conifers can include Thuja plicata, Pinus monticola, Abies lasiocarpa, and Picea engelmannii. Heights of the tree layer are only 24-37 m. The shrub layer is not particularly abundant (typically <20% total cover of shrubs), but Vaccinium membranaceum may exceed 15% cover. The low-growing Paxistima myrsinites or Linnaea borealis are common. The herbaceous layer is dominated by Xerophyllum tenax (averaging 30% cover), a perennial forb with dense tufts of grasslike leaves and stout rhizomes. Other forb species contribute little cover, and grass species are uncommon. Ground mosses and lichens average 10% cover, and epiphytic species are uncommon.
Dynamics	--
Adjacent Types	--
Classification Comments	There is considerable classification confusion regarding this type, which has been described as occurring from the southeastern Olympics to northern Idaho. It is currently archived in the USNVC, but WNHP believes it to be a valid type in the

	interior. Stands in the Olympics likely correspond to Pseudotsuga menziesii - Tsuga heterophylla / Vaccinium alaskaense / Xerophyllum tenax Forest (CEGL005547).

A3613 Tsuga heterophylla - Thuja plicata Warm-Mesic Central Rocky Mountain Forest Alliance

Scientific Name	Thuja plicata / Asarum caudatum Forest
EL Code — WNHP Abb	CEGL000472 — THUPLI/ASACAU
CSR	G5/SNR
Ecological System	CES306.802 Northern Rocky Mountain Mesic Montane Mixed Conifer Forest
Element Summary	[Adapted from Cooper et al. (1991)] Thuja plicata dominates the canopy. A species-rich herbaceous layer is characteristic, with the presence of Asarum caudatum scattered throughout the stand being diagnostic. When common (≥ 1%), Viola glabella is an equivalent indicator. Pteridium aquilinum and Polystichum munitum commonly occur, with coverages to 5 percent (coverage much higher on open, disturbed sites); other fern species have not been recorded in greater than trace amounts. Other common forbs are Clintonia uniflora, Coptis occidentalis, Prosartes (=Disporum) hookeri, Maianthemum stellatum, and Tiarella trifoliata. Any of Pseudotsuga menziesii, Abies grandis, Larix occidentalis, and Pinus monticola may be present, depending on stand age, and Abies lasiocarpa and Picea engelmannii may be present on colder sites.
Distribution	This association occurs commonly throughout the range of Thuja plicata in northern Idaho, from drainages in the Selway-Bitterroot Wilderness to the Canadian border.
Environment	The normal elevational range is from 2,200 to 5,200 ft (670 to 1,590 m). It can be found on all aspects, landforms, and positions, with moderate slopes (8 to 25 degrees) predominating. Occupies the warm, moist end of the spectrum for Thuja plicata associations.
Physiognomy	--
Vegetation	--
Dynamics	--
Adjacent Types	On a moisture gradient, this association occurs between THUPLI/CLIUNI (which is drier) and THUPLI/GYMDRY (moister).
Classification Comments	Not previously identified at MSSP.

Scientific Name	Thuja plicata / Clintonia uniflora Forest
EL Code — WNHP Abb	CEGL000474 — THUPLI/CLIUNI
CSR	G4/S3
Ecological System	CES306.802 Northern Rocky Mountain Mesic Montane Mixed Conifer Forest
Element Summary	This association represents the warmest and driest Thuja plicata-dominated forests. Elevation range is 670 to 1530 m (2200-5000 feet). Stands occur on bottomlands, benches, and lower slopes with gentle to steep gradients, most often on gentle slopes. All aspects are represented. Soils are volcanic ash over glacial till or outwash with variable parent material. Soil textures are silt loams to mostly sandy loams, with high coarse fragments (16-63%). All soils are well- to moderately well-drained. Thuja plicata is dominant in the overstory and in the subcanopy as a reproducing tree. Undergrowth is characterized by scattered mesophytic herbs and subshrubs of which Clintonia uniflora is the most diagnostic. Thuja plicata is dominant or codominant and the characteristic tree (average cover ranges between 35 and 60%). Pseudotsuga menziesii, Larix occidentalis, Pinus contorta, and Abies grandis are often abundant codominants (average cover ranging from 10-30%). The shrub layer is relatively sparse with 5-10% cover. Shrub species present include Paxistima myrsinites, Linnaea borealis, Mahonia repens, and Lonicera utahensis. The herbaceous layer is not abundant, with a high variance in the forb and grass species present. Goodyera oblongifolia, Chimaphila umbellata, Clintonia uniflora, Tiarella trifoliata, Coptis occidentalis, Orthilia secunda, and Viola orbiculata are the more commonly encountered species, but with very low abundance (1-3%), occasionally with as much as 5% cover. Clintonia uniflora, while not present in all stands, is the indicator species for this relatively depauperate type; other indicators include Tiarella trifoliata, Coptis occidentalis, and Adenocaulon bicolor.
Distribution	This association is known from northeastern Washington, northern Idaho, and northwestern Montana.
Environment	This association represents the warmest and driest Thuja plicata-dominated forests. It is the most widely distributed association within Tsuga heterophylla - Thuja plicata Cool-Mesic Central Rocky Mountain Forest Woodland Alliance (A3612) in Washington, Idaho and Montana, and reflects the driest sites that can support climax stands of Thuja. Elevation range is 670 to 1530 m (2200-5000 feet). Stands occur on bottomlands, benches, and lower slopes with gentle to steep gradients, most often on gentle slopes. It occurs on all aspects throughout its range, with a tendency to occupy northern aspects in the easternmost part of its range, and warmer aspects (southeast to northwest) in the western portion of the range. Soils are volcanic ash over glacial till or outwash with variable parent material. Some parent materials are calcium-rich, others are granitic. Soil textures are silt loams to mostly sandy loams, with high coarse fragments (16-63%). All soils are well- to moderately well-drained.
Physiognomy	--

Vegetation	Thuja plicata is dominant in the overstory and in the subcanopy as a reproducing tree. Undergrowth is characterized by scattered mesophytic herbs and subshrubs of which Clintonia uniflora is the most diagnostic. Thuja plicata is dominant or codominant and the characteristic tree (average cover ranges between 35 and 60%). Pseudotsuga menziesii, Larix occidentalis, Pinus contorta, and Abies grandis are often abundant codominants (average cover ranging from 10-30%). The shrub layer is relative sparse with 5-10% cover. Shrub species present include Paxistima myrsinites, Linnaea borealis, Mahonia repens, Taxus brevifolia, and Lonicera utahensis. The herbaceous layer is not abundant, with a high variance in the forb and grass species present. Goodyera oblongifolia, Chimaphila umbellata, Clintonia uniflora, Tiarella trifoliata, Coptis occidentalis, Orthilia secunda, and Viola orbiculata are the more commonly encountered species, but with very low abundance (1-3%), occasionally with as much as 5% cover. Clintonia uniflora, while not present in all stands, is the indicator species for this relatively depauperate type.
Dynamics	--
Adjacent Types	--
Classification Comments	--

Scientific Name	Tsuga heterophylla / Aralia nudicaulis Forest
EL Code — WNHP Abb	CEGL000488 — TSUHET/ARANUD
CSR	G3/S3
Ecological System	CES306.802 Northern Rocky Mountain Mesic Montane Mixed Conifer Forest
Element Summary	This forested association occurs on warm, moist locations, some of the warmest locations in the Interior Northwest for Tsuga heterophylla communities. It occurs primarily on gentle stream benches, lower valley side slopes and toeslopes, alluvial terraces and valley bottoms, 640 to 1219 m (2100-4000 feet) in elevation. Soils are typically well-drained, fine-textured with an ash layer, loam to silty loam, moist but never boggy. Parent materials range from glacial till, coarse alluvium to colluvium. This association is heavily forested. Total tree canopy cover ranges from 70-95%. Tsuga heterophylla is always present with 20-75% cover. Thuja plicata is often present with 10-40% average cover. Other trees are always present, but not in any consistent combination. Other tree species include Abies grandis, Betula papyrifera, Larix occidentalis, Pseudotsuga menziesii, and Pinus monticola. The shrub layer is relatively sparse with less than 10% total cover. Typical species include Paxistima myrsinites, Cornus sericea, Lonicera spp., Acer spp., and Linnaea borealis. The herbaceous layer is relatively lush, with 10-80% cover and floristically rich, but only Aralia nudicaulis, Clintonia uniflora, and Maianthemum stellatum have more than 5% cover. Aralia nudicaulis is not present in every stand in the literature, but it is expressed as the forb with the highest constancy and highest cover value within all sampled stands.
Distribution	This association in known from central and northeastern Washington, northern Idaho, north of the Coeur d'Alene River, and in Montana on the west side of Glacier National Park.
Environment	This forested association occurs on gentle slopes along valley bottoms in warm, moist locations, some of the warmest for Tsuga heterophylla communities. It occurs primarily on stream benches, lower valley side slopes and toeslopes, alluvial terraces and valley bottoms at 640 to 1220 m (2100-4000 feet) in elevation. Soils are typically well-drained, occasionally somewhat poorly drained, fine-textured with an ash layer, loam to silty loam, moist but never boggy, and are relatively deep. Parent materials range from glacial till, coarse alluvium or colluvium.
Physiognomy	--
Vegetation	This association is heavily forested. Total tree canopy cover ranges from 70-95%. Tsuga heterophylla is always present with 20-75% cover. Thuja plicata is often present with 10-40% average cover. Other trees are always present, but not in any consistent combination. Other tree species include Abies grandis, Betula papyrifera, Larix occidentalis, Pseudotsuga menziesii, and Pinus monticola. Deciduous tree presence may be an indication of recent fires. The shrub layer is relatively sparse with less than 10% total cover. Typical species include Paxistima myrsinites, Cornus sericea, Lonicera spp., Acer spp., and Linnaea borealis. The herbaceous layer is relatively lush, with 10-80% cover and floristically rich, however, only Aralia nudicaulis, Clintonia uniflora, and Maianthemum stellatum have more than 5% cover. Aralia nudicaulis is not present in every stand in the

	literature, but it is expressed as the forb with the highest constancy and highest cover value within all sampled stands.
Dynamics	--
Adjacent Types	--
Classification Comments	Not previously identified at MSSP.

Scientific Name	Tsuga heterophylla / Asarum caudatum Forest
EL Code — WNHP Abb	CEGL000490 — TSUHET/ASACAU
CSR	G4/SNR
Ecological System	CES306.802 Northern Rocky Mountain Mesic Montane Mixed Conifer Forest
Element Summary	[Adapted from Cooper et al. (1991)] Tsuga heterophylla dominates the canopy. All conifer species of northern Idaho except Larix lyallii, Pinus albicaulis, and Tsuga mertensiana can occur in this forested association. The shrub and herbaceous layers are just as diverse, with an average of eight shrub species and 15 to 20 herbaceous species present on all but the most closed-canopy late successional stands. The presence of Asarum caudatum throughout the stand is diagnostic. Clintonia uniflora, Coptis occidentalis, Prosartes (=Disporum) hookeri, Adenocaulon bicolor, and Tiarella trifoliata have high constancy and are diagnostic. The shrub species Linnaea borealis, Lonicera utahensis, Paxistima myrsinites, Rosa gymnocarpa, and Vaccinium membranaceum also exhibit high constancy. For additional information, see Cooper et al. (1991) and Lillybridge et al. (1995).
Distribution	--
Environment	If temperature and soil moisture are adequate, this association can occupy any landform or slope position at elevations ranging from 2,200 to 5,000 ft (670 to 1,520 m).
Physiognomy	--
Vegetation	--
Dynamics	--
Adjacent Types	--
Classification Comments	Not previously identified at MSSP.

Scientific Name	Tsuga heterophylla / Athyrium filix-femina Forest
EL Code — WNHP Abb	CEGL000491 — TSUHET/ATHFIL
CSR	G2/S1S2
Ecological System	CES306.802 Northern Rocky Mountain Mesic Montane Mixed Conifer Forest
Element Summary	This association occurs in northern Idaho, on the west slope of the Bitterroot Mountains, in the Coeur d'Alene National Forest, and western Montana in Glacier National Park. It occurs on stream terraces, toeslopes and lower slope positions, from roughly 915 to 2500 m (3000-8200 feet) elevation. Slopes are less than 25% and aspects are northwestern to eastern. Soils are well-drained, loamy sands to silt loams in texture, with some having a high gravel content. This is a needle-leaved evergreen forest, dominated by Tsuga heterophylla. Other trees occasionally present may include Thuja plicata, Abies grandis, Pinus monticola, Abies lasiocarpa, and Picea engelmannii, but only Tsuga heterophylla is reproducing successfully. Scattered shrubs occur, but none are particularly abundant. Shrub species occasionally present include Taxus brevifolia, Rhododendron menziesii (= Menziesia ferruginea), Acer glabrum, and Rubus parviflorus. The herbaceous layer is abundant and dominated by perennial ferns. Athyrium filix-femina is always present, with cover usually over 10% and occasionally over 50%. Gymnocarpium dryopteris is also common.
Distribution	It has been described from northern Idaho, on the west slope of the Bitterroot Mountains, in the Coeur d'Alene National Forest, and west of the Continental Divide (Lake McDonald drainage) in Montana's Glacier National Park.
Environment	This association occurs in a mountainous region of inland maritime climate, characterized by mild, moderate winters with prolonged gentle rains, deep snow accumulations at higher altitudes and abundant clouds, fog and high humidity. Summers are typically very dry for most of the region, with < 1 inch of precipitation per month). Geologically, the region is underlain by metamorphosed, Precambrian sedimentary strata that have been folded and intensely faulted. This association occupies stream terraces, toeslopes and lower slope positions, from roughly 915 to 2500 m (3000-8200 feet) elevation. Slopes are less than 25% and aspects are northwestern to eastern. Soils are well-drained, loamy sands to silt loams in texture, with a high gravel content. Litter depth averages 5 cm.
Physiognomy	--
Vegetation	This association is a needle-leaved evergreen forest dominated by Tsuga heterophylla. Other trees occasionally present may include Thuja plicata, Abies grandis, Pinus monticola, Abies lasiocarpa, and Picea engelmannii, but only Tsuga heterophylla is reproducing successfully. Scattered shrubs occur, but none are particularly abundant. Species occasionally present include the needle-leaved evergreen Taxus brevifolia and the deciduous broad-leaved Rhododendron menziesii (= Menziesia ferruginea), Acer glabrum, and Rubus parviflorus. The herbaceous layer is abundant and dominated by perennial ferns. Athyrium filix-femina is always present, with cover usually over 10% and occasionally over 50%. Gymnocarpium dryopteris is also common.
Dynamics	--
Adjacent Types	--

Classification Comments	--

Scientific Name	Tsuga heterophylla / Gymnocarpium dryopteris Riparian Forest
EL Code — WNHP Abb	CEGL000494 — TSUHET/GYMDRY
CSR	G3G4/S3
Ecological System	CES306.802 Northern Rocky Mountain Mesic Montane Mixed Conifer Forest
Element Summary	This association occurs as small, usually linear patches from Coeur d'Alene National Forest northward to northeastern Washington and northwestern Montana, west of the Continental Divide. This association is generally restricted to conditions of moisture accumulation and low insolation, i.e., sheltered slopes and toeslopes, alluvial bottoms and benches forming part of the meso-riparian zone. It shows no affinity for particular aspects due to sheltered positions and is perhaps subirrigated, at least until early summer. The elevation range is from 555 to 1370 m (1820-4500 feet). In northeastern Washington and northern Idaho, soils generally have an ash component overlying a mixed alluvium or colluvium derived from metasediments and glacial till. In Montana soils are derived from a variety of parent materials, though alluvium from sedimentary rock is common. Textures are silt, silt loam, loams and sandy loams. This mesic forest type varies widely in degree of canopy closure from nearly 100% in younger stands to open (less than 60% canopy cover) in stands that have experienced wind-throw, root-rot, or underburns. This type can include all successional stages. Early seral stands can be dominated by other than Tsuga heterophylla or Thuja plicata; however, in late seral to climax stands these two conifers invariably dominate the canopy with specimens approaching 50 m (160 feet) in height. Long-persisting seral tree species include Abies grandis, Picea engelmannii, Pinus monticola (particularly in northern Idaho), Larix occidentalis, Pseudotsuga menziesii, and Betula papyrifera. The shrub layer is often relatively species-rich but not abundant and clearly subordinate to the herbaceous cover. Tall and mid-shrubs with the highest constancy and cover include Acer glabrum, Lonicera utahensis, Paxistima myrsinites, Rosa gymnocarpa, Rubus parviflorus, Taxus brevifolia, and Vaccinium membranaceum. Linnaea borealis is the only subshrub of note. Bromus vulgaris is consistently present in trace amounts. In addition to being 100% constant the herbaceous indicator Gymnocarpium dryopteris ranges in cover from 10 to 90% and averages around 25%. Other forbs of high constancy (>60%) and indicative of mesic or moister moisture levels include Adenocaulon bicolor, Asarum caudatum, Aralia nudicaulis, Clintonia uniflora, Tiarella trifoliata, Galium triflorum, Prosartes hookeri, Maianthemum stellatum, Trillium ovatum, and Viola orbiculata.
Distribution	This association is strongly associated with an Inland Maritime climatic regime and is thus confined to that portion of eastern Washington, northern Idaho and western Montana receiving in excess of 30 inches annual precipitation and not experiencing severe Arctic cold fronts.

Environment	This association occurs as small, usually linear patches extending from Coeur d'Alene National Forest northward to northeastern Washington and northwestern Montana, west of the Continental Divide. This association is generally restricted to conditions of moisture accumulation and low insolation, i.e., sheltered slopes and toeslopes, alluvial bottoms and benches forming part of the meso-riparian zone. Overall it shows no affinity for particular aspects due to sheltered positions and is perhaps subirrigated, at least until early summer; however, with certain drainages it is not found on southerly exposures. The documented elevation range is from 555 to 1370 m (1820-4500 feet). In general, these are nutrient-rich soils with a relatively thick (3-6 inches) organic layer in older stands. In northeastern Washington and northern Idaho soils generally have an ash component overlying a mixed alluvium or colluvium derived from metasediments and glacial till; loams, silt loams and sandy loams predominate, with gravel content ranging from 30 to 50%. In Montana soils are derived from a variety of parent materials, though alluvium from sedimentary rock is often predominant, and textural range is similar to that of Idaho and Washington occurrences. There is no mottling or gleying to indicate greater than seasonal saturation at most.
Physiognomy	--
Vegetation	This small-patch (usually linear in form), mesic forest type varies widely in degree of canopy closure from nearly 100% in younger stands to open (less than 60% canopy cover) in stands that have experienced wind-throw, root-rot, or underburns. This type, as defined here, can include early seral as well as late seral to climax stands, though the latter condition is by far the one that has been most thoroughly sampled (documented by plots). Early seral stands can be dominated by other than Tsuga heterophylla or Thuja plicata; however, these two conifers invariably dominate the canopy with specimens approaching 50 m (160 feet) in height in late seral to climax stands. Long-persisting seral tree species include Abies grandis, Picea engelmannii, Pinus monticola (particularly in northern Idaho), Larix occidentalis, Pseudotsuga menziesii, and Betula papyrifera. Though Larix occidentalis has been cited as an early seral dominant, the more usual condition is that the climax dominants (Tsuga heterophylla and Thuja plicata) are the early seral dominants on these especially mesic sites that do not require post-disturbance amelioration to make them habitable by climax species. The shrub layer is often relatively species-rich but not abundant and clearly subordinate to the herbaceous cover. Tall and mid-shrubs with the highest constancy and cover include Acer glabrum, Lonicera utahensis, Paxistima myrsinites, Rosa gymnocarpa, Rubus parviflorus, Taxus brevifolia, and Vaccinium membranaceum. Linnaea borealis is the only subshrub of note. Bromus vulgaris is consistently present in trace amounts. In addition to being 100% constant the herbaceous indicator Gymnocarpium dryopteris ranges in cover from 10 to 90% and averages around 25%. Other forbs of high constancy (>60%) and indicative moisture levels rated mesic and moister include Adenocaulon bicolor, Asarum caudatum, Aralia nudicaulis, Clintonia uniflora, Tiarella trifoliata, Galium triflorum, Prosartes (=Disporum) hookeri, Maianthemum stellatum, Trillium ovatum, and Viola orbiculata. Among the forbs with at least sub-hydric affinities are Athyrium filix-femina (low cover and stature), Circaea alpina, Streptopus amplexifolius,

	Trautvetteria caroliniensis, and Viola glabella; the foregoing species have low to moderate constancy (20-50%).
Dynamics	Fire-return intervals for this and related mesic to hygric associations are estimated to be about 200 to 400 years. The moisture regime of these sites is such that the climax species (Thuja plicata and Tsuga heterophylla) are able to rapidly recolonize disturbed sites, even those experiencing stand-replacing fire. Thus these sites may be occupied by early-seral forest as well as late-successional and climax stages. Though highly reduced in abundance and occurring only in microsite positions, mesophytic forbs consistently survive fire (stand-replacing and surface fires) and logging; once a shrub/tree canopy is re-established they flourish to characterize the undergrowth with their lushness and diversity. At the canopy closure stage of succession the undergrowth may be reduced to scattered forbs; often Gymnocarpium dryopteris is the most conspicuous, though its stature may be reduced in microsite positions.
Adjacent Types	Throughout much of its range this type grades to Tsuga heterophylla / Clintonia uniflora Forest (CEGL000493) or Tsuga heterophylla / Asarum caudatum Forest (CEGL000490) of drier sites and to Tsuga heterophylla / Athyrium filix-femina Forest (CEGL000491), Thuja plicata / Athyrium filix-femina Forest (CEGL000473), or Thuja plicata - Tsuga heterophylla / Oplopanax horridus Rocky Mountain Swamp Forest (CEGL000479) of marginally wetter, perennially subirrigated environments.
Classification Comments	--

G218 Rocky Mountain Subalpine Moist-Mesic Spruce - Fir Forest

A3614 Abies lasiocarpa - Picea engelmannii Rocky Mountain Moist Forest Alliance

Scientific Name	Abies lasiocarpa - (Picea engelmannii) / Rhododendron albiflorum Forest
EL Code — WNHP Abb	CEGL008286 — ABILAS-(PICENG)/RHOALB
CSR	GNR/S4
Ecological System	CES306.830 Rocky Mountain Subalpine Mesic-Wet Spruce-Fir Forest and Woodland
Element Summary	This association represents open to moderately closed woodlands of the coast-interior transition zone of the East Cascades. It occurs at subalpine elevations (1570 - 1884), on moderately angled (19° mean) middle to upper slopes with deep, late-melting snowpacks. Sites often have west to north aspects (297° mean aspect). Abies lasiocarpa and Picea engelmannii codominate in the canopy. Tsuga mertensiana and Abies amabilis are frequently absent; when present, they average less than 5% cover. The shrub layer is frequently dense and is dominated by Rhododendron albiflorum, typically with Vaccinium membranaceum. Low shrubs Vaccinium scoparium or Vaccinium myrtillus are usually present. The herb layer is sparse to moderately dense. A few areas at higher elevations or on west-facing sites with deep snowpack may be dominated by Luzula hitchcockii (=glabrata var. hitchcockii), with Valeriana sitchensis.
Distribution	This forest association occurs in the coast-interior transition area of the East Cascades in Washington, possibly extending into British Columbia.
Environment	These woodlands occur at subalpine elevations, on moderately angled middle to upper slopes with deep, late-melting snowpacks. Sites often have west to north aspects.
Physiognomy	These woodlands or forests are dominated needle-leaved trees in a relatively open canopy (average total canopy cover = 43%, though occasionally stands are moderately closed). The shrub layer is dense (43% mean cover of tall shrubs) and the understory is dominated by forbs (35% mean cover).
Vegetation	Abies lasiocarpa and Picea engelmannii codominate in the canopy. Tsuga mertensiana and Abies amabilis are frequently absent; when present, they average less than 5% cover. The shrub layer is frequently dense and is dominated by Rhododendron albiflorum, typically with Vaccinium membranaceum. Low shrubs Vaccinium scoparium or Vaccinium myrtillus are usually present. The herb layer is sparse to moderately dense. A few areas at higher elevations or on west-facing sites with deep snowpack may be dominated by Luzula hitchcockii (=glabrata var. hitchcockii), with Valeriana sitchensis.
Dynamics	These spruce-fir forests are typically characterized by a high-severity/low frequency fire regime ((Agee, 1993). The cool, moist subalpine environment typically limits ignition opportunities to only a few weeks in late summer (Jenkins et al., 2008).
Adjacent Types	--
Classification Comments	Previous surveyors identified a ABLA2/RHAL/XETE association at MSSP (Morrison et al., 2007). That association is included within this USNVC concept.

Scientific Name	Abies lasiocarpa - Picea engelmannii / Clintonia uniflora - Xerophyllum tenax Forest
EL Code — WNHP Abb	CEGL005892 — ABILAS-PICENG/CLIUNI-XERTEN
CSR	G4/SNR
Ecological System	CES306.830 Rocky Mountain Subalpine Mesic-Wet Spruce-Fir Forest and Woodland
Element Summary	This association has been described only for the northern Rocky Mountains. It occupies most of what was considered the dry and cold portion of the former Abies lasiocarpa / Clintonia uniflora association. It is found predominantly on well-drained sites with south- or west-facing exposures and all degrees of slope steepness; it is seldom found on toeslope positions or steam terraces. Within a given landscape (Glacier-Waterton International Peace Park) it exhibited a wide elevational range, from 1340 to 1800 m (4400-5900 feet); this upper elevation is extreme and beyond the elevational limits of Clintonia uniflora, but within the distributional limits of Tiarella trifoliata. Parent materials are dominated by granitic, quartzites, mica schists, and partially metamorphosed sedimentary types, such as argillite. In northern Idaho and western Montana, ash caps of varying thickness are common. In local landscapes it grades to Abies grandis / Xerophyllum tenax - Clintonia uniflora or Thuja plicata / Clintonia uniflora at lower elevations, and above, or on drier sites, to Abies lasiocarpa / Xerophyllum tenax (which may be dominated by seral tree species). The tree canopy is dominated by a variable combination of Abies lasiocarpa and Picea engelmannii; cover of the upper canopy generally ranges from 60 to 80%. Seral tree species (Pinus contorta, Pseudotsuga menziesii, Larix occidentalis) are relatively more successful in post-disturbance colonization than they are in other Clintonia uniflora-characterized sites (stands dominated by seral tree species comprise a separate set of associations). This response essentially reflects the warmer, more open sites that following disturbance do not so readily regenerate to shrub dominance. The undergrowth is dominated by a low- to mid-shrub, discontinuous layer of Vaccinium membranaceum; other high-constancy shrubs, which seldom exceed 15% cover, include Lonicera utahensis, Spiraea lucida (=betulifolia), Rubus parviflorus, Paxistima myrsinites, Acer glabrum, and Amelanchier alnifolia. The graminoid component often comprises less than 1% cover, and there are none that appear with even moderate constancy. The forb layer is generally dominated by Xerophyllum tenax, whose cover ranges from barely greater than 1% to 60 or 70% in more open stands. The other diagnostic forbs, Clintonia uniflora and Tiarella trifoliata, seldom exceed 5% cover. Other forbs of high constancy and occasional layer dominance include Thalictrum occidentale, Orthilia secunda, Viola orbiculata, Arnica latifolia (or Arnica cordifolia), Goodyera oblongifolia and Osmorhiza berteroi.
Distribution	This association has been described only for the northern Rocky Mountains of extreme northeastern Washington, northern Idaho and western Montana, extending north into southwestern Alberta; this type is to be expected in western British Columbia based on environmental parameters.

Environment	This association has been described only for the northern Rocky Mountains. It occupies most of what was considered the dry and cold portion of former Abies lasiocarpa - Picea engelmannii / Clintonia uniflora Forest (CEGL000307). It is found predominantly on well-drained sites with south- or west-facing exposures and all degrees of slope steepness; it is seldom found on toeslope positions or steam terraces. Within a given landscape (Glacier-Waterton International Peace Park) it exhibits a wide elevational range, from 1340 to 1800 m (4400-5900 feet); this upper elevation is extreme and beyond the elevational limits of Clintonia uniflora. Parent materials are dominated by granitic, quartzites, mica schists, and partially metamorphosed sedimentary types, such as argillite. In northern Idaho and western Montana ash caps of varying thickness are common.
Physiognomy	--
Vegetation	The tree canopy is dominated by a variable combination of Abies lasiocarpa and Picea engelmannii; cover of the upper canopy generally ranges from 60 to 80%. Throughout Montana many of the Picea populations show clear hybridization between Picea engelmannii and Picea glauca; however, most populations exhibit the Picea engelmannii characteristics more strongly. It is notable that with a shift to more of an existing vegetation-based classification that this type constitutes much less of the landscape than it would have under the concept of potential vegetation types. This is because seral tree species (Pinus contorta, Pseudotsuga menziesii, Larix occidentalis) are relatively more successful in post-disturbance colonization than they are in other Clintonia uniflora-characterized sites (stands dominated by seral tree species comprise a separate set of associations). This response essentially reflects the warmer, more open sites that following disturbance do not so readily regenerate to shrub dominance. The undergrowth is dominated by a low- to mid-shrub, discontinuous layer of Vaccinium membranaceum; other high-constancy shrubs, which seldom exceed 15% cover, include Lonicera utahensis, Spiraea lucida (=betulifolia), Rubus parviflorus, Paxistima myrsinites, Acer glabrum, and Amelanchier alnifolia. The graminoid component often comprises less than 1% cover, and there are none that appear with even moderate constancy. The forb layer is generally dominated by Xerophyllum tenax, whose cover ranges from barely greater than 1% to 60 or 70% in open stands. The other diagnostic forbs, Clintonia uniflora and Tiarella trifoliata, seldom exceed 5% cover. Other forbs of high constancy and occasional layer dominance include Thalictrum occidentale, Orthilia secunda, Viola orbiculata, Arnica latifolia (or Arnica cordifolia), Goodyera oblongifolia, and Osmorhiza berteroi (= Osmorhiza chilensis). There are regional distinctions within the forb layer with northern Idaho having several forbs of high constancy including Anemone piperi, Trillium ovatum, Coptis occidentalis, and Pectiantia (=Mitella) stauropetala.
Dynamics	--
Adjacent Types	--
Classification Comments	Not previously identified at MSSP.

Scientific Name	Abies lasiocarpa - Picea engelmannii / Clintonia uniflora Forest
EL Code — WNHP Abb	CEGL005912 — ABILAS-PICENG/CLIUNI
CSR	G5/S3
Ecological System	CES306.830 Rocky Mountain Subalpine Mesic-Wet Spruce-Fir Forest and Woodland
Element Summary	This association is broadly distributed across the inland northwest and northern Rocky Mountains, where it is associated with a maritime component of climate. It occurs as far east as the Continental Divide in northwestern Montana and Alberta, extending only a few air miles to the east of this strongest of topographic breaks. This community occupies relatively moist (mesic) and cool sites having free air drainage and lacking frost pocket conditions. Elevations range from 1066 to 1710 m (3500-5600 feet). It occurs on slopes of all degrees of steepness and aspect orientation, though it is more likely to occur from toeslope through midslope positions (predominantly collecting positions). At the dry extremes of its distribution it is more strongly associated with protected positions such as concave slopes, moist depressions in gently sloping plateaus, stringers along perennial stream bottoms, toeslopes and northeastern aspects. It occurs on a variety of parent materials, as varying as granite, limestone, glacial-fluvial material, and volcanic ash caps. Abies lasiocarpa and Picea engelmannii dominate the tree canopy. The most important seral species are Pseudotsuga menziesii, Larix occidentalis, and Pinus contorta, however, their cover seldom exceeds 10-15%. Total tree canopy cover is generally in excess of 55% ranging to 75%. Abies lasiocarpa dominates the tree regeneration layer, whereas Picea engelmannii reproduction is more sporadic. The shrub layer ranges from low diversity and cover to extremely diverse and high in cover; the shrubs present are judged largely seral. Those of highest constancy include Acer glabrum, Ribes lacustre, Lonicera utahensis, Rubus parviflorus, Symphoricarpos albus, and Vaccinium membranaceum. The low-shrub component is well-represented by Linnaea borealis, Spiraea lucida (=betulifolia), Paxistima myrsinites, and, in the northern portion of the type's range, Vaccinium myrtillus. The only graminoids consistently present are Bromus vulgaris and Calamagrostis rubescens; the latter species may be relatively abundant on early seral stands but with an increase in tree canopy cover it is less abundant. The forb component is relatively species-rich and abundant; cover of the diagnostic species Clintonia uniflora or Tiarella trifoliata generally does not exceed 20%. There are many other forbs with high constancy and the potential to have appreciable cover, including Maianthemum stellatum, Arnica cordifolia, Thalictrum occidentale, and Eucephalus engelmannii; forbs merely with high constancy include Orthilia secunda, Galium triflorum, Goodyera oblongifolia, Osmorhiza berteroi, and Viola orbiculata.
Distribution	This association is broadly distributed across the inland northwest and northern Rocky Mountains, associated with a maritime component of climate. It occurs as far east as the Continental Divide in northwestern Montana and Alberta, but extends only a few air miles to the east of this strongest of topographic breaks.

Environment	This community occupies relatively moist (mesic) and cool sites having free air drainage and lacking frost pocket conditions. It is speculated to have the most moderate temperature regimes within Abies lasiocarpa - Picea engelmannii Rocky Mountain Moist Forest Alliance (A3614). It occurs on slopes of all degrees of steepness and aspect orientation, though it is more likely to occur from toeslope through midslope positions (predominantly collecting positions). At the dry extreme of its distribution, it is more strongly associated with protected positions such as concave slopes, moist depressions in gently sloping plateau areas, stringers along perennial stream bottoms, toeslopes and northeastern aspects. In the north it ranges from 1066 to 1585 m (3500-5200 feet) (extreme outliers at 1710 m [5600 feet]), whereas to the south it ranges from 1555 to 1710 m (5100-5600 feet). A variety of parent materials are represented, including those as disparate as granite and limestone, including all manner of glaciofluvial material. In northern Idaho and northwestern Montana, it is routinely found on ash caps, ranging from 3 to 60 cm in depth. The soil textures are predominantly loams and silt loams (reflecting in part the volcanic ash); soils typically have less than 15% coarse fragment content and are well-drained.
Physiognomy	--
Vegetation	A highly variable mix of Abies lasiocarpa and Picea engelmannii dominate the overstory, ostensibly at all stages of succession; tree canopy cover is generally in excess of 55% ranging to 75%. Certainly the regeneration layers are Abies lasiocarpa-dominated whereas Picea engelmannii reproduction is more sporadic, but its autecological characteristics provide for its presence throughout the sere. The most important seral species are Pseudotsuga menziesii, Larix occidentalis, and Pinus contorta, however, their cover seldom exceeds 10-15% [see Global Classification Comments]. The shrub layer ranges from virtually nonexistent to extremely diverse and high in cover; the shrubs present are judged largely seral in their response and not specific enough in indicator value to be useful in further subdividing this syntaxon. Those of highest constancy include Acer glabrum, Ribes lacustre, Lonicera utahensis, Rubus parviflorus, Symphoricarpos albus, and Vaccinium membranaceum. The low-shrub component is well-represented by Linnaea borealis, Spiraea lucida (=betulifolia), Paxistima myrsinites, and, in the northern portion of the type's range, Vaccinium myrtillus. The only graminoids consistently present are Bromus vulgaris and Calamagrostis rubescens; the latter species may be relatively abundant on early seral stands but with an increase in tree canopy cover it is less abundant. The forb component is relatively species-rich and abundant; cover of the diagnostic species Clintonia uniflora or Tiarella trifoliata generally does not exceed 20% [see Global Classification Comments]. A host of forbs with high constancy and the potential to have appreciable cover include Maianthemum stellatum, Arnica cordifolia, Thalictrum occidentale, and Eucephalus engelmannii (= Aster engelmannii); forbs merely exhibiting high constancy include Orthilia secunda, Galium triflorum, Goodyera oblongifolia, Osmorhiza berteroi, and Viola orbiculata.

Dynamics	It has not been established why particular stands may regenerate following disturbance to dominance by the tree species generally regarded as dominant later in the sere and persisting to long-term stability. It is known that clearcutting followed by broadcast burning may create persistent shrubfields, which retard regeneration (Williams et al. 1995); however, it may be that these shrubfields retard the regeneration of seral tree species more effectively than they do shade-tolerant climax species. With the death of canopy tree species and slow ingrowth of Abies lasiocarpa and Picea engelmannii, other associations, whose undergrowth is characterized by Clintonia uniflora (e.g., Pinus contorta / Clintonia uniflora), will succeed to this association; for stands dominated by Larix occidentalis or Pseudotsuga menziesii this replacement will not occur (statistically speaking) within historic fire-return intervals within this subalpine zone (80-150 years).
Adjacent Types	--
Classification Comments	Not previously identified at MSSP.

Scientific Name	Abies lasiocarpa - Picea engelmannii / Luzula glabrata var. hitchcockii Woodland
EL Code — WNHP Abb	CEGL000317 — ABILAS-PICENG/LUZGLA
CSR	G5/S2
Ecological System	CES306.830 Rocky Mountain Subalpine Mesic-Wet Spruce-Fir Forest and Woodland
Element Summary	This association is a minor one, occurring as small-patch occurrences at the highest subalpine elevations within the northern Rocky Mountains, southern portion of the Canadian Rockies and west to the eastern slope of the Cascade Range. Across the core area of its distribution its known elevational range is 1830 to 2500 m (6000-8200 feet). It occupies cold sites that receive snow in excess of what is received by surrounding topography and also retains the snow cache late into summer. Sites may occur on all aspects and degrees of slope so long as snowpack is long-persisting. Parent materials are various, including extrusive and intrusive volcanics (primarily granitic), sedimentary colluvium and morainal detritus; regardless of parent material, kind/source soils weather to coarse-textured, extremely acidic soils (usually less than pH of 4.2). Stands are usually very open with short-stature Abies lasiocarpa and Picea engelmannii dominating the canopy. Scattered seral tree species include Pinus albicaulis and Pinus contorta. The shrub component is generally depauperate with thin patches of a variable mix of Vaccinium scoparium, Vaccinium membranaceum (dwarfed in size to less than 0.2 m), Lonicera utahensis, Ribes montigenum, and Phyllodoce empetriformis. The forb component is strongly dominated by Luzula glabrata, which can occur as a dense sward (cover approaching 100%) to the near exclusion of other herbs. Arnica latifolia is universally the most abundant and constant forb in a very depauperate layer.
Distribution	This association is a minor one, occurring as small- or infrequently as large-patch occurrences at the highest subalpine elevations within the northern Rocky Mountains and southern portion of the Canadian Rockies. Documented outliers occur in the Teton Range of Wyoming.
Environment	This association is a minor one, occurring as small- or infrequently as large-patch occurrences at the highest subalpine elevations within the northern Rocky Mountains and southern portion of the Canadian Rockies. Across the core area of its distribution its known elevational range is 1830 to 2500 m (6000-8200 feet); outliers of the association are found in Wyoming's Teton Range at 2990 m (9800 feet) and higher. It occupies cold sites that receive snow in excess of what is received by surrounding topography and also retains the snow cache late into summer. Sites may occur on all aspects and degrees of slope so long as snowpack is long-persisting. Parent materials are various, including extrusive and intrusive volcanics (primarily granitic), sedimentary colluvium and morainal detritus; regardless of parent material, kind/source soils weather to coarse-textured, extremely acidic soils (usually less than pH of 4.2) with a high gravel content, reflected in the considerable amount displayed on the surface. Soils are poorly developed (Inceptisols, Entisols) with virtually no horizonation.
Physiognomy	--

Vegetation	Stands are usually very open with short-stature Abies lasiocarpa and Picea engelmannii dominating the canopy. Scattered seral tree species include Pinus albicaulis and Pinus contorta. The shrub component is generally depauperate with thin patches of a variable mix of Vaccinium scoparium, Vaccinium myrtillus, Vaccinium membranaceum (dwarfed in size to less than 0.2 m), Lonicera utahensis, Sambucus racemosa, Ribes montigenum, and Phyllodoce empetriformis. The forb component is strongly dominated by Luzula glabrata, which can occur as a dense sward (cover approaching 100%) to the near exclusion of other herbs; most studies report an average cover between 20 and 40%. Other graminoids present vary by region with Juncus parryi, Carex rossii, and Carex geyeri being most prevalent in central and northern Idaho where the type is ostensibly most extensive. Arnica latifolia is universally the most abundant and constant forb in a very depauperate layer. In Idaho, Chionophila tweedyi, Pedicularis contorta, Polemonium pulcherrimum, and Valeriana sitchensis are the species with highest constancy; with the exception of Chionophila tweedyi, the same expression is found on the east slope of the Cascades (Lillybridge et al., 1995). In Montana Arnica latifolia, Hieracium gracile, Viola orbiculata, and Xerophyllum tenax tend to be consistently present, though only the first and last named attain high coverages. In Grand Teton National Park, forbs include Pedicularis racemosa, Sibbaldia procumbens, Arnica latifolia, Ligusticum filicinum, Erigeron spp., Eucephalus engelmannii, and Lupinus sp.
Dynamics	--
Adjacent Types	--
Classification Comments	Previous surveyors identified a ABLA/LUGLH association at MSSP (Morrison & Wooten, 2010). That community is synonymous with this USNVC type. Not observed in 2022. Remains in key based on previous reports.

G218 Rocky Mountain Subalpine Moist-Mesic Spruce - Fir Forest

Scientific Name	Abies lasiocarpa - Picea engelmannii / Menziesia ferruginea Forest
EL Code — WNHP Abb	CEGL000319 — ABILAS-PICENG/MENFER
CSR	G5/SNR
Ecological System	CES306.830 Rocky Mountain Subalpine Mesic-Wet Spruce-Fir Forest and Woodland
Element Summary	This association is a moist, higher elevation forest. It occurs in northern Idaho and much of the western third of Montana, northwestern Wyoming, and stretches into northeastern Washington and Oregon. It has been documented to occur in Alberta and British Columbia as well. Rhododendron menziesii (= Menziesia ferruginea) distribution in the northern Rockies coincides with areas having maritime influence. It occurs on gentle and steep slopes, generally on the upper third of the slope, or on gentle benches where moisture is retained throughout the summer. In the southern and lower elevational limits of its range it is limited to north-facing, sheltered pockets. Elevational range is 1190 to 2500 m (3900-8200 feet). Soils are generally acidic, often silty to loamy, with high gravel content. Abies lasiocarpa and Picea engelmannii are the dominant overstory species. Pinus contorta, Pseudotsuga menziesii, Pinus albicaulis, Tsuga heterophylla, Tsuga mertensiana, and Larix occidentalis can be present in the over and under canopies as well. Rhododendron menziesii (= Menziesia ferruginea) forms a dense shrub layer, usually between 1.2 and 1.8 m (4-6 feet) tall but can be shorter due to snow damage. Shorter shrubs often present include Vaccinium scoparium and Vaccinium membranaceum. Arnica cordifolia (or Arnica latifolia) and Orthilia secunda are nearly always present in the sparse herbaceous layer. Xerophyllum tenax may be present but never more than 5%. This association is distinguished from other Abies lasiocarpa - Picea engelmannii / Menziesia ferruginea types [see Similar Associations] by the lack of certain indicator species or their cover is less than 5% (for example, Clintonia uniflora, Streptopus amplexifolius, Luzula hitchcockii (=glabrata var. hitchcockii), or Xerophyllum tenax).
Distribution	It occurs in northern Idaho and much of the western third of Montana, northwestern Wyoming, and stretches into northeastern Washington and Oregon. It has been documented to occur in Alberta and British Columbia as well.
Environment	Rhododendron menziesii (= Menziesia ferruginea) distribution in the northern Rockies coincides with areas having maritime influence. It occurs on gentle and steep slopes, generally on the upper third of the slope, or on gentle benches where moisture is retained throughout the summer. In the southern and lower elevational limits of its range it is limited to north-facing aspects. Elevational range is 1190 to 2500 m (3900-8200 feet). Soils are generally acidic, often silty to loamy, with high gravel content.
Physiognomy	--

Vegetation	Abies lasiocarpa and Picea engelmannii are the dominant overstory species. Pinus contorta, Pseudotsuga menziesii, Pinus albicaulis, Tsuga heterophylla, Tsuga mertensiana, and Larix occidentalis can be present in the over and under canopies as well. Rhododendron menziesii (= Menziesia ferruginea) forms a dense shrub layer, usually between 1.2 and 1.8 m (4-6 feet) tall but can be shorter due to snow damage. Shorter shrubs often present include Vaccinium scoparium and Vaccinium membranaceum. Other shrubs that may be present, depending on geographic location, include Alnus viridis ssp. sinuata (= Alnus sinuata), Rhododendron albiflorum, Sorbus scopulina, Ribes spp., and Lonicera utahensis. Arnica cordifolia or Arnica latifolia and Orthilia secunda are nearly always present in the sparse herbaceous layer. Goodyera oblongifolia is often present. Xerophyllum tenax may be present but never more than 5%. This association is distinguished from other Abies lasiocarpa - Picea engelmannii / Menziesia ferruginea types [see Similar Associations] by the lack of certain indicator species or their cover is less than 5% (for example, Clintonia uniflora, Streptopus amplexifolius, Luzula hitchcockii (=glabrata var. hitchcockii), or Xerophyllum tenax).
Dynamics	--
Adjacent Types	--
Classification Comments	Previous surveyors identified a ABLA/MEFE association at MSSP (Morrison & Wooten, 2010). That community is synonymous with this USNVC type.

Scientific Name	Abies lasiocarpa - Picea engelmannii / Menziesia ferruginea / Clintonia uniflora
EL Code — WNHP Abb	CEGL005893 — ABILAS-PICENG/MENFER/CLIUNI
CSR	G4G5/SNR
Ecological System	CES306.830 Rocky Mountain Subalpine Mesic-Wet Spruce-Fir Forest and Woodland
Element Summary	This is a broadly distributed association strongly associated with Pacific maritime climatic regime which penetrates with ever diminishing influence just east of the Continental Divide in the northern Rocky Mountains. It is well-documented from north-central Idaho and western Montana northwards into neighboring provinces of Alberta and British Columbia. This is a type of lower to mid-elevation subalpine environments with a relatively narrow elevation range in any given locality and an overall range of 1280 to 1770 m. It is characteristic of cool, moist exposures, typically occupying moderate to steep slopes with north- and east-facing slope aspects. Soils are derived from a variety of noncalcareous and calcareous sedimentary rock, as well as metamorphic types (including quartzites, mica schists), volcanics (both intrusive and extrusive, including granitics and basalts), and glacial till and drift. Surface horizon soil textures are predominantly silt loams and loams. In northern Idaho and western Montana an ash cap of variable depth (2.5-61 cm [1-24 inches]) increases the moisture-holding capacity and nutrient content of these soils. The overstory is dominated by a variable combination of Abies lasiocarpa and Picea engelmannii; total tree canopy cover is generally in the range of 50 to 80%. This association represents predominantly mature to old-growth conditions, but seral species can be present, in declining order of importance, Pinus contorta, Pseudotsuga menziesii, Larix occidentalis, Pinus monticola, and Pinus albicaulis. The undergrowth generally has a lush aspect with a tall to mid-sized shrub layer dominated by Menziesia ferruginea, Vaccinium membranaceum, Alnus viridis ssp. sinuata, Sorbus spp., Lonicera utahensis, and Ribes lacustre. Vaccinium scoparium (or Vaccinium myrtillus) and Linnaea borealis are the predominant dwarf-shrubs. Graminoids are scarce with only Bromus vulgaris and Bromus ciliatus being present with any constancy at all. The forb component is virtually always dominated by one, or a combination of, the following three species: Xerophyllum tenax, Arnica latifolia (or Arnica cordifolia), or Thalictrum occidentale. However, the type is recognized by the presence of either Clintonia uniflora or Tiarella trifoliata, which have much more restricted environmental ranges (mesic to hygric moisture regimes) than the above-named forb dominants; their cover seldom exceeds 10%. Other forbs consistently present with low coverages include Veratrum viride, Heracleum maximum, Galium triflorum, and Senecio triangularis.
Distribution	This is a broadly distributed association strongly associated with Pacific maritime influences in the northern Rocky Mountains of northern Idaho, western Montana, and southwestern Alberta with a minor presence southward into the ranges of central Idaho. This association is expected to occur in British Columbia, Washington, and Oregon based on the existence of appropriate habitat and distributional range of the defining species.

Environment	This is a broadly distributed association strongly associated with Pacific maritime influences which penetrate with ever diminishing influence as far east as just east of the Continental Divide in Glacier-Waterton International Peace Park and the Lewis and Clark National Forest to the south. This is a type of lower to mid-elevation subalpine environments cited from a relatively narrow elevation range, 1555 to 1675 m (5100-5500 feet) in central Idaho (Steele et al. 1981), 1400 to 1800 m (4600-5900 feet) in northern Idaho (Cooper et al. 1987), and 1370 to 1740 m (4500-5700 feet) in western Montana (Pfister et al. 1977). A more intensive inventory of Glacier-Waterton International Peace Park has demonstrated a slightly broader elevation range, 1280 to 1920 m (4200-5800 (6300) feet). It is characteristic of cool, moist exposures, typically occupying moderate to steep slopes with northerly and easterly aspects. It is associated with collecting positions, from midslopes downward to toeslopes and even benches where cold air ponds. Again, an intensive sampling of Glacier-Waterton shows it to occur across a broader environmental spectrum than hitherto had been appreciated. Factor compensation is nicely exemplified in the Glacier-Waterton data with stands occurring on southerly exposures but only at the highest elevations of the type. Soils are derived from a variety of noncalcareous and calcareous sedimentary, metamorphic (including quartzites, mica schists), volcanics (including granitics and basalts), and glacial till and drift. In Montana in the vicinity of the Continental Divide, it has been demonstrated that the type occurs about 90 to 150 m (300-500 feet) higher on calcareous substrates in contrast to all varieties of noncalcareous substrates. Surface horizon soil textures are predominantly silt loams and loams. In northern Idaho and western Montana an ash cap of variable depth (2.5-61 cm [1-24 inches]) increases the moisture-holding capacity and nutrient content of these soils.
Physiognomy	--
Vegetation	The overstory is dominated by a variable combination of Abies lasiocarpa and Picea engelmannii, though in exceptional cases either may be wanting; total tree canopy cover is generally in the range of 50 to 80%. Most of the plots from which this type has been defined represent mature to old-growth conditions; though younger stands will key here, they are not well-represented on the landscape due to the fact that this type is distinctive in that both Abies lasiocarpa and Picea engelmannii establish readily only shortly after disturbance events. Other seral tree species are, in declining order of importance, Pinus contorta, Pseudotsuga menziesii, Larix occidentalis, Pinus monticola, and Pinus albicaulis. Sites are apparently beyond the cold limits of Pinus ponderosa. The undergrowth generally has a lush aspect with a tall to mid-sized shrub layer dominated by Menziesia ferruginea, Vaccinium membranaceum, Alnus viridis ssp. sinuata, Sorbus spp., Lonicera utahensis, and Ribes lacustre. Vaccinium scoparium (or Vaccinium myrtillus) and Linnaea borealis are the only dwarf-shrubs present with greater than 20% constancy. Menziesia ferruginea has by far the greatest cover with some stands in the very moderate environments of northern Idaho having cover approaching 100% and heights over 8 feet; this condition contrasts with this type at its cold dry limits on the east slope of the Rocky Mountains where Menziesia ferruginea height potential is in the 3- to 4-foot range and cover is often not much greater than 10%. Graminoids are scarce with only Bromus vulgaris and Bromus

	ciliatus being present with any constancy at all. The forb component is virtually always dominated by one or a combination of the following three: Xerophyllum tenax, Arnica latifolia (or Arnica cordifolia), or Thalictrum occidentale, which are at least 80% constant and have coverages often exceeding 20%. However, the type is recognized by the presence of either Clintonia uniflora or Tiarella trifoliata, which have much more restricted environmental ranges (mesic to hygric moisture regimes) than the above-named forb dominants; their cover seldom exceeds 10%. The consistent presence of other forbs affirms the type's mesic to hygric nature and includes Veratrum viride, Heracleum maximum, Galium triflorum, and Senecio triangularis; were they plentiful a yet wetter community would be recognized. In more localized landscapes the following forbs are highly constant, Anemone piperi, Orthilia secunda (= Pyrola secunda), Viola orbiculata, Goodyera oblongifolia, and Trillium ovatum.
Dynamics	The mesic to hygric nature of this type favors the establishment of tree species of the climax stage, Abies lasiocarpa and Picea engelmannii, following disturbance. However, a frequent alternative post-disturbance scenario, particularly following clearcutting, is the development of long-persisting shrubfields, where tall shrubs (Menziesia ferruginea, Alnus viridis ssp. sinuata, Sorbus sitchensis, Sorbus scopulina) dominate and trees are slow to establish.
Adjacent Types	--
Classification Comments	Not previously identified at MSSP, nor in Washington State. The very similar *Abies lasiocarpa - Picea engelmannii / Menziesia ferruginea* Forest (CEGL000319) is distinguished from by the lack of certain indicator species or their cover is less than 5% (for example, *Clintonia uniflora*, *Streptopus amplexifolius*, *Luzula glabrata* var. *hitchcockii* (= *Luzula hitchcockii*), or *Xerophyllum tenax*. It may also be present at MSSP.

