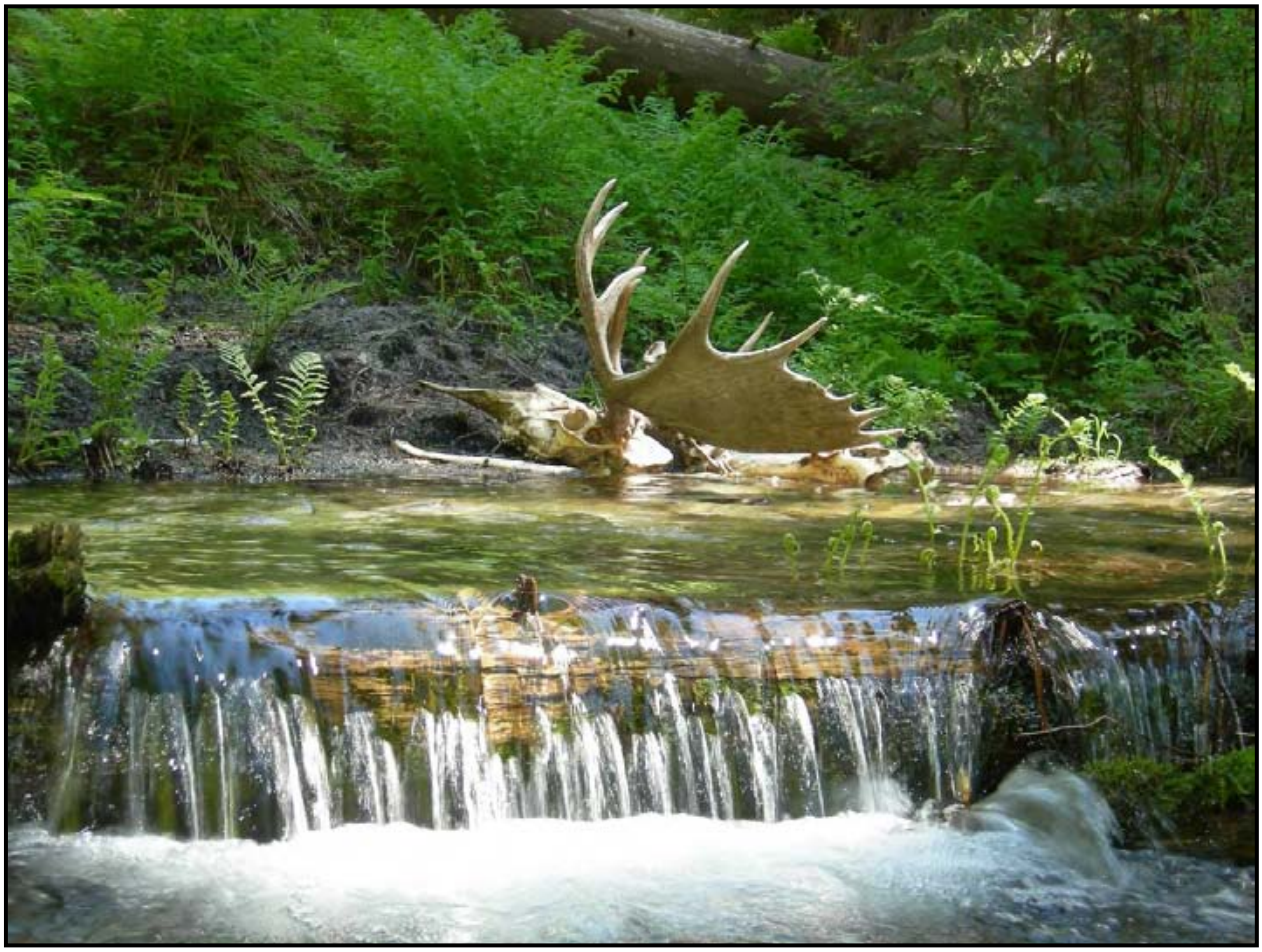
Biological Surveys

Conducted in the SEIS Analysis Area at

Mt. Spokane State Park During 2010



Pacific Biodiversity Institute

Biological Surveys Conducted in the SEIS Analysis Area at Mt. Spokane State Park During 2010

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Introduction

We conducted a sequence of biological surveys within portions of Mt. Spokane State Park during the summer of 2010. The area surveyed was within the area included in a supplemental EIS (SEIS) related to ski area expansion. The focus of our surveys was to assess vegetation composition and habitat conditions for wildlife species. We conducted a reconnaissance-level survey of the SEIS Analysis Area and a more detailed habitat and rare plant survey of the smaller Biological Survey Area. The boundaries of these two areas are illustrated in Figure 1.

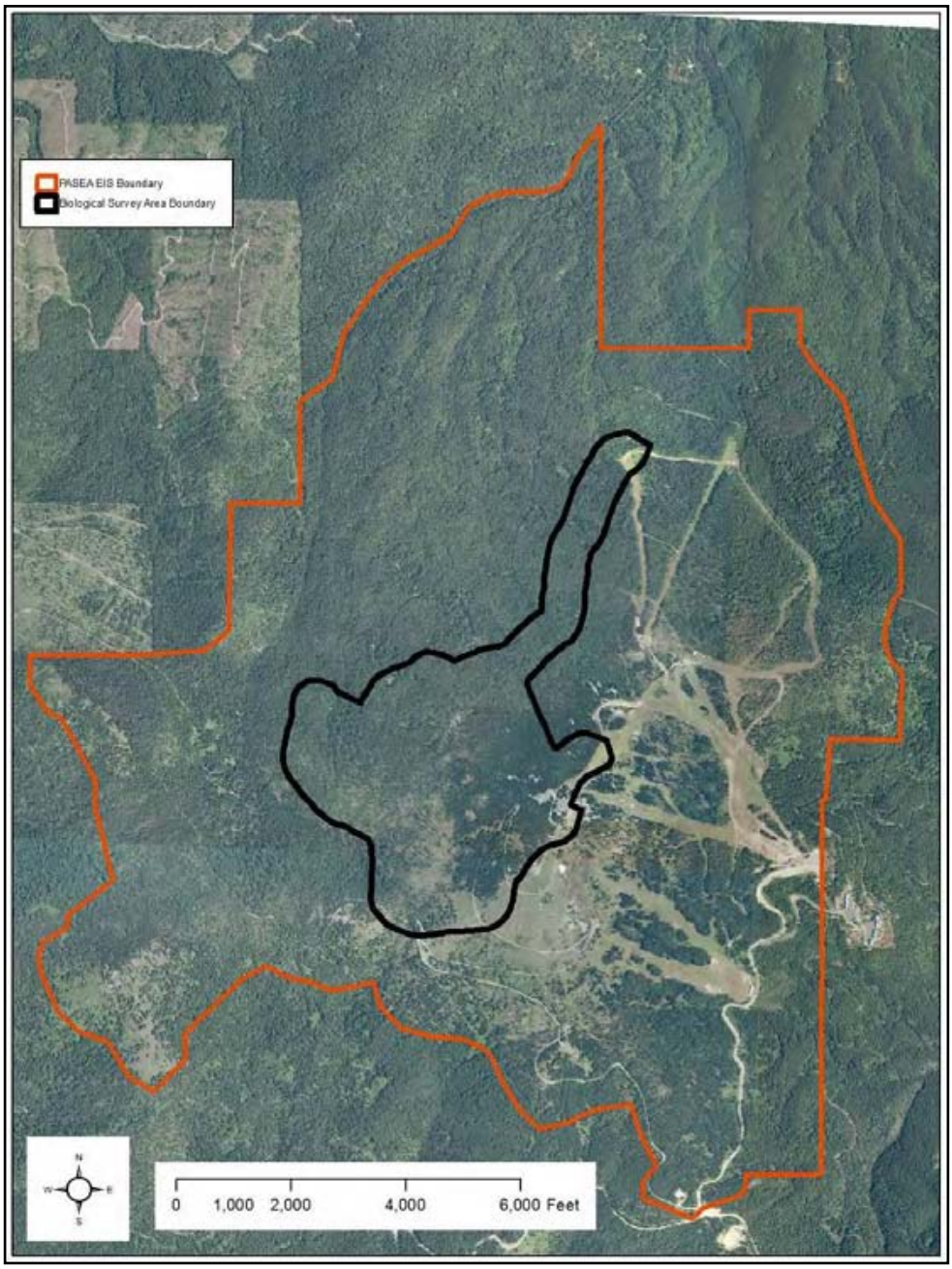

Figure 1. Boundaries of SEIS Analysis Area and Biological Survey Area at Mt. Spokane.

Vegetation/Habitat Surveys within the SEIS Analysis Area

Methods

We conducted a reconnaissance-level vegetation and habitat survey in the SEIS analysis area (about 3,814 acres). Pre-field reviews were conducted to develop initial habitat type maps in the SEIS survey area of Mt. Spokane State Park. We reviewed existing literature and GIS datasets in the Mt. Spokane area (Wooten and others 2009, Smith and Morrison 2009, Smith 2009, Romain-Bondi and others 2009, Snetsinger and White 2009, Morrison and others 2007, Crawford 1993).

We mapped all vegetation polygons in the SEIS Analysis Area based on our past work at Mt. Spokane, combined with additional aerial photo-interpretation and GIS analysis. The polygons were mapped using ArcGIS, using onscreen digitizing based on textural appearance, hydrology and topography. Features were mapped as contiguous polygons. These maps were combined with maps of special habitat features such as talus slopes and wetlands provided by SE Group.

All of the mapped polygons were visited at least once during the field season. Three field sessions were conducted from June 27 to August 30, 2010 by G. Wooten, P. Morrison, H. Smith, J. Rhodes and A. Yamamuro. We quickly visited each polygon in the field to determine its basic vegetation attributes. We keyed each polygon to its plant association, based on a plant association key we developed from previous work at Mt. Spokane with modifications made during 2010. We collected the following vegetation data at each polygon: Plant Associations, Dominant Overstory Species (trees), Dominant Understory Species (shrubs and herbs), Canopy Closure, and Stand Age Class. In some cases we also recorded brief notes about the polygon.

