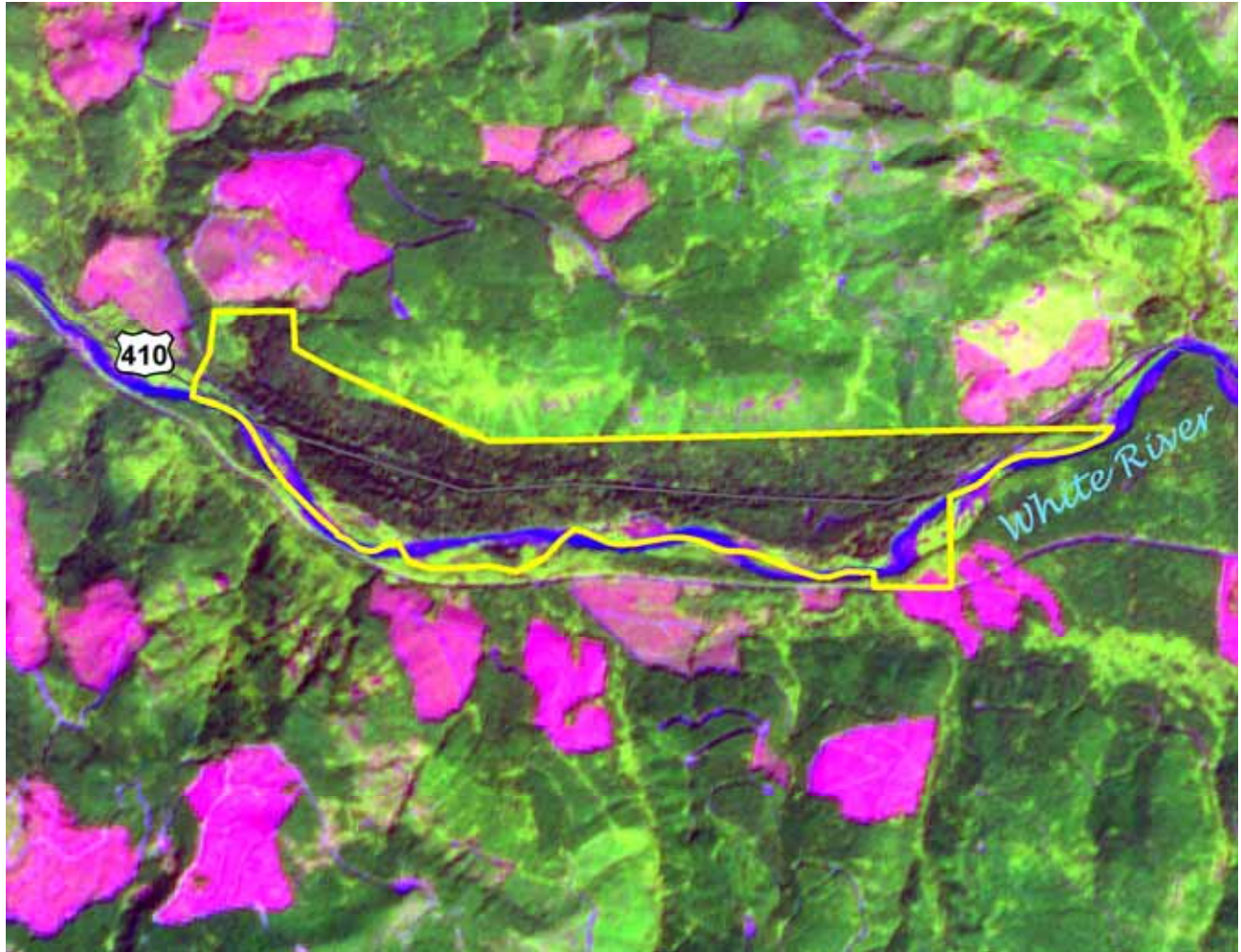


Rare Plant and Vegetation Survey of Federation Forest State Park



Pacific Biodiversity Institute

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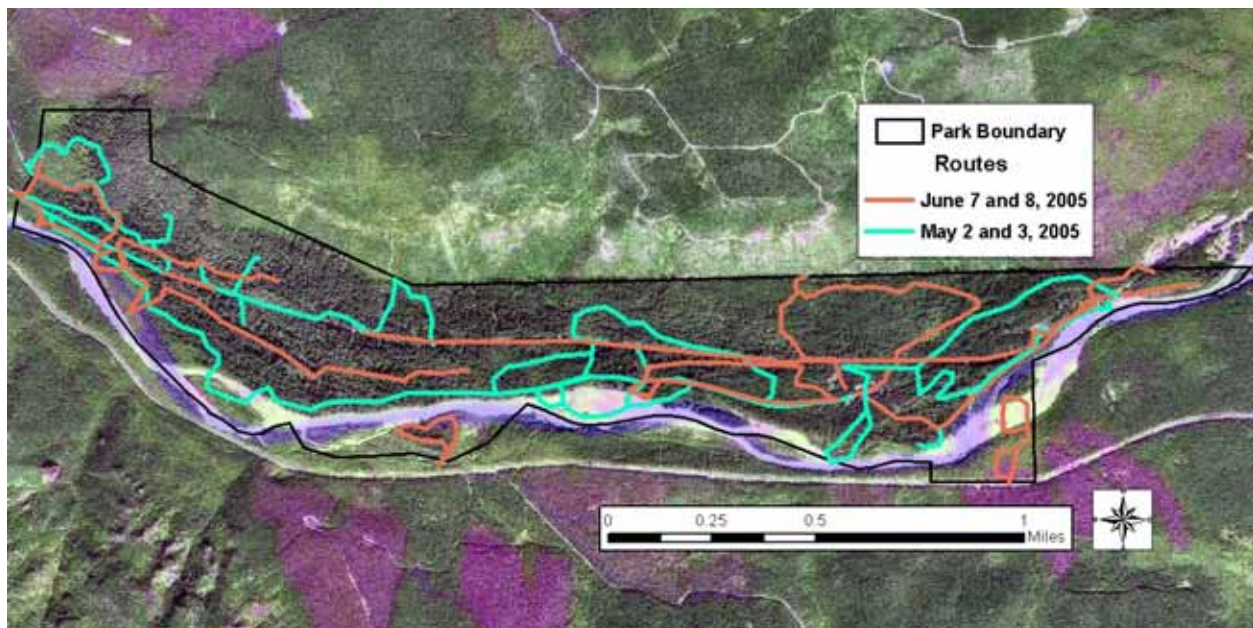
Introduction

Under two contracts with the Washington State Parks and Recreation Commission, Pacific Biodiversity Institute (PBI) surveyed Federation Forest State Park, located in King County, for rare plant occurrences and mapped according to vegetation communities. The primary work agreement between PBI and the Washington State Parks and Recreation Commission expired in late June 2005, which did not allow for middle and late summer blooming plants to be adequately surveyed. A subsequent service contract was granted in late July that extended the survey season to the end of August. Vegetation data was collected for all the mapped vegetation types during the course of both contracts. This report summarizes the activities and findings of the contracted work under both work agreements.

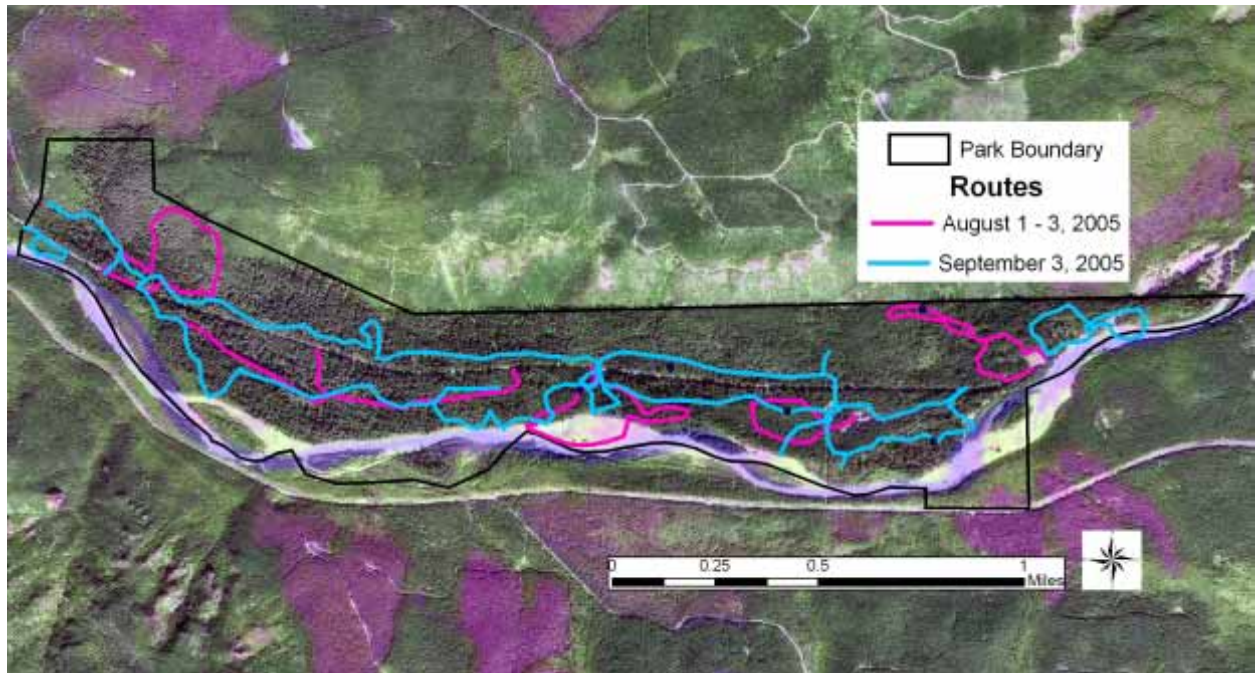
Survey Conditions and Survey Routes

The survey conditions were good in most parts of Federation Forest. In some areas the vegetation was quite dense, making travel difficult, but the extensive trail system enabled us to access much of the park. Access to the park parcels on the south side of the White River necessitated going through locked gates on private logging roads (temporarily open).

Map 1. Survey routes for the vegetation community mapping and rare and endangered plant surveys conducted by PBI in 2005 under the primary contract, which expired in June.



Map 2. Survey routes for the vegetation community mapping and rare and endangered plant surveys conducted by PBI in 2005 under the secondary contract.



Notes About Boundary Discrepancies

The actual boundary of Federation Forest State Park was a bit difficult to discern. We began our surveys using the 2004 Washington State Department of Natural Resources Major Public Lands GIS data (MPL), but found that there were lingering questions about accuracy, especially around the White River boundary and possible parcels on the south side of the White River. Paper maps reviewed at the office at Federation Forest also showed two potential park boundaries. Washington State Parks provided us an updated 2005 park boundary map which differed somewhat dramatically from the MPL layer in the southern section of the Park. In the end, we decided to stay with the MPL layer because we had already surveyed some of the polygons associated with the layer and we felt it would be more valuable to keep that information in.

Figure 1. From top to bottom – the WA State Parks 2005 park boundary, the 2004 MPL boundary, and both the previous layers overlaid one another.



Vegetation Communities

Methods

Vegetation communities within Federation Forest State Park were delineated and classified using a combination of field survey and remote sensing techniques. We relied on descriptions from the United States Forest Service Mount Baker Snoqualmie National Forest Plant Associations Guide (Henderson et al. 1992), Washington State Department of Natural Resources (WADNR) late-seral forested plant associations of the Puget Lowland (Chappell 2004), and freshwater wetland vegetation (Kunze 1994) to make final vegetation community assignments. In some cases, these references were not adequate in describing existing vegetation associations. In these cases, alternative vegetation communities or plant associations were created by PBI.

Remote sensing techniques consisted of manually delineating plant associations or mosaics of plant associations in a digital environment. We reviewed ortho-rectified aerial photography from the 1990s and recent ASTER satellite images for discernable vegetation or landform patterns. Topographic maps and digital elevation models (DEMs) were also employed to assist the process of vegetation community delineation. The draft vegetation polygons were created by hand in a GIS by ocular assessment.

Field surveys consisted of visiting sites located within the vegetation polygons created during the remote sensing process. At representative sites within a polygon, vegetation data and site descriptions were recorded in a fashion consistent with the “plant community polygon” format provided by the Washington State Parks and Recreation Commission. Further refinements and editing of the draft vegetation polygon layers were done by hand on hardcopy maps in the field, and later edited digitally in a GIS environment.

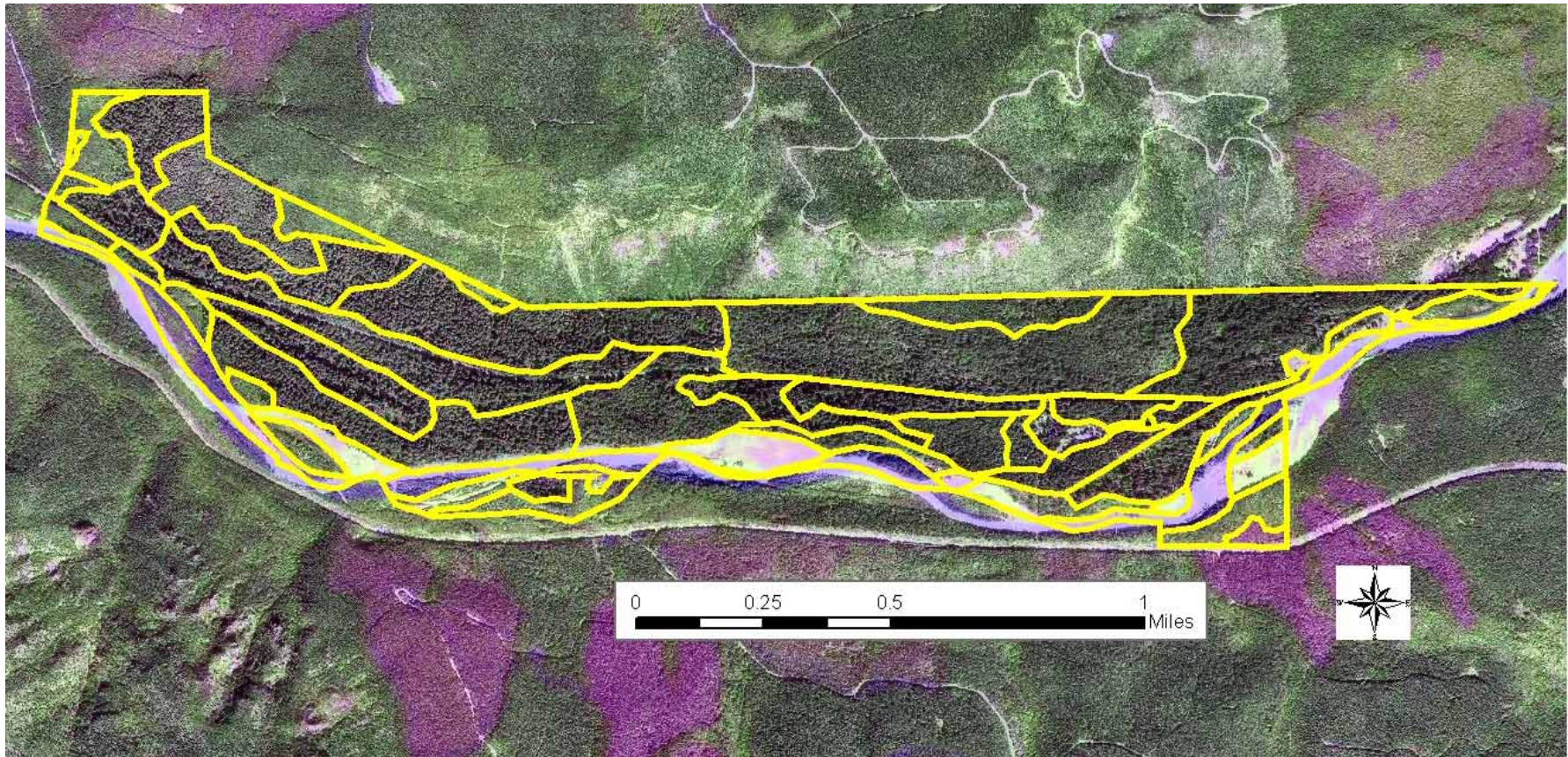
Results

We mapped and surveyed 50 vegetation polygons, comprised of 16 plant community types, within Federation Forest State Park. Vegetation community types are either stand-alone plant associations or mosaics of multiple plant associations. The following table lists the vegetation community types mapped. Maps 3 and 4 on the following pages illustrate the location of these vegetation community types. Note that Map 4 only shows the primary plant associations (PA1 in the database).