Scientific Name	Abies lasiocarpa - Picea engelmannii / Menziesia ferruginea / Xerophyllum tenax Forest
EL Code — WNHP Abb	CEGL005895 — ABILAS-PICENG/MENFER/XERTEN
CSR	G4/SNR
Ecological System	CES306.830 Rocky Mountain Subalpine Mesic-Wet Spruce-Fir Forest and Woodland
Element Summary	This association occurs throughout the middle to northern Rocky Mountains and on into the Canadian Rockies as a small- to large-patch type from mid to upper subalpine habitats. In the southerly portions of its distribution, the Wallowa and Seven Devils mountains and Idaho Batholith, it faithfully occupies moderate to steep slopes of northerly aspects at elevations ranging from 1700 to 2300 m (5600-7500 feet), but dropping to 1370 m (4500 feet) where frost pocket conditions obtain. Further to the north it also occurs predominantly on northerly exposures, but at higher elevations in wetter climates, it may be found on southerly exposures. It can occur on a given slope from the toe, up the backslope to the slope shoulder, and in wetter climates is found on ridgetops as well. It is perhaps most widely distributed in western Montana where individual stands may comprise hundreds to thousands of acres. It exhibits no particular substrate preferences being found on granitic, fine-grained sedimentaries (including argillite and limestone), metasediments, and mica-schist; volcanic ash caps of varying depths (to 50 cm thickness) are very prevalent in the southern and western portions. The predominant soil texture is silt loam, and soils are uniformly well-drained. Rock content of surface horizons ranges from about 15% to over 50%. This is a closed forest type for the most part with total upper canopy cover ranging upward from 60%. A variable mix of Abies lasiocarpa and Picea engelmannii dominates the canopy as well as the regeneration layers. Seral tree species do poorly on these sites; Pinus contorta, Pseudotsuga menziesii, and Larix occidentalis are the only tree species consistently present and seldom is their canopy cover as great as 20%. The modal condition for the undergrowth varies with geographic region. Rhododendron menziesii (= Menziesia ferruginea) consistently dominates the tall-shrub layer, which may also have Alnus viridis ssp. sinuata as a conspicuous component. In all parts of the type's range Vaccinium membranaceum is the mid (short) shrub dominant with coverages generally upwards of 30%; it is usually accompanied by low cover of Ribes lacustre and the somewhat shorter dwarf-shrub Vaccinium scoparium (or its ecological analogue Vaccinium myrtillus). The only graminoid consistently present, Luzula glabrata, occurs in slightly greater than trace amounts in stands at higher elevations and experiencing deeper snowpack. The herb layer, depauperate in comparison to that of Abies lasiocarpa - Picea engelmannii / Menziesia ferruginea / Clintonia uniflora Forest (CEGL005893), is strongly dominated by Xerophyllum tenax; Arnica cordifolia, Arnica latifolia, Goodyera oblongifolia, Viola orbiculata, and Orthilia secunda are the only forbs approaching or exceeding 50% constancy.
Distribution	This association occurs from the northernmost middle Rocky Mountains, throughout the northern Rocky Mountains and on into the Canadian Rockies at least to the latitude of Jasper National Park (Canada) as a small- to large-patch type from mid to upper subalpine habitats.

Environment	This association occurs throughout the middle to northern Rocky Mountains and on into the Canadian Rockies of southwestern and west-central Alberta as a small- to large-patch type from mid to upper subalpine habitats. In the southerly portions of its distribution, the Wallowa and Seven Devils mountains and Idaho Batholith (somewhat disjunct in Teton Range of Wyoming), it faithfully occupies moderate to steep slopes of northerly aspects at elevations ranging from 1700 to 2195 m (5600-7200 feet), but dropping to 1370 m (4500 feet) where frost pocket conditions obtain. Further to the north it also occurs predominantly on northerly exposures, but at higher elevations in wetter climates, it may be found on western and even southern exposures; it can occur on a given slope from the toe, up the backslope to the slope shoulder, and in wetter climates is found on ridgetops as well. It is perhaps most widely distributed in western Montana where individual stands may comprise hundreds to thousands of acres. In a circumscribed area, such as Glacier National Park, it may have a fairly consistent elevational range of 1000 to 1200 m (5400-6600 feet). It exhibits no particular substrate preferences being found on granitic, fine-grained sedimentaries (including argillite and limestone), metasediments, and mica-schist; volcanic ash caps of varying depths (to 50 cm thickness) are very prevalent in the southern and western portions. The predominant soil texture is silt loam, and soils, at least those occurring in the U.S., are uniformly well-drained.
Physiognomy	--
Vegetation	This is a closed forest type for the most part with total upper canopy cover ranging upward from 60%. A variable mix of Abies lasiocarpa and Picea engelmannii dominate the canopy as well as the regeneration layers. Seral tree species do poorly on these sites; Pinus contorta, Pseudotsuga menziesii, and Larix occidentalis are the only tree species consistently present and seldom is their canopy cover as great as 20%. The modal condition for the undergrowth varies with geographic region; in northern Idaho and eastern Washington Rhododendron menziesii (= Menziesia ferruginea), joined by Rhododendron albiflorum in over half the stands inventoried, forms a lush and mostly continuous, tall (to 6 feet or more) shrub layer. This is contrasted with the physiognomy of stands on the east side of the Continental Divide where the tall-shrub canopy can be decidedly discontinuous and seldom exceeds 3-4 feet in height and lacks Rhododendron albiflorum, though Alnus viridis ssp. sinuata (= Alnus sinuata) and Sorbus scopulina are consistently present. In all parts of the type's range Vaccinium membranaceum is the mid (short) shrub dominant with coverages generally upwards of 30%; it is usually accompanied by low cover of Ribes lacustre and the somewhat shorter Vaccinium scoparium (or its ecological analogue Vaccinium myrtillus). The only graminoid consistently present, Luzula glabrata, occurs in slightly greater than trace amounts in stands at higher elevations and experiencing deeper snowpack. The herb layer, depauperate in comparison to that of Abies lasiocarpa - Picea engelmannii / Menziesia ferruginea / Clintonia uniflora Forest (CEGL005893), is strongly dominated by Xerophyllum tenax; Arnica cordifolia, Arnica latifolia, Goodyera oblongifolia, Viola orbiculata, and Orthilia secunda are the only forbs approaching or exceeding 50% constancy.
Dynamics	--
Adjacent Types	--

Classification Comments	Not previously identified at MSSP. The very similar *Abies lasiocarpa - Picea engelmannii* / *Menziesia ferruginea* Forest (CEGL000319) is distinguished from by the lack of certain indicator species or their cover is less than 5% (for example, *Clintonia uniflora*, *Streptopus amplexifolius*, *Luzula glabrata* var. *hitchcockii* (= *Luzula hitchcockii*), or *Xerophyllum tenax*. It may also be present at MSSP.

G218 Rocky Mountain Subalpine Moist-Mesic Spruce - Fir Forest

Scientific Name	Abies lasiocarpa - Picea engelmannii / Vaccinium membranaceum / Xerophyllum tenax Forest
EL Code — WNHP Abb	CEGL005917 — ABILAS-PICENG/VACMEM/XERTEN
CSR	GNR/SNR
Ecological System	CES306.830 Rocky Mountain Subalpine Mesic-Wet Spruce-Fir Forest and Woodland
Element Summary	This association is broadly distributed throughout the mid to upper subalpine zones of the northern Rocky Mountains, concentrated west of the Continental Divide. It is strongly associated with moderate to steep, cold, relatively dry slopes, usually having southeast- through south- to west-facing exposures. It typically occurs from midslopes upwards to slope shoulders, ridgetops and occasionally extending to high-elevation benches as well. Elevations range is from 1425-2025 m (4675-6643 feet) in the northern portion of its distribution and 1740-2470 m (5700-8100 feet) in its southern extent. These sites have well-drained, nutrient-poor soils derived from a variety of parent materials. The range in soil surface texture is broad, from silt to loamy sand with the gravel content averaging about 14% near surface and increasing markedly with depth. Litter dominates ground surface with low cover of bare soil and rock. The evergreen needle-leaved tree canopy is open to dense (30-80% cover) and may be stunted (2-5 m) in the highest elevation stands. The upper tree canopy is typically codominated by Abies lasiocarpa, Picea engelmannii trees and mature seral tree species, with Abies lasiocarpa dominating the subcanopy and regeneration layers. Important seral species in the tree canopy are Pseudotsuga menziesii, Pinus contorta, and Larix occidentalis. The short-shrub layer is typically composed of dense patches and dominated by Vaccinium membranaceum. Other consistent shrubs and dwarf-shrubs include Lonicera utahensis, Mahonia repens, Paxistima myrsinites, Sorbus scopulina, and Spiraea lucida (=betulifolia). The herbaceous layer is dominated by Xerophyllum tenax and Calamagrostis rubescens (locally). Other relatively consistent species are Arnica latifolia, Carex geyeri, Osmorhiza berteroi, Orthilia secunda, Thalictrum occidentale, and Viola orbiculata. Occasionally cover of Vaccinium membranaceum may be low or absent, then Xerophyllum tenax strongly dominates the understory.
Distribution	This association is broadly distributed throughout the mid to upper subalpine zones of the northern Rocky Mountains, concentrated west of the Continental Divide.
Environment	This association is broadly distributed throughout the mid to upper subalpine zones of the northern Rocky Mountains, concentrated west of the Continental Divide in western Montana and central and northern Idaho, northwestern Wyoming, northeastern Washington and extending into the Canadian Rockies of southwestern Alberta and British Columbia. Elevation range is from 1425-2025 m (4674-6642 feet) in the northern portion of its distribution and 1740-2470 m (5700-8100 feet) in its southern extent. It is strongly associated with moderate to steep, cold and relatively dry slopes, usually having southeast- through south- to west-facing exposures, usually occurring from midslopes upwards to slope shoulders, ridgetops and occasionally extending to high-elevation benches as well. These sites have well-drained, nutrient-poor soils derived from a variety of parent

	materials, including volcanics (quartz monzonite, undifferentiated granites, rhyolite), noncalcareous sedimentaries and metamorphics (quartzite, argillite, gneiss, schist, phyllite), and glacial till. The range in soil surface texture is broad, from silty loam to sandy loam with the gravel content averaging about 14% near the surface and increasing markedly with depth. Litter dominates ground surface with low cover of bare soil and rock.
Physiognomy	--
Vegetation	This conifer association is characterized by Abies lasiocarpa and Picea engelmannii codominating the tree canopy with a typically dense understory dominated by Vaccinium membranaceum (canopy cover) and Xerophyllum tenax. Cover of Vaccinium scoparium and Vaccinium myrtillus is low (<5%). The evergreen needle-leaved tree canopy is open to dense (30-80% cover) and may be stunted (2-5 m) in the highest elevation stands. The upper tree canopy is typically codominated by Abies lasiocarpa, Picea engelmannii trees, and mature seral tree species, with Abies lasiocarpa dominating the subcanopy and regeneration layers. Important seral species in the tree canopy are Pseudotsuga menziesii, Pinus contorta, and Larix occidentalis. The short-shrub layer is typically composed of dense patches and dominated by Vaccinium membranaceum. Other consistent shrubs and dwarf-shrubs include Lonicera utahensis, Mahonia repens, Paxistima myrsinites, Sorbus scopulina, and Spiraea lucida (=betulifolia). The herbaceous layer is dominated by Xerophyllum tenax and Calamagrostis rubescens (locally). Other relatively consistent species are Arnica latifolia, Carex geyeri, Osmorhiza berteroi (= Osmorhiza chilensis), Orthilia secunda, Thalictrum occidentale, and Viola orbiculata. Occasionally, cover of Vaccinium membranaceum may be low or absent, then Xerophyllum tenax strongly dominates the understory.
Dynamics	--
Adjacent Types	--
Classification Comments	Not previously identified at MSSP.

Scientific Name	Abies lasiocarpa - Picea engelmannii / Vaccinium membranaceum Rocky Mountain Forest
EL Code — WNHP Abb	CEGL000341 — ABILAS-PICENG/VACMEM
CSR	G5/SNR
Ecological System	CES306.830 Rocky Mountain Subalpine Mesic-Wet Spruce-Fir Forest and Woodland
Element Summary	This is a cool and moderately moist forest, known from southwestern Montana, northern and eastern Idaho, western Wyoming, and northern Utah. Rocky Mountain is in the name to distinguish it from similar types in the Cascades and on the Olympic Peninsula. This association occurs generally on north- and northeast-facing slopes, although it has been documented to occur on any aspect. Slopes are gentle to quite steep, and it can occur on flat cool benches. Elevational range is 1680 to 2685 m (5500-8800 feet). Soils are acidic, well-drained to moderately well-drained gravelly loams to gravelly clays. This forest is dominated by Abies lasiocarpa and Picea engelmannii in the overstory tree canopy. We exclude stands dominated in the overstory canopy by Pinus contorta or Pseudotsuga menziesii that may have Abies lasiocarpa and Picea engelmannii in the subcanopy. Abies lasiocarpa and Picea engelmannii combined cover occupies at least 25% of the overstory canopy in mixed conifer stands. Abies lasiocarpa and Picea engelmannii create a codominant canopy. Occasionally Abies lasiocarpa is present only in the subcanopy, with Picea engelmannii the dominant overstory conifer. Other conifers often present include Pinus contorta and Pseudotsuga menziesii. Pinus albicaulis, Larix occidentalis, and Picea glauca can occur in stands in the northern part of its range. Shrub canopy is 1-2 feet tall, dominated by discontinuous to continuous cover of Vaccinium membranaceum. Vaccinium scoparium may be present in near equal amounts. This association is differentiated from similar types by a lack of Xerophyllum tenax (although it may be present, it is never abundant) and clear dominance of Abies lasiocarpa and Picea engelmannii in the overstory canopy.
Distribution	This association is known from eastern and northern Idaho, western Wyoming, southwestern Montana, and northern Utah. It may also occur in Washington but has not yet been documented there.
Environment	This association occurs generally on north- and northeast-facing slopes, although it has been documented to occur on any aspect. Slopes are gentle to quite steep. It can occur on flat cool benches. Elevational range is 1737 to 2680 m (5500-8800 feet). Soils are acidic, well-drained to moderately well-drained gravelly loams to gravelly clays.
Physiognomy	--

Vegetation	This forest is dominated by Abies lasiocarpa and Picea engelmannii in the overstory tree canopy. We exclude stands dominated by Pinus contorta or Pseudotsuga menziesii that may have Abies lasiocarpa and Picea engelmannii in the subcanopy. Abies lasiocarpa and Picea engelmannii combined cover occupies at least 25% of the overstory canopy in mixed conifer stands. Abies lasiocarpa and Picea engelmannii create a codominant canopy. Occasionally Abies lasiocarpa is present only in the subcanopy, with Picea engelmannii the dominant overstory conifer. Other conifers often present include Pinus contorta, Pseudotsuga menziesii, Pinus albicaulis, Larix occidentalis, and Picea glauca. Shrub canopy is 1-2 feet tall, dominated by discontinuous to continuous cover of Vaccinium membranaceum. Vaccinium scoparium may be present in near equal amounts. Other shrubs often present include Lonicera utahensis, Juniperus communis, Sorbus scopulina, Shepherdia canadensis, Spiraea lucida (=betulifolia), and Paxistima myrsinites. The herbaceous cover is depauperate, with Calamagrostis rubescens, Carex geyeri, and Carex rossii the most common graminoids. Common forbs include Arnica cordifolia, Arnica latifolia, and Pedicularis racemosa. This association is differentiated from similar types by a lack of Xerophyllum tenax (although it may be present, it is never abundant) and clear dominance of Abies lasiocarpa and Picea engelmannii in the overstory canopy.
Dynamics	--
Adjacent Types	--
Classification Comments	Previous surveys identified ABLA/VAME (Morrison & Wooten, 2010) and ABLA2/VAME (Morrison et al., 2007) associations at MSSP. Those are synonymous with this UNSVC type.

Scientific Name	Abies lasiocarpa / Xerophyllum tenax Forest
EL Code — WNHP Abb	CEGL000346 — ABILAS/XERTEN
CSR	G5/S3
Ecological System	CES306.830 Rocky Mountain Subalpine Mesic-Wet Spruce-Fir Forest and Woodland
Element Summary	[Adapted from Cooper et al. (1991)] Abies lasiocarpa is dominant, with typically only sporadic Picea engelmannii. Generally abundant Xerophyllum tenax and Vaccinium membranaceum (on all but the coldest sites) are the only undergrowth species with high constancy. For additional information see Cooper (1975), Daubenmire and Daubenmire (1968), Pfister et al. (1977), Steele et al. (1983), and Williams et al. (1990, 1995).
Distribution	--
Environment	It is strongly associated with steep, warm exposures with well-drained soils but also occurs on benches. Observed elevational range was 5,100 to 6,200 ft (1,550 to 1,890 m) in the north and 5,300 to 7,600 ft (1,615 to 2,320 m) on the Nez Perce NF.
Physiognomy	--
Vegetation	--
Dynamics	--
Adjacent Types	It usually grades to ABILAS-PICENG/MENFER on colder sites and to ABILAS-PICENG/CLIUNI-XERTEN in moderated environments.
Classification Comments	--

G219 Rocky Mountain Subalpine Dry-Mesic Spruce - Fir Forest

A3643 Abies lasiocarpa - Picea engelmannii Rocky Mountain Dry-Mesic Forest Alliance

Scientific Name	Abies lasiocarpa - Picea engelmannii / Calamagrostis rubescens Forest
EL Code — WNHP Abb	CEGL000301 — ABILAS-PICENG/CALRUB
CSR	G4G5/S4
Ecological System	CES306.828 Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland
Element Summary	This association is known from northeastern Oregon and central and eastern Washington, Idaho, northern Utah, northwestern Wyoming to east of the Continental Divide in Montana. This forest is often on moderate to steep slopes and ranges in elevation from 1372 to 1800 m (4500-5900 feet) in Oregon and Washington, and from 1768 to 2590 m (5800-8500 feet) in the Rocky Mountains. Soils are skeletal and range from silts to loams. This association is a montane forested community in cool and dry areas in the western part of its range, and in mesic areas in the northern and eastern portion of its range. Abies lasiocarpa is the dominant overstory tree, often with Picea engelmannii. Pinus contorta and Pseudotsuga menziesii are often codominant to more abundant than Abies. In Washington and Oregon, Larix occidentalis and Abies grandis may also be present. The shrub layer is minor. Paxistima myrsinites is most often present and can have as much as 15% cover. The herbaceous layer is generally described as a mat or sward of Calamagrostis rubescens, with 40-50% cover. Carex geyeri can be present and abundant. Other forbs commonly present include Arnica cordifolia, Thalictrum occidentale, Osmorhiza berteroi, Orthilia secunda, Arnica latifolia, and Carex rossii. Where Calamagrostis rubescens is less than 5% cover and Carex geyeri is 5% and greater, the stand represents Abies lasiocarpa - Picea engelmannii / Carex geyeri Forest (CEGL000304).
Distribution	This association is known from eastern Oregon and Washington, northern Utah, Idaho, western Montana, and northwestern Wyoming.
Environment	This forest is often on moderate to steep slopes and ranges in elevation from 1372 to 1800 m (4500-5900 feet) in Oregon and Washington, and from 1768 to 2590 m (5800-8500 feet) in the Rocky Mountains. Soils are skeletal and range from silts to loams.
Physiognomy	--
Vegetation	This association is a montane forested community in cool and dry areas in the western part of its range, and in mesic areas in the northern and western portion of its range. Abies lasiocarpa is the dominant overstory tree, often with Picea engelmannii. Pinus contorta and Pseudotsuga menziesii are often codominant to more abundant than Abies. In Washington and Oregon, Larix occidentalis and Abies grandis may also be present. The shrub layer is minor. Paxistima myrsinites is most often present and can have as much as 15% cover. Other shrubs may be present but in very low amounts include Lonicera utahensis, Amelanchier alnifolia, Juniperus communis, and Spiraea lucida (=betulifolia). The herbaceous layer is generally described as a mat or sward of Calamagrostis rubescens, with 40-50% cover. Carex geyeri can be present and abundant. Other forbs commonly present

	include Arnica cordifolia, Thalictrum occidentale, Osmorhiza berteroi (= Osmorhiza chilensis), Orthilia secunda, Arnica latifolia, and Carex rossii. Where Calamagrostis rubescens is less than 5% cover and Carex geyeri is 5% and greater, the stand represents Abies lasiocarpa - Picea engelmannii / Carex geyeri Forest (CEGL000304).
Dynamics	--
Adjacent Types	--
Classification Comments	Previous surveyors identified a ABLA/CARU association at MSSP (Morrison & Wooten, 2010). That community is synonymous with this USNVC type.

G219 Rocky Mountain Subalpine Dry-Mesic Spruce - Fir Forest

Scientific Name	Abies lasiocarpa - Picea engelmannii / Carex geyeri Forest
EL Code — WNHP Abb	CEGL000304 — ABILAS-PICENG/CARGEY
CSR	G5/SNR
Ecological System	CES306.828 Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland
Element Summary	This forest occupies the lower and grades into the upper subalpine zone of the interior mountains of Oregon, Washington, Idaho, Montana, Colorado and Utah. It occurs on shallow slopes and ridgetops, on all aspects. Slopes are mostly gentle but can be steep (6-48%). Elevation range is 2011 to 3260 m (6600-10,700 feet). Soils are non-gravelly to stony loams to silts, mostly from sedimentary substrates, and igneous parent material in Utah. The ground surface is mostly litter duff with traces of lichens and moss and has little rock or bare soil. Abies lasiocarpa is the dominant conifer in this forested association. Picea engelmannii is commonly a subdominant on all but the driest sites. Other conifers may be present and include Pinus contorta, Pinus albicaulis, and Pseudotsuga menziesii, these generally not exceeding the cover of Abies lasiocarpa and Picea engelmannii combined. On higher and colder sites, Pinus albicaulis can be important. Shrub cover is variable, ranging from absent to 20% over. Species include Ribes spp., Vaccinium spp., Spiraea lucida (=betulifolia), Mahonia repens, and Sorbus scopulina. The herbaceous layer is dominated by sparse to abundant Carex geyeri. Calamagrostis rubescens is generally absent or poorly represented. Forbs can be sparse. Other herbaceous species include Festuca idahoensis, Pseudoroegneria spicata, Arnica cordifolia, Arnica latifolia, Osmorhiza spp., and Moneses uniflora. The dominance of Abies lasiocarpa in the upper canopy and as a reproducing tree, and the lack of abundance of other conifers, though present, is the differentiated character of the overstory, along with an abundance and constancy of Carex geyeri in the understory, characterize this association.
Distribution	This association is known from eastern Oregon and Washington, central and eastern Idaho, western Wyoming, central and south-central Montana, southern and northern Utah, and western Colorado.
Environment	This forest occupies the lower subalpine zone on shallow slopes and ridgetops, on southerly aspects in Montana and Idaho, all aspects in Wyoming, mostly southerly aspects in Colorado and northerly aspects in southern Utah. Slopes are mostly gentle to occasionally steep (6-48%). Elevation range is 2011 to 3260 m (6600-10,700 feet), the low end corresponding to more northerly latitudes, the upper elevations occurring farther south, i.e., 2011 to 2350 m (6600-7700 feet) in southern Montana, 2377 to 2896 m (7800-9500 feet) in Idaho, 2331 to 2895 m (7650-9500 feet) in northern Wyoming, 2103 to 3260 m (6900-10,700 feet) in Colorado, 2680 to 2987 m (8800-9800 feet) in southern Utah, and 2072 to 2377 m (6850-7800 feet) in eastern Oregon and Washington. Soils are non-gravelly to stony loams to silts, mostly from sedimentary substrates, and igneous parent material in Utah. The ground surface is mostly litter duff with traces of lichens and moss and has little rock or bare soil.
Physiognomy	--

Vegetation	Abies lasiocarpa, usually along with Picea engelmannii is the dominant conifer in this forested association. Other conifers may be present and include Pinus contorta, Pinus albicaulis, and Pseudotsuga menziesii, generally not exceeding the cover of Abies lasiocarpa and Picea engelmannii combined. On moist sites in Utah, Populus tremuloides can be a codominant tree. On drier and more exposed sites, Picea engelmannii drops out. On higher and colder sites, Pinus albicaulis can become codominant. Shrub cover is variable, ranging from absent to 20% over. Species include Ribes spp., Vaccinium ssp., Spiraea lucida (=betulifolia), Mahonia repens (= Berberis repens), and Sorbus scopulina. The herbaceous layer is dominated by sparse to abundant Carex geyeri. Calamagrostis rubescens is generally absent or poorly represented. Forbs can be sparse. Other herbaceous species include Festuca idahoensis, Pseudoroegneria spicata (= Agropyron spicatum), Arnica cordifolia, Arnica latifolia, Osmorhiza spp., and Moneses uniflora (= Pyrola uniflora). The dominance of Abies lasiocarpa in the upper canopy and as a reproducing tree, and the lack of abundance of other conifers, though present, is the differentiated character of the overstory, along with an abundance and constancy of Carex geyeri in the understory characterize this association.
Dynamics	--
Adjacent Types	--
Classification Comments	Previous surveyors identified ABLA/CAGE2 (Morrison et al., 2007), which is synonymous with this USNVC type.

G220 Rocky Mountain Lodgepole Pine Forest & Woodland

A3366 Pinus contorta Rocky Mountain Forest Alliance

Scientific Name	Pinus contorta / Calamagrostis rubescens Forest
EL Code — WNHP Abb	CEGL000139 — PINCON/CALRUB
CSR	G5/S3
Ecological System	CES306.820 Rocky Mountain Lodgepole Pine Forest
Element Summary	This association is found in the upper montane and subalpine zone of the central and northern Rocky Mountains on cool, dry sites. It typically occurs on gentle to moderately steep, lower slopes, benches and valley bottoms where soils are better developed. Soils are gravelly, sandy or silt loams. Ground cover is dominated by litter with low cover of rock and bare ground. The vegetation is characterized by a Pinus contorta-dominated tree canopy with a grassy understory. The tree canopy varies from open to nearly closed (30-90% cover) and often is solely dominated by Pinus contorta. However, in some stands Abies lasiocarpa, Picea engelmannii, Pinus albicaulis, or Pseudotsuga menziesii trees may be present, especially in the subcanopy. Scattered dwarf- and short shrubs are often present, but they seldom form a distinct layer. Common dwarf- and short shrubs may include Arctostaphylos uva-ursi, Amelanchier alnifolia, Mahonia repens, Paxistima myrsinites, Prunus virginiana, Spiraea lucida (=betulifolia), Symphoricarpos oreophilus, Lonicera utahensis, and Vaccinium scoparium. The moderately dense (30-50% cover) herbaceous layer is dominated by the perennial graminoids Calamagrostis rubescens and Carex geyeri. Diagnostic of this association is the dominance of Pinus contorta in the tree canopy with Calamagrostis rubescens dominating the graminoid layer. Also, the cover of Calamagrostis rubescens is greater than Vaccinium scoparium.
Distribution	This association occurs in the upper montane and subalpine zone of the central and northern Rocky Mountains.
Environment	This association is found in the upper montane and subalpine zone of the central and northern Rocky Mountains. It is more common east of the Continental Divide. Elevations range between 1050 and 2477 m (3440-8122 feet) depending on longitude and aspect. It typically occurs on cool, dry sites on lower slopes, benches and valley bottoms where soils are better developed. Topography is rolling with gentle to moderately steep slopes. Soils are gravelly, sandy, silt loams, or clay-based, derived from a variety of parent materials, excepting alkaline, calcareous, sedimentary substrates (Cooper 1975). Ground cover is dominated by litter with low cover of rock and bare ground.
Physiognomy	--

Vegetation	This upper montane and subalpine conifer association is characterized by a Pinus contorta-dominated tree canopy with a grassy understory. The tree canopy varies from open to nearly closed (30-90% cover) and is often solely dominated by Pinus contorta. However, in some stands scattered Abies lasiocarpa, Picea engelmannii, Pinus albicaulis, Pseudotsuga menziesii, Populus tremuloides, or Pinus flexilis trees may be present, especially in the subcanopy. Some stands have only a tall-shrub canopy of trees, with no mature canopy cover, as the site was burned 10-15 years prior. Scattered dwarf- and short shrubs are often present, but they seldom form a distinct layer and except for Arctostaphylos uva-ursi have low cover. Common dwarf- and short shrubs may include Amelanchier alnifolia, Lonicera utahensis, Mahonia repens, Paxistima myrsinites, Prunus virginiana, Spiraea lucida (=betulifolia), Symphoricarpos oreophilus, and Vaccinium scoparium. The moderately dense (30-50% cover) herbaceous layer is dominated by the perennial graminoids Calamagrostis rubescens and Carex geyeri. The herbaceous layer is densest in openings between trees. Other common herbaceous species include Arnica cordifolia, Carex rossii, Chamerion angustifolium, Lupinus argenteus, Festuca idahoensis, Orthilia secunda, Geranium viscosissimum, and Packera streptanthifolia.
Dynamics	The dominance of Pinus contorta in stands in this association is related to fire history and topo-edaphic conditions (Cooper, 1975; Pfister et al., 1977; Steele et al., 1981, 1983; Mauk & Henderson, 1984; Cooper et al., 1991). Following stand-replacing fires, Pinus contorta will rapidly colonize and develop into dense stands of even-aged trees. Over time, many of these stands can succeed to dominance by other, more shade-tolerant conifer species. Most forests in this association are early- to mid-successional forests which developed following fires and are considered seral to Abies lasiocarpa - Picea engelmannii / Calamagrostis rubescens Forest (CEGL000301) or Pseudotsuga menziesii / Calamagrostis rubescens Woodland (CEGL000429) (Cooper, 1975; Pfister et al., 1977; Steele et al., 1981, 1983), while other stands have a canopy that is dominated by more persistent Pinus contorta that is successfully regenerating, especially on more extreme sites with only scattered Abies lasiocarpa, Picea engelmannii, Pinus flexilis, or Pseudotsuga menziesii.
Adjacent Types	--
Classification Comments	Not previously identified at MSSP.

Scientific Name	Pinus contorta / Clintonia uniflora Forest
EL Code — WNHP Abb	CEGL005916 — PINCON/CLIUNI
CSR	G5/SNR
Ecological System	CES306.820 Rocky Mountain Lodgepole Pine Forest
Element Summary	Broadly distributed throughout the northern Rocky Mountains and adjacent terrain, this large-patch to matrix seral lodgepole pine forest association occupies relatively moist (mesic) and warm to cool sites having free air drainage and lacking frost-pocket conditions. It occurs on slopes of all degrees of steepness and aspect orientation, though it is more likely to occur in predominantly collecting positions. At the dry extreme of its distribution it is more strongly associated with protected positions such as concave slopes, moist depressions in gently sloping plateau areas, stringers along perennial stream bottoms, toeslopes and northeastern aspects. In the north it ranges from 760 to 1585 m (450-5200 feet), whereas to the south it ranges from 1060 to 1710 m (3500-5600 feet). A wide variety of parent materials are represented including those as disparate as granite, limestone, and all manner of glaciofluvial material. It is also routinely found on ash caps, ranging from 3 to 60 cm in depth. The soil textures are predominantly loams and silt loams; soils typically have less than 15% coarse-fragment content and are well-drained. This mesic, wholly seral association is characterized by Pinus contorta dominating the upper canopy. Other tree species do occur in the overstory but with much less cover, including the seral Larix occidentalis and Pinus monticola as well as those from warmer environments: Pinus ponderosa, Pseudotsuga menziesii, Thuja plicata, and Tsuga heterophylla, and those of colder environments: Abies lasiocarpa, Abies grandis, and Picea engelmannii. The shrub layer may be highly diverse with tall shrubs (e.g., Acer glabrum, Taxus brevifolia, Amelanchier alnifolia), short shrubs (Symphoricarpos albus, Paxistima myrsinites, Rubus parviflorus, Spiraea lucida (=betulifolia)), and dwarf-shrubs (e.g., Chimaphila umbellata, Linnaea borealis, Mahonia repens) abundantly represented. The graminoid component is inconspicuous. The cover of the diagnostic forbs Clintonia uniflora and Tiarella trifoliata is greatest when this type occurs in warmer environments, up to 30% canopy cover. In the colder environments cover of these diagnostics and all forbs is generally less. Other forbs of high constancy are Aralia nudicaulis, Adenocaulon bicolor, Coptis occidentalis, Cornus canadensis, Galium triflorum, Goodyera oblongifolia, Maianthemum stellatum, Osmorhiza berteroi, Orthilia secunda, Thalictrum occidentale, Trillium ovatum, Viola glabella (or Viola canadensis), and Viola orbiculata.
Distribution	This association occurs from the southern portion of the Idaho Batholith of central Idaho northward to the eastern fringes of the Colville National Forest of northeastern Washington, across northern Idaho and southeastern British Columbia and eastward into western Montana, predominantly west of the Continental Divide to its northeast extremes in southwestern Alberta.

Environment	Broadly distributed throughout the northern Rocky Mountains and adjacent terrain, this large-patch to matrix seral community occupies relatively moist (mesic) and warm to cool sites having free air drainage and lacking frost-pocket conditions. It occurs on slopes of all degrees of steepness and aspect orientation, though it is more likely to occur from toeslope through midslope positions (predominantly collecting positions). At the dry extreme of its distribution it is more strongly associated with protected positions such as concave slopes, moist depressions in gently sloping plateau areas, stringers along perennial stream bottoms, toeslopes and northeastern aspects. In the north it ranges from 760 to 1585 m (450-5200 feet) (extreme outliers at 1710 m (5600 feet)), whereas to the south it ranges from 1060 to 1710 m (3500-5600 feet). A wide variety of parent materials are represented, including all major rock types (sedimentary, metamorphic and igneous) with examples as disparate as granite and limestone; all manner of glaciofluvial material blankets stream and river terraces, and glacial till is common on the upland benches. In eastern Washington, northern Idaho and northwestern Montana it is routinely found on ash caps, ranging from 3 to 60 cm in depth. Soil textures are predominantly from the fine end of the spectrum with loams and silt loams common (reflecting in part a volcanic ash component, if not ash cap); soils typically have less than 15% coarse-fragment content and are well-drained.
Physiognomy	--
Vegetation	This mesic, wholly seral association is characterized by Pinus contorta dominating the upper canopy, by definition having three times the cover of other canopy tree species; other tree species do occur in the overstory but with much less cover, including both other species considered almost exclusively seral (Larix occidentalis and Pinus monticola) and those capable of functioning as both seral and climax species, including those from warmer environments, Pinus ponderosa, Pseudotsuga menziesii, Thuja plicata, and Tsuga heterophylla and those of colder environments, Abies lasiocarpa, Abies grandis, and Picea engelmannii. The shrub layer may be highly diverse with tall shrubs (e.g., Acer glabrum, Taxus brevifolia, Amelanchier alnifolia), short shrubs (Symphoricarpos albus, Paxistima myrsinites, Rubus parviflorus, Spiraea lucida (=betulifolia)), and dwarf-shrubs (e.g., Chimaphila umbellata, Linnaea borealis, Mahonia repens) abundantly represented. Often one of the forenamed short shrubs will be dominant; historical accident suffices for an explanation of this shifting dominance until such time as a thorough analysis is undertaken. The graminoid component is inconspicuous with no one species exhibiting high constancy, though Bromus vulgaris, Bromus ciliatus, and Calamagrostis rubescens are more consistently present and with greater cover than other graminoids. The cover of the diagnostic forbs Clintonia uniflora and Tiarella trifoliata is greatest when this type occurs in the zones potentially dominated by Thuja plicata and Tsuga heterophylla, up to 30% canopy cover (can even be dominant forbs), whereas in the colder environments characterized by Abies lasiocarpa, Abies grandis and Picea engelmannii, cover of these diagnostics and all forbs is generally less. Other forbs of high constancy, at least in some portion of this association's considerable range, are Aralia nudicaulis, Adenocaulon bicolor, Coptis occidentalis, Cornus canadensis, Galium triflorum, Goodyera oblongifolia, Maianthemum stellatum, Osmorhiza berteroi (= Osmorhiza chilensis),

	Orthilia secunda , Thalictrum occidentale, Trillium ovatum, Viola glabella (or Viola canadensis), and Viola orbiculata.
Dynamics	This association is sufficiently mesic to support a host of tree species more shade-tolerant than Pinus contorta and, therefore, the association is purely a seral community type. Pinus contorta is a relatively short-lived species in these mesic forests; seldom does it exceed 200 years in the northern Rocky Mountains and considerably less in the Inland Northwest, where many Pinus contorta stands are found naturally breaking-up at around 120 years since initiation. It has been noted in northern Idaho that following disturbance in this type Pinus contorta often does not succeed itself, the first tree-dominated successional stages being dominated by Larix occidentalis, Pseudotsuga menziesii, or less frequently by more shade-tolerant species; some of this variation in fire succession can be related to the varying degrees of cone serotiny in Pinus contorta. Higher incidences of cone serotiny are found in regions/ecosystems experiencing a higher degree of stand-replacing fire (Lotan et al., 1983). This plant association (because of the requirement of Pinus contorta dominance) is expected to be more prevalent in high montane and subalpine environments, where stand-replacing fire is the primary mode of stand initiation. In the more mesic montane environments stand-replacing fire is a less frequent mode of stand initiation and, being very shade-intolerant, Pinus contorta does poorly at establishing in these less-than-full-sunlight conditions; this association is expected to be an uncommon type in the Tsuga heterophylla, Thuja plicata, and Abies grandis series.
Adjacent Types	--
Classification Comments	Not previously identified at MSSP.

Scientific Name	Pinus contorta / Vaccinium membranaceum / Xerophyllum tenax Forest
EL Code — WNHP Abb	CEGL005913 — PINCON/VACMEM/XERTEN
CSR	G4/SNR
Ecological System	CES306.820 Rocky Mountain Lodgepole Pine Forest
Element Summary	This large-patch to matrix type is manifested as a seral type from central Idaho northward to northern Idaho, eastern Washington, western Montana and southwestern Alberta. This association is most prominent in west-central and central Montana forests. This association's elevation range is rather broad, from 1030 to 2015 m (3100-6600 feet). It occupies primarily south- through west-facing, moderate to steep slopes and is usually found on midslope to slope shoulder positions. It also occurs on benches associated with broad ridges. Soils are well-drained and derived from a broad spectrum of parent materials including glacial till and drift, both calcareous and noncalcareous sedimentary types, intrusive and extrusive igneous rock and metamorphic types, particularly quartzite. In one study soil texture ranged from gravelly sandy loams to silts. Ground surfaces have little or no bare soil or rock exposed. The canopy structure ranges from moderately open to closed (>60% cover) with Pinus contorta being strongly dominant in this layer, with lesser amounts of Larix occidentalis and Pseudotsuga menziesii. At mid to upper elevation limits of the type, Abies grandis, Abies lasiocarpa and Picea engelmannii may be minor components of the overstory and major components of the subcanopy. A tall-shrub layer is absent and even scattered individuals are rare. A short-shrub layer dominates the undergrowth with Vaccinium membranaceum being dominant, often exceeding 50% canopy cover; Spiraea lucida (=betulifolia), Lonicera utahensis, Paxistima myrsinites, Amelanchier alnifolia, and Rosa gymnocarpa are the other high-constancy species of this layer. Dwarf-shrub layer species that occur with consistency include only Vaccinium scoparium and Mahonia repens. The herbaceous layer is generally relatively depauperate with the diagnostic species Xerophyllum tenax being strongly dominant (average cover reported by various studies ranging from 25 to 61%). Only two graminoids occur consistently and are well-represented in cover, Calamagrostis rubescens and Carex geyeri. Other forbs with moderate to high constancy include Arnica cordifolia, Arnica latifolia, Chimaphila umbellata, Orthilia secunda, Thalictrum occidentale, and Viola orbiculata; not all of these forbs have high constancy throughout the range of the type.
Distribution	This large-patch to matrix type is found from central Idaho north to northern Idaho, to eastern Washington, western Montana and southwestern Alberta, and it very probably will be identified for British Columbia with additional crosswalking.
Environment	This large-patch to matrix type is manifested as a seral type from central Idaho northward to northern Idaho, eastern Washington, western Montana and southwestern Alberta, and it very probably will be identified for British Columbia. This association is most prominent in west-central and central Montana forests. This association's elevation range is rather broad, from 1030 to 2015 m (3100-6600 feet). Virtually the whole of this appreciable elevation range can be realized in a given geographic area. It occupies primarily south- through west-facing, moderate to steep slopes and is usually found on midslope to slope shoulder positions. It also

	occurs on benches associated with broad ridges. Soils are well-drained and derived from a broad spectrum of parent materials including glacial till and drift, both calcareous and noncalcareous sedimentary types, intrusive and extrusive igneous rock and metamorphic types, particularly quartzite. In one study soil texture ranged from gravelly sandy loams to silts, and a yet greater range in texture can be expected across the type's distribution. Ground surfaces have little or no bare soil or rock exposed.
Physiognomy	--
Vegetation	The canopy structure ranges from moderately open to closed (>60% cover) with Pinus contorta being strongly dominant in this layer though often joined by lesser amounts of Larix occidentalis and Pseudotsuga menziesii (sites beyond the cold limits of Pinus ponderosa for the most part). At mid to upper elevation limits of the type, Abies grandis, Abies lasiocarpa, and Picea engelmannii may be minor components of the overstory and major components of the subcanopy. A tall-shrub layer is absent and even scattered individuals are rare. The short-shrub layer dominates the undergrowth with Vaccinium membranaceum being dominant, often exceeding 50% canopy cover; Spiraea lucida (=betulifolia), Lonicera utahensis, Paxistima myrsinites, Amelanchier alnifolia, and Rosa gymnocarpa are the other high-constancy species of this layer. Dwarf-shrub layer species that occur with consistency include only Vaccinium scoparium, Vaccinium myrtillus and Mahonia repens (= Berberis repens); if the cover of either of these Vaccinium species exceeds approximately 5%, then a different association is indicated. The herbaceous layer is generally relatively depauperate with the diagnostic species Xerophyllum tenax being strongly dominant (average cover reported by various studies ranging from 25 to 61%). Only two graminoids occur consistently and are well-represented in cover, Calamagrostis rubescens and Carex geyeri. Other forbs with moderate to high constancy include Arnica cordifolia, Arnica latifolia, Chimaphila umbellata, Orthilia secunda , Thalictrum occidentale, and Viola orbiculata; not all of these forbs have high constancy throughout the range of the type.
Dynamics	Data from the subalpine zone of northern Idaho indicate that because of natural mortality patterns Pinus contorta canopy domination is not expected to last more than 160-180 years following stand initiation (Cooper et al., 1991). Stands of this association are predominantly early, mid and late seral stages succeeding to Abies lasiocarpa - Picea engelmannii / Vaccinium membranaceum / Xerophyllum tenax Forest (CEGL005917) and Pseudotsuga menziesii / Vaccinium membranaceum / Xerophyllum tenax Forest (CEGL005852).
Adjacent Types	--
Classification Comments	Not previously identified at MSSP.

Scientific Name	Pinus contorta / Vaccinium membranaceum Rocky Mountain Forest
EL Code — WNHP Abb	CEGL000169 — PINCON/VACMEM
CSR	G3G4/S4Q
Ecological System	CES306.820 Rocky Mountain Lodgepole Pine Forest
Element Summary	This type is known from Yellowstone and Grand Teton national parks in northwestern Wyoming, southwestern Idaho south to Utah. It occurs on moist slopes and benches having northerly to easterly aspects, between 2055 and 2440 m (6730-8000 feet) in elevation. Soils are loam-based and are well- to moderately well-drained. In Oregon it occurs on moist sites above 1525 m (5000 feet) and below 1830 m (6000 feet), on slopes <15%. In Oregon and Montana, stands are considered seral to Abies lasiocarpa / Vaccinium membranaceum Forest (CEGL000342). The overstory canopy is dominated by Pinus contorta. Other conifers that may be present as incidental individuals are Abies lasiocarpa, Pseudotsuga menziesii, and Picea engelmannii. In Montana, stands dominated by Pinus contorta, but with Abies lasiocarpa in the subcanopy, are classified as Abies lasiocarpa / Vaccinium membranaceum Forest (CEGL000342) but would be included here floristically. The undergrowth is usually dominated by Vaccinium membranaceum, with Lonicera utahensis. Other shrubs occasionally present include Shepherdia canadensis and Spiraea lucida (=betulifolia). Vaccinium scoparium can be well-represented. Herbaceous species include Calamagrostis rubescens, Carex geyeri, and Arnica cordifolia.
Distribution	This association is known from Idaho, Montana, Oregon and Wyoming.
Environment	This type is known from Yellowstone and Grand Teton national parks in northwestern Wyoming, southwestern Idaho south to Utah. It occurs on moist slopes and benches having northerly to easterly aspects, between 2057 and 2438 m (6729-8000 feet) in elevation. Soils are loam-based and are well- to moderately well-drained. In Oregon it occurs on moist sites from 1372 to 1981 m (4500-6500 feet), on undulating topography, on low slopes (2-20%). Soils are pumice ash (in Oregon), fine sandy loams, well- to moderately well-drained.
Physiognomy	--
Vegetation	The overstory canopy is dominated by Pinus contorta. Other conifers that may be present as incidental individuals are Abies lasiocarpa, Pseudotsuga menziesii, and Picea engelmannii. In Montana, stands dominated by Pinus contorta, but with Abies lasiocarpa in the subcanopy, are classified as Abies lasiocarpa / Vaccinium membranaceum Forest (CEGL000342) but would be included here floristically. The undergrowth is usually dominated by Vaccinium membranaceum, with Lonicera utahensis. Other shrubs occasionally present include Shepherdia canadensis and Spiraea lucida (=betulifolia). Vaccinium scoparium can be well-represented. Herbaceous species include Calamagrostis rubescens, Carex geyeri, and Arnica cordifolia.
Dynamics	Stands are often considered seral to Abies lasiocarpa / Vaccinium membranaceum Forest (CEGL000342).
Adjacent Types	--

Classification Comments	Not previously identified at MSSP. The difference between this association and Pinus contorta / Vaccinium membranaceum Forest (CEGL000170) is unclear and should be examined.

1.B.3.Nc Rocky Mountain-Great Basin Montane Flooded & Swamp Forest

G505 Rocky Mountain-Great Basin Swamp Forest

A3775 Picea engelmannii Swamp Forest Alliance

Scientific Name	Picea engelmannii - Tsuga heterophylla / Lysichiton americanus Swamp Forest
EL Code — WNHP Abb	CWWA000376 — PICENG-TSUHET/LYSAME
CSR	GNR/SNR
Ecological System	CES306.803 Northern Rocky Mountain Conifer Swamp
Element Summary	Picea engelmannii and/or Tsuga heterophylla dominate the canopy. Thuja plicata is often codominant. Lysichiton americanus is the diagnostic dominant herb.
Distribution	--
Environment	[Adapted from Ramm-Granberg et al., 2021 description for Picea engelmannii Swamp Forest Alliance] In Washington, these swamps are primarily found from 650 to 2200 m (mean = 1400 m). They often occur as seepage swamps (groundwater discharge) with poorly drained soils that are saturated year-round or seasonally flooded or saturated in the spring. They may also occur on flats, in depressions, and around lake and pond shore margins. Windthrow creates canopy gaps and pit-mound topography that increases microsite diversity. Downed trees, root wads, and mounds provide suitable substrates for tree and shrub species that are not able to establish on saturated soils. Hollows created by windthrow are often dominated by species tolerant of saturated soil conditions. Canopy gaps create a diversity of light conditions in the swamp. Beaver activity may also occur in these swamps. For additional information, see John et al., (1988 p47), Lillybridge et al. (1995 p148), and Kovalchik and Clausnitzer (2004 p39).
Physiognomy	--
Vegetation	--
Dynamics	--
Adjacent Types	--
Classification Comments	This type is synonymous with the TSHE/LYAM3 association identified by Morrison and Wooten (2010).

A3776 Thuja plicata - Tsuga heterophylla Rocky Mountain Swamp Forest Alliance

Scientific Name	Thuja plicata / Athyrium filix-femina Swamp Forest
EL Code — WNHP Abb	CEGL000473 — THUPLI/ATHFIL
CSR	G3G4/SNR
Ecological System	CES306.803 Northern Rocky Mountain Conifer Swamp
Element Summary	This small-patch, hygric (damp) to hydric (wet) community is associated with the inland penetration of a Pacific maritime climatic regime, occurring in the east Cascades and northeastern Washington, east into northern Idaho and northwestern Montana. This type ranges in elevation from 460 to 1430 m (1500-4700 feet). The primary environmental driver is abundant water throughout the growing season; standing water is often present early in the growing season, and water tables are high throughout the year. This is typically a streamside stringer, around seeps, where toeslopes intercept the water table, and some of the most extensive examples are associated with gentle slopes (<20 % inclination) with perched water tables. The stands are often sheltered in valley bottoms. Sites often have considerable microsite variation due to hummocking, and this can be reflected in the within-stand vegetation patterning. Soils are derived primarily from alluvium of various geologic origins. With textures ranging from loamy sands to silt loams and often having an appreciable gravel content, soils are very permeable. The tree canopy is highly variable in cover with dense old-growth Thuja-dominated stands approaching 100% canopy cover and other sites that perhaps have experienced wind throw having less than 50% cover. Thuja plicata dominates both the upper canopy and the reproductive layers; Tsuga heterophylla, Abies grandis and Picea engelmannii are consistent upper canopy components; only Tsuga has appreciable cover in the reproductive layers. In a modal expression of the type a nearly continuous layer of Athyrium filix-femina dominates the undergrowth, concealing a rich diversity of forbs. Some sites have appreciable cover of tall shrubs including Taxus brevifolia, Alnus viridis ssp. sinuata, and Acer glabrum. Incidental individuals or small patches of Oplopanax horridus may be found. The short and dwarf-shrub layers are relatively inconspicuous, a combined cover seldom exceeding 10%. Some consistently present hygric- to hydric-indicating forbs include Senecio triangularis, Trautvetteria caroliniensis, Streptopus amplexifolius, Gymnocarpium dryopteris, Viola glabella, Aconitum columbianum, and Circaea alpina; some have considered the presence of the first four of these forbs to be indicative of the type when the cover of Athyrium is less than 1%.
Distribution	This small-patch, hygric to hydric community occurs from the Selway River of Idaho northward to southern British Columbia, westward to the Cascade Range and eastward to lower elevation sites of northwestern Montana to just west of the Continental Divide; it is associated with the inland penetration of a Pacific maritime climatic regime.

Environment	This small-patch, hygric (damp) to hydric (wet) community occurs from just west of the Continental Divide in Montana, west into the east Cascades of Washington. It ranges in elevation from 460 to 1430 m (1500-4700 feet), but the majority of occurrences are below 1070 m (3500 feet), at least in Idaho, Montana and northeastern Washington. The primary environmental driver is abundant water throughout the growing season; standing water is often present early in the growing season, and water tables are high throughout the year. It typically occurs as a streamside stringer, around seeps, where toeslopes intercept the water table, and some of the most extensive examples are associated with gentle slopes (<20 % inclination) with perched water tables. The stands are often sheltered in valley bottoms. Sites often have considerable microsite variation due to hummocking, and this can be reflected in the within-stand vegetation patterning. Soils are derived primarily from alluvium of various geologic origins, including quartzite, sandstone, granite, metasediments, biotite, and shale. With textures ranging from loamy sands to silt loams and often having an appreciable gravel content, soils are very permeable.
Physiognomy	--
Vegetation	The tree canopy is highly variable in cover with dense old-growth Thuja plicata-dominated stands approaching 100% canopy cover, and other sites that perhaps have experienced windthrow having less than 50% cover. Thuja plicata dominates both the upper canopy and the reproductive layers; Tsuga heterophylla, Abies grandis, and Picea engelmannii are consistent upper canopy components with only Tsuga having appreciable cover in the reproductive layers. Tree species that are major seral components on mesic upland sites, e.g., Larix occidentalis, Pinus contorta, and Pseudotsuga, are at most incidental on this wetter association. In a modal expression of the type, a nearly continuous layer of Athyrium filix-femina dominates the undergrowth, concealing a rich diversity of forbs. Some sites have appreciable cover of tall shrubs, including Taxus brevifolia, Alnus viridis ssp. sinuata, and Acer glabrum. Incidental individuals or small patches of Oplopanax horridus may be found [see Global Classification Comments]. The short- and dwarf-shrub layers are relatively inconspicuous, a combined cover seldom exceeding 10% due to the prevalence of Athyrium, with only Rubus parviflorus, Rosa gymnocarpa, Ribes lacustre, Cornus canadensis, and Linnaea borealis having greater than 50% constancy. Some consistently present hygric- to hydric-indicating forbs include Senecio triangularis, Trautvetteria caroliniensis, Streptopus amplexifolius, Gymnocarpium dryopteris, Viola glabella, Aconitum columbianum, Mertensia paniculata, and Circaea alpina; some have considered the presence of the first four of these forbs to be indicative of the type (Cooper et al. 1987, Hansen et al. 1995) when the cover of Athyrium is meager (less than 1%). Other forbs of high constancy but lacking indicator value within this type include Clintonia uniflora, Maianthemum stellatum, Prosartes (=Disporum) hookeri, Galium triflorum, Coptis occidentalis, Tiarella trifoliata, Trillium ovatum, and Viola orbiculata. Within Idaho from the St. Joe to the Selway rivers, the presence (>5% cover) of Adiantum pedatum is said to denote the warm (low-elevation) and nutrient-rich expression (cove-like, collecting topographic positions) of the association; another fern, Polystichum munitum, also is most numerous and vigorous within this type and geographic restriction.

Dynamics	Fire is seldom stand-replacing in these wet-site stands; thus, trees often attain large girth and height and great age.
Adjacent Types	--
Classification Comments	This type is synonymous with the THPL/ATFI association identified by Morrison and Wooten (2010).