During vegetation surveys, surveyors occasionally edited polygon boundaries based on their observations. In addition to paper maps of the area, surveyors were equipped with mobile GIS/GPS devices running ArcPad software with base layers of aerial photography and topography as well as the vegetation polygon layer. Using this equipment, it was possible to refine the vegetation polygons in the field, where necessary.

Plant associations were identified based on literature descriptions (Cooper and others 1991, Crawford 1993, Daubenmire 1981, Kovalchik and Clausnitzer 2004, NatureServe 2009, Pfister and others 1977, Williams and others 1995). The dominant plant association in a polygon is the primary plant association. In some cases, one or two additional plant associations were identified within a polygon.

Once the fieldwork was completed, we created a final vegetation/habitat database for the SEIS Analysis Area and polygon GIS layer containing all the attributes described above.

Plant associations were identified based on literature descriptions (Cooper and others 1991, Crawford 1993, Daubenmire 1981, Kovalchik and Clausnitzer 2004, NatureServe 2009, Pfister and others 1977, Williams and others 1995). The dominant plant association in a polygon is the primary plant association. Two other plant associations could be optionally identified within a polygon.

Results

During the summer field season of 2010, our team mapped and surveyed 325 vegetation/habitat polygons in the SEIS Analysis Area. We found a diversity of habitat conditions and vegetation associations within this large area. Figure 2 illustrates the variation of the primary (dominant) plant association (PA1) in each polygon that we mapped and surveyed. In many polygons we also recorded secondary plant associations, often occurring as small patches or strips. In some of the more diverse polygons, we recorded tertiary plant associations, also occurring in small patches. Table 1 contains a list of all the plant associations found with both the SEIS Analysis Area and the Biological Survey Area. This table also contains the full scientific name and common name of each plant association, as well as whether it occurs as a primary or a secondary plant association.

In each polygon we estimated the forest canopy cover to one of six Daubenmire cover classes. Figure 3 illustrates the variation in canopy cover in the study area. We also recorded the dominant tree species, shrub species and herb species in each polygon. We estimated the forest age range in each polygon. We cored a sample of trees scattered throughout the study area and counted tree rings to determine stand ages and to gain a better understanding of the tree age/diameter/height/site condition relationships in the analysis area. We also counted tree rings on a sample of cut stumps (where we could find them) scattered through out the analysis area to further aid in the determination of the age range of each polygon. All of this data was incorporated in a Microsoft Access database and then attached to a GIS data layer (ESRI shapefile), which is distributed with this report. The following maps are only a partial illustration of the data contained in the database and shapefile.

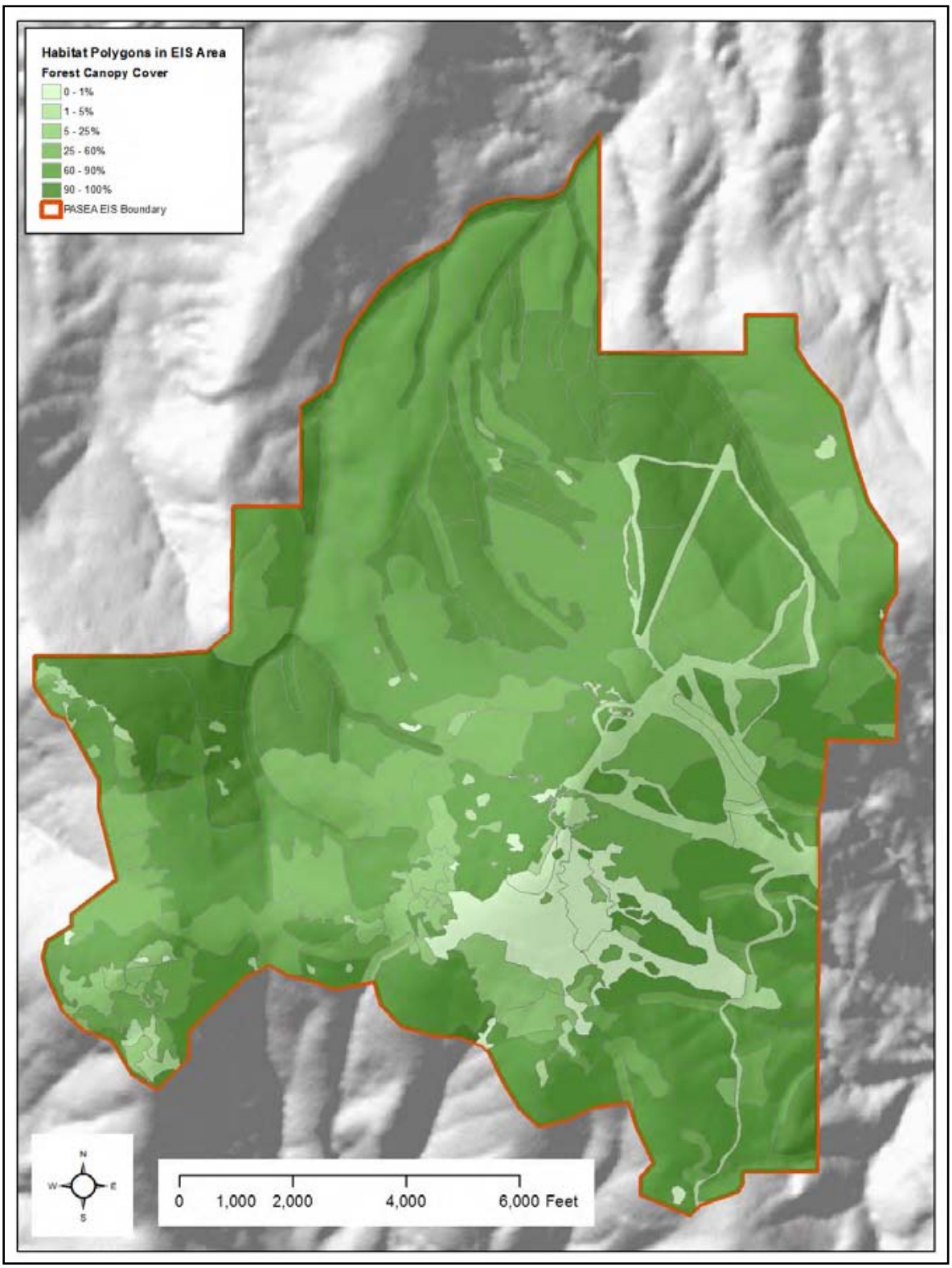

Figure 2. Primary Plant Associations in the SEIS Analysis Area.
(See Table 1 for the definition of the codes.)

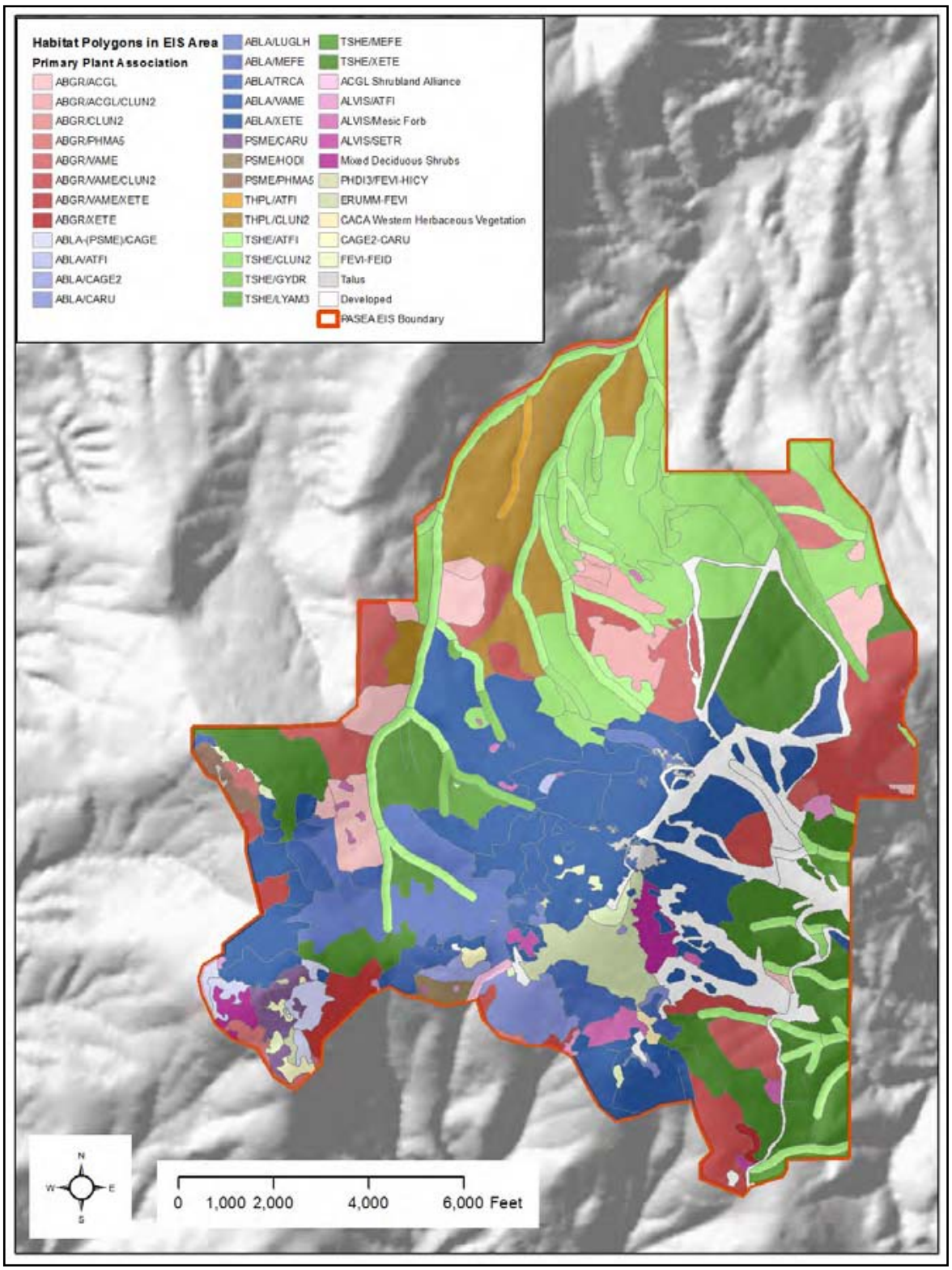

Figure 3. Forest canopy cover of polygons in the SEIS Analysis Area.