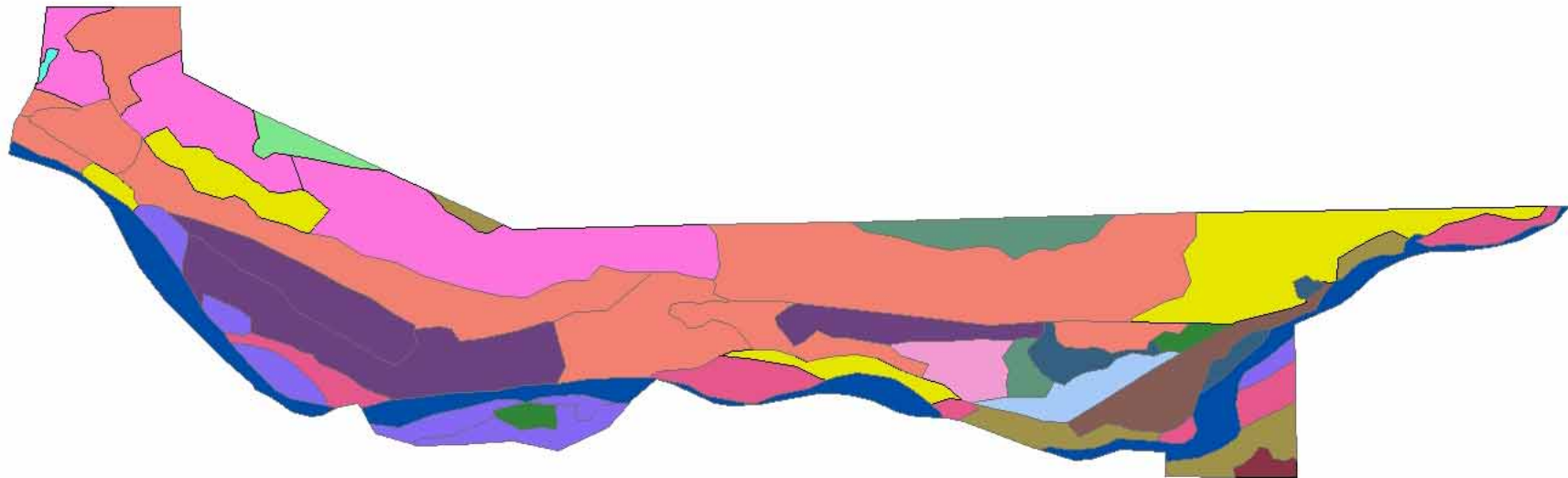
Vegetation Community Types Encountered in Federation Forest State Park

Abbreviation	Association Name	English Name	Reference	Status
ALRU/POMU	<i>Alnus rubra</i> / <i>Polystichum munitum</i>	red alder / sword fern	Chappell 2004	G4S4
TSHE/BENE	<i>Tsuga heterophylla</i> / <i>Berberis nervosa</i>	western hemlock / Oregongrape	Henderson et al. 1992	G4
TSHE/POMU-BENE	<i>Tsuga heterophylla</i> / <i>Polystichum munitum</i> - <i>Berberis nervosa</i>	western hemlock / swordfern – Oregongrape	Henderson et al. 1992	G4
TSHE/POMU-GASH	<i>Tsuga heterophylla</i> / <i>Polystichum munitum</i> - <i>Gaultheria shallon</i>	western hemlock / swordfern - salal	Henderson et al. 1992	G4
TSHE/ACCI-BENE	<i>Tsuga heterophylla</i> / <i>Acer circinatum</i> - <i>Berberis nervosa</i>	western hemlock / vinemaple - Oregongrape	Henderson et al. 1992	G4
TSHE/GASH-BENE	<i>Tsuga heterophylla</i> / <i>Gaultheria shallon</i> - <i>Berberis nervosa</i>	western hemlock / salal - Oregongrape	Henderson et al. 1992	G4
TSHE/GASH	<i>Tsuga heterophylla</i> / <i>Gaultheria shallon</i>	western hemlock / salal	Henderson et al. 1992	G4
TSHE/BENE-CHME	<i>Tsuga heterophylla</i> / <i>Berberis nervosa</i> - <i>Corallorhiza mertensiana</i>	western hemlock / Oregongrape – western coralroot	Henderson et al. 1992	??
TSHE/OPHO-ATFI	<i>Tsuga heterophylla</i> / <i>Oplopanax horridus</i> – <i>Athyrium filix-femina</i>	western hemlock / devil's club – ladyfern	Henderson et al. 1992	G4
TSHE/POMU-TITR	<i>Tsuga heterophylla</i> / <i>Polystichum munitum</i> – <i>Tiarella trifoliata</i>	western hemlock / swordfern – foamflower	Henderson et al. 1992	G3
TSHE/LYAM	<i>Tsuga heterophylla</i> / <i>Lysichitum americanum</i>	western hemlock / skunk cabbage	Henderson et al. 1992	
TSHE/TITR-GYDR	<i>Tsuga heterophylla</i> / <i>Tiarella trifoliata</i> - <i>Gymnocarpium dryopteris</i>	western hemlock / foamflower - oak fern	Henderson et al. 1992	G3
ALRU/RUSP	<i>Alnus rubra</i> / <i>Rubus spectabilis.</i>	red alder / salmonberry	Kunze 1994	G4G5
DEVELOPED / DISTURBED	developed / disturbed site	developed or disturbed site	PBI	
FLOODPLAIN GRAVEL/SAND BAR	floodplain gravel/sand bar	floodplain gravel/sand bar	PBI	
BEDROCK CLIFF – ROCK OUTCROP	non-forested bedrock cliff – rock outcrop	non-forested bedrock cliff – rock outcrop	PBI	

Map 3. Layout of the vegetation community polygons overlaying a 1998 digital ortho-photo combined with TM7 spectral imagery.

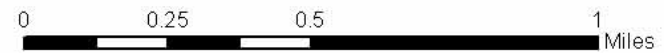


Map 4. The primary vegetation community types represented by each polygon.



**Vegetation
Community Types**

 ALRU/POMU	 TSHE/TITR-GYDR	 TSHE/GASH-BENE	 Water
 ALRU/RUSP	 TSHE/ACCI-BENE	 TSHE/OPHO-ATFI	 floodplain gravel/sand bar
 Bed Rock Cliff - Rock Outcrop	 TSHE/BENE	 TSHE/POMU-BENE	
 Clear Cut	 TSHE/BENE-CHME	 TSHE/POMU-GASH	
 Developed / Disturbed	 TSHE/GASH	 TSHE/POMU-TITR	



Examples of Vegetation Community Types

Alnus rubra / *Polystichum munitum* forest (ALRU/POMU)



There is very little ALRU/POMU forest in Federation Forest State Park. Occurrences are typically small margins along the park boundary associated with large scale timber harvest operations on adjacent private lands. Over time, seed influences from the adjacent conifer forests will probably establish successful conifer regeneration in these patches. Hand planting of native conifer seedlings such as Douglas-fir or western hemlock might help to more quickly re-establish a conifer dominated canopy.

In some of the conifer forests along the White River, along the lowest forested benches above the floodplain, small to large patches of ALRU/POMU can be found in a mosaic with TSHE/POMU-TITR and TSHE/OPHO-ATFI. These ALRU/POMU forests differ from the ones associated with recent logging along the park boundary. *Populus trichocarpa* (black cottonwood) is commonly a canopy dominant in these forests, which illustrates that the river floodplain once existed in these spots. Flooding disturbances and a high water table influence and maintain these ALRU/POMU forests.

***Alnus rubra* / *Rubus spectabilis* (ALRU/RUSP)**



ALRU/RUSP occurs frequently along the floodplain of the White River in small even aged stands typically covered completely by red alder. Understory vegetation varies depending on the age of the alder overstory. In younger stands, little to no understory vegetation occurs. In older stands, understory vegetation can be thick and shrubby, typically dominated by *Rubus spectabilis*. Frequent flooding and channel migration by the White River keeps the distribution and structure of these patches dynamic. ALRU/RUSP occurs in a mosaic with the floodplain gravel/sand bar community, as both communities are frequently shifting and replacing each other as the river floods and meanders.



Floodplain gravel/sand bar



Common along the White River primary channel is the floodplain gravel/sand bar community. This community is typified by having a lot of exposed rounded river rock and coarse woody debris scattered about on the soil surface. Various young willows, cottonwoods, and alders may be colonizing small patches of sand or gravel bar, and Scot's broom (*Cytisus scoparius*) occurs in scattered clumps in the higher, less frequently flooded, parts of the gravel bars. Seasonal flooding and channel meandering frequently disturbs the vegetation in this community, constantly altering its structure and distribution along the main river channel. This community intergrades with the ALRU/RUSP community type.



***Tsuga heterophylla* / *Berberis nervosa* forest (TSHE/BENE)**



The TSHE/BENE plant association is common along the south facing slopes of the north boundary hillside of Federation Forest State Park. *Berberis nervosa* is the dominant understory shrub, with little to no *Polystichum munitum* present. Age-class diversity and canopy layer complexity tends to be relatively simple in TSHE/BENE areas compared to other mixed conifer forests in the Park, possibly indicating the historic occurrence of a stand replacing fire in these patches. It is possible that historic logging and associated post-logging burning took place in these areas.



***Tsuga heterophylla* / *Polystichum munitum* – *Berberis nervosa* forest
(TSHE/POMU-BENE)**



The TSHE/POMU-BENE plant association occurs frequently throughout Federation Forest State Park. This plant association frequently grades into the TSHE/BENE plant association along the north border hillside, typically being below the TSHE/BENE patches on less steep slopes. TSHE/POMU-BENE has more complex overstory and understory canopy structures and higher age-class diversity than what is seen in the adjacent TSHE/BENE forests. TSHE/POMU-BENE also frequently grades into the TSHE/OPHO-ATFI forest on the valley bottom flats. TSHE/POMU-BENE tends to occur on the more well drained soils whereas TSHE/OPHO-ATFI occurs on more saturated soils.



***Tsuga heterophylla* / *Gaultheria shallon* forest (TSHE/GASH)**



TSHE/GASH mostly occurs around the visitor's center, and is probably the result of a severe fire that burned on the site. This plant association is typified in the park by having a young even-aged closed canopy conifer forest cover with between 70 – 100% salal cover in the understory. This plant association grades into TSHE/GASH-BENE plant association.

***Tsuga heterophylla* / *Gaultheria shallon* – *Berberis nervosa* forest (TSHE/GASH-BENE)**



This forest type was mapped along the northern boundary of the park, where the adjacent private forest lands that were logged via clear-cutting abut the remnant old-growth and late successional forests. The juxtaposition of old natural forests versus young industrial Douglas-fir plantations has created an artificial “edge” effect in the older forests along the clear-cut boundary. Along with the primary edge effect of letting in more light to the understory, the higher rates of wind-throw and steeper rocky hillsides common along the northern border seem to have resulted in a much more open forest canopy structure that allows an assortment of understory shrubs to thrive. TSHE/GASH-BENE is a frequent association found along these open canopy edges, though TSHE/ACCI-BENE and TSHE/POMU-GASH occur frequently as well.

TSHE/GASH-BENE is also found around the visitor’s center, somewhat in a mosaic with the TSHE/GASH plant association. The occurrence here is probably related to a historical fire that severely burned the forest where the visitor’s center sits today.

***Tsuga heterophylla* / *Polystichum munitum* - *Gaultheria shallon* forest
(TSHE/POMU-GASH)**



This plant association exists in the clear-cut region of the northwest part of the park. An even age cohort of mostly Douglas-fir is regenerating in this area, with a thick understory of salal and swordfern. This plant association does begin to grade into the TSHE/GASH-BENE and TSHE/POMU-BENE plant associations as you move away from the clear-cut and into the older forest's interiors.

***Tsuga heterophylla* / *Acer circinatum* - *Berberis nervosa* forest (TSHE/ACCI-BENE)**



A few small patches of TSHE/ACCI-BENE occur within Federation Forest State Park, both on the hillside along the northern boundary of the park and in the picnic area near the visitor's center. Vine maple (*Acer circinatum*) creates a nice emerald ceiling underneath the darker coniferous upper-canopy in these forests. *Berberis nervosa* is the dominant shrub cover underneath the vine maple. A remnant old-growth patch of TSHE/ACCI-BENE was mapped on the south side of the White River, but this patch may or may not be within the park boundary (see Notes About Boundary Discrepancies).

***Tsuga heterophylla* / *Berberis nervosa* - *Corallorhiza mertensiana* forest
(TSHE/BENE-CHME)**



West of the visitor's center, the same historic fire that seems to have favored the establishment of the TSHE/GASH plant association led to the establishment of a TSHE/BENE-CHME association in a large contiguous patch. The nearly complete lack of understory vegetation, save for a few Oregongrape here and there are characteristic of this association. Many saprophytes were seen growing in this forest patch, including western coralroot (*Corallorhiza mertensiana*), spotted coralroot (*Corallorhiza maculata*), candystick (*Allotropa virgata*), and pinesap (*Hypopitys monotropa*). As this closed canopy forest continues to self-thin its stem density, canopy openings caused by tree mortality and wind-throw may open up the dark understory for establishment of more light sensitive plants, allowing a new plant association to become established.

***Tsuga heterophylla* / *Oplopanax horridum* – *Athyrium filix-femina* forest
(TSHE/OPHO-ATFI)**



The TSHE/OPHO-ATFI plant association occurs frequently throughout the forested valley bottom flats of Federation Forest State Park. This plant association occurs where soils tend to be more saturated than in areas of the TSHE/POMU-DREX plant association. Understory vegetation diversity is relatively higher in this community than in the other plant association types found in the park. In some areas, logging or road / trail development has disturbed the soils and canopies of this plant association, resulting in patch fragmentation and structural alterations. However a majority of the TSHE/OPHO-ATFI patches are in good ecological condition, with few exotics plant infestations and complex multiple storied canopy structures made up of a diversity of plant growth forms (trees, shrubs, ferns, herbs, and graminoids).



***Tsuga heterophylla* / *Polystichum munitum* – *Tiarella trifoliata* forest
(TSHE/POMU-TITR)**



TSHE/POMU-TITR occurs frequently in small patches throughout Federation Forest State Park. The plant association seems to favor slightly more saturated soils than the TSHE/POMU-BENE association, and slightly less saturated soils than the TSHE/OPHO-ATFI association. It is constantly in a mosaic with these two other plant associations throughout the valley bottom flats away from the White River. Near the White River, on some of the lower terraces above the floodplain, some larger patches of this association stand out. ALRU/POMU mosaics with this association in these areas, and a few large black cottonwood (*Populus trichocarpa*) trees peak through the forest overstory.

Tsuga heterophylla / *Lysichitum americanum* forest (TSHE/LYAM)



Small linear patches of the TSHE/LYAM association could be found throughout the valley bottom flats in the old-growth forest patches. Saturated soils characterized the location where TSHE/LYAM occurred. Western corydalis (*Corydalis scouleri*) frequently grew in such abundance and at such a height that in many of the TSHE/LYAM patches, it was the only visible understory plant besides vine maple, in effect covering the *Lysichitum americanum* and other lower growing understory plants. This plant association frequently mosaics with the TSHE/OPHO-ATFI and TSHE/POMU-TITR associations. This is the wettest plant association in the park.

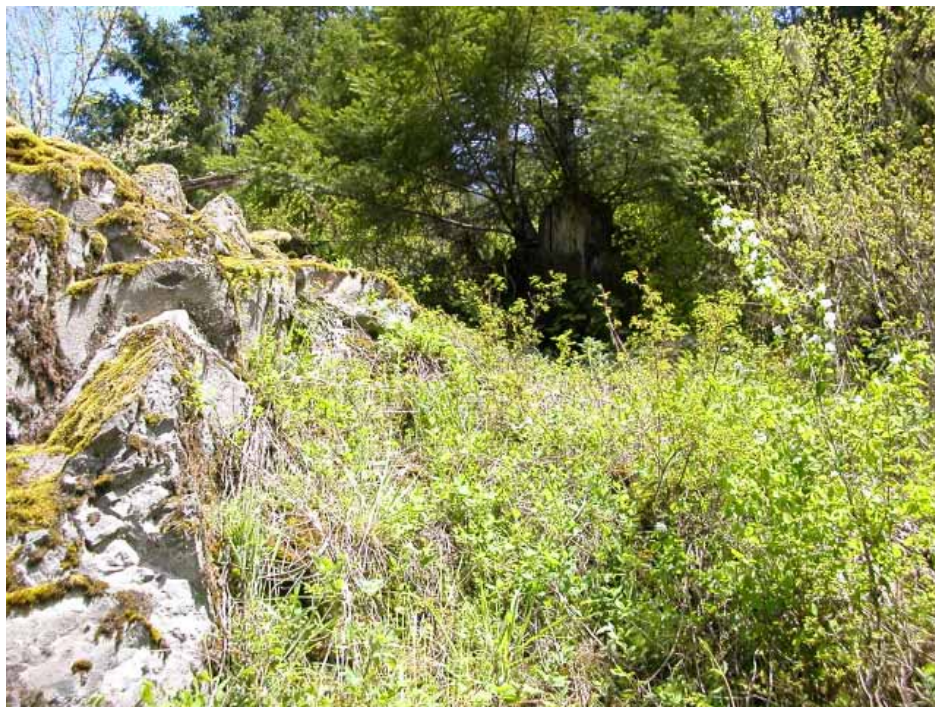
***Tsuga heterophylla* / *Tiarella trifoliata* - *Gymnocarpium dryopteris* forest (TSHE/TITR-GYDR)**

Some small patches of TSHE/TITR-GYDR occur within the park, confined to the valley bottom flats where the soils are more mesic. This association is found in mosaic with the TSHE/OPHO-ATFI and TSHE/LYAM associations. Foamflower (*Tiarella trifoliata*) and oakfern (*Gymnocarpium dryopteris*) are among the dominant understory plants, most of which are herbs. There is a notable absence of swordfern and/or Oregongrape.