G506 Rocky Mountain-Great Basin Montane Riparian Forest

A3757 Abies lasiocarpa - Picea engelmannii Riparian Forest Alliance

Scientific Name	Abies lasiocarpa - Picea engelmannii / Streptopus amplexifolius Riparian Forest
EL Code — WNHP Abb	CEGL000336 — ABILAS-PICENG/STRAMP
CSR	G4/S2S3
Ecological System	CES306.833 Rocky Mountain Subalpine-Montane Riparian Woodland
Element Summary	This is a very broadly distributed association occurring in the major ranges of northern Utah, Wyoming, Idaho, eastern Washington and Montana into at least west-central Alberta. In drier climates it is a small-patch type, but with higher precipitation regimes; it can expand to large patches in valley locations. Elevations range from 1250 m in the north to 3355 m at the highest in the south. In the southern portion of this type's distribution, parent materials are largely alluvium, soils are loamy to silty in texture, derived from the local country rock, which ranges from sandstone to basalt to granitic in the vicinity of major batholiths. In the north, sedimentary and metasediments are the rule with silty clay loams and loams predominating. Mottling and rust pockets are found in many soil pits, indicating high water tables or subirrigation for a portion of the year. Subirrigation is reflected by landscape positions on lower terraces and stringers of lower order streams, toeslopes and side-hill seeps. Most of the indicator forbs present are associated with the decidedly rich end of the soil-nutrient regime. The canopy for the most part is open, the modal cover ranging between 40-60%, dominated by Abies lasiocarpa and Picea engelmannii. Pinus contorta is the major seral species in the middle Rockies, whereas in the northern Rockies Pseudotsuga menziesii, Larix occidentalis, Pinus monticola, and Abies grandis are additional seral species. The dominant aspect of the undergrowth is an abundance of medium to tall forbs, though shrub cover can at times approach 50%; shrubs are a more important component in the northern distribution of the association. Shrubs with the highest constancy and cover include Ribes lacustre, Vaccinium membranaceum, Alnus viridis ssp. sinuata, Lonicera utahensis, Cornus sericea, and Rhododendron menziesii (= Menziesia ferruginea). The graminoid component is negligible. Of the forbs diagnostic for the association four, Streptopus amplexifolius, Senecio triangularis, Heracleum maximum and Pectiantia (=Mitella) pentandra, are distributed across the breadth of the type, though there are numerous ancillary high-constancy forbs spanning the type's range including Thalictrum occidentale, Geranium richardsonii, Osmorhiza berteroi, Maianthemum stellatum, Orthilia secunda, and Arnica cordifolia (or Arnica latifolia at higher elevations). Aconitum columbianum, Saxifraga odontoloma, Mertensia ciliata, and Mertensia arizonica are wet-site taxa occurring with relatively high constancy in the southerly portion of the association. The forb component of diagnostic species is more diverse from central Idaho northward.
Distribution	This is a very broadly distributed association of the Intermountain West occurring from Utah's Uinta Mountains northward, occurring in the major ranges of

	Wyoming, Idaho, eastern Washington and Montana into at least west-central Alberta.
Environment	This is a very broadly distributed association of the Intermountain West occurring from Utah's Uinta Mountains northward, occurring in the major ranges of Wyoming, Idaho, eastern Washington and Montana into at least west-central Alberta. In the south it is an incidental, small-patch type, but with higher precipitation regimes of northerly climes, it can expand to large patches in valley locations. Given this extensive latitudinal gradient it is not surprising that it occurs as high as 3355 m (11, 000 feet) in the south (Uintas) and as low as 1250 m (4100 feet) in northeastern Montana; however, within a given landscape (Glacier National Park, for example) it exhibits a 915-m (3000-foot) range (1280-2200 m [4200-7200 feet]). In the southern portion of this type's distribution parent materials are largely alluvium, loamy to silty in texture, derived from the local country rock, which ranges from sandstone to basalt to granitic in the vicinity of major batholiths. In the north, sedimentary and metasediments are the rule with silty clay loams and loams predominating. Mottling and rust pockets are found in many soil pits, indicating high water tables or subirrigation for a portion of the year. Subirrigation is reflected by landscape positions on lower terraces and stringers of lower order streams, toeslopes and side-hill seeps where the moisture status is gauged to be hygric to subhydric. Most of the indicator forbs present are associated with the decidedly rich end of the soil-nutrient regime.
Physiognomy	--
Vegetation	The canopy for the most part is open, the modal cover ranging between 40-60%, dominated by Abies lasiocarpa and Picea engelmannii. In the south of the type's distribution Picea engelmannii is a long-lived seral species that dominates the canopy for 200 or more years. Pinus contorta is the other major seral species in the middle Rockies, whereas in the northern Rockies Pseudotsuga menziesii, Larix occidentalis, Pinus monticola, and Abies grandis are added to the seral species mix, though their cover is always less than that of the diagnostic tree species. The dominant aspect of the undergrowth is a predominance of medium to tall forbs, though shrub cover can at times approach 50%; shrubs are a more important component in the northern distribution of the association. Shrubs with the highest constancy and cover include Ribes lacustre, Vaccinium membranaceum, Alnus viridis ssp. sinuata, Lonicera utahensis, Cornus sericea, and Rhododendron menziesii (= Menziesia ferruginea). The graminoid component verges on negligible with only Bromus vulgaris (or the ecologically very similar Bromus ciliatus) having a constancy greater than 30%. Of the forbs diagnostic for the association four, Streptopus amplexifolius, Senecio triangularis, Heracleum maximum and Pectiantia (=Mitella) pentandra, are distributed across the breadth of the type, though there are numerous ancillary high-constancy forbs spanning the type's range including Thalictrum occidentale, Geranium richardsonii, Osmorhiza berteroi, Maianthemum stellatum, Orthilia secunda, and Arnica cordifolia (or Arnica latifolia at higher elevations). Aconitum columbianum, Saxifraga odontoloma (= Saxifraga arguta), Mertensia ciliata, and Mertensia arizonica are wet-site taxa occurring with relatively high constancy in the southerly portion of the association. The forb component of diagnostic species is more diverse from central Idaho northward and includes Ligusticum canbyi, Trautvetteria caroliniensis, Athyrium filix-femina,

	Mertensia paniculata, Veratrum viride, Heracleum maximum, Erigeron peregrinus, Gymnocarpium dryopteris, Angelica arguta (or Angelica dawsonii), Trollius laxus, Pectiantia (=Mitella) breweri, and Viola glabella. High-constancy forbs in the northern portion of the type's range include Clintonia uniflora, Tiarella trifoliata, Eucephalus engelmannii, Galium triflorum, Actaea rubra, Valeriana sitchensis, and Xerophyllum tenax.
Dynamics	Shrubs are usually a minor component of closed-canopy stands, but with canopy reduction they can begin to constitute a distinct layer. Alnus viridis ssp. sinuata, following fire or logging, especially where soils have been compacted, can form dense thickets in which conifers are very slow to reestablish.
Adjacent Types	--
Classification Comments	Not previously identified at MSSP.

Scientific Name	Abies lasiocarpa / Athyrium filix-femina Riparian Woodland
EL Code — WNHP Abb	CWWA000002 — ABILAS/ATHFIL
CSR	G2/S2
Ecological System	CES306.833 Rocky Mountain Subalpine-Montane Riparian Woodland
Element Summary	This conifer-dominated wetland association is found in the east Cascades and Northern Rockies in BC and adjacent US between 4000 and 5500 feet elevation. It is located in relative broad but steep valleys associated with Rosgen A and B channel types on toe slopes and terraces. Abies lasiocarpa or Picea engelmannii can be dominant or co-dominant in the canopy. Shrubs are present but rare dominant. Ribes lacustre and Rubus parviflorus are most frequent. Athyrium filix-femina and Gymnocarpium dryopteris are the most common herbaceous species, the former always present and over 10% cover. Tiarella trifoliata, Galium triflorum, and Streptopus amplexifolius occur frequently.
Distribution	--
Environment	--
Physiognomy	--
Vegetation	--
Dynamics	--
Adjacent Types	--
Classification Comments	This type is synonymous with the ABLA/ATFI association identified by Morrison and Wooten (2010).

Scientific Name	Abies lasiocarpa / Trautvetteria caroliniensis Riparian Forest
EL Code — WNHP Abb	CEGL000339 — ABILAS/TRACAR
CSR	G3/S3
Ecological System	CES306.833 Rocky Mountain Subalpine-Montane Riparian Woodland
Element Summary	This association is typified by large trees on very moist sites. This community is native from northern Idaho's Selkirk Mountains south to Oregon's Wallowa Mountains. Elevations range between 1220-1525 m (4000-5000 feet). Aspects are variable. Soils are silt loams and silt which are relatively deep. In Idaho and Washington, this community is associated with small draws and valleys less than 50 m wide. Oregon occurrences are mid-slopes as well as bottomland sites or sloping seeps. The tree canopy is dominated by Abies lasiocarpa and Picea engelmannii with 20-24% and 19-30% average cover, respectively. Small amounts of Pseudotsuga menziesii and Larix occidentalis occur in its northern distribution, while Oregon has minor Pinus contorta and Abies grandis cover. The major shrub is Vaccinium membranaceum (5-14% cover). Important forbs are Trautvetteria caroliniensis (13%) and Viola orbiculata (8%).
Distribution	This association occurs in mountains of northeastern Oregon, eastern Washington, and western Idaho.
Environment	--
Physiognomy	--
Vegetation	--
Dynamics	--
Adjacent Types	--
Classification Comments	This type is synonymous with the ABLA/TRCA association identified by Morrison and Wooten (2010).

Scientific Name	Picea engelmannii / Alnus viridis ssp. sinuata Riparian Forest
EL Code — WNHP Abb	CWWA000377 — PICENG/ALNVIR
CSR	GNR/SNR
Ecological System	CES306.833 Rocky Mountain Subalpine-Montane Riparian Woodland
Element Summary	This association typically occurs above 1370 m (4500 ft) on ROSGEN A or B streambanks or terraces in narrow, subalpine valleys or montane cold-air drainages. Valley gradients are typically moderate to very steep. Sites are typically seasonally flooded, but water tables drop well below the surface during the growing season. The canopy is characteristically dominated by Picea engelmannii and Abies lasiocarpa is nearly always present. Alnus viridis dominates the shrub layer (mean cover > 50%). The herb layer is usually poorly developed, but may include Athyrium filix-femina and/or tall forbs such as Angelica arguta and Heracleum maximum.
Distribution	This association is restricted in total area, but commonly found in the mountains of northeastern Oregon, eastern Washington, and western Idaho.
Environment	--
Physiognomy	--
Vegetation	--
Dynamics	--
Adjacent Types	--
Classification Comments	This type is named ABLA2/ALSI in Kovalchik and Clausnitzer (2004). Documented at Mount Spokane in 6 plots collected by AECOM in 2022.

Scientific Name	Picea engelmannii / Athyrium filix-femina Riparian Woodland
EL Code — WNHP Abb	CWWA000183 — PICENG/ATHFIL
CSR	G2?/S1?
Ecological System	CES306.833 Rocky Mountain Subalpine-Montane Riparian Woodland
Element Summary	Documented occurrences of this association are found at elevations from 3300 to 4300 feet. Sites sampled were floodplains located in very narrow to narrow V-shaped valleys from 15 to 65 feet wide. Moderate to very high gradient (4%-10%) valleys were sampled. Soils generally consist of silt loam over sandy loam, gravel, cobbles, and stones. The mean thickness of the fine-textured material was 12 inches. These sites are seasonally flooded or saturated to the surface. The water table drops to 8-18 inches during the growing season. Adjacent streams are 5 to 30 feet wide and classified as A3, B3, C2 and C4 stream types. Stands representing this community are dominated by a scattered overstory of Picea englemannii. Other conifers are scarce; only accidental Abies grandis occur in the understory. Rubus parviflorus is a common shrub associate. Ribes lacustre, Alnus viridis, and Ribes hudsonianum are occasionally abundant shrubs. Symphoricarpos albus is an important component only on less active floodplains. The understory is characterized by the Atyrium filix-femina, with mean canopy coverage of 43%. Other important herbaceous species include Streptopus amplexifolius, Circaea alpina, Saxifraga odontoloma, Galium spp., and many others. Associated grasses include Cinna latifolia and Bromus vulgaris.
Distribution	This association is restricted in total area, but commonly found in the mountains of northeastern Oregon, eastern Washington, and western Idaho.
Environment	Documented occurrences of this association are found at elevations from 3300 to 4300 feet. Sites sampled were floodplains located in very narrow to narrow V-shaped valleys from 15 to 65 feet wide. Moderate to very high gradient (4%-10%) valleys were sampled. Soils generally consist of silt loam over sandy loam, gravel, cobbles, and stones. The mean thickness of the fine-textured material was 12 inches. These sites are seasonally flooded or saturated to the surface. The water table drops to 8-18 inches during the growing season. Adjacent streams are 5 to 30 feet wide and classified as A3, B3, C2 and C4 stream types.
Physiognomy	--
Vegetation	Stands representing this community are dominated by a scattered overstory of Picea englemannii. Other conifers are scarce; only accidental Abies grandis occur in the understory. Rubus parviflorus is a common shrub associate. Ribes lacustre, Alnus viridis, and Ribes hudsonianum are occasionally abundant shrubs. Symphoricarpos albus is an important component only on less active floodplains. The understory is characterized by the Atyrium filix-femina, with mean canopy coverage of 43%. Other important herbaceous species include Streptopus amplexifolius, Circaea alpina, Saxifraga odontoloma, Galium spp., and many others. Associated grasses include Cinna latifolia and Bromus vulgaris.
Dynamics	--
Adjacent Types	--
Classification Comments	Description courtesy of Crowe and Clausnitzer (1997). Documented at Mount Spokane in 1 plot collected by AECOM in 2022.

G506 Rocky Mountain-Great Basin Montane Riparian Forest

A4432 Thuja plicata - Tsuga heterophylla Rocky Mountain Riparian Forest Alliance

Scientific Name	Thuja plicata / Gymnocarpium dryopteris Riparian Forest
EL Code — WNHP Abb	CEGL000476 — THUPLI/GYMDRY
CSR	G3/SNR
Ecological System	CES306.833 Rocky Mountain Subalpine-Montane Riparian Woodland
Element Summary	This Thuja plicata forest association is known from the northern Rocky Mountains of British Columbia, northern Idaho and northwestern Montana. It represents one of the driest Thuja plicata riparian communities, and the driest Thuja type to have a fern layer. It occurs at elevations ranging from 975 to 1370 m (3200-4500 feet). Typical locations include slopes or benches along major mountain streams. Slopes are moderate to steep, and stands are generally located on mid to lower slopes. Parent materials are usually quartzite, sandstone, or schist, often mixed or overlain with volcanic ash. Soils are gravelly loams to silty clay loam to silt. Stands are subirrigated yet well-drained. Duff layers average 8 cm in depth. Late-seral stands have closed canopies and are dominated by Thuja plicata. Stands not in a late-seral stage are more heterogeneous, with a mix of conifers in addition to Thuja. Seral species persisting in these stands include Abies grandis as the most abundant and common. Others include Tsuga heterophylla, Picea engelmannii (or Picea x albertiana), Pinus monticola, Larix occidentalis, and Pseudotsuga menziesii. The shrub layer is typically limited to 10-20% total cover. Highly constant species include Acer glabrum, Lonicera utahensis, Linnaea borealis, Rubus parviflorus, and Taxus brevifolia. The herbaceous layer has mostly ferns and forb species with few to no grasses. Gymnocarpium dryopteris is diagnostic for this type, with at least 1% cover, but is often much more abundant. Athyrium filix-femina or Adiantum pedatum are often present, but with low cover or only on moist microsites. Other highly constant mesic forbs include Clintonia uniflora, Tiarella trifoliata, Coptis occidentalis, Osmorhiza berteroi, Prosartes hookeri, Aralia nudicaulis, and Maianthemum stellatum.
Distribution	This association is known from areas of inland maritime climate of the northern Rocky Mountains, in British Columbia, northern Idaho and northwestern Montana.
Environment	--
Physiognomy	--
Vegetation	--
Dynamics	--
Adjacent Types	--
Classification Comments	This association was not previously documented at Mount Spokane, but was reported from one plot collected by AECOM in 2022.

G796 Northern Rocky Mountain Lowland-Foothill Riparian Forest

A0311 Populus balsamifera ssp. trichocarpa Northern Rocky Mountain Riparian Forest Alliance

Scientific Name	Populus balsamifera (ssp. trichocarpa, ssp. balsamifera) / Symphoricarpos (albus, oreophilus, occidentalis) Riparian Forest
EL Code — WNHP Abb	CEGL000677 — POPBAL/SYM(ALB,ORE,OCC)
CSR	G2/S1S2
Ecological System	CES306.804 Northern Rocky Mountain Lower Montane Riparian Woodland and Shrubland
Element Summary	This association is known from the Blue Mountains of eastern Oregon, through the Columbia Basin to the Cascades of eastern Washington, into central and northern Idaho, western Wyoming, and north to the mountains of southern British Columbia. This late-seral association typically occurs at low elevations from 579 to 2040 m (1900-6693 feet) in broad mountain valleys and canyons of low- to moderate-gradient streams and rivers. The association occupies alluvial terraces with deep silty loam soils (over cobble and gravel) on infrequently flooded sites well above the average high-water line and summer water table. Tall and mature Populus balsamifera ssp. trichocarpa form the open to closed overstory canopy, with occasional understory asexual reproduction and conifers present. Conifer species, especially Pinus ponderosa and Pseudotsuga menziesii, may indicate the potential successional pathway on these relatively dry terrace sites. The shrub layer is clearly dominated by one species of Symphoricarpos, either Symphoricarpos albus, Symphoricarpos oreophilus, or Symphoricarpos occidentalis (usually with at least 20% cover), although a variety of other tall and medium shrubs (all with cover less than Symphoricarpos albus) are often present. The most consistently prominent shrubs are Acer glabrum, Amelanchier alnifolia, Crataegus douglasii, Philadelphus lewisii, Prunus virginiana, Rosa spp., and Rubus parviflorus, the presence of which may reflect successional relationships with other alluvial terrace associations. The herbaceous layer is diverse, but has only moderate cover, and often includes exotic species indicative of past disturbance. Perennial grasses, especially Elymus glaucus, Phalaris arundinacea, and Poa pratensis, often codominate with various tall forbs and Equisetum spp. The most important forbs include Clematis ligusticifolia, Heracleum maximum, Maianthemum spp., Thalictrum occidentale, and Urtica dioica.
Distribution	This association is known from low-elevation, large rivers in Oregon, Washington, Idaho, western Wyoming, and British Columbia. It has been reported from Montana as part of another community [see Hansen et al. (1995)]. This association is moderately wide-ranging. It occurs in the Blue Mountains and adjacent Columbia Basin and High Lava Plains (e.g., Ochoco Mountains) of central and northeastern Oregon (Kovalchik 1987, Crowe and Clausnitzer 1997, Crowe et al. 2002). The association is also known from the Columbia Basin, eastern slope of the Cascade Range, Okanogan Highlands, and the northern Blue Mountains of eastern Washington (Crawford 2001, Kovalchik 2001). Stands occur on most large rivers of northern Idaho (e.g., Coeur d'Alene, Kootenai, St. Joe, and St. Maries rivers), but is widely scattered in west-central Idaho (e.g., Hells Canyon and Weiser River basin)

	and eastern Idaho (e.g., Henry's Fork River) (Jankovsky-Jones et al., 2001). This association occurs in the Canadian Rockies and Thompson-Okanogan ecoregions of British Columbia. It is apparently not known from adjacent northwestern Montana, although it is expected to occur there.
Environment	This late-seral association typically occurs at low elevations from 579 to 2040 m (1900-6693 feet) in broad mountain valleys and canyons of low- to moderate-gradient streams and rivers. The association occupies alluvial terraces and elevated streambanks with deep silty loam soils (over cobble and gravel) on infrequently flooded sites well above the average high-water line and summer water table.
Physiognomy	--
Vegetation	Tall and mature Populus balsamifera ssp. trichocarpa form the open to closed overstory canopy, with occasional understory asexual reproduction and conifers present. Conifer species, especially Pinus ponderosa and Pseudotsuga menziesii, may indicate the potential successional pathway on these relatively dry terrace sites. The shrub layer is clearly dominated by one species of Symphoricarpos, either Symphoricarpos albus, Symphoricarpos oreophilus, or Symphoricarpos occidentalis (usually with at least 20% cover), although a variety of other tall and medium shrubs (all with cover less than Symphoricarpos sp.) are usually present. The most consistently prominent shrubs are Acer glabrum, Amelanchier alnifolia, Crataegus douglasii, Philadelphus lewisii, Prunus virginiana, Rosa spp., and Rubus parviflorus, the presence of which may reflect successional relationships with other alluvial terrace associations. The herbaceous layer is diverse, but has only moderate cover, and often includes exotic species indicative of past disturbance. Perennial grasses, especially Elymus glaucus, Phalaris arundinacea, and Poa pratensis, often codominate with various tall forbs and Equisetum spp. The most important forbs include Clematis ligusticifolia, Heracleum maximum, Maianthemum spp., Wyethia amplexicaulis, Thalictrum occidentale, Urtica dioica, Geranium viscosissimum, and Helianthella uniflora.
Dynamics	This association is a mid- to late-seral association that usually occurs on inactive floodplain terraces that flood only episodically. Over time, these terraces may wash away from lateral movement of the channel (Moseley & Bursik, 1994; Hansen et al., 1995). In addition, Populus balsamifera ssp. trichocarpa reproduction is low and limited to less vigorous asexual suckering. Without intact ecological processes promoting stand replacement and succession, long-term persistence of this type will decrease. Young stands of Populus balsamifera ssp. trichocarpa establish on fresh alluvium found on point bars and banks of rivers with intact, natural flooding regimes (Moseley & Bursik, 1994; Hansen et al., 1995; Crowe & Clausnitzer, 1997; Jankovsky-Jones et al., 2001; Kovalchik, 2001; Crawford, 2003; Kovalchik & Clausnitzer, 2004). As rivers downcut and channels migrate over time, these point bars and banks are less frequently flooded and loamy soils develop. These sites are favorable for Symphoricarpos albus establishment and formation of new stands of this association.
Adjacent Types	--
Classification Comments	WNHP believes this type is synonymous with the POBAT/SYAL association identified by Morrison and Wooten (2010).

2.B.2.Nf Western North American Grassland & Shrubland

G267 Central Rocky Mountain-Interior Montane Grassland

A3966 Festuca idahoensis - Calamagrostis rubescens - Achnatherum nelsonii Central Rocky Mountain Montane Mesic Grassland Alliance

Scientific Name	Carex hoodii - Festuca idahoensis Grassland
EL Code — WNHP Abb	CEGL001595 — CARHOO-FESIDA
CSR	G2/S2
Ecological System	CES306.806 Northern Rocky Mountain Subalpine-Upper Montane Grassland
Element Summary	This plant association occurs in eastern Oregon, Washington and Idaho on high-elevation ridges of the Wallowa and Seven Devil mountains of the Blue Mountains ecoregional section. Sites range from gentle, broad, dissected plateau ridgetops to steep mountain side slopes at 1830-2410 m (6000-7900 feet) elevation. Soils are moderately deep to deep silt loam. Stands are typically dense with high and diverse cover of sedges, grasses, and perennial forbs. Abundant Festuca idahoensis and Danthonia intermedia occur with a variety of different sedge and grass species, including Carex hoodii, Carex geyeri, Achnatherum occidentale, and Koeleria macrantha. Commonly associated forbs are Lupinus argenteus var. laxiflorus, Geum triflorum, Hieracium scouleri var. albertinum, Antennaria rosea, Arenaria congesta, and Symphyotrichum foliaceum. This association should not be mistaken as Festuca idahoensis - Carex hoodii Grassland (CEGL001609), which is abundant in the Blue Mountains ecoregional section. Carex hoodii - Festuca idahoensis is distinguished from Festuca idahoensis - Carex hoodii on the basis of the presence of Danthonia intermedia, Arenaria congesta, or Antennaria rosea.
Distribution	The association is documented from the eastern Wallowa Mountains and Seven Devil Mountains in the eastern portion of the Blue Mountains ecoregional section in eastern Oregon, Washington and Idaho.
Environment	Sites range from gentle, broad, dissected plateau ridgetops to steep mountain side slopes at 1830-2410 m (6000-7900 feet) elevation. Soils are moderately deep to deep silt loam.
Physiognomy	--
Vegetation	Stands are typically dense with high and diverse cover of sedges, grasses, and perennial forbs. Abundant Festuca idahoensis and Danthonia intermedia occur with a variety of different sedge and grass species, including Carex hoodii, Carex geyeri, Achnatherum occidentale (= Stipa occidentalis), and Koeleria macrantha. Commonly associated forbs are Lupinus argenteus var. laxiflorus (= Lupinus laxiflorus), Geum triflorum, Hieracium scouleri var. albertinum (= Hieracium albertinum), Antennaria rosea, Arenaria congesta, and Symphyotrichum foliaceum (= Aster foliaceus).
Dynamics	--
Adjacent Types	--
Classification Comments	Not previously identified at MSSP.

G271 Rocky Mountain-North Pacific Subalpine-Montane Mesic Grassland & Meadow

A1257 Festuca viridula - Carex hoodii - Lupinus spp. Subalpine Mesic Meadow Alliance

Scientific Name	Festuca viridula - Festuca idahoensis Meadow
EL Code — WNHP Abb	CEGL001633 — FESVIR-FESIDA
CSR	G2?Q/S1S2
Ecological System	CES306.829 / CES204.099 Rocky Mountain Subalpine-Montane Mesic Meadow / North Pacific Alpine and Subalpine Dry Grassland
Element Summary	This association has only been described from northern Idaho, near the border with Canada, in the Selkirk Mountains, Kaniksu National Forest. It occurs in a mountainous region of inland maritime climate, characterized by mild, moderate winters with prolonged gentle rains, deep snow accumulations at higher altitudes and abundant clouds, fog and high humidity. Summers are typically sunny and dry for most of the region (<1 inch of precipitation/ month). Geologically, the region is underlain by metamorphosed, Precambrian sedimentary strata that are primarily argillites and quartzites. The entire region was covered two times by the continental ice sheet, and has since been overlain by eolian deposits, especially volcanic ash. Due to prevailing southwesterly winds, much of the deposition has occurred on the leeward (north to northeasterly) slopes. It occurs as subalpine openings within spruce-fir forest, from roughly 1586 to 1769 m (5200-5800 feet) elevation. Sites are typically on moderate to steep mountain slopes of southern to southeastern aspects. Because of prevailing southwesterly winds, these sites are windswept and snow free much of the winter. Soils are well-drained loams, with abundant coarse fragments in the subsurface layers. This association is poorly described. The perennial bunchgrasses Festuca viridula and Festuca idahoensis dominate. Associated species are unknown, but can be expected to include subalpine perennial forbs typical of open, relatively dry sites. Festuca viridula-dominated grasslands in the Blue and Wallowa mountains of Oregon are described as dense, sod-forming clumps of this grass, nearly forb-free, with much litter and no bare ground or exposed gravel or rock particles.
Distribution	It has only been described from northern Idaho, near the border with Canada, in the Selkirk Mountains, Kaniksu National Forest.
Environment	This association occurs in a mountainous region of inland maritime climate, characterized by mild, moderate winters with prolonged gentle rains, deep snow accumulations at higher altitudes and abundant clouds, fog and high humidity. Summers are typically sunny and dry for most of the region (<1 inch of precipitation/ month). Geologically, the region is underlain by metamorphosed, Precambrian sedimentary strata that are primarily argillites and quartzites. The entire region was covered two times by the continental ice sheet, and has since been overlain by eolian deposits, especially volcanic ash. Due to prevailing southwesterly winds, much of the deposition has occurred on the leeward (north to northeasterly) slopes. Little detailed information is available for this association. It occurs as subalpine openings within spruce-fir forest, from roughly 1586 to 1769 m (5200-5800 feet) elevation. Sites are typically on moderate to steep mountain slopes of southern to southeastern aspects. Because of prevailing southwesterly

	winds, these sites are windswept and snow free much of the winter. Soils are well-drained loams, with abundant coarse fragments in the subsurface layers.
Physiognomy	--
Vegetation	This association is poorly described. The perennial bunchgrasses Festuca viridula and Festuca idahoensis dominate. Associated species are unknown, but can be expected to include subalpine perennial forbs typical of open, relatively dry sites. Festuca viridula-dominated grasslands in the Blue and Wallowa mountains of Oregon (Johnson & Simon, 1987; Johnson & Clausnitzer, 1992) are described as dense, sod-forming clumps of this grass, nearly forb-free, with much litter and no bare ground or exposed gravel or rock particles.
Dynamics	--
Adjacent Types	--
Classification Comments	This USNVC type is synonymous with FESIDA-FESVIR meadow and FEVI-FEID (Morrison & Wooten, 2010 AECOM unpublished field work 2020).

G272 Central Rocky Mountain Montane-Foothill Shrubland

A3975 Physocarpus malvaceus - Symphoricarpos albus Mesic Shrubland Alliance

Scientific Name	Physocarpus malvaceus - Symphoricarpos albus Shrubland
EL Code — WNHP Abb	CEGL001171 — PHYMAL-SYMALB
CSR	G3/S2S3
Ecological System	CES306.994 Northern Rocky Mountain Montane-Foothill Deciduous Shrubland
Element Summary	This association is known from canyonlands of the northern Wallowa Mountains, Imnaha River, and Snake River within northeastern Oregon, southeastern Washington, and west-central Idaho. The association occurs on upper slope positions of steep, northeast- to northwest-facing canyon slopes at 1125 to 1375 m (3700-4500 feet) elevation. Deep soils on these relatively moist, shaded sites are formed from basalt colluvium. Physocarpus malvaceus is the dominant shrub species (mean cover exceeds 80%). Symphoricarpos albus is consistently present. Other associated shrub species include Amelanchier alnifolia, Prunus virginiana, and Philadelphus lewisii. Shrubs are so abundant that growth of understory forbs and graminoids is limited. This Physocarpus malvaceus association is distinguished from Pseudotsuga menziesii / Physocarpus malvaceus Forest (CEGL000447) by the absence of trees. Periodic fire may serve to maintain this deciduous shrubland vegetation by controlling the establishment of trees.
Distribution	The association was previously documented in the canyonlands of the northern Wallowa Mountains, Imnaha River, and Snake River within northeastern Oregon, southeastern Washington, and west-central Idaho. Occurrences at Mount Spokane represent the first documented stands outside of the Blue Mountains ecoregion.
Environment	The association was previously documented on upper slope positions of steep, northeast- to northwest-facing canyon slopes at 1125 to 1375 m (3700-4500 feet) elevation. Deep soils on these relatively moist, shaded sites are formed from basalt colluvium. At Mount Spokane, the association was most frequently observed as a narrow-to-broad ecotone between dry grasslands and Pseudotsuga menziesii-dominated forests (G210) on southwest-facing upper slopes.
Physiognomy	--
Vegetation	Physocarpus malvaceus is the dominant shrub species (mean cover exceeds 80%). Symphoricarpos albus is consistently present. Other associated shrub species include Amelanchier alnifolia, Prunus virginiana, and Philadelphus lewisii. Shrubs are so abundant that growth of understory forbs and graminoids is limited.
Dynamics	Periodic fire may serve to maintain this deciduous shrubland vegetation by controlling the establishment of trees. At Mount Spokane, these shrublands are seral to Pseudotsuga menziesii / Physocarpus malvaceus Forest.
Adjacent Types	Frequently observed as a narrow-to-broad ecotone between dry grasslands and Pseudotsuga menziesii-dominated forests (G210) on southwest-facing upper slopes.
Classification Comments	Stands classified as Physocarpus malvaceus - Symphoricarpos albus by Johnson and Simon (1987) were considered to have marginal potential for tree establishment. Other Physocarpus malvaceus-dominated communities are known to occur but are

	poorly documented within the Pacific Northwest region. Further development of the classification of these shrublands may modify the concept of this Physocarpus malvaceus shrubland. At Mount Spokane, most areas previously classified as "Mixed deciduous shrubs" (Morrison et al., 2007; Morrison & Wooten, 2010) likely represent this association. WNHP is expanding the range and concept slightly to extend to dry montane aspects. Prunus emarginata appears to replace P. virginiana as an indicator at Mount Spokane.

A3963 Amelanchier alnifolia Montane-Foothill Shrubland Alliance

Scientific Name	Acer glabrum var. douglasii - (Symphoricarpos albus) Wet Shrubland
EL Code — WNHP Abb	CWWA000282 — ACEGLA-(SYMALB)
CSR	GNR/SNR
Ecological System	CES306.994 Northern Rocky Mountain Montane-Foothill Deciduous Shrubland
Element Summary	This association typically occurs on hot, dry sites near lower treeline. Most stands are associated with narrow, steep, V-shaped valleys and canyons with intermittent or ephemeral streams. Stands are dominated by Acer glabrum and may be codominated by Amelanchier alnifolia, Holodiscus discolor, Rubus parviflorus, Symphoricarpos albus, or Cornus stolonifera. Alnus viridis is characteristically absent.
Distribution	Common at low forested elevations and in higher elevation shrub-steppe in eastern Washington. Likely present elsewhere in the region.
Environment	--
Physiognomy	--
Vegetation	--
Dynamics	--
Adjacent Types	--
Classification Comments	This association is called ACGLD in Kovalchik and Clausnitzer (2004). Not previously reported from Mount Spokane. Documented in AECOM vegetation plots in 2022. Stands with Alnus viridis present likely represent Alnus viridis ssp. sinuata / Mesic Forbs Wet Shrubland (CEGL006657) or Alnus viridis ssp. sinuata / Athyrium filix-femina - Cinna latifolia Wet Shrubland (CEGL001156).

G273 Central Rocky Mountain Lower Montane, Foothill & Valley Grassland

A3987 Festuca idahoensis - Pseudoroegneria spicata - Poa secunda Dry Grassland Alliance

Scientific Name	Festuca idahoensis - Eriogonum heracleoides Grassland
EL Code — WNHP Abb	CEGL001616 — FESIDA-ERIHER
CSR	G2/S2
Ecological System	CES306.040 Northern Rocky Mountain Lower Montane, Foothill and Valley Grassland
Element Summary	These grasslands are described from parks in the forests of the Okanogan Highlands of northeastern Washington and southern British Columbia, and from Oregon. Stands may also occur in northern Idaho. This association occurs as grassland 'parks' from 670 m to over 2000 m elevation in the Pinus ponderosa and Pseudotsuga menziesii zones. Sites are typically on dry slopes with southern exposures; apparently too dry during the late summer to support trees. Soils are loams to gravelly fine sandy loams, developed on bedrock controlled glacial tills. The vegetation is a medium-tall grassland association, dominated by the perennial bunchgrasses Festuca idahoensis or Festuca campestris, with Pseudoroegneria spicata, Poa secunda, and Koeleria macrantha. The diagnostic species Eriogonum heracleoides, a low (1-4 dm tall), perennial, suffrutescent forb, does not contribute to the physiognomic structure of this type, and is often sparsely present. There is a rich perennial forb component, including such species as Achillea millefolium, Lomatium triternatum, Erigeron corymbosus, and Balsamorhiza spp. Stands are distinguished from other Festuca idahoensis stands by the presence of Eriogonum heracleoides.
Distribution	As currently defined, this type is restricted to the Okanogan Highlands of Washington and adjacent British Columbia (western third of "Canadian Rocky Mountains ecoregion").
Environment	As currently defined, this association occurs as grassland "parks" from 670 to over 1980 m (2000-6500 feet) elevation in the Pinus ponderosa and Pseudotsuga menziesii zones. The Okanogan Highlands region is mountainous, but characterized by broad, rounded summits and moderate slopes. The entire region was repeatedly covered by continental glaciers during the Pleistocene, and deposits of glacial drift are found throughout. The climate of the region is somewhat more continental in nature than western Washington, with warm summers and cold winters. Precipitation occurs primarily in winter and averages 30 to 50 cm (12-20 inches) annually. The slopes where this association is found are generally southerly in aspect. Apparently, the soils where it is found dry beyond the permanent wilting point of conifers during the late summer, so the sites do not support trees. These sites are elevationally above, or geographically beyond, the main distributional range of Artemisia tripartita and Purshia tridentata. Soils are loams to gravelly fine sandy loams, developed on bedrock-controlled glacial tills. It is considered a topo-edaphic climax. Sites supporting this association in Spokane County are on shallow soils, also within Pinus ponderosa forests.

Physiognomy	--
Vegetation	This is a medium-tall grassland association dominated by the perennial bunchgrasses Festuca idahoensis or Festuca altaica (= Festuca scabrella), with Pseudoroegneria spicata, Poa secunda, and Koeleria macrantha. The low (1-4 dm tall), perennial suffrutescent forb Eriogonum heracleoides does not contribute to the physiognomic structure of this type, and is often sparsely present. There is a rich perennial forb component, including such species as Achillea millefolium, Lomatium triternatum, Erigeron corymbosus, and Balsamorhiza spp. Most stands of this type have been grazed. The annual grass Bromus tectorum is a vigorous invader of overgrazed stands, along with many other annuals. Poa pratensis will sometimes replace the Festuca and Pseudoroegneria in grazed stands.
Dynamics	This association may be very closely related to Festuca campestris (= Festuca scabrella) grasslands occurring to the west of the Rocky Mountains. Most stands have been heavily grazed, which has resulted in a shift in species composition.
Adjacent Types	--
Classification Comments	This association was first described in Daubenmire (1970). At Mount Spokane, Eriogonum umbellatum var. majus replaces Eriogonum heracleoides as a key diagnostic. WNHP may propose a revision to the USNVC description to account for the Mount Spokane stands, which occur in a moister climate than stands from the Okanogan Highlands.

G305 Central Rocky Mountain-North Pacific High Montane Mesic Shrubland

A3968 Abies lasiocarpa - Populus tremuloides / Acer glabrum Central Rocky Mountain Avalanche Chute Shrubland Alliance

Scientific Name	Rubus parviflorus / Chamerion angustifolium - Heracleum maximum Shrubland
EL Code — WNHP Abb	CEGL001127 — RUBPAR/CHAANG-HERMAX
CSR	G4/S3S4
Ecological System	CES306.961 Northern Rocky Mountain Subalpine Deciduous Shrubland
Element Summary	This is a subalpine shrubland association currently known from northwestern Montana, and from the northern Cascades of western Washington. It occurs on toeslope, low slope and midslope landforms with moderately steep to steep grades. It can be found at all aspects, and in northwestern Montana often occupies avalanche chutes and other areas where snow movement prohibits tree establishment or dislodges taller, established specimens. In the Cascades it is reported to occur below the timberline zone, on sites where the snow-free season is long, typically starting in April-May. Slopes are moderately to rapidly well-drained. In Glacier National Park elevations range from 1375-2010 m (4510-6593 feet). Parent material is derived from a variety of glacial substrates. Ground cover is primarily litter, with 1-25% rock of various sizes, and bare soil. This is a diverse, dense, shrubby meadow association. Total cover of the shrub layer ranges from 30% to well over 90%, and the herbaceous layer is equally abundant. The tall shrub Rubus parviflorus is dominant in most of these shrublands, with an average of 30-60% cover. Other tall shrubs can include Spiraea lucida (=betulifolia), Sorbus scopulina, Symphoricarpos albus, Acer glabrum, Lonicera spp., Ribes spp., Vaccinium spp. Prunus emarginata, and Sorbus sitchensis; one or more of these may have moderate cover in some areas. Stunted, shrubby Abies lasiocarpa, Abies amabilis, or Abies concolor may be present. The forb component is often very diverse, and mesic forbs prevail. Chamerion angustifolium was present in all plots, a good indicator of periodic disturbance that characterizes this association. Other common to abundant species include Heracleum maximum, Pteridium aquilinum, Valeriana sitchensis, Veratrum viride, Thalictrum occidentale, Solidago canadensis, Erythronium grandiflorum, Artemisia ludoviciana, Osmorhiza occidentalis, Angelica arguta, and Galium triflorum.
Distribution	This shrubby, subalpine meadow association is currently known from northwestern Montana in Glacier National Park, and from the northern Cascades of western Washington. It is likely to occur in subalpine mountainous regions of much of the northern Rocky Mountains.
Environment	This is a subalpine shrubland association occurring on toeslope, low slope and midslope landforms with moderately steep to steep grades. It can be found at all aspects, and in northwestern Montana often occupies avalanche chutes and other areas where snow movement prohibits tree establishment or dislodges taller, established specimens. In the Cascades it is reported to occur below the timberline zone, on sites where the snow-free season is long, typically starting in April-May (Franklin & Dyrness, 1973). Slopes are moderately to rapidly well-drained. In

	Glacier National Park elevations range from 1375-2010 m (4510-6593 feet). Parent material is derived from a variety of glacial substrates, including till and fluvial deposits, and colluvium. The association has also been documented on weathered-in-place sedimentary limestone. Soils are typically sandy loams or sandy clay loams exhibiting various degrees of development. In the stands sampled in Glacier National Park, most soil contained 30-50% gravel and cobbles. Ground cover is primarily litter, with 1-25% rock of various sizes, and bare soil.
Physiognomy	--
Vegetation	This is a diverse, dense, shrubby meadow association. Douglas (1972) reports 70 species as occurring in the Cascadian examples, with an average of 32 per stand. Occurrences in northwestern Montana are equally as diverse and lush. Total cover of the shrub layer ranges from 30% to well over 90%, and the herbaceous layer is equally abundant. The tall shrub Rubus parviflorus is dominant in most of these shrublands, with an average of 30-60% cover. Other tall shrubs can include Spiraea lucida (=betulifolia), Sorbus scopulina, Symphoricarpos albus, Acer glabrum, Lonicera spp., Ribes spp., Vaccinium spp. Prunus emarginata, and Sorbus sitchensis; one or more of these may have moderate cover in some areas. Stunted, shrubby Abies lasiocarpa, Abies amabilis, or Abies concolor may be present. The forb component is often very diverse, and mesic forbs prevail. Chamerion angustifolium (= Epilobium angustifolium) was present in all plots, a good indicator of periodic disturbance that characterizes this association. Other common to abundant species include Heracleum maximum, Pteridium aquilinum, Valeriana sitchensis, Veratrum viride, Thalictrum occidentale, Solidago canadensis, Erythronium grandiflorum, Artemisia ludoviciana, Osmorhiza occidentalis, Angelica arguta, and Galium triflorum.
Dynamics	This association is characterized by two species well-known to be adapted to recent disturbances, including fire and unstable substrates: Rubus parviflorus and Chamerion angustifolium. The fern Pteridium aquilinum is also common on recently burned sites, and is another indicator that this association is likely an early-successional type.
Adjacent Types	--
Classification Comments	Not previously identified at MSSP.

A3970 Menziesia ferruginea - Spiraea betulifolia Montane-Subalpine Shrubland Alliance

Scientific Name	Vaccinium membranaceum / Xerophyllum tenax Shrubland
EL Code — WNHP Abb	CEGL005891 — VACMEM/XERTEN
CSR	G3?/S2S3
Ecological System	CES306.961 Northern Rocky Mountain Subalpine Deciduous Shrubland
Element Summary	This community type is found throughout Glacier National Park in Montana and is also documented from a single record for Waterton Lakes National Park, Alberta. This dwarf-shrubland occurs in small to large patches at mid to upper subalpine elevations, from 1600 to 2020 m (5250-6630 feet). It is found primarily on steep (to 70%), southeast- through south- to southwest-facing slopes. Topographic situation is variable and includes all slope positions, but upper slopes and slope shoulders are quite commonly represented. It develops on both calcareous and noncalcareous substrates, usually red and green argillites. Soils are moderately to well-drained with loamy textures predominating. The litter layer is nearly continuous. This vegetation type is largely interpreted to be an early-seral expression of burned subalpine forests, usually those potentially dominated by Abies lasiocarpa and Picea engelmannii. Variable combinations of Abies lasiocarpa, Picea engelmannii, and Pinus contorta are common in the seedling and sapling size classes. The shrub layer dominant Vaccinium membranaceum averages 35% cover (10-80%). Other shrubs of high constancy include Paxistima myrsinites, Spiraea lucida (=betulifolia), and Sorbus scopulina; Rubus parviflorus is present in lower elevation plots and low coverage of Vaccinium scoparium (or Vaccinium myrtillus) is characteristic of higher elevation sites. Xerophyllum tenax almost invariably dominates the forb layer, averaging 40% cover. Carex geyeri and Luzula glabrata have high constancy. The remainder of the forb component varies depending on moisture status, with Valeriana sitchensis, Veratrum viride, Erigeron peregrinus, and Eucephalus engelmannii being regularly present in moister sites. Increaser species such as Arnica cordifolia, Arnica latifolia, Chamerion angustifolium and Erythronium grandiflorum are present across the range of sites.
Distribution	This association occurs from Washington to Montana and Alberta.
Environment	At Glacier National Park, this dwarf-shrubland occurs in small to large patches at mid to upper subalpine elevations, from 1600 to 2020 m (5250-6630 feet). It is found primarily on steep (to 70%), southeast- through south- to southwest-facing slopes. Topographic situation is variable and includes all slope positions, but upper slopes and slope shoulders are quite commonly represented. It develops on both calcareous and noncalcareous substrates, usually red and green argillites. Soils are moderately to well-drained with loamy textures predominating. The litter layer is nearly continuous.
Physiognomy	--

Vegetation	At Glacier National Park, this vegetation type is largely interpreted to be an early-seral expression of burned subalpine forests, usually those potentially dominated by Abies lasiocarpa and Picea engelmannii. Variable combinations of Abies lasiocarpa, Picea engelmannii, and Pinus contorta are common in the seedling and sapling size classes. The shrub layer dominant Vaccinium membranaceum averages 35% cover (10-80%). Other shrubs of high constancy include Paxistima myrsinites, Spiraea lucida (=betulifolia), and Sorbus scopulina; Rubus parviflorus is present in lower elevation plots and low coverage of Vaccinium scoparium (or Vaccinium myrtillus) is characteristic of higher elevation sites. Xerophyllum tenax almost invariably dominates the forb layer, averaging 40% cover. Carex geyeri and Luzula glabrata have high constancy. The remainder of the forb component varies depending on moisture status, with Valeriana sitchensis, Veratrum viride, Erigeron peregrinus, and Eucephalus engelmannii being regularly present in moister sites. Increaser species such as Arnica cordifolia, Arnica latifolia, Chamerion angustifolium (= Epilobium angustifolium) and Erythronium grandiflorum are present across the range of sites.
Dynamics	--
Adjacent Types	--
Classification Comments	Not previously identified at MSSP.

2.B.2.Ng Western North American Interior Chaparral

G282 Western North American Montane Sclerophyll Scrub

A3936 Ceanothus velutinus Shrubland Alliance

Scientific Name	Salix scouleriana - Acer glabrum - (Ceanothus velutinus) Shrubland
EL Code — WNHP Abb	CEGL008236 — SALSCO-ACEGLA-(CEAVEL)
CSR	GNR/SNR
Ecological System	CES306.994 Northern Rocky Mountain Montane-Foothill Deciduous Shrubland
Element Summary	This association is characteristically species-rich. A dense, tall shrub layer develops after a stand-replacing disturbance event (typically fire). Salix sp. (usually Salix scouleriana) codominates with Acer glabrum. Paxistima myrsinites typically dominates the shorter shrub layer. Amelanchier alnifolia, Sorbus scopulina (diagnostic), and Rubus nutkanus (=parviflorus) may be prominent among other diverse shrubs. Shrub-form Acer macrophyllum, Vaccinium membranaceum (diagnostic), Acer circinatum, and Prunus emarginata often occur. Ceanothus velutinus is often present, but usually not prominent. The herbaceous layer is diverse and variable; Thalictrum occidentale, Maianthemum racemosum, Pteridium aquilinum, Chamerion angustifolium, and Prosartes (=Disporum) hookeri are common. Pseudotsuga menziesii and Abies lasiocarpa regeneration are often present. These shrublands occur at mid-montane elevations (700-1250m) on generally moderate (21° mean slope) southwesterly aspects (204° mean aspect).
Distribution	This shrubland association is described from the eastern North Cascades and may also be found in the Okanogan Mountains of Washington and British Columbia and perhaps the Central Rocky Mountains.
Environment	These shrublands occur at mid-montane elevations (700-1250m) on generally moderate (21° mean slope) southwesterly aspects (204° mean aspect).
Physiognomy	These are dense shrublands (87% mean cover) with a moderate herbaceous understory (14% mean cover, primarily from forbs). Overstory tree cover averages 2% (primarily from conifers). Broad-leaved trees (Acer macrophyllum) are present only as regeneration, but conifers dominate that layer as well (9% mean cover, compared to 4% for broad-leaved trees).
Vegetation	This association is characteristically species-rich. A dense, tall shrub layer is codominated by Salix sp. (usually Salix scouleriana) and Acer glabrum var. douglasii. Paxistima myrsinites typically dominates the shorter shrub layer. Amelanchier alnifolia, Sorbus scopulina (diagnostic), and Rubus nutkanus (=parviflorus) may be prominent among other diverse shrubs. Shrub-form Acer macrophyllum, Vaccinium membranaceum (diagnostic), Acer circinatum, and Prunus emarginata often occur. Ceanothus velutinus is often present, but usually not prominent. The herbaceous layer is diverse and variable; Thalictrum occidentale, Maianthemum racemosum, Pteridium aquilinum, Chamerion angustifolium, and Prosartes (=Disporum) hookeri are common. Pseudotsuga menziesii and Abies lasiocarpa regeneration are often present.
Dynamics	Stands initiate after stand-replacing fires.

Adjacent Types	--
Classification Comments	Not previously identified at MSSP.

2.C.4.Nb Western North American Temperate Freshwater Marsh, Wet Meadow & Shrubland

G521 Vancouverian-Rocky Mountain Montane Wet Meadow & Marsh

A4425 Carex utriculata - Calamagrostis canadensis Basin Marsh & Wet Meadow Alliance

Scientific Name	Calamagrostis canadensis Western Wet Meadow
EL Code — WNHP Abb	CEGL001559 — CALCAN Western
CSR	G4/S3S4
Ecological System	CES306.812 Rocky Mountain Alpine-Montane Wet Meadow
Element Summary	This wet grassland association occurs widely throughout mountainous areas of the western United States and Canada. These grasslands are a relatively small, meadow association that occurs in broad glaciated valleys, openings in moist forests, silted-in beaver ponds, and narrow floodplains of lower montane canyons. Elevations range from 670 to 3415 m (2200-11,200 feet). Parent material is generally coarse alluvium or fine glacial tills. Soils are Inceptisols, Entisols, and occasionally Mollisols. Textures range from clay loam, silty clay and silt loam to sand. Occurrences may have an organic layer on the surface as well as significant amounts of sand and rock in the lower layers, and are poorly to moderately well-drained. Stands generally stay relatively wet to moist throughout the growing season, are often flooded in the spring, and the water table drops 50-80 cm from the surface by late summer. This association is typically a dense sward of graminoid cover dominated by Calamagrostis canadensis. Other graminoid species usually present include Carex aquatilis and Glyceria spp. Other Carex spp. that can be present in low amounts, depending on geographic location, include Carex utriculata, Carex nebrascensis, Carex canescens and Carex saxatilis. Forb cover is variable, from nearly absent to over 25%. Species include Caltha leptosepala, Senecio triangularis, Heracleum maximum, Mentha arvensis, Geum macrophyllum, Epilobium spp., plus many other species, depending on location. Shrubs may be present with 1-5% cover and may include Alnus incana, Symphoricarpos spp., and Salix spp. Trees are rare but can include 1-3% cover of Pinus contorta, Abies lasiocarpa, and Picea engelmannii.
Distribution	This type occurs widely throughout mountainous areas of the western United States and probably into Canada.
Environment	These grasslands are a relatively small, meadow association that occurs in broad glaciated valleys, openings in moist forests, silted-in beaver ponds, and narrow floodplains of lower montane canyons. Elevations range from 670 to 3400 m (2200-11,200 feet). Sites are flat to gently sloping. Parent material is generally coarse alluvium or fine glacial tills. Soils are Inceptisols, Entisols, and occasionally Mollisols. Textures range from clay loam, silty clay and silt loam to sand. Stands may have an organic layer on the surface as well as significant amounts of sand and rock in the lower layers. Stands are poorly to moderately well-drained. Stands generally stay relatively wet to moist throughout the growing season, are often

	flooded in the spring, and the water table drops 50-80 cm from the surface by late summer.
Physiognomy	--
Vegetation	This association is typically a dense sward of graminoid cover dominated by Calamagrostis canadensis. Other graminoid species usually present include Carex aquatilis and Glyceria spp. Other Carex spp. that can be present in low amounts, depending on location, include Carex utriculata, Carex microptera, Carex nebrascensis, Carex canescens, and Carex saxatilis. Forb cover is variable, from nearly absent to over 25%. Species include Caltha leptosepala, Senecio triangularis, Heracleum maximum, Mentha arvensis, Geum macrophyllum, and Epilobium spp. Shrubs may be present with 1-5% cover and may include Alnus incana and Salix spp. Trees are rare but can include Pinus contorta, Abies lasiocarpa, and Picea engelmannii. Chamerion angustifolium may be abundant (10%) reflecting recent disturbance (fire).
Dynamics	Moderate to heavy grazing reduces the vigor of Calamagrostis canadensis, and other mostly non-native graminoids and forbs will dominate the site. Species include Poa pratensis, Agrostis stolonifera, Juncus arcticus ssp. littoralis, and Achillea millefolium. Prescribed burning may increase the cover of rhizomatous species, such as Calamagrostis canadensis, an aggressive invader of burned sites, while reducing the abundance of other associated species. However, with repeated burning, non-native, rhizomatous Poa pratensis may be favored. Burning should be postponed if livestock grazing is necessary in the area. This is because of the high palatability of young Calamagrostis canadensis shoots which revegetate burned sites (Hansen et al., 1995). Calamagrostis canadensis and the associated Carex species are effective streambank stabilizers due to their rhizomatous growth habit. Many Carex species tend to form a dense, thick sod highly resistant to erosion. Deschampsia cespitosa, another associated species, is not an effective streambank stabilizer due to its weak, fibrous root system (Hansen et al., 1995).
Adjacent Types	--
Classification Comments	This USNVC type is synonymous with CACA Western Herbaceous Vegetation (Morrison & Wooten, 2010).

A4427 Heracleum maximum - Carex scopulorum var. bracteosa - Veratrum viride Wet Meadow Alliance

Scientific Name	Heracleum maximum Wet Meadow
EL Code — WNHP Abb	CEGL005857 — HERMAX
CSR	G3G4/S3S4
Ecological System	CES306.812 Rocky Mountain Alpine-Montane Wet Meadow
Element Summary	This is a lush forb meadow type of the Northern Rockies, in northwestern Montana and southern Alberta. Stands of this herbaceous vegetation are found on moderately sloped to flat benches, valley floors, and colluvial slopes, predominately on glacial deposits, with southeast aspects between 1671 to 1700 m (5480-5574 feet) elevation. Soils are moderately drained to well-drained silt or clay loams, and the ground surface is mostly litter and duff. This lush herbaceous association consists of a wide diversity of graminoids and forbs. Occasionally a few scattered shrubs are present with up to 10% combined cover, including Spiraea lucida (=betulifolia), Amelanchier alnifolia, Dasiphora fruticosa ssp. floribunda, and Symphoricarpos occidentalis. There is a wide variety of tall forbs including Heracleum maximum, which, while not present nor dominant in all stands, is the indicator species for this wet association. Forbs consistently present are Osmorhiza occidentalis, Thalictrum occidentale, Potentilla gracilis, Fragaria virginiana, Achillea millefolium, and Valeriana sitchensis with 2-20% cover. Graminoids present consist of Bromus carinatus, Carex hoodii, and Carex geyeri.
Distribution	This forb meadow type occurs in the Northern Rockies, in northwestern Montana and southern Alberta.
Environment	--
Physiognomy	--
Vegetation	--
Dynamics	--
Adjacent Types	--
Classification Comments	WNHP believes this USNVC type to be synonymous with HEMA80-RUOC2 (Morrison & Wooten, 2010). The other option would be a range expansion of Saussurea americana - Heracleum maximum Wet Meadow (CEGL001945).