Table 1. Plant Associations (PAs) found in the SEIS Analysis Area and Biological Survey Area.

Plant Associations	Scientific Name	Common Name	Rank BSA	Rank SEIS Area
ABGR/ACGL	Abies grandis / Acer glabrum	Grand fir / Rocky Mt. maple	PA2	PA1
ABGR/ACGL/CLUN2	Abies grandis / Acer glabrum / Clintonia uniflora	Grand fir / Rocky Mt. maple / Beadlily	PA1	PA1
ABGR/CLUN2	Abies grandis / Clintonia uniflora	Grand fir / Beadlily		PA1
ABGR/PHMA5	Abies grandis / Physocarpus malvaceus	Grand fir / Ninebark		PA1
ABGR/VAME	Abies grandis / Vaccinium membranaceum	Grand fir / Thinleaf huckleberry	PA1	PA1
ABGR/VAME/CLUN2	Abies grandis / Clintonia uniflora	Grand fir / Beadlily	PA1	PA1
ABGR/VAME/XETE	Abies grandis / Vaccinium membranaceum / Xerophyllum tenax	Grand fir / Thinleaf huckleberry / Beargrass		PA1
ABGR/XETE	Abies grandis / Xerophyllum tenax	Grand fir / Beargrass		PA1
ABLA-(PSME)/CAGE	Abies lasiocarpa – (Pseudotsuga menziesii) / Carex geyeri	Subalpine fir – (Douglas-fir) / Elk sedge		PA1
ABLA/ATFI	Abies lasiocarpa / Athyrium felix-femina	Subalpine fir / Ladyfern	PA1	PA1
ABLA/CAGE2	Abies lasiocarpa / Carex geyeri	Subalpine fir / Elk sedge	PA2	PA1
ABLA/CARO	Abies lasiocarpa / Carex rossii	Subalpine fir / Ross sedge		PA2
ABLA/CARU	Abies lasiocarpa / Calamagrostis rubescens	Subalpine fir / Pinegrass	PA2	PA1
ABLA/LUGLH	Abies lasiocarpa / Luzula glabrata ssp. hitchcockii	Subalpine fir / Hitchcock's woodrush	PA1	PA1
ABLA/MEFE	Abies lasiocarpa / Menziesia ferruginea	Subalpine fir / Fool's Huckleberry	PA1	PA1
ABLA/RHAL/XETE	Abies lasiocarpa / Rhododendron albiflorum / Xerophyllum tenax	Subalpine fir / Cascade azalea / Beargrass		PA2
ABLA/Talus	Abies lasiocarpa / Talus	Subalpine fir / Talus	PA2	PA2
ABLA/TRCA	Abies lasiocarpa / Trautvetteria caroliniensis	Subalpine fir / Carolina bugbane	PA1	PA1
ABLA/VAME	Abies lasiocarpa / Vaccinium membranaceum	Subalpine fir / Thinleaf huckleberry	PA1	PA1
ABLA/XETE	Abies lasiocarpa / Xerophyllum tenax	Subalpine fir / Beargrass	PA1	PA1
ABLA-PIEN/ACGL	Abies lasiocarpa – Picea engelmannii / Acer glabrum	Subalpine fir – Engelmann spruce / Rocky Mt. maple		PA2
ACGL Shrubland Alliance	Acer glabrum Shrubland Alliance	Rocky Mt. maple / Shrubland Alliance		PA1
ALVIS/ATFI	Alnus viridis ssp. sinuata / Athyrium felix-femina	Sitka alder / Ladyfern	PA1	PA1
ALVIS/Mesic Forb	Alnus viridis ssp. sinuata / Mesic Forb	Sitka alder / Mesic Forb	PA1	PA1
ALVIS/SETR	Alnus viridis ssp. sinuata / Senecio triangularis	Sitka alder / Triangle-leaf groundsel	PA1	PA1
CACA Western Herbaceous Vegetation	Calamagrostis canadensis Western Herbaceous Vegetation	Blue-joint grass Western Herbaceous Vegetation		PA1
CAGE2-CARU	Carex geyeri – Calamagrostis rubescens	Elk sedge – Pinegrass	PA2	PA1
CASCP	Carex scopulorum ssp. Prionophylla	Sawtooth sedge	PA2	PA2
Developed	Developed	Developed	PA1	PA1

Table 1. Plant Associations (PAs) found in the SEIS Analysis Area and Biological Survey Area.

Plant Associations	Scientific Name	Common Name	Rank BSA	Rank SEIS Area
ERUMM-FEVI	Eriogonum umbellatum var. majus – Festuca viridula	Sulfur-flower buckwheat – Green fescue	PA1	PA1
FEVI-FEID	Festuca viridula – Festuca idahoensis	Green fescue – Idaho fescue	PA1	PA1
HEMA80-RUOC2	Heracleum maximum /- Rudbeckia occidentalis	Cow parsnip – Western coneflower		PA2
Mixed Deciduous Shrubs	Mixed Deciduous Shrubs	Mixed Deciduous Shrubs	PA2	PA1
PHDI3/ARCA7-IOST	Phlox diffusa / Arenaria capillaries – Ionactis stenomeres	Spreading phlox / Green fescue – Rocky Mt. aster	PA2	PA2
PHDI3/FEVI-HICY	Phlox diffusa / Festuca viridula – Hieracium cynoglossoides	Spreading phlox / Green fescue / Houndstongue hawkweed	PA1	PA1
POBAT/SYAL	Populus balsamifera ssp. Trichocarpa / Symphoricarpos albus	Black cottonwood / Snowberry		PA2
PSME/CAGE2	Pseudotsuga menziesii / Carex geyeri	Douglas-fir / Elk sedge		PA2
PSME/CARU	Pseudotsuga menziesii / Calamagrostis rubescens	Douglas-fir / Pinegrass		PA1
PSME/FEID	Pseudotsuga menziesii / Festuca idahoensis	Douglas-fir / Idaho fescue		PA2
PSME/HODI	Pseudotsuga menziesii / Holodiscus discolor	Douglas-fir / Oceanspray		PA1
PSME/PHMA5	Pseudotsuga menziesii / Physocarpus malvaceus	Douglas-fir / Ninebark		PA1
RILA/Talus	Ribes lacustre / Talus	Prickly currant / Talus	PA2	PA2
RUPA/Mixed Graminoids	Rubus parviflorus / Mixed graminoids	Thimbleberry / Mixed graminoids		PA2
SETR-VECA2	Senecio triangularis – Veratrum californicum	Arrowleaf groundsel – California hellebore	PA2	PA2
Talus	Talus	Talus	PA1	PA1
THPL/ARNU2	Thuja plicata / Aralia nudicaulis	Western redcedar / Sarsaparilla		PA2
THPL/ATFI	Thuja plicata / Athyrium felix-femina	Western redcedar / Ladyfern		PA1
THPL/CLUN2	Thuja plicata / Clintonia uniflora	Western redcedar / Beadlily		PA1
THSE/ASCA2	Tsuga heterophylla / Asarum caudatum	Western hemlock / Wild ginger		PA2
TSHE/ATFI	Tsuga heterophylla / Athyrium felix-femina	Western hemlock / Ladyfern	PA1	PA1
TSHE/CLUN2	Tsuga heterophylla / Clintonia uniflora	Western hemlock / Beadlily	PA1	PA1
TSHE/GYDR	Tsuga heterophylla / Gymnocarpium dryopteris	Western hemlock / Oak fern	PA1	PA1
TSHE/LYAM3	Tsuga heterophylla / Lysichiton americanus	Western hemlock / Skunk Cabbage		PA1
TSHE/MEFE	Tsuga heterophylla / Menziesia ferruginea	Western hemlock / Fool's Huckleberry	PA1	PA1
TSHE/XETE	Tsuga heterophylla / Xerophyllum tenax	Western hemlock / Beargrass	PA1	PA1

The column "Rank BSA" flags PAs that occur in the Biological Survey Area (BSA) by whether they are primary PAs (PA1) or secondary or tertiary (PA2). The column "Rank SEIS Area" flags PAs that occur in the SEIS Analysis Area as primary PAs (PA1) or secondary or tertiary PAs (PA2).

Rare Plant and Wildlife Habitat Surveys within the Biological Survey Area

Methods

Prior to field work, we reviewed all previous relevant studies on Mt. Spokane and all readily available data on vegetation, rare plants, weeds and habitat conditions. We refined the existing vegetation and habitat polygon data in our GIS lab, where possible, based on consolidation of existing data sources and further assessment of aerial imagery and ancillary GIS data. We prepared field maps, along with habitat/faunal keys, lists of target species, and recording forms. PBI prepared data for and then used mobile GIS/GPS devices running ArcPad 8.3 software for field mapping and spatial data collection.

Rare Plant Survey Methods

The objective of the rare plant surveys was to locate any rare vascular plants occurring within the Biological Survey Area. Rare plants include federally Endangered or Threatened species or Washington State sensitive, threatened or endangered vascular plant species tracked by the Washington Natural Heritage Program (WNHP).

Rare plant survey methods were based on the USDA rare plant survey handbook (Range Management Staff 2008). Vegetation and rare vascular plant surveys were conducted during the 2010 field season. These surveys did not include surveys for non-vascular plant species.