Non-Forested Bedrock Cliff – Rock Outcrop



Above the private timberland access road in the far northwestern section of the park, a steep rocky outcrop forms a series of cliffs with no forest overstory. This is a unique type of habitat for Federation Forest State Park, since most of the rest of the park is either heavily forested or in the floodplain. Service berry (*Amelanchier alnifolia*), varileaf phacelia (*Phacelia heterophylla* var. *pseudohispida*), and chickweed monkeyflower (*Mimulus alsinoides*), which hardly occur elsewhere within the park, are all well established on these rocky exposures. Historic logging has impacted the forests surrounding this rocky cliff area, and the logging road abuts the lower end of the westernmost cliff just outside the park boundary.



Rare Plant Surveys

Methods

We visited Federation Forest State Park multiple times during the 2005 field season to conduct a rare plant survey. Field surveys were conducted on May 2 and 3, and again on June 7 and 8 under the primary contract. Additional surveys were performed from August 1 -3, and again on September 3 under the second contract. We were equipped with reference literature, rare plant lists for the area, maps showing rare plant locations from previous surveys, and a portable plant identification lab. We looked for rare plants in habitats previously identified as being likely occurrence sites. So as not to miss a rare plant, all vascular plant species encountered during the inventory were identified on site, at base camp in the portable laboratory, or back at our office.

Survey routes were determined based on the desire to efficiently cover a large proportion of the park's area throughout the field season. We surveyed habitats of the park where we felt rare plants were more likely to occur more intensively. Survey routes for the rare plant inventory and rare plant locations were recorded either by hand, on a hardcopy topographic map, or as GPS waypoints and trackpoints, all of which were later compiled into a single GIS data layer (Maps 1 and 2).

Results

A total of 259 vascular plant species were identified during the contracted plant surveys at Federation State Park. Of these, 62 of the plant species are non-native, accounting for 24% of the total. In terms of abundance, one alien species earned rating of 1 (abundant in multiple habitats), *Myosotis scripoides*, and one species earned level 2 (abundant in specific habitats, *Geranium robertianum*). There are 22 species with a rating of 3 (common in specific habitats), 24 species are in group 4 (these species were rare in the park) and 14 of group 5 (rare, 5 or fewer sightings).

Listed Plants in Federation Forest State Park

Four vascular plant species found in Federation State Park are on the Washington Natural Heritage Program "Watch" list, *Eburophyton austiniae* (phantom orchid, now known as *Cephalanthera austiniae* (Gray) Heller), *Hemitomes congestum* (gnome plant), *Pleuricospora fimbriolata* (fringed pine-sap), and *Platanthera orbiculata* (round-leaved rein-orchid). Watch List plants are characterized by the WNHP as species that were previously listed as sensitive, and remain under scrutiny.

Eburophyton austiniae: Phantom Orchid

Phantom orchid is a saprophyte; it contains no photosynthetic chlorophyll. It is a species of moist, dense, coniferous forests, with a range extending from the Olympic and Cascade Mountains in Washington to southern California, and east to Idaho.

Hemitomes congestum: Gnome Plant

Gnome plant is in the family *Ericaceae* and is another saprophyte, lacking chlorophyll and therefore lacking any green color. It grows in older forests in the Cascades and Olympic mountains and is quite uncommon in Washington State.

***Pleuricospora fimbriolata*: Fringed Pine-sap**

Fringed pine-sap is also in the family *Ericaceae* and is a saprophyte. It inhabits dense coniferous forests from the Cascades and the Olympics in Washington south the Sierra Nevada in northwest California.

***Platanthera orbiculata*: Round-Leaved Rein-Orchid**

Round-leaved rein-orchid is in the family *Orchidaceae*. It is found on both sides of the Cascades in Washington and Oregon from moist woods to swamps.

Vascular Plant List for Federation Forest State Park

Key to Vascular Plant Species List

Field 2, “Ab”: Abundance. An abundance rating system has been used to indicate how common each species is in the park. There are 5 rating levels, as follows:

- 1—Abundant in multiple plant communities
- 2—Common in multiple plant communities
- 3—Common in specific plant communities
- 4—Uncommon in specific plant associations
- 5—Rare, five or fewer sightings in the park.

Field 3, “Code”: Four-letter plant code as shown on the USDA PLANTS database.

Field 6, “Rank”: Any species classified by the WNHP as endangered, threatened, sensitive or “watch” will have a letter in this field indicating its rank.

Field 9, “Type”: t= tree, s= shrub, p= perennial, a= annual, g= graminoid, f= fern

Field 10, “Alien”: species that are not native to the park are indicated with a “a”

Field 11, “Synonym”: The species list uses Hitchcock and Cronquist, *Flora of the Pacific Northwest* as the taxonomic authority, as this is still the standard reference for our area. Updated nomenclature when it exists is shown in this column.

Asterisked species: The fern species *Dryopteris expansa* is shown in the species list with this updated nomenclature because this name is now in such wide circulation. *D. expansa* was not recognized by Hitchcock and Cronquist.

The list of species identified during this project is below. Note: An asterisk (*) in the species code indicates that the species was not identified to variety and no official USDA 4-letter code exists for the species.

Vascular Plants of Federation Forest State Park

#	Ab	Code	Scientific Name	Common Name	Rank	Family- Scientific	Family- Common	Type	Alien?	Synonym
1	4	ABGR	<i>Abies grandis</i>	grand fir		Pinaceae	Pine	t		
2	4	ABLA	<i>Abies lasiocarpa</i>	subalpine fir		Pinaceae	Pine	t		
3	5	ABPR	<i>Abies procera</i>	noble fir		Pinaceae	Pine	t		
4	2	ACCI	<i>Acer circinatum</i>	vine maple		Aceraceae	Maple	s		
5	3	ACMA3	<i>Acer macrophyllum</i>	bigleaf maple		Aceraceae	Maple	t		
6	3	ACTR	<i>Achlys triphylla</i>	vanillaleaf		Ranunculaceae	Buttercup	p		
7	4	ACRU2	<i>Actaea rubra</i>	baneberry		Ranunculaceae	Buttercup	p		
8	4	ADBI	<i>Adenocaulon bicolor</i>	pathfinder		Compositae	Composite	p		
9	5	ADPE	<i>Adiantum pedatum</i>	northern maidenhair fern		Polypodiaceae	Common Fern	f		<i>Adiantum aleuticum</i>
10	4	AGRE2	<i>Agropyron repens</i>	quackgrass		Gramineae	Grass	g	a	
11	3	AICA	<i>Aira caryophylla</i>	silver hairgrass		Gramineae	Grass	g	a	
12	3	AIPR	<i>Aira praecox</i>	little hairgrass		Gramineae	Grass	g	a	
13	5	ALVI2	<i>Allotropa virgata</i>	candystick		Ericaceae	Heather	p		
14	2	ALRU2	<i>Alnus rubra</i>	red alder		Betulaceae	Birch	t		
15	5	ALSI	<i>Alnus sinuata</i>	Sitka alder		Betulaceae	Birch	s		<i>Alnus viridis</i> ssp. <i>sinuata</i>
16	3	ALAE	<i>Alopecurus aequalis</i>	little meadow-foxtail		Gramineae	Grass	p		
17	4	AMAL2	<i>Amelanchier alnifolia</i>	serviceberry		Rosaceae	Rose	s		
18	5	ANMA	<i>Anaphalis margaritacea</i>	pearly everlasting		Compositae	Composite	p		
19	4	ANAR3	<i>Angelica arguta</i>	sharptooth angelica		Umbelliferaceae	Parsley	p		
20	5	ANMI3	<i>Antennaria microphylla</i>	rosy pussytoes		Compositae	Composite	p		
21	4	ANOD5	<i>Anthoxanthum odoratum</i>	sweet vernalgrass		Gramineae	Grass	g	a	
22	5	AQFO	<i>Aquilegia formosa</i>	red columbine		Ranunculaceae	Buttercup	p		
23	5	ARFU	<i>Arabis furcata</i>	Cascade rockcress		Cruciferae	Mustard	p		
24	4	ARNE	<i>Arctostaphylos nevadensis</i>	kinnikinnick		Ericaceae	Heather	s		
25	4	ARMA18	<i>Arenaria macrophylla</i>	big-leaved sandwort		Caryophyllaceae	Pink	p		<i>Moehringia macrophylla</i>
26	4	AREL3	<i>Arrhenatherum elatius</i>	oatgrass		Gramineae	Grass	g	a	
27	5	ARAB3	<i>Artemisia absinthium</i>	wormwood		Compositae	Composite	p	a	
28	4	ARDO3	<i>Artemisia douglasiana</i>	Douglas sagebrush		Compositae	Composite	p		
29	4	ARSY	<i>Aruncus sylvester</i>	goatsbeard		Rosaceae	Rose	s		<i>Aruncus dioicus</i> var. <i>acuminatus</i>
30	4	ASCA	<i>Asarum caudatum</i>	wild ginger		Aristolochiaceae	Birthwort	p		
31	3	ATFI	<i>Athyrium filix-femina</i>	lady-fern		Polypodiaceae	Common Fern	f		
32	3	BENE	<i>Berberis nervosa</i>	Cascade Oregongrape		Berberidaceae	Barberry	s		<i>Mahonia nervosa</i>
33	4	BLSP	<i>Blechnum spicant</i>	deer-fern		Polypodiaceae	Common Fern	f		

34	3	BRCO4	<i>Bromus commutatus</i>	hairy brome		Gramineae	Grass	g	a	
35	3	BRPA3	<i>Bromus pacificus</i>	Pacific brome		Gramineae	Grass	g		
36	4	BRTE	<i>Bromus tectorum</i>	cheatgrass		Gramineae	Grass	g	a	
37	5	CAHE3	<i>Callitriche heterophylla</i>	water starwort		Callitrichaceae	Water-starwort	p		
38	5	CABU	<i>Calypso bulbosa</i>	fairy slipper		Orchidaceae	Orchid	p		
39	4	CAAN5	<i>Cardamine angulata</i>	seaside bittercress		Cruciferae	Mustard	p		
40	4	CAOC	<i>Cardamine occidentalis</i>	western bittercress		Cruciferae	Mustard	p		
41	3	CAOLO	<i>Cardamine oligosperma</i> var. <i>oligosperma</i>	little western bittercress		Cruciferae	Mustard	a		
42	4	CAAM10	<i>Carex amplifolia</i>	big-leaf sedge		Cyperaceae	Sedge	g		
43	4	CAAQ	<i>Carex aquatilis</i>	water sedge		Cyperaceae	Sedge	g		
44	5	CACU5	<i>Carex cusickii</i>	Cusick's sedge		Cyperaceae	Sedge	g		
45	4	CADE9	<i>Carex deweyana</i>	Dewey's sedge		Cyperaceae	Sedge	g		
46	4	CAHE7	<i>Carex hendersonii</i>	Henderson's sedge		Cyperaceae	Sedge	g		
47	4	CALA13	<i>Carex laeviculmis</i>	smoothstem sedge		Cyperaceae	Sedge	g		
48	4	CAL16	<i>Carex limnophila</i>	pond sedge		Cyperaceae	Sedge	g		<i>Carex microptera</i>
49	4	CAME6	<i>Carex mertensii</i>	Merten's sedge		Cyperaceae	Sedge	g		
50	3	CAPA58	<i>Carex pachystachya</i>	thick-headed sedge		Cyperaceae	Sedge	g		
51	4	CARO5	<i>Carex rossii</i>	Ross sedge		Cyperaceae	Sedge	g		
52	4	CEMA4	<i>Centaurea maculosa</i>	spotted knapweed		Compositae	Composite	b	a	
53	5	CEMO	<i>Centaurea montana</i>	perennial cornflower		Compositae	Composite	p	a	
54	4	CEVI3	<i>Cerastium viscosum</i>	sticky chickweed		Caryophyllaceae	Pink	a	a	<i>Cerastium glomeratum</i>
55	4	CHME	<i>Chimaphila menziesii</i>	little pipsissiwa		Ericaceae	Heather	p		
56	5	CHUM	<i>Chimaphila umbellata</i>	pipis sewa		Ericaceae	Heather	p		
57	3	CHLE80	<i>Chrysanthemum leucanthemum</i>	oxeye daisy		Compositae	Composite	p	a	<i>Leucanthemum vulgare</i>
58	5	CHOR4	<i>Chrysopsis oregona</i>	Oregon false goldenaster		Compositae	Composite	s		<i>Heterotheca oregona</i> var. <i>oregona</i>
59	3	CIAL	<i>Circaea alpina</i>	enchanter's nightshade		Onagraceae	Evening-primrose	p		
60	4	CIAR4	<i>Cirsium arvense</i>	Canada thistle		Compositae	Composite	p	a	
61	4	CIVU	<i>Cirsium vulgare</i>	bull thistle		Compositae	Composite	b	a	
62	3	CLUN2	<i>Clintonia uniflora</i>	beadlily		Liliaceae	Lily	p		
63	3	COPA3	<i>Collinsia parviflora</i>	blue-eyed Mary		Scrophulariaceae	Figwort	a		
64	4	COHE2	<i>Collomia heterophylla</i>	varied-leaved collomia		Polemoniaceae	Phlox	a		
65	4	COMA4	<i>Corallorhiza maculata</i>	spotted coralroot		Orchidaceae	Orchid	p		
66	4	COME4	<i>Corallorhiza mertensiana</i>	western coralroot		Orchidaceae	Orchid	p		
67	4	COCA13	<i>Cornus canadensis</i>	bunchberry dogwood		Cornaceae	Dogwood	p		
68	3	COST4	<i>Cornus stolonifera</i>	redosier dogwood		Cornaceae	Dogwood	s		<i>Cornus sericea</i> ssp. <i>sericea</i>
69	3	COSC4	<i>Corydalis scouleri</i>	western corydalis		Fumariaceae	Fumitory	p		

70	4	CRAC2	<i>Crepis acuminata</i>	long-leaved hawksbeard		Compositae	Composite	p		
71	5	CRCR	<i>Cryptogramma crispa</i>	parsley-fern		Polypodiaceae	Common Fern	f		
72	4	CYFR2	<i>Cystopteris fragilis</i>	fragile fern		Polypodiaceae	Common Fern	f		
73	3	CYSC4	<i>Cytisus scoparius</i>	Scot's broom		Leguminosae	Pea	s	a	
74	3	DACA6	<i>Daucus carota</i>	Queen Anne's lace		Umbelliferaeae	Parsley	b	a	
75	5	DAST	<i>Datura stramonium</i>	jimsonweed		Solanaceae	Nightshade	a	a	
76	3	DEDA	<i>Deschampsia danthonioides</i>	annual hairgrass		Gramineae	Grass	g		
77	3	DIFO	<i>Dicentra formosa</i>	Pacific bleedingheart		Fumariaceae	Fumitory	p		
78	4	DIPU	<i>Digitalis purpurea</i>	foxglove		Scrophulariaceae	Figwort	a	a	
79	3	DIHO3	<i>Disporum hookeri</i>	Hooker's fairybells		Liliaceae	Lily	p		
80	4	DRVEV	<i>Draba verna</i> var. <i>verna</i>	spring whitlowgrass		Cruciferae	Mustard	a		
81	3	DREX2	<i>Dryopteris expansa</i>	spreading wood-fern		Polypodiaceae	Common Fern	f		
82	5	EBAU	<i>Eburophyton austinae</i>	phantom orchid	W	Orchidaceae	Orchid	p		<i>Cephalanthera austinae</i>
83	3	ELGL	<i>Elymus glaucus</i>	blue wild rye		Gramineae	Grass	g		
84	4	EPAN2	<i>Epilobium angustifolium</i>	fireweed		Onagraceae	Evening-primrose	p		<i>Chamerion angustifolium</i>
85	4	EPMI	<i>Epilobium minutum</i>	small-flowered willow-herb		Onagraceae	Evening-primrose	a		
86	3	EPWA	<i>Epilobium watsonii</i>	Watson's willow-herb		Onagraceae	Evening-primrose	p		<i>Epilobium ciliatum</i> spp. <i>glandulosum</i>
87	3	EQAR	<i>Equisetum arvense</i>	field horsetail		Equisetaceae	Horsetail	p		
88	3	EQSC	<i>Equisetum scirpoides</i>	sedgelike horsetail		Equisetaceae	Horsetail	p		
89	3	EQTE	<i>Equisetum telmateia</i>	giant horsetail		Equisetaceae	Horsetail	p		
90	4	FEMY2	<i>Festuca myuros</i>	rat-tail fescue		Gramineae	Grass	g	a	<i>Vulpia myuros</i> , <i>V. megalura</i>
91	3	FEOC	<i>Festuca occidentalis</i>	western fescue		Gramineae	Grass	g		
92	3	FERU	<i>Festuca rubra</i>	red fescue		Gramineae	Grass	g		
93	4	FESU	<i>Festuca subuliflora</i>	Coast Range fescue		Gramineae	Grass	g		
94	5	FIAR2	<i>Filago arvensis</i>	field filago		Compositae	Composite	a	a	<i>Logfia arvensis</i>
95	4	FRVE	<i>Fragaria vesca</i>	woods strawberry		Rosaceae	Rose	p		
96	3	FRVI	<i>Fragaria virginiana</i>	wild strawberry		Rosaceae	Rose	p		
97	3	GAAP2	<i>Galium aparine</i>	cleavers		Rubiaceae	Madder	a	a	
98	3	GASH	<i>Gaultheria shallon</i>	salal		Ericaceae	Heather	s		
99	5	GEDI	<i>Geranium dissectum</i>	cutleaf geranium		Geraniaceae	Geranium	a	a	<i>Geranium laxum</i>
100	2	GERO	<i>Geranium robertianum</i>	Robert geranium		Geraniaceae	Geranium	a	a	
101	4	GEMA4	<i>Geum macrophyllum</i>	large-leaved avens		Rosaceae	Rose	p		
102	4	GLHE2	<i>Glechoma hederacea</i>	ground ivy		Labiatae	Mint	p	a	
103	3	GLEL	<i>Glyceria elata</i>	tall mannagrass		Gramineae	Grass	g		
104	4	GLGR	<i>Glyceria grandis</i>	western mannagrass		Gramineae	Grass	g		
105	3	GLLE2	<i>Glyceria leptostachya</i>	reed mannagrass		Gramineae	Grass	g		