A4424 Senecio triangularis - Saxifraga spp. - Mimulus spp. Streamside Wet Meadow Alliance

Scientific Name	Senecio triangularis Wet Meadow
EL Code — WNHP Abb	CEGL001987 — SENTRI
CSR	G5?/S3
Ecological System	CES306.812 Rocky Mountain Alpine-Montane Wet Meadow
Element Summary	This association has large gaps in its documented range, occurring in the alpine/subalpine of Colorado and reported again in the mountains of Montana, eastern Oregon and northward into Alberta. This broadly distributed wetland type occurs in small and often linear patches. In Montana and Oregon this type has been well-documented as a riparian stringer of high-gradient, ephemeral, first- or second-order streams; water tables are at the surface throughout the summer. This type also occurs as a species-rich herb meadow on fluvial, residual and colluvial landforms, many of which are subject to snow avalanches. Its documented elevation range in Montana-Alberta is from 1225 to 2181 m (4020-7150 feet). All substrates are apparently relatively medium- to coarse-textured and well-drained. However, all these seemingly disparate environments are subirrigated, with oxygenated water through most of the growing season. The vegetation is characterized by a dense herbaceous layer dominated by Senecio triangularis. Graminoids are a minor component, with Poa alpina, Phleum alpinum, Juncus drummondii, Trisetum spicatum, Elymus glaucus, Glyceria striata, and Carex disperma the reported species. Shrubs are virtually absent; only Ribes spp. associated with wetlands are present in trace amounts. The diagnostic forb Senecio triangularis is 100% constant and almost always the dominant, the only recorded exceptions being Chamerion spp. and Epilobium spp. which may increase markedly following disturbance. Other moderate- to high-constancy forbs indicative of wet-site conditions include Trollius laxus, Parnassia fimbriata, Mimulus lewisii, Veratrum viride, Equisetum arvense, Thalictrum occidentale, Geum macrophyllum, Arnica cordifolia, and Ranunculus spp. Species more associated with the diverse forb meadow condition include Allium schoenoprasum, Arnica mollis, Angelica arguta, Castilleja rhexiifolia, Castilleja miniata, Chamerion angustifolium, Erigeron peregrinus, Epilobium spp. (including Epilobium ciliatum, Epilobium anagallidifolium), and Valeriana sitchensis.
Distribution	This association is reported from the mountains of Montana, eastern Oregon and northward into Alberta and British Columbia, Canada.
Environment	This is a broadly distributed wetland type that occurs in small and often linear patches. In Montana this type has been well-documented as a riparian stringer (Hansen et al., 1995) of high-gradient, ephemeral, first- or second-order streams; water tables are at the surface throughout the summer. This type also occurs as a species-rich herb meadow on fluvial, residual and colluvial landforms, many of which are subject to snow avalanches. Its documented elevation range in Montana-Alberta is from 1225 to 2181 m (4020-7150 feet) (Hansen et al., 1995). In Oregon it occupies similar habitats, occurring on alluvial bars and streambanks (Crowe & Clausnitzer, 1997). It also occupies midslope to toeslope positions of

	talus and scree slopes, as well as glaciofluvial deposits that receive late-melting runoff (subsurface). All substrates are apparently relatively medium- to coarse-textured and well-drained. However, the unifying factor of all these seemingly disparate environments is that sites are subirrigated, ostensibly with oxygenated water through most of the growing season.
Physiognomy	--
Vegetation	This association is characterized by a dense herbaceous layer dominated by Senecio triangularis. In Montana, shrubs are virtually absent, only Ribes spp. associated with wetlands are present in trace amounts. Graminoid are also a minor presence, with Poa alpina, Phleum alpinum, Juncus drummondii, Trisetum spicatum, and Elymus glaucus being at least 40% constant but seldom exhibiting more than 2-3% cover (Hansen et al. 1995) In Oregon, Crowe and Clausnitzer (1997) report that Glyceria striata (= Glyceria elata) and Carex disperma occur in most stands. The diagnostic forb Senecio triangularis is 100% constant and almost always the dominant, the only recorded exceptions being Chamerion spp. and Epilobium spp. which may increase markedly following disturbance. Other moderate- to high-constancy forbs indicative of wet-site conditions include Trollius laxus, Parnassia fimbriata, Mimulus lewisii, Veratrum viride, Mertensia spp., and Equisetum arvense. In Oregon common forbs include Thalictrum occidentale, Geum macrophyllum, Canadanthus modestus (= Aster modestus), Arnica cordifolia, and Ranunculus spp. Species more associated with the diverse forb meadow condition include Allium schoenoprasum, Arnica mollis, Angelica arguta, Castilleja rhexiifolia, Castilleja miniata, Chamerion angustifolium (= Epilobium angustifolium), Erigeron peregrinus, Epilobium spp. (including Epilobium ciliatum, Epilobium anagallidifolium (= Epilobium alpinum)), and Valeriana sitchensis. In Wyoming, Agrostis exarata is constant, and Mimulus guttatus or Mimulus lewisii, Platanthera dilatata (= Habenaria dilatata), Epilobium anagallidifolium, and Pectiantia (=Mitella) pentandra are common and sometimes abundant (Mattson, 1984).
Dynamics	The riparian examples of this association are described by Hansen et al. (1995) as early-seral communities destined for conifer dominance. However, with repeated flooding and scouring, stands rarely mature beyond the sapling stage. Achuff et al. (2002) identify the meadow portion and scree slope portion of the type as successionally mature. In Oregon, this association may succeed to Alnus sinuata / Mesic Forb Association (Crowe et al. 2004) if the site remains stable for a long enough period of time. Some sample sites in the Strawberry Mountains were located in watersheds that had been severely burned two years prior to sampling. All upland trees were killed in the fire and the side slopes were still depauperate. These sites were heavily shaded by subalpine fir forests prior to the fire, and once the forests regrow and shade the sites again, this association will undoubtedly succeed to another association.
Adjacent Types	Upland vegetation adjacent to sites sampled in Oregon includes Abies grandis, Abies concolor, and Abies lasiocarpa associations.
Classification Comments	WNHP believes this USNVC type to be synonymous with SETR-VECA2 (Morrison & Wooten, 2010).

Scientific Name	Athyrium filix-femina - Gymnocarpium dryopteris Wet Meadow [Provisional]
EL Code — WNHP Abb	CWWA000313 — ATHFIL-GYMDRY
CSR	GNR/SNR
Ecological System	CES306.812 Rocky Mountain Alpine-Montane Wet Meadow
Element Summary	This association occurs at montane to subalpine elevations along low to steep gradient ROSGEN type A and B streams, or in seeps and springs. Athyrium filix-femina and/or Gymnocarpium dryopteris dominate a well-developed herb layer. Sites at higher elevations may be dominated by dominated by Athyrium distentifolium. Other common herbs include Galium spp., Senecio triangularis, Streptopus amplexifoloius, Viola glabella, and Cinna latifolia. Melica smithii is often present in stands at Mount Spokane. Patches of Alnus viridis, Ribes lacustre, or other wet shrubs are typically present.
Distribution	--
Environment	--
Physiognomy	--
Vegetation	--
Dynamics	--
Adjacent Types	--
Classification Comments	This type is called ATFI-GYDR in Kovalchik and Clausnitzer (2004) and Athyrium filix-femina Association in Crowe et al. (2004). The description is adapated from Kovalchik and Clausnitzer (2004).

G527 Western Montane-Subalpine Riparian & Seep Shrubland

A4416 Alnus viridis ssp. sinuata Riparian Shrubland Alliance

Scientific Name	Alnus viridis ssp. sinuata / Athyrium filix-femina - Cinna latifolia Wet Shrubland
EL Code — WNHP Abb	CEGL001156 — ALNVIR/ATHFIL-CINLAT
CSR	G4/S3
Ecological System	CES306.832 Rocky Mountain Subalpine-Montane Riparian Shrubland
Element Summary	This association is found in cool and moist mountainous regions between about 1022-1837 m (3350-6012 feet) elevation, ranging from northern California, along the eastern slope of the Cascades to southern British Columbia, through northeastern Oregon, Washington and Montana and north into the Canadian Rockies. It usually occurs as narrow stringers in moderate to steep, V-shaped valleys in areas of deep or long-lasting snowpacks. Such habitats include floodplains and streambanks of small streams (orders 1 and 2), avalanche chutes, and occasionally springs. These areas often flood during snowmelt and remain wet throughout the summer. Soils vary, but are typically thin silt or sandy loams over alluvial cobble and gravel. Alnus viridis ssp. sinuata forms dense, 3- to 5-m tall thickets with 60 to nearly 100% cover, but less dense stands are also known. Conifers, especially Abies grandis and Picea engelmannii, are sometimes present and may indicate a successional trend toward conifer-dominated associations. Periodic severe flood or avalanche disturbance may be necessary for maintaining the long-term dominance of Alnus viridis ssp. sinuata. The only understory shrubs with greater than 50% constancy (but usually low cover), are Ribes spp. (Ribes hudsonianum or Ribes lacustre), Salix drummondiana, and Rubus parviflorus. Athyrium filix-femina, 30-90 cm tall, is always present in the understory, typically with 20-80% cover, while another fern, Gymnocarpium dryopteris, is sometimes subdominant. Cinna latifolia is often present, but averages only 5% cover (and less than Athyrium filix-femina). Tall forbs, most commonly Maianthemum stellatum, Senecio triangularis, Chamerion angustifolium, Prosartes spp., and Streptopus amplexifolius, have high constancy but usually have less than 10% cover, although they can occasionally be quite abundant, with as much as 50% canopy cover. A lush ground layer composed of species including, but not limited to, Boykinia major, Circaea alpina, Claytonia cordifolia, Galium triflorum, and Pectiantia (=Mitella) spp., is often present beneath the taller Athyrium filix-femina canopy.
Distribution	This association is known from moist, mid elevations in the inland Pacific Northwest. It is documented in Oregon, Idaho, Washington, British Columbia, Montana, and California. This association is irregularly distributed, but wide-ranging throughout moister high-elevation areas of the inland Pacific Northwest. The core range of the association appears to be the Blue Mountains of northeast Oregon (Crowe & Clausnitzer, 1997), the Clearwater basin of central Idaho, the mountains of northeastern Washington (Kovalchik, 2001; Kovalchik & Clausnitzer, 2004) and adjacent north Idaho and British Columbia, and northwest Montana (Hansen et al., 1995) extending into the Canadian Rockies. It is also found in the Klamath Ranges of northern California and along the eastern slope of the Cascade

	Range from Oregon, north through Washington into the Thompson-Okanogan region of British Columbia, Canada (Kovalchik, 2001; Crowe et al., 2002; Kovalchik & Clausnitzer, 2004; Sawyer et al., 2009).
Environment	This association is apparently limited to moist, mid- to high-elevation mountainous areas with deep or long-lasting snowpacks between about 1022-1837 m (3350-6012 feet) elevation (Crowe & Clausnitzer, 1997; Crowe et al., 2002). In these areas the association most frequently develops as narrow stringers in moderate to steep, V-shaped valleys along small streams (orders 1 and 2) and avalanche chutes. Although sediments must remain stable and moist enough to support initial establishment of both Alnus viridis ssp. sinuata and Athyrium filix-femina (Crowe & Clausnitzer, 1997), the association may need periodic severe flood or avalanche disturbance to reduce tree invasion and maintain Alnus viridis ssp. sinuata dominance (Hansen et al., 1995). Alnus viridis ssp. sinuata readily sprouts after severe disturbance and is long-lived.
Physiognomy	--
Vegetation	Alnus viridis ssp. sinuata forms dense, 3- to 5-m tall, thickets with 60% to nearly 100% cover, but less dense stands are also known. Conifers, especially Abies grandis and Picea engelmannii, are sometimes present and may indicate a successional trend toward conifer-dominated associations. Periodic severe flood or avalanche disturbance may be necessary for maintaining the long-term dominance of Alnus viridis ssp. sinuata. The only understory shrubs with greater than 50% constancy (but usually low cover), are Ribes spp. (Ribes hudsonianum or Ribes lacustre) and Rubus parviflorus. Athyrium filix-femina, 30-90 cm tall, is always present in the understory, typically with 20-80% cover, while another fern, Gymnocarpium dryopteris, is sometimes subdominant. Cinna latifolia is often present, but averages only 5% cover (and less than Athyrium filix-femina). Tall forbs, most commonly Maianthemum stellatum, Senecio triangularis, and Streptopus amplexifolius, have high constancy but usually have less than 10% cover each. A lush forb ground layer composed of species including, but not limited to, Boykinia major, Circaea alpina, Claytonia cordifolia, Galium triflorum, and Pectiantia (=Mitella) spp., is often present beneath the taller Athyrium filix-femina canopy.
Dynamics	Alnus viridis ssp. sinuata is considered an early-seral species able to quickly colonize bare mineral soil. It has the ability to resprout after fire, flood, avalanche, ice, or other disturbances to above-ground stems (Kovalchik, 2001; Kovalchik & Clausnitzer, 2004). Repeated broadcast burning in the Thuja plicata - Tsuga heterophylla zone (such as after logging operations) can increase the frequency and cover of Alnus viridis ssp. sinuata (Hansen et al., 1995), although severe fires may kill root crowns (Crowe & Clausnitzer, 1997; Kovalchik, 2001; Kovalchik & Clausnitzer, 2004). Natural fires are rare to occasional in cool and moist valley bottoms occupied by this type. While it is possible that logging and subsequent slash burning may promote this association in some areas, logging operations may also lead to site desiccation through alteration of the hydrology, soil compaction, and erosion leading to the loss of mesic species such as Athyrium filix-femina (Hansen et al., 1995; Crowe & Clausnitzer, 1997).
Adjacent Types	--

Classification Comments	This USNVC type is synonymous with ALVIS/ATFI (Morrison & Wooten, 2010)

Scientific Name	Alnus viridis ssp. sinuata / Mesic Forbs Wet Shrubland
EL Code — WNHP Abb	CEGL006657 — ALNVIR Mesic
CSR	GNR/S4S5
Ecological System	CES306.832 Rocky Mountain Subalpine-Montane Riparian Shrubland
Element Summary	This deciduous shrubland is located in moderate to high-elevation (1200-3000 m) riparian habitats of the northern Rocky Mountains and Cascade Range where deep snow accumulations are common. They usually occur in low-gradient creek drainages, on midslope avalanche chutes, in cirque basins, and in relatively steep drainages, all of which flood from spring snowmelt or summer rainstorms. The wet soils and frequent fluvial disturbance act to discourage colonization by coniferous trees and allow full sunlight to reach the ground at these sites. Soils are often well-drained colluvial or glacial-fluvial deposits, generally sandy loam to clay loam over sorted gravels and sands. A dense tall-shrub cover of Alnus viridis ssp. sinuata characterizes this vegetation. Acer circinatum, Alnus incana, Sambucus racemosa, or Salix drummondiana may be codominant in the tall-shrub layer. Acer glabrum, Ribes lacustre, Sorbus scopulina, and Rhododendron menziesii (= Menziesia ferruginea) may also be present. In the northern Rocky Mountains, Abies lasiocarpa colonizes these communities, and scattered seedlings or saplings may be present. Low cold-deciduous or ericaceous shrubs may be abundant, including Rubus spectabilis, Rubus parviflorus, Sambucus racemosa, Paxistima myrsinites, and Vaccinium spp. A lush herbaceous layer is usually present, but highly variable. It is characterized by a high diversity of low-abundance tall mesic forbs. In the North Cascades, Thalictrum occidentale, Claytonia sibirica, Viola glabella, Heracleum maximum, Prosartes (= Disporum) hookeri, Hydrophyllum fendleri, Maianthemum stellatum, Aconitum columbianum, Achillea millefolium, Veratrum viride, Senecio triangularis, Urtica dioica, and Osmorhiza berteroi are common. Graminoids and ferns are generally uncommon.
Distribution	This deciduous shrubland is located in moderate to high-elevation (1200-3000 m) riparian and avalanche chute habitats of the northern Rocky Mountains of Montana and Alberta, as well as the Cascade Range of Washington.
Environment	This deciduous shrubland is located in moderate to high-elevation (1200-3000 m) riparian habitats of the northern Rocky Mountains and Cascade Range where deep snow accumulations are common. They usually occur in low-gradient creek drainages, on midslope avalanche chutes, in cirque basins, and in relatively steep drainages, all of which flood from spring snowmelt or summer rainstorms. The wet soils and frequent fluvial disturbance act to discourage colonization by coniferous trees and allow full sunlight to reach the ground at these sites. Soils are often well-drained colluvial or glacial-fluvial deposits, generally sandy loam to clay loam over sorted gravels and sands.
Physiognomy	--

Vegetation	A dense tall-shrub cover of Alnus viridis ssp. sinuata characterizes this vegetation. Acer circinatum, Alnus incana, Sambucus racemosa, or Salix drummondiana may be codominant in the tall-shrub layer. Acer glabrum, Ribes lacustre, Sorbus scopulina, and Rhododendron menziesii (= Menziesia ferruginea) may also be present. In the northern Rocky Mountains, Abies lasiocarpa colonizes these communities, and scattered seedlings or saplings may be present. Low cold-deciduous or ericaceous shrubs may be abundant, including Rubus spectabilis, Rubus parviflorus, Sambucus racemosa, Paxistima myrsinites, and Vaccinium spp. A lush herbaceous layer is usually present, characterized by a high diversity of low-abundance tall mesic forbs, including Aconitum columbianum, Achillea millefolium, Heracleum maximum (= Heracleum lanatum), Veratrum viride, Senecio triangularis, Prosartes spp. (= Disporum spp.), Urtica dioica, and Osmorhiza berteroi (= Osmorhiza chilensis). Graminoids are generally uncommon.
Dynamics	This association usually occurs at sites that are too wet or frequently disturbed for coniferous forest to establish. Alnus viridis ssp. sinuata is highly shade-intolerant and persists largely in forest openings with abundant light. It colonizes quickly, has rapid growth, and resprouts following fire or flood, making it an important species on wet, disturbed sites.
Adjacent Types	--
Classification Comments	This represents a merger of Alnus viridis ssp. sinuata Shrubland (CEGL001154) and Alnus viridis ssp. sinuata / Mesic Forbs Shrubland association (CEGL002633). This USNVC type is synonymous with ALVIS/Mesic Forb, AVLIS/SETR (Morrison & Wooten, 2010), and ALSI/Mesic Forb (Morrison et al., 2007).

A4421 Alnus incana - Cornus sericea Riparian Shrubland Alliance

Scientific Name	Alnus incana / Athyrium filix-femina Wet Shrubland
EL Code — WNHP Abb	CEGL002628 — ALNINC/ATHFIL
CSR	G3/S3?
Ecological System	CES306.832 Rocky Mountain Subalpine-Montane Riparian Shrubland
Element Summary	This association is a locally common association found at low elevations from about 701 to 2074 m (2300-6800 feet), in cool and moist, often maritime-influenced, regions of Idaho, Washington, Oregon, and adjacent non-coastal areas. This association often occurs on floodplains, streambanks, and overflow channels of perennial streams that vary in gradient and valley width. These sites usually have soil ranging from silty loam to sandy-gravelly loam over cobble alluvium. The association is also sometimes sampled in wetlands with organic loam soils on the margins of springs, oxbows, lakes, and sediment-filled beaver ponds. Alnus incana forms an open to partially closed canopy, averaging 5-6.5 m tall, typically having 30-60% cover. Picea engelmannii, or Thuja plicata in maritime-influenced areas, occur with moderate constancy, possibly indicating successional pathways for this type. Other shrubs with high constancy, but mostly low cover, include Cornus sericea, Ribes lacustre, Ribes hudsonianum, Rubus parviflorus, and Symphoricarpos albus. Athyrium filix-femina with 20-75% cover, sometimes with lesser amounts of Gymnocarpium dryopteris, forms a lush fern layer, up to 1.0 m tall. Cinna latifolia up to about 20% cover, with less abundant Carex deweyana, Carex disperma, Glyceria striata, and Scirpus microcarpus, are the most common graminoids. Tall forbs, such as Maianthemum stellatum, Mertensia paniculata, Senecio triangularis, and Streptopus amplexifolius, frequently occur with low cover, and a low-forb ground layer (composed of species such as Boykinia major, Circaea alpina, Claytonia cordifolia, Equisetum arvense, Mitella pentandra, and Trautvetteria caroliniensis) also exists.
Distribution	This association is known from Idaho, Washington, and Oregon. It is expected to occur in similar habitats in British Columbia, Montana and California.
Environment	This association is a locally common association found at low elevations from about 701 to 2074 m (2300-6800 feet), in cool and moist, often maritime-influenced, regions of Idaho, Washington, Oregon, and adjacent non-coastal areas. This association often occurs on floodplains, streambanks, and overflow channels of perennial streams that vary in gradient and valley width. These sites usually have soil ranging from silty loam to sandy-gravelly loam over cobble alluvium. The association is also sometimes sampled in wetlands with organic loam soils on the margins of springs, oxbows, lakes, and sediment-filled beaver ponds.
Physiognomy	--

Vegetation	Alnus incana forms an open to partially closed canopy, averaging 5-6.5 m tall, typically having 30-60% cover. Picea engelmannii, or Thuja plicata in maritime-influenced areas, occur with moderate constancy, possibly indicating successional pathways for this type. Other shrubs with high constancy, but mostly low cover, include Cornus sericea, Ribes lacustre, Ribes hudsonianum, Rubus parviflorus, and Symphoricarpos albus. Athyrium filix-femina with 20-75% cover, sometimes with lesser amounts of Gymnocarpium dryopteris, forms a lush fern layer, up to 1.0 m tall. Cinna latifolia up to about 20% cover, with less abundant Carex deweyana, Carex disperma, Glyceria striata, and Scirpus microcarpus, are the most common graminoids. Tall forbs, such as Maianthemum stellatum, Mertensia paniculata, Senecio triangularis, and Streptopus amplexifolius, frequently occur with low cover, and a low-forb ground layer (composed of species such as Boykinia major, Circaea alpina, Claytonia cordifolia, Equisetum arvense, Mitella pentandra, and Trautvetteria caroliniensis) also exists.
Dynamics	Overgrazing and trampling decrease Alnus incana vigor and cover. This can reduce its ability to stabilize streambanks, allowing overwidening or incision of the channel, and thus, drying the moist soils necessary to support this association (Crowe & Clausnitzer, 1997; Kovalchik & Clausnitzer, 2004). It is most likely a persistent mid-seral type requiring regular flood scouring and deposition for maintenance (Crowe & Clausnitzer, 1997; Kovalchik & Clausnitzer, 2004). For example, both Alnus incana and Athyrium filix-femina are quick to recolonize ground disturbed by fire or flood (scouring and alluvial deposition) and might form a stable community until stream dynamics change. If the stream channel becomes sinuous and entrenched (e.g., Rosgen E channel), Salix species may invade (Crowe & Clausnitzer, 1997). More likely, downcutting and floodplain widening may dry out alluvial terraces and allow conifer invasion (Hansen et al., 1995). This change may lead toward an Abies grandis-dominated type in the Blue Mountains (Crowe & Clausnitzer, 1997) and a Thuja plicata- or Abies lasiocarpa-dominated type in northern Washington and Idaho (Kovalchik & Clausnitzer, 2004), each with Athyrium filix-femina dominating the undergrowth.
Adjacent Types	--
Classification Comments	This is a well-documented association described from 40 quantitative plots. Twelve in eastern Oregon (Crowe & Clausnitzer, 1997; Crowe et al., 2004); and 28 from eastern Washington (Kovalchik & Clausnitzer, 2004). This association may have been included in a broader Alnus incana type in Montana (Hansen et al., 1995). The broad Alnus incana community type of Hansen et al. (1995) has a similar mixed shrub and mesic forb understory, including noticeable Athyrium filix-femina cover. This association resembles other Alnus incana associations which all have similar mixed shrub species, mesic forbs species, and Athyrium filix-femina in their understories (Crowe & Clausnitzer, 1997; Crowe et al., 2004; Kovalchik & Clausnitzer, 2004). This association is distinguished from other Alnus incana types in having Athyrium filix-femina as clearly the most abundant understory herbaceous species (with at least, but usually much more than, 5% cover), as well as relatively low cover of other shrub species.

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Appendix C
Plant Taxa Observed in Mount Spokane State Park, 2020–2022

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Appendix C. Plant Taxa Observed in Mount Spokane State Park, 2020–2022

Growth Form	Family	AECOM Code	Scientific Name	Observers	Observation Year	Voucher Specimen	Global Rare Rank	State Rare Rank	Conservation Rank List	WA Noxious Weeds Rank	WA Invasive Weed	WA Weed Quarantine List	WA Weed Monitor List
Deciduous Trees	Betulaceae	alnrub1	*Alnus rubra*	AECOM,WNHP	2022	FALSE							
Deciduous Trees	Betulaceae	betpap1	*Betula papyrifera*	AECOM,WNHP	2022	FALSE							
Deciduous Trees	Pinaceae	larocc1	*Larix occidentalis*	AECOM,WNHP	2020–2021,2022	FALSE							
Deciduous Trees	Salicaceae	poptre1	*Populus tremuloides*	AECOM,WNHP	2020–2021,2022	FALSE							
Deciduous Trees	Salicaceae	poptri1	*Populus trichocarpa*	AECOM,WNHP	2020–2021,2022	FALSE							
Evergreen Trees	Cupressaceae	thupli1	*Thuja plicata*	AECOM,WNHP	2022	FALSE							
Evergreen Trees	Pinaceae	abiama1	*Abies amabilis*	WNHP	2022	FALSE							
Evergreen Trees	Pinaceae	abigra1	*Abies grandis*	AECOM,WNHP	2020–2021,2022	FALSE							
Evergreen Trees	Pinaceae	abilassb1	*Abies lasiocarpa* ssp. *bifolia*	AECOM,WNHP	2020–2021,2022	FALSE							
Evergreen Trees	Pinaceae	picengve1	*Picea engelmannii* var. *engelmannii*	AECOM,WNHP	2022	FALSE							
Evergreen Trees	Pinaceae	pinconvl1	*Pinus contorta* var. *latifolia*	AECOM,WNHP	2020–2021,2022	FALSE							
Evergreen Trees	Pinaceae	pinmon1	*Pinus monticola*	AECOM,WNHP	2020–2021,2022	FALSE							
Evergreen Trees	Pinaceae	pinponvp1	*Pinus ponderosa* var. *ponderosa*	AECOM,WNHP	2020–2021,2022	FALSE							

Growth Form	Family	AECOM Code	Scientific Name	Observers	Observation Year	Voucher Specimen	Global Rare Rank	State Rare Rank	Conservation Rank List	WA Noxious Weeds Rank	WA Invasive Weed	WA Weed Quarantine List	WA Weed Monitor List
Evergreen Trees	Pinaceae	psemenvg1	*Pseudotsuga menziesii* var. *glauca*	AECOM,WNHP	2020–2021,2022	FALSE							
Evergreen Trees	Pinaceae	tsuhet1	*Tsuga heterophylla*	AECOM,WNHP	2022	FALSE							
Evergreen Trees	Taxaceae	taxbre1	*Taxus brevifolia*	AECOM,WNHP	2022	FALSE							
Deciduous Shrubs	Adoxaceae	samcer1	*Sambucus cerulea*	AECOM	2022	FALSE							
Deciduous Shrubs	Adoxaceae	samracvm1	*Sambucus racemosa var. melanocarpa*	AECOM,WNHP	2020–2021,2022	FALSE							
Deciduous Shrubs	Betulaceae	alnincst1	*Alnus incana* ssp. *tenuifolia*	AECOM,WNHP	2022	FALSE							
Deciduous Shrubs	Betulaceae	alnvirss1	*Alnus viridis* ssp. *sinuata*	AECOM,WNHP	2022	FALSE							
Deciduous Shrubs	Betulaceae	betocc1	*Betula occidentalis**	WNHP	2022	FALSE							
Deciduous Shrubs	Caprifoliaceae	lonuta1	*Lonicera utahensis*	AECOM,WNHP	2020–2021,2022	FALSE							
Deciduous Shrubs	Caprifoliaceae	symalb1	*Symphoricarpos albus*	AECOM,WNHP	2020–2021,2022	FALSE							
Deciduous Shrubs	Cornaceae	corsto1	*Cornus stolonifera*	AECOM	2022	FALSE							
Deciduous Shrubs	Ericaceae	rhomen1	*Rhododendron menziesii*	AECOM,WNHP	2022	FALSE							
Deciduous Shrubs	Ericaceae	vacmem1	*Vaccinium membranaceum*	AECOM,WNHP	2020–2021,2022	FALSE							

Growth Form	Family	AECOM Code	Scientific Name	Observers	Observation Year	Voucher Specimen	Global Rare Rank	State Rare Rank	Conservation Rank List	WA Noxious Weeds Rank	WA Invasive Weed	WA Weed Quarantine List	WA Weed Monitor List
Deciduous Shrubs	Ericaceae	vacsco1	*Vaccinium scoparium*	AECOM	2020–2021,2022	FALSE							
Deciduous Shrubs	Grossulariaceae	ribbra1	*Ribes bracteosum*	WNHP	2022	FALSE							
Deciduous Shrubs	Grossulariaceae	riblac1	*Ribes lacustre*	AECOM,WNHP	2020–2021,2022	FALSE							
Deciduous Shrubs	Grossulariaceae	ribvis1	*Ribes viscosissimum*	AECOM,WNHP	2020–2021,2022	FALSE							
Deciduous Shrubs	Hydrangeaceae	philew1	*Philadelphus lewisii*	AECOM	2022	FALSE							
Deciduous Shrubs	Plantaginaceae	penfru1	*Penstemon fruticosus*	AECOM,WNHP	2020–2021,2022	FALSE							
Deciduous Shrubs	Rosaceae	amealn1	*Amelanchier alnifolia*	AECOM,WNHP	2020–2021,2022	FALSE							
Deciduous Shrubs	Rosaceae	holdisvd1	*Holodiscus discolor* var. *discolor*	AECOM,WNHP	2020–2021,2022	FALSE							
Deciduous Shrubs	Rosaceae	malfus1	*Malus fusca*	AECOM	2022	FALSE							
Deciduous Shrubs	Rosaceae	phycap1	*Physocarpus capitatus*	AECOM	2022	FALSE							
Deciduous Shrubs	Rosaceae	phymal1	*Physocarpus malvaceus*	AECOM,WNHP	2020–2021,2022	FALSE							
Deciduous Shrubs	Rosaceae	pruema1	*Prunus emarginata*	AECOM,WNHP	2020–2021,2022	TRUE							

Growth Form	Family	AECOM Code	Scientific Name	Observers	Observation Year	Voucher Specimen	Global Rare Rank	State Rare Rank	Conservation Rank List	WA Noxious Weeds Rank	WA Invasive Weed	WA Weed Quarantine List	WA Weed Monitor List
Deciduous Shrubs	Rosaceae	pruvir1	*Prunus virginiana*	AECOM	2020–2021,2022	FALSE							
Deciduous Shrubs	Rosaceae	rosgym1	*Rosa gymnocarpa*	AECOM,WNHP	2020–2021,2022	FALSE							
Deciduous Shrubs	Rosaceae	rosnutsm1	*Rosa nutkana* ssp. *macdougalii*	AECOM,WNHP	2020–2021,2022	FALSE							
Deciduous Shrubs	Rosaceae	roswoo1	*Rosa woodsii*	AECOM	2022	FALSE							
Deciduous Shrubs	Rosaceae	rubnut1	*Rubus nutkanus*	AECOM,WNHP	2022	FALSE							
Deciduous Shrubs	Rosaceae	sorsco1	*Sorbus scopulina*	AECOM,WNHP	2020–2021,2022	FALSE							
Deciduous Shrubs	Rosaceae	sorsit1	*Sorbus sitchensis**	WNHP	2022	FALSE							
Deciduous Shrubs	Rosaceae	spiluc1	*Spiraea lucida*	AECOM,WNHP	2020–2021,2022	FALSE							
Deciduous Shrubs	Salicaceae	salsco1	*Salix scouleriana*	AECOM,WNHP	2022	TRUE							
Deciduous Shrubs	Sapindaceae	acecir1	*Acer circinatum*	WNHP	2022	FALSE							
Deciduous Shrubs	Sapindaceae	aceglavd1	*Acer glabrum* var. *douglasii*	AECOM,WNHP	2020–2021,2022	FALSE							
Evergreen Shrubs	Berberidaceae	berner1	*Berberis nervosa*	WNHP	2022	FALSE							
Evergreen Shrubs	Berberidaceae	berrep1	*Berberis repens*	AECOM,WNHP	2020–2021,2022	FALSE							

Growth Form	Family	AECOM Code	Scientific Name	Observers	Observation Year	Voucher Specimen	Global Rare Rank	State Rare Rank	Conservation Rank List	WA Noxious Weeds Rank	WA Invasive Weed	WA Weed Quarantine List	WA Weed Monitor List
Evergreen Shrubs	Celastraceae	paxmyr1	*Paxistima myrsinites*	AECOM,WNHP	2022	FALSE							
Evergreen Shrubs	Ericaceae	arcuva1	*Arctostaphylos uva-ursi*	AECOM	2020–2021	FALSE							
Evergreen Shrubs	Rhamnaceae	ceavelvv1	*Ceanothus velutinus* var. *velutinus*	AECOM,WNHP	2022	FALSE							
Vines	Caprifoliaceae	loncil1	*Lonicera ciliosa*	AECOM	2022	FALSE							
Vines	Ranunculaceae	cleoccvg1	*Clematis occidentalis* var. *grosseserrata*	AECOM	2022	FALSE							
Forbs	Apiaceae	angarg1	*Angelica arguta*	AECOM,WNHP	2020–2021,2022	TRUE							
Forbs	Apiaceae	hermax1	*Heracleum maximum*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Apiaceae	ligcan1	*Ligusticum canbyi*	AECOM,WNHP	2020–2021,2022	TRUE							
Forbs	Apiaceae	lomdis1	*Lomatium dissectum*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Apiaceae	lomtri1	*Lomatium triternatum*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Apiaceae	osmber1	*Osmorhiza berteroi*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Apiaceae	osmocc1	*Osmorhiza occidentalis*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Apocynaceae	apoand1	*Apocynum androsaemifolium*	AECOM,WNHP	2020–2021,2022	FALSE							

Growth Form	Family	AECOM Code	Scientific Name	Observers	Observation Year	Voucher Specimen	Global Rare Rank	State Rare Rank	Conservation Rank List	WA Noxious Weeds Rank	WA Invasive Weed	WA Weed Quarantine List	WA Weed Monitor List
Forbs	Araliaceae	aranud1	*Aralia nudicaulis*	AECOM	2022	FALSE							
Forbs	Aristolochiaceae	asacau1	*Asarum caudatum*	AECOM,WNHP	2022	FALSE							
Forbs	Asparagaceae	maidil1	*Maianthemum dilatatum*	WNHP	2022	FALSE							
Forbs	Asparagaceae	mairacsa1	*Maianthemum racemosum* ssp. *amplexicaule*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Asparagaceae	maiste1	*Maianthemum stellatum*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Asparagaceae	trigravg1	*Triteleia grandiflora* var. *grandiflora*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Asteraceae	achmil1	*Achillea millefolium*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Asteraceae	adebic1	*Adenocaulon bicolor*	AECOM,WNHP	2022	FALSE							
Forbs	Asteraceae	agogla1	*Agoseris glauca*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Asteraceae	anamar1	*Anaphalis margaritacea*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Asteraceae	antluzsl1	*Antennaria luzuloides* ssp. *luzuloides*	AECOM	2020–2021	FALSE							
Forbs	Asteraceae	antmed1	*Antennaria media*	AECOM	2020–2021	FALSE							
Forbs	Asteraceae	antmic1	*Antennaria microphylla*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Asteraceae	arncor1	*Arnica cordifolia*	AECOM,WNHP	2022	FALSE							

Growth Form	Family	AECOM Code	Scientific Name	Observers	Observation Year	Voucher Specimen	Global Rare Rank	State Rare Rank	Conservation Rank List	WA Noxious Weeds Rank	WA Invasive Weed	WA Weed Quarantine List	WA Weed Monitor List
Forbs	Asteraceae	arnful1	*Arnica fulgens*	WNHP	2022	FALSE							
Forbs	Asteraceae	arnlat1	*Arnica latifolia*	AECOM	2022	FALSE							
Forbs	Asteraceae	cendif1	*Centaurea diffusa*	WNHP	2022	FALSE				Class B	True	True	False
Forbs	Asteraceae	censtosa1	*Centaurea stoebe* ssp. *australis*	AECOM,WNHP	2020–2021,2022	FALSE				Class B	True	True	False
Forbs	Asteraceae	cirarv1	*Cirsium arvense*	AECOM,WNHP	2022	FALSE				Class C	True	False	False
Forbs	Asteraceae	cirvul1	*Cirsium vulgare*	WNHP	2022	FALSE				Class C	True	False	False
Forbs	Asteraceae	crebar1	*Crepis barbigera*	AECOM,WNHP	2022	FALSE							
Forbs	Asteraceae	eristr1	*Erigeron strigosus*	AECOM	2022	FALSE							
Forbs	Asteraceae	eurcon1	*Eurybia conspicua*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Asteraceae	hiealb1	*Hieracium albiflorum*	AECOM,WNHP	2022	FALSE							
Forbs	Asteraceae	hieaur1	*Hieracium aurantiacum*	AECOM,WNHP	2022	FALSE				Class B	False	True	False
Forbs	Asteraceae	hiesco1	*Hieracium scouleri*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Asteraceae	ionste1	*Ionactis stenomeres*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Asteraceae	jacvul1	*Jacobaea vulgaris*	AECOM	2022	FALSE				Class B	True	True	False
Forbs	Asteraceae	lacser1	*Lactuca serriola*	AECOM	2020–2021	FALSE							
Forbs	Asteraceae	leuvul1	*Leucanthemum vulgare*	AECOM	2022	FALSE				Class C	True	True	False

Growth Form	Family	AECOM Code	Scientific Name	Observers	Observation Year	Voucher Specimen	Global Rare Rank	State Rare Rank	Conservation Rank List	WA Noxious Weeds Rank	WA Invasive Weed	WA Weed Quarantine List	WA Weed Monitor List
Forbs	Asteraceae	madexi1	*Madia exigua*	AECOM	2020–2021	FALSE							
Forbs	Asteraceae	madglo1	*Madia glomerata*	AECOM	2020–2021,2022	TRUE							
Forbs	Asteraceae	micnut1	*Microseris nutans*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Asteraceae	mycmur1	*Mycelis muralis*	AECOM,WNHP	2022	FALSE				Not Ranked	False	False	True
Forbs	Asteraceae	rudocc1	*Rudbeckia occidentalis*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Asteraceae	senintve1	*Senecio integerrimus* var. *exaltatus*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Asteraceae	sentri1	*Senecio triangularis*	AECOM,WNHP	2022	FALSE							
Forbs	Asteraceae	tanvul1	*Tanacetum vulgare*	AECOM,WNHP	2020–2021,2022	FALSE				Class C	True	False	False
Forbs	Asteraceae	tarery1	*Taraxacum erythrospermum*	WNHP	2022	FALSE							
Forbs	Asteraceae	taroff1	*Taraxacum officinale*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Asteraceae	tradub1	*Tragopogon dubius**	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Boraginaceae	ancoff1	*Anchusa officinalis*	AECOM,WNHP	2022	TRUE				Class B	False	True	False
Forbs	Boraginaceae	crytorvt1	*Cryptantha torreyana* var. *torreyana*	AECOM	2022	TRUE							
Forbs	Boraginaceae	mercil1	*Mertensia ciliata*	AECOM,WNHP	2022	FALSE							

Growth Form	Family	AECOM Code	Scientific Name	Observers	Observation Year	Voucher Specimen	Global Rare Rank	State Rare Rank	Conservation Rank List	WA Noxious Weeds Rank	WA Invasive Weed	WA Weed Quarantine List	WA Weed Monitor List
Forbs	Boraginaceae	merlon1	*Mertensia longiflora*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Boraginaceae	merpan1	*Mertensia paniculata*	AECOM	2020–2021,2022	FALSE							
Forbs	Brassicaceae	boediv1	*Boechera divaricarpa*	AECOM	2020–2021	FALSE							
Forbs	Brassicaceae	boeret1	*Boechera retrofracta*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Brassicaceae	turgla1	*Turritis glabra*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Campanulaceae	camrot1	*Campanula rotundifolia*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Caryophyllaceae	erecapva1	*Eremogone capillaris var. americana*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Caryophyllaceae	erecon1	*Eremogone congesta*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Caryophyllaceae	moemac1	*Moehringia macrophylla*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Caryophyllaceae	silmen1	*Silene menziesii*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Caryophyllaceae	silpar2	*Silene parryi*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Caryophyllaceae	sperub1	*Spergularia rubra*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Caryophyllaceae	stebor1	*Stellaria borealis*	WNHP	2022	FALSE							

Growth Form	Family	AECOM Code	Scientific Name	Observers	Observation Year	Voucher Specimen	Global Rare Rank	State Rare Rank	Conservation Rank List	WA Noxious Weeds Rank	WA Invasive Weed	WA Weed Quarantine List	WA Weed Monitor List
Forbs	Convolvulaceae	conarv1	*Convolvulus arvensis*	WNHP	2022	FALSE				Class C	False	False	False
Forbs	Crassulaceae	sedlan1	*Sedum lanceolatum*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Crassulaceae	sedstess1	*Sedum stenopetalum* ssp. *stenopetalum*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Ericaceae	chimen1	*Chimaphila menziesii*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Ericaceae	chiumbsu1	*Chimaphila umbellata* ssp. *umbellata*	AECOM,WNHP	2022	FALSE							
Forbs	Ericaceae	monhyp1	*Monotropa hypopitys**	WNHP	2022	FALSE							
Forbs	Ericaceae	monuni2	*Monotropa uniflora*	AECOM	2022	FALSE							
Forbs	Ericaceae	ortsec1	*Orthilia secunda*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Ericaceae	pteand1	*Pterospora andromedea*	AECOM,WNHP	2022	FALSE							
Forbs	Ericaceae	pyraph1	*Pyrola aphylla*	AECOM	2022	FALSE							
Forbs	Ericaceae	pyrasa1	*Pyrola asarifolia*	AECOM,WNHP	2022	FALSE							
Forbs	Ericaceae	pyrmin1	*Pyrola minor*	WNHP	2022	FALSE							
Forbs	Ericaceae	pyrpic1	*Pyrola picta*	AECOM,WNHP	2022	FALSE							
Forbs	Fabaceae	astcan1	*Astragalus canadensis*	AECOM	2022	FALSE							
Forbs	Fabaceae	astcanvm1	*Astragalus canadensis* var. *mortonii*	AECOM,WNHP	2022	FALSE							

Growth Form	Family	AECOM Code	Scientific Name	Observers	Observation Year	Voucher Specimen	Global Rare Rank	State Rare Rank	Conservation Rank List	WA Noxious Weeds Rank	WA Invasive Weed	WA Weed Quarantine List	WA Weed Monitor List
Forbs	Fabaceae	luparg1	*Lupinus argenteus*	WNHP	2022	FALSE							
Forbs	Fabaceae	lupargva1	*Lupinus argenteus var. argenteus*	AECOM	2022	FALSE							
Forbs	Fabaceae	lupser1	*Lupinus sericeus*	AECOM	2020–2021	FALSE							
Forbs	Fabaceae	lupsulvs1	*Lupinus sulphureus* var. *subsaccatus*	AECOM	2020–2021	FALSE							
Forbs	Fabaceae	lupsul1	*Lupinus sulphureus**	WNHP	2022	FALSE							
Forbs	Fabaceae	medlup1	*Medicago lupulina*	AECOM	2022	FALSE							
Forbs	Fabaceae	meloff1	*Melilotus officinalis*	WNHP	2022	FALSE							
Forbs	Fabaceae	tripra1	*Trifolium pratense*	WNHP	2022	FALSE				Not Ranked	True	False	False
Forbs	Fabaceae	trirep1	*Trifolium repens*	WNHP	2022	FALSE				Not Ranked	True	False	False
Forbs	Hydrophyllaceae	hydcapvc1	*Hydrophyllum capitatum* var. *capitatum*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Hydrophyllaceae	phahet1	*Phacelia heterophylla*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Hypericaceae	hyppersp1	*Hypericum perforatum* ssp. *perforatum*	AECOM,WNHP	2020–2021,2022	FALSE				Class C	True	False	False
Forbs	Lamiaceae	pruvul1	*Prunella vulgaris*	WNHP	2022	FALSE							
Forbs	Lamiaceae	pruvulvl1	*Prunella vulgaris* var. *lanceolata*	AECOM	2022	FALSE							
Forbs	Liliaceae	cliuni1	*Clintonia uniflora*	AECOM,WNHP	2022	FALSE							

Growth Form	Family	AECOM Code	Scientific Name	Observers	Observation Year	Voucher Specimen	Global Rare Rank	State Rare Rank	Conservation Rank List	WA Noxious Weeds Rank	WA Invasive Weed	WA Weed Quarantine List	WA Weed Monitor List
Forbs	Liliaceae	erygravg1	*Erythronium grandiflorum* var. *grandiflorum*	AECOM	2020–2021	FALSE							
Forbs	Liliaceae	prohoo1	*Prosartes hookeri*	AECOM,WNHP	2022	FALSE							
Forbs	Liliaceae	prosmi1	*Prosartes smithii**	WNHP	2022	FALSE							
Forbs	Liliaceae	protra1	*Prosartes trachycarpa*	AECOM	2022	FALSE							
Forbs	Liliaceae	stramp1	*Streptopus amplexifolius*	AECOM,WNHP	2022	FALSE							
Forbs	Linnaeaceae	linborsl1	*Linnaea borealis* ssp. *longiflora*	AECOM,WNHP	2022	FALSE							
Forbs	Melanthiaceae	toxvenvg1	*Toxicoscordion venenosum* var. *gramineum*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Melanthiaceae	triovavo1	*Trillium ovatum* var. *ovatum*	AECOM,WNHP	2022	FALSE							
Forbs	Melanthiaceae	vercalvc1	*Veratrum californicum* var. *californicum*	AECOM	2020–2021,2022	FALSE							
Forbs	Melanthiaceae	xerten1	*Xerophyllum tenax*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Montiaceae	clalan1	*Claytonia lanceolata*	AECOM	2020–2021	FALSE							
Forbs	Montiaceae	clasib1	*Claytonia sibirica*	AECOM,WNHP	2022	FALSE							
Forbs	Onagraceae	chaang1	*Chamaenerion angustifolium*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Onagraceae	ciralp1	*Circaea alpina*	AECOM,WNHP	2022	FALSE							

Growth Form	**Family**	**AECOM Code**	**Scientific Name**	**Observers**	**Observation Year**	**Voucher Specimen**	**Global Rare Rank**	**State Rare Rank**	**Conservation Rank List**	**WA Noxious Weeds Rank**	**WA Invasive Weed**	**WA Weed Quarantine List**	**WA Weed Monitor List**
Forbs	Onagraceae	epibra1	*Epilobium brachycarpum*	AECOM	2020–2021	FALSE							
Forbs	Onagraceae	epicil1	*Epilobium ciliatum*	AECOM	2022	FALSE							
Forbs	Onagraceae	epigla2	*Epilobium glandulosum*	AECOM	2022	TRUE							
Forbs	Onagraceae	epimin1	*Epilobium minutum*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Onagraceae	gaydif1	*Gayophytum diffusum*	WNHP	2022	FALSE							
Forbs	Orchidaceae	cormac1	*Corallorhiza maculata*	AECOM,WNHP	2022	TRUE							
Forbs	Orchidaceae	cormer1	*Corallorhiza mertensiana*	AECOM,WNHP	2022	TRUE							
Forbs	Orchidaceae	corstr1	*Corallorhiza striata*	AECOM	2022	FALSE							
Forbs	Orchidaceae	cypmon1	*Cypripedium montanum*	AECOM,WNHP	2022	FALSE							
Forbs	Orchidaceae	gooobl1	*Goodyera oblongifolia*	AECOM,WNHP	2022	FALSE							
Forbs	Orchidaceae	neoban1	*Neottia banksiana*	AECOM,WNHP	2022	TRUE							
Forbs	Orchidaceae	neocon1	*Neottia convallarioides*	AECOM,WNHP	2022	TRUE							
Forbs	Orchidaceae	plaaqu1	*Platanthera aquilonis*	WNHP	2022	FALSE	G5	[S1]	2021 WA Vascular Plant Review List 1				
Forbs	Orchidaceae	plaelese1	*Platanthera elegans* ssp. *elegans*	AECOM	2022	FALSE							

Growth Form	**Family**	**AECOM Code**	**Scientific Name**	**Observers**	**Observation Year**	**Voucher Specimen**	**Global Rare Rank**	**State Rare Rank**	**Conservation Rank List**	**WA Noxious Weeds Rank**	**WA Invasive Weed**	**WA Weed Quarantine List**	**WA Weed Monitor List**
Forbs	Orchidaceae	plaelo2	*Platanthera elongata*	AECOM,WNHP	2022	TRUE							
Forbs	Orchidaceae	plahur1	*Platanthera huronensis*	WNHP	2022	FALSE							
Forbs	Orchidaceae	plastr1	*Platanthera stricta*	AECOM,WNHP	2022	TRUE							
Forbs	Orobanchaceae	aphfas1	*Aphyllon fasciculatum*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Orobanchaceae	aphfra1	*Aphyllon franciscanum*	AECOM	2022	FALSE							
Forbs	Orobanchaceae	casminvm1	*Castilleja miniata* var. *miniata*	AECOM	2020–2021	FALSE							
Forbs	Orobanchaceae	castho1	*Castilleja thompsonii*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Orobanchaceae	pedbra1	*Pedicularis bracteosa*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Orobanchaceae	pedracva1	*Pedicularis racemosa* var. *alba*	AECOM	2022	FALSE							
Forbs	Orobanchaceae	pedrac1	*Pedicularis racemosa**	WNHP	2022	FALSE							
Forbs	Phrymaceae	erymos1	*Erythranthe moschata*	AECOM,WNHP	2022	TRUE							
Forbs	Plantaginaceae	colgra1	*Collinsia grandiflora*	WNHP	2022	FALSE							
Forbs	Plantaginaceae	colpar1	*Collinsia parviflora*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Plantaginaceae	lindalsd1	*Linaria dalmatica* ssp. *dalmatica*	AECOM,WNHP	2020–2021,2022	FALSE				Class B	True	True	False

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Forbs	Plantaginaceae	pencon1	*Penstemon confertus*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Plantaginaceae	peneatve1	*Penstemon eatonii* var. *eatonii*	WNHP	2022	FALSE							
Forbs	Plantaginaceae	plalan1	*Plantago lanceolata*	WNHP	2022	FALSE							
Forbs	Plantaginaceae	plamaj1	*Plantago major*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Plantaginaceae	synrub1	*Synthyris rubra*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Plantaginaceae	verame1	*Veronica americana*	AECOM,WNHP	2022	FALSE							
Forbs	Plantaginaceae	verana1	*Veronica anagallis-aquatica**	WNHP	2022	FALSE							
Forbs	Plantaginaceae	veroff2	*Veronica officinalis*	AECOM,WNHP	2022	FALSE							
Forbs	Polemoniaceae	colgra2	*Collomia grandiflora*	AECOM	2022	FALSE							
Forbs	Polemoniaceae	collin1	*Collomia linearis**	WNHP	2022	FALSE							
Forbs	Polemoniaceae	micgra1	*Microsteris gracilis*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Polemoniaceae	phldif1	*Phlox diffusa*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Polygonaceae	eriher1	*Eriogonum heracleoides*	WNHP	2022	FALSE							
Forbs	Polygonaceae	eriumb1	*Eriogonum umbellatum*	AECOM	2020–2021,2022	TRUE							

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Forbs	Polygonaceae	eriumbvm1	*Eriogonum umbellatum* var. *majus*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Polygonaceae	polsawso1	*Polygonum sawatchense* ssp. *oblivium*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Polygonaceae	polspe1	*Polygonum spergulariiforme*	AECOM	2020–2021	FALSE							
Forbs	Polygonaceae	rumace2	*Rumex acetosella*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Primulaceae	dodpul1	*Dodecatheon pulchellum**	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Primulaceae	lysnum1	*Lysimachia nummularia*	AECOM	2022	TRUE				Not Ranked	False	False	True
Forbs	Ranunculaceae	acocolsc1	*Aconitum columbianum* ssp. *columbianum*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Ranunculaceae	actrub1	*Actaea rubra*	AECOM,WNHP	2022	FALSE							
Forbs	Ranunculaceae	anelya1	*Anemone lyallii*	AECOM	2020–2021	FALSE							
Forbs	Ranunculaceae	anepip1	*Anemone piperi*	AECOM,WNHP	2022	FALSE							
Forbs	Ranunculaceae	copocc1	*Coptis occidentalis*	AECOM,WNHP	2020–2021,2022	FALSE	G4G5	[S1]	2021 WA Vascular Plant Review List 1				
Forbs	Ranunculaceae	delnut1	*Delphinium nuttallianum*	AECOM	2020–2021	FALSE							
Forbs	Ranunculaceae	delnut2	*Delphinium nuttallii**	WNHP	2022	FALSE							

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Forbs	Ranunculaceae	ranrep1	*Ranunculus repens*	WNHP	2022	FALSE				Not Ranked	True	False	False
Forbs	Ranunculaceae	thafen1	*Thalictrum fendleri**	WNHP	2022	FALSE							
Forbs	Ranunculaceae	thaocc1	*Thalictrum occidentale*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Ranunculaceae	thaven1	*Thalictrum venulosum*	AECOM	2022	FALSE							
Forbs	Ranunculaceae	tracar1	*Trautvetteria caroliniensis*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Rosaceae	fravessc1	*Fragaria vesca* ssp. *californica*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Rosaceae	fravirsg1	*Fragaria virginiana* ssp. *glauca*	AECOM	2020–2021	FALSE							
Forbs	Rosaceae	geumac1	*Geum macrophyllum*	WNHP	2022	FALSE							
Forbs	Rosaceae	potgra2	*Potentilla gracilis*	AECOM	2020–2021	FALSE							
Forbs	Rosaceae	sansti1	*Sanguisorba stipulata*	AECOM	2022	FALSE							
Forbs	Rubiaceae	galapa1	*Galium aparine*	WNHP	2022	FALSE							
Forbs	Rubiaceae	galbif2	*Galium bifolium*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Rubiaceae	galtri3	*Galium triflorum*	AECOM,WNHP	2022	FALSE							
Forbs	Saxifragaceae	heucyl1	*Heuchera cylindrica*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Saxifragaceae	litgla1	*Lithophragma glabrum*	AECOM	2020–2021	FALSE							