Pre-field reviews were conducted to determine likely habitats for suspected rare plants and plant associations in the Biological Survey Area. We reviewed existing literature and GIS datasets in the Mt. Spokane area (Smith and Morrison 2009, Smith 2009, Snetsinger and White 2009, Wooten and others 2009, Morrison and others 2007, Crawford 1993). We reviewed species lists of potential rare plants listed by the Washington Natural Heritage Program based on species on or adjacent to the Colville National Forest (Table 2) and from a list developed by SE Group (Table 3).

Table 2. Suspected rare plant species and habitats listed by the Colville National Forest.

Vascular Plant Species	Occurrence	Habitats
Meadow pussy-toes *(Antennaria corymbosa)*	D	Moist meadows, stream-sides, and moist open forests, 5000 ft.
Nuttall's pussy-toes *(Antennaria parvifolia)*	D	Dry, open areas with sandy or gravely soil along rivers, creeks, or lake shores, usually in ponderosa pine forests, 1400-2600 ft.
Least bladdery milk vetch *(Astragalus microcystis)*	D	Gravelly to sandy areas, from riverbanks to open forests, 1400-6200 ft.
Upswept moonwort *(Botrychium ascendens)*	D	Coniferous forests, in wet and dry meadows, roadsides, ravines, and along perennial streams, 2100-6400 ft.
Crenulate moonwort *(Botrychium crenulatum)*	D	Western red-cedar/western hemlock forests, stream-banks, and floodplains, 2030-5500 ft.
Western moonwort *(Botrychium hesperium)*	D	Sagebrush shrub-lands and, moist or dry meadows, 2700-6300 ft.
Skinny moonwort *(Botrychium lineare)*	D	Western red-cedar/western hemlock forests, stream-banks, and floodplains, 2000-4000 ft.

Table 2. Suspected rare plant species and habitats listed by the Colville National Forest.

Vascular Plant Species	Occurrence	Habitats
Two-spiked moonwort *(Botrychium paradoxum)*	D	Late seral red-cedar/western hemlock forests on floodplains, stream terraces near perennial or intermittent streams, compacted old roadbeds, early seral lodgepole, and grazed homestead meadows, 2400-6400 ft.
Stalked moonwort *(Botrychium pedunculosum)*	D	Moist or dry meadows, along perennial streams, and in coniferous forests, 1800 to 6300 ft.
Hair-like sedge (Carex capillaris)	D	Stream-banks, wet meadows, wet ledges, and marshy lake shores, 2800-6500 ft.
Bristly sedge *(Carex comosa)*	D	Marshes, lake shores, and wet meadows, to 2000 ft.
Yellow bog sedge *(Carex dioica var. gynocrates)*	S	Sphagnum bogs, forested wetlands and other wet marshy places, 2600-3800 ft.
Poor sedge *(Carex magellanica ssp. irrigua)*	D ~	Fens, bogs, shady wet meadows, shrub wetlands, and ponds, 1600-7000 ft.
Smoky Mountain sedge *(Carex proposita)*	D	Rocky slopes and ridges, often on talus or granite substrate, near or above tree line.
Beaked sedge *(Carex rostrata)*	D ~	Quaking or floating peat, 4500-5000 ft.
Many-headed sedge *(Carex sychnocephala)*	S	Moist or wet ground adjacent to marshes or along lake shores, 1000-3000 ft.
Quill sedge *(Carex tenera)*	D	Wetlands, 3000 ft.
Northern-golden carpet *(Chrysosplenium tetrandrum)*	S	Seeps, rock crevices, wet banks, and other open, wet places at lower to mid-elevations (on Loomis Forest at >5000 ft elevation)
Bulb-bearing water hemlock *(Cicuta bulbifera)*	D	Edges of marshes and lake margins, in bogs, wet meadows, shallow standing water and along slow moving streams, 2200-3720 ft.
Stellar's rockbrake *(Cryptogramma stelleri)*	D	Moist, shaded cliffs and ledges, commonly on limestone cliffs, 3000-6000 ft.
Yellow lady's slipper *(Cypripedium parviflorum)*	D	Bogs and wet forests, perennial streams on limestone rock under mixed coniferous forest, 2100-3440 ft.
Yellow mountain avens *(Dryas drummondii)*	D	Crevices of steep, rocky, dry cliffs, and on limestone rock along rivers, 1900 to 6800 ft.
Crested shield fern *(Dryopteris cristata)*	D	Fens, wet meadows and wooded swamps, 2150-4100 ft.
Green keeled cotton-grass *(Eriophorum viridicarinatum)*	D ~	Cold, sometimes calcareous, swamps and bogs, 2000-6600 ft.
Creeping snowberry *(Gaultheria hispidula)*	D ~	Sphagnum bogs and forests, 3000-6000 ft.
Water avens *(Geum rivale)*	D	Wet meadows, bogs, riparian zones along perennial streams, and moist old pastures, 2500-6400 ft
Sandberg desert parsley *(Lomatium sandbergii)*	D	Dry, rocky, or open slopes and ridges in the upper montane to subalpine zones.
Bog clubmoss *(Lycopodiella inundata)*	S	Sphagnum bogs, wet, sandy places, wetlands near lakes, and swampy ground, 1800 ft.

Table 2. Suspected rare plant species and habitats listed by the Colville National Forest.

Vascular Plant Species	Occurrence	Habitats
Treelike clubmoss *(Lycopodium dendroideum)*	D	Rock outcrops, talus or boulder fields, often with a moss and organic debris layer, ecotone between meadow or wetland and the adjacent forest, often growing near the base of large boulders in a fairly dense ground cover, 3000-3650 ft.
Marsh muhly *(Muhlenbergia glomerata)*	D	Along stream-banks, meadows, marshes, bogs, and the shores of ponds and lakes, 2900-3500 ft.
Adder's tongue *(Ophioglossum pusillum)*	D	Pastures, old fields, roadside ditches, and flood plain forests in seasonally wet, rather acid soil, 2800-3200 ft.
Common twinpod *(Physaria didymocarpa var. didymocarpa)*	S	Steep shale outcrops, rocky flats, gravelly prairies, talus slopes, dry hillsides, and road cuts, 2000-5400 ft.
Small northern bog-orchid *(Platanthera obtusata)*	D	Damp or wet places in forests, marshes, bogs, meadows, and along stream-banks, 800 to 5000 ft.
Idaho gooseberry *(Ribes oxyacanthoides ssp. irriguum)*	D	Along streams, meadow openings near streams, and slopes of moist to dry canyons, 3000-5000 ft.
Lowland toothcup *(Rotala ramosior)*	S	Riparian wetlands growing below high water, often in a community of small emergent annuals, 2200 ft.
Hoary willow *(Salix candida)*	D	Bogs, fens, and swampy areas in peat soils, 2000-3000 ft.
MacCall's willow *(Salix maccalliana)*	D	Bogs, fens, swamps, and marshes in open, low-lying sites in peat soils, 2400-3000 ft.
Black snake-root *(Sanicula marilandica)*	D	Moist, meadows, riparian flood plains, moist woods, and marsh edges, often on calcareous substrates. 1800-3050 ft.
Strict blue-eyed grass *(Sisyrinchium montanum)*	D	In a small natural seeps or springs at low elevations in Ponderosa pine forests.
Northern blue-eyed grass *(Sisyrinchium septentrionale)*	D	Open wet meadows, sometimes near perennial streams or within a mosaic of forested wetlands, 2100-6100 ft.
Prairie cordgrass *(Spartina pectinata)*	D	Wet areas such as swales, meadows, edges of marshes and ponds, and along streams and riverbanks, 2000 ft.
Purple meadowrue *(Thalictrum dasycarpum)*	D	Deciduous riparian forests, damp thickets, swamps, and wet meadows, often near floodplains, 2000 ft.
Flat-leaved bladderwort *(Utricularia intermedia)*	S ~	Shallow ponds, slow-moving streams, and wet sedge or rush meadows, to 4000 ft.
Velvet-leaf blueberry *(Vaccinium myrtilloides)*	S	Dry or moist, sandy or rocky clearings and open forests, also in sphagnum bogs and swamps, 2000-3000 ft.
Kidney-leaved violet *(Viola renifolia)*	D	Moist, forested sites, and sometimes along ditches or streams, 2300-4400 ft
Plants are listed as Documented (D) or Suspected (S) on the Colville National Forest as of January 2010. Additional selection criteria are flagged with a tilda (~), representing plants of high elevation peatlands (above 4000 feet elevation).		

Table 3. Suspected rare vascular plant species list provided by SE Group.

Scientific Name	Common Name	Habitat Requirements	Target Species for Survey?	Survey Type
Sanicula marilandica	Black snake-root	Moist, low ground, such as meadows, riparian flood plains, moist woods, and marsh edges	1,500 to 2,900 feet	No, outside elevation range - N/A
Viola renifolia	Kidney-leaf white violet	Moist, forested sites from lowlands to subalpine, sometimes along ditches or streams	2,320 to 3,800 feet	Yes, Intuitive-Controlled – Riparian areas
Eriophorum viridicarinatum	Green-keeled cottongrass	Cold, calcareous sphagnum bogs, swamps, and meadows at mid to high elevations	2,000 to 6,000 feet	No, alkaline bogs or sphagnum bogs are not present - N/A
Penstemon wilcoxii	Wilcox's penstemon	Shrubby areas, open forest, forested slopes, moist soil and rocky hills	2,300 to 4,200 feet	Yes – General
Ribes oxyacanthoides	Idaho gooseberry	Associated with streams and riparian areas, also occurs on slopes of moist to dry canyons	3,000 to 5,000 feet	Yes, along riparian corridors only, Intuitive-Controlled – Riparian Areas
Hierochloe odorata	Common northern sweetgrass	Moist slopes, meadows, and stream banks from the foothills to sub-alpine elevations	325 to 4,420 feet, Yes, Intuitive-Controlled; Riparian Areas	

Habitat type maps were developed to help prioritize rare plant searches within the Biological Survey Area. Stands were mapped with ArcGIS, using onscreen digitizing on based on textural appearance, hydrology and topography. Features were mapped as contiguous polygons. These maps were combined with maps of special habitat features such as talus slopes and wetlands provided by SE Group.