106	4	GNUL	Gnaphalium uliginosum	marsh cudweed		Compositae	Composite	a	a	
107	4	GOOB2	Goodyera oblongifolia	rattlesnake plantain		Orchidaceae	Orchid	p		
108	3	GYDR	Gymnocarpium dryopteris	oak fern		Polypodiaceae	Common Fern	f		
109	5	HECO6	Hemitomes congestum	gnome-plant	W	Ericaceae	Heather	p		
110	4	HELA4	Heracleum lanatum	cow parsnip		Umbelliferaeae	Parsley	p		
111	3	HEMI	Heuchera micrantha	smallflowered alumroot		Saxifragaceae	Saxifrage	p		
112	4	HIAL2	Hieracium albiflorum	white-flowered hawkweed		Compositae	Composite	p		
113	3	HISA4	Hieracium sabaudum	New England hawkweed		Compositae	Composite	p	a	not in Hitchcock
114	3	HOLA	Holcus lanatus	common velvetgrass		Gramineae	Grass	g	a	
115	4	HODI	Holodiscus discolor	oceanspray		Rosaceae	Rose	s		
116	3	HYTE	Hydrophyllum tenuipes	slender-stem waterleaf		Hydrophyllaceae	Waterleaf	p		
117	3	HYPE	Hypericum perforatum	St. John's-wort		Hypericaceae	St. John's-wort	p	a	
118	3	HYRA3	Hypochaeris radicata	hairy cat's-ear		Compositae	Composite	a	a	
119	5	HYMO3	Hypopitys monotropa	pinemap		Ericaceae	Heather	p		
120	4	JUBU	Juncus bufonius	toad rush		Juncaceae	Rush	g		
121	3	JUEF	Juncus effusus	common rush		Juncaceae	Rush	g		
122	4	JUEN	Juncus ensifolius	dagger-leaved rush		Juncaceae	Rush	g		
123	3	LAMU	Lactuca muralis	wall lettuce		Compositae	Composite	a	a	Mycelis muralis
124	5	LAPU2	Lamium purpureum	purple deadnettle		Labiatae	Mint	a	a	
125	4	LANE3	Lathyrus nevadensis	Nuttall's peavine		Leguminosae	Pea	p		
126	5	LASY	Lathyrus sylvestris	narrow-leaved peavine		Leguminosae	Pea	p	a	
127	3	LECA5	Lepidium campestre	field pepperwort		Cruciferae	Mustard	a	a	
128	4	LICA	Ligusticum canbyi	licoriceroot		Umbelliferaeae	Parsley	p		
129	5	LICO	Lilium columbianum	tiger lily		Liliaceae	Lily	p		
130	3	LIBO3	Linnaea borealis	twinflower		Scrophulariaceae	Figwort	p		
131	4	LICA	Listera caurina	northwest twayblade		Orchidaceae	Orchid	p		
132	4	LICO6	Listera cordata	heartleaf twayblade		Orchidaceae	Orchid	p		
133	3	LOC13	Lonicera ciliosa	orange honeysuckle		Caprifoliaceae	Honeysuckle	s		
134	4	LOIN5	Lonicera involucrata	black twinberry		Caprifoliaceae	Honeysuckle	s		
135	5	LOCO6	Lotus corniculatus	birdsfoot trefoil		Leguminosae	Pea	p	a	
136	4	LODE	Lotus denticulatus	meadow lotus		Leguminosae	Pea	a		
137	4	LOMI	Lotus micranthus	small-flowered deervetch		Leguminosae	Pea	a		
138	4	LOPU3	Lotus purshiana	Spanish clover		Leguminosae	Pea	a		
139	5	LULAL	Lupinus latifolius var. latifolius	broadleaf lupine		Leguminosae	Pea	p		
140	4	LUPO2	Lupinus polyphyllus	many-leaved lupine		Leguminosae	Pea	p		
141	4	LUCA2	Luzula campestris	field woodrush		Juncaceae	Rush	g		

142	3	LUPA	<i>Luzula parviflora</i>	small-flowered woodrush		Juncaceae	Rush	g		
143	5	LYSE	<i>Lycopodium selago</i>	fir clubmoss		Lycopodiaceae	Clubmoss	cm		
144	3	LYAM3	<i>Lysichiton americanum</i>	skunk cabbage		Araceae	Arum	p		Lysichiton americanus
145	2	MADI	<i>Maianthemum dilatatum</i>	may-lily		Liliaceae	Lily	p		
146	4	MAMA11	<i>Matricaria matricarioides</i>	pineapple weed		Compositae	Composite	a	a	Matricaria discoidea
147	4	MELU	<i>Medicago lupulina</i>	black medic		Leguminosae	Pea	p	a	
148	4	MESM	<i>Melica smithii</i>	Smith's melic		Gramineae	Grass	g		
149	3	MESU	<i>Melica subulata</i>	Alaska oniongrass		Gramineae	Grass	g		
150	5	MEFE	<i>Menziesia ferruginea</i>	fool's huckleberry		Ericaceae	Heather	s		
151	3	MIGR	<i>Microsteris gracilis</i>	pink-eyed Mary		Polemoniaceae	Phlox	a		
152	4	MIAL3	<i>Mimulus alsinoides</i>	chickweed monkeyflower		Scrophulariaceae	Figwort	p		
153	3	MIGU	<i>Mimulus guttatus</i>	yellow monkeyflower		Scrophulariaceae	Figwort	p		
154	3	MIPE	<i>Mitella pentandra</i>	alpine mitrewort		Saxifragaceae	Saxifrage	p		
155	5	MOUN3	<i>Monatropa uniflora</i>	Indian pipe		Ericaceae	Heather	p		
156	4	MOPA5	<i>Montia parvifolia</i>	littleleaf montia		Caryophyllaceae	Pink	p		
157	1	MOSI2	<i>Montia sibirica</i>	Siberian miner's lettuce		Caryophyllaceae	Pink	a		Claytonia sibirica
158	5	MYDI	<i>Myosotis discolor</i>	yellow and blue forgetmenot		Boraginaceae	Borage	a		
159	4	MYLA	<i>Myosotis laxa</i>	small-flowered forgetmenot		Boraginaceae	Borage	p		
160	1	MYSC	<i>Myosotis scirpoides</i>	common forgetmenot		Boraginaceae	Borage	a	a	
161	4	NEPA	<i>Nemophila parviflora</i>	small-flowered nemophila		Hydrophyllaceae	Waterleaf	a		
162	4	NONE3	<i>Nothochelone nemorosa</i>	woodland beard-tongue		Scrophulariaceae	Figwort	p		
163	3	OECE	<i>Oemleria cerasiformis</i>	Indian plum		Rosaceae	Rose	s		
164	3	OESA	<i>Oenanthe sarmentosa</i>	water-parsley		Umbelliferaceae	Parsley	p		
165	3	OPHO	<i>Oplopanax horridum</i>	devil's club		Araliaceae	Ginseng	s		
166	4	OSCH	<i>Osmorhiza chilensis</i>	mountain sweet-cicely		Umbelliferaceae	Parsley	p		Osmorhiza berteroi
167	4	PESE5	<i>Penstemon serrulatus</i>	Cascade penstemon		Scrophulariaceae	Figwort	s		
168	3	PEFRP	<i>Petasites frigidus</i> var. <i>plamatus</i>	sweet coltsfoot		Compositae	Composite	p		
169	4	PHHEP	<i>Phacelia heterophylla</i> var. <i>pseudohispida</i>	varileaf phacelia		Hydrophyllaceae	Waterleaf	p		
170	4	PHAR3	<i>Phalaris arundinacea</i>	reed canarygrass		Gramineae	Grass	p	a	
171	4	PISI	<i>Picea sitchensis</i>	Sitka spruce		Pinaceae	Pine	t		
172	3	PLLA	<i>Plantago lanceolata</i>	narrowleaf plantain		Plantaginaceae	Plantain	p	a	
173	4	PLMA2	<i>Plantago major</i>	common plantain		Plantaginaceae	Plantain	p	a	
174	5	PLOR4	<i>Platanthera orbiculata</i>	roundleaved rein-orchid	W	Orchidaceae	Orchid	p		
175	5	PLFI2	<i>Pleuricospora fimbriolata</i>	fringed-pinesap	W	Ericaceae	Heather	p		
176	3	POAN	<i>Poa annua</i>	annual bluegrass		Gramineae	Grass	g	a	
177	4	POCO	<i>Poa compressa</i>	Canada bluegrass		Gramineae	Grass	g		

178	4	POLE2	<i>Poa leptocoma</i>	bog bluegrass		Gramineae	Grass	g		
179	4	POPR	<i>Poa pratensis</i>	Kentucky bluegrass		Gramineae	Grass	g	a	
180	3	POTR2	<i>Poa trivialis</i>	rough bluegrass		Gramineae	Grass	g	a	
181	5	PODO4	<i>Polygonum douglasii</i>	Douglas' knotweed		Polygonaceae	Buckwheat	a		
182	3	POGL8	<i>Polypodium glycyrrhiza</i>	licorice fern		Polypodiaceae	Common Fern	f		
183	1	POMU	<i>Polystichum munitum</i>	sword-fern		Polypodiaceae	Common Fern	f		
184	4	POTR15	<i>Populus trichocarpa</i>	black cottonwood		Salicaceae	Willow	t		<i>Populus balsamifera</i> ssp. <i>trichocarpa</i>
185	4	PRVU	<i>Prunella vulgaris</i>	self-heal		Labiatae	Mint	p		
186	4	PREMM	<i>Prunus emarginata</i> var. <i>mollis</i>	bittercherry		Rosaceae	Rose	s		
187	1	PSME	<i>Pseudotsuga menziesii</i>	Douglas fir		Pinaceae	Pine	t		
188	4	PTAQ	<i>Pteridium aquilinum</i>	bracken fern		Polypodiaceae	Common Fern	f		
189	4	PYUN	<i>Pyrola uniflora</i>	woodnymph		Ericaceae	Heather	p		<i>Moneses uniflora</i>
190	3	RAOC	<i>Ranunculus occidentalis</i>	western buttercup		Ranunculaceae	Buttercup	p		
191	3	RARER	<i>Ranunculus repens</i> var. <i>repens</i>	creeping buttercup		Ranunculaceae	Buttercup	p	a	
192	4	RAUN	<i>Ranunculus uncinatus</i>	woodland buttercup		Ranunculaceae	Buttercup	p		
193	5	RHMA3	<i>Rhododendron macrophyllum</i>	western rhododendron		Ericaceae	Heather	s		
194	3	RIBR	<i>Ribes bracteosum</i>	stink currant		Grossulariaceae	Current	s		
195	5	RIHU	<i>Ribes hudsonianum</i>	stinking currant		Grossulariaceae	Current	s		
196	4	RILA	<i>Ribes lacustre</i>	swamp currant		Grossulariaceae	Current	s		
197	3	RISA2	<i>Ribes sanguineum</i>	red-flowered currant		Grossulariaceae	Current	s		
198	4	ROGY	<i>Rosa gymnocarpa</i>	baldhip rose		Rosaceae	Rose	s		
199	5	RUDI2	<i>Rubus discolor</i>	Himalayan blackberry		Rosaceae	Rose	s	a	
200	4	RULA	<i>Rubus laciniatus</i>	evergreen blackberry		Rosaceae	Rose	s	a	
201	4	RULE	<i>Rubus leucodermis</i>	black raspberry		Rosaceae	Rose	s		
202	4	RUPA	<i>Rubus parviflorus</i>	thimbleberry		Rosaceae	Rose	s		
203	4	RUPE	<i>Rubus pedatus</i>	fiveleaved bramble		Rosaceae	Rose	s		
204	1	RUSP	<i>Rubus spectabilis</i>	salmonberry		Rosaceae	Rose	s		
205	3	RUUR	<i>Rubus ursinus</i>	trailing blackberry		Rosaceae	Rose	s		
206	3	RUAC3	<i>Rumex acetosella</i>	sheep sorrel		Polygonaceae	Buckwheat	a	a	
207	3	RUOC3	<i>Rumex occidentalis</i>	western dock		Polygonaceae	Buckwheat	p		
208	5	SASA	<i>Sagina saginoides</i>	alpine pearlwort		Caryophyllaceae	Pink	p		
209	4	SABA	<i>Salix barclayi</i>	Barclay's willow		Salicaceae	Willow	s		
210	5	SALA5	<i>Salix lasiandra</i>	pacific willow		Salicaceae	Willow	s		<i>Salix lucida</i>
211	4	SAME2	<i>Salix melanopsis</i>	dusky willow		Salicaceae	Willow	s		
212	4	SAPS	<i>Salix pseudomonticola</i>	false mountain willow		Salicaceae	Willow	s		
213	3	SASI2	<i>Salix sitchensis</i>	Sitka willow		Salicaceae	Willow	t		

214	3	SARA2	<i>Sambucus racemosa</i>	red elderberry		Caprifoliaceae	Honeysuckle	s		
215	4	SCCY	<i>Scirpus cyperinus</i>	woolgrass		Cyperaceae	Sedge	g		
216	4	SEJA	<i>Senecio jacobaea</i>	tansy ragwort		Compositae	Composite	a	a	
217	4	SEVU	<i>Senecio vulgaris</i>	common groundsel		Compositae	Composite	p	a	
218	5	SIAN2	<i>Silene antirrhina</i>	sleepy cat		Caryophyllaceae	Pink	p	a	
219	3	SMST	<i>Smilacina stellata</i>	star-flowered solomon's seal		Liliaceae	Lily	p		<i>Maianthemum stellatum</i>
220	5	SONIV3	<i>Solanum nigrum</i> var. <i>virginicum</i>	American black nightshade		Solanaceae	Nightshade	p	a	<i>Solanum americanum</i>
221	4	SOCA6	<i>Solidago canadensis</i>	Canada goldenrod		Compositae	Composite	p		
222	5	SPRU	<i>Spergularia rubra</i>	red sandspurry		Caryophyllaceae	Pink	a	a	
223	4	SPDE	<i>Spiraea densiflora</i>	subalpine spiraea		Rosaceae	Rose	s		
224	5	SPRO	<i>Spiranthes romanzoffiana</i>	hooded ladie's tress		Orchidaceae	Orchid	p		
225	3	STCO14	<i>Stachys cooleyae</i>	cooley's hedge-nettle		Labiatae	Mint	p		<i>Stachys chamissonis</i> var. <i>cooleyae</i>
226	3	STCA	<i>Stellaria calycantha</i>	northern starwort		Caryophyllaceae	Pink	a		
227	3	STCR2	<i>Stellaria crispa</i>	crisped starwort		Caryophyllaceae	Pink	p		
228	4	STME2	<i>Stellaria media</i>	chickweed		Caryophyllaceae	Pink	a	a	
229	3	STUM	<i>Stellaria umbellata</i>	umbellate starwort		Caryophyllaceae	Pink	a		
230	4	STST3	<i>Streptopus streptopoides</i>	twisted-stalk		Liliaceae	Lily	p		
231	4	SYAL	<i>Symphoricarpos albus</i>	common snowberry		Caprifoliaceae	Honeysuckle	s		
232	3	TAOF	<i>Taraxacum officinale</i>	common dandelion		Compositae	Composite	b	a	
233	5	TABR2	<i>Taxus brevifolia</i>	Pacific yew		Taxaceae	Yew	s		
234	4	TENU	<i>Teesdalia nudicaulis</i>	teesdalia		Cruciferae	Mustard	a	a	
235	5	TEGR2	<i>Tellima grandiflora</i>	fringecup		Saxifragaceae	Saxifrage	p		
236	3	THPL	<i>Thuja plicata</i>	western redcedar		Cupressaceae	Cyperess	t		
237	3	TITR	<i>Tiarella trifoliata</i>	foamflower		Saxifragaceae	Saxifrage	p		
238	2	TOME	<i>Tolmiea menziesii</i>	youth-on-age		Saxifragaceae	Saxifrage	p		
239	5	TRCAO	<i>Trautvetteria caroliniensis</i> var. <i>occidentalis</i>	false bugbane		Ranunculaceae	Buttercup	p		
240	5	TRLA6	<i>Trientalis latifolia</i>	western starflower		Primulaceae	Primrose	p		<i>Trientalis borealis</i> ssp. <i>latifolia</i>
241	3	TRPR2	<i>Trifolium pratense</i>	red clover		Leguminosae	Pea	p	a	
242	3	TRRE3	<i>Trifolium repens</i>	white clover		Leguminosae	Pea	p	a	
243	3	TROV	<i>Trillium ovatum</i>	white trillium		Liliaceae	Lily	p		
244	1	TSHE	<i>Tsuga heterophylla</i>	Pacific hemlock		Pinaceae	Pine	t		
245	5	TYLA	<i>Typha latifolia</i>	common cattail		Typhaceae	Cat-tail	p		
246	5	URDI	<i>Urtica dioica</i>	stinging nettle		Urticaceae	Nettle	p		
247	3	VAPA	<i>Vaccinium parvifolium</i>	red huckleberry		Ericaceae	Heather	s		
248	5	VALER	<i>Valeriana</i> sp.	valerian		Valerianaceae	Valerian	p		
249	5	VETH	<i>Verbascum thapsus</i>	common mullein		Scrophulariaceae	Figwort	b	a	

250	4	VEAM2	Veronica americana	American brooklime		Scrophulariaceae	Figwort	p		
251	4	VEAR	Veronica arvensis	field speedwell		Scrophulariaceae	Figwort	a	a	
252	4	VEBI2	Veronica biloba	bilobed speedwell		Scrophulariaceae	Figwort	a	a	
253	3	VECH	Veronica chamaedrys	Germander speedwell		Scrophulariaceae	Figwort	p	a	
254	4	VEWO	Veronica wormskjoldii	alpine speedwell		Scrophulariaceae	Figwort	p		
255	4	VIAM	Vicia americana	American vetch		Leguminosae	Pea	p		
256	5	VIHI	Vicia hirsuta	Hairy Vetch		Leguminosae	Pea	p	a	
257	3	VIGL	Viola glabella	pioneer violet		Violaceae	Violet	p		
258	3	VIOR	Viola orbiculata	darkwoods violet		Violaceae	Violet	p		
259	3	VISE3	Viola sempervirens	evergreen violet		Violaceae	Violet	p		

Discussion

Previous to our 2005 survey, no state or federally listed vascular plants had been documented within Federation Forest State Park. Our 2005 project did not locate any new populations of listed sensitive, threatened or endangered plants. The four Watch List plant species may at some future time become listed. The State Parks should work to protect these rare species. Maintaining a healthy population of these species in Federation Forest will help avoid a state or federal listing.