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Forbs	Saxifragaceae	mitcau1	*Mitellastra caulescens*	AECOM,WNHP	2022	TRUE							
Forbs	Saxifragaceae	tiatrivu1	*Tiarella trifoliata* var. *unifoliata*	AECOM,WNHP	2022	FALSE							
Forbs	Saxifragaceae	tiatri1	*Tiarella trifoliata**	WNHP	2022	FALSE							
Forbs	Scrophulariaceae	scrlan1	*Scrophularia lanceolata*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Scrophulariaceae	vertha1	*Verbascum thapsus*	WNHP	2022	FALSE							
Forbs	Urticaceae	urtdio1	*Urtica dioica*	AECOM,WNHP	2022	FALSE							
Forbs	Valerianaceae	valsit1	*Valeriana sitchensis*	AECOM,WNHP	2020–2021,2022	FALSE							
Forbs	Violaceae	viogla1	*Viola glabella*	AECOM	2020–2021,2022	FALSE							
Forbs	Violaceae	vioorb1	*Viola orbiculata*	AECOM,WNHP	2022	FALSE							
Grasses	Poaceae	achoccsp1	*Achnatherum occidentale* ssp. *pubescens*	AECOM	2020–2021	FALSE							
Grasses	Poaceae	agrcap1	*Agrostis capillaris*	WNHP	2022	FALSE				Not Ranked	True	False	False
Grasses	Poaceae	agrgig1	*Agrostis gigantea*	AECOM,WNHP	2020–2021,2022	FALSE				Not Ranked	True	False	False
Grasses	Poaceae	agrsca1	*Agrostis scabra*	AECOM,WNHP	2020–2021,2022	FALSE							
Grasses	Poaceae	agrsto1	*Agrostis stolonifera*	AECOM	2022	TRUE				Not Ranked	True	False	False

Growth Form	Family	AECOM Code	Scientific Name	Observers	Observation Year	Voucher Specimen	Global Rare Rank	State Rare Rank	Conservation Rank List	WA Noxious Weeds Rank	WA Invasive Weed	WA Weed Quarantine List	WA Weed Monitor List
Grasses	Poaceae	broine1	*Bromus inermis*	AECOM,WNHP	2020–2021,2022	FALSE				Not Ranked	True	False	False
Grasses	Poaceae	brosit1	*Bromus sitchensis*	WNHP	2022	FALSE							
Grasses	Poaceae	brositvc1	*Bromus sitchensis* var. *carinatus*	AECOM	2022	FALSE							
Grasses	Poaceae	brositvs1	*Bromus sitchensis* var. *sitchensis*	AECOM	2022	FALSE							
Grasses	Poaceae	brotec1	*Bromus tectorum*	AECOM	2022	FALSE				Not Ranked	True	False	False
Grasses	Poaceae	brovul1	*Bromus vulgaris*	AECOM,WNHP	2020–2021,2022	FALSE							
Grasses	Poaceae	calcanvc1	*Calamagrostis canadensis* var. *canadensis*	AECOM	2020–2021	FALSE							
Grasses	Poaceae	calrub1	*Calamagrostis rubescens*	AECOM,WNHP	2020–2021,2022	FALSE							
Grasses	Poaceae	cinlat1	*Cinna latifolia*	AECOM,WNHP	2022	FALSE							
Grasses	Poaceae	dacglo1	*Dactylis glomerata*	WNHP	2022	FALSE							
Grasses	Poaceae	dancal1	*Danthonia californica*	WNHP	2022	FALSE							
Grasses	Poaceae	danint1	*Danthonia intermedia*	AECOM,WNHP	2020–2021,2022	FALSE							
Grasses	Poaceae	deselo1	*Deschampsia elongata*	AECOM	2022	FALSE							
Grasses	Poaceae	elyglasg1	*Elymus glaucus* ssp. *glaucus*	AECOM,WNHP	2020–2021,2022	FALSE							

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Grasses	Poaceae	elypse1	*Elymus pseudorepens*	AECOM,WNHP	2020–2021,2022	TRUE							
Grasses	Poaceae	elyrep1	*Elymus repens*	AECOM,WNHP	2020–2021,2022	FALSE				Not Ranked	True	False	False
Grasses	Poaceae	fesida1	*Festuca idahoensis*	AECOM,WNHP	2020–2021,2022	FALSE							
Grasses	Poaceae	fesocc1	*Festuca occidentalis*	AECOM,WNHP	2022	FALSE							
Grasses	Poaceae	fesvir1	*Festuca viridula*	AECOM,WNHP	2020–2021,2022	FALSE							
Grasses	Poaceae	glyela1	*Glyceria elata*	AECOM,WNHP	2022	TRUE							
Grasses	Poaceae	koemac1	*Koeleria macrantha*	WNHP	2022	FALSE							
Grasses	Poaceae	melsmi1	*Melica smithii*	AECOM	2022	TRUE							
Grasses	Poaceae	phlalp1	*Phleum alpinum*	AECOM	2022	FALSE							
Grasses	Poaceae	phlpra1	*Phleum pratense*	AECOM,WNHP	2020–2021,2022	FALSE				Not Ranked	True	False	False
Grasses	Poaceae	poabul1	*Poa bulbosa*	AECOM	2022	FALSE				Not Ranked	True	False	False
Grasses	Poaceae	poacom1	*Poa compressa*	AECOM,WNHP	2020–2021,2022	FALSE							
Grasses	Poaceae	poapra1	*Poa pratensis*	AECOM	2020–2021	FALSE				Not Ranked	True	False	False
Grasses	Poaceae	poasecss1	*Poa secunda* ssp. *secunda*	AECOM	2020–2021	FALSE							
Grasses	Poaceae	scharu1	*Schedonorus arundinaceus*	AECOM	2020–2021	FALSE				Not Ranked	True	False	False

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Grasses	Poaceae	trican1	*Trisetum canescens*	AECOM	2022	FALSE							
Sedges	Cyperaceae	caramp1	*Carex amplifolia*	AECOM,WNHP	2022	TRUE							
Sedges	Cyperaceae	cargey1	*Carex geyeri*	AECOM,WNHP	2020–2021,2022	FALSE							
Sedges	Cyperaceae	carhoo1	*Carex hoodii*	AECOM,WNHP	2020–2021,2022	FALSE							
Sedges	Cyperaceae	carkelvk1	*Carex kelloggii* var. *kelloggii*	AECOM	2022	TRUE							
Sedges	Cyperaceae	carlae2	*Carex laeviculmis*	AECOM,WNHP	2022	TRUE							
Sedges	Cyperaceae	carlep4	*Carex leptopoda*	AECOM	2022	TRUE							
Sedges	Cyperaceae	carmic4	*Carex microptera*	AECOM,WNHP	2022	TRUE							
Sedges	Cyperaceae	carpac2	*Carex pachystachya**	AECOM	2020–2021	FALSE							
Sedges	Cyperaceae	carpet1	*Carex petasata*	AECOM,WNHP	2020–2021,2022	TRUE							
Sedges	Cyperaceae	carpra5	*Carex praticola*	WNHP	2022	TRUE							
Sedges	Cyperaceae	carros1	*Carex rossii*	AECOM,WNHP	2020–2021,2022	FALSE							
Sedges	Cyperaceae	carsti1	*Carex stipata*	WNHP	2022	TRUE							
Sedges	Cyperaceae	scimic1	*Scirpus microcarpus*	AECOM,WNHP	2022	TRUE							
Rushes	Juncaceae	junens1	*Juncus ensifolius*	AECOM	2022	TRUE							

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Rushes	Juncaceae	junpar1	*Juncus parryi*	AECOM,WNHP	2020–2021,2022	FALSE							
Rushes	Juncaceae	junten1	*Juncus tenuis*	AECOM	2022	TRUE							
Rushes	Juncaceae	luzhit1	*Luzula hitchcockii*	AECOM,WNHP	2020–2021,2022	FALSE							
Rushes	Juncaceae	luzpar1	*Luzula parviflora*	WNHP	2022	FALSE							
Rushes	Juncaceae	luzspiss1	*Luzula spicata* ssp. *spicata*	AECOM	2020–2021	FALSE							
Ferns	Athyriaceae	athfilsc2	*Athyrium filix-femina ssp. cyclosorum*	AECOM,WNHP	2022	FALSE							
Ferns	Cystopteridaceae	cysfra1	*Cystopteris fragilis*	AECOM	2020–2021,2022	FALSE							
Ferns	Cystopteridaceae	gymdis1	*Gymnocarpium disjunctum*	AECOM,WNHP	2022	TRUE							
Ferns	Cystopteridaceae	gymdry1	*Gymnocarpium dryopteris*	AECOM,WNHP	2022	FALSE							
Ferns	Dennstaedtiaceae	pteaquvp1	*Pteridium aquilinum var. pubescens*	AECOM,WNHP	2020–2021,2022	FALSE							
Ferns	Dryopteridaceae	drycar1	*Dryopteris carthusiana*	AECOM	2022	FALSE							
Ferns	Dryopteridaceae	dryexp1	*Dryopteris expansa*	AECOM,WNHP	2022	FALSE							
Ferns	Dryopteridaceae	dryfil1	*Dryopteris filix-mas*	AECOM,WNHP	2022	TRUE							
Ferns	Dryopteridaceae	poland1	*Polystichum andersonii*	AECOM,WNHP	2022	TRUE							

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Ferns	Dryopteridaceae	pollon1	*Polystichum lonchitis*	AECOM	2022	TRUE							
Ferns	Dryopteridaceae	polmun1	*Polystichum munitum*	AECOM,WNHP	2022	TRUE							
Ferns	Equisetaceae	equarv1	*Equisetum arvense*	WNHP	2022	FALSE							
Ferns	Woodsiaceae	woooreso1	*Woodsia oregana* ssp. *oregana**	AECOM	2020–2021	FALSE							
Lycophytes	Selaginellaceae	selden1	*Selaginella densa*	AECOM	2022	TRUE							
Lycophytes	Selaginellaceae	selsco1	*Selaginella scopulorum*	AECOM	2020–2021	FALSE							
Mosses	Amblystegiaceae	hygbes1	*Hygrohypnum bestii*	AECOM	2022	TRUE							
Mosses	Bartramiaceae	phifonvf1	*Philonotis fontana* var. *fontana*	AECOM	2022	TRUE							
Mosses	Brachytheciaceae	braery1	*Brachythecium erythrorrhizon*	AECOM	2022	TRUE							
Mosses	Brachytheciaceae	brafri1	*Brachythecium frigidum*	AECOM	2022	TRUE							
Mosses	Brachytheciaceae	brariv1	*Brachythecium rivulare*	AECOM	2022	TRUE							
Mosses	Brachytheciaceae	kinpra1	*Kindbergia praelonga*	AECOM	2022	TRUE							
Mosses	Calypogeiaceae	calfis1	*Calypogeia fissa*	AECOM	2022	TRUE							
Mosses	Grimmiaceae	griano1	*Grimmia anomala*	AECOM	2022	TRUE							
Mosses	Hylocomiaceae	hylspl1	*Hylocomium splendens*	AECOM	2022	TRUE							

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Mosses	Hylocomiaceae	rhytri1	*Rhytidiadelphus triquetrus*	AECOM	2022	TRUE							
Mosses	Hylocomiaceae	rhyrob1	*Rhytidiopsis robusta*	AECOM	2022	TRUE							
Mosses	Hypnaceae	hersel1	*Herzogiella seligeri*	AECOM	2022	TRUE	G3G4	[S1]	WA Mosses Review List 1				
Mosses	Mielichhoferiaceae	pohwah1	*Pohlia wahlenbergii*	AECOM	2022	TRUE							
Mosses	Mniaceae	placil1	*Plagiomnium ciliare*	AECOM	2022	TRUE							
Mosses	Pterigynandraceae	ptefil1	*Pterigynandrum filiforme*	AECOM	2022	TRUE							
Mosses	Roellobryaceae	roeroe1	*Roellobryon roellii*	AECOM	2022	TRUE							
Liverworts	Aneuraceae	anepin1	*Aneura pinguis*	AECOM	2022	TRUE							
Liverworts	Lophocoleaceae	chipol1	*Chiloscyphus polyanthos*	AECOM	2022	TRUE							
Liverworts	Marchantiaceae	marlat1	*Marchantia latifolia*	AECOM	2022	TRUE							
Liverworts	Scapaniaceae	scaund1	*Scapania undulata*	AECOM	2022	TRUE							

Appendix D
Wetland and Riparian Ecological Integrity Assessment Metrics

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Appendix D. Wetland and Riparian Ecological Integrity Assessment Metrics

Primary Rank Factor	Major Ecological Factor	Metric/Variant NAME	Where Measured	Apply to:
LANDSCAPE CONTEXT	LANDSCAPE	**LAN1 Contiguous Natural Cover** (0-500 m)	Office then field check	All Types (not for use with sub-AAs or most point-based AAs)
		LAN2 Land Use Index (0-500 m)	Office then field check	All Types (not for use with sub-AAs or most point-based AAs)
	BUFFER	**BUF1 Perimeter with Natural Buffer**	Office then field check	All Types (not for use with sub-AAs or most point-based AAs)
		BUF2 Width of Natural Buffer Width	Office then field check	All Types (not for use with sub-AAs or most point-based AAs)
		BUF3 Condition of Natural Buffer	Office then field check	All Types (not for use with sub-AAs or most point-based AAs)
CONDITION	VEGETATION	**VEG1 Native Plant Species Cover**	Field	All Types (not for use with sub-AAs or most point-based AAs)
		Submetrics: *VEG1a. Tree Stratum*		Flooded & Swamp Forest Formation
		VEG1b. Shrub/Herb Stratum		All Types
		VEG2 Invasive Nonnative Plant Species Cover	Field	All Types
		VEG3 Native Plant Species Composition	Field	All Types

Primary Rank Factor	**Major Ecological Factor**	**Metric/Variant NAME**	**Where Measured**	**Apply to:**
		Submetrics: *VEG3a. Native Diagnostic/Functional Species*		See USNNVC Subgroup descriptions for guidance
		VEG3b. Native Species Diversity		See USNNVC Subgroup descriptions for guidance
		VEG3c. Native Increasers		See USNNVC Subgroup descriptions for guidance
		VEG3d. Native Decreasers		See USNNVC Subgroup descriptions for guidance
		VEG4 Vegetation Structure	Field	All Types (variant differs by USNVC Formation)
		VEG4, variant 1		Flooded & Swamp Forest Formation
		Submetrics: *VEG4 var1a. Canopy/Subcanopy Age Class diversity*		
		VEG4 var1b. Old/Large Live Trees		
		VEG4, variant 3		Freshwater Marsh, Wet Meadow and Shrubland Formation
		VEG4, variant 4		Salt Marsh Formation
		VEG4, variant 5		Bog and Fen Formation
		Submetrics: *VEG4 var5a. Tree Structure*		

Primary Rank Factor	Major Ecological Factor	Metric/Variant NAME	Where Measured	Apply to:
		VEG4 var5b. Shrub/Herb Structure		
		VEG4 var5c. Bryophyte Structure		
		VEG4, variant 6		Aquatic Vegetation Formation
		VEG5. Woody Regeneration	Field	Flooded & Swamp Forest Formation and optional for shrub-dominated types
		VEG6 Coarse Woody Debris	Field	Flooded & Swamp Forest Formation and optional for non-forested types
		VEG6, variant 1		Forested Wetlands
		Submetrics: *VEG6 var.1a. CWD Size Diversity*		
		VEG6 var.1b. CWD Decay Class Diversity		
		VEG6 var.1c. Snag Size Diversity		
		VEG6 var.1d. Snag Decay Class Diversity		
		VEG6, variant 2		Non-forested Wetlands
		Submetrics: *VEG6 var2a. Litter Source*		

Primary Rank Factor	Major Ecological Factor	Metric/Variant NAME	Where Measured	Apply to:
		VEG6 var2b. Litter Accumulation		
	HYDROLOGY	**HYD1 Water Source**	Field & Office	All Types (varies by HGM Class)
		HYD1, variant 1		Riverine (non-tidal)
		HYD1, variant 2		Organic Soil Flats, Mineral Soil Flats
		HYD1, variant 3		Depression, Lacustrine, Slope
		HYD1, variant 4		Estuarine Fringe (tidal)
		HYD2 Hydroperiod	Field	All Types (varies by HGM)
		HYD2, variant 1		Riverine (non-tidal)
		HYD2, variant 2		Organic Soil Flats, Mineral Soil Flats
		HYD2, variant 3		Depression, Lacustrine, Slope
		HYD2, variant 4		Estuarine Fringe (tidal)
		HYD3 Hydrologic Connectivity	Field	All Types (varies by HGM)
		HYD3, variant 1		Riverine (non-tidal)
		HYD3, variant 2		Organic Soil Flats, Mineral Soil Flats
		HYD3, variant 3		Depression, Lacustrine, Slope
		HYD3, variant 4		Estuarine Fringe (tidal)

Primary Rank Factor	Major Ecological Factor	Metric/Variant NAME	Where Measured	Apply to:
	SOIL	**SOI1 Soil Condition**	Field	All Types (variant differs by USNVC Formation)
		SOI1, variant 1		Flooded and Swamp Forest, Freshwater Marsh, Wet Meadow and Shrubland (nontidal), Bog and Fen, and Aquatic Vegetation formations.
		SOI1, variant 2		Salt Marsh Formation and Freshwater Marsh, Wet Meadow, and Shrubland (tidal) Formation
SIZE	SIZE	**SIZ1 Comparative Size (Patch Type)**	Office then field check	All Types (ratings vary by patch type); not for use with sub-AAs or points
		SIZ2 Change in Size (optional)	Office then field check	All Types (not for use with sub-AAs or points)

Appendix E
Upland Ecological Integrity Assessment Metrics

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Appendix E. Upland Ecological Integrity Assessment Metrics

Primary Rank Factor	Major Ecological Factor	Metric/Variant Name	Where Measured	Apply to:
LANDSCAPE CONTEXT	LANDSCAPE	**LAN1 Contiguous Natural Cover** (0-500 m)	Office then field check	All EIA modules and AA sizes (for large AAs, score entire AA, not assessment points)
		LAN2 Land Use Index (0-500 m)	Office then field check	All EIA modules and AA sizes (for large AAs, score entire AA, not assessment points)
	EDGE	**EDG1 Perimeter with Natural Edge**	Office then field check	All EIA modules (all sizes; for large AAs, score entire AA, not assessment points)
		EDG2 Width of Natural Edge	Office then field check	All EIA modules (all sizes; for large AAs, score entire AA, not assessment points)
		EDG3 Condition of Natural Edge	Office then field check	All EIA Modules (small AAs)
CONDITION	VEGETATION	**VEG1 Native Plant Species Cover**	Field	All EIA modules (all sizes); Use lowest submetric score
		Submetrics: *VEG1a. Tree Stratum*		Forested EIA modules (all sizes)
		VEG1b. Shrub/Herb Stratum		All EIA Modules (all sizes)
		VEG2 Invasive Nonnative Plant Species Cover	Field	All EIA Modules (all sizes)
		VEG3 Native Plant Species Composition	Field	All EIA Modules (all sizes)

Primary Rank Factor	Major Ecological Factor	Metric/Variant Name	Where Measured	Apply to:
		Submetrics: *VEG3a. Native Diagnostic/Functional Species*		
		VEG3b. Native Species Diversity		
		VEG3c. Native Increasers		
		VEG3d. Native Decreasers		
		VEG4 Vegetation Structure	Field	All EIA Modules (all sizes; variant differs by EIA Module)
		VEG4, variant 7		Dry Forests and Woodlands (all sizes)
		VEG4, variant 8		Mesic / Hypermaritime Forests (all sizes)
		Submetrics for VEG4 var7 and var8 *VEG4 var7/8a. Canopy Structure*		
		VEG4 var7/8b. Old/Large Live Trees		
		VEG4, variant 9		Shrublands (all sizes)

Primary Rank Factor	Major Ecological Factor	Metric/Variant Name	Where Measured	Apply to:
		Submetrics: *VEG4 var9a Shrub cover*		
		VEG4 var9b Tree encroachment		
		VEG4, variant 10		Shrub-Steppe (all sizes)
		VEG4, variant 11		Grasslands / Meadows (all sizes)
		Submetrics for VEG4 var10 and var11: *VEG4 var10/11a Woody Vegetation Cover*		
		VEG4 var10/11b Bunchgrass Cover		
		VEG4 var10/11c Biological Soil Crust		
		VEG4, variant 12		Bedrock / Cliffs (all sizes)
		VEG5 Woody Regeneration	Field	Forested EIA modules (all sizes; variant differs by EIA Module)
		VEG5, variant 2		Dry Forests and Woodlands (all sizes)
		VEG5, variant 3		Mesic / Hypermaritime Forests (all sizes)

Primary Rank Factor	Major Ecological Factor	Metric/Variant Name	Where Measured	Apply to:
		VEG6 Coarse Woody Debris	Field	Forested EIA modules (all sizes; variant differs by EIA Module)
		VEG6, variant 3		Dry Forests and Woodlands (all sizes)
		VEG6, variant 4		Mesic / Hypermaritime Forests (all sizes)
		Submetrics for VEG6 var3 and var4: *VEG6 var3/4a. CWD Size Diversity*		
		VEG6 var3/4b. CWD Decay Class Diversity		
		VEG6 var3/4c. Snag Size Diversity		
		VEG6 var3/4d. Snag Decay Class Diversity		
		VEG6, variant 5		Shrub-Steppe; Grasslands / Meadows (all sizes)

Primary Rank Factor	Major Ecological Factor	Metric/Variant Name	Where Measured	Apply to:
		<u>*Submetrics*</u>*:* *VEG6 var5a. Litter Source*		
		VEG6 var3/4d. Litter Accumulation		
	SOIL	**SOI1 Soil Condition**	Field	All EIA Modules (all sizes)
		SOI1, variant 3		All EIA Modules (all sizes)
SIZE	SIZE	**SIZ1 Comparative Size (Patch Type)**	Office then field check	All EIA Modules (for large AAs, score entire AA, not assessment points)
		SIZ2 Change in Size (Optional)	Office then field check	Required for small AAs of large-patch ecosystems; optional for other small AAs

Appendix F
List of Plant Associations Surveyed in Mount Spokane State Park, 2020–2022

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Appendix F. List of Plant Associations Surveyed in Mount Spokane State Park, 2020–2022

Group	Alliance	Association Code	Association Title	Global/ State Rank	WA State Conservation Rank
G210: Central Rocky Mountain Dry Mixed Conifer Forest & Woodland	A3392: Central Rocky Mountain Douglas-fir Dry-mesic Forest & Woodland	PINPON-PSEMEN/PHYMAL	*Pinus ponderosa - Pseudotsuga menziesii / Physocarpus malvaceus* Forest	GNRQ/S2	Threatened
G210: Central Rocky Mountain Dry Mixed Conifer Forest & Woodland	A3392: Central Rocky Mountain Douglas-fir Dry-mesic Forest & Woodland	PSEMEN/PHYMAL	*Pseudotsuga menziesii / Physocarpus malvaceus* Forest	G5/S4	No Concern
G210: Central Rocky Mountain Dry Mixed Conifer Forest & Woodland	A3392: Central Rocky Mountain Douglas-fir Dry-mesic Forest & Woodland	PSEMEN/SYMALB	*Pseudotsuga menziesii / Symphoricarpos albus* Forest	G5/S4	No Concern
G210: Central Rocky Mountain Dry Mixed Conifer Forest & Woodland	A3395: Douglas-fir - Ponderosa Pine / Herbaceous Understory Central Rocky Mountain Woodland	PSEMEN/CALRUB	*Pseudotsuga menziesii / Calamagrostis rubescens* Woodland	G5/S5	No Concern
G210: Central Rocky Mountain Dry Mixed Conifer Forest & Woodland	A3395: Douglas-fir - Ponderosa Pine / Herbaceous Understory Central Rocky Mountain Woodland	PSEMEN/CARGEY	*Pseudotsuga menziesii / Carex geyeri* Forest	G4?/S1	Sensitive
G210: Central Rocky Mountain Dry Mixed Conifer Forest & Woodland	A3395: Douglas-fir - Ponderosa Pine / Herbaceous Understory Central Rocky Mountain Woodland	PSEMEN/FESIDA	*Pseudotsuga menziesii / Festuca idahoensis* Woodland	G4/S2	Sensitive
G211: Central Rocky Mountain-Interior Mesic Grand Fir - Douglas-fir - Western Larch Forest	A0275: Western Larch Central Rocky Mountain Forest	LAROCC/CLIUNI	*Larix occidentalis / Clintonia uniflora* Forest	GNR/SNR	Review 1
G211: Central Rocky Mountain-Interior Mesic Grand Fir - Douglas-fir - Western Larch Forest	A0275: Western Larch Central Rocky Mountain Forest	LAROCC/CLIUNI-XERTEN	*Larix occidentalis / Clintonia uniflora - Xerophyllum tenax* Forest	GNR/SNR	Review 1
G211: Central Rocky Mountain-Interior Mesic Grand Fir - Douglas-fir - Western Larch Forest	A3362: Grand Fir - Douglas-fir Central Rocky Mountain Forest & Woodland	ABIGRA/ACEGLA	*Abies grandis / Acer glabrum* Forest	G3/S2	Threatened
G211: Central Rocky Mountain-Interior Mesic Grand Fir - Douglas-fir - Western Larch Forest	A3362: Grand Fir - Douglas-fir Central Rocky Mountain Forest & Woodland	ABIGRA/CARGEY	*Abies grandis / Carex geyeri* Woodland	G3/S3	Sensitive
G211: Central Rocky Mountain-Interior Mesic Grand Fir - Douglas-fir - Western Larch Forest	A3362: Grand Fir - Douglas-fir Central Rocky Mountain Forest & Woodland	ABIGRA/CLIUNI	*Abies grandis / Clintonia uniflora* Forest	G5/S3	Sensitive
G211: Central Rocky Mountain-Interior Mesic Grand Fir - Douglas-fir - Western Larch Forest	A3362: Grand Fir - Douglas-fir Central Rocky Mountain Forest & Woodland	ABIGRA/PHYMAL	*Abies grandis / Physocarpus malvaceus* Forest	G3/S2	Threatened
G211: Central Rocky Mountain-Interior Mesic Grand Fir - Douglas-fir - Western Larch Forest	A3362: Grand Fir - Douglas-fir Central Rocky Mountain Forest & Woodland	ABIGRA/SYMALB	*Abies grandis / Symphoricarpos albus* Forest	G3?/SNR	Sensitive
G211: Central Rocky Mountain-Interior Mesic Grand Fir - Douglas-fir - Western Larch Forest	A3362: Grand Fir - Douglas-fir Central Rocky Mountain Forest & Woodland	ABIGRA/TRACAR	*Abies grandis / Trautvetteria caroliniensis* Forest	G3/S1S2	Threatened

Group	Alliance	Association Code	Association Title	Global/ State Rank	WA State Conservation Rank
G211: Central Rocky Mountain-Interior Mesic Grand Fir - Douglas-fir - Western Larch Forest	A3362: Grand Fir - Douglas-fir Central Rocky Mountain Forest & Woodland	ABIGRA/XERTEN	*Abies grandis / Xerophyllum tenax* Forest	G4/SNR	Sensitive
G211: Central Rocky Mountain-Interior Mesic Grand Fir - Douglas-fir - Western Larch Forest	A3362: Grand Fir - Douglas-fir Central Rocky Mountain Forest & Woodland	PSEMEN/CLIUNI	*Pseudotsuga menziesii / Clintonia uniflora* Forest	G4G5/SNR	Sensitive
G211: Central Rocky Mountain-Interior Mesic Grand Fir - Douglas-fir - Western Larch Forest	A3362: Grand Fir - Douglas-fir Central Rocky Mountain Forest & Woodland	PSEMEN/CLIUNI-XERTEN	*Pseudotsuga menziesii / Clintonia uniflora - Xerophyllum tenax* Forest	G4G5/SNR	Sensitive
G211: Central Rocky Mountain-Interior Mesic Grand Fir - Douglas-fir - Western Larch Forest	A3362: Grand Fir - Douglas-fir Central Rocky Mountain Forest & Woodland	PSEMEN/PHYMAL-LINBOR	*Pseudotsuga menziesii / Physocarpus malvaceus - Linnaea borealis* Forest	G4/S4	No Concern
G211: Central Rocky Mountain-Interior Mesic Grand Fir - Douglas-fir - Western Larch Forest	A3362: Grand Fir - Douglas-fir Central Rocky Mountain Forest & Woodland	PSEMEN/VACMEM	*Pseudotsuga menziesii / Vaccinium membranaceum* Forest	G5?/S3S5	No Concern
G211: Central Rocky Mountain-Interior Mesic Grand Fir - Douglas-fir - Western Larch Forest	A3362: Grand Fir - Douglas-fir Central Rocky Mountain Forest & Woodland	PSEMEN/VACMEM/XERTEN	*Pseudotsuga menziesii / Vaccinium membranaceum / Xerophyllum tenax* Forest	G4G5/SNR	Sensitive
G217: Central Rocky Mountain-Interior Cedar - Hemlock Forest	A3612: Western Hemlock - Western Red-cedar Cool-Mesic Central Rocky Mountain Forest & Woodland	THUPLI/ARANUD	*Thuja plicata / Aralia nudicaulis* Forest	G2/S2	Threatened
G217: Central Rocky Mountain Interior Western Red-cedar - Western Hemlock Forest	A3612: Western Hemlock - Western Red-cedar Cool-Mesic Central Rocky Mountain Forest & Woodland	THUPLI/CLIUNI-XERTEN	*Thuja plicata / Clintonia uniflora - Xerophyllum tenax* Forest	G4?/SNR	Sensitive
G217: Central Rocky Mountain Interior Western Red-cedar - Western Hemlock Forest	A3612: Western Hemlock - Western Red-cedar Cool-Mesic Central Rocky Mountain Forest & Woodland	TSUHET/CLIUNI	*Tsuga heterophylla / Clintonia uniflora* Forest	G4/S4	No Concern
G217: Central Rocky Mountain Interior Western Red-cedar - Western Hemlock Forest	A3612: Western Hemlock - Western Red-cedar Cool-Mesic Central Rocky Mountain Forest & Woodland	TSUHET/MENFER	*Tsuga heterophylla / Menziesia ferruginea* Forest	G2/S2S3	Threatened
G217: Central Rocky Mountain Interior Western Red-cedar - Western Hemlock Forest	A3612: Western Hemlock - Western Red-cedar Cool-Mesic Central Rocky Mountain Forest & Woodland	TSUHET/XERTEN	*Tsuga heterophylla / Xerophyllum tenax* Forest	G2/S2	Threatened
G217: Central Rocky Mountain Interior Western Red-cedar - Western Hemlock Forest	A3613: Central Rocky Mountain Western Hemlock - Western Red-cedar Warm-Mesic Forest	THUPLI/CLIUNI	*Thuja plicata / Clintonia uniflora* Forest	G4/S3	Sensitive
G217: Central Rocky Mountain Interior Western Red-cedar - Western Hemlock Forest	A3613: Central Rocky Mountain Western Hemlock - Western Red-cedar Warm-Mesic Forest	TSUHET/ARANUD	*Tsuga heterophylla / Aralia nudicaulis* Forest	G3/S3	Sensitive

Group	Alliance	Association Code	Association Title	Global/ State Rank	WA State Conservation Rank
G217: Central Rocky Mountain Interior Western Red-cedar - Western Hemlock Forest	A3613: Central Rocky Mountain Western Hemlock - Western Red-cedar Warm-Mesic Forest	TSUHET/ASACAU	*Tsuga heterophylla / Asarum caudatum* Forest	G4/SNR	Sensitive
G217: Central Rocky Mountain Interior Western Red-cedar - Western Hemlock Forest	A3613: Central Rocky Mountain Western Hemlock - Western Red-cedar Warm-Mesic Forest	TSUHET/ATHFIL	*Tsuga heterophylla / Athyrium filix-femina* Forest	G2Q/S1S2	Endangered
G217: Central Rocky Mountain Interior Western Red-cedar - Western Hemlock Forest	A3613: Central Rocky Mountain Western Hemlock - Western Red-cedar Warm-Mesic Forest	TSUHET/GYMDRY	*Tsuga heterophylla / Gymnocarpium dryopteris Riparian* Forest	G3G4/S3	Sensitive
G218: Rocky Mountain Subalpine Moist-Mesic Spruce - Fir Forest	A3614: Subalpine Fir - Engelmann Spruce Rocky Mountain Moist Forest	ABILAS-PICENG/CLIUNI	*Abies lasiocarpa - Picea engelmannii / Clintonia uniflora* Forest	G5/S3	Sensitive
G218: Rocky Mountain Subalpine Moist-Mesic Spruce - Fir Forest	A3614: Subalpine Fir - Engelmann Spruce Rocky Mountain Moist Forest	ABILAS-PICENG/CLIUNI-XERTEN	*Abies lasiocarpa - Picea engelmannii / Clintonia uniflora - Xerophyllum tenax* Forest	G4G5/SNR	Sensitive
G218: Rocky Mountain Subalpine Moist-Mesic Spruce - Fir Forest	A3614: Subalpine Fir - Engelmann Spruce Rocky Mountain Moist Forest	ABILAS-PICENG/MENFER	*Abies lasiocarpa - Picea engelmannii / Menziesia ferruginea* Forest	G5/SNR	Sensitive
G218: Rocky Mountain Subalpine Moist-Mesic Spruce - Fir Forest	A3614: Subalpine Fir - Engelmann Spruce Rocky Mountain Moist Forest	ABILAS-PICENG/MENFER/CLIUNI	*Abies lasiocarpa - Picea engelmannii / Menziesia ferruginea / Clintonia uniflora* Forest	G4G5/SNR	Sensitive
G218: Rocky Mountain Subalpine Moist-Mesic Spruce - Fir Forest	A3614: Subalpine Fir - Engelmann Spruce Rocky Mountain Moist Forest	ABILAS-PICENG/MENFER/XERTEN	*Abies lasiocarpa - Picea engelmannii / Menziesia ferruginea / Xerophyllum tenax* Forest	G4G5/SNR	Sensitive
G218: Rocky Mountain Subalpine Moist-Mesic Spruce - Fir Forest	A3614: Subalpine Fir - Engelmann Spruce Rocky Mountain Moist Forest	ABILAS-PICENG/VACMEM	*Abies lasiocarpa - Picea engelmannii / Vaccinium membranaceum* Rocky Mountain Forest	G5/SNR	Sensitive
G218: Rocky Mountain Subalpine Moist-Mesic Spruce - Fir Forest	A3614: Subalpine Fir - Engelmann Spruce Rocky Mountain Moist Forest	ABILAS-PICENG/VACMEM/XERTEN	*Abies lasiocarpa - Picea engelmannii / Vaccinium membranaceum / Xerophyllum tenax* Forest	GNR/SNR	Review 1
G218: Rocky Mountain Subalpine Moist-Mesic Spruce - Fir Forest	A3614: Subalpine Fir - Engelmann Spruce Rocky Mountain Moist Forest	ABILAS/XERTEN	*Abies lasiocarpa / Xerophyllum tenax* Forest	G5/S3	Sensitive
G219: Rocky Mountain Subalpine Dry-Mesic Spruce - Fir Forest	A3643: Subalpine Fir - Engelmann Spruce Rocky Mountain Dry-Mesic Forest	ABILAS-PICENG/CALRUB	*Abies lasiocarpa - Picea engelmannii / Calamagrostis rubescens* Forest	G4G5/S4	No Concern
G219: Rocky Mountain Subalpine Dry-Mesic Spruce - Fir Forest	A3643: Subalpine Fir - Engelmann Spruce Rocky Mountain Dry-Mesic Forest	ABILAS-PICENG/CARGEY	*Abies lasiocarpa - Picea engelmannii / Carex geyeri* Forest	G5/SNR	Sensitive

Group	Alliance	Association Code	Association Title	Global/ State Rank	WA State Conservation Rank
G220: Rocky Mountain Lodgepole Pine Forest & Woodland	A3366: Lodgepole Pine Rocky Mountain Forest	PINCON/CALRUB	*Pinus contorta / Calamagrostis rubescens* Forest	G5/S3	Sensitive
G220: Rocky Mountain Lodgepole Pine Forest & Woodland	A3366: Lodgepole Pine Rocky Mountain Forest	PINCON/CLIUNI	*Pinus contorta / Clintonia uniflora* Forest	G5/SNR	Sensitive
G220: Rocky Mountain Lodgepole Pine Forest & Woodland	A3366: Lodgepole Pine Rocky Mountain Forest	PINCON/VACMEM	*Pinus contorta / Vaccinium membranaceum* Rocky Mountain Forest	G3G4/S4	No Concern
G220: Rocky Mountain Lodgepole Pine Forest & Woodland	A3366: Lodgepole Pine Rocky Mountain Forest	PINCON/VACMEM/XERTEN	*Pinus contorta / Vaccinium membranaceum / Xerophyllum tenax* Forest	G4G5/SNR	Sensitive
G222: Rocky Mountain Subalpine-Montane Aspen Forest & Woodland	A2036: Quaking Aspen Rocky Mountain Forest & Woodland	POPTRE	*Populus tremuloides* Forest [Provisional]	n/a	n/a
G267: Central Rocky Mountain-Interior Montane Grassland	A3966: Idaho Fescue - Pinegrass - Columbia Needlegrass Central Rocky Mountain Montane Mesic Grassland	CARHOO-FESIDA	*Carex hoodii - Festuca idahoensis* Grassland	G2/S2	Threatened
G271: Rocky Mountain-North Pacific Subalpine-Montane Mesic Grassland & Meadow	A1257: Greenleaf Fescue - Hood's Sedge - Lupine species Subalpine Mesic Meadow	FESVIR-FESIDA	*Festuca viridula - Festuca idahoensis* Meadow	G2?Q/S1S2	Endangered
G271: Rocky Mountain-North Pacific Subalpine-Montane Mesic Grassland & Meadow	A3948: Sitka Valerian - Hitchcock's Smooth Woodrush - Common Beargrass Subalpine Mesic Meadow	XERTEN	*Xerophyllum tenax* Meadow	GNR/SU	Review 1
G272: Central Rocky Mountain Montane-Foothill Shrubland	A3975: Mallow Ninebark - Common Snowberry Mesic Shrubland	PHYMAL-SYMALB	*Physocarpus malvaceus - Symphoricarpos albus* Shrubland	G3/S2S3	Threatened
G273: Central Rocky Mountain Lower Montane, Foothill & Valley Grassland	A3987: Idaho Fescue - Bluebunch Wheatgrass - Sandberg Bluegrass Dry Grassland	FESIDA-ERIHER	*Festuca idahoensis - Eriogonum heracleoides* Grassland	G2/S2	Threatened
G282: Western North American Montane Sclerophyll Scrub	A3936: Snowbrush Ceanothus Shrubland	SALSCO-ACEGLA-(CEAVEL)	*Salix scouleriana - Acer glabrum - (Ceanothus velutinus)* Shrubland	GNR/SNR	Review 1
G305: Central Rocky Mountain-North Pacific High Montane Mesic Shrubland	A3968: Subalpine Fir - Quaking Aspen / Rocky Mountain Maple Central Rocky Mountain Avalanche Chute Shrubland	RUBPAR/CHAANG-HERMAX	*Rubus parviflorus / Chamerion angustifolium - Heracleum maximum* Shrubland	G4/S3S4	Review 2
G305: Central Rocky Mountain-North Pacific High Montane Mesic Shrubland	A3970: Fool's-huckleberry - Shinyleaf Meadowsweet Montane-Subalpine Shrubland	VACMEM/XERTEN	*Vaccinium membranaceum / Xerophyllum tenax* Shrubland	G3?/S2S3	Threatened
G505: Rocky Mountain-Great Basin Swamp Forest	A3776: Western Red-cedar - Western Hemlock Rocky Mountain Swamp Forest	THUPLI/ATHFIL	*Thuja plicata / Athyrium filix-femina* Swamp Forest	G3G4/SNR	Sensitive

Group	Alliance	Association Code	Association Title	Global/ State Rank	WA State Conservation Rank
G506: Rocky Mountain-Great Basin Montane Riparian Forest	A3757: Subalpine Fir - Engelmann Spruce Swamp Forest	ABILAS-PICENG/STRAMP	*Abies lasiocarpa* - *Picea engelmannii* / *Streptopus amplexifolius* Riparian Forest	G4/S2S3	Sensitive
G506: Rocky Mountain-Great Basin Montane Riparian Forest	A3757: Subalpine Fir - Engelmann Spruce Swamp Forest	PICENG/ALNVIR	*Picea engelmannii / Alnus viridis ssp. sinuata* Riparian Forest	GNR/SNR	Review 1
G506: Rocky Mountain-Great Basin Montane Riparian Forest	A3757: Subalpine Fir - Engelmann Spruce Swamp Forest	PICENG/ATHFIL	*Picea engelmannii / Athyrium filix-femina* Riparian Woodland	G2?/S1?	Endangered
G506: Rocky Mountain-Great Basin Montane Riparian Forest	A4432: Western Red-Cedar - Western Hemlock Rocky Mountain Riparian Forest	THUPLI/GYMDRY	*Thuja plicata / Gymnocarpium dryopteris* Riparian Forest	G3/SNR	Sensitive
G521: Vancouverian-Rocky Mountain Montane Wet Meadow & Marsh	A4424: Arrowleaf Ragwort - Saxifrage species - Monkeyflower species Streamside Wet Meadow	ATHFIL-GYMDRY	*Athyrium filix-femina* - *Gymnocarpium dryopteris* Wet Meadow [Provisional]	GNR/SNR	Review 1
G521: Vancouverian-Rocky Mountain Montane Wet Meadow & Marsh	A4424: Arrowleaf Ragwort - Saxifrage species - Monkeyflower species Streamside Wet Meadow	SENTRI	*Senecio triangularis* Wet Meadow	G5?/S3	Sensitive
G521: Vancouverian-Rocky Mountain Montane Wet Meadow & Marsh	A4425: Bluejoint - Slimstem Reedgrass- Fowl Bluegrass Wet Meadow	CALCAN Western	*Calamagrostis canadensis* Western Wet Meadow	G4/S3S4	Review 2
G521: Vancouverian-Rocky Mountain Montane Wet Meadow & Marsh	A4427: Common Cow-parsnip - California False Hellebore - Yellowcress species Wet Meadow	HERMAX	*Heracleum maximum* Wet Meadow	G3G4/S3S4	Sensitive
G527: Western Montane-Subalpine Riparian & Seep Shrubland	A4416: Sitka Alder Riparian Shrubland	ALNVIR Mesic	*Alnus viridis ssp. sinuata /* Mesic Forbs Wet Shrubland	GNR/S4S5	No Concern
G527: Western Montane-Subalpine Riparian & Seep Shrubland	A4416: Sitka Alder Riparian Shrubland	ALNVIR/ATHFIL-CINLAT	*Alnus viridis ssp. sinuata / Athyrium filix-femina* - *Cinna latifolia* Wet Shrubland	G4/S3	Sensitive
G527: Western Montane-Subalpine Riparian & Seep Shrubland	A4421: Gray Alder - Red-Osier Dogwood Riparian Shrubland	ALNINC/ATHFIL	*Alnus incana / Athyrium filix-femina* Wet Shrubland	G3/S3?	Sensitive
G796: Northern Rocky Mountain Lowland-Foothill Riparian Forest	A0311: Black Cottonwood Northern Rocky Mountain Riparian Forest	POPBAL/ACEGLA	*Populus balsamifera ssp. trichocarpa / Acer glabrum* Riparian Woodland	G2?/S2	Threatened

Appendix G
Dumbbell Charts Showing the 10th, 50th, and 90th Percentiles of Importance Values for the Dominant Plant Species by Alliance

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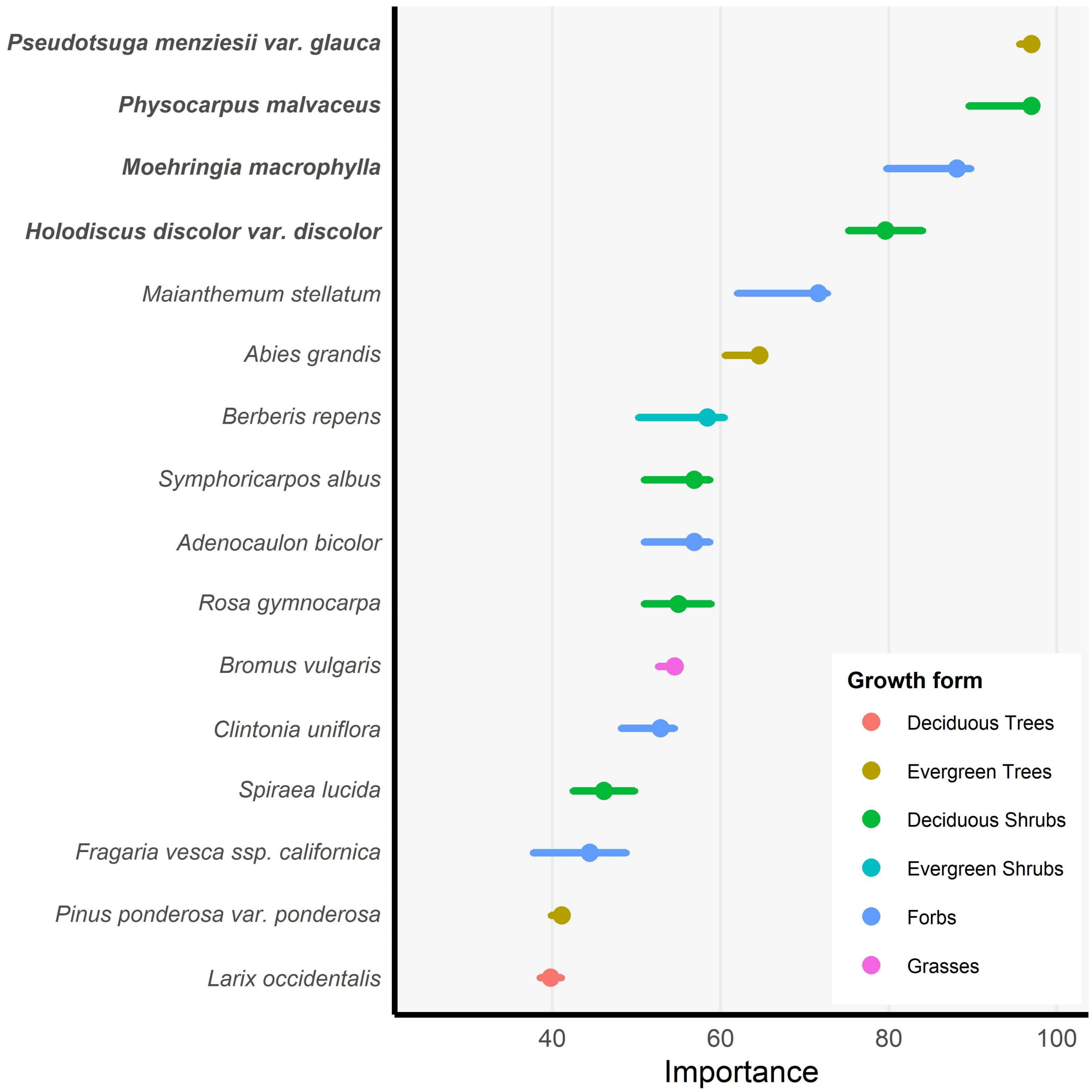
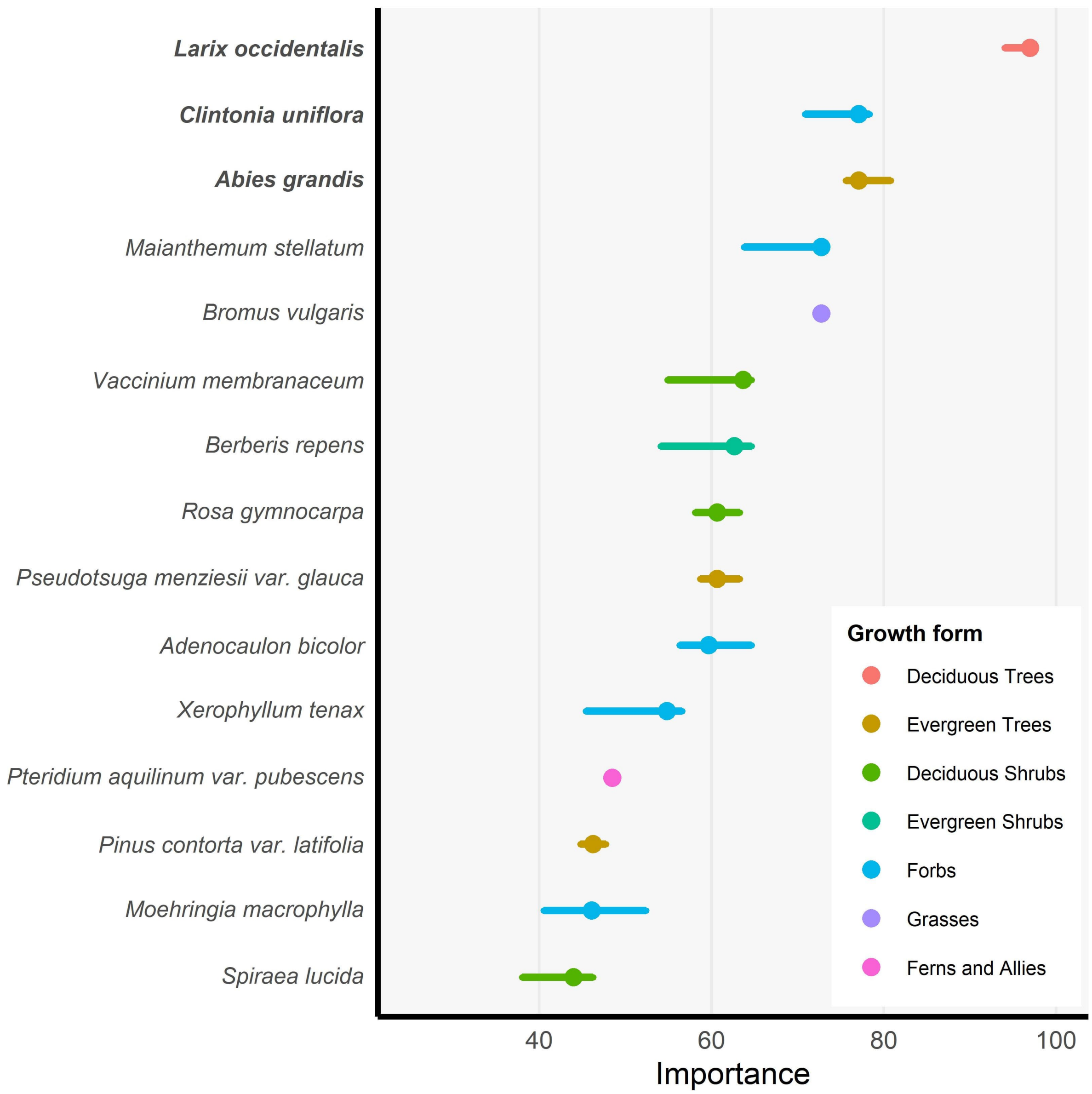
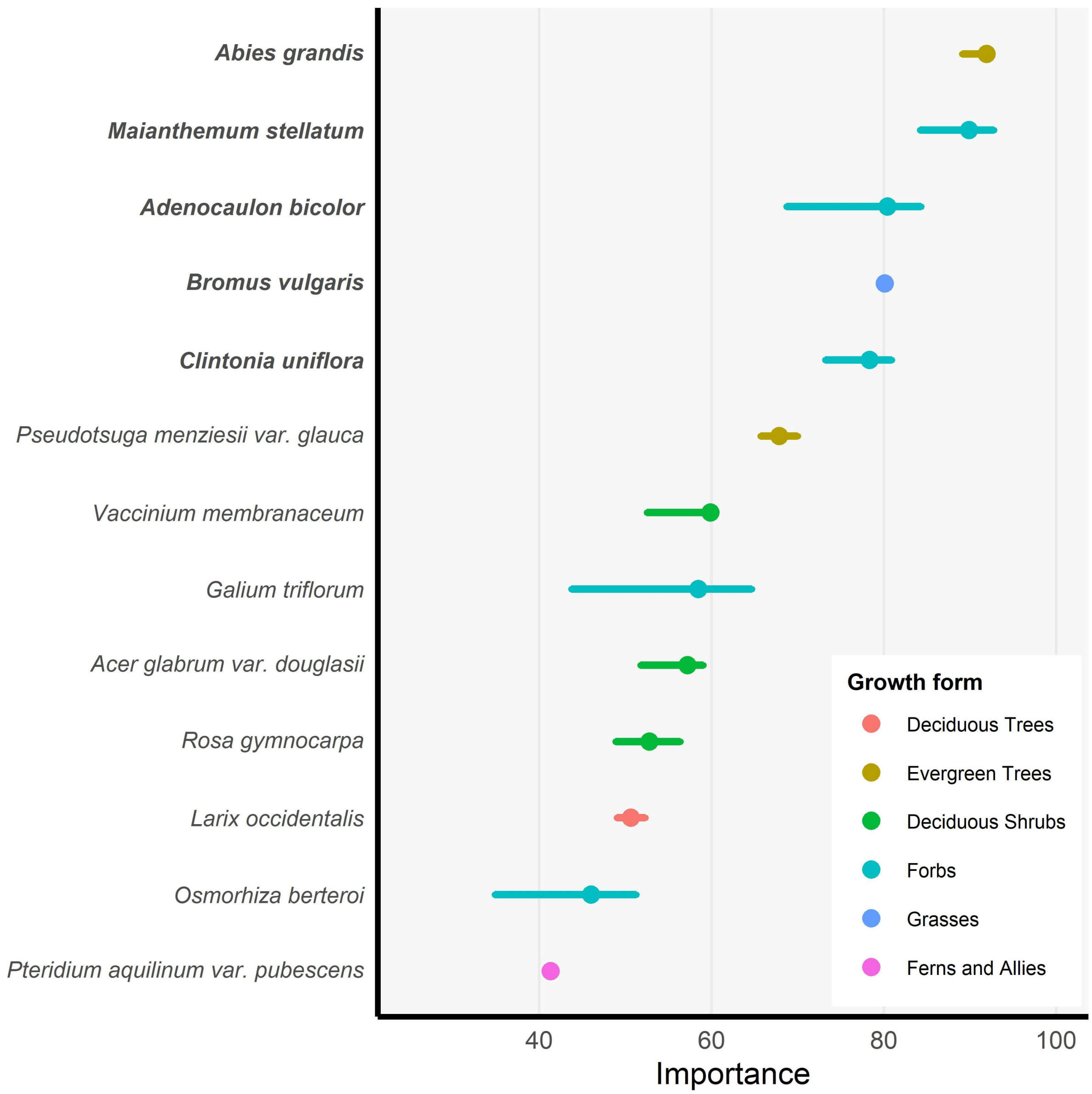
Appendix G1. Median and 10th and 90th percentiles of importance for the most common plant species by growth form in the *Pseudotsuga menziesii – Pinus ponderosa* Dry-mesic Central Rocky Mountain Forest & Woodland Alliance (A3392). Bold font indicates >80% constancy.