All plant species were identified within the Biological Survey Area using the Flora of the Pacific Northwest (Hitchcock and Cronquist 1973) as a primary key. Species that could not be identified in the field were collected for further identification. All plant species that were identified were added to our master plant list.

Three summer vegetation surveys were completed to cover the important phenology of special status species of interest. The first rare plant survey (June 27-29) commenced several weeks after snowmelt on the north-facing side of Mt. Spokane's summit. This survey was designed to capture data on early blooming special status plant species. During this survey, we also collected information on plant associations and overall vegetation composition and structure that will be used to describe important components of the habitat for special status wildlife species. The data we collected is further described in the wildlife habitat section of this report.

The second rare plant survey was conducted on July 16-19 to capture information on summer blooming species. Considerable additional data on vegetation condition and wildlife habitat characteristics was collected at this time.

A third rare plant survey was conducted on August 28-30 as part of our more detailed habitat surveys within the Biological Survey Area. On this visit, we revisited some wetland hotspots

and many other areas to see if any rare plants had emerged that we might have been missed during the first surveys.

Data collected during each survey was entered into databases, analyzed and combined into a final draft survey report.

Noxious Weed Survey Methods

Noxious weeds listed by the Washington State Noxious Weed Control Board were identified and mapped if they occurred within the Biological Survey Area.

Wildlife Habitat Survey Methods

We completed a summer wildlife habitat survey to obtain information on wildlife habitat characteristics for a variety of wildlife species previously designated as important at Mt. Spokane by WDFW and Washington State Parks. These wildlife species are listed in Table 4. These wildlife and their preferred habitat conditions are described in more detail in a previous study by Pacific Biodiversity Institute titled "Habitat Elements and Life Stage Matrix for Wildlife Species of Interest in Mount Spokane State Park" (Romain-Bondi and others 2009). This study can be referred to when evaluating habitat conditions for each wildlife species. It was beyond the scope of our current contract with Mt Spokane 2000 to conduct a specific habitat analysis for each of the 21 wildlife species. However, we noted wildlife presence, signs and special habitat conditions when they were encountered in our fieldwork.

Table 4. The 21 wildlife species focused on for habitat conditions and availability in the MKC analysis area.

Species	Scientific Name	WDFW Species of Concern	Federal Status
Carnivores			
Gray wolf	*Canis lupus*	Endangered	Recently delisted as Endangered – now under appeal
Canadian lynx	*Lynx canadensis*	Threatened	Threatened
Wolverine	*Gulo gulo*	Candidate	Species of Concern
American marten	*Martes americana*	None	None
Ungulates			
Rocky Mountain elk	*Cervus elaphus*	None	None
White-tailed deer	*Odocoileus virginianus ochrourus*	None	None
Moose	*Alces alces*	None	None
Birds			
Northern goshawk	*Picoides arcticus*	Candidate	Species of Concern
Boreal owl	*Aegolius funereus richardoni*	Monitor	None
Pileated woodpecker	*Dryocopus pileatus*	Candidate	None
Black-backed woodpecker	*Picoides arcticus*	Candidate	None
Dusky grouse	*Dendragapus obscurus pallidus*	None	None
Brown creeper	*Certhia americana*	None	None

Table 4. The 21 wildlife species focused on for habitat conditions and availability in the MKC analysis area.

Species	Scientific Name	WDFW Species of Concern	Federal Status
Winter wren	*Troglodytes troglodytes*	None	None
Olive-sided flycatcher	*Contopus cooperi*	None	None
Small mammals			
Pika	*Ochotona princeps*	None	None
Pygmy shrew	*Sorex hoyi*	Monitor	None
Silver-haired bat	*Lasionycteris noctivagans*	None	None
Hoary bat	*Lasiurus cinereus*	None	None
Other species			
Western toad	*Bufo boreas*	Candidate	Species of Concern
Compton tortoiseshell butterfly	*Nymphalis vaualbum*	Monitor	None

Wildlife habitat data was collected within each polygon for the following parameters:

- plant associations
- number of tree canopy layers and dominant tree species composition
- canopy closure
- tree diameter distribution
- tree height distribution
- tree density distribution
- dominant shrub-layer cover and species composition
- dominant herb-layer cover and species composition
- estimate of snag size and density
- estimate of the characteristics of the down woody debris (logs) cover
- substrate characteristics
- special habitat features
- ecological factors or wildlife habitat characteristics that may warrant special consideration

To gather information on the attributes listed above we combined polygon surveys with the use of nested variable radius and fixed radius ecology plots. In the variable radius plots, we used a basal area factor of 10 to sample trees and snags, unless over 15 trees would be included in the plot with that basal area factor. If that was the case, we used a 20 basal area factor. In a few stands of denser, larger diameter trees, we used a 40 basal area factor. We used a nearly identical methodology during our ecological surveys of another portion of Mt. Spokane State Park in 2006 and 2007 (Morrison and others 2007). Readers should refer to that report for more details on sampling methodology. The plots were established on a fixed grid, so that there was one plot approximately every 10 acres. A set of 36 plots was established in and adjacent to the Biological Survey Area in 2006 by a field crew of Maurice Williamson that was trained by PBI ecologists. We used the data from these plots and added another 23 plots during our 2010 field

surveys within the Biological Survey Area (BSA) to fill the portions of the BSA that were not covered by plots established in 2006. Nineteen of these plots were located on the fixed grid system, and another 4 plots were located within polygons that would not be sampled by the fixed grid. In total, we were able to utilized data from 59 ecology plots to assist in the determination of the habitat attributes described above (Figure 4).

All the data from the field plots were entered into a Microsoft Access database, analyzed and summarized. We calculated many habitat variables from the data collected and then summarized these variables on a plot and polygon basis. We used an inverse distance weighted (IDW) spatial analysis technique, identical to what we use in on of our previous studies at Mt. Spokane (Morrison and others 2007) to interpolate the plot data to fill the BSA landscape. Then we summarized the data on a polygon basis using the zonal statistics tool in ArcGIS. Once all the habitat attributes were assigned to all the polygons in the BSA, each attribute for each polygon was examined by one or both authors, compared to high resolution aerial photography, polygon and plot databases and field notes. The polygon attributes were adjusted from the zonal mean values derived above based on the above information expert experience with the habitat in question.

During the wildlife habitat surveys we made note of any important wildlife sign that we encountered while conducting the surveys. This information was recorded in the special habitat feature attribute of the polygon database for the BSA.

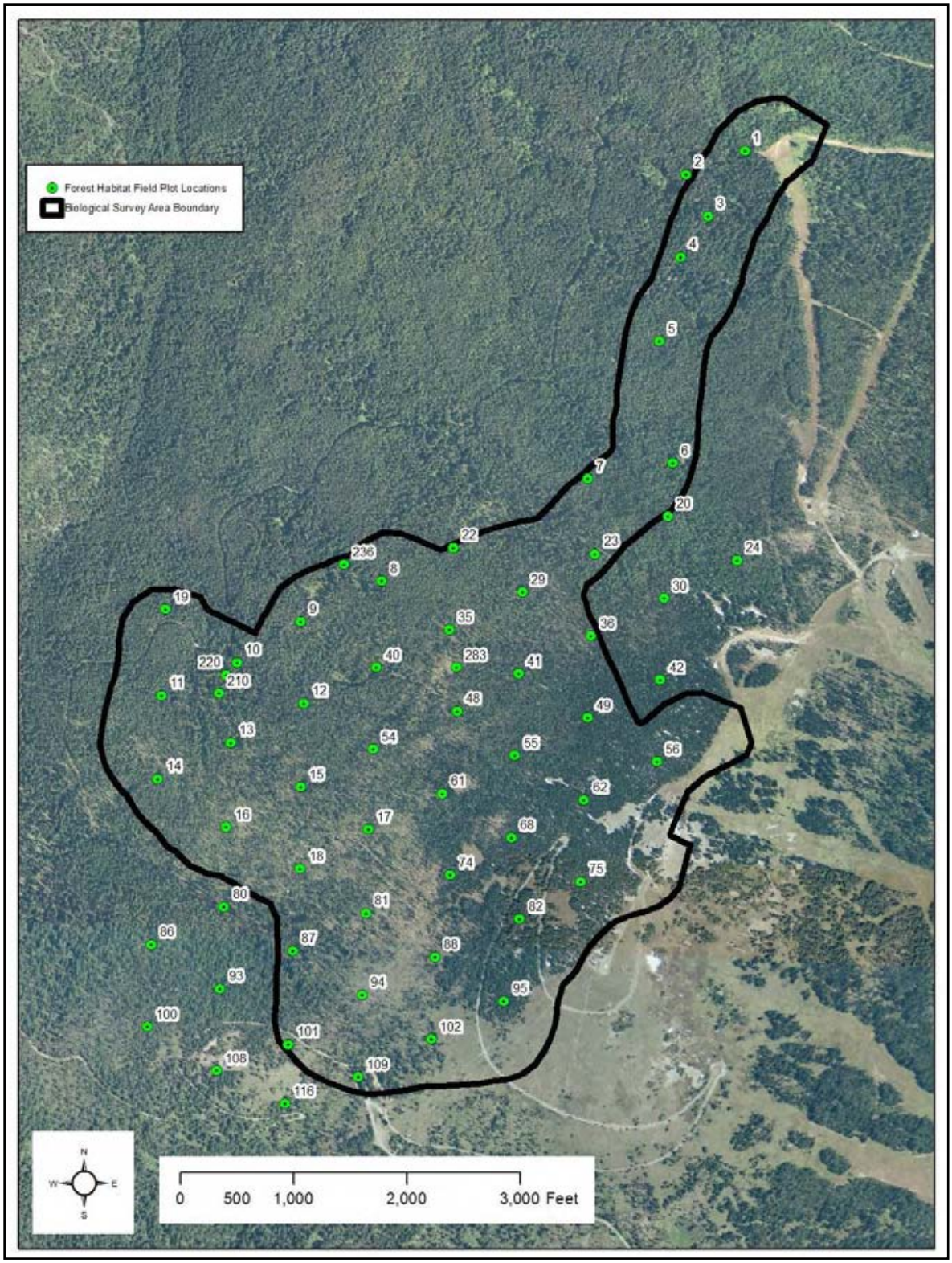

Figure 4. Forest habitat plot locations in and near the Biological Survey Area.