Ecological Condition of Federation Forest State Park

Some of the forest stands in Federation Forest State Park represent some of the best low-elevation old-growth forests remaining in the Puget Sound and Western Cascades regions. Although there was limited selective cutting many years ago in some of the old-growth stands, the stands are now in remarkably good ecological condition. In most cases, recreational impacts have been low and non-native plant invasions are limited to road and trail borders. Old growth structure is often remarkable. Excellent examples of large (over 1 meter DBH) Sitka spruce (*Picea sitchensis*) can be found. Specimens of this species in this size class are exceedingly rare in Washington State at this time. Very large Douglas-fir (*Pseudotsuga menziesii*), western hemlock (*Tsuga heterophylla*) and western red cedar (*Thuja plicata*) are abundant. A few large, old noble fir (*Abies nobilis*) are found in the park.

The mature forests within the park represent regeneration from logging during the past 60 to 80 years. Many of these stands are now in good condition and will develop old-growth characteristics in another 100 years. Most sites in the park are quite productive, so late-successional structure will develop relatively rapidly in most places. There are a few places along the northern border of the park where it appears that clear-cuts on adjacent private lands ended up slopping over into the park. These areas are in an early successional condition now.

The river flood plain contains good examples of deciduous forest dominated by red alder (*Alnus rubra*), black cottonwood (*Populus trichocarpa*) and bigleaf maple (*Acer macrophyllum*) and several willow species (*Salix*). These stands are fairly young, representing regeneration from past flood events. Nearly all the gravel bars along the White River have very early successional vegetation, often dominated by Scot's broom (*Cytisus scoparius*). Many other non-native plants are found within the floodplain area. It appears that seeds and other propagules are spread downstream by the river during flood events. The floodplain ecosystems have been highly altered by non-native species invasions. Unfortunately, without elimination of alien species throughout the watershed above the park, efforts to control alien species in the park will be pointless.

Recommendations

In general the ecological condition of Federation Forest State Park is quite good. The older forests have the best condition while the river floodplain areas and areas near roads and trails have high levels of non-native plant cover. Maintenance of the condition of the late-successional forests should be a prime emphasis for this park, as many of the stands are exemplary for Washington State. Likewise, the mature forests are well on their way to becoming old-growth. With wise management, they will approach the condition that many old-growth stands have today.

Control of non-native plants should be confined to the sides of roads and trails. Mowing is probably the best option, as it will cause the least harm to native plants growing next to the roads and trails. The soils in this park are saturated much of the year and herbicide movement can be rapid and adversely affect plants that are not immediately sprayed. Control of non-native plants in the river floodplain will be futile, unless massive efforts are undertaken upstream.

GIS Products Produced

Associated with this report is a polygon layer created by PBI depicting the vegetation community types mapped in Federation Forest State Park. The dataset has been converted into ESRI shapefile format and provided to the Washington State Parks and Recreation Commission. The spatial datasets are complete with metadata meeting FGDC standards. Refer to the associated metadata for descriptions and attribute definitions for each spatial dataset.

References

Chappell C.B. 2004. *Terrestrial plant associations of the Puget trough ecoregion*, Washington. Washington Natural Heritage Program. Washington Department of Natural Resources. Olympia WA.

Henderson, J.A., R. D. Leshner, D.H. Peter, and D.C. Shaw. 1992. *Field Guide to the forest plant associations of the Mt. Baker-Snoqualmie National Forest*. USDA Forest Service Technical Paper. R6-Ecol-TP-028-91.

Kunze. L.M. 1994. *Preliminary classification of native, low elevation, freshwater wetland vegetation in western Washington*. Washington Natural Heritage Program. Washington Department of Natural Resources. Olympia WA.

Appendix A - Field Survey Schedule

Primary Contract Survey Dates

May 2 and 3, 2005

Dana Visalli
Hans Smith
Peter Morrison

June 7 and 8, 2005

Dana Visalli
Hans Smith
Katherine Beck (June 7 only)
Peter Morrison

Secondary Contract Survey Dates

August 1 - 3, 2005

Hans Smith

September 3, 2005

Peter Morrison

Appendix B – Vegetation Survey Data

Legend:

Site = name of locality of map project

Polygon = number you put on map

Name/Date = your name / day-month-year completed polygon survey

Photo roll/number = number of roll (on canister) and number of shot

Survey intensity

1 = walked or could see most of polygon (high confidence in survey data)

2 = walked or could see part of polygon interior (moderate confidence)

3 = walked perimeter or could see part of polygon interior (low confidence)

4 = photo interpretation or other remote survey

VEGETATION COVER

This is canopy cover, i.e. the space between leaves/branches is included in “cover”. Each Life form category canopy cover must be 0-100%. Therefore, the sum of all life forms (layers) can exceed 100%. List most abundant species in each life form category; when trees are cored, note DBH, species, length of core, number of rings counted.

TOTAL VEGETATION COVER includes all vascular plants, mosses, lichens and foliose lichens (crustose lichens excluded they are considered rock); this never exceeds 100%.

SOIL SURFACE estimate to nearest % the following, the sum of the categories adds to 100%

Rock outcrop = exposed bedrock including detached boulders over 1m across

Gravel/cobble = large fragments between sand and boulder

Bareground = exposed mineral soil

Mosses/lichens = nonvascular plant cover on soil

Litter = includes logs, branches, and basal area of plants

Describe in comments if there is wide variation in any category; note % standing water if it is persistent or characteristic of site.

LAND USE - put 0 (zero) if not applicable to site.

Logging

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 clear-cutting

Stand Age

- 1 = very young 0-40 yr
- 2 = young 40-90 yr
- 3 = mature 90-200 yr
- 4 = old-growth 200+ yr
- 5 = young with scattered old trees (2-10 old trees per acre)
- 6 = mature with scattered old trees

Agriculture

- 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 to ground soil compaction or churning)
- 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 current, 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

Recreation Use Severity

- 1 = heavy use, abundant soil and vegetation displacement off trail/road
- 2 = moderate use, frequent soil and vegetation displacement off trail/road
- 3 = light use, little sign of activity off trail/road

Recreation Use Primary Type

- 1 = wheeled
- 2 = hoofed
- 3 = pedestrian
- 4 = combination of above
- 5 = other

Hydrology

- 1 = unaltered
- 2 = altered; dams, dikes, ditches, culverts, etc
- 3 = not assessed

Plant Association (PA) = list all PAs encountered in polygon survey, in comments list source of name if not on provided key.

Condition Rank of PA in key or estimate

% of Polygon = your estimate

Pattern = 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

Exotic = primary species observed; secondary species observed.

Plot Number = number of any plots established for EO (element occurrence), or other more detail sheets within polygon.

Vegetation Polygon Data

	Polygon Number	16
Survey Intensity	1	
Observer	PM	
Date	5/2/05	
Specific Location	gravel bar at east end of Federation Forest	
Total Vegetation	40	
Trees Total	6	
Dominant Tree Sp		
emergent	0	
main canopy	0	
subcanopy	6	
Shrubs Total	26	
Dominant Shrub Sp		
> 1.5' tall	22	
< 1.5' tall	4	
Graminoids Total	2	
Dominant Graminoid Sp		
Graminoids perennial	2	
Graminoids annual	0	
Forbs Total	6	
Dominant Forb Sp		
Forbs perennial	4	
Forbs annual	2	
Ferns - evergreen		
Ferns - deciduous		
Exotics Total	25	
Exotics perennial	22	
Exotics annual	3	
Rock Outcrop	0	
Gravel	40	
Bare Ground	15	
Moss-Lichen	5	
Litter	40	
Logging	0	
Stand Age	1	
Agriculture	0	
Livestock	0	
Development	0	
Wildlife	0	
Recreation Severity	2	
Recreation Type	3	
Hydrology	1	

Exotic Species

primary spp
Cytisus scoparius

secondary spp
Hypocharis radicata

Plant Associations

	Percent	Pattern
1. floodplain gravel/sand bar	100	Matrix
2.		
3.		

Note:

Polygon Number 21
Survey Intensity 1

Observer PM
Date 5/2/05
Specific Location picnic areas along White River at eastern part of park

Total Vegetation 90
Trees Total 20
Dominant Tree Sp
emergent
main canopy
subcanopy
Shrubs Total
Dominant Shrub Sp
> 1.5' tall
< 1.5' tall
Graminoids Total
Dominant Graminoid Sp
Graminoids perennial
Graminoids annual
Forbs Total
Dominant Forb Sp
Forbs perennial
Forbs annual
Ferns - evergreen
Ferns - deciduous
Exotics Total
Exotics perennial
Exotics annual
Rock Outcrop
Gravel
Bare Ground
Moss-Lichen
Litter
Logging
Stand Age
Agriculture
Livestock
Development
Wildlife
Recreation Severity
Recreation Type
Hydrology 2

Exotic Species

primary spp

secondary spp

Plant Associations	Percent	Pattern
1. Developed / Disturbed	100	Matrix
2.		
3.		

Note: developed area - lawns and picnic tables and roads, trails and some native veg.

Polygon Number 22
Survey Intensity 4

Observer Hans
Date 6/20/05

Specific Location

Total Vegetation

Trees Total

Dominant Tree Sp

emergent

main canopy

subcanopy

Shrubs Total

Dominant Shrub Sp

> 1.5' tall

< 1.5' tall

Graminoids Total

Dominant Graminoid Sp

Graminoids perennial

Graminoids annual

Forbs Total

Dominant Forb Sp

Forbs perennial

Forbs annual

Ferns - evergreen

Ferns - deciduous

Exotics Total

Exotics perennial

Exotics annual

Rock Outcrop

Gravel

Bare Ground

Moss-Lichen

Litter

Logging

Stand Age

Agriculture

Livestock

Development

Wildlife

Recreation Severity

Recreation Type

Hydrology

Exotic Species

primary spp

secondary spp

Plant Associations

Percent

Pattern

1. Water

100

Matrix

2.

3.

Note:

Polygon Number	28
Survey Intensity	1
Observer	HS
Date	6/7/05
Specific Location	Just W of Visitor Center
Total Vegetation	100
Trees Total	98
Dominant Tree Sp	PSME/TSHE
emergent	3
main canopy	89
subcanopy	6
Shrubs Total	50
Dominant Shrub Sp	GASH/BENE
> 1.5' tall	30
< 1.5' tall	20
Graminoids Total	0
Dominant Graminoid Sp	
Graminoids perennial	0
Graminoids annual	0
Forbs Total	3
Dominant Forb Sp	LIBO
Forbs perennial	3
Forbs annual	0
Ferns - evergreen	1
Ferns - deciduous	4
Exotics Total	0
Exotics perennial	0
Exotics annual	0
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss-Lichen	95
Litter	5
Logging	3
Stand Age	2
Agriculture	0
Livestock	0
Development	3
Wildlife	3
Recreation Severity	2
Recreation Type	3
Hydrology	1

Exotic Species

primary spp

secondary spp

Plant Associations	Percent	Pattern
1. TSHE/GASH-BENE	100	Matrix
2.		
3.		

Note:

Polygon Number	30
Survey Intensity	2
Observer	Hans
Date	5/2/05
Specific Location	Alder filled steep drainage N of Hwy 410 along N border of Park
Total Vegetation	100
Trees Total	95
Dominant Tree Sp	ALRU
emergent	5
main canopy	86
subcanopy	4
Shrubs Total	3
Dominant Shrub Sp	ACCI
> 1.5' tall	2
< 1.5' tall	1
Graminoids Total	1
Dominant Graminoid Sp	
Graminoids perennial	1
Graminoids annual	
Forbs Total	4
Dominant Forb Sp	
Forbs perennial	4
Forbs annual	
Ferns - evergreen	20
Ferns - deciduous	2
Exotics Total	
Exotics perennial	
Exotics annual	
Rock Outcrop	
Gravel	
Bare Ground	
Moss-Lichen	15
Litter	85
Logging	3
Stand Age	1
Agriculture	0
Livestock	0
Development	0
Wildlife	3
Recreation Severity	0
Recreation Type	0
Hydrology	1

Exotic Species

primary spp

secondary spp

Plant Associations

	Percent	Pattern
1. ALRU/POMU	60	Scattered,
2. TSHE/POMU-BENE	40	Scattered,
3.		

Note:

Polygon Number	39
Survey Intensity	1
Observer	PM
Date	5/2/05
Specific Location	river bottom forest between road and river on east side of park
Total Vegetation	100
Trees Total	90
Dominant Tree Sp	THPL, TSHE, PSME
emergent	25
main canopy	60
subcanopy	5
Shrubs Total	55
Dominant Shrub Sp	ACCI, BENE, RUPA
> 1.5' tall	50
< 1.5' tall	5
Graminoids Total	1
Dominant Graminoid Sp	
Graminoids perennial	1
Graminoids annual	0
Forbs Total	75
Dominant Forb Sp	TITR, HYTE, CIAL, DIFO
Forbs perennial	74
Forbs annual	1
Ferns - evergreen	5
Ferns - deciduous	10
Exotics Total	1
Exotics perennial	1
Exotics annual	0
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss-Lichen	15
Litter	85
Logging	2
Stand Age	4
Agriculture	0
Livestock	0
Development	3
Wildlife	0
Recreation Severity	3
Recreation Type	3
Hydrology	1

Exotic Species

- primary spp**
Cytisus scoparius on edge
- secondary spp**
Geranium robertianum

Plant Associations

	Percent	Pattern
1. TSHE/TITR-GYDR	85	Matrix
2. TSHE/OPHO-ATFI	10	Small
3. TSHE/LYAM	5	Small

Note: river is riprapped in places - so some alteration of flood regime is possible; Ferns: POMU, GYDR,

Polygon Number	44
Survey Intensity	2
Observer	DV
Date	6/8/05
Specific Location	S side of river, small old growth forest plot
Total Vegetation	95
Trees Total	90
Dominant Tree Sp	PSME, THPL, PISI
emergent	20
main canopy	60
subcanopy	10
Shrubs Total	5
Dominant Shrub Sp	ACCI
> 1.5' tall	5
< 1.5' tall	0
Graminoids Total	1
Dominant Graminoid Sp	
Graminoids perennial	1
Graminoids annual	0
Forbs Total	5
Dominant Forb Sp	
Forbs perennial	5
Forbs annual	0
Ferns - evergreen	5
Ferns - deciduous	0
Exotics Total	1
Exotics perennial	0
Exotics annual	1
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss-Lichen	5
Litter	95
Logging	1
Stand Age	4
Agriculture	0
Livestock	6
Development	5
Wildlife	3
Recreation Severity	3
Recreation Type	0
Hydrology	1

Exotic Species

primary spp
Geranium robertianum
secondary spp

Plant Associations

	Percent	Pattern
1. TSHE/ACCI-BENE	100	Matrix
2.		
3.		

Note:

Polygon Number	45
Survey Intensity	2
Observer	DV
Date	6/8/05
Specific Location	S side of river W unit, alders around old growth
Total Vegetation	100
Trees Total	80
Dominant Tree Sp	ALRU
emergent	0
main canopy	70
subcanopy	10
Shrubs Total	15
Dominant Shrub Sp	OMCE, RUSP
> 1.5' tall	10
< 1.5' tall	5
Graminoids Total	20
Dominant Graminoid Sp	
Graminoids perennial	20
Graminoids annual	0
Forbs Total	15
Dominant Forb Sp	
Forbs perennial	5
Forbs annual	10
Ferns - evergreen	2
Ferns - deciduous	0
Exotics Total	10
Exotics perennial	0
Exotics annual	10
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss-Lichen	5
Litter	95
Logging	3
Stand Age	1
Agriculture	0
Livestock	6
Development	5
Wildlife	3
Recreation Severity	3
Recreation Type	6
Hydrology	1

Exotic Species

primary spp
Geranium robertianum

secondary spp

Plant Associations

	Percent	Pattern
1. ALRU/RUSP	100	Matrix
2.		
3.		