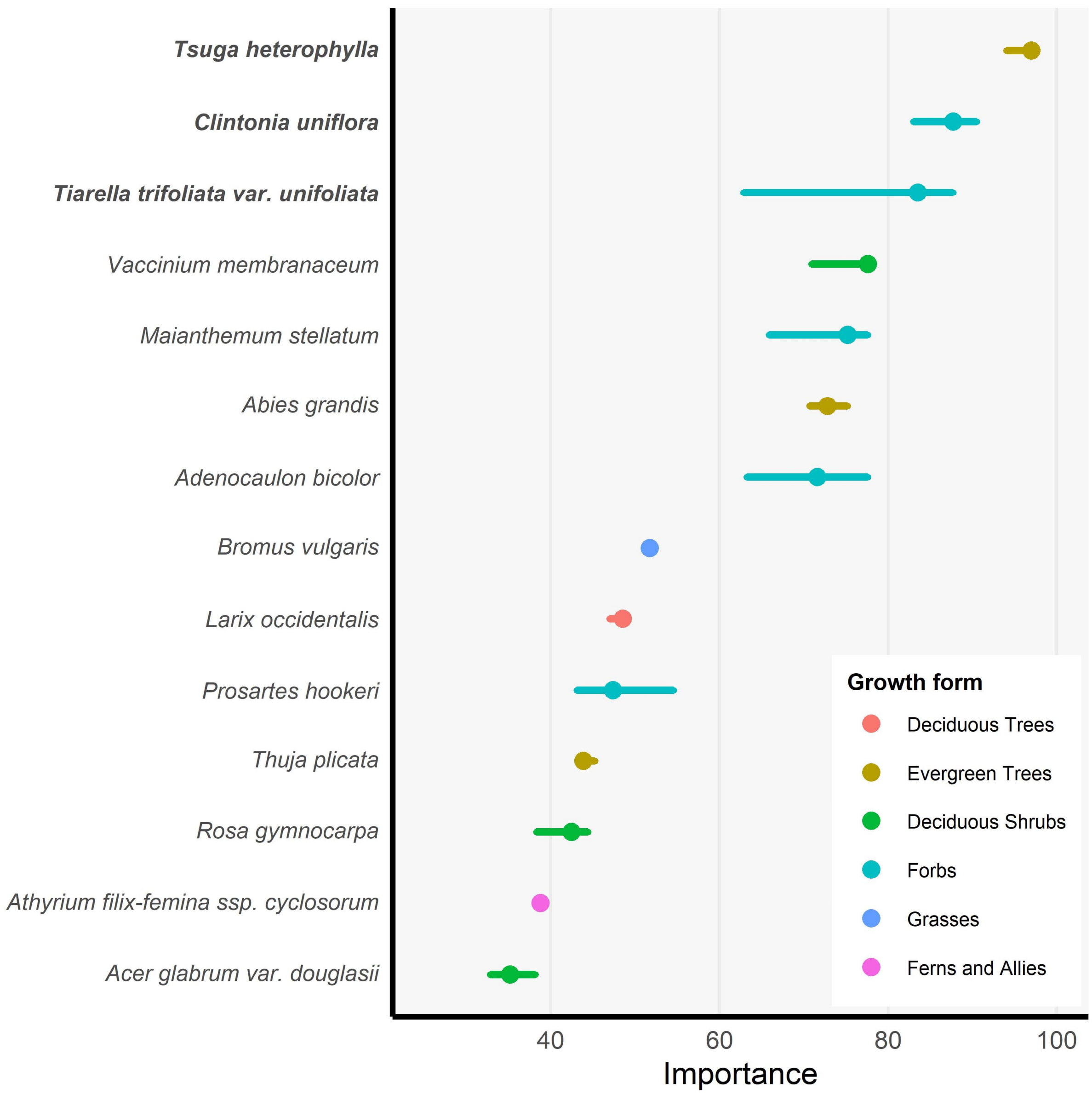
Appendix G2. Median and 10th and 90th percentiles of importance for the most common plant species by growth form in the *Larix occidentalis* Central Rocky Mountain Forest Alliance (A0275). Bold font indicates >80% constancy.



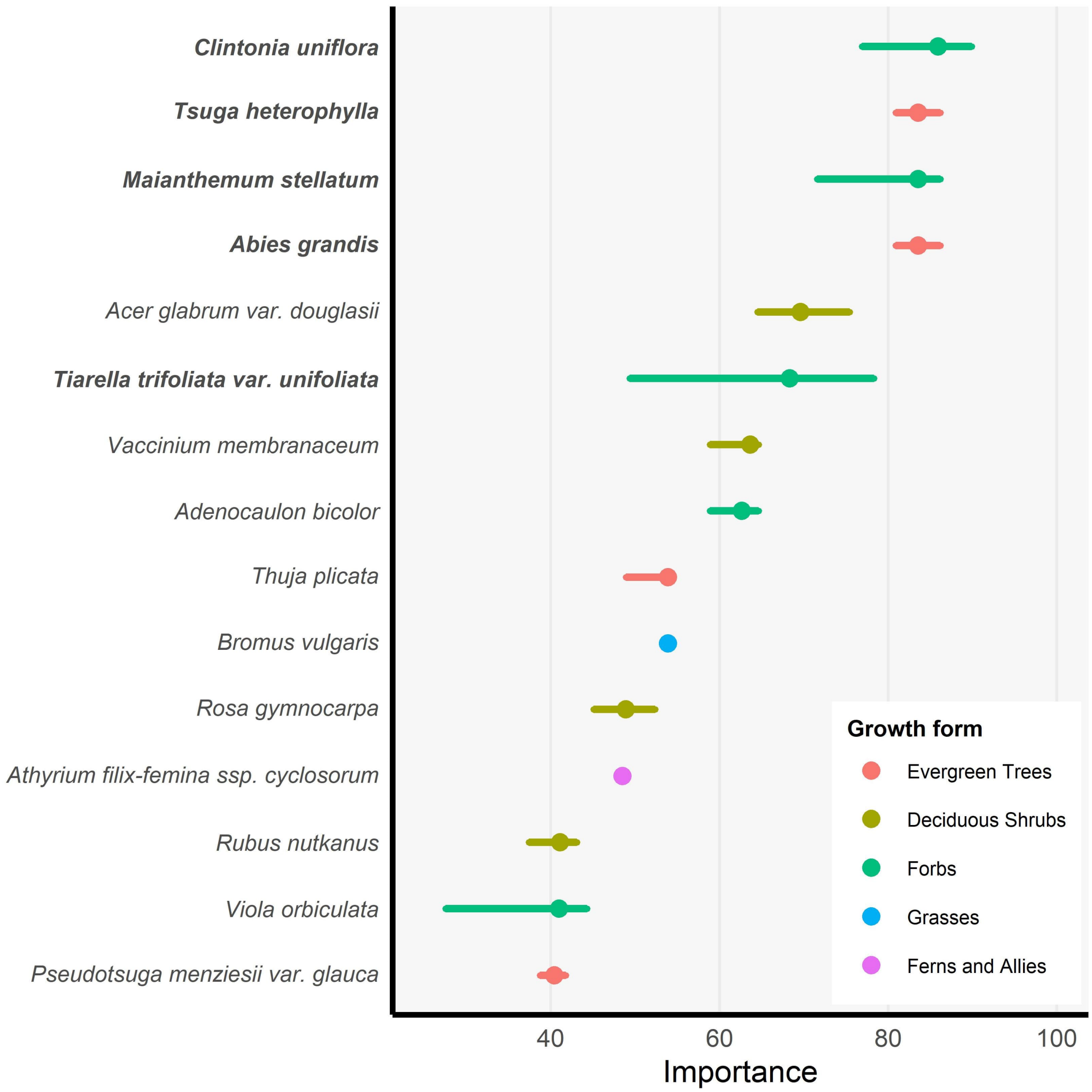
Appendix G3. Median and 10th and 90th percentiles of importance for the most common plant species by growth form in the *Abies grandis* – *Pseudotsuga menziesii* Central Rocky Mountain Forest & Woodland Alliance (A3362). Bold font indicates >80% constancy.



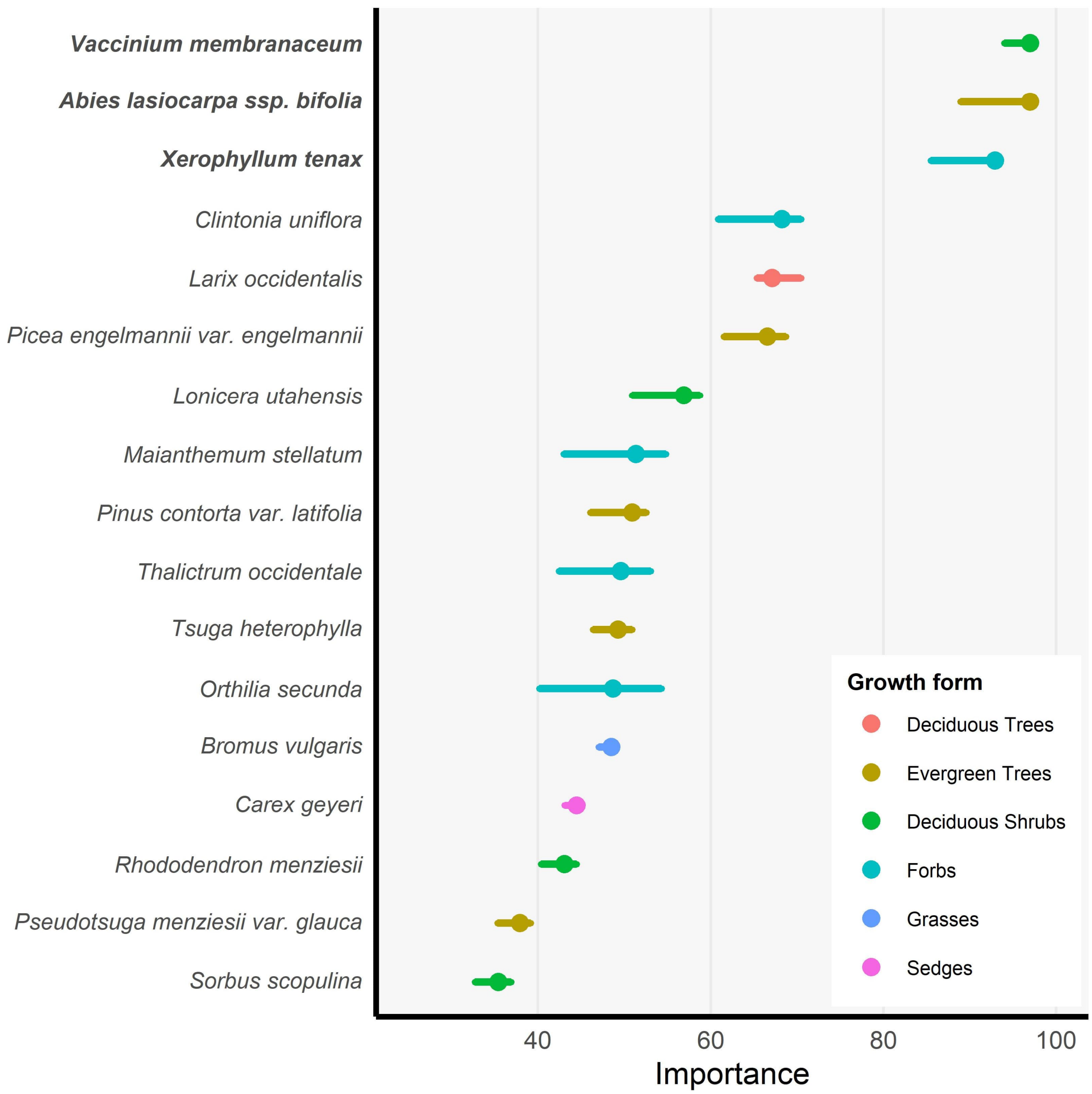
Appendix G4. Median and 10th and 90th percentiles of importance for the most common plant species by growth form in the *Tsuga heterophylla – Thuja plicata* Cool-Mesic Central Rocky Mountain Forest Alliance (A3612). Bold font indicates >80% constancy.



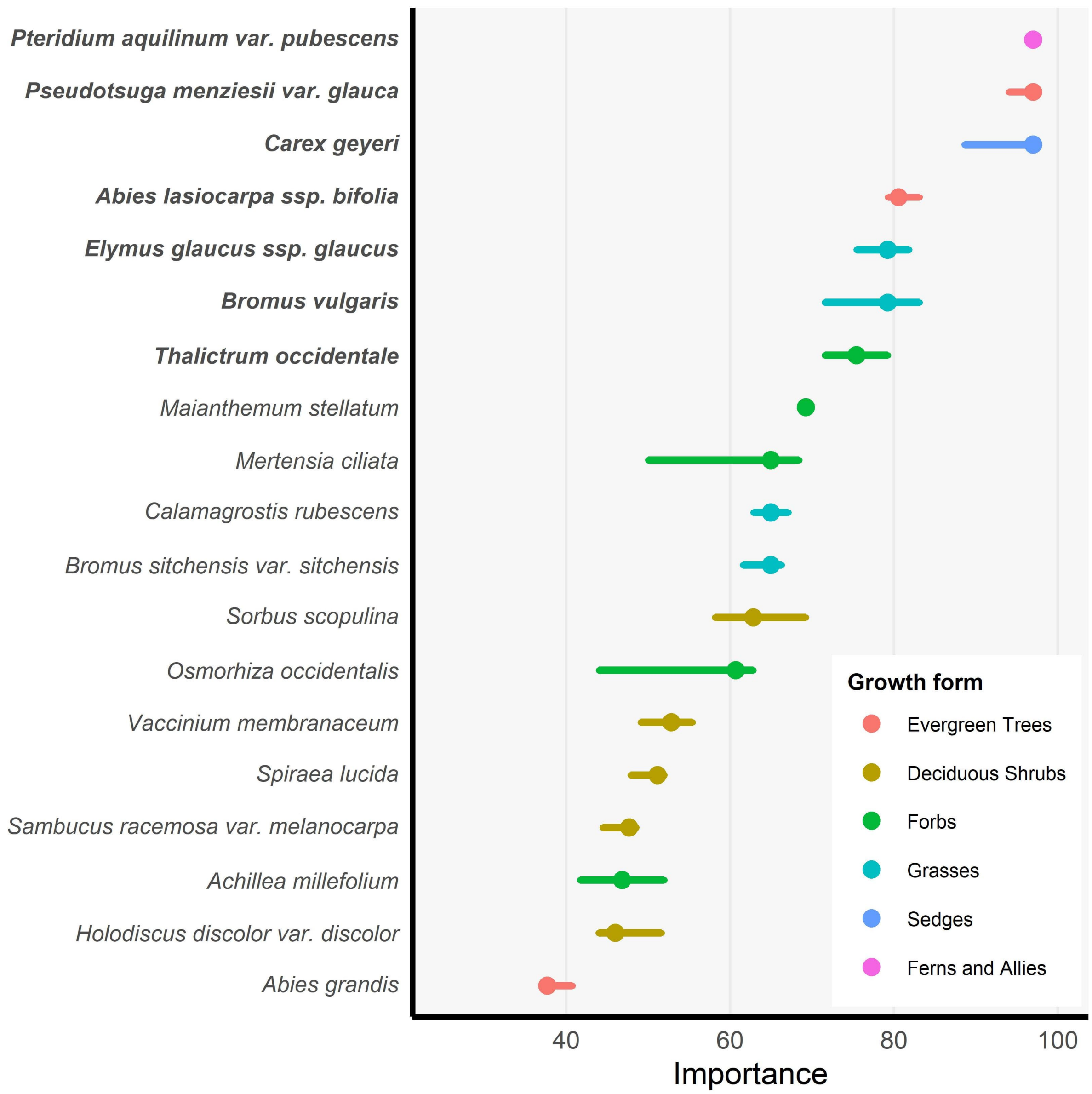
Appendix G5. Median and 10th and 90th percentiles of importance for the most common plant species by growth form in the *Tsuga heterophylla – Thuja plicata* Warm-Mesic Central Rocky Mountain Forest Alliance (A3613). Bold font indicates >80% constancy.



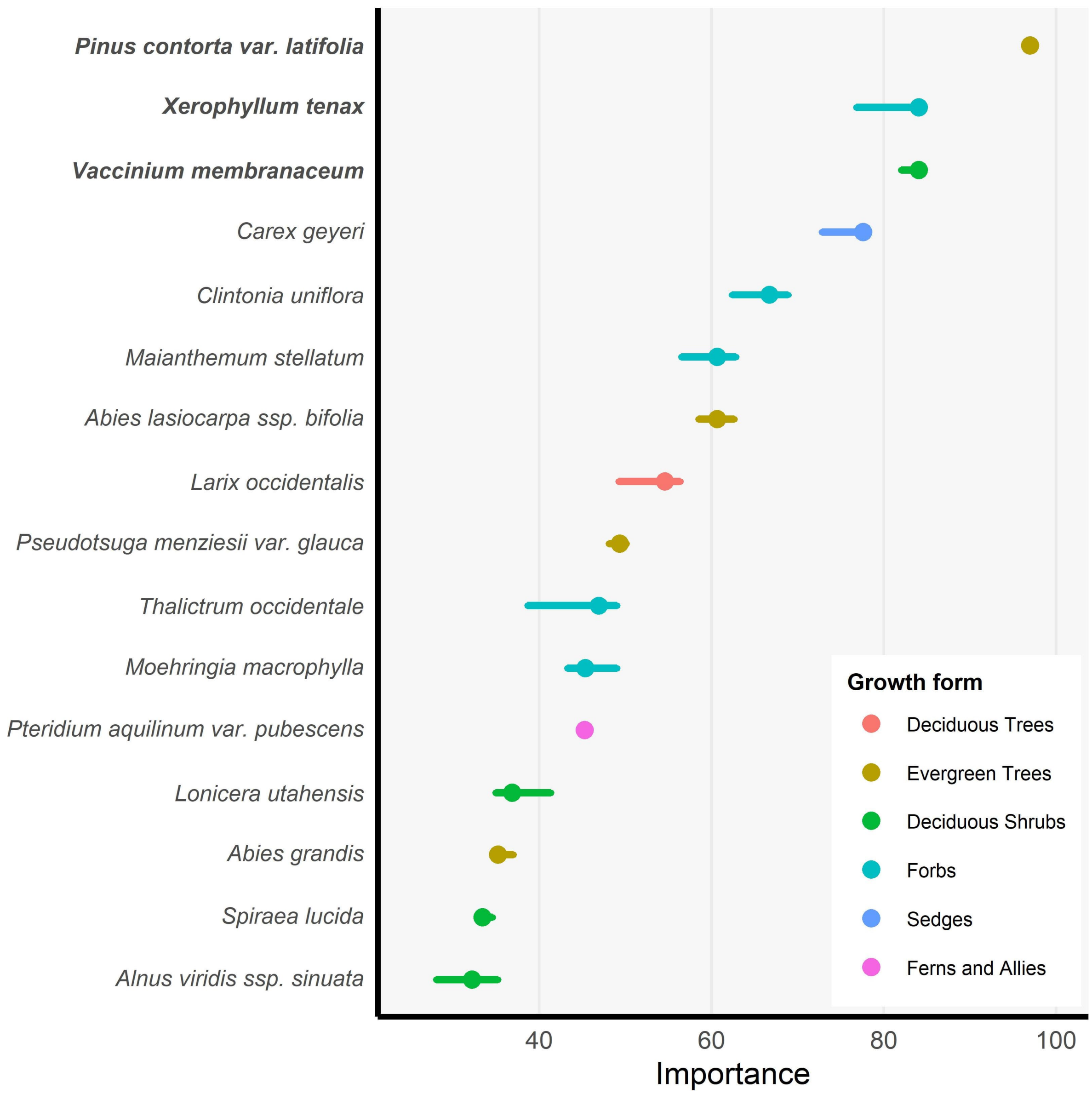
Appendix G6. Median and 10th and 90th percentiles of importance for the most common plant species by growth form in the *Abies lasiocarpa – Picea engelmannii* Rocky Mountain Moist Forest Alliance (A3614). Bold font indicates >80% constancy.



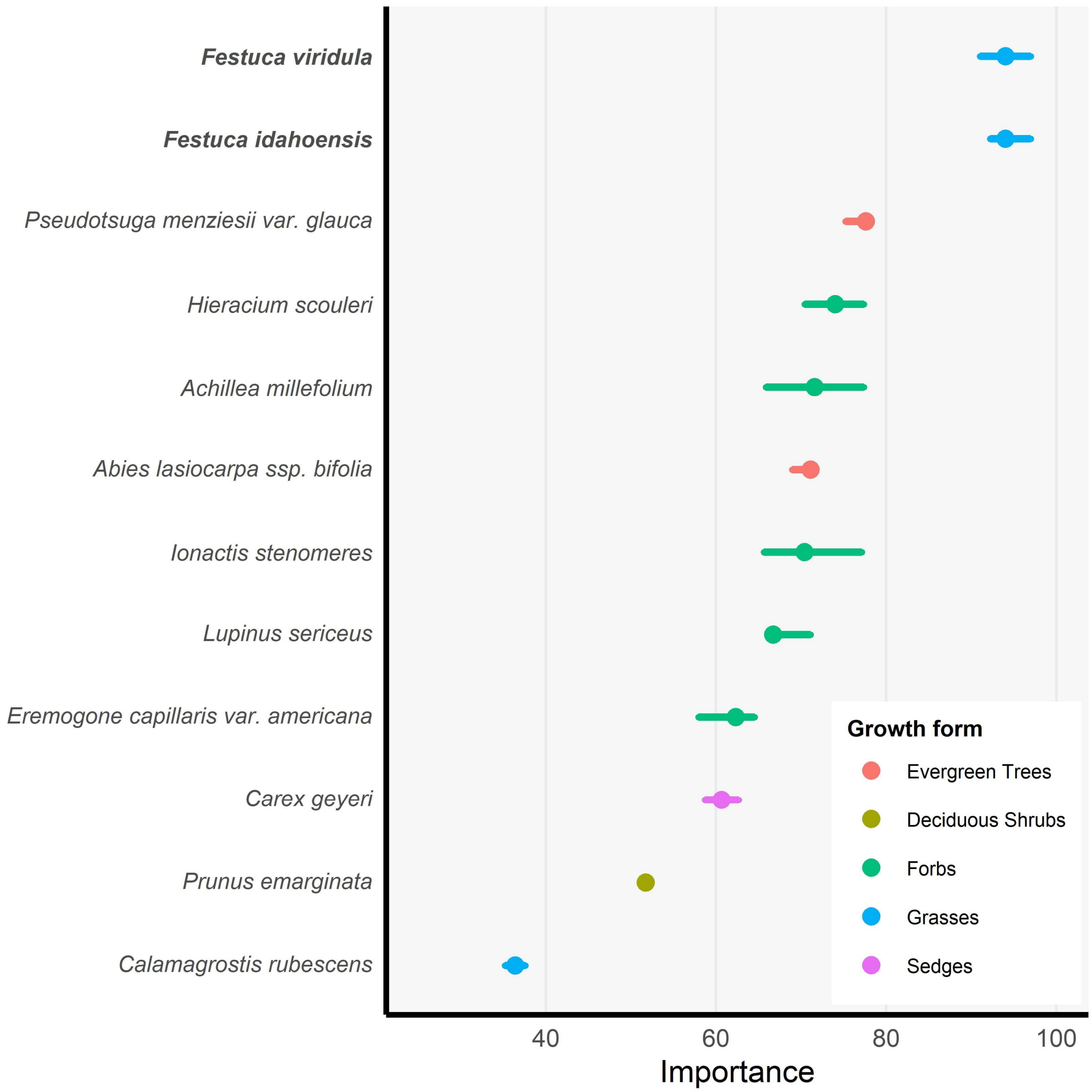
Appendix G7. Median and 10th and 90th percentiles of importance for the most common plant species by growth form in the *Abies lasiocarpa – Picea engelmannii* Rocky Mountain Dry-Mesic Forest Alliance (A3643). Bold font indicates >80% constancy.



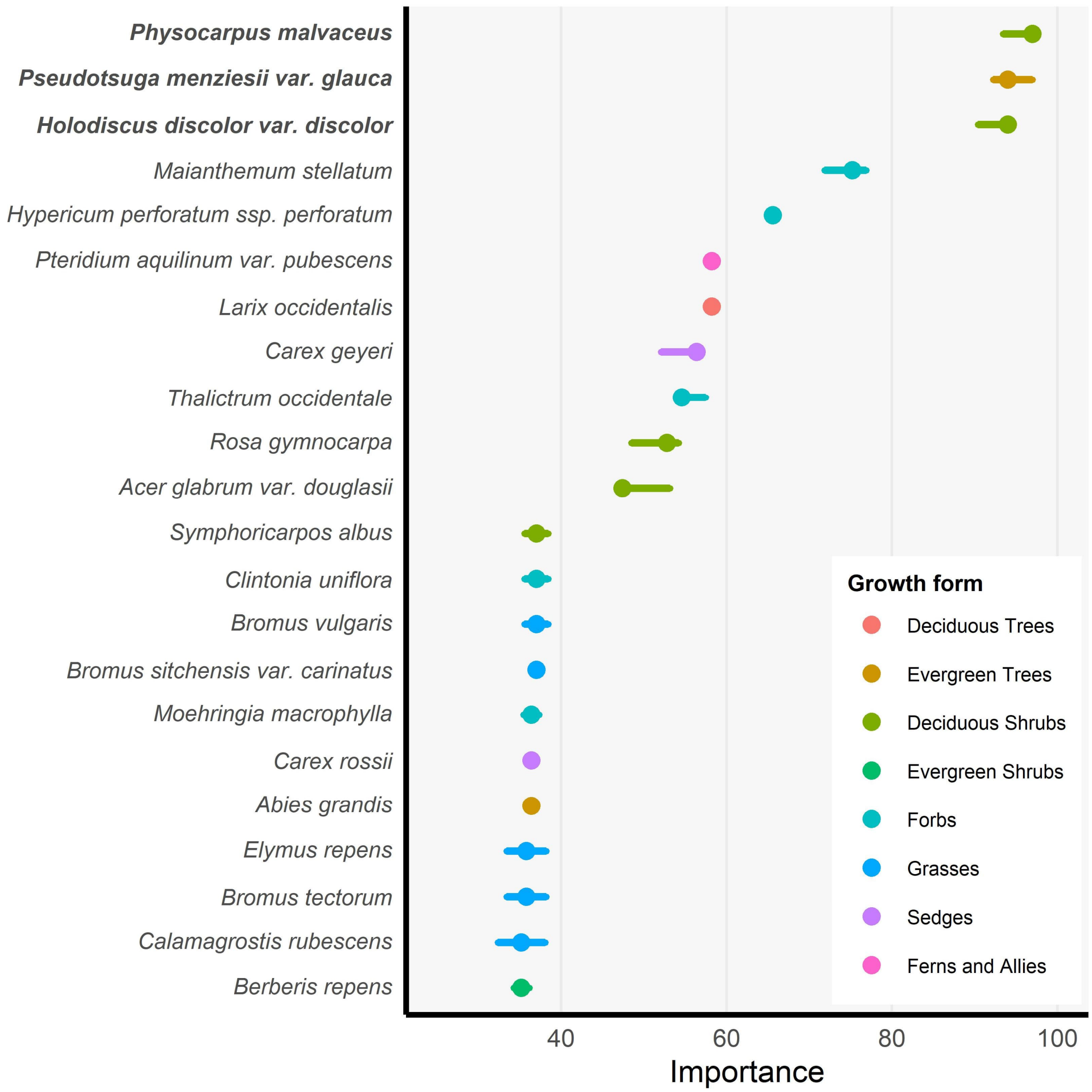
Appendix G8. Median and 10th and 90th percentiles of importance for the most common plant species by growth form in the *Pinus contorta* Rocky Mountain Forest Alliance (A3366). Bold font indicates >80% constancy.



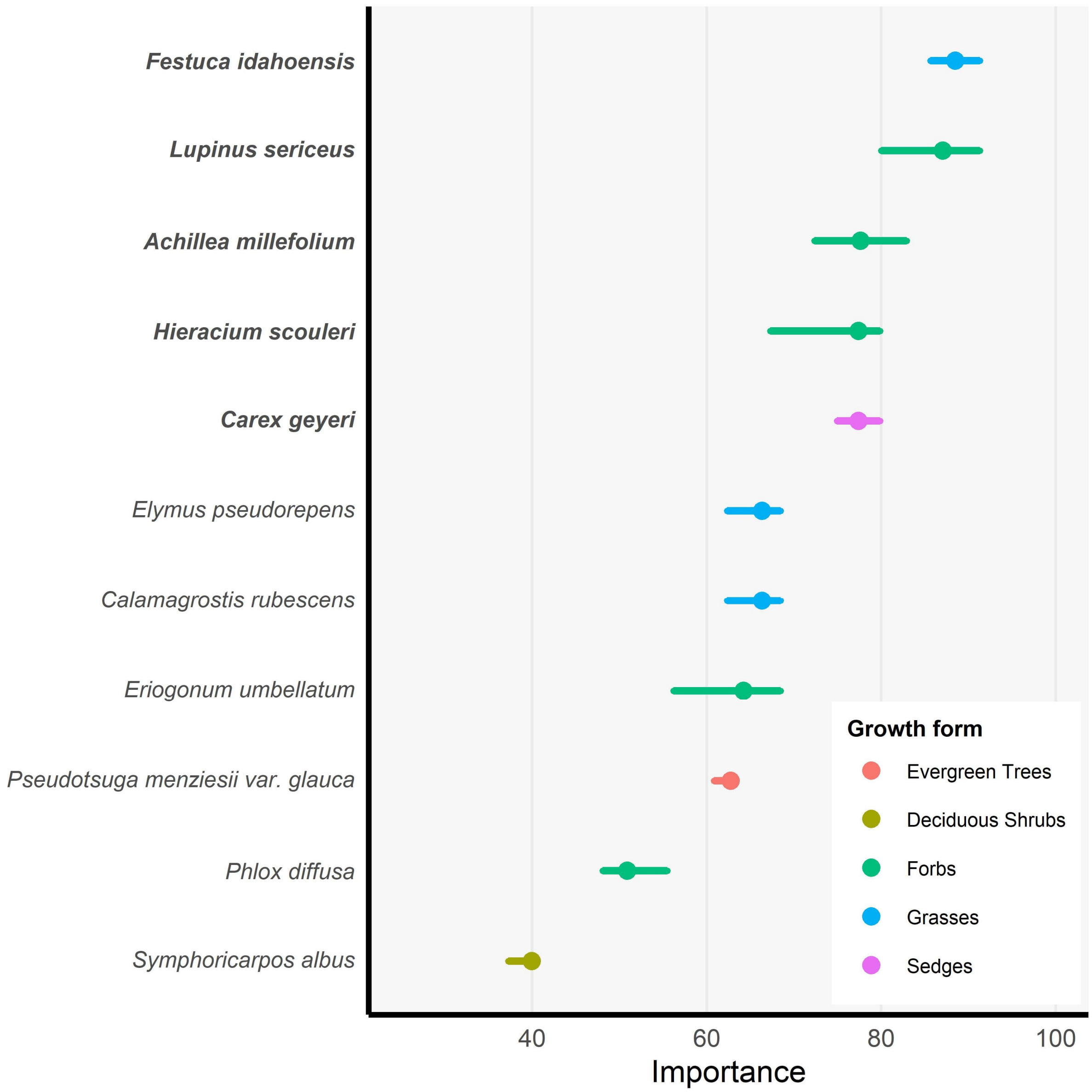
Appendix G9. Median and 10th and 90th percentiles of importance for the most common plant species by growth form in the *Festuca viridula – Carex hoodii – Lupinus* spp. Subalpine Mesic Meadow Alliance (A1257). Bold font indicates >80% constancy.



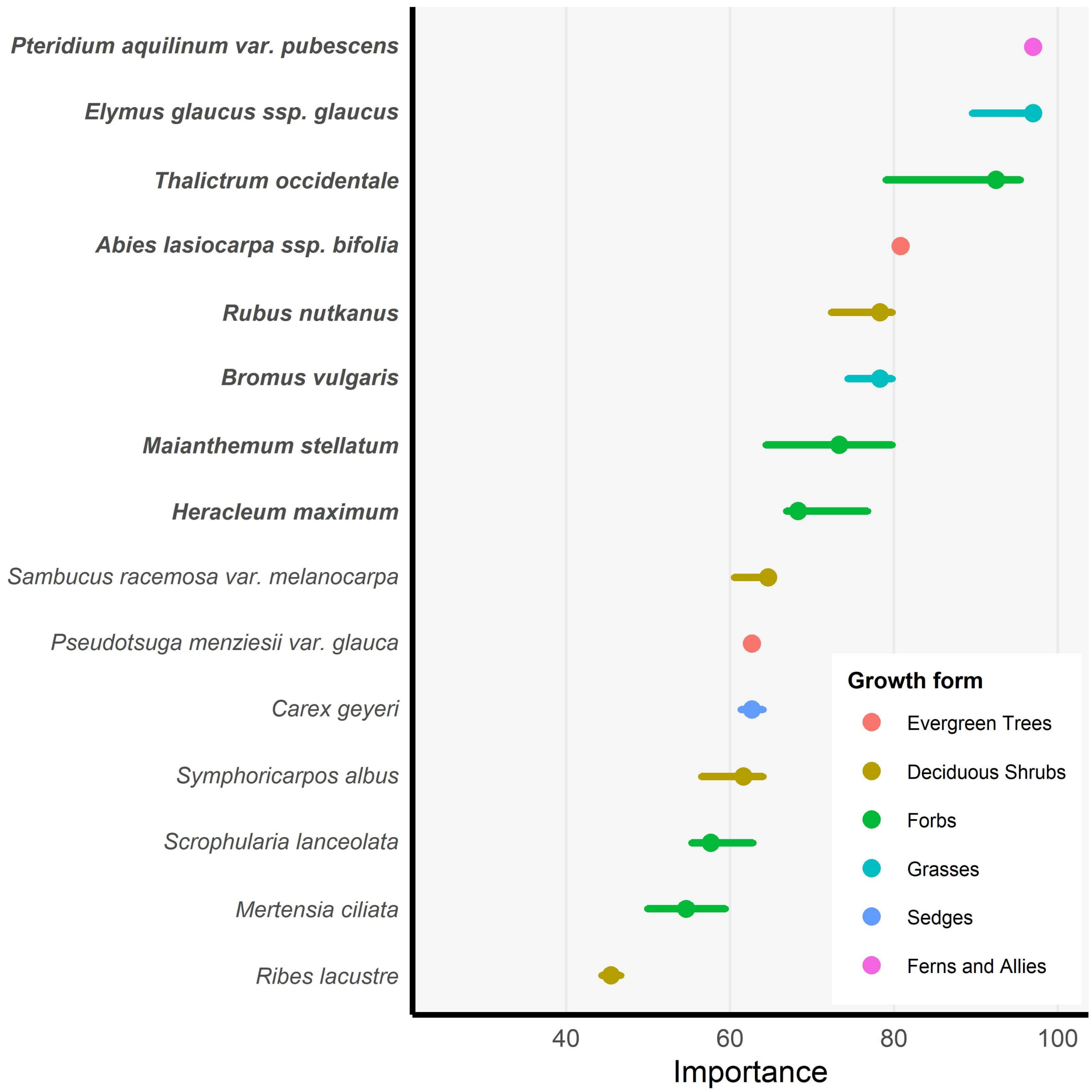
Appendix G10. Median and 10th and 90th percentiles of importance for the most common plant species by growth form in the *Physocarpus malvaceus – Symphoricarpos albus* Mesic Shrubland Alliance (A3975). Bold font indicates >80% constancy.



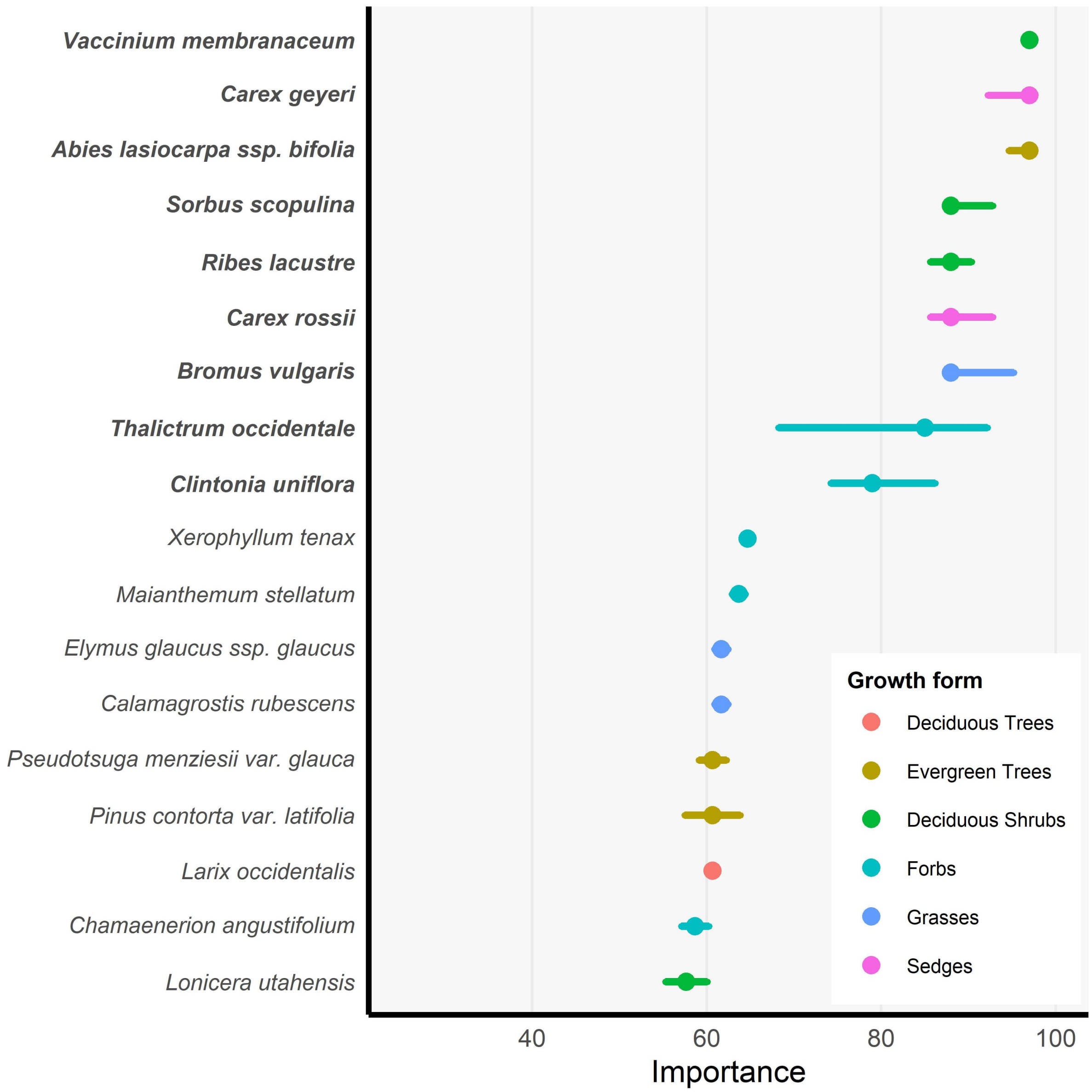
Appendix G11. Median and 10th and 90th percentiles of importance for the most common plant species by growth form in the *Festuca idahoensis – Pseudoroegneria spicata – Poa secunda* Dry Grassland Alliance (A3987). Bold font indicates >80% constancy.



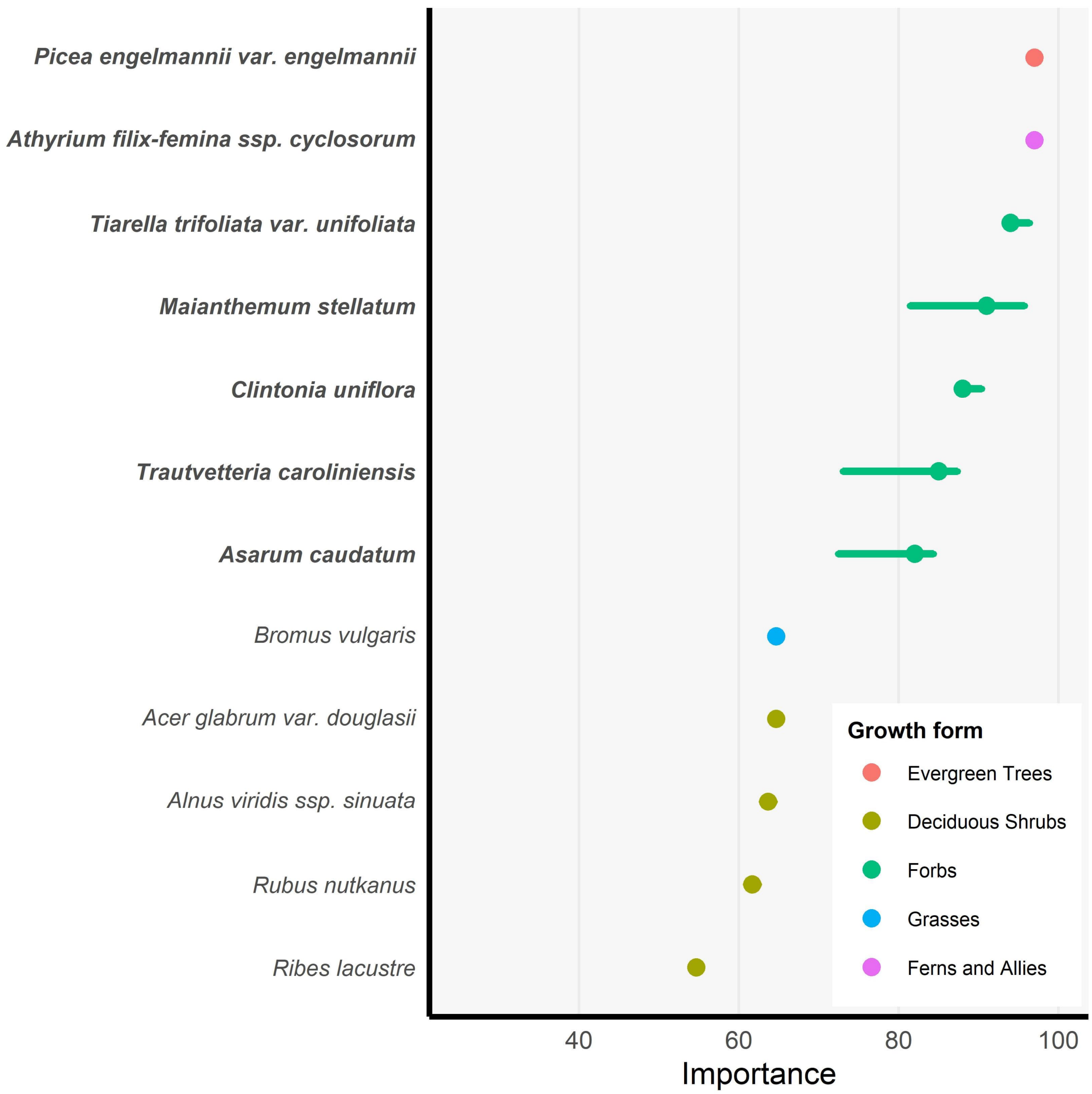
Appendix G12. Median and 10th and 90th percentiles of importance for the most common plant species by growth form in the *Abies lasiocarpa – Populus tremuloides / Acer glabrum* Central Rocky Mountain Avalanche Chute Shrubland Alliance (A3968). Bold font indicates >80% constancy.



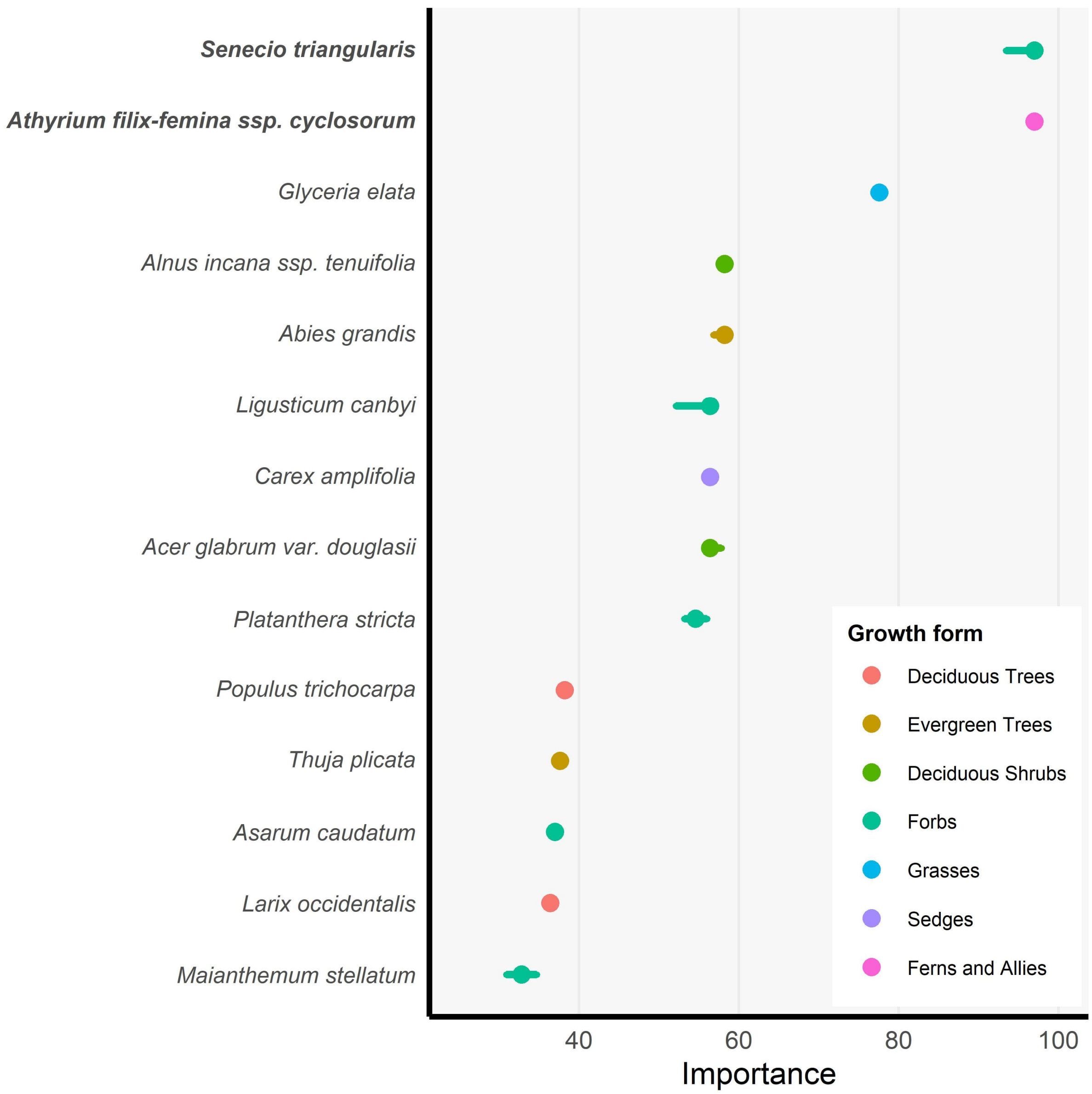
Appendix G13. Median and 10th and 90th percentiles of importance for the most common plant species by growth form in the *Menziesia ferruginea – Spiraea betulifolia* Montane-Subalpine Shrubland Alliance (A3970). Bold font indicates >80% constancy.



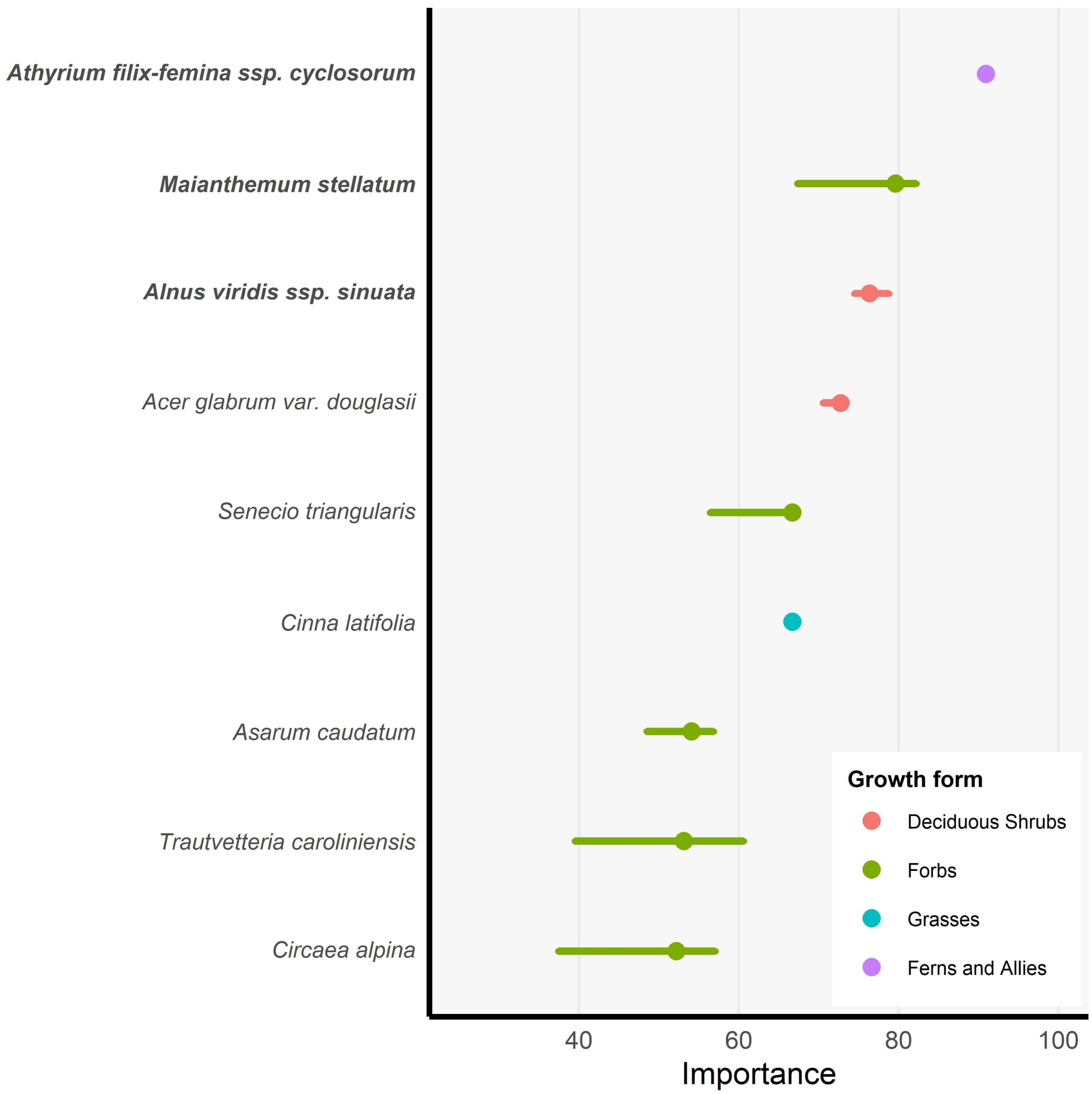
Appendix G14. Median and 10th and 90th percentiles of importance for the most common plant species by growth form in the *Abies lasiocarpa – Picea engelmannii* Riparian Forest Alliance (A3757). Bold font indicates >80% constancy.



Appendix G15. Median and 10th and 90th percentiles of importance for the most common plant species by growth form in the *Senecio triangularis* – *Saxifraga* spp. – *Mimulus* spp. Streamside Wet Meadow Alliance (A4424). Bold font indicates >80% constancy.



Appendix G16. Median and 10th and 90th percentiles of importance for the most common plant species by growth form in the *Alnus viridis* ssp. *sinuata* Riparian Shrubland Alliance (A4416). Bold font indicates >80% constancy.