Results

Rare Plant Survey Results

No rare or threatened vascular plant species were observed during the 2010 rare plant surveys. No state or federally listed vascular plant species are known to occur within the Biological Survey Area at Mt. Spokane State Park, despite diligent searching.

On a large wetland complex near the southwest end of the Biological Survey area, we found *Viola macloskeyi* (Figure 5). This species bears a very close physical resemblance and habitat preference to the rare plant, *Viola renifolia*. The identity of these plants was discussed with botanist Kathy Ahlenslager of the Colville National Forest, who is familiar with both species. Their identity was confirmed by comparison with known specimens of *V. renifolia* growing near Orient, Washington. The key differentiating features were the presence of roots at the surface of the substrate (stolons) and the lack of ciliate petioles.

Figure 5. *Viola macloskeyi* growing in the wetland complex at the south end of the Biological Survey Area.

We also closely examined the spreading phlox that grows extensively in the meadows near the summit of Mount Spokane (Figure 6). We determined this species to be *Phlox diffusa*, however it differs in being about twice as tall (up to about 1 dm) as typical *Phlox diffusa* that grows elsewhere in Washington. No other distinguishing features were observed, therefore we inferred that this variation was due to environmental factors. However it remains to be confirmed whether this is due environmental factors or to genetic variation in a disjunct habitat.

Figure 6. Phlox diffusa at Mt. Spokane

Floristic Inventory

We identified 36 new vascular plants that we had not found during previous years at Mt. Spokane State Park, bringing the total number of plant species we have found there to 258. Table 5 lists all species found to date at Mt. Spokane State Park by PBI botanists. The table lists each species by its assigned, accepted national code (USDA 2009), current scientific name, national common name, family, and whether the plant is native or exotic.

Table 5. Vascular plant species that occur in Mt. Spokane State Park.

Symbol	Scientific Name with Author	Common Name	Family	Exotic
ABGR	Abies grandis (Douglas ex D. Don) Lindl.	grand fir	Pinaceae	
ABLA	Abies lasiocarpa (Hook.) Nutt.	subalpine fir	Pinaceae	
ACGLD4	Acer glabrum Torr. var. douglasii (Hook.) Dippel	Douglas maple	Aceraceae	
ACMI2	Achillea millefolium L.	common yarrow	Asteraceae	
ACNE9	Achnatherum nelsonii (Scribn.) Barkworth	Columbia needlegrass	Poaceae	
ACCO4	Aconitum columbianum Nutt.	Columbian monkshood	Ranunculaceae	
ACRU2	Actaea rubra (Aiton) Willd.	red baneberry	Ranunculaceae	
ADBI	Adenocaulon bicolor Hook.	American trailplant	Asteraceae	
ADAE	Adonis aestivalis L.	summer pheasant's eye	Ranunculaceae	yes
AGCA5	Agrostis capillaris L.	colonial bentgrass	Poaceae	
AGSC5	Agrostis scabra Willd.	rough bentgrass	Poaceae	

Table 5. Vascular plant species that occur in Mt. Spokane State Park.

Symbol	Scientific Name with Author	Common Name	Family	Exotic
ALIN2	Alnus incana (L.) Moench	gray alder	Betulaceae	
ALVIS	Alnus viridis (Chaix) DC. ssp. sinuata (Regel) A. Löve & D. Löve	Sitka alder	Betulaceae	
AMAL2	Amelanchier alnifolia (Nutt.) Nutt. ex M. Roem.	Saskatoon serviceberry	Rosaceae	
ANMA	Anaphalis margaritacea (L.) Benth.	western pearly everlasting	Asteraceae	
ANPI	Anemone piperi Britton ex Rydb.	Piper's anemone	Ranunculaceae	
ANAR3	Angelica arguta Nutt.	Lyall's angelica	Apiaceae	
ANDI2	Antennaria dimorpha (Nutt.) Torr. & A. Gray	low pussytoes	Asteraceae	
ANMI3	Antennaria microphylla Rydb.	littleleaf pussytoes	Asteraceae	
APAN2	Apocynum androsaemifolium L.	spreading dogbane	Apocynaceae	
ARHO2	Arabis holboellii Hornem.	Holboell's rockcress	Brassicaceae	
ARNU2	Aralia nudicaulis L.	wild sarsaparilla	Araliaceae	
ARUV	Arctostaphylos uva-ursi (L.) Spreng.	kinnikinnick	Ericaceae	
ARCA7	Arenaria capillaris Poir.	slender mountain sandwort	Caryophyllaceae	
ARCO5	Arenaria congesta Nutt.	ballhead sandwort	Caryophyllaceae	
ARCO9	Arnica cordifolia Hook.	heartleaf arnica	Asteraceae	
ARLA8	Arnica latifolia Bong.	broadleaf arnica	Asteraceae	
ASCA2	Asarum caudatum Lindl.	British Columbia wildginger	Aristolochiaceae	
ASDE6	Aspidotis densa (Brack.) Lellinger	Indian's dream	Pteridaceae	
ATFI	Athyrium filix-femina (L.) Roth	common ladyfern	Dryopteridaceae	
BERU	Besseya rubra (Douglas ex Hook.) Rydb.	red besseya	Scrophulariaceae	
BEOC2	Betula occidentalis Hook.	water birch	Betulaceae	
BEPA	Betula papyrifera Marsh.	paper birch	Betulaceae	
BRCA5	Bromus carinatus Hook. & Arn.	California brome	Poaceae	
BRIN2	Bromus inermis Leyss.	smooth brome	Poaceae	yes
BRVU	Bromus vulgaris (Hook.) Shear	Columbia brome	Poaceae	
CACA4	Calamagrostis canadensis (Michx.) P. Beauv.	bluejoint	Poaceae	
CARU	Calamagrostis rubescens Buckley	pinegrass	Poaceae	
CARO2	Campanula rotundifolia L.	bluebell bellflower	Campanulaceae	
CAAM10	Carex amplifolia Boott	bigleaf sedge	Cyperaceae	
CAAT3	Carex athrostachya Olney	slenderbeak sedge	Cyperaceae	
CABE2	Carex bebbii Olney ex Fernald	Bebb's sedge	Cyperaceae	
CACO11	Carex concinnoides Mack.	northwestern sedge	Cyperaceae	

Table 5. Vascular plant species that occur in Mt. Spokane State Park.

Symbol	Scientific Name with Author	Common Name	Family	Exotic
CACR4	Carex crawfordii Fernald	Crawford's sedge	Cyperaceae	
CADE9	Carex deweyana Schwein.	Dewey sedge	Cyperaceae	
CADI6	Carex disperma Dewey	softleaf sedge	Cyperaceae	
CAGE2	Carex geyeri Boott	Geyer's sedge	Cyperaceae	
CAHO5	Carex hoodii Boott	Hood's sedge	Cyperaceae	
CAIL	Carex illota L.H. Bailey	sheep sedge	Cyperaceae	
CALA13	Carex laeviculmis Meinsh.	smoothstem sedge	Cyperaceae	
CAPH2	Carex phaeocephala Piper	dunhead sedge	Cyperaceae	
CARO5	Carex rossii Boott	Ross' sedge	Cyperaceae	
CASCP	Carex scopulorum T. Holm var. prionophylla (T. Holm) L.A. Standl.	firethread sedge	Cyperaceae	
CAST7	Carex straminiformis L.H. Bailey	Shasta sedge	Cyperaceae	
CAXE	Carex xerantica L.H. Bailey	whitescale sedge	Cyperaceae	
CATH4	Castilleja thompsonii Pennell	Thompson's Indian paintbrush	Scrophulariaceae	
CEMA4	Centaurea maculosa auct. non Lam. [misapplied] >>Centaurea stoebe ssp. micranthos	spotted knapweed	Asteraceae	yes
CEST8	Centaurea stoebe L.	spotted knapweed	Asteraceae	yes
CENU2	Cerastium nutans Raf.	nodding chickweed	Caryophyllaceae	yes
CEFOV2	Cerastium fontanum Baumg. ssp. vulgare (Hartm.) Greuter & Burdet	big chickweed	Caryophyllaceae	
CHAN9	Chamerion angustifolium (L.) Holub	fireweed	Onagraceae	
CHME	Chimaphila menziesii (R. Br. ex D. Don) Spreng.	little prince's pine	Ericaceae	
CHUM	Chimaphila umbellata (L.) W. Bartram	pipsissewa	Pyrolaceae	
CILA2	Cinna latifolia (Trevis. ex Goepp.) Griseb.	drooping woodreed	Poaceae	
CIAL	Circaea alpina L.	small enchanter's nightshade	Onagraceae	
CIAR4	Cirsium arvense (L.) Scop.	Canada thistle	Asteraceae	yes
CLRH	Clarkia rhomboidea Douglas ex Hook.	diamond clarkia	Onagraceae	
CLCO3	Claytonia cordifolia S. Watson	heartleaf springbeauty	Portulacaceae	
CLLA2	Claytonia lanceolata Pall. ex Pursh	lanceleaf springbeauty	Portulacaceae	
CLSIS	Claytonia sibirica L. var. sibirica	Siberian springbeauty	Portulacaceae	
CLUN2	Clintonia uniflora (Menzies ex Schult. & Schult. f.) Kunth	bride's bonnet	Liliaceae	
COPA3	Collinsia parviflora Lindl.	maiden blue eyed Mary	Scrophulariaceae	
COLI2	Collomia linearis Nutt.	tiny trumpet	Polemoniaceae	
COOC	Coptis occidentalis (Nutt.) Torr. & A. Gray	Idaho goldthread	Ranunculaceae	

Table 5. Vascular plant species that occur in Mt. Spokane State Park.