Note: river terrace

Polygon Number	49
Survey Intensity	1
Observer	Hans
Date	5/2/05
Specific Location	E of ALRU patch on N Park hillside - N of Hwy 410
Total Vegetation	100
Trees Total	98
Dominant Tree Sp	TSHE
emergent	10
main canopy	80
subcanopy	8
Shrubs Total	15
Dominant Shrub Sp	BENE
> 1.5' tall	2
< 1.5' tall	13
Graminoids Total	1
Dominant Graminoid Sp	
Graminoids perennial	1
Graminoids annual	
Forbs Total	1
Dominant Forb Sp	
Forbs perennial	1
Forbs annual	
Ferns - evergreen	5
Ferns - deciduous	1
Exotics Total	
Exotics perennial	
Exotics annual	
Rock Outcrop	
Gravel	
Bare Ground	1
Moss-Lichen	10
Litter	89
Logging	1
Stand Age	3
Agriculture	0
Livestock	0
Development	0
Wildlife	3
Recreation Severity	0
Recreation Type	0
Hydrology	1

Exotic Species

primary spp

secondary spp

Plant Associations	Percent	Pattern
---------------------------	----------------	----------------

- | | | |
|-------------------|----|--------|
| 1. TSHE/BENE | 80 | Matrix |
| 2. TSHE/POMU-BENE | 20 | Large |
| 3. | | |

Note: Stand replacement logging and associated slash fire probable on site - could be reason why there is no

Polygon Number	53
Survey Intensity	1
Observer	Hans
Date	5/3/05
Specific Location	N of mid Park trailhead, N of Hwy 410
Total Vegetation	100
Trees Total	98
Dominant Tree Sp	PSME / TSHE
emergent	15
main canopy	78
subcanopy	5
Shrubs Total	15
Dominant Shrub Sp	BENE
> 1.5' tall	5
< 1.5' tall	10
Graminoids Total	1
Dominant Graminoid Sp	
Graminoids perennial	1
Graminoids annual	
Forbs Total	2
Dominant Forb Sp	MADI
Forbs perennial	2
Forbs annual	
Ferns - evergreen	30
Ferns - deciduous	1
Exotics Total	1
Exotics perennial	1
Exotics annual	
Rock Outcrop	
Gravel	
Bare Ground	
Moss-Lichen	15
Litter	85
Logging	2
Stand Age	3
Agriculture	0
Livestock	0
Development	3
Wildlife	3
Recreation Severity	2
Recreation Type	3
Hydrology	2

Exotic Species

primary spp
Geranium robertianum

secondary spp

Plant Associations	Percent	Pattern
1. TSHE/POMU-BENE	63	Matrix
2. TSHE/BENE	33	Large
3. TSHE/BENE-CHME	4	Small

Note: Old abandoned roads evident in polygon. ALRU/POMU patch is related to a landslide at the bottom

Polygon Number	56
Survey Intensity	2
Observer	DV
Date	6/7/05
Specific Location	small polygon at E end of park, access road from riprap
Total Vegetation	100
Trees Total	85
Dominant Tree Sp	PSME(5), THPL(1),
emergent	10
main canopy	65
subcanopy	10
Shrubs Total	10
Dominant Shrub Sp	
> 1.5' tall	10
< 1.5' tall	0
Graminoids Total	2
Dominant Graminoid Sp	
Graminoids perennial	2
Graminoids annual	0
Forbs Total	30
Dominant Forb Sp	
Forbs perennial	30
Forbs annual	0
Ferns - evergreen	3
Ferns - deciduous	0
Exotics Total	2
Exotics perennial	1
Exotics annual	1
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss-Lichen	10
Litter	90
Logging	3
Stand Age	1
Agriculture	0
Livestock	6
Development	4
Wildlife	3
Recreation Severity	2
Recreation Type	3
Hydrology	3

Exotic Species

primary spp
Lactuca muralis

secondary spp

Plant Associations	Percent	Pattern
---------------------------	----------------	----------------

1. ALRU/POMU

100

Matrix

2.

3.

Note: deciduous after logging; pics

Polygon Number	59
Survey Intensity	1
Observer	PM
Date	5/3/05
Specific Location	forest in NE section of park, above road
Total Vegetation	95
Trees Total	90
Dominant Tree Sp	TSHE 50/PSME
emergent	10
main canopy	70
subcanopy	10
Shrubs Total	15
Dominant Shrub Sp	ACCI, BENE, RUSP,
> 1.5' tall	10
< 1.5' tall	5
Graminoids Total	1
Dominant Graminoid Sp	
Graminoids perennial	1
Graminoids annual	0
Forbs Total	40
Dominant Forb Sp	TITR, CLUN2, VIGL,
Forbs perennial	40
Forbs annual	0
Ferns - evergreen	10
Ferns - deciduous	3
Exotics Total	0
Exotics perennial	0
Exotics annual	0
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss-Lichen	10
Litter	90
Logging	1
Stand Age	6
Agriculture	0
Livestock	0
Development	3
Wildlife	2
Recreation Severity	3
Recreation Type	3
Hydrology	1

Exotic Species

primary spp

secondary spp

Plant Associations

	Percent	Pattern
1. TSHE/POMU-TITR	90	Matrix
2. TSHE/OPHO-ATFI	10	Small
3.		

Note:

Polygon Number	61
Survey Intensity	1
Observer	PM
Date	5/3/05
Specific Location	rock quarry
Total Vegetation	45
Trees Total	35
Dominant Tree Sp	PSME, POTR
emergent	0
main canopy	15
subcanopy	20
Shrubs Total	5
Dominant Shrub Sp	CYSC4, HODI
> 1.5' tall	3
< 1.5' tall	2
Graminoids Total	2
Dominant Graminoid Sp	
Graminoids perennial	2
Graminoids annual	0
Forbs Total	10
Dominant Forb Sp	
Forbs perennial	7
Forbs annual	3
Ferns - evergreen	
Ferns - deciduous	
Exotics Total	15
Exotics perennial	10
Exotics annual	5
Rock Outcrop	5
Gravel	35
Bare Ground	10
Moss-Lichen	5
Litter	45
Logging	1
Stand Age	1
Agriculture	0
Livestock	0
Development	6
Wildlife	0
Recreation Severity	3
Recreation Type	3
Hydrology	1

Exotic Species

- primary spp**
Chrysanthemum leucanthemum
- secondary spp**
Cytisus scoparius

Plant Associations Percent Pattern

- 1. Developed / Disturbed 100 Matrix
- 2.
- 3.

Note: unusual site; lots of rock, signs of cat/excavation activity

Polygon Number 62
Survey Intensity 4

Observer Hans
Date 6/20/05

Specific Location

Total Vegetation

Trees Total

Dominant Tree Sp

emergent

main canopy

subcanopy

Shrubs Total

Dominant Shrub Sp

> 1.5' tall

< 1.5' tall

Graminoids Total

Dominant Graminoid Sp

Graminoids perennial

Graminoids annual

Forbs Total

Dominant Forb Sp

Forbs perennial

Forbs annual

Ferns - evergreen

Ferns - deciduous

Exotics Total

Exotics perennial

Exotics annual

Rock Outcrop

Gravel

Bare Ground

Moss-Lichen

Litter

Logging

Stand Age

Agriculture

Livestock

Development

Wildlife

Recreation Severity

Recreation Type

Hydrology

Exotic Species

primary spp

secondary spp

Plant Associations

Percent

Pattern

1. Water

100

Matrix

2.

3.

Note:

Polygon Number 64
Survey Intensity 4

Observer Hans
Date 6/20/05

Specific Location

Total Vegetation

Trees Total

Dominant Tree Sp

emergent

main canopy

subcanopy

Shrubs Total

Dominant Shrub Sp

> 1.5' tall

< 1.5' tall

Graminoids Total

Dominant Graminoid Sp

Graminoids perennial

Graminoids annual

Forbs Total

Dominant Forb Sp

Forbs perennial

Forbs annual

Ferns - evergreen

Ferns - deciduous

Exotics Total

Exotics perennial

Exotics annual

Rock Outcrop

Gravel

Bare Ground

Moss-Lichen

Litter

Logging

Stand Age

Agriculture

Livestock

Development

Wildlife

Recreation Severity

Recreation Type

Hydrology

Exotic Species

primary spp

secondary spp

Plant Associations

	Percent	Pattern
1. Clear Cut	100	Matrix
2.		
3.		

Note:

Polygon Number	65
Survey Intensity	1
Observer	HS
Date	6/7/05
Specific Location	SE section across river from day-use area
Total Vegetation	100
Trees Total	100
Dominant Tree Sp	ALRU/PSME
emergent	1
main canopy	94
subcanopy	5
Shrubs Total	75
Dominant Shrub Sp	RUSP/ACCI/BENE
> 1.5' tall	65
< 1.5' tall	10
Graminoids Total	2
Dominant Graminoid Sp	
Graminoids perennial	2
Graminoids annual	0
Forbs Total	10
Dominant Forb Sp	SMST, Mianthemum,
Forbs perennial	10
Forbs annual	0
Ferns - evergreen	15
Ferns - deciduous	4
Exotics Total	1
Exotics perennial	1
Exotics annual	0
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss-Lichen	15
Litter	85
Logging	3
Stand Age	2
Agriculture	0
Livestock	0
Development	0
Wildlife	3
Recreation Severity	2
Recreation Type	3
Hydrology	1

Exotic Species

primary spp

secondary spp

Plant Associations	Percent	Pattern
1. ALRU/POMU	90	Matrix
2. TSHE/ACCI-BENE	10	linear
3.		

Note: Pattern 2: linear (along ridge); Photos: 4396-403

Polygon Number	66
Survey Intensity	1
Observer	DV
Date	6/7/05
Specific Location	across the river, east unit floodplain
Total Vegetation	30
Trees Total	10
Dominant Tree Sp	
emergent	0
main canopy	8
subcanopy	2
Shrubs Total	15
Dominant Shrub Sp	
> 1.5' tall	10
< 1.5' tall	5
Graminoids Total	3
Dominant Graminoid Sp	
Graminoids perennial	3
Graminoids annual	0
Forbs Total	2
Dominant Forb Sp	
Forbs perennial	1
Forbs annual	1
Ferns - evergreen	0
Ferns - deciduous	0
Exotics Total	15
Exotics perennial	15
Exotics annual	0
Rock Outcrop	0
Gravel	30
Bare Ground	55
Moss-Lichen	5
Litter	10
Logging	1
Stand Age	1
Agriculture	0
Livestock	6
Development	5
Wildlife	3
Recreation Severity	3
Recreation Type	0
Hydrology	1

Exotic Species

primary spp
Cytisus scoparius
secondary spp

Plant Associations	Percent	Pattern
1. floodplain gravel/sand bar	70	Matrix
2. ALRU/RUSP	30	large patch
3.		

Note:

Polygon Number 67
Survey Intensity 4

Observer Hans
Date 6/20/05
Specific Location

Total Vegetation 60
Trees Total 60
Dominant Tree Sp ALRU
emergent
main canopy 60
subcanopy
Shrubs Total
Dominant Shrub Sp
> 1.5' tall
< 1.5' tall
Graminoids Total
Dominant Graminoid Sp
Graminoids perennial
Graminoids annual
Forbs Total
Dominant Forb Sp
Forbs perennial
Forbs annual
Ferns - evergreen
Ferns - deciduous
Exotics Total
Exotics perennial
Exotics annual
Rock Outcrop
Gravel
Bare Ground
Moss-Lichen
Litter
Logging
Stand Age
Agriculture
Livestock
Development
Wildlife
Recreation Severity
Recreation Type
Hydrology 1

Exotic Species

primary spp

secondary spp

Plant Associations

	Percent	Pattern
1. ALRU/RUSP	95	Matrix
2. floodplain gravel/sand bar	5	small
3.		

Note:

Polygon Number 68
 Survey Intensity 4
 Observer Hans
 Date 6/20/05
 Specific Location
 Total Vegetation 40
 Trees Total 20
 Dominant Tree Sp ALRU
 emergent
 main canopy 20
 subcanopy
 Shrubs Total 20
 Dominant Shrub Sp
 > 1.5' tall 18
 < 1.5' tall 2
 Graminoids Total 3
 Dominant Graminoid Sp
 Graminoids perennial 3
 Graminoids annual
 Forbs Total 3
 Dominant Forb Sp
 Forbs perennial 3
 Forbs annual
 Ferns - evergreen
 Ferns - deciduous
 Exotics Total 10
 Exotics perennial 10
 Exotics annual
 Rock Outcrop
 Gravel 90
 Bare Ground
 Moss-Lichen
 Litter 10
 Logging
 Stand Age
 Agriculture
 Livestock
 Development
 Wildlife
 Recreation Severity
 Recreation Type
 Hydrology 1

Exotic Species

primary spp
 Cytisus scoparius
 secondary spp

Plant Associations Percent Pattern

- 1. floodplain gravel/sand bar
- 2.
- 3.

Note:

Polygon Number	71
Survey Intensity	1
Observer	HS
Date	6/7/05
Specific Location	Along river - mid of park
Total Vegetation	100
Trees Total	95
Dominant Tree Sp	THPL/ACMA/POTR/PISI
emergent	28
main canopy	60
subcanopy	7
Shrubs Total	60
Dominant Shrub Sp	ACCI/RUSP/OPHO
> 1.5' tall	59
< 1.5' tall	1
Graminoids Total	1
Dominant Graminoid Sp	CIAL/Hydrophyllum/Mai
Graminoids perennial	1
Graminoids annual	0
Forbs Total	50
Dominant Forb Sp	
Forbs perennial	50
Forbs annual	0
Ferns - evergreen	30
Ferns - deciduous	5
Exotics Total	0
Exotics perennial	0
Exotics annual	0
Rock Outcrop	0
Gravel	0
Bare Ground	1
Moss-Lichen	3
Litter	96
Logging	1
Stand Age	3
Agriculture	0
Livestock	0
Development	3
Wildlife	3
Recreation Severity	2
Recreation Type	3
Hydrology	1

Exotic Species

primary spp

secondary spp

Plant Associations

	Percent	Pattern
1. TSHE/POMU-TITR	60	Matrix
2. TSHE/OPHO-ATFI	25	Small
3. ALRU/POMU	15	scattered,

Note:

Polygon Number	72
Survey Intensity	1
Observer	PM
Date	5/3/05
Specific Location	POTR, ALRU forest along White River south of Visitor Center
Total Vegetation	97
Trees Total	80
Dominant Tree Sp	(POTR, ALRU, PISI)
emergent	2
main canopy	55
subcanopy	23
Shrubs Total	40
Dominant Shrub Sp	(CYSC4, RILA, BENE,
> 1.5' tall	35
< 1.5' tall	5
Graminoids Total	26
Dominant Graminoid Sp	
Graminoids perennial	25
Graminoids annual	1
Forbs Total	25
Dominant Forb Sp	
Forbs perennial	23
Forbs annual	2
Ferns - evergreen	5
Ferns - deciduous	
Exotics Total	15
Exotics perennial	14
Exotics annual	1
Rock Outcrop	0
Gravel	5
Bare Ground	5
Moss-Lichen	3
Litter	87
Logging	1
Stand Age	2
Agriculture	0
Livestock	0
Development	6
Wildlife	3
Recreation Severity	3
Recreation Type	3
Hydrology	1

Exotic Species

- primary spp**
- Cytisus scoparius
- secondary spp**
- Glecoma hederacea

Plant Associations

	Percent	Pattern
1. ALRU/POMU	100	Matrix
2.		
3.		

Note: trails to power distribution line crosses polygon; Ferns (evergreen): POMU

Polygon Number 73
 Survey Intensity 4
 Observer Hans
 Date 6/20/05
 Specific Location
 Total Vegetation 40
 Trees Total 20
 Dominant Tree Sp ALRU
 emergent
 main canopy 20
 subcanopy
 Shrubs Total 20
 Dominant Shrub Sp
 > 1.5' tall 18
 < 1.5' tall 2
 Graminoids Total 3
 Dominant Graminoid Sp
 Graminoids perennial 3
 Graminoids annual
 Forbs Total 3
 Dominant Forb Sp
 Forbs perennial 3
 Forbs annual
 Ferns - evergreen
 Ferns - deciduous
 Exotics Total 10
 Exotics perennial 10
 Exotics annual
 Rock Outcrop
 Gravel 90
 Bare Ground
 Moss-Lichen
 Litter 10
 Logging
 Stand Age
 Agriculture
 Livestock
 Development
 Wildlife
 Recreation Severity
 Recreation Type
 Hydrology 1

Exotic Species

primary spp
 Cytisus scoparius
 secondary spp

Plant Associations Percent Pattern

1. floodplain gravel/sand bar
- 2.
- 3.