Appendix H
Complete EIA Data and Comments

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Appendix H. Complete EIA Data and Comments

Ecosystem Type	Patch Type	Veg Polygon Keylink	Landscape MEF	Buffer MEF	Vegetation MEF	Hydrology MEF	Soil/Substrate MEF	Landscape Context Score	Condition Score	Landscape Context Rank	Condition Rank	EIA Score	EIA Rank	Size Score	Size "Points"	EORANK Score	EORANK	User Adjusted Combined EO Rank	User Adjusted EO Rank Reason	Element Occurrence?
Nonforested Wetland	Small	MountSpokane_518	3.00	4.00	4.00	4.00	3.00	3.67	3.90	A-	A+	3.83	A+	4.00	0.75	4.58	A+			Yes
Upland Forest & Woodland	matrix	MountSpokane_424	4.00	4.00	4.00	n/a	3.00	4.00	3.85	A+	A+	3.92	A+	1.00	-1.5	2.42	C+			Addt. analysis needed
Forested Wetland	Small	MountSpokane_603	2.50	3.46	4.00	3.33	3.00	3.15	3.67	B+	A-	3.51	A-	4.00	0.75	4.26	A+			Yes
Upland Forest & Woodland	matrix	MountSpokane_408	3.50	4.00	3.87	n/a	3.00	3.67	3.74	A-	A-	3.70	A-	1.00	-1.5	2.20	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_822	2.50	3.36	4.00	n/a	4.00	2.78	4.00	B-	A+	3.45	B+	1.00	-1.5	1.95	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_490	4.00	3.72	4.00	n/a	4.00	3.91	4.00	A+	A+	3.96	A+	1.00	-1.5	2.46	C+			Addt. analysis needed
Nonforested Upland	Large	MountSpokane_377	2.50	3.72	3.88	n/a	3.00	3.11	3.74	B+	A-	3.46	B+	2.00	-0.33	3.13	B+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_820	2.50	3.36	4.00	n/a	4.00	2.78	4.00	B-	A+	3.45	B+	1.00	-1.5	1.95	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_1009	3.00	3.72	3.27	n/a	2.00	3.24	3.08	B+	B+	3.15	B+	1.00	-1.5	1.65	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_946	3.50	4.00	3.27	n/a	3.00	3.67	3.23	A-	B+	3.42	B+	1.00	-1.5	1.92	C-			Addt. analysis needed
Nonforested Upland	Large	MountSpokane_950	3.50	4.00	3.50	n/a	3.00	3.75	3.43	A-	B+	3.57	A-	1.00	-1	2.57	B-	A-	Combined size = B (+0.33 pts); Combined EO Rank Score = 3.74 (A-)	Yes
Upland Forest & Woodland	matrix	MountSpokane_416	4.00	4.00	4.00	n/a	3.00	4.00	3.85	A+	A+	3.92	A+	1.00	-1.5	2.42	C+			Addt. analysis needed
Nonforested Upland	Large	MountSpokane_371	2.50	3.72	3.63	n/a	3.00	3.11	3.53	B+	A-	3.34	B+	2.00	-0.33	3.01	B+			Addt. analysis needed
Nonforested Upland	Large	MountSpokane_401	2.50	3.72	3.88	n/a	3.00	3.11	3.74	B+	A-	3.46	B+	2.00	-0.33	3.13	B+			Addt. analysis needed
Forested Wetland	Small	MountSpokane_604	2.50	3.46	4.00	3.33	3.00	3.15	3.67	B+	A-	3.51	A-	4.00	0.75	4.26	A+			Yes
Forested Wetland	Small	MountSpokane_712	2.50	3.46	4.00	3.33	3.00	3.15	3.67	B+	A-	3.51	A-	4.00	0.75	4.26	A+			Yes
Forested Wetland	Small	MountSpokane_713	2.50	3.46	4.00	3.33	3.00	3.15	3.67	B+	A-	3.51	A-	4.00	0.75	4.26	A+			Yes
Forested Wetland	Small	MountSpokane_714	2.50	3.46	4.00	3.33	3.00	3.15	3.67	B+	A-	3.51	A-	4.00	0.75	4.26	A+			Yes
Upland Forest & Woodland	matrix	MountSpokane_481	3.00	3.13	3.00	n/a	3.00	3.04	3.00	B+	B+	3.02	B+	1.00	-1.5	1.52	C-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_508	3.00	3.13	3.00	n/a	3.00	3.04	3.00	B+	B+	3.02	B+	1.00	-1.5	1.52	C-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_501	3.00	3.36	3.07	n/a	2.00	3.12	2.91	B+	B-	3.00	B+	1.00	-1.5	1.50	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_818	2.00	3.72	3.93	n/a	3.00	2.57	3.79	B-	A-	3.24	B+	1.00	-1.5	1.74	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_252	4.00	4.00	4.00	n/a	3.00	4.00	3.85	A+	A+	3.92	A+	1.00	-1.5	2.42	C+	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_425	4.00	4.00	4.00	n/a	3.00	4.00	3.85	A+	A+	3.92	A+	1.00	-1.5	2.42	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_1059	3.00	4.00	4.00	n/a	3.00	3.33	3.85	B+	A+	3.62	A-	1.00	-1.5	2.12	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_422	3.00	4.00	3.67	n/a	3.00	3.33	3.57	B+	A-	3.46	B+	2.00	-0.5	2.96	B-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_788	2.50	3.36	4.00	n/a	4.00	2.78	4.00	B-	A+	3.45	B+	1.00	-1.5	1.95	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_516	3.00	3.13	3.00	n/a	3.00	3.04	3.00	B+	B+	3.02	B+	1.00	-1.5	1.52	C-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Forested Wetland	Small	MountSpokane_718	2.50	3.46	4.00	3.33	3.00	3.15	3.67	B+	A-	3.51	A-	4.00	0.75	4.26	A+			Yes
Forested Wetland	Small	MountSpokane_719	2.50	3.46	4.00	3.33	3.00	3.15	3.67	B+	A-	3.51	A-	4.00	0.75	4.26	A+			Yes
Forested Wetland	Small	MountSpokane_706	2.50	3.46	4.00	4.00	4.00	3.15	4.00	B+	A+	3.74	A-	3.00	0.25	3.99	A+			Yes
Forested Wetland	Small	MountSpokane_707	2.50	3.46	4.00	4.00	4.00	3.15	4.00	B+	A+	3.74	A-	3.00	0.25	3.99	A+			Yes
Forested Wetland	Small	MountSpokane_708	2.50	3.46	4.00	4.00	4.00	3.15	4.00	B+	A+	3.74	A-	3.00	0.25	3.99	A+			Yes
Upland Forest & Woodland	matrix	MountSpokane_601	2.00	3.72	3.93	n/a	3.00	2.57	3.79	B-	A-	3.24	B+	1.00	-1.5	1.74	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_602	2.00	3.72	3.93	n/a	3.00	2.57	3.79	B-	A-	3.24	B+	1.00	-1.5	1.74	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_612	2.00	3.72	3.93	n/a	3.00	2.57	3.79	B-	A-	3.24	B+	1.00	-1.5	1.74	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_716	2.00	3.72	3.93	n/a	3.00	2.57	3.79	B-	A-	3.24	B+	1.00	-1.5	1.74	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_722	2.00	3.72	3.93	n/a	3.00	2.57	3.79	B-	A-	3.24	B+	1.00	-1.5	1.74	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_725	2.00	3.72	3.93	n/a	3.00	2.57	3.79	B-	A-	3.24	B+	1.00	-1.5	1.74	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_726	2.00	3.72	3.93	n/a	3.00	2.57	3.79	B-	A-	3.24	B+	1.00	-1.5	1.74	C-			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_631	3.00	3.46	4.00	3.33	4.00	3.31	3.77	B+	A-	3.63	A-	4.00	0.75	4.38	A+			Yes
Forested Wetland	Small	MountSpokane_651	2.50	3.46	4.00	4.00	4.00	3.15	4.00	B+	A+	3.74	A-	3.00	0.25	3.99	A+			Yes
Forested Wetland	Small	MountSpokane_653	2.50	3.46	4.00	4.00	4.00	3.15	4.00	B+	A+	3.74	A-	3.00	0.25	3.99	A+			Yes
Upland Forest & Woodland	matrix	MountSpokane_909	3.00	3.00	3.93	n/a	3.00	3.00	3.79	B+	A-	3.44	B+	1.00	-1.5	1.94	C-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_914	3.00	3.00	3.93	n/a	3.00	3.00	3.79	B+	A-	3.44	B+	1.00	-1.5	1.94	C-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_346	3.00	3.72	3.27	n/a	2.00	3.24	3.08	B+	B+	3.15	B+	1.00	-1.5	1.65	C-			Addt. analysis needed
Forested Wetland	Small	MountSpokane_657	2.50	3.46	4.00	4.00	4.00	3.15	4.00	B+	A+	3.74	A-	3.00	0.25	3.99	A+			Yes
Upland Forest & Woodland	matrix	MountSpokane_556	3.50	3.72	3.60	n/a	3.00	3.57	3.51	A-	A-	3.54	A-	1.00	-1.5	2.04	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_427	3.50	3.46	3.93	n/a	3.00	3.49	3.79	B+	A-	3.66	A-	1.00	-1.5	2.16	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_770	2.50	3.36	3.47	n/a	1.00	2.78	3.10	B-	B+	2.96	B-	1.00	-1.5	1.46	D			Addt. analysis needed
Forested Wetland	Small	MountSpokane_735	2.50	3.46	4.00	4.00	4.00	3.15	4.00	B+	A+	3.74	A-	3.00	0.25	3.99	A+			Yes
Forested Wetland	Small	MountSpokane_737	2.50	3.46	4.00	4.00	4.00	3.15	4.00	B+	A+	3.74	A-	3.00	0.25	3.99	A+			Yes
Forested Wetland	Small	MountSpokane_743	2.50	3.46	4.00	4.00	4.00	3.15	4.00	B+	A+	3.74	A-	3.00	0.25	3.99	A+			Yes
Upland Forest & Woodland	Large	MountSpokane_711	2.00	3.72	4.00	n/a	4.00	2.86	4.00	B-	A+	3.49	B+	2.00	-0.33	3.16	B+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_907	3.00	2.71	3.73	n/a	3.00	2.90	3.62	B-	A-	3.30	B+	1.00	-1.5	1.80	C-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Nonforested Wetland	Small	MountSpokane_283	2.50	4.00	4.00	4.00	4.00	3.51	4.00	A-	A+	3.85	A+	4.00	0.75	4.60	A+			Yes
Nonforested Wetland	Small	MountSpokane_937	3.00	4.00	4.00	4.00	4.00	3.67	4.00	A-	A+	3.90	A+	4.00	0.75	4.65	A+			Yes
Upland Forest & Woodland	matrix	MountSpokane_479	3.00	2.71	3.73	n/a	3.00	2.90	3.62	B-	A-	3.30	B+	1.00	-1.5	1.80	C-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_554	3.50	4.00	2.80	n/a	4.00	3.67	2.98	A-	B-	3.29	B+	1.00	-1.5	1.79	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_881	2.00	2.06	3.27	n/a	3.00	2.02	3.23	C+	B+	2.68	B-	1.00	-1.5	1.18	D			Addt. analysis needed

Appendix H. Complete EIA Data and Comments

Ecosystem Type	Patch Type	Veg Polygon Keylink	Landscape MEF	Buffer MEF	Vegetation MEF	Hydrology MEF	Soil/Substrate MEF	Landscape Context Score	Condition Score	Landscape Context Rank	Condition Rank	EIA Score	EIA Rank	Size Score	Size "Points"	EORANK Score	EORANK	User Adjusted Combined EO Rank	User Adjusted EO Rank Reason	Element Occurrence?
Upland Forest & Woodland	matrix	MountSpokane_915	3.50	3.00	3.80	n/a	3.00	3.34	3.68	B+	A-	3.52	A-	1.00	-1.5	2.02	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_919	3.00	3.00	3.93	n/a	3.00	3.00	3.79	B+	A-	3.44	B+	1.00	-1.5	1.94	C-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_921	3.00	3.00	3.93	n/a	3.00	3.00	3.79	B+	A-	3.44	B+	1.00	-1.5	1.94	C-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_929	3.50	3.00	2.93	n/a	3.00	3.34	2.94	B+	B-	3.12	B+	1.00	-1.5	1.62	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_260	3.00	3.72	4.00	n/a	4.00	3.24	4.00	B+	A+	3.66	A-	1.00	-1.5	2.16	C+	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_261	3.00	3.22	3.80	n/a	3.00	3.07	3.68	B+	A-	3.41	B+	1.00	-1.5	1.91	C-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_922	3.00	2.71	3.73	n/a	3.00	2.90	3.62	B-	A-	3.30	B+	1.00	-1.5	1.80	C-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MKC_1	3.50	4.00	3.27	n/a	4.00	3.67	3.38	A-	B+	3.51	A-	1.00	-1.5	2.01	C+			Addt. analysis needed
Nonforested Upland	Large	MKC_10	3.50	4.00	3.00	n/a	3.00	3.75	3.00	A-	B+	3.34	B+	2.00	-0.33	3.01	B+	A-	Combined size = B (+0.33 pts); Combined EO Rank Score = 3.74 (A-)	Yes
Nonforested Upland	Large	MKC_11	3.50	4.00	3.00	n/a	3.00	3.75	3.00	A-	B+	3.34	B+	2.00	-0.33	3.01	B+	A-	Combined size = B (+0.33 pts); Combined EO Rank Score = 3.74 (A-)	Yes
Nonforested Upland	Large	MKC_12	3.50	4.00	3.00	n/a	3.00	3.75	3.00	A-	B+	3.34	B+	2.00	-0.33	3.01	B+	A-	Combined size = B (+0.33 pts); Combined EO Rank Score = 3.74 (A-)	Yes
Nonforested Upland	Large	MKC_13	3.50	4.00	3.00	n/a	3.00	3.75	3.00	A-	B+	3.34	B+	2.00	-0.33	3.01	B+	A-	Combined size = B (+0.33 pts); Combined EO Rank Score = 3.74 (A-)	Yes
Nonforested Upland	Large	MKC_14	3.50	4.00	3.00	n/a	3.00	3.75	3.00	A-	B+	3.34	B+	2.00	-0.33	3.01	B+	A-	Combined size = B (+0.33 pts); Combined EO Rank Score = 3.74 (A-)	Yes
Nonforested Upland	Large	MKC_15	3.50	4.00	3.00	n/a	3.00	3.75	3.00	A-	B+	3.34	B+	2.00	-0.33	3.01	B+	A-	Combined size = B (+0.33 pts); Combined EO Rank Score = 3.74 (A-)	Yes
Nonforested Upland	Large	MKC_16	3.50	4.00	3.63	n/a	4.00	3.75	3.68	A-	A-	3.71	A-	2.00	-0.33	3.38	B+			Addt. analysis needed
Upland Forest & Woodland	matrix	MKC_17	3.50	4.00	3.20	n/a	3.00	3.67	3.17	A-	B+	3.39	B+	1.00	-1.5	1.89	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MKC_18	3.50	4.00	3.20	n/a	3.00	3.67	3.17	A-	B+	3.39	B+	1.00	-1.5	1.89	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MKC_19	3.50	4.00	3.20	n/a	3.00	3.67	3.17	A-	B+	3.39	B+	1.00	-1.5	1.89	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MKC_2	3.50	4.00	4.00	n/a	4.00	3.67	4.00	A-	A+	3.85	A+	1.00	-1.5	2.35	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MKC_20	3.50	4.00	3.20	n/a	3.00	3.67	3.17	A-	B+	3.39	B+	1.00	-1.5	1.89	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MKC_21	3.50	4.00	3.20	n/a	3.00	3.67	3.17	A-	B+	3.39	B+	1.00	-1.5	1.89	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MKC_3	3.50	4.00	4.00	n/a	4.00	3.67	4.00	A-	A+	3.85	A+	1.00	-1.5	2.35	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MKC_4	3.00	3.13	4.00	n/a	3.00	3.04	3.85	B+	A+	3.49	B+	1.00	-1.5	1.99	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MKC_5	3.50	4.00	3.20	n/a	3.00	3.67	3.17	A-	B+	3.39	B+	1.00	-1.5	1.89	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MKC_6	3.50	4.00	4.00	n/a	3.00	3.67	3.85	A-	A+	3.77	A-	1.00	-1.5	2.27	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MKC_7	3.50	4.00	3.20	n/a	3.00	3.67	3.17	A-	B+	3.39	B+	1.00	-1.5	1.89	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MKC_8	3.50	4.00	3.20	n/a	3.00	3.67	3.17	A-	B+	3.39	B+	1.00	-1.5	1.89	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MKC_9	3.50	4.00	3.20	n/a	3.00	3.67	3.17	A-	B+	3.39	B+	1.00	-1.5	1.89	C-			Addt. analysis needed
Nonforested Upland	Large	MountSpokane_004	2.00	2.45	3.75	n/a	3.00	2.22	3.64	C+	A-	3.00	B+	2.00	-0.33	2.67	B-	A-	Combined size = B (+0.33 pts); Combined EO Rank Score = 3.74 (A-)	Yes
Nonforested Upland	Large	MountSpokane_004	2.00	2.45	3.75	n/a	3.00	2.22	3.64	C+	A-	3.00	B+	2.00	-0.33	2.67	B-	A-	Combined size = B (+0.33 pts); Combined EO Rank Score = 3.74 (A-)	Yes
Nonforested Upland	Large	MountSpokane_004	2.00	2.45	3.75	n/a	3.00	2.22	3.64	C+	A-	3.00	B+	2.00	-0.33	2.67	B-	A-	Combined size = B (+0.33 pts); Combined EO Rank Score = 3.74 (A-)	Yes
Nonforested Upland	Large	MountSpokane_004	2.00	2.45	3.75	n/a	3.00	2.22	3.64	C+	A-	3.00	B+	2.00	-0.33	2.67	B-	A-	Combined size = B (+0.33 pts); Combined EO Rank Score = 3.74 (A-)	Yes
Nonforested Upland	Large	MountSpokane_005	2.50	2.71	3.25	n/a	2.00	2.61	3.06	B-	B+	2.86	B-	2.00	-0.33	2.53	B-	A-	Combined size = B (+0.33 pts); Combined EO Rank Score = 3.74 (A-)	Yes
Nonforested Upland	Large	MountSpokane_005	2.50	2.71	3.25	n/a	2.00	2.61	3.06	B-	B+	2.86	B-	2.00	-0.33	2.53	B-	A-	Combined size = B (+0.33 pts); Combined EO Rank Score = 3.74 (A-)	Yes
Nonforested Upland	Large	MountSpokane_006	3.50	4.00	3.50	n/a	3.00	3.75	3.43	A-	B+	3.57	A-	1.00	-1	2.57	B-	A-	Combined size = B (+0.33 pts); Combined EO Rank Score = 3.74 (A-)	Yes
Nonforested Upland	Large	MountSpokane_007	3.50	4.00	3.50	n/a	3.00	3.75	3.43	A-	B+	3.57	A-	1.00	-1	2.57	B-	A-	Combined size = B (+0.33 pts); Combined EO Rank Score = 3.74 (A-)	Yes
Nonforested Upland	Large	MountSpokane_008	3.50	4.00	3.50	n/a	3.00	3.75	3.43	A-	B+	3.57	A-	1.00	-1	2.57	B-	A-	Combined size = B (+0.33 pts); Combined EO Rank Score = 3.74 (A-)	Yes
Nonforested Upland	Large	MountSpokane_009	3.50	4.00	3.50	n/a	3.00	3.75	3.43	A-	B+	3.57	A-	1.00	-1	2.57	B-	A-	Combined size = B (+0.33 pts); Combined EO Rank Score = 3.74 (A-)	Yes
Nonforested Upland	Large	MountSpokane_010	3.50	4.00	3.50	n/a	3.00	3.75	3.43	A-	B+	3.57	A-	1.00	-1	2.57	B-	A-	Combined size = B (+0.33 pts); Combined EO Rank Score = 3.74 (A-)	Yes
Nonforested Upland	Large	MountSpokane_011	3.50	4.00	3.50	n/a	3.00	3.75	3.43	A-	B+	3.57	A-	1.00	-1	2.57	B-	A-	Combined size = B (+0.33 pts); Combined EO Rank Score = 3.74 (A-)	Yes
Nonforested Upland	Large	MountSpokane_012	3.00	4.00	3.63	n/a	3.00	3.50	3.53	A-	A-	3.52	A-	1.00	-1	2.52	B-	B-	Combined EO RANK Score = 2.58 (B-)	Yes
Nonforested Upland	Large	MountSpokane_013	3.00	4.00	4.00	n/a	4.00	3.50	4.00	A-	A+	3.78	A-	1.00	-1	2.78	B-	A-	Combined size = B (+0.33 pts); Combined EO Rank Score = 3.74 (A-)	Yes
Nonforested Upland	Large	MountSpokane_014	3.00	4.00	4.00	n/a	4.00	3.50	4.00	A-	A+	3.78	A-	1.00	-1	2.78	B-	A-	Combined size = B (+0.33 pts); Combined EO Rank Score = 3.74 (A-)	Yes
Nonforested Upland	Large	MountSpokane_015	3.00	4.00	3.63	n/a	3.00	3.50	3.53	A-	A-	3.52	A-	1.00	-1	2.52	B-	B-	Combined EO RANK Score = 2.58 (B-)	Yes

Appendix H. Complete EIA Data and Comments

Ecosystem Type	Patch Type	Veg Polygon Keylink	Landscape MEF	Buffer MEF	Vegetation MEF	Hydrology MEF	Soil/Substrate MEF	Landscape Context Score	Condition Score	Landscape Context Rank	Condition Rank	EIA Score	EIA Rank	Size Score	Size "Points"	EORANK Score	EORANK	User Adjusted Combined EO Rank	User Adjusted EO Rank Reason	Element Occurrence?
Nonforested Upland	Large	MountSpokane_016	3.50	4.00	3.13	n/a	3.00	3.75	3.11	A-	B+	3.40	B+	2.00	-0.33	3.07	B+	A-	Combined size = B (+0.33 pts); Combined EO Rank Score = 3.74 (A-)	Yes
Nonforested Upland	Large	MountSpokane_017	3.50	4.00	3.38	n/a	3.00	3.75	3.32	A-	B+	3.51	A-	2.00	-0.33	3.18	B+	B+	Includes MTSP_G273_468_2022_08_10	Yes
Nonforested Upland	Large	MountSpokane_018	3.50	4.00	3.38	n/a	3.00	3.75	3.32	A-	B+	3.51	A-	2.00	-0.33	3.18	B+	B+	Includes MTSP_G273_468_2022_08_10	Yes
Nonforested Upland	Large	MountSpokane_019	3.50	4.00	3.38	n/a	3.00	3.75	3.32	A-	B+	3.51	A-	2.00	-0.33	3.18	B+	B+	Includes MTSP_G273_468_2022_08_10	Yes
Nonforested Upland	Large	MountSpokane_020	3.50	4.00	3.38	n/a	3.00	3.75	3.32	A-	B+	3.51	A-	2.00	-0.33	3.18	B+	B+	Includes MTSP_G273_468_2022_08_10	Yes
Nonforested Upland	Large	MountSpokane_021	3.50	4.00	3.38	n/a	3.00	3.75	3.32	A-	B+	3.51	A-	2.00	-0.33	3.18	B+	B+	Includes MTSP_G273_468_2022_08_10	Yes
Nonforested Upland	Large	MountSpokane_022	3.50	4.00	3.38	n/a	3.00	3.75	3.32	A-	B+	3.51	A-	2.00	-0.33	3.18	B+	B+	Includes MTSP_G273_468_2022_08_10	Yes
Nonforested Upland	Large	MountSpokane_023	3.50	4.00	3.13	n/a	3.00	3.75	3.11	A-	B+	3.40	B+	2.00	-0.33	3.07	B+	A-	Combined size = B (+0.33 pts); Combined EO Rank Score = 3.74 (A-)	Yes
Nonforested Upland	Large	MountSpokane_024	3.50	4.00	3.38	n/a	3.00	3.75	3.32	A-	B+	3.51	A-	2.00	-0.33	3.18	B+	B+	Includes MTSP_G273_468_2022_08_10	Yes
Nonforested Upland	Large	MountSpokane_025	3.50	4.00	3.13	n/a	3.00	3.75	3.11	A-	B+	3.40	B+	2.00	-0.33	3.07	B+	A-	Combined size = B (+0.33 pts); Combined EO Rank Score = 3.74 (A-)	Yes
Nonforested Upland	Large	MountSpokane_026	3.50	4.00	3.38	n/a	3.00	3.75	3.32	A-	B+	3.51	A-	2.00	-0.33	3.18	B+	B+	Includes MTSP_G273_468_2022_08_10	Yes
Nonforested Upland	Large	MountSpokane_027	3.50	4.00	3.38	n/a	3.00	3.75	3.32	A-	B+	3.51	A-	2.00	-0.33	3.18	B+	B+	Includes MTSP_G273_468_2022_08_10	Yes
Nonforested Upland	Large	MountSpokane_028	3.50	4.00	3.38	n/a	3.00	3.75	3.32	A-	B+	3.51	A-	2.00	-0.33	3.18	B+	B+	Includes MTSP_G273_468_2022_08_10	Yes
Nonforested Upland	Large	MountSpokane_029	3.50	4.00	3.38	n/a	3.00	3.75	3.32	A-	B+	3.51	A-	2.00	-0.33	3.18	B+	B+	Includes MTSP_G273_468_2022_08_10	Yes
Nonforested Upland	Large	MountSpokane_030	3.50	4.00	3.13	n/a	3.00	3.75	3.11	A-	B+	3.40	B+	2.00	-0.33	3.07	B+	A-	Combined size = B (+0.33 pts); Combined EO Rank Score = 3.74 (A-)	Yes
Nonforested Upland	Large	MountSpokane_031	3.50	4.00	3.13	n/a	3.00	3.75	3.11	A-	B+	3.40	B+	2.00	-0.33	3.07	B+	A-	Combined size = B (+0.33 pts); Combined EO Rank Score = 3.74 (A-)	Yes
Nonforested Upland	Large	MountSpokane_032	3.50	4.00	3.13	n/a	3.00	3.75	3.11	A-	B+	3.40	B+	2.00	-0.33	3.07	B+	A-	Combined size = B (+0.33 pts); Combined EO Rank Score = 3.74 (A-)	Yes
Nonforested Upland	Large	MountSpokane_033	3.50	4.00	3.13	n/a	3.00	3.75	3.11	A-	B+	3.40	B+	2.00	-0.33	3.07	B+	A-	Combined size = B (+0.33 pts); Combined EO Rank Score = 3.74 (A-)	Yes
Nonforested Upland	Large	MountSpokane_034	3.50	4.00	3.13	n/a	3.00	3.75	3.11	A-	B+	3.40	B+	2.00	-0.33	3.07	B+	A-	Combined size = B (+0.33 pts); Combined EO Rank Score = 3.74 (A-)	Yes
Nonforested Upland	Large	MountSpokane_035	3.50	4.00	3.38	n/a	3.00	3.75	3.32	A-	B+	3.51	A-	2.00	-0.33	3.18	B+	B+	Includes MTSP_G273_468_2022_08_10	Yes
Nonforested Upland	Large	MountSpokane_036	3.50	4.00	3.13	n/a	3.00	3.75	3.11	A-	B+	3.40	B+	2.00	-0.33	3.07	B+	A-	Combined size = B (+0.33 pts); Combined EO Rank Score = 3.74 (A-)	Yes
Nonforested Upland	Large	MountSpokane_037	3.50	4.00	3.38	n/a	3.00	3.75	3.32	A-	B+	3.51	A-	2.00	-0.33	3.18	B+	B+	Includes MTSP_G273_468_2022_08_10	Yes
Nonforested Upland	Large	MountSpokane_038	3.50	4.00	3.13	n/a	3.00	3.75	3.11	A-	B+	3.40	B+	2.00	-0.33	3.07	B+	A-	Combined size = B (+0.33 pts); Combined EO Rank Score = 3.74 (A-)	Yes
Nonforested Upland	Large	MountSpokane_039	3.50	4.00	3.38	n/a	3.00	3.75	3.32	A-	B+	3.51	A-	2.00	-0.33	3.18	B+	B+	Includes MTSP_G273_468_2022_08_10	Yes
Upland Forest & Woodland	Matrix	MountSpokane_043	3.00	3.46	3.40	n/a	2.00	3.15	3.19	B+	B+	3.17	B+	1.00	-1.5	1.67	C-			No
Upland Forest & Woodland	matrix	MountSpokane_1000	3.50	4.00	4.00	n/a	4.00	3.67	4.00	A-	A+	3.85	A+	1.00	-1.5	2.35	C+			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_1001	3.00	3.46	3.60	n/a	3.00	3.23	3.51	B+	A-	3.38	B+	2.00	-0.33	3.05	B+			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_1002	3.00	3.46	3.60	n/a	3.00	3.23	3.51	B+	A-	3.38	B+	2.00	-0.33	3.05	B+			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_1003	3.00	3.46	3.60	n/a	3.00	3.23	3.51	B+	A-	3.38	B+	2.00	-0.33	3.05	B+			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_1004	3.00	3.46	3.60	n/a	3.00	3.23	3.51	B+	A-	3.38	B+	2.00	-0.33	3.05	B+			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_1005	3.00	3.46	3.60	n/a	3.00	3.23	3.51	B+	A-	3.38	B+	2.00	-0.33	3.05	B+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_1006	3.50	4.00	3.27	n/a	4.00	3.67	3.38	A-	B+	3.51	A-	1.00	-1.5	2.01	C+	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_1007	3.50	4.00	4.00	n/a	4.00	3.67	4.00	A-	A+	3.85	A+	1.00	-1.5	2.35	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_1008	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	2.00	-0.5	3.05	B+			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_1010	2.50	2.45	3.60	n/a	4.00	2.47	3.66	C+	A-	3.13	B+	2.00	-0.33	2.80	B-			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_1017	3.00	3.22	3.40	n/a	4.00	3.11	3.49	B+	B+	3.32	B+	3.00	0.33	3.65	A-			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_1019	3.00	3.22	3.40	n/a	4.00	3.11	3.49	B+	B+	3.32	B+	3.00	0.33	3.65	A-			Addt. analysis needed
Upland Forest & Woodland	Matrix	MountSpokane_1020	4.00	4.00	4.00	n/a	4.00	4.00	4.00	A+	A+	4.00	A+	1.00	-1.5	2.50	B-			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_1021	3.00	3.22	3.40	n/a	4.00	3.11	3.49	B+	B+	3.32	B+	3.00	0.33	3.65	A-			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_1022	3.00	3.22	3.40	n/a	4.00	3.11	3.49	B+	B+	3.32	B+	3.00	0.33	3.65	A-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_1023	3.00	3.13	4.00	n/a	3.00	3.04	3.85	B+	A+	3.49	B+	1.00	-1.5	1.99	C-			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_1026	2.50	3.46	3.80	n/a	4.00	2.98	3.83	B-	A+	3.45	B+	2.00	-0.33	3.12	B+			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_1030	3.00	3.22	3.40	n/a	4.00	3.11	3.49	B+	B+	3.32	B+	3.00	0.33	3.65	A-			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_1031	3.00	3.22	3.40	n/a	4.00	3.11	3.49	B+	B+	3.32	B+	3.00	0.33	3.65	A-			Addt. analysis needed
Upland Forest & Woodland	Matrix	MountSpokane_1038	3.50	4.00	4.00	n/a	4.00	3.67	4.00	A-	A+	3.85	A+	1.00	-1.5	2.35	C+			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_1040	3.00	3.22	3.40	n/a	4.00	3.11	3.49	B+	B+	3.32	B+	3.00	0.33	3.65	A-			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_1041	2.50	2.45	4.00	n/a	4.00	2.47	4.00	C+	A+	3.31	B+	2.00	-0.33	2.98	B-			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_1042	2.50	2.45	4.00	n/a	4.00	2.47	4.00	C+	A+	3.31	B+	2.00	-0.33	2.98	B-			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_1043	2.50	2.45	4.00	n/a	4.00	2.47	4.00	C+	A+	3.31	B+	2.00	-0.33	2.98	B-			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_1044	2.50	2.45	4.00	n/a	4.00	2.47	4.00	C+	A+	3.31	B+	2.00	-0.33	2.98	B-			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_1045	3.00	3.22	3.40	n/a	4.00	3.11	3.49	B+	B+	3.32	B+	3.00	0.33	3.65	A-			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_1048	3.00	3.72	4.00	4.00	4.00	3.48	4.00	B+	A+	3.85	A+	3.00	0.25	4.10	A+			Yes
Nonforested Wetland	Small	MountSpokane_1049	3.00	3.72	4.00	4.00	4.00	3.48	4.00	B+	A+	3.85	A+	3.00	0.25	4.10	A+			Yes
Nonforested Wetland	Small	MountSpokane_514	3.50	3.22	3.75	4.00	3.00	3.31	3.76	B+	A-	3.63	A-	4.00	0.75	4.38	A+			Yes
Nonforested Wetland	Small	MountSpokane_515	3.50	3.22	3.75	4.00	3.00	3.31	3.76	B+	A-	3.63	A-	4.00	0.75	4.38	A+			Yes
Upland Forest & Woodland	matrix	MountSpokane_1055	4.00	4.00	3.93	n/a	4.00	4.00	3.94	A+	A+	3.97	A+	1.00	-1.5	2.47	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_1056	4.00	4.00	3.93	n/a	4.00	4.00	3.94	A+	A+	3.97	A+	1.00	-1.5	2.47	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_1058	3.50	3.00	3.80	n/a	3.00	3.34	3.68	B+	A-	3.52	A-	1.00	-1.5	2.02	C+			Addt. analysis needed

Appendix H. Complete EIA Data and Comments

Ecosystem Type	Patch Type	Veg Polygon Keylink	Landscape MEF	Buffer MEF	Vegetation MEF	Hydrology MEF	Soil/Substrate MEF	Landscape Context Score	Condition Score	Landscape Context Rank	Condition Rank	EIA Score	EIA Rank	Size Score	Size "Points"	EORANK Score	EORANK	User Adjusted Combined EO Rank	User Adjusted EO Rank Reason	Element Occurrence?
Upland Forest & Woodland	Large	MountSpokane_1060	3.00	3.22	3.40	n/a	4.00	3.11	3.49	B+	B+	3.32	B+	3.00	0.33	3.65	A-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_1061	2.50	3.00	3.40	n/a	2.00	2.67	3.19	B-	B+	2.95	B-	1.00	-1.5	1.45	D			Addt. analysis needed
Forested Wetland	Small	MountSpokane_1062	4.00	4.00	4.00	4.00	4.00	4.00	4.00	A+	A+	4.00	A+	3.00	0.25	4.25	A+			Yes
Nonforested Wetland	Small	MountSpokane_1063	4.00	4.00	3.88	4.00	4.00	4.00	3.93	A+	A+	3.95	A+	4.00	0.75	4.70	A+			Yes
Nonforested Wetland	Small	MountSpokane_527	3.50	3.22	3.75	4.00	3.00	3.31	3.76	B+	A-	3.63	A-	4.00	0.75	4.38	A+			Yes
Nonforested Wetland	Small	MountSpokane_543	4.00	4.00	4.00	4.00	4.00	4.00	4.00	A+	A+	4.00	A+	4.00	0.75	4.75	A+			Yes
Nonforested Upland	Large	MountSpokane_1066	2.50	3.72	4.00	n/a	3.00	3.11	3.85	B+	A+	3.52	A-	1.00	-1	2.52	B-	A-	Combined size = B (+0.33 pts); Combined EO Rank Score = 3.74 (A-)	Yes
Nonforested Wetland	Small	MountSpokane_865	4.00	4.00	4.00	4.00	4.00	4.00	4.00	A+	A+	4.00	A+	4.00	0.75	4.75	A+			Yes
Upland Forest & Woodland	Matrix	MountSpokane_167	3.00	3.46	4.00	n/a	4.00	3.15	4.00	B+	A+	3.62	A-	1.00	-1.5	2.12	C+	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	Large	MountSpokane_205	2.50	3.46	3.80	n/a	4.00	2.98	3.83	B-	A+	3.45	B+	2.00	-0.33	3.12	B+			Addt. analysis needed
Upland Forest & Woodland	Matrix	MountSpokane_207	2.50	3.13	4.00	n/a	4.00	2.71	4.00	B-	A+	3.42	B+	1.00	-1.5	1.92	C-			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_212	3.50	3.46	4.00	n/a	4.00	3.48	4.00	B+	A+	3.77	A-	3.00	0.33	4.10	A+			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_224	2.50	3.46	4.00	n/a	4.00	2.98	4.00	B-	A+	3.54	A-	2.00	-0.33	3.21	B+			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_225	2.50	3.46	4.00	n/a	4.00	2.98	4.00	B-	A+	3.54	A-	2.00	-0.33	3.21	B+			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_226	2.50	3.46	4.00	n/a	4.00	2.98	4.00	B-	A+	3.54	A-	2.00	-0.33	3.21	B+			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_228	3.00	3.22	3.40	n/a	4.00	3.11	3.49	B+	B+	3.32	B+	3.00	0.33	3.65	A-			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_229	3.00	3.22	3.40	n/a	4.00	3.11	3.49	B+	B+	3.32	B+	3.00	0.33	3.65	A-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_231	2.50	3.72	4.00	n/a	3.00	2.90	3.85	B-	A+	3.42	B+	1.00	-1.5	1.92	C-			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_232	3.00	2.83	4.00	n/a	4.00	2.91	4.00	B-	A+	3.51	A-	1.00	-1	2.51	B-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_234	3.00	3.13	4.00	n/a	3.00	3.04	3.85	B+	A+	3.49	B+	1.00	-1.5	1.99	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_245	4.00	4.00	3.93	n/a	4.00	4.00	3.94	A+	A+	3.97	A+	1.00	-1.5	2.47	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_247	3.50	4.00	4.00	n/a	4.00	3.67	4.00	A-	A+	3.85	A+	1.00	-1.5	2.35	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_250	4.00	4.00	4.00	n/a	3.00	4.00	3.85	A+	A+	3.92	A+	1.00	-1.5	2.42	C+	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	Large	MountSpokane_253	3.50	4.00	4.00	n/a	4.00	3.75	4.00	A-	A+	3.89	A+	2.00	-0.33	3.56	A-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_254	3.50	4.00	3.47	n/a	2.00	3.67	3.25	A-	B+	3.43	B+	1.00	-1.5	1.93	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_255	4.00	4.00	4.00	n/a	4.00	4.00	4.00	A+	A+	4.00	A+	1.00	-1.5	2.50	B-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_256	4.00	4.00	3.93	n/a	4.00	4.00	3.94	A+	A+	3.97	A+	1.00	-1.5	2.47	C+			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_257	4.00	4.00	4.00	n/a	3.00	4.00	3.85	A+	A+	3.92	A+	3.00	0.33	4.25	A+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_258	4.00	4.00	4.00	n/a	4.00	4.00	4.00	A+	A+	4.00	A+	1.00	-1.5	2.50	B-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	Large	MountSpokane_259	4.00	4.00	4.00	n/a	3.00	4.00	3.85	A+	A+	3.92	A+	3.00	0.33	4.25	A+			Addt. analysis needed
Upland Forest & Woodland	Matrix	MountSpokane_264	3.50	4.00	4.00	n/a	4.00	3.67	4.00	A-	A+	3.85	A+	1.00	-1.5	2.35	C+			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_269	4.00	4.00	4.00	n/a	4.00	4.00	4.00	A+	A+	4.00	A+	1.00	-1	3.00	B+			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_544	4.00	4.00	4.00	4.00	4.00	4.00	4.00	A+	A+	4.00	A+	4.00	0.75	4.75	A+			Yes
Nonforested Wetland	Small	MountSpokane_934	4.00	4.00	4.00	4.00	4.00	4.00	4.00	A+	A+	4.00	A+	4.00	0.75	4.75	A+			Yes
Upland Forest & Woodland	matrix	MountSpokane_306	3.00	3.13	4.00	n/a	3.00	3.04	3.85	B+	A+	3.49	B+	1.00	-1.5	1.99	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_309	3.00	3.72	4.00	n/a	4.00	3.24	4.00	B+	A+	3.66	A-	1.00	-1.5	2.16	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_313	3.00	3.13	4.00	n/a	3.00	3.04	3.85	B+	A+	3.49	B+	1.00	-1.5	1.99	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_314	3.00	3.13	4.00	n/a	3.00	3.04	3.85	B+	A+	3.49	B+	1.00	-1.5	1.99	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_315	3.00	3.13	4.00	n/a	3.00	3.04	3.85	B+	A+	3.49	B+	1.00	-1.5	1.99	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_317	3.50	3.00	4.00	n/a	4.00	3.34	4.00	B+	A+	3.70	A-	1.00	-1.5	2.20	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_318	3.50	3.00	4.00	n/a	4.00	3.34	4.00	B+	A+	3.70	A-	1.00	-1.5	2.20	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_321	3.50	3.00	4.00	n/a	4.00	3.34	4.00	B+	A+	3.70	A-	1.00	-1.5	2.20	C+			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_936	3.00	3.72	4.00	4.00	4.00	3.48	4.00	B+	A+	3.85	A+	4.00	0.75	4.60	A+			Yes
Nonforested Wetland	Small	MountSpokane_986	4.00	3.46	4.00	4.00	4.00	3.64	4.00	A-	A+	3.89	A+	4.00	0.75	4.64	A+			Yes
Nonforested Wetland	Small	MountSpokane_689	4.00	4.00	4.00	4.00	4.00	4.00	4.00	A+	A+	4.00	A+	4.00	0.75	4.75	A+			Yes
Nonforested Wetland	Small	MountSpokane_690	4.00	4.00	4.00	4.00	4.00	4.00	4.00	A+	A+	4.00	A+	4.00	0.75	4.75	A+			Yes
Nonforested Wetland	Small	MountSpokane_740	4.00	4.00	4.00	4.00	4.00	4.00	4.00	A+	A+	4.00	A+	4.00	0.75	4.75	A+			Yes
Nonforested Wetland	Small	MountSpokane_370	3.00	3.72	4.00	4.00	4.00	3.48	4.00	B+	A+	3.85	A+	3.00	0.25	4.10	A+			Yes
Upland Forest & Woodland	Large	MountSpokane_338	3.50	3.46	4.00	n/a	4.00	3.48	4.00	B+	A+	3.77	A-	3.00	0.33	4.10	A+			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_379	3.00	3.72	4.00	4.00	4.00	3.48	4.00	B+	A+	3.85	A+	3.00	0.25	4.10	A+			Yes
Upland Forest & Woodland	matrix	MountSpokane_341	3.50	4.00	4.00	n/a	4.00	3.67	4.00	A-	A+	3.85	A+	1.00	-1.5	2.35	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_342	3.50	4.00	4.00	n/a	4.00	3.67	4.00	A-	A+	3.85	A+	1.00	-1.5	2.35	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_343	3.50	4.00	4.00	n/a	4.00	3.67	4.00	A-	A+	3.85	A+	1.00	-1.5	2.35	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_345	3.00	3.72	4.00	n/a	4.00	3.24	4.00	B+	A+	3.66	A-	1.00	-1.5	2.16	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_364	3.50	4.00	4.00	n/a	4.00	3.67	4.00	A-	A+	3.85	A+	1.00	-1.5	2.35	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_366	3.00	3.46	2.33	n/a	2.00	3.15	2.28	B+	C+	2.67	B-	1.00	-1.5	1.17	D			No
Nonforested Wetland	Small	MountSpokane_385	3.00	3.72	4.00	4.00	4.00	3.48	4.00	B+	A+	3.85	A+	3.00	0.25	4.10	A+			Yes
Nonforested Upland	Large	MountSpokane_369	2.50	3.72	3.88	n/a	3.00	3.11	3.74	B+	A-	3.46	B+	2.00	-0.33	3.13	B+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_372	3.00	3.72	4.00	n/a	4.00	3.24	4.00	B+	A+	3.66	A-	1.00	-1.5	2.16	C+	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_373	3.00	3.36	3.80	n/a	3.00	3.12	3.68	B+	A-	3.43	B+	1.00	-1.5	1.93	C-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Nonforested Upland	Large	MountSpokane_374	2.50	3.72	4.00	n/a	3.00	3.11	3.85	B+	A+	3.52	A-	1.00	-1	2.52	B-	A-	Combined size = B (+0.33 pts); Combined EO Rank Score = 3.74 (A-)	Yes

Appendix H. Complete EIA Data and Comments

Ecosystem Type	Patch Type	Veg Polygon Keylink	Landscape MEF	Buffer MEF	Vegetation MEF	Hydrology MEF	Soil/Substrate MEF	Landscape Context Score	Condition Score	Landscape Context Rank	Condition Rank	EIA Score	EIA Rank	Size Score	Size "Points"	EORANK Score	EORANK	User Adjusted Combined EO Rank	User Adjusted EO Rank Reason	Element Occurrence?
Nonforested Upland	Large	MountSpokane_375	2.50	3.72	4.00	n/a	3.00	3.11	3.85	B+	A+	3.52	A-	1.00	-1	2.52	B-	A-	Combined size = B (+0.33 pts); Combined EO Rank Score = 3.74 (A-)	Yes
Nonforested Upland	Large	MountSpokane_376	2.50	3.72	3.63	n/a	3.00	3.11	3.53	B+	A-	3.34	B+	2.00	-0.33	3.01	B+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_378	2.50	3.72	4.00	n/a	3.00	2.90	3.85	B-	A+	3.42	B+	1.00	-1.5	1.92	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_380	3.00	4.00	4.00	n/a	4.00	3.33	4.00	B+	A+	3.70	A-	1.00	-1.5	2.20	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_383	3.00	3.36	3.07	n/a	2.00	3.12	2.91	B+	B-	3.00	B+	1.00	-1.5	1.50	C-			Addt. analysis needed
Nonforested Upland	Large	MountSpokane_384	2.50	3.72	4.00	n/a	3.00	3.11	3.85	B+	A+	3.52	A-	1.00	-1	2.52	B-	A-	Combined size = B (+0.33 pts); Combined EO Rank Score = 3.74 (A-)	Yes
Upland Forest & Woodland	matrix	MountSpokane_386	3.50	4.00	4.00	n/a	4.00	3.67	4.00	A-	A+	3.85	A+	1.00	-1.5	2.35	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_388	2.50	4.00	4.00	n/a	3.00	3.00	3.85	B-	A+	3.47	B+	1.00	-1.5	1.97	C-			Addt. analysis needed
Nonforested Upland	Large	MountSpokane_392	2.50	3.72	3.63	n/a	3.00	3.11	3.53	B+	A-	3.34	B+	2.00	-0.33	3.01	B+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_409	3.00	3.22	3.80	n/a	3.00	3.07	3.68	B+	A-	3.41	B+	1.00	-1.5	1.91	C-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_410	3.50	4.00	4.00	n/a	4.00	3.67	4.00	A-	A+	3.85	A+	1.00	-1.5	2.35	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_411	3.50	4.00	4.00	n/a	4.00	3.67	4.00	A-	A+	3.85	A+	1.00	-1.5	2.35	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_412	4.00	4.00	4.00	n/a	3.00	4.00	3.85	A+	A+	3.92	A+	1.00	-1.5	2.42	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_413	3.50	4.00	3.87	n/a	3.00	3.67	3.74	A-	A-	3.70	A-	1.00	-1.5	2.20	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_414	3.50	4.00	3.87	n/a	3.00	3.67	3.74	A-	A-	3.70	A-	1.00	-1.5	2.20	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_415	3.50	4.00	3.87	n/a	3.00	3.67	3.74	A-	A-	3.70	A-	1.00	-1.5	2.20	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_417	4.00	4.00	4.00	n/a	3.00	4.00	3.85	A+	A+	3.92	A+	1.00	-1.5	2.42	C+	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_418	4.00	4.00	4.00	n/a	3.00	4.00	3.85	A+	A+	3.92	A+	1.00	-1.5	2.42	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_420	4.00	4.00	4.00	n/a	3.00	4.00	3.85	A+	A+	3.92	A+	1.00	-1.5	2.42	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_421	3.00	4.00	3.67	n/a	3.00	3.33	3.57	B+	A-	3.46	B+	2.00	-0.5	2.96	B-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_426	4.00	4.00	4.00	n/a	3.00	4.00	3.85	A+	A+	3.92	A+	1.00	-1.5	2.42	C+	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_429	4.00	4.00	4.00	n/a	3.00	4.00	3.85	A+	A+	3.92	A+	1.00	-1.5	2.42	C+	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_431	3.50	4.00	4.00	n/a	4.00	3.67	4.00	A-	A+	3.85	A+	1.00	-1.5	2.35	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_467	1.50	2.06	3.60	n/a	3.00	1.68	3.51	C-	A-	2.69	B-	1.00	-1.5	1.19	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_472	3.00	3.36	3.80	n/a	3.00	3.12	3.68	B+	A-	3.43	B+	1.00	-1.5	1.93	C-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_474	3.00	3.72	3.07	n/a	2.00	3.24	2.91	B+	B-	3.06	B+	1.00	-1.5	1.56	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_475	2.50	3.00	3.40	n/a	2.00	2.67	3.19	B-	B+	2.95	B-	1.00	-1.5	1.45	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_476	3.50	3.22	4.00	n/a	4.00	3.41	4.00	B+	A+	3.73	A-	1.00	-1.5	2.23	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_477	4.00	3.72	4.00	n/a	4.00	3.91	4.00	A+	A+	3.96	A+	1.00	-1.5	2.46	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_478	3.00	3.00	3.93	n/a	3.00	3.00	3.79	B+	A-	3.44	B+	1.00	-1.5	1.94	C-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_480	3.00	3.13	3.00	n/a	3.00	3.04	3.00	B+	B+	3.02	B+	1.00	-1.5	1.52	C-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	Matrix	MountSpokane_482	3.00	3.36	2.33	n/a	2.00	3.12	2.28	B+	C+	2.66	B-	1.00	-1.5	1.16	D			No
Upland Forest & Woodland	matrix	MountSpokane_491	3.00	2.21	3.40	n/a	3.00	2.74	3.34	B-	B+	3.07	B+	1.00	-1.5	1.57	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_500	3.00	4.00	4.00	n/a	3.00	3.33	3.85	B+	A+	3.62	A-	1.00	-1.5	2.12	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_502	3.00	3.13	3.00	n/a	3.00	3.04	3.00	B+	B+	3.02	B+	1.00	-1.5	1.52	C-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_503	3.00	3.13	3.00	n/a	3.00	3.04	3.00	B+	B+	3.02	B+	1.00	-1.5	1.52	C-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_504	3.00	3.13	3.00	n/a	3.00	3.04	3.00	B+	B+	3.02	B+	1.00	-1.5	1.52	C-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_505	3.00	3.13	3.00	n/a	3.00	3.04	3.00	B+	B+	3.02	B+	1.00	-1.5	1.52	C-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Nonforested Upland	Large	MountSpokane_506	4.00	3.00	3.13	n/a	3.00	3.50	3.11	A-	B+	3.28	B+	1.00	-1	2.28	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_507	3.50	3.00	3.80	n/a	3.00	3.34	3.68	B+	A-	3.52	A-	1.00	-1.5	2.02	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_509	3.00	3.13	3.00	n/a	3.00	3.04	3.00	B+	B+	3.02	B+	1.00	-1.5	1.52	C-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_510	3.00	3.13	3.00	n/a	3.00	3.04	3.00	B+	B+	3.02	B+	1.00	-1.5	1.52	C-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_511	3.00	3.13	3.00	n/a	3.00	3.04	3.00	B+	B+	3.02	B+	1.00	-1.5	1.52	C-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_512	3.00	3.13	3.00	n/a	3.00	3.04	3.00	B+	B+	3.02	B+	1.00	-1.5	1.52	C-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_513	3.00	3.00	3.93	n/a	3.00	3.00	3.79	B+	A-	3.44	B+	1.00	-1.5	1.94	C-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Nonforested Wetland	Small	MountSpokane_387	3.00	3.72	4.00	4.00	4.00	3.48	4.00	B+	A+	3.85	A+	3.00	0.25	4.10	A+			Yes
Nonforested Wetland	Small	MountSpokane_389	3.00	3.72	4.00	4.00	4.00	3.48	4.00	B+	A+	3.85	A+	3.00	0.25	4.10	A+			Yes
Upland Forest & Woodland	matrix	MountSpokane_517	3.50	3.00	3.80	n/a	3.00	3.34	3.68	B+	A-	3.52	A-	1.00	-1.5	2.02	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_519	3.50	3.00	2.93	n/a	3.00	3.34	2.94	B+	B-	3.12	B+	1.00	-1.5	1.62	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_520	3.50	3.00	3.80	n/a	3.00	3.34	3.68	B+	A-	3.52	A-	1.00	-1.5	2.02	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_521	3.50	3.00	2.93	n/a	3.00	3.34	2.94	B+	B-	3.12	B+	1.00	-1.5	1.62	C-			Addt. analysis needed