Symbol	Scientific Name with Author	Common Name	Family	Exotic
COMA25	Corallorhiza maculata (Raf.) Raf.	summer coralroot	Orchidaceae	
COME17	Corallorhiza mertensiana Bong.	Pacific coralroot	Orchidaceae	
COST19	Corallorhiza striata Lindl.	hooded coralroot	Orchidaceae	
COTR18	Corallorhiza trifida Chatelain	yellow coralroot	Orchidaceae	
COSE16	Cornus sericea L.	redosier dogwood	Cornaceae	
CYMO2	Cypripedium montanum Douglas ex Lindl.	mountain lady's slipper	Orchidaceae	
CYFR2	Cystopteris fragilis (L.) Bernh.	brittle bladderfern	Dryopteridaceae	
DAGL	Dactylis glomerata L.	orchardgrass	Poaceae	yes
DAIN	Danthonia intermedia Vasey	timber oatgrass	Poaceae	
DENU2	Delphinium nuttallianum Pritz. ex Walp.	twolobe larkspur	Ranunculaceae	
DOPUC	Dodecatheon pulchellum (Raf.) Merr. ssp. cusickii (Greene) Calder & Roy L. Taylor	Cusick's shootingstar	Primulaceae	
DREX2	Dryopteris expansa (C. Presl) Fraser-Jenkins & Jermy	spreading woodfern	Dryopteridaceae	
ELGL	Elymus glaucus Buckley	blue wildrye	Poaceae	
ELRE4	Elymus repens (L.) Gould	quackgrass	Poaceae	yes
EPLA3	Epilobium lactiflorum Hausskn.	milkflower willowherb	Onagraceae	
ERUMM	Eriogonum umbellatum Torr. var. majus Hook.	sulphur-flower buckwheat	Polygonaceae	
ERGR9	Erythronium grandiflorum Pursh	yellow avalanche-lily	Liliaceae	
EUCO36	Eurybia conspicua (Lindl.) G.L. Nesom	western showy aster	Asteraceae	
FEID	Festuca idahoensis Elmer	Idaho fescue	Poaceae	
FEOC	Festuca occidentalis Hook.	western fescue	Poaceae	
FEOV	Festuca ovina L.	sheep fescue	Poaceae	yes
FEVI	Festuca viridula Vasey	greenleaf fescue	Poaceae	
FRVE	Fragaria vesca L.	woodland strawberry	Rosaceae	
GABI	Galium bifolium S. Watson	twinleaf bedstraw	Rubiaceae	
GATR3	Galium triflorum Michx.	fragrant bedstraw	Rubiaceae	
GADI2	Gayophytum diffusum Torr. & A. Gray	spreading groundsmoke	Onagraceae	
GEMA4	Geum macrophyllum Willd.	largeleaf avens	Rosaceae	
GNAPH	Gnaphalium L.	cudweed	Asteraceae	
GOOB2	Goodyera oblongifolia Raf.	western rattlesnake plantain	Orchidaceae	
GYDR	Gymnocarpium dryopteris (L.) Newman	western oakfern	Dryopteridaceae	
HESU	Hedysarum sulphurescens Rydb.	white sweetvetch	Fabaceae	
HEMA80	Heracleum maximum Bartram	common cowparsnip	Apiaceae	

Table 5. Vascular plant species that occur in Mt. Spokane State Park.

Symbol	Scientific Name with Author	Common Name	Family	Exotic
HECY2	Heuchera cylindrica Douglas ex Hook.	roundleaf alumroot	Saxifragaceae	
HIAL2	Hieracium albiflorum Hook.	white hawkweed	Asteraceae	
HIAU	Hieracium aurantiacum L.	orange hawkweed	Asteraceae	
HICA10	Hieracium caespitosum Dumort.	meadow hawkweed	Asteraceae	
HISC2	Hieracium scouleri Hook.	Scouler's woollyweed	Asteraceae	
HICY	Hieracium cynoglossoides Arv.-Touv.	houndstongue hawkweed	Asteraceae	
HODI	Holodiscus discolor (Pursh) Maxim.	oceanspray	Rosaceae	
HYCA4	Hydrophyllum capitatum Douglas ex Benth.	ballhead waterleaf	Hydrophyllaceae	
HYFO	Hypericum formosum Kunth (syn. Hypericum scouleri Hook.)	Scouler's St. Johnswort	Clusiaceae	
HYPE	Hypericum perforatum L.	common St. Johnswort	Clusiaceae	yes
HYRA3	Hypochaeris radicata L.	hairy cat's ear	Asteraceae	yes
IOST	Ionactis stenomeres (A. Gray) Greene	Rocky Mountain aster	Asteraceae	
JUBU	Juncus bufonius L.	toad rush	Juncaceae	
JUEN	Juncus ensifolius Wikstr.	swordleaf rush	Juncaceae	
JUPA	Juncus parryi Engelm.	Parry's rush	Juncaceae	
JUCO6	Juniperus communis L.	common juniper	Cupressaceae	
JUSC2	Juniperus scopulorum Sarg.	Rocky Mountain juniper	Cupressaceae	
LAOC	Larix occidentalis Nutt.	western larch	Pinaceae	
LICA2	Ligusticum canbyi (J.M. Coult. & Rose) J.M. Coult. & Rose	Canby's licorice-root	Apiaceae	
LIDA	Linaria dalmatica (L.) Mill.	Dalmatian toadflax	Scrophulariaceae	yes
LIBO3	Linnaea borealis L.	twinflower	Caprifoliaceae	
LICO5	Listera convallarioides (Sw.) Nutt. ex Elliot	broadlipped twayblade	Orchidaceae	
LIPA5	Lithophragma parviflorum (Hook.) Nutt. ex Torr. & A. Gray	smallflower woodland-star	Saxifragaceae	
LODI	Lomatium dissectum (Nutt.) Mathias & Constance	fernleaf biscuitroot	Apiaceae	
LOCI3	Lonicera ciliosa (Pursh) Poir. ex DC.	orange honeysuckle	Caprifoliaceae	
LOIN5	Lonicera involucrata (Richardson) Banks ex Spreng.	twinberry honeysuckle	Caprifoliaceae	
LOUT2	Lonicera utahensis S. Watson	Utah honeysuckle	Caprifoliaceae	
LUBIS	Lupinus bingenensis Suksd. var. subsaccatus Suksd.	Bingen lupine	Fabaceae	
LULE3	Lupinus leucophyllus Douglas ex Lindl.	velvet lupine	Fabaceae	
LUSE4	Lupinus sericeus Pursh	silky lupine	Fabaceae	
LUCAM3	Luzula campestris (L.) DC. var. multiflora (Ehrh.) Celak.			

Table 5. Vascular plant species that occur in Mt. Spokane State Park.

Symbol	Scientific Name with Author	Common Name	Family	Exotic
LUGLH	Luzula glabrata (Hoppe ex Rostk.) Desv. var. hitchcockii (Hämet-Ahti) Dorn	Hitchcock's smooth woodrush	Juncaceae	
LUPA4	Luzula parviflora (Ehrh.) Desv.	smallflowered woodrush	Juncaceae	
LYAM3	Lysichiton americanus Hultén & H. St. John	American skunkcabbage	Araceae	
MAAQ2	Mahonia aquifolium (Pursh) Nutt.	hollyleaved barberry	Berberidaceae	
MARE11	Mahonia repens (Lindl.) G. Don	creeping barberry	Berberidaceae	
MARAA	Maianthemum racemosum (L.) Link ssp. amplexicaule (Nutt.) LaFrankie	feathery false lily of the valley	Liliaceae	
MAST4	Maianthemum stellatum (L.) Link	starry false lily of the valley	Liliaceae	
MESP	Melica spectabilis Scribn.	purple oniongrass	Poaceae	
MESU	Melica subulata (Griseb.) Scribn.	Alaska oniongrass	Poaceae	
MEOF	Melilotus officinalis (L.) Lam.	yellow sweetclover	Fabaceae	yes
MEFE	Menziesia ferruginea Sm.	rusty menziesia	Ericaceae	
MELO4	Mertensia longiflora Greene	small bluebells	Boraginaceae	
MEPA	Mertensia paniculata (Aiton) G. Don	tall bluebells	Boraginaceae	
MINU	Microseris nutans (Hook.) Sch. Bip.	nodding microseris	Asteraceae	
MIGR	Microsteris gracilis (Hook.) Greene	slender phlox	Polemoniaceae	
MIGU	Mimulus guttatus DC.	seep monkeyflower	Scrophulariaceae	
MIMO3	Mimulus moschatus Douglas ex Lindl.	muskflower	Scrophulariaceae	
MIMIM	Minuartia michauxii (Fenzl) Farw. var. michauxii	Michaux's stitchwort	Caryophyllaceae	
MIBR6	Mitella breweri A. Gray	Brewer's miterwort	Saxifragaceae	
MIST3	Mitella stauropetala Piper	smallflower miterwort	Saxifragaceae	
MOMA3	Moehringia macrophylla (Hook.) Fenzl	largeleaf sandwort	Caryophyllaceae	
MOUN3	Monotropa uniflora L.	Indianpipe	Monotropaceae	
MOLI4	Montia linearis (Douglas ex Hook.) Greene	narrowleaf minerslettuce	Portulacaceae	
MYMU	Mycelis muralis (L.) Dumort.	wall-lettuce	Asteraceae	yes
ORLU	Orobanche ludoviciana Nutt.	Louisiana broomrape	Orobanchaceae	
ORSE	Orthilia secunda (L.) House	sidebells wintergreen	Pyrolaceae	
OSBE	Osmorhiza berteroi DC.	sweetcicely	Apiaceae	
OSOC	Osmorhiza occidentalis (Nutt. ex Torr. & A. Gray) Torr.	western sweetroot	Apiaceae	
OSPU	Osmorhiza purpurea (J.M. Coult. & Rose) Suksd.	purple sweetroot	Apiaceae	
PEBR	Pedicularis bracteosa Benth.	bracted lousewort	Scrophulariaceae	
PECO	Pedicularis contorta Benth.	coiled lousewort	Scrophulariaceae	
PERAA	Pedicularis racemosa Douglas ex Benth.	sickletop lousewort	Scrophulariaceae	

Table 5. Vascular plant species that occur in Mt. Spokane State Park.