Note:

Polygon Number	75
Survey Intensity	2
Observer	DV
Date	5/2/05
Specific Location	site is in river spring floodway
Total Vegetation	70
Trees Total	35
Dominant Tree Sp	ALRU (35)
emergent	0
main canopy	30
subcanopy	5
Shrubs Total	10
Dominant Shrub Sp	SASI (10)
> 1.5' tall	5
< 1.5' tall	5
Graminoids Total	2
Dominant Graminoid Sp	
Graminoids perennial	2
Graminoids annual	0
Forbs Total	23
Dominant Forb Sp	
Forbs perennial	23
Forbs annual	0
Ferns - evergreen	0
Ferns - deciduous	0
Exotics Total	1
Exotics perennial	1
Exotics annual	0
Rock Outcrop	0
Gravel	10
Bare Ground	10
Moss-Lichen	0
Litter	80
Logging	0
Stand Age	1
Agriculture	0
Livestock	6
Development	5
Wildlife	3
Recreation Severity	0
Recreation Type	0
Hydrology	1

Exotic Species

primary spp
Cirsium arvense
secondary spp

Plant Associations	Percent	Pattern
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1. ALRU/RUSP
- 2.
- 3.

100	Matrix
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Note:

Polygon Number	76
Survey Intensity	2
Observer	DV
Date	5/2/05
Specific Location	site is in river spring floodway
Total Vegetation	70
Trees Total	40
Dominant Tree Sp	ALRU (40)
emergent	0
main canopy	35
subcanopy	5
Shrubs Total	20
Dominant Shrub Sp	SASI (20)
> 1.5' tall	15
< 1.5' tall	5
Graminoids Total	10
Dominant Graminoid Sp	
Graminoids perennial	5
Graminoids annual	5
Forbs Total	5
Dominant Forb Sp	
Forbs perennial	3
Forbs annual	2
Ferns - evergreen	0
Ferns - deciduous	0
Exotics Total	2
Exotics perennial	2
Exotics annual	0
Rock Outcrop	0
Gravel	20
Bare Ground	0
Moss-Lichen	60
Litter	20
Logging	0
Stand Age	1
Agriculture	0
Livestock	6
Development	5
Wildlife	3
Recreation Severity	0
Recreation Type	0
Hydrology	1

Exotic Species

- primary spp**
Cytisus scoparius
- secondary spp**
Hypocharis radicata

Plant Associations

	Percent	Pattern
1. ALRU/RUSP	100	Matrix
2.		
3.		

Note:

Polygon Number	77
Survey Intensity	4
Observer	Hans
Date	6/20/05
Specific Location	
Total Vegetation	40
Trees Total	20
Dominant Tree Sp	ALRU
emergent	
main canopy	20
subcanopy	
Shrubs Total	20
Dominant Shrub Sp	
> 1.5' tall	18
< 1.5' tall	2
Graminoids Total	3
Dominant Graminoid Sp	
Graminoids perennial	3
Graminoids annual	
Forbs Total	3
Dominant Forb Sp	
Forbs perennial	3
Forbs annual	
Ferns - evergreen	
Ferns - deciduous	
Exotics Total	10
Exotics perennial	10
Exotics annual	
Rock Outcrop	
Gravel	90
Bare Ground	
Moss-Lichen	
Litter	10
Logging	
Stand Age	
Agriculture	
Livestock	
Development	
Wildlife	
Recreation Severity	
Recreation Type	
Hydrology	1

Exotic Species

primary spp
Cytisus scoparius
secondary spp

Plant Associations

	Percent	Pattern
1. floodplain gravel/sand bar	100	Matrix
2.		
3.		

Note:

Polygon Number 78
 Survey Intensity 4
 Observer Hans
 Date 6/20/05
 Specific Location
 Total Vegetation 60
 Trees Total 60
 Dominant Tree Sp ALRU
 emergent
 main canopy 60
 subcanopy
 Shrubs Total
 Dominant Shrub Sp
 > 1.5' tall
 < 1.5' tall
 Graminoids Total
 Dominant Graminoid Sp
 Graminoids perennial
 Graminoids annual
 Forbs Total
 Dominant Forb Sp
 Forbs perennial
 Forbs annual
 Ferns - evergreen
 Ferns - deciduous
 Exotics Total
 Exotics perennial
 Exotics annual
 Rock Outcrop
 Gravel
 Bare Ground
 Moss-Lichen
 Litter
 Logging
 Stand Age
 Agriculture
 Livestock
 Development
 Wildlife
 Recreation Severity
 Recreation Type
 Hydrology 1

Exotic Species

primary spp

secondary spp

Plant Associations

	Percent	Pattern
1. ALRU/RUSP	95	Matrix
2. floodplain gravel/sand bar	5	small
3.		

Note:

Polygon Number	84
Survey Intensity	1
Observer	Hans
Date	5/2/05
Specific Location	N of Hwy 410 in W side of Park - flats
Total Vegetation	98
Trees Total	90
Dominant Tree Sp	TSHE
emergent	30
main canopy	30
subcanopy	30
Shrubs Total	25
Dominant Shrub Sp	ACCI
> 1.5' tall	23
< 1.5' tall	2
Graminoids Total	1
Dominant Graminoid Sp	
Graminoids perennial	1
Graminoids annual	
Forbs Total	25
Dominant Forb Sp	MADI
Forbs perennial	24
Forbs annual	1
Ferns - evergreen	25
Ferns - deciduous	4
Exotics Total	1
Exotics perennial	1
Exotics annual	
Rock Outcrop	
Gravel	
Bare Ground	1
Moss-Lichen	59
Litter	40
Logging	2
Stand Age	4
Agriculture	0
Livestock	0
Development	6
Wildlife	3
Recreation Severity	2
Recreation Type	3
Hydrology	2

Exotic Species

primary spp
Galium aparine
secondary spp

Plant Associations	Percent	Pattern
1. TSHE/POMU-TITR	85	Matrix
2. TSHE/OPHO-ATFI	15	Clumped,
3.		

Note: Development is trails and roads.

Polygon Number	86
Survey Intensity	1
Observer	HS
Date	6/8/05
Specific Location	below & E of north central clearcut
Total Vegetation	100
Trees Total	80
Dominant Tree Sp	
emergent	20
main canopy	50
subcanopy	10
Shrubs Total	50
Dominant Shrub Sp	
> 1.5' tall	39
< 1.5' tall	11
Graminoids Total	1
Dominant Graminoid Sp	Melica sp.
Graminoids perennial	1
Graminoids annual	0
Forbs Total	8
Dominant Forb Sp	mixed
Forbs perennial	8
Forbs annual	0
Ferns - evergreen	10
Ferns - deciduous	2
Exotics Total	0
Exotics perennial	0
Exotics annual	0
Rock Outcrop	1
Gravel	0
Bare Ground	1
Moss-Lichen	23
Litter	75
Logging	2
Stand Age	2
Agriculture	0
Livestock	0
Development	0
Wildlife	2
Recreation Severity	0
Recreation Type	0
Hydrology	1

Exotic Species

primary spp

secondary spp

Plant Associations	Percent	Pattern
1. TSHE/GASH-BENE	47	Small
2. TSHE/POMU-BENE	43	Small
3. TSHE/BENE	10	Small

Note: Ferns (evergreen): POMU; Photos: 4464-75; windthrow opening canopy in heavy GASH & BENE

Polygon Number	90
Survey Intensity	1
Observer	Hans
Date	5/2/05
Specific Location	Above tight curve of logging road in W side of Park - N of Hwy 410
Total Vegetation	100
Trees Total	90
Dominant Tree Sp	TSHE
emergent	15
main canopy	65
subcanopy	10
Shrubs Total	15
Dominant Shrub Sp	ACCI
> 1.5' tall	12
< 1.5' tall	3
Graminoids Total	1
Dominant Graminoid Sp	
Graminoids perennial	1
Graminoids annual	
Forbs Total	4
Dominant Forb Sp	MADI
Forbs perennial	3
Forbs annual	1
Ferns - evergreen	40
Ferns - deciduous	2
Exotics Total	1
Exotics perennial	1
Exotics annual	
Rock Outcrop	1
Gravel	
Bare Ground	
Moss-Lichen	20
Litter	79
Logging	2
Stand Age	4
Agriculture	0
Livestock	0
Development	2
Wildlife	3
Recreation Severity	0
Recreation Type	0
Hydrology	2

Exotic Species

primary spp
Digitalis purpurea

secondary spp

Plant Associations	Percent	Pattern
1. TSHE/POMU-BENE	98	Matrix
2. TSHE/POMU-TITR	2	linear
3.		

Note:

Polygon Number	94
Survey Intensity	1
Observer	PM
Date	6/7/05
Specific Location	Polygon on west edge of park, immediately north of road
Total Vegetation	97
Trees Total	90
Dominant Tree Sp	TSHE, PSME, ALRU
emergent	20
main canopy	50
subcanopy	20
Shrubs Total	15
Dominant Shrub Sp	ACCI, RUSP, SARA
> 1.5' tall	4
< 1.5' tall	11
Graminoids Total	0
Dominant Graminoid Sp	
Graminoids perennial	0
Graminoids annual	0
Forbs Total	18
Dominant Forb Sp	
Forbs perennial	18
Forbs annual	0
Ferns - evergreen	55
Ferns - deciduous	5
Exotics Total	1
Exotics perennial	0
Exotics annual	1
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss-Lichen	35
Litter	65
Logging	0
Stand Age	6
Agriculture	0
Livestock	0
Development	0
Wildlife	0
Recreation Severity	3
Recreation Type	3
Hydrology	0

Exotic Species

primary spp

secondary spp

Plant Associations Percent Pattern

1. TSHE/POMU-BENE 100 Matrix

2.

3.

Note: Ferns (evergreen): POMU, BLSP, POGL; (deciduous): DREX; multiage - some old growth - some 30-

Polygon Number	99
Survey Intensity	1
Observer	Hans
Date	5/2/05
Specific Location	NE of logging road entrance in W side of Park (N of Hwy 410)
Total Vegetation	99
Trees Total	85
Dominant Tree Sp	TSHE
emergent	20
main canopy	55
subcanopy	10
Shrubs Total	85
Dominant Shrub Sp	BENE
> 1.5' tall	10
< 1.5' tall	75
Graminoids Total	1
Dominant Graminoid Sp	
Graminoids perennial	1
Graminoids annual	
Forbs Total	3
Dominant Forb Sp	
Forbs perennial	3
Forbs annual	
Ferns - evergreen	5
Ferns - deciduous	1
Exotics Total	
Exotics perennial	
Exotics annual	
Rock Outcrop	1
Gravel	
Bare Ground	
Moss-Lichen	70
Litter	29
Logging	1
Stand Age	3
Agriculture	0
Livestock	0
Development	0
Wildlife	3
Recreation Severity	0
Recreation Type	0
Hydrology	1

Exotic Species

primary spp

secondary spp

Plant Associations	Percent	Pattern
---------------------------	----------------	----------------

- | | | |
|-------------------|----|--------|
| 1. TSHE/BENE | 98 | Matrix |
| 2. TSHE/POMU-BENE | 2 | Small |
| 3. | | |

Note: Stand replacement logging and associated slash fire probable on site - could be reason why there is no

Polygon Number	103
Survey Intensity	2
Observer	DV
Date	5/3/05
Specific Location	
Total Vegetation	40
Trees Total	20
Dominant Tree Sp	(ALRU (15), SASC (5),
emergent	0
main canopy	20
subcanopy	0
Shrubs Total	20
Dominant Shrub Sp	
> 1.5' tall	20
< 1.5' tall	0
Graminoids Total	5
Dominant Graminoid Sp	
Graminoids perennial	2
Graminoids annual	3
Forbs Total	5
Dominant Forb Sp	
Forbs perennial	2
Forbs annual	3
Ferns - evergreen	0
Ferns - deciduous	0
Exotics Total	25
Exotics perennial	20
Exotics annual	5
Rock Outcrop	0
Gravel	20
Bare Ground	10
Moss-Lichen	70
Litter	0
Logging	1
Stand Age	0
Agriculture	0
Livestock	5
Development	5
Wildlife	3
Recreation Severity	3
Recreation Type	0
Hydrology	1

Exotic Species

primary spp

secondary spp

Plant Associations	Percent	Pattern
1. floodplain gravel/sand bar	60	Matrix
2. ALRU/RUSP	40	Large
3.		

Note: Photos: Yes; high water floodway

Polygon Number	104
Survey Intensity	2
Observer	DV
Date	6/7/05
Specific Location	Visitor center area
Total Vegetation	50
Trees Total	50
Dominant Tree Sp	PSME
emergent	0
main canopy	45
subcanopy	5
Shrubs Total	40
Dominant Shrub Sp	
> 1.5' tall	40
< 1.5' tall	0
Graminoids Total	2
Dominant Graminoid Sp	
Graminoids perennial	2
Graminoids annual	0
Forbs Total	5
Dominant Forb Sp	
Forbs perennial	4
Forbs annual	1
Ferns - evergreen	3
Ferns - deciduous	2
Exotics Total	1
Exotics perennial	0
Exotics annual	1
Rock Outcrop	0
Gravel	0
Bare Ground	50
Moss-Lichen	5
Litter	45
Logging	2
Stand Age	2
Agriculture	0
Livestock	6
Development	1
Wildlife	3
Recreation Severity	1
Recreation Type	1
Hydrology	2

Exotic Species

primary spp
Geranium robertianum
secondary spp

Plant Associations	Percent	Pattern
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1. Developed / Disturbed
- 2.
- 3.

100

Matrix

Note: 50% tree cover - the rest is developed

Polygon Number	109
Survey Intensity	2
Observer	Hans
Date	6/8/05
Specific Location	N of Visitors area, S of Hwy 410
Total Vegetation	100
Trees Total	99
Dominant Tree Sp	TSHE/PSME
emergent	6
main canopy	85
subcanopy	8
Shrubs Total	15
Dominant Shrub Sp	BENE/GASH
> 1.5' tall	8
< 1.5' tall	7
Graminoids Total	1
Dominant Graminoid Sp	
Graminoids perennial	1
Graminoids annual	
Forbs Total	20
Dominant Forb Sp	Smilacina stellata,
Forbs perennial	20
Forbs annual	
Ferns - evergreen	5
Ferns - deciduous	1
Exotics Total	
Exotics perennial	
Exotics annual	
Rock Outcrop	
Gravel	
Bare Ground	
Moss-Lichen	40
Litter	60
Logging	2
Stand Age	3
Agriculture	
Livestock	
Development	2
Wildlife	3
Recreation Severity	2
Recreation Type	3
Hydrology	1

Exotic Species

primary spp

secondary spp

Plant Associations

	Percent	Pattern
1. TSHE/POMU-BENE	70	large patch
2. TSHE/POMU-GASH	30	small
3.		

Note:

Polygon Number	113
Survey Intensity	1
Observer	Hans
Date	5/3/05
Specific Location	Just W of visitor's center
Total Vegetation	100
Trees Total	98
Dominant Tree Sp	TSHE/ PSME
emergent	10
main canopy	81
subcanopy	7
Shrubs Total	5
Dominant Shrub Sp	BENE
> 1.5' tall	1
< 1.5' tall	4
Graminoids Total	1
Dominant Graminoid Sp	LUPA
Graminoids perennial	1
Graminoids annual	
Forbs Total	2
Dominant Forb Sp	SMST
Forbs perennial	2
Forbs annual	
Ferns - evergreen	1
Ferns - deciduous	1
Exotics Total	
Exotics perennial	
Exotics annual	
Rock Outcrop	
Gravel	
Bare Ground	
Moss-Lichen	95
Litter	5
Logging	1
Stand Age	1
Agriculture	0
Livestock	0
Development	3
Wildlife	3
Recreation Severity	3
Recreation Type	3
Hydrology	1

Exotic Species

primary spp

secondary spp

Plant Associations	Percent	Pattern
1. TSHE/BENE-CHME	90	Matrix
2. TSHE/BENE	5	Small
3. TSHE/GASH-BENE	5	Small

Note: Even aged stand in self-thinning successional phase - very little understory vegetation.

Polygon Number	115
Survey Intensity	1
Observer	PM
Date	5/3/05
Specific Location	stand south of visitor center parking lot
Total Vegetation	95
Trees Total	95
Dominant Tree Sp	PSME, TSHE
emergent	2
main canopy	90
subcanopy	3
Shrubs Total	80
Dominant Shrub Sp	GASH, BENE, ACCI
> 1.5' tall	50
< 1.5' tall	30
Graminoids Total	1
Dominant Graminoid Sp	
Graminoids perennial	1
Graminoids annual	0
Forbs Total	3
Dominant Forb Sp	CLUN, VIGL
Forbs perennial	3
Forbs annual	0
Ferns - evergreen	3
Ferns - deciduous	0
Exotics Total	1
Exotics perennial	1
Exotics annual	0
Rock Outcrop	0
Gravel	2
Bare Ground	3
Moss-Lichen	50
Litter	45
Logging	2
Stand Age	3
Agriculture	0
Livestock	0
Development	6
Wildlife	3
Recreation Severity	2
Recreation Type	3
Hydrology	1

Exotic Species

- primary spp**
- Glecoma hederacea
- secondary spp**

Plant Associations

	Percent	Pattern
1. TSHE/GASH	50	Large
2. TSHE/GASH-BENE	50	Large
3.		

Note: Ferns: POMU

Polygon Number	116
Survey Intensity	2
Observer	DV
Date	5/3/05
Specific Location	
Total Vegetation	95
Trees Total	90
Dominant Tree Sp	PSME (30), THPL (5)/
emergent	35
main canopy	35
subcanopy	20
Shrubs Total	5
Dominant Shrub Sp	ACCI (4), RILA (1),
> 1.5' tall	5
< 1.5' tall	0
Graminoids Total	1
Dominant Graminoid Sp	
Graminoids perennial	1
Graminoids annual	0
Forbs Total	5
Dominant Forb Sp	ACTR (4)
Forbs perennial	5
Forbs annual	0
Ferns - evergreen	8
Ferns - deciduous	2
Exotics Total	1
Exotics perennial	0
Exotics annual	1
Rock Outcrop	0
Gravel	0
Bare Ground	5
Moss-Lichen	45
Litter	50
Logging	2
Stand Age	4
Agriculture	0
Livestock	6
Development	5
Wildlife	3
Recreation Severity	3
Recreation Type	3
Hydrology	1

Exotic Species

primary spp

secondary spp

Plant Associations	Percent	Pattern
1. TSHE/POMU-BENE	100	Matrix
2.		
3.		