Appendix H. Complete EIA Data and Comments

Ecosystem Type	Patch Type	Veg Polygon Keylink	Landscape MEF	Buffer MEF	Vegetation MEF	Hydrology MEF	Soil/Substrate MEF	Landscape Context Score	Condition Score	Landscape Context Rank	Condition Rank	EIA Score	EIA Rank	Size Score	Size "Points"	EORANK Score	EORANK	User Adjusted Combined EO Rank	User Adjusted EO Rank Reason	Element Occurrence?
Upland Forest & Woodland	matrix	MountSpokane_522	3.50	3.00	2.93	n/a	3.00	3.34	2.94	B+	B-	3.12	B+	1.00	-1.5	1.62	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_523	3.50	3.00	2.93	n/a	3.00	3.34	2.94	B+	B-	3.12	B+	1.00	-1.5	1.62	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_524	3.50	4.00	2.53	n/a	4.00	3.67	2.75	A-	B-	3.16	B+	1.00	-1.5	1.66	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_525	3.00	3.00	3.93	n/a	3.00	3.00	3.79	B+	A-	3.44	B+	1.00	-1.5	1.94	C-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_526	4.00	4.00	3.47	n/a	3.00	4.00	3.40	A+	B+	3.67	A-	1.00	-1.5	2.17	C+			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_1064	3.00	3.72	4.00	4.00	4.00	3.48	4.00	B+	A+	3.85	A+	3.00	0.25	4.10	A+			Yes
Upland Forest & Woodland	matrix	MountSpokane_528	3.50	3.00	2.93	n/a	3.00	3.34	2.94	B+	B-	3.12	B+	1.00	-1.5	1.62	C-			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_368	3.00	3.72	4.00	4.00	4.00	3.48	4.00	B+	A+	3.85	A+	3.00	0.25	4.10	A+			Yes
Upland Forest & Woodland	matrix	MountSpokane_530	2.00	2.06	3.27	n/a	3.00	2.02	3.23	C+	B+	2.68	B-	1.00	-1.5	1.18	D			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_1065	3.00	3.72	4.00	4.00	4.00	3.48	4.00	B+	A+	3.85	A+	3.00	0.25	4.10	A+			Yes
Upland Forest & Woodland	matrix	MountSpokane_532	2.00	2.45	3.40	n/a	4.00	2.15	3.49	C+	B+	2.89	B-	1.00	-1.5	1.39	D			No
Upland Forest & Woodland	matrix	MountSpokane_533	2.00	2.71	3.40	n/a	4.00	2.23	3.49	C+	B+	2.93	B-	1.00	-1.5	1.43	D			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_423	3.00	4.00	4.00	4.00	3.00	3.67	3.90	A-	A+	3.83	A+	4.00	0.75	4.58	A+			Yes
Nonforested Wetland	Small	MountSpokane_428	3.00	4.00	4.00	4.00	3.00	3.67	3.90	A-	A+	3.83	A+	4.00	0.75	4.58	A+			Yes
Upland Forest & Woodland	matrix	MountSpokane_537	2.00	2.71	3.40	n/a	4.00	2.23	3.49	C+	B+	2.93	B-	1.00	-1.5	1.43	D			Addt. analysis needed
Nonforested Upland	Large	MountSpokane_538	2.50	3.22	3.13	n/a	3.00	2.86	3.11	B-	B+	3.00	B-	1.00	-1.00	2.00	C-	B+	Expansion of existing EO (much larger system on Ragged Ridge)	Yes
Nonforested Upland	Large	MountSpokane_539	2.50	3.22	3.13	n/a	3.00	2.86	3.11	B-	B+	3.00	B-	1.00	-1.00	2.00	C-	B+	Expansion of existing EO (much larger system on Ragged Ridge)	Yes
Upland Forest & Woodland	matrix	MountSpokane_540	2.00	2.06	3.27	n/a	3.00	2.02	3.23	C+	B+	2.68	B-	1.00	-1.5	1.18	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_541	2.00	2.06	3.27	n/a	3.00	2.02	3.23	C+	B+	2.68	B-	1.00	-1.5	1.18	D			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_542	3.00	3.00	3.80	n/a	3.00	3.00	3.68	B+	A-	3.37	B+	2.00	-0.33	3.04	B+			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_430	3.00	4.00	4.00	4.00	3.00	3.67	3.90	A-	A+	3.83	A+	4.00	0.75	4.58	A+			Yes
Nonforested Wetland	Small	MountSpokane_944	4.00	4.00	3.88	4.00	4.00	4.00	3.93	A+	A+	3.95	A+	4.00	0.75	4.70	A+			Yes
Nonforested Wetland	Small	MountSpokane_1067	4.00	4.00	3.88	4.00	4.00	4.00	3.93	A+	A+	3.95	A+	4.00	0.75	4.70	A+			Yes
Upland Forest & Woodland	Large	MountSpokane_547	3.00	3.00	3.80	n/a	3.00	3.00	3.68	B+	A-	3.37	B+	2.00	-0.33	3.04	B+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_548	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	1.00	-1.5	2.05	C+	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_549	3.50	4.00	2.80	n/a	4.00	3.67	2.98	A-	B-	3.29	B+	1.00	-1.5	1.79	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_550	3.50	4.00	2.80	n/a	4.00	3.67	2.98	A-	B-	3.29	B+	1.00	-1.5	1.79	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_551	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	1.00	-1.5	2.05	C+	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_552	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	1.00	-1.5	2.05	C+	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_553	3.50	3.46	4.00	n/a	4.00	3.49	4.00	B+	A+	3.77	A-	1.00	-1.5	2.27	C+			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_332	3.00	2.71	4.00	3.33	4.00	2.81	3.77	B-	A-	3.48	B+	3.00	0.25	3.73	A-			Yes
Upland Forest & Woodland	matrix	MountSpokane_557	4.00	4.00	3.47	n/a	3.00	4.00	3.40	A+	B+	3.67	A-	1.00	-1.5	2.17	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_558	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	1.00	-1.5	2.05	C+	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_559	2.50	3.36	3.53	n/a	3.00	2.78	3.45	B-	B+	3.15	B+	1.00	-1.5	1.65	C-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_560	4.00	4.00	3.80	n/a	3.00	4.00	3.68	A+	A-	3.82	A+	1.00	-1.5	2.32	C+	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_561	4.00	4.00	3.47	n/a	3.00	4.00	3.40	A+	B+	3.67	A-	1.00	-1.5	2.17	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_562	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	1.00	-1.5	2.05	C+	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_563	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	1.00	-1.5	2.05	C+	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_564	3.00	3.00	3.53	n/a	3.00	3.00	3.45	B+	B+	3.25	B+	1.00	-1.5	1.75	C-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_565	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	1.00	-1.5	2.05	C+	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	Large	MountSpokane_567	4.00	4.00	3.80	n/a	4.00	4.00	3.83	A+	A+	3.91	A+	1.00	-1	2.91	B-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_569	3.50	3.46	4.00	n/a	4.00	3.49	4.00	B+	A+	3.77	A-	1.00	-1.5	2.27	C+			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_333	3.00	2.71	4.00	3.33	4.00	2.81	3.77	B-	A-	3.48	B+	3.00	0.25	3.73	A-			Yes
Nonforested Wetland	Small	MountSpokane_334	3.00	2.71	4.00	3.33	4.00	2.81	3.77	B-	A-	3.48	B+	3.00	0.25	3.73	A-			Yes
Upland Forest & Woodland	matrix	MountSpokane_579	2.50	3.36	4.00	n/a	4.00	2.78	4.00	B-	A+	3.45	B+	1.00	-1.5	1.95	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_580	2.50	3.36	4.00	n/a	4.00	2.78	4.00	B-	A+	3.45	B+	1.00	-1.5	1.95	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_581	1.50	2.06	3.60	n/a	3.00	1.68	3.51	C-	A-	2.69	B-	1.00	-1.5	1.19	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_582	2.00	2.71	3.60	n/a	2.00	2.23	3.36	C+	B+	2.85	B-	1.00	-1.5	1.35	D			No
Upland Forest & Woodland	matrix	MountSpokane_583	1.50	2.06	3.60	n/a	3.00	1.68	3.51	C-	A-	2.69	B-	1.00	-1.5	1.19	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_584	2.00	2.45	3.40	n/a	4.00	2.15	3.49	C+	B+	2.89	B-	1.00	-1.5	1.39	D			No
Upland Forest & Woodland	matrix	MountSpokane_585	2.00	2.45	3.40	n/a	4.00	2.15	3.49	C+	B+	2.89	B-	1.00	-1.5	1.39	D			No
Upland Forest & Woodland	matrix	MountSpokane_586	2.00	2.45	3.40	n/a	4.00	2.15	3.49	C+	B+	2.89	B-	1.00	-1.5	1.39	D			No
Upland Forest & Woodland	matrix	MountSpokane_589	2.00	2.06	3.27	n/a	3.00	2.02	3.23	C+	B+	2.68	B-	1.00	-1.5	1.18	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_590	2.00	2.06	3.27	n/a	3.00	2.02	3.23	C+	B+	2.68	B-	1.00	-1.5	1.18	D			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_591	2.50	2.45	4.00	n/a	4.00	2.47	4.00	C+	A+	3.31	B+	2.00	-0.33	2.98	B-			Addt. analysis needed

Appendix H. Complete EIA Data and Comments

Ecosystem Type	Patch Type	Veg Polygon Keylink	Landscape MEF	Buffer MEF	Vegetation MEF	Hydrology MEF	Soil/Substrate MEF	Landscape Context Score	Condition Score	Landscape Context Rank	Condition Rank	EIA Score	EIA Rank	Size Score	Size "Points"	EORANK Score	EORANK	User Adjusted Combined EO Rank	User Adjusted EO Rank Reason	Element Occurrence?
Upland Forest & Woodland	matrix	MountSpokane_592	2.50	3.36	3.53	n/a	3.00	2.78	3.45	B-	B+	3.15	B+	1.00	-1.5	1.65	C-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_593	2.50	3.36	4.00	n/a	4.00	2.78	4.00	B-	A+	3.45	B+	1.00	-1.5	1.95	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_594	2.50	3.36	4.00	n/a	4.00	2.78	4.00	B-	A+	3.45	B+	1.00	-1.5	1.95	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_595	2.50	3.36	4.00	n/a	4.00	2.78	4.00	B-	A+	3.45	B+	1.00	-1.5	1.95	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_596	2.50	3.36	4.00	n/a	4.00	2.78	4.00	B-	A+	3.45	B+	1.00	-1.5	1.95	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_597	2.50	3.36	4.00	n/a	4.00	2.78	4.00	B-	A+	3.45	B+	1.00	-1.5	1.95	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_598	2.50	3.36	4.00	n/a	4.00	2.78	4.00	B-	A+	3.45	B+	1.00	-1.5	1.95	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_599	2.50	3.36	4.00	n/a	4.00	2.78	4.00	B-	A+	3.45	B+	1.00	-1.5	1.95	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_600	2.50	3.36	4.00	n/a	4.00	2.78	4.00	B-	A+	3.45	B+	1.00	-1.5	1.95	C-			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_335	3.00	2.71	4.00	3.33	4.00	2.81	3.77	B-	A-	3.48	B+	3.00	0.25	3.73	A-			Yes
Nonforested Wetland	Small	MountSpokane_336	3.00	2.71	4.00	3.33	4.00	2.81	3.77	B-	A-	3.48	B+	3.00	0.25	3.73	A-			Yes
Nonforested Wetland	Small	MountSpokane_337	3.00	2.71	4.00	3.33	4.00	2.81	3.77	B-	A-	3.48	B+	3.00	0.25	3.73	A-			Yes
Upland Forest & Woodland	matrix	MountSpokane_607	3.00	4.00	4.00	n/a	4.00	3.33	4.00	B+	A+	3.70	A-	1.00	-1.5	2.20	C+			Addt. analysis needed
Nonforested Upland	Large	MountSpokane_608	3.00	4.00	3.50	n/a	3.00	3.50	3.43	A-	B+	3.46	B+	1.00	-1	2.46	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_609	2.50	3.36	4.00	n/a	4.00	2.78	4.00	B-	A+	3.45	B+	1.00	-1.5	1.95	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_610	3.00	4.00	4.00	n/a	4.00	3.33	4.00	B+	A+	3.70	A-	1.00	-1.5	2.20	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_611	3.00	4.00	2.33	n/a	4.00	3.33	2.58	B+	B-	2.92	B-	1.00	-1.5	1.42	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_613	2.50	3.36	3.53	n/a	3.00	2.78	3.45	B-	B+	3.15	B+	1.00	-1.5	1.65	C-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	Large	MountSpokane_614	2.50	2.45	4.00	n/a	4.00	2.47	4.00	C+	A+	3.31	B+	2.00	-0.33	2.98	B-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_615	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	2.00	-0.5	3.05	B+			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_339	4.00	4.00	4.00	4.00	4.00	4.00	4.00	A+	A+	4.00	A+	2.00	-0.25	3.75	A+			Yes
Nonforested Wetland	Small	MountSpokane_941	4.00	4.00	4.00	4.00	4.00	4.00	4.00	A+	A+	4.00	A+	2.00	-0.25	3.75	A+			Yes
Nonforested Wetland	Small	MountSpokane_994	3.00	3.46	3.75	4.00	3.00	3.31	3.76	B+	A-	3.63	A-	2.00	-0.25	3.38	B-	C+	Not a viable conservation target (very tip of a riparian shrubland that extends primarily onto industrial timberland)	No
Upland Forest & Woodland	matrix	MountSpokane_619	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	2.00	-0.5	3.05	B+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_620	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	2.00	-0.5	3.05	B+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_621	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	2.00	-0.5	3.05	B+			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_529	2.00	3.00	4.00	4.00	3.00	2.67	3.90	B-	A+	3.53	A-	3.00	0.25	3.78	A-			Yes
Upland Forest & Woodland	Large	MountSpokane_623	2.50	2.45	4.00	n/a	4.00	2.47	4.00	C+	A+	3.31	B+	2.00	-0.33	2.98	B-			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_531	2.00	3.00	4.00	4.00	3.00	2.67	3.90	B-	A+	3.53	A-	3.00	0.25	3.78	A-			Yes
Nonforested Wetland	Small	MountSpokane_534	2.00	3.00	4.00	4.00	3.00	2.67	3.90	B-	A+	3.53	A-	3.00	0.25	3.78	A-			Yes
Nonforested Wetland	Small	MountSpokane_535	2.00	3.00	4.00	4.00	3.00	2.67	3.90	B-	A+	3.53	A-	3.00	0.25	3.78	A-			Yes
Nonforested Wetland	Small	MountSpokane_545	3.00	4.00	4.00	4.00	4.00	3.67	4.00	A-	A+	3.90	A+	3.00	0.25	4.15	A+			Yes
Nonforested Wetland	Small	MountSpokane_546	3.50	4.00	4.00	4.00	4.00	3.84	4.00	A+	A+	3.95	A+	2.00	-0.25	3.70	A-			Yes
Nonforested Wetland	Small	MountSpokane_555	3.00	3.72	4.00	4.00	4.00	3.48	4.00	B+	A+	3.85	A+	2.00	-0.25	3.60	A-			Yes
Nonforested Wetland	Small	MountSpokane_887	3.00	3.72	4.00	4.00	4.00	3.48	4.00	B+	A+	3.85	A+	2.00	-0.25	3.60	A-			Yes
Upland Forest & Woodland	Large	MountSpokane_632	2.00	3.72	4.00	n/a	4.00	2.86	4.00	B-	A+	3.49	B+	2.00	-0.33	3.16	B+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_633	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	2.00	-0.5	3.05	B+			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_888	3.00	3.72	4.00	4.00	4.00	3.48	4.00	B+	A+	3.85	A+	2.00	-0.25	3.60	A-			Yes
Upland Forest & Woodland	Large	MountSpokane_635	4.00	4.00	4.00	n/a	4.00	4.00	4.00	A+	A+	4.00	A+	2.00	-0.33	3.67	A-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_636	3.50	4.00	3.80	n/a	4.00	3.67	3.83	A-	A+	3.76	A-	1.00	-1.5	2.26	C+			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_889	3.00	3.72	4.00	4.00	4.00	3.48	4.00	B+	A+	3.85	A+	2.00	-0.25	3.60	A-			Yes
Upland Forest & Woodland	matrix	MountSpokane_638	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	2.00	-0.5	3.05	B+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_639	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	2.00	-0.5	3.05	B+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_640	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	2.00	-0.5	3.05	B+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_641	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	2.00	-0.5	3.05	B+			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_642	4.00	4.00	4.00	n/a	4.00	4.00	4.00	A+	A+	4.00	A+	2.00	-0.33	3.67	A-			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_574	2.50	2.71	3.80	3.67	4.00	2.64	3.77	B-	A-	3.43	B+	3.00	0.25	3.68	A-			Yes
Upland Forest & Woodland	matrix	MountSpokane_645	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	2.00	-0.5	3.05	B+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_646	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	2.00	-0.5	3.05	B+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_647	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	2.00	-0.5	3.05	B+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_648	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	2.00	-0.5	3.05	B+			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_575	2.50	2.71	3.80	3.67	4.00	2.64	3.77	B-	A-	3.43	B+	3.00	0.25	3.68	A-			Yes
Upland Forest & Woodland	Large	MountSpokane_650	2.00	3.72	4.00	n/a	4.00	2.86	4.00	B-	A+	3.49	B+	2.00	-0.33	3.16	B+			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_815	2.50	2.71	3.80	3.67	4.00	2.64	3.77	B-	A-	3.43	B+	3.00	0.25	3.68	A-			Yes
Upland Forest & Woodland	matrix	MountSpokane_652	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	2.00	-0.5	3.05	B+			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_841	2.50	2.71	3.80	3.67	4.00	2.64	3.77	B-	A-	3.43	B+	3.00	0.25	3.68	A-			Yes
Upland Forest & Woodland	Large	MountSpokane_654	3.00	3.46	4.00	n/a	4.00	3.23	4.00	B+	A+	3.65	A-	2.00	-0.33	3.32	B+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_655	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	2.00	-0.5	3.05	B+			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_842	2.50	2.71	3.80	3.67	4.00	2.64	3.77	B-	A-	3.43	B+	3.00	0.25	3.68	A-			Yes
Nonforested Wetland	Small	MountSpokane_880	2.50	2.71	3.80	3.67	4.00	2.64	3.77	B-	A-	3.43	B+	3.00	0.25	3.68	A-			Yes
Nonforested Wetland	Small	MountSpokane_882	2.50	2.71	3.80	3.67	4.00	2.64	3.77	B-	A-	3.43	B+	3.00	0.25	3.68	A-			Yes
Upland Forest & Woodland	Large	MountSpokane_659	3.00	3.46	4.00	n/a	4.00	3.23	4.00	B+	A+	3.65	A-	1.00	-1	2.65	B-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_660	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	2.00	-0.5	3.05	B+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_661	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	2.00	-0.5	3.05	B+			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_663	3.50	3.72	4.00	n/a	4.00	3.61	4.00	A-	A+	3.83	A+	3.00	0.33	4.16	A+			Addt. analysis needed

Appendix H. Complete EIA Data and Comments

Ecosystem Type	Patch Type	Veg Polygon Keylink	Landscape MEF	Buffer MEF	Vegetation MEF	Hydrology MEF	Soil/Substrate MEF	Landscape Context Score	Condition Score	Landscape Context Rank	Condition Rank	EIA Score	EIA Rank	Size Score	Size "Points"	EORANK Score	EORANK	User Adjusted Combined EO Rank	User Adjusted EO Rank Reason	Element Occurrence?
Upland Forest & Woodland	Large	MountSpokane_679	2.50	2.45	4.00	n/a	4.00	2.47	4.00	C+	A+	3.31	B+	2.00	-0.33	2.98	B-			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_681	2.50	2.45	3.60	n/a	4.00	2.47	3.66	C+	A-	3.13	B+	2.00	-0.33	2.80	B-			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_884	2.50	2.71	3.80	3.67	4.00	2.64	3.77	B-	A-	3.43	B+	3.00	0.25	3.68	A-			Yes
Upland Forest & Woodland	matrix	MountSpokane_683	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	2.00	-0.5	3.05	B+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_684	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	2.00	-0.5	3.05	B+			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_685	4.00	4.00	4.00	n/a	4.00	4.00	4.00	A+	A+	4.00	A+	2.00	-0.33	3.67	A-			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_686	4.00	4.00	4.00	n/a	4.00	4.00	4.00	A+	A+	4.00	A+	2.00	-0.33	3.67	A-			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_885	2.50	2.71	3.80	3.67	4.00	2.64	3.77	B-	A-	3.43	B+	3.00	0.25	3.68	A-			Yes
Upland Forest & Woodland	Large	MountSpokane_688	4.00	4.00	4.00	n/a	4.00	4.00	4.00	A+	A+	4.00	A+	2.00	-0.33	3.67	A-			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_606	3.00	3.46	4.00	4.00	4.00	3.31	4.00	B+	A+	3.79	A-	3.00	0.25	4.04	A+			Yes
Nonforested Wetland	Small	MountSpokane_630	3.00	3.46	4.00	4.00	4.00	3.31	4.00	B+	A+	3.79	A-	3.00	0.25	4.04	A+			Yes
Upland Forest & Woodland	Large	MountSpokane_694	4.00	4.00	4.00	n/a	4.00	4.00	4.00	A+	A+	4.00	A+	2.00	-0.33	3.67	A-			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_695	3.00	3.46	4.00	n/a	4.00	3.23	4.00	B+	A+	3.65	A-	1.00	-1	2.65	B-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_698	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	2.00	-0.5	3.05	B+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_699	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	2.00	-0.5	3.05	B+			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_702	2.00	3.72	4.00	n/a	4.00	2.86	4.00	B-	A+	3.49	B+	2.00	-0.33	3.16	B+			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_703	3.00	3.46	4.00	n/a	4.00	3.23	4.00	B+	A+	3.65	A-	1.00	-1	2.65	B-			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_705	2.00	3.72	4.00	n/a	4.00	2.86	4.00	B-	A+	3.49	B+	2.00	-0.33	3.16	B+			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_658	3.00	3.46	4.00	4.00	4.00	3.31	4.00	B+	A+	3.79	A-	3.00	0.25	4.04	A+			Yes
Upland Forest & Woodland	Large	MountSpokane_710	2.00	3.72	4.00	n/a	4.00	2.86	4.00	B-	A+	3.49	B+	2.00	-0.33	3.16	B+			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_741	3.00	3.46	4.00	4.00	4.00	3.31	4.00	B+	A+	3.79	A-	3.00	0.25	4.04	A+			Yes
Nonforested Wetland	Small	MountSpokane_605	3.00	3.46	4.00	3.33	4.00	3.31	3.77	B+	A-	3.63	A-	4.00	0.75	4.38	A+			Yes
Nonforested Wetland	Small	MountSpokane_616	3.00	3.46	4.00	3.33	4.00	3.31	3.77	B+	A-	3.63	A-	4.00	0.75	4.38	A+			Yes
Nonforested Wetland	Small	MountSpokane_617	3.00	3.46	4.00	3.33	4.00	3.31	3.77	B+	A-	3.63	A-	4.00	0.75	4.38	A+			Yes
Nonforested Wetland	Small	MountSpokane_618	3.00	3.46	4.00	3.33	4.00	3.31	3.77	B+	A-	3.63	A-	4.00	0.75	4.38	A+			Yes
Nonforested Wetland	Small	MountSpokane_622	3.00	3.46	4.00	3.33	4.00	3.31	3.77	B+	A-	3.63	A-	4.00	0.75	4.38	A+			Yes
Upland Forest & Woodland	matrix	MountSpokane_727	2.00	3.72	3.93	n/a	3.00	2.57	3.79	B-	A-	3.24	B+	1.00	-1.5	1.74	C-			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_624	3.00	3.46	4.00	3.33	4.00	3.31	3.77	B+	A-	3.63	A-	4.00	0.75	4.38	A+			Yes
Upland Forest & Woodland	matrix	MountSpokane_729	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	2.00	-0.5	3.05	B+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_730	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	2.00	-0.5	3.05	B+			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_625	3.00	3.46	4.00	3.33	4.00	3.31	3.77	B+	A-	3.63	A-	4.00	0.75	4.38	A+			Yes
Nonforested Wetland	Small	MountSpokane_626	3.00	3.46	4.00	3.33	4.00	3.31	3.77	B+	A-	3.63	A-	4.00	0.75	4.38	A+			Yes
Nonforested Wetland	Small	MountSpokane_628	3.00	3.46	4.00	3.33	4.00	3.31	3.77	B+	A-	3.63	A-	4.00	0.75	4.38	A+			Yes
Nonforested Wetland	Small	MountSpokane_629	3.00	3.46	4.00	3.33	4.00	3.31	3.77	B+	A-	3.63	A-	4.00	0.75	4.38	A+			Yes
Nonforested Wetland	Small	MountSpokane_634	3.00	3.46	4.00	3.33	4.00	3.31	3.77	B+	A-	3.63	A-	4.00	0.75	4.38	A+			Yes
Nonforested Wetland	Small	MountSpokane_637	3.00	3.46	4.00	3.33	4.00	3.31	3.77	B+	A-	3.63	A-	4.00	0.75	4.38	A+			Yes
Nonforested Wetland	Small	MountSpokane_644	3.00	3.46	4.00	3.33	4.00	3.31	3.77	B+	A-	3.63	A-	4.00	0.75	4.38	A+			Yes
Upland Forest & Woodland	Large	MountSpokane_738	4.00	4.00	4.00	n/a	4.00	4.00	4.00	A+	A+	4.00	A+	2.00	-0.33	3.67	A-			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_656	3.00	3.46	4.00	3.33	4.00	3.31	3.77	B+	A-	3.63	A-	4.00	0.75	4.38	A+			Yes
Nonforested Wetland	Small	MountSpokane_682	3.00	3.46	4.00	3.33	4.00	3.31	3.77	B+	A-	3.63	A-	4.00	0.75	4.38	A+			Yes
Nonforested Wetland	Small	MountSpokane_687	3.00	3.46	4.00	3.33	4.00	3.31	3.77	B+	A-	3.63	A-	4.00	0.75	4.38	A+			Yes
Nonforested Wetland	Small	MountSpokane_731	3.00	3.46	4.00	3.33	4.00	3.31	3.77	B+	A-	3.63	A-	4.00	0.75	4.38	A+			Yes
Nonforested Wetland	Small	MountSpokane_732	3.00	3.46	4.00	3.33	4.00	3.31	3.77	B+	A-	3.63	A-	4.00	0.75	4.38	A+			Yes
Upland Forest & Woodland	Large	MountSpokane_744	2.50	2.45	4.00	n/a	4.00	2.47	4.00	C+	A+	3.31	B+	2.00	-0.33	2.98	B-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_745	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	2.00	-0.5	3.05	B+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_746	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	2.00	-0.5	3.05	B+			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_747	2.50	2.45	4.00	n/a	4.00	2.47	4.00	C+	A+	3.31	B+	2.00	-0.33	2.98	B-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_748	2.50	3.36	3.53	n/a	3.00	2.78	3.45	B-	B+	3.15	B+	1.00	-1.5	1.65	C-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	Large	MountSpokane_749	2.50	2.45	4.00	n/a	4.00	2.47	4.00	C+	A+	3.31	B+	2.00	-0.33	2.98	B-			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_733	3.00	3.46	4.00	3.33	4.00	3.31	3.77	B+	A-	3.63	A-	4.00	0.75	4.38	A+			Yes
Upland Forest & Woodland	matrix	MountSpokane_751	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	2.00	-0.5	3.05	B+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_752	2.50	3.36	3.53	n/a	3.00	2.78	3.45	B-	B+	3.15	B+	1.00	-1.5	1.65	C-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_754	2.50	3.36	2.07	n/a	1.00	2.78	1.91	B-	C-	2.30	C+	1.00	-1.5	0.80	D			No
Upland Forest & Woodland	matrix	MountSpokane_756	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	2.00	-0.5	3.05	B+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_757	2.00	1.68	2.33	n/a	1.00	1.89	2.13	C-	C+	2.03	C+	1.00	-1.5	0.53	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_758	2.50	3.36	2.07	n/a	1.00	2.78	1.91	B-	C-	2.30	C+	1.00	-1.5	0.80	D			No
Upland Forest & Woodland	matrix	MountSpokane_759	2.50	3.36	3.47	n/a	1.00	2.78	3.10	B-	B+	2.96	B-	1.00	-1.5	1.46	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_760	2.00	1.68	2.33	n/a	1.00	1.89	2.13	C-	C+	2.03	C+	1.00	-1.5	0.53	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_761	2.00	1.68	2.33	n/a	1.00	1.89	2.13	C-	C+	2.03	C+	1.00	-1.5	0.53	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_762	2.00	1.68	2.33	n/a	1.00	1.89	2.13	C-	C+	2.03	C+	1.00	-1.5	0.53	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_763	2.50	3.36	3.47	n/a	1.00	2.78	3.10	B-	B+	2.96	B-	1.00	-1.5	1.46	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_767	2.50	3.36	3.47	n/a	1.00	2.78	3.10	B-	B+	2.96	B-	1.00	-1.5	1.46	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_768	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	2.00	-0.5	3.05	B+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_769	2.50	3.36	3.47	n/a	1.00	2.78	3.10	B-	B+	2.96	B-	1.00	-1.5	1.46	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_771	2.50	3.36	2.07	n/a	1.00	2.78	1.91	B-	C-	2.30	C+	1.00	-1.5	0.80	D			No
Upland Forest & Woodland	matrix	MountSpokane_772	2.50	3.36	2.07	n/a	1.00	2.78	1.91	B-	C-	2.30	C+	1.00	-1.5	0.80	D			No
Upland Forest & Woodland	matrix	MountSpokane_773	2.50	3.36	2.07	n/a	1.00	2.78	1.91	B-	C-	2.30	C+	1.00	-1.5	0.80	D			No

Appendix H. Complete EIA Data and Comments

Ecosystem Type	Patch Type	Veg Polygon Keylink	Landscape MEF	Buffer MEF	Vegetation MEF	Hydrology MEF	Soil/Substrate MEF	Landscape Context Score	Condition Score	Landscape Context Rank	Condition Rank	EIA Score	EIA Rank	Size Score	Size "Points"	EORANK Score	EORANK	User Adjusted Combined EO Rank	User Adjusted EO Rank Reason	Element Occurrence?
Upland Forest & Woodland	matrix	MountSpokane_774	2.50	3.36	2.07	n/a	1.00	2.78	1.91	B-	C-	2.30	C+	1.00	-1.5	0.80	D			No
Upland Forest & Woodland	matrix	MountSpokane_775	2.50	3.36	2.07	n/a	1.00	2.78	1.91	B-	C-	2.30	C+	1.00	-1.5	0.80	D			No
Upland Forest & Woodland	matrix	MountSpokane_776	2.50	3.36	2.07	n/a	1.00	2.78	1.91	B-	C-	2.30	C+	1.00	-1.5	0.80	D			No
Upland Forest & Woodland	matrix	MountSpokane_777	2.50	3.36	2.07	n/a	1.00	2.78	1.91	B-	C-	2.30	C+	1.00	-1.5	0.80	D			No
Upland Forest & Woodland	matrix	MountSpokane_778	2.50	3.36	2.07	n/a	1.00	2.78	1.91	B-	C-	2.30	C+	1.00	-1.5	0.80	D			No
Upland Forest & Woodland	matrix	MountSpokane_779	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	2.00	-0.5	3.05	B+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_780	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	2.00	-0.5	3.05	B+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_782	2.50	3.36	3.53	n/a	3.00	2.78	3.45	B-	B+	3.15	B+	1.00	-1.5	1.65	C-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_785	2.50	3.36	3.53	n/a	3.00	2.78	3.45	B-	B+	3.15	B+	1.00	-1.5	1.65	C-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_786	2.50	3.36	4.00	n/a	4.00	2.78	4.00	B-	A+	3.45	B+	1.00	-1.5	1.95	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_787	2.50	3.36	4.00	n/a	4.00	2.78	4.00	B-	A+	3.45	B+	1.00	-1.5	1.95	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_789	2.50	3.36	2.07	n/a	1.00	2.78	1.91	B-	C-	2.30	C+	1.00	-1.5	0.80	D			No
Upland Forest & Woodland	matrix	MountSpokane_790	2.50	3.36	4.00	n/a	4.00	2.78	4.00	B-	A+	3.45	B+	1.00	-1.5	1.95	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_791	2.50	3.36	4.00	n/a	4.00	2.78	4.00	B-	A+	3.45	B+	1.00	-1.5	1.95	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_793	2.50	3.36	2.07	n/a	1.00	2.78	1.91	B-	C-	2.30	C+	1.00	-1.5	0.80	D			No
Upland Forest & Woodland	matrix	MountSpokane_795	2.50	3.36	3.53	n/a	3.00	2.78	3.45	B-	B+	3.15	B+	1.00	-1.5	1.65	C-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_796	2.50	3.36	3.53	n/a	3.00	2.78	3.45	B-	B+	3.15	B+	1.00	-1.5	1.65	C-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_798	1.50	2.06	3.60	n/a	3.00	1.68	3.51	C-	A-	2.69	B-	1.00	-1.5	1.19	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_799	1.50	2.06	3.60	n/a	3.00	1.68	3.51	C-	A-	2.69	B-	1.00	-1.5	1.19	D			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_801	2.00	3.00	3.40	n/a	4.00	2.50	3.49	B-	B+	3.04	B+	1.00	-1	2.04	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_802	2.00	2.71	3.40	n/a	4.00	2.23	3.49	C+	B+	2.93	B-	1.00	-1.5	1.43	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_803	2.00	2.71	3.40	n/a	4.00	2.23	3.49	C+	B+	2.93	B-	1.00	-1.5	1.43	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_804	2.00	2.71	3.40	n/a	4.00	2.23	3.49	C+	B+	2.93	B-	1.00	-1.5	1.43	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_805	2.00	2.71	3.40	n/a	4.00	2.23	3.49	C+	B+	2.93	B-	1.00	-1.5	1.43	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_806	2.00	2.71	3.40	n/a	4.00	2.23	3.49	C+	B+	2.93	B-	1.00	-1.5	1.43	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_807	2.00	2.71	3.40	n/a	4.00	2.23	3.49	C+	B+	2.93	B-	1.00	-1.5	1.43	D			Addt. analysis needed
Forested Wetland	Small	MountSpokane_808	2.00	2.71	3.40	4.00	4.00	2.48	3.67	C+	A-	3.31	B+	3.00	0.25	3.56	A-			Yes
Forested Wetland	Small	MountSpokane_810	2.00	2.71	3.40	4.00	4.00	2.48	3.67	C+	A-	3.31	B+	3.00	0.25	3.56	A-			Yes
Upland Forest & Woodland	matrix	MountSpokane_811	2.00	2.71	3.40	n/a	4.00	2.23	3.49	C+	B+	2.93	B-	1.00	-1.5	1.43	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_812	2.00	2.71	3.40	n/a	4.00	2.23	3.49	C+	B+	2.93	B-	1.00	-1.5	1.43	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_814	2.00	2.71	3.40	n/a	4.00	2.23	3.49	C+	B+	2.93	B-	1.00	-1.5	1.43	D			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_734	3.00	3.46	4.00	3.33	4.00	3.31	3.77	B+	A-	3.63	A-	4.00	0.75	4.38	A+			Yes
Upland Forest & Woodland	matrix	MountSpokane_816	2.50	3.36	4.00	n/a	4.00	2.78	4.00	B-	A+	3.45	B+	1.00	-1.5	1.95	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_817	1.50	2.06	3.60	n/a	3.00	1.68	3.51	C-	A-	2.69	B-	1.00	-1.5	1.19	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_819	2.50	3.36	4.00	n/a	4.00	2.78	4.00	B-	A+	3.45	B+	1.00	-1.5	1.95	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_821	2.00	2.71	3.40	n/a	4.00	2.23	3.49	C+	B+	2.93	B-	1.00	-1.5	1.43	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_823	1.50	2.06	3.60	n/a	3.00	1.68	3.51	C-	A-	2.69	B-	1.00	-1.5	1.19	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_824	2.00	2.71	3.40	n/a	4.00	2.23	3.49	C+	B+	2.93	B-	1.00	-1.5	1.43	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_825	1.50	2.06	3.60	n/a	3.00	1.68	3.51	C-	A-	2.69	B-	1.00	-1.5	1.19	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_826	2.00	2.71	3.40	n/a	4.00	2.23	3.49	C+	B+	2.93	B-	1.00	-1.5	1.43	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_827	2.00	2.71	3.40	n/a	4.00	2.23	3.49	C+	B+	2.93	B-	1.00	-1.5	1.43	D			Addt. analysis needed
Forested Wetland	Small	MountSpokane_828	2.00	2.71	3.40	4.00	4.00	2.48	3.67	C+	A-	3.31	B+	3.00	0.25	3.56	A-			Yes
Upland Forest & Woodland	matrix	MountSpokane_829	2.00	2.71	3.40	n/a	4.00	2.23	3.49	C+	B+	2.93	B-	1.00	-1.5	1.43	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_830	2.00	2.71	3.40	n/a	4.00	2.23	3.49	C+	B+	2.93	B-	1.00	-1.5	1.43	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_831	1.50	2.06	3.60	n/a	3.00	1.68	3.51	C-	A-	2.69	B-	1.00	-1.5	1.19	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_832	1.50	2.06	3.60	n/a	3.00	1.68	3.51	C-	A-	2.69	B-	1.00	-1.5	1.19	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_833	1.50	2.06	3.60	n/a	3.00	1.68	3.51	C-	A-	2.69	B-	1.00	-1.5	1.19	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_834	2.00	2.71	3.40	n/a	4.00	2.23	3.49	C+	B+	2.93	B-	1.00	-1.5	1.43	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_835	2.00	2.71	3.40	n/a	4.00	2.23	3.49	C+	B+	2.93	B-	1.00	-1.5	1.43	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_836	1.50	2.06	3.60	n/a	3.00	1.68	3.51	C-	A-	2.69	B-	1.00	-1.5	1.19	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_837	2.00	2.71	3.40	n/a	4.00	2.23	3.49	C+	B+	2.93	B-	1.00	-1.5	1.43	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_838	2.00	2.71	3.40	n/a	4.00	2.23	3.49	C+	B+	2.93	B-	1.00	-1.5	1.43	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_839	1.50	2.06	3.60	n/a	3.00	1.68	3.51	C-	A-	2.69	B-	1.00	-1.5	1.19	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_840	2.00	2.06	3.27	n/a	3.00	2.02	3.23	C+	B+	2.68	B-	1.00	-1.5	1.18	D			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_736	3.00	3.46	4.00	3.33	4.00	3.31	3.77	B+	A-	3.63	A-	4.00	0.75	4.38	A+			Yes
Nonforested Wetland	Small	MountSpokane_739	3.00	3.46	4.00	3.33	4.00	3.31	3.77	B+	A-	3.63	A-	4.00	0.75	4.38	A+			Yes
Upland Forest & Woodland	matrix	MountSpokane_843	2.00	2.71	3.40	n/a	4.00	2.23	3.49	C+	B+	2.93	B-	1.00	-1.5	1.43	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_844	2.00	2.71	3.40	n/a	4.00	2.23	3.49	C+	C+	2.93	B-	1.00	-1.5	1.43	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_845	2.00	2.06	3.27	n/a	3.00	2.02	3.23	C+	B+	2.68	B-	1.00	-1.5	1.18	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_846	2.00	2.71	3.40	n/a	4.00	2.23	3.49	C+	B+	2.93	B-	1.00	-1.5	1.43	D			Addt. analysis needed
Forested Wetland	Small	MountSpokane_847	2.00	2.71	3.40	4.00	4.00	2.48	3.67	C+	A-	3.31	B+	3.00	0.25	3.56	A-			Yes
Forested Wetland	Small	MountSpokane_848	2.00	2.71	3.40	4.00	4.00	2.48	3.67	C+	A-	3.31	B+	3.00	0.25	3.56	A-			Yes
Forested Wetland	Small	MountSpokane_849	2.00	2.71	3.40	4.00	4.00	2.48	3.67	C+	A-	3.31	B+	3.00	0.25	3.56	A-			Yes
Upland Forest & Woodland	matrix	MountSpokane_850	2.00	2.71	3.40	n/a	4.00	2.23	3.49	C+	B+	2.93	B-	1.00	-1.5	1.43	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_851	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	2.00	-0.5	3.05	B+			Addt. analysis needed

Appendix H. Complete EIA Data and Comments

Ecosystem Type	Patch Type	Veg Polygon Keylink	Landscape MEF	Buffer MEF	Vegetation MEF	Hydrology MEF	Soil/Substrate MEF	Landscape Context Score	Condition Score	Landscape Context Rank	Condition Rank	EIA Score	EIA Rank	Size Score	Size "Points"	EORANK Score	EORANK	User Adjusted Combined EO Rank	User Adjusted EO Rank Reason	Element Occurrence?
Upland Forest & Woodland	matrix	MountSpokane_852	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	2.00	-0.5	3.05	B+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_853	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	2.00	-0.5	3.05	B+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_854	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	2.00	-0.5	3.05	B+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_855	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	2.00	-0.5	3.05	B+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_856	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	2.00	-0.5	3.05	B+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_857	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	2.00	-0.5	3.05	B+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_858	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	2.00	-0.5	3.05	B+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_859	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	1.00	-1.5	2.05	C+	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_860	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	1.00	-1.5	2.05	C+	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_861	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	1.00	-1.5	2.05	C+	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_862	4.00	4.00	3.47	n/a	3.00	4.00	3.40	A+	B+	3.67	A-	1.00	-1.5	2.17	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_863	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	1.00	-1.5	2.05	C+	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_864	3.50	3.46	4.00	n/a	4.00	3.49	4.00	B+	A+	3.77	A-	1.00	-1.5	2.27	C+			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_742	3.00	3.46	4.00	3.33	4.00	3.31	3.77	B+	A-	3.63	A-	4.00	0.75	4.38	A+			Yes
Upland Forest & Woodland	matrix	MountSpokane_866	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	1.00	-1.5	2.05	C+	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_867	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	1.00	-1.5	2.05	C+	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_868	1.50	2.06	3.60	n/a	3.00	1.68	3.51	C-	A-	2.69	B-	1.00	-1.5	1.19	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_869	3.00	3.00	3.53	n/a	3.00	3.00	3.45	B+	B+	3.25	B+	1.00	-1.5	1.75	C-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_870	1.50	2.06	3.60	n/a	3.00	1.68	3.51	C-	A-	2.69	B-	1.00	-1.5	1.19	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_871	2.00	2.06	3.27	n/a	3.00	2.02	3.23	C+	B+	2.68	B-	1.00	-1.5	1.18	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_872	2.00	2.06	3.27	n/a	3.00	2.02	3.23	C+	B+	2.68	B-	1.00	-1.5	1.18	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_874	3.00	3.00	3.53	n/a	3.00	3.00	3.45	B+	B+	3.25	B+	1.00	-1.5	1.75	C-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_875	2.00	2.06	3.27	n/a	3.00	2.02	3.23	C+	B+	2.68	B-	1.00	-1.5	1.18	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_876	2.00	2.06	3.27	n/a	3.00	2.02	3.23	C+	B+	2.68	B-	1.00	-1.5	1.18	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_877	2.00	2.06	3.27	n/a	3.00	2.02	3.23	C+	B+	2.68	B-	1.00	-1.5	1.18	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_878	3.00	3.00	3.53	n/a	3.00	3.00	3.45	B+	B+	3.25	B+	1.00	-1.5	1.75	C-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_879	2.00	2.06	3.27	n/a	3.00	2.02	3.23	C+	B+	2.68	B-	1.00	-1.5	1.18	D			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_750	3.00	3.46	4.00	3.33	4.00	3.31	3.77	B+	A-	3.63	A-	4.00	0.75	4.38	A+			Yes
Nonforested Wetland	Small	MountSpokane_715	2.50	3.13	4.00	4.00	3.00	2.92	3.90	B-	A+	3.61	A-	2.00	-0.25	3.36	B+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_883	2.00	2.06	3.27	n/a	3.00	2.02	3.23	C+	B+	2.68	B-	1.00	-1.5	1.18	D			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_717	2.50	3.13	4.00	4.00	3.00	2.92	3.90	B-	A+	3.61	A-	2.00	-0.25	3.36	B+			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_720	2.50	3.13	4.00	4.00	3.00	2.92	3.90	B-	A+	3.61	A-	2.00	-0.25	3.36	B+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_886	2.00	2.06	3.27	n/a	3.00	2.02	3.23	C+	B+	2.68	B-	1.00	-1.5	1.18	D			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_723	2.50	3.13	4.00	4.00	3.00	2.92	3.90	B-	A+	3.61	A-	2.00	-0.25	3.36	B+			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_721	2.50	3.13	4.00	4.00	3.00	2.92	3.90	B-	A+	3.61	A-	2.00	-0.25	3.36	B+			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_724	2.50	3.13	4.00	4.00	3.00	2.92	3.90	B-	A+	3.61	A-	2.00	-0.25	3.36	B+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_890	3.50	3.72	3.60	n/a	3.00	3.57	3.51	A-	A-	3.54	A-	1.00	-1.5	2.04	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_891	3.50	3.72	3.60	n/a	3.00	3.57	3.51	A-	A-	3.54	A-	1.00	-1.5	2.04	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_892	3.50	3.72	3.60	n/a	3.00	3.57	3.51	A-	A-	3.54	A-	1.00	-1.5	2.04	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_893	3.50	3.72	3.60	n/a	3.00	3.57	3.51	A-	A-	3.54	A-	1.00	-1.5	2.04	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_894	4.00	4.00	3.80	n/a	3.00	4.00	3.68	A+	A-	3.82	A+	1.00	-1.5	2.32	C+	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_895	4.00	4.00	3.80	n/a	3.00	4.00	3.68	A+	A-	3.82	A+	1.00	-1.5	2.32	C+	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	Large	MountSpokane_896	3.00	3.46	3.60	n/a	3.00	3.23	3.51	B+	A-	3.38	B+	2.00	-0.33	3.05	B+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_899	2.00	2.71	3.60	n/a	2.00	2.23	3.36	C+	B+	2.85	B-	1.00	-1.5	1.35	D			No
Upland Forest & Woodland	matrix	MountSpokane_901	2.00	2.71	3.60	n/a	2.00	2.23	3.36	C+	B+	2.85	B-	1.00	-1.5	1.35	D			No
Upland Forest & Woodland	matrix	MountSpokane_902	2.50	3.00	3.40	n/a	2.00	2.67	3.19	B-	B+	2.95	B-	1.00	-1.5	1.45	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_903	2.50	3.00	3.40	n/a	2.00	2.67	3.19	B-	B+	2.95	B-	1.00	-1.5	1.45	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_905	2.50	3.00	3.40	n/a	2.00	2.67	3.19	B-	B+	2.95	B-	1.00	-1.5	1.45	D			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_906	2.00	2.71	3.60	n/a	2.00	2.23	3.36	C+	B+	2.85	B-	1.00	-1.5	1.35	D			No
Upland Forest & Woodland	matrix	MountSpokane_910	3.50	3.72	3.60	n/a	3.00	3.57	3.51	A-	A-	3.54	A-	1.00	-1.5	2.04	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_911	4.00	4.00	3.47	n/a	3.00	4.00	3.40	A+	B+	3.67	A-	1.00	-1.5	2.17	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_912	3.50	3.00	3.80	n/a	3.00	3.34	3.68	B+	A-	3.52	A-	1.00	-1.5	2.02	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_913	3.50	3.00	3.80	n/a	3.00	3.34	3.68	B+	A-	3.52	A-	1.00	-1.5	2.02	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_916	3.00	3.00	3.93	n/a	3.00	3.00	3.79	B+	A-	3.44	B+	1.00	-1.5	1.94	C-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_918	3.50	3.72	3.60	n/a	3.00	3.57	3.51	A-	A-	3.54	A-	1.00	-1.5	2.04	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_920	3.00	3.00	3.93	n/a	3.00	3.00	3.79	B+	A-	3.44	B+	1.00	-1.5	1.94	C-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes

Appendix H. Complete EIA Data and Comments

Ecosystem Type	Patch Type	Veg Polygon Keylink	Landscape MEF	Buffer MEF	Vegetation MEF	Hydrology MEF	Soil/Substrate MEF	Landscape Context Score	Condition Score	Landscape Context Rank	Condition Rank	EIA Score	EIA Rank	Size Score	Size "Points"	EORANK Score	EORANK	User Adjusted Combined EO Rank	User Adjusted EO Rank Reason	Element Occurrence?
Upland Forest & Woodland	matrix	MountSpokane_924	3.00	3.00	3.93	n/a	3.00	3.00	3.79	B+	A-	3.44	B+	1.00	-1.5	1.94	C-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_925	3.50	3.00	3.80	n/a	3.00	3.34	3.68	B+	A-	3.52	A-	1.00	-1.5	2.02	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_926	3.50	3.00	3.80	n/a	3.00	3.34	3.68	B+	A-	3.52	A-	1.00	-1.5	2.02	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_927	3.50	3.00	2.93	n/a	3.00	3.34	2.94	B+	B-	3.12	B+	1.00	-1.5	1.62	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_930	3.50	3.00	3.80	n/a	3.00	3.34	3.68	B+	A-	3.52	A-	1.00	-1.5	2.02	C+			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_728	2.50	3.13	4.00	4.00	3.00	2.92	3.90	B-	A+	3.61	A-	2.00	-0.25	3.36	B+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_935	3.00	3.00	4.00	n/a	4.00	3.00	4.00	B+	A+	3.55	A-	1.00	-1.5	2.05	C+	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Nonforested Wetland	Small	MountSpokane_649	2.50	3.72	4.00	4.00	4.00	3.32	4.00	B+	A+	3.80	A-	2.00	-0.25	3.55	A-			Yes
Nonforested Wetland	Small	MountSpokane_709	2.50	3.72	4.00	4.00	4.00	3.32	4.00	B+	A+	3.80	A-	2.00	-0.25	3.55	A-			Yes
Upland Forest & Woodland	matrix	MountSpokane_938	3.50	3.46	3.93	n/a	3.00	3.49	3.79	B+	A-	3.66	A-	1.00	-1.5	2.16	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_939	3.50	4.00	4.00	n/a	4.00	3.67	4.00	A-	A+	3.85	A+	1.00	-1.5	2.35	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_940	4.00	4.00	3.80	n/a	4.00	4.00	3.83	A+	A+	3.91	A+	1.00	-1.5	2.41	C+			Addt. analysis needed
Forested Wetland	Small	MountSpokane_282	3.50	4.00	3.60	4.00	4.00	3.84	3.78	A+	A-	3.80	A-	2.00	-0.25	3.55	A-	C-	Size is way too generous. Atypical landscape setting for this community. Not a viable conservation target	No
Upland Forest & Woodland	matrix	MountSpokane_942	3.50	4.00	3.07	n/a	4.00	3.67	3.21	A-	B+	3.41	B+	1.00	-1.5	1.91	C-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_945	3.00	4.00	4.00	n/a	4.00	3.33	4.00	B+	A+	3.70	A-	1.00	-1.5	2.20	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_947	3.00	3.72	4.00	n/a	4.00	3.24	4.00	B+	A+	3.66	A-	1.00	-1.5	2.16	C+	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Nonforested Upland	Large	MountSpokane_948	2.50	3.72	3.88	n/a	3.00	3.11	3.74	B+	A-	3.46	B+	2.00	-0.33	3.13	B+			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_949	3.00	3.46	3.60	n/a	3.00	3.23	3.51	B+	A-	3.38	B+	2.00	-0.33	3.05	B+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_951	3.00	4.00	4.00	n/a	4.00	3.33	4.00	B+	A+	3.70	A-	1.00	-1.5	2.20	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_952	3.00	3.13	4.00	n/a	3.00	3.04	3.85	B+	A+	3.49	B+	1.00	-1.5	1.99	C-			Addt. analysis needed
Nonforested Upland	Large	MountSpokane_953	3.50	4.00	4.00	n/a	3.00	3.75	3.85	A-	A+	3.81	A+	1.00	-1	2.81	B-	B-	Combined EO RANK Score = 2.58 (B-)	Yes
Upland Forest & Woodland	matrix	MountSpokane_954	3.00	3.46	2.87	n/a	2.00	3.15	2.74	B+	B-	2.92	B-	1.00	-1.5	1.42	D			No
Upland Forest & Woodland	matrix	MountSpokane_955	3.50	3.46	3.60	n/a	4.00	3.49	3.66	B+	A-	3.58	A-	1.00	-1.5	2.08	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_957	4.00	4.00	3.93	n/a	4.00	4.00	3.94	A+	A+	3.97	A+	1.00	-1.5	2.47	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_959	3.50	4.00	3.73	n/a	4.00	3.67	3.77	A-	A-	3.72	A-	1.00	-1.5	2.22	C+	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_960	3.50	4.00	4.00	n/a	3.00	3.67	3.85	A-	A+	3.77	A-	1.00	-1.5	2.27	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_961	4.00	4.00	4.00	n/a	4.00	4.00	4.00	A+	A+	4.00	A+	1.00	-1.5	2.50	B-	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_964	3.50	3.00	3.80	n/a	3.00	3.34	3.68	B+	A-	3.52	A-	1.00	-1.5	2.02	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_965	3.50	3.46	4.00	n/a	4.00	3.49	4.00	B+	A+	3.77	A-	1.00	-1.5	2.27	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_968	3.50	4.00	4.00	n/a	4.00	3.67	4.00	A-	A+	3.85	A+	1.00	-1.5	2.35	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_969	3.50	4.00	3.87	n/a	4.00	3.67	3.89	A-	A+	3.79	A-	1.00	-1.5	2.29	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_970	3.00	4.00	4.00	n/a	3.00	3.33	3.85	B+	A+	3.62	A-	1.00	-1.5	2.12	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_971	3.50	3.22	4.00	n/a	4.00	3.41	4.00	B+	A+	3.73	A-	1.00	-1.5	2.23	C+			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_1053	3.50	4.00	4.00	4.00	4.00	3.84	4.00	A+	A+	3.95	A+	3.00	0.25	4.20	A+			Yes
Upland Forest & Woodland	Large	MountSpokane_979	3.50	3.72	4.00	n/a	4.00	3.61	4.00	A-	A+	3.83	A+	3.00	0.33	4.16	A+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_980	3.50	4.00	4.00	n/a	4.00	3.67	4.00	A-	A+	3.85	A+	1.00	-1.5	2.35	C+			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_981	4.00	4.00	4.00	n/a	4.00	4.00	4.00	A+	A+	4.00	A+	1.00	-1.5	2.50	B-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_982	2.50	3.36	2.07	n/a	1.00	2.78	1.91	B-	C-	2.30	C+	1.00	-1.5	0.80	D			No
Upland Forest & Woodland	Large	MountSpokane_983	2.50	3.72	4.00	n/a	4.00	3.11	4.00	B+	A+	3.60	A-	1.00	-1	2.60	B-			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_1054	3.50	4.00	4.00	4.00	4.00	3.84	4.00	A+	A+	3.95	A+	3.00	0.25	4.20	A+			Yes
Upland Forest & Woodland	Large	MountSpokane_987	4.00	4.00	3.40	n/a	3.00	4.00	3.34	A+	B+	3.64	A-	1.00	-1	2.64	B-			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_992	3.50	3.46	3.80	n/a	4.00	3.48	3.83	B+	A+	3.67	A-	1.00	-1	2.67	B-			Addt. analysis needed
Upland Forest & Woodland	Large	MountSpokane_993	3.50	3.46	3.80	n/a	4.00	3.48	3.83	B+	A+	3.67	A-	1.00	-1	2.67	B-			Addt. analysis needed
Nonforested Wetland	Small	MountSpokane_972	3.50	4.00	4.00	4.00	4.00	3.84	4.00	A+	A+	3.95	A+	3.00	0.25	4.20	A+			Yes
Upland Forest & Woodland	matrix	MountSpokane_995	3.50	3.46	3.80	n/a	4.00	3.49	3.83	B+	A+	3.68	A-	1.00	-1.5	2.18	C+	A+	Combined size = B (+0.5 pts); Combined EO Rank Score = 4.06 (A+)	Yes
Upland Forest & Woodland	matrix	MountSpokane_998	3.00	3.13	4.00	n/a	3.00	3.04	3.85	B+	A+	3.49	B+	1.00	-1.5	1.99	C-			Addt. analysis needed
Upland Forest & Woodland	matrix	MountSpokane_999	3.50	4.00	4.00	n/a	4.00	3.67	4.00	A-	A+	3.85	A+	1.00	-1.5	2.35	C+			Addt. analysis needed