Symbol	Scientific Name with Author	Common Name	Family	Exotic
	ssp. alba Pennell			
PECO6	Penstemon confertus Douglas ex Lindl.	yellow penstemon	Scrophulariaceae	
PEFR3	Penstemon fruticosus (Pursh) Greene	bush penstemon	Scrophulariaceae	
PEPR2	Penstemon procerus Douglas ex Graham	littleflower penstemon	Scrophulariaceae	
PHHA	Phacelia hastata Douglas ex Lehm.	silverleaf phacelia	Hydrophyllaceae	
PHHE2	Phacelia heterophylla Pursh	varileaf phacelia	Hydrophyllaceae	
PHAR3	Phalaris arundinacea L.	reed canarygrass	Poaceae	
PHPR3	Phleum pratense L.	timothy	Poaceae	yes
PHDI3	Phlox diffusa Benth.	spreading phlox	Polemoniaceae	
PHLO2	Phlox longifolia Nutt.	longleaf phlox	Polemoniaceae	
PHMA5	Physocarpus malvaceus (Greene) Kuntze	mallow ninebark	Rosaceae	
PIEN	Picea engelmannii Parry ex Engelm.	Engelmann spruce	Pinaceae	
PIAL	Pinus albicaulis Engelm.	whitebark pine	Pinaceae	
PICO	Pinus contorta Douglas ex Louden	lodgepole pine	Pinaceae	
PIMO3	Pinus monticola Douglas ex D. Don	western white pine	Pinaceae	
PIPO	Pinus ponderosa C. Lawson	ponderosa pine	Pinaceae	
PIEL2	Piperia elegans (Lindl.) Rydb.	elegant piperia	Orchidaceae	
PLMA2	Plantago major L.	common plantain	Plantaginaceae	yes
PLST4	Platanthera stricta Lindl.	slender bog orchid	Orchidaceae	
POBU	Poa bulbosa L.	bulbous bluegrass	Poaceae	yes
POCO	Poa compressa L.	Canada bluegrass	Poaceae	yes
PONEI2	Poa nemoralis L. ssp. interior (Rydb.) W.A. Weber	inland bluegrass	Poaceae	
POPR	Poa pratensis L.	Kentucky bluegrass	Poaceae	yes
POSE	Poa secunda J. Presl	Sandberg bluegrass	Poaceae	
PODO4	Polygonum douglasii Greene	Douglas' knotweed	Polygonaceae	
POMU	Polystichum munitum (Kaulf.) C. Presl	western swordfern	Dryopteridaceae	
POBAT	Populus balsamifera L. ssp. trichocarpa (Torr. & A. Gray ex Hook.) Brayshaw	black cottonwood	Salicaceae	
POTR5	Populus tremuloides Michx.	quaking aspen	Salicaceae	
POARC	Potentilla arguta Pursh ssp. convallaria (Rydb.) D.D. Keck	cream cinquefoil	Rosaceae	
PRHO2	Prosartes hookeri Torr.	drops-of-gold	Liliaceae	
PREM	Prunus emarginata (Douglas ex Hook.) D. Dietr.	bitter cherry	Rosaceae	
PSME	Pseudotsuga menziesii (Mirb.) Franco	Douglas-fir	Pinaceae	

Table 5. Vascular plant species that occur in Mt. Spokane State Park.

Symbol	Scientific Name with Author	Common Name	Family	Exotic
PTAQ	Pteridium aquilinum (L.) Kuhn	western brackenfern	Dennstaedtiaceae	
PTAN2	Pterospora andromedea Nutt.	woodland pinedrops	Monotropaceae	
PYAS	Pyrola asarifolia Michx.	liverleaf wintergreen	Pyrolaceae	
PYCH	Pyrola chlorantha Sw.	greenflowered wintergreen	Pyrolaceae	
PYPI2	Pyrola picta Sm.	whiteveined wintergreen	Pyrolaceae	
RAUN	Ranunculus uncinatus D. Don ex G. Don	woodland buttercup	Ranunculaceae	
RILA	Ribes lacustre (Pers.) Poir.	prickly currant	Grossulariaceae	
RIVI3	Ribes viscosissimum Pursh	sticky currant	Grossulariaceae	
ROGY	Rosa gymnocarpa Nutt.	dwarf rose	Rosaceae	
RONU	Rosa nutkana C. Presl	Nootka rose	Rosaceae	
RULE	Rubus leucodermis Douglas ex Torr. & A. Gray	whitebark raspberry	Rosaceae	
RUPA	Rubus parviflorus Nutt.	thimbleberry	Rosaceae	
RUPE	Rubus pedatus Sm.	strawberryleaf raspberry	Rosaceae	
RUOC2	Rudbeckia occidentalis Nutt.	western coneflower	Asteraceae	
RUAC2	Rumex acetosa L.	garden sorrel	Polygonaceae	yes
RUAC3	Rumex acetosella L.	common sheep sorrel	Polygonaceae	yes
SAPR	Sagina procumbens L.	birdeye pearlwort	Caryophyllaceae	
SASC	Salix scouleriana Barratt ex Hook.	Scouler's willow	Salicaceae	
SARA2	Sambucus racemosa L.	red elderberry	Caprifoliaceae	
SACA14	Sanguisorba canadensis L.	Canadian burnet	Rosaceae	
SCLA	Scrophularia lanceolata Pursh	lanceleaf figwort	Scrophulariaceae	
SELA	Sedum lanceolatum Torr.	spearleaf stonecrop	Crassulaceae	
SEIN2	Senecio integerrimus Nutt.	lambstongue ragwort	Asteraceae	
SETR	Senecio triangularis Hook.	arrowleaf ragwort	Asteraceae	
SIME	Silene menziesii Hook.	Menzies' campion	Caryophyllaceae	
SIPA4	Silene parryi (S. Watson) C.L. Hitchc. & Maguire	Parry's silene	Caryophyllaceae	
SOCA6	Solidago canadensis L.	Canada goldenrod	Asteraceae	
SOSC2	Sorbus scopulina Greene	Greene's mountain ash	Rosaceae	
SPBE2	Spiraea betulifolia Pall.	white spirea	Rosaceae	
STCA	Stellaria calycantha (Ledeb.) Bong.	northern starwort	Caryophyllaceae	
STNI	Stellaria nitens Nutt.	shiny chickweed	Caryophyllaceae	
STAM2	Streptopus amplexifolius (L.) DC.	claspleaf twistedstalk	Liliaceae	

Table 5. Vascular plant species that occur in Mt. Spokane State Park.

Symbol	Scientific Name with Author	Common Name	Family	Exotic
SYAL	Symphoricarpos albus (L.) S.F. Blake	common snowberry	Caprifoliaceae	
SYOC	Symphoricarpos occidentalis Hook.	western snowberry	Caprifoliaceae	
TAVU	Tanacetum vulgare L.	common tansy	Asteraceae	yes
TAOF	Taraxacum officinale F.H. Wigg.	common dandelion	Asteraceae	yes
TABR2	Taxus brevifolia Nutt.	Pacific yew	Cupressaceae	
THOC	Thalictrum occidentale A. Gray	western meadow-rue	Ranunculaceae	
THPL	Thuja plicata Donn ex D. Don	western redcedar	Cupressaceae	
TITRU	Tiarella trifoliata L. var. unifoliata (Hook.) Kurtz	oneleaf foamflower	Saxifragaceae	
TOPAP3	Torreyochloa pallida (Torr.) Church var. pauciflora (J. Presl) J.I. Davis	pale false mannagrass	Poaceae	
TRDU	Tragopogon dubius Scop.	yellow salsify	Asteraceae	yes
TRCA	Trautvetteria caroliniensis (Walter) Vail	Carolina bugbane	Ranunculaceae	
TRRE3	Trifolium repens L.	white clover	Fabaceae	yes
TROV2	Trillium ovatum Pursh	Pacific trillium	Liliaceae	
TRCA21	Trisetum canescens Buckley	tall trisetum	Poaceae	
TSHE	Tsuga heterophylla (Raf.) Sarg.	western hemlock	Pinaceae	
URDI	Urtica dioica L.	stinging nettle	Urticaceae	
VAAL3	Vaccinium alaskaense Howell	Alaska blueberry	Ericaceae	
VAME	Vaccinium membranaceum Douglas ex Torr.	thinleaf huckleberry	Ericaceae	
VASC	Vaccinium scoparium Leiberg ex Coville	grouse whortleberry	Ericaceae	
VECA2	Veratrum californicum Durand	California false hellebore	Liliaceae	
VETH	Verbascum thapsus L.	common mullein	Scrophulariaceae	yes
VESE	Veronica serpyllifolia L.	thymeleaf speedwell	Scrophulariaceae	
VIGL	Viola glabella Nutt.	pioneer violet	Violaceae	
VIMA2	Viola macloskeyi Lloyd	small white violet	Violaceae	
VIOR	Viola orbiculata Geyer ex Holz.	darkwoods violet	Violaceae	
XETE	Xerophyllum tenax (Pursh) Nutt.	common beargrass	Liliaceae	