Note: Ferns (evergreen): POMU; (deciduous): GYDR; Photos: Yes

Polygon Number	117
Survey Intensity	1
Observer	HS
Date	6/7/05
Specific Location	W of Visitor Center, just S of 410
Total Vegetation	100
Trees Total	90
Dominant Tree Sp	THPL/TSHE/PISI
emergent	32
main canopy	54
subcanopy	4
Shrubs Total	70
Dominant Shrub Sp	ACCI/OPHO/RUSP
> 1.5' tall	68
< 1.5' tall	2
Graminoids Total	1
Dominant Graminoid Sp	LUCA/CA??
Graminoids perennial	1
Graminoids annual	0
Forbs Total	25
Dominant Forb Sp	Cordalys/Listera sp./SMST
Forbs perennial	24
Forbs annual	1
Ferns - evergreen	5
Ferns - deciduous	5
Exotics Total	0
Exotics perennial	0
Exotics annual	0
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss-Lichen	80
Litter	20
Logging	2
Stand Age	5
Agriculture	0
Livestock	0
Development	6
Wildlife	3
Recreation Severity	2
Recreation Type	3
Hydrology	1

Exotic Species

primary spp

secondary spp

Plant Associations

	Percent	Pattern
1. TSHE/OPHO-ATFI	50	Scattered,
2. TSHE/LYAM	42	Scattered,
3. TSHE/POMU-BENE	8	linear

Note: Ferns (evergreen): POMU; (deciduous): ATFE/Dryopteris

Polygon Number	120
Survey Intensity	1
Observer	Hans
Date	5/2/05
Specific Location	W border N of Hwy 410
Total Vegetation	100
Trees Total	85
Dominant Tree Sp	TSHE
emergent	30
main canopy	30
subcanopy	25
Shrubs Total	15
Dominant Shrub Sp	ACCI
> 1.5' tall	13
< 1.5' tall	2
Graminoids Total	1
Dominant Graminoid Sp	LUPA
Graminoids perennial	1
Graminoids annual	
Forbs Total	10
Dominant Forb Sp	TEGR
Forbs perennial	10
Forbs annual	
Ferns - evergreen	40
Ferns - deciduous	10
Exotics Total	2
Exotics perennial	1
Exotics annual	1
Rock Outcrop	
Gravel	
Bare Ground	
Moss-Lichen	50
Litter	50
Logging	1
Stand Age	4
Agriculture	0
Livestock	0
Development	6
Wildlife	3
Recreation Severity	2
Recreation Type	4
Hydrology	2

Exotic Species

- primary spp**
- Geranium robertianum
- secondary spp**
- Galium aparine

Plant Associations	Percent	Pattern
1. TSHE/POMU-BENE	60	Matrix
2. TSHE/OPHO-ATFI	20	Small
3. TSHE/BENE	20	Small

Note: Development = roads / trails. Big OG trees!

Polygon Number	122
Survey Intensity	1
Observer	PM
Date	6/8/05
Specific Location	south of road, between river & road at west end of park
Total Vegetation	95
Trees Total	90
Dominant Tree Sp	
emergent	33
main canopy	38
subcanopy	19
Shrubs Total	15
Dominant Shrub Sp	
> 1.5' tall	10
< 1.5' tall	5
Graminoids Total	1
Dominant Graminoid Sp	
Graminoids perennial	1
Graminoids annual	0
Forbs Total	15
Dominant Forb Sp	
Forbs perennial	15
Forbs annual	0
Ferns - evergreen	30
Ferns - deciduous	20
Exotics Total	0
Exotics perennial	0
Exotics annual	0
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss-Lichen	30
Litter	70
Logging	2
Stand Age	4
Agriculture	0
Livestock	0
Development	0
Wildlife	0
Recreation Severity	3
Recreation Type	3
Hydrology	0

Exotic Species

primary spp

secondary spp

Plant Associations	Percent	Pattern
1. TSHE/POMU-TITR	60	Matrix
2. TSHE/TITR-GYDR	35	Large
3. TSHE/POMU-BENE	5	Small

Note: Ferns (evergreen): POMU, POGL; (deciduous): ATFI, DREX; exotics along road, but not included in

Polygon Number	123
Survey Intensity	2
Observer	DV
Date	5/2/05
Specific Location	
Total Vegetation	100
Trees Total	70
Dominant Tree Sp	TSHE (35), PSME (35)
emergent	5
main canopy	60
subcanopy	5
Shrubs Total	10
Dominant Shrub Sp	
> 1.5' tall	5
< 1.5' tall	5
Graminoids Total	2
Dominant Graminoid Sp	
Graminoids perennial	2
Graminoids annual	0
Forbs Total	30
Dominant Forb Sp	
Forbs perennial	25
Forbs annual	5
Ferns - evergreen	8
Ferns - deciduous	2
Exotics Total	2
Exotics perennial	0
Exotics annual	2
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss-Lichen	10
Litter	90
Logging	3
Stand Age	2
Agriculture	6
Livestock	6
Development	2
Wildlife	2
Recreation Severity	3
Recreation Type	1
Hydrology	1

Exotic Species

primary spp
Geranium robertianum
secondary spp

Plant Associations	Percent	Pattern
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1. TSHE/POMU-BENE
- 2.
- 3.

100

Matrix

Note: Ferns (evergreen): POMU

Polygon Number	124
Survey Intensity	2
Observer	DV
Date	5/3/05
Specific Location	
Total Vegetation	100
Trees Total	80
Dominant Tree Sp	PSME (35), TSHE (35)
emergent	20
main canopy	50
subcanopy	10
Shrubs Total	20
Dominant Shrub Sp	ACCI (5), VAPA (5)
> 1.5' tall	20
< 1.5' tall	0
Graminoids Total	2
Dominant Graminoid Sp	
Graminoids perennial	2
Graminoids annual	0
Forbs Total	25
Dominant Forb Sp	MIDI (10), VIGL (5)
Forbs perennial	25
Forbs annual	0
Ferns - evergreen	10
Ferns - deciduous	2
Exotics Total	2
Exotics perennial	0
Exotics annual	2
Rock Outcrop	0
Gravel	0
Bare Ground	5
Moss-Lichen	40
Litter	55
Logging	2
Stand Age	4
Agriculture	0
Livestock	6
Development	5
Wildlife	3
Recreation Severity	3
Recreation Type	3
Hydrology	1

Exotic Species

primary spp

secondary spp

Plant Associations	Percent	Pattern
1. TSHE/POMU-BENE	100	Matrix
2.		
3.		

Note: Ferns (evergreen): POMU; (deciduous): GYDR; many trees > 3' DBH

Polygon Number	126
Survey Intensity	1
Observer	PM
Date	6/7/05
Specific Location	on trail through park
Total Vegetation	100
Trees Total	85
Dominant Tree Sp	THPL, TSHE, PISI,
emergent	30
main canopy	30
subcanopy	25
Shrubs Total	80
Dominant Shrub Sp	ACCI, OPHO
> 1.5' tall	70
< 1.5' tall	10
Graminoids Total	0
Dominant Graminoid Sp	
Graminoids perennial	0
Graminoids annual	0
Forbs Total	30
Dominant Forb Sp	MADI, DIFO, LYAM,
Forbs perennial	30
Forbs annual	0
Ferns - evergreen	8
Ferns - deciduous	15
Exotics Total	0
Exotics perennial	0
Exotics annual	0
Rock Outcrop	0
Gravel	0
Bare Ground	
Moss-Lichen	
Litter	
Logging	0
Stand Age	4
Agriculture	0
Livestock	0
Development	0
Wildlife	0
Recreation Severity	3
Recreation Type	3
Hydrology	0

Exotic Species

primary spp

secondary spp

Plant Associations	Percent	Pattern
1. TSHE/OPHO-ATFI	60	Matrix
2. TSHE/TITR-GYDR	35	Small
3. TSHE/LYAM	5	Small

Note: Ferns (evergreen): POMU; (deciduous): ATFE, DREX, GYDR; moderate variability understory cover;

Polygon Number	127
Survey Intensity	1
Observer	Hans
Date	5/2/05
Specific Location	N of Hwy 410 in middle of Park
Total Vegetation	100
Trees Total	98
Dominant Tree Sp	TSHE
emergent	20
main canopy	60
subcanopy	18
Shrubs Total	20
Dominant Shrub Sp	ACCI
> 1.5' tall	15
< 1.5' tall	5
Graminoids Total	1
Dominant Graminoid Sp	
Graminoids perennial	1
Graminoids annual	
Forbs Total	20
Dominant Forb Sp	HYTE
Forbs perennial	18
Forbs annual	2
Ferns - evergreen	15
Ferns - deciduous	7
Exotics Total	1
Exotics perennial	1
Exotics annual	
Rock Outcrop	
Gravel	
Bare Ground	
Moss-Lichen	45
Litter	55
Logging	2
Stand Age	4
Agriculture	0
Livestock	0
Development	6
Wildlife	3
Recreation Severity	2
Recreation Type	3
Hydrology	2

Exotic Species

primary spp
Geranium robertianum

secondary spp

Plant Associations	Percent	Pattern
1. TSHE/POMU-BENE	80	Matrix
2. TSHE/OPHO-ATFI	15	Clumped,
3. TSHE/LYAM	5	Small

Note: Development is trails and roads.

Polygon Number	128
Survey Intensity	1
Observer	Hans
Date	5/2/05
Specific Location	On hill above Hwy 410 - W side of Park
Total Vegetation	100
Trees Total	90
Dominant Tree Sp	PSME
emergent	1
main canopy	80
subcanopy	9
Shrubs Total	45
Dominant Shrub Sp	BENE
> 1.5' tall	3
< 1.5' tall	42
Graminoids Total	1
Dominant Graminoid Sp	
Graminoids perennial	1
Graminoids annual	
Forbs Total	1
Dominant Forb Sp	
Forbs perennial	1
Forbs annual	
Ferns - evergreen	2
Ferns - deciduous	1
Exotics Total	1
Exotics perennial	1
Exotics annual	
Rock Outcrop	1
Gravel	
Bare Ground	
Moss-Lichen	3
Litter	96
Logging	3
Stand Age	1
Agriculture	0
Livestock	0
Development	2
Wildlife	3
Recreation Severity	3
Recreation Type	0
Hydrology	1

Exotic Species

primary spp

secondary spp

Plant Associations	Percent	Pattern
1. TSHE/BENE	93	Matrix
2. TSHE/GASH-BENE	5	Small
3. TSHE/ACCI-BENE	2	Small

Note: Old abandoned road evident in polygon

Polygon Number	129
Survey Intensity	1
Observer	HS, DV
Date	5/3/05
Specific Location	
Total Vegetation	60
Trees Total	10
Dominant Tree Sp	PSME
emergent	1
main canopy	8
subcanopy	1
Shrubs Total	32
Dominant Shrub Sp	AMAL-LOCI-HODI-
> 1.5' tall	25
< 1.5' tall	7
Graminoids Total	3
Dominant Graminoid Sp	Holcus sp.
Graminoids perennial	3
Graminoids annual	0
Forbs Total	12
Dominant Forb Sp	GAAP2, Fragaria sp.
Forbs perennial	10
Forbs annual	2
Ferns - evergreen	1
Ferns - deciduous	2
Exotics Total	1
Exotics perennial	0
Exotics annual	1
Rock Outcrop	10
Gravel	0
Bare Ground	0
Moss-Lichen	70
Litter	20
Logging	2
Stand Age	1
Agriculture	0
Livestock	0
Development	0
Wildlife	0
Recreation Severity	0
Recreation Type	0
Hydrology	1

Exotic Species

primary spp

secondary spp

Cerastium sp.

Plant Associations

	Percent	Pattern
1. Bed Rock Cliff - Rock Outcrop	95	Small
2. TSHE/GASH-BENE	5	Small
3.		

Note:

Polygon Number	213	
Survey Intensity	1	
Observer	PM	
Date	5/3/05	
Specific Location	forest and picnic area east of (?) from visitor center	
Total Vegetation	99	
Trees Total	97	
Dominant Tree Sp	PSME, TSHE, THPL	
emergent	5	
main canopy	85	
subcanopy	7	
Shrubs Total	25	
Dominant Shrub Sp	ACCI, BENE	
> 1.5' tall	20	
< 1.5' tall	5	
Graminoids Total	1	
Dominant Graminoid Sp		
Graminoids perennial	1	
Graminoids annual	0	
Forbs Total	60	
Dominant Forb Sp	SMST, ACTR, MYDI,	
Forbs perennial	60	
Forbs annual	0	
Ferns - evergreen	5	
Ferns - deciduous	3	
Exotics Total	1	
Exotics perennial	0	
Exotics annual	1	
Rock Outcrop	0	
Gravel	5	
Bare Ground	2	
Moss-Lichen	10	
Litter	83	
Logging	2	
Stand Age	6	
Agriculture	0	
Livestock	0	
Development	6	
Wildlife	3	
Recreation Severity	2	
Recreation Type	4	
Hydrology	1	

Exotic Species

primary spp

secondary spp

Plant Associations	Percent	Pattern
1. TSHE/ACCI-BENE	100	Matrix
2.		
3.		

Note: Ferns (evergreen): POMU, DREX; picnic area, roads and trails in area

Polygon Number	214
Survey Intensity	1
Observer	PM
Date	6/7/05
Specific Location	along trail through park
Total Vegetation	100
Trees Total	85
Dominant Tree Sp	TSHE, PISI, PSME,
emergent	30
main canopy	30
subcanopy	25
Shrubs Total	65
Dominant Shrub Sp	ACCI, RUSP, OPHO,
> 1.5' tall	60
< 1.5' tall	5
Graminoids Total	0
Dominant Graminoid Sp	
Graminoids perennial	0
Graminoids annual	0
Forbs Total	35
Dominant Forb Sp	DIFO, TITR
Forbs perennial	35
Forbs annual	0
Ferns - evergreen	10
Ferns - deciduous	10
Exotics Total	0
Exotics perennial	0
Exotics annual	0
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss-Lichen	10
Litter	90
Logging	0
Stand Age	4
Agriculture	0
Livestock	0
Development	0
Wildlife	0
Recreation Severity	3
Recreation Type	3
Hydrology	0

Exotic Species

primary spp

secondary spp

Plant Associations

	Percent	Pattern
1. TSHE/OPHO-ATFI	50	Large
2. TSHE/POMU-BENE	50	Large
3.		

Note: Ferns (evergreen): POMU; (deciduous): ATFI; quite variable understory cover; trail through but no

Polygon Number	216
Survey Intensity	2
Observer	DV
Date	6/8/05
Specific Location	S side of river, W unit, bar along river
Total Vegetation	50
Trees Total	7
Dominant Tree Sp	ALRU
emergent	0
main canopy	7
subcanopy	0
Shrubs Total	33
Dominant Shrub Sp	CYSC
> 1.5' tall	22
< 1.5' tall	11
Graminoids Total	5
Dominant Graminoid Sp	
Graminoids perennial	3
Graminoids annual	2
Forbs Total	5
Dominant Forb Sp	
Forbs perennial	3
Forbs annual	2
Ferns - evergreen	0
Ferns - deciduous	0
Exotics Total	32
Exotics perennial	30
Exotics annual	2
Rock Outcrop	0
Gravel	30
Bare Ground	50
Moss-Lichen	10
Litter	10
Logging	1
Stand Age	1
Agriculture	0
Livestock	6
Development	5
Wildlife	3
Recreation Severity	3
Recreation Type	0
Hydrology	1

Exotic Species

primary spp
Cytisus scoparius

secondary spp

Plant Associations

	Percent	Pattern
1. ALRU/RUSP	100	Matrix
2.		
3.		

Note:

Polygon Number	250
Survey Intensity	2
Observer	Hans
Date	6/8/05
Specific Location	logged area Northwestern area of park
Total Vegetation	100
Trees Total	98
Dominant Tree Sp	PSME
emergent	0
main canopy	98
subcanopy	0
Shrubs Total	89
Dominant Shrub Sp	GASH
> 1.5' tall	88
< 1.5' tall	1
Graminoids Total	1
Dominant Graminoid Sp	
Graminoids perennial	1
Graminoids annual	
Forbs Total	3
Dominant Forb Sp	
Forbs perennial	3
Forbs annual	
Ferns - evergreen	3
Ferns - deciduous	2
Exotics Total	
Exotics perennial	
Exotics annual	
Rock Outcrop	1
Gravel	
Bare Ground	1
Moss-Lichen	49
Litter	49
Logging	4
Stand Age	1
Agriculture	0
Livestock	0
Development	0
Wildlife	3
Recreation Severity	0
Recreation Type	0
Hydrology	1

Exotic Species

primary spp

secondary spp

Plant Associations

	Percent	Pattern
1. TSHE/POMU-GASH	96	matrix
2. TSHE/GASH-BENE	2	along
3. TSHE/ACCI-BENE	2	along

Note: