Rare Plant and Vegetation Survey of Seaquest State Park

Pacific Biodiversity Institute

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December 2006

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Recommended Citation

Smith, H.M. IV and P.H. Morrison. 2006. Rare Plant and Vegetation Survey of Seaquest State Park. Pacific Biodiversity Institute, Winthrop, Washington. 88 p.

Acknowledgements

The photographs in this report are by Hans Smith. Juliet Rhodes completed the data entry and worked on checking data integrity. LeChi Huynh, a conservation science intern at Pacific Biodiversity Institute, edited the report.

Project Funding

This project was conducted under a contract with the Washington State Parks and Recreation Commission.

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Introduction

Under contract with the Washington State Parks and Recreation Commission Seaquest State Park, located in Cowlitz County, was surveyed for rare plant occurrences and mapped according to vegetation communities by Pacific Biodiversity Institute (PBI). Vegetation data was collected for all the mapped vegetation types. This report summarizes the activities and findings of the contracted work.

Survey Routes

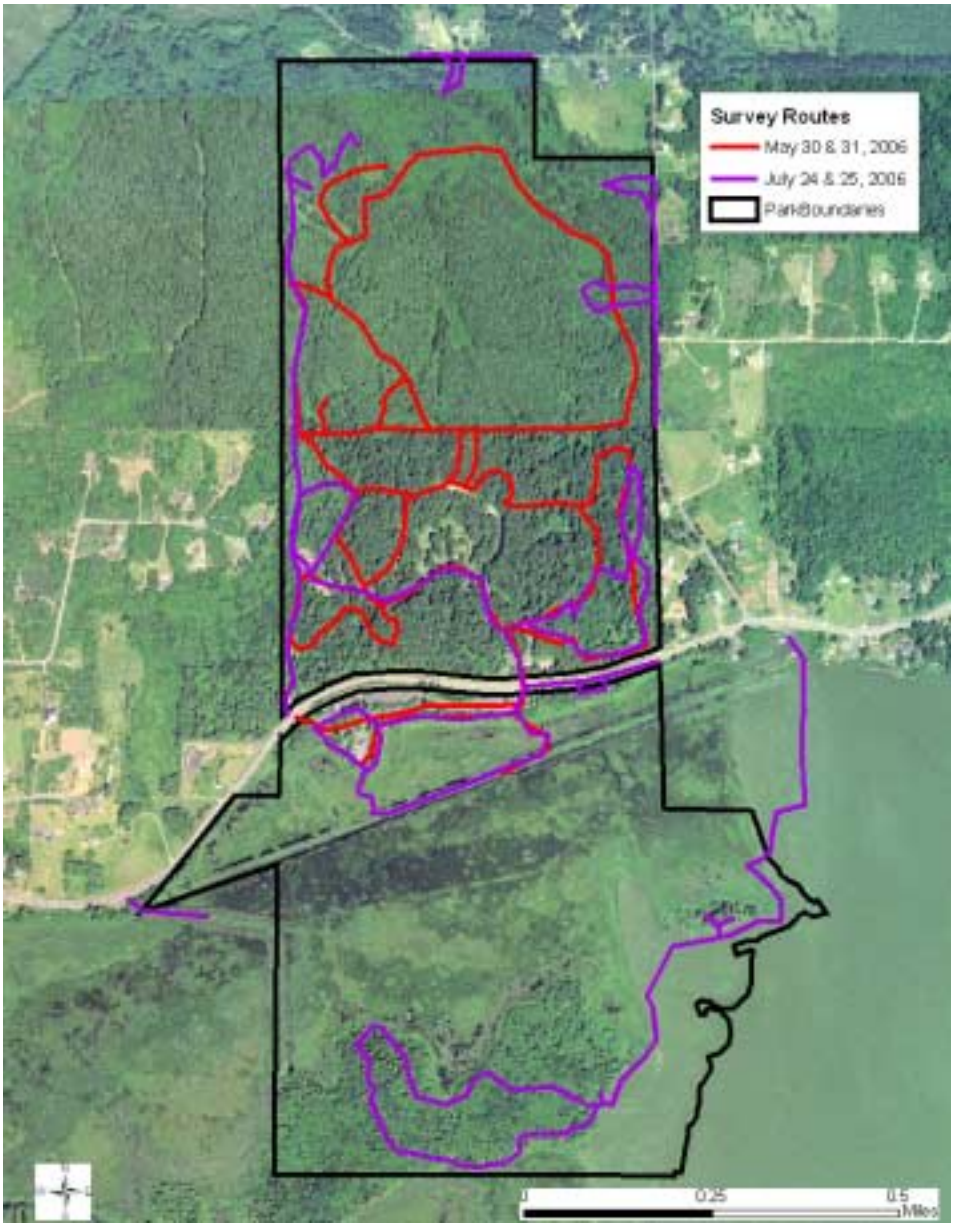

Figure 1. Survey routes for the vegetation community mapping and rare and endangered plant surveys conducted by PBI in 2006.

Vegetation Communities

Methods

Vegetation communities within Seaquest State Park were delineated and classified using a combination of field survey and remote sensing techniques. We relied on descriptions from the Washington State Department of Natural Resources (WADNR) late-seral forested plant associations of the Puget Lowland (Chappell 2004), and freshwater wetland vegetation (Kunze 1994). In some cases, the WADNR descriptions were not adequate in describing existing vegetation associations. In these cases, alternative vegetation communities or plant associations were created by PBI or found in alternative reference material.

Remote sensing techniques consisted of manually delineating plant associations or mosaics of plant associations in a digital environment. We reviewed orthorectified aerial photography from the 1990s and recent ASTER and LANDSAT Thematic Mapper satellite images for discernable vegetation or landform patterns. We also used high resolution true color ortho-rectified aerial photography obtained from Washington Department of Natural Resources through Washington Department of Fish and Wildlife. Topographic maps, and digital elevation models (DEMs) were also employed to assist the process of vegetation community delineation. The 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 vegetation polygon layers were done by hand on hardcopy maps in the field, and later edited digitally in a GIS.

Results

We mapped and surveyed 37 vegetation community polygons, comprised of 16 vegetation community types, within Seaquest State Park. Vegetation community polygons are either stand-alone plant associations or mosaics of multiple plant associations. Table 1 lists the plant associations and/or cover types found in Seaquest State Park. See Appendix B for interpretation of "Status" codes. Figures 2 through 5 illustrate the location of the vegetation community polygons. Note that Figure 3 only shows the primary plant associations in each polygon (PA1 in the database). A printout of the complete set of data we collected for each polygon is attached in Appendix D. The ecological condition of each polygon was evaluated according to a simple ranking system described in Appendix C.

Table 1. Vegetation Community Types Encountered in Seaquest State Park.

Abbreviation	Association Name	English Name	Reference	Status
ALRU2/POMU	*Alnus rubra / Polystichum munitum*	red alder / sword fern	Chappell 2004	G4S4
ALRU2/RUSP c.t.	*Alnus rubra / Rubus spectabilis* community type	red alder / salmonberry community type	Kunze 1994	G4G5
CACU5/Sphagnum sp. c.t.	*Carex cusickii / Sphagnum sp.* community type	Cusick's sedge / sphagnum sp. community type	Kunze 1994	G1G2
CASI3 c.t.	*Carex sitchensis* community type	water sedge community type	Kunze 1994	G4
FRLA/CAOB3 c.t.	*Fraxinus latifolia / Carex obnupta* community type	Oregon ash / slough sedge community type	Kunze 1994	G4
Mixed Shrub Undescribed			Chappell 2004	
NUPO2 c.t.	*Nuphar polysepala* community type	pond-lily community type	Kunze 1994	G5
PSME-ABGR/COCO6/POMU	*Pseudotsuga menziesii – Abies grandis / Corylus cornuta / Polystichum munitum*	Douglas-fir – grand fir / California hazelnut / sword fern	Chappell 2004	G3S3
PSME-TSHE/GASH/POMU	*Pseudotsuga menziesii - Tsuga heterophylla / Gaultheria shallon / Polystichum munitum*	Douglas-fir - western hemlock / salal / sword fern	Chappell 2004	G4
PSME-TSHE/GASH-MANE2	*Pseudotsuga menziesii - Tsuga heterophylla / Gaultheria shallon / Mahonia nervosa*	Douglas-fir - western hemlock / salal / dwarf Oregongrape	Chappell 2004	G4S4
Salix sp. c.t.	*Salix sp.*community type	willow community type	Kunze 1994	
SPDO c.t.	*Spiraea douglasii* community type	rose spirea community type	Kunze 1994	G5
SPDO/Sphagnum sp. c.t.	*Spiraea douglasii / Sphagnum sp.*community type	rose spirea / sphagnum sp. community type	Kunze 1994	G3S3
TSHE-PSME/POMU-DREX2	*Tsuga heterophylla - Pseudotsuga menziesii / Polystichum munitum - Dryopteris expansa*	western hemlock - Douglas-fir / sword fern - spreading woodfern	Chappell 2004	G3S3
developed				
Water				

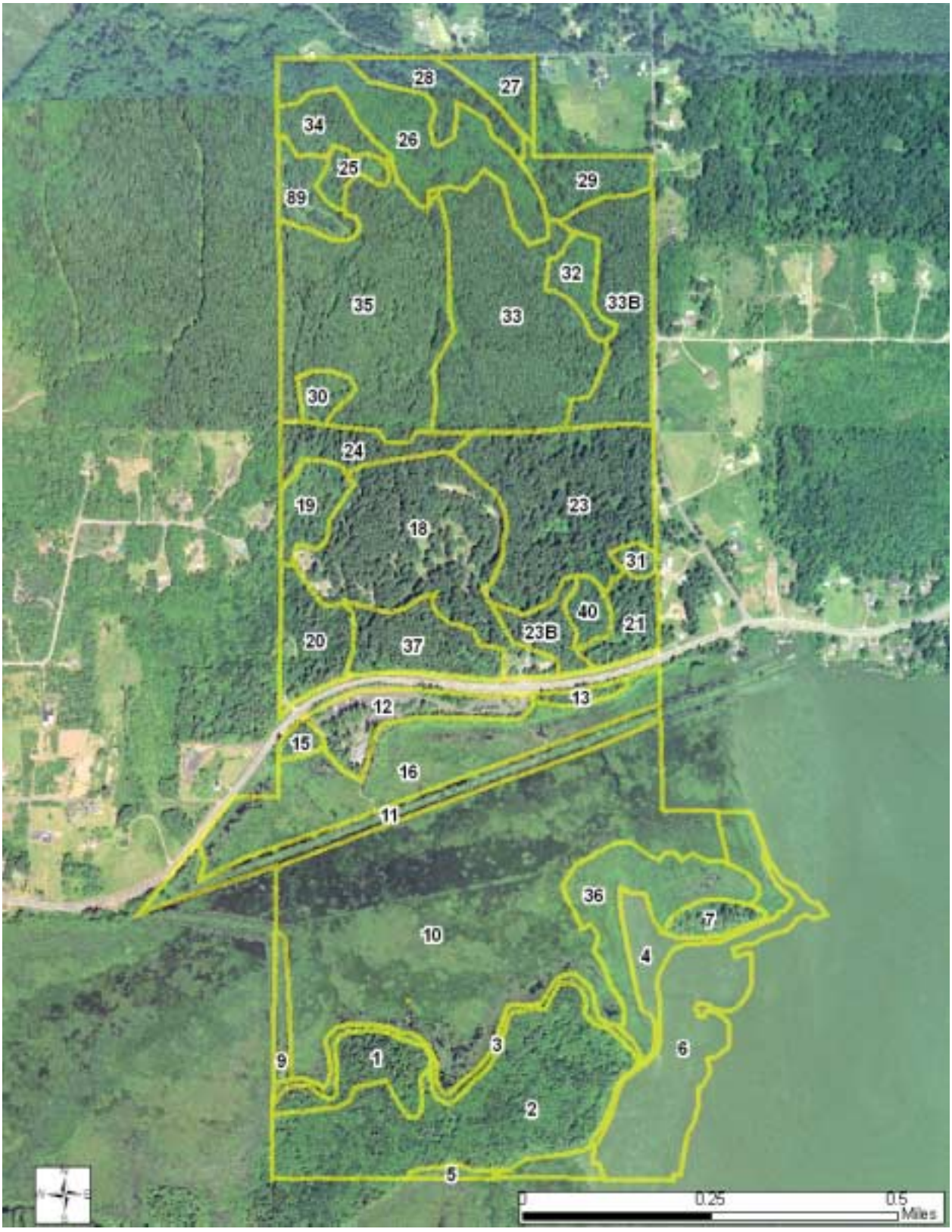

Figure 2. Layout of the vegetation community polygons overlaying a high resolution color aerial photograph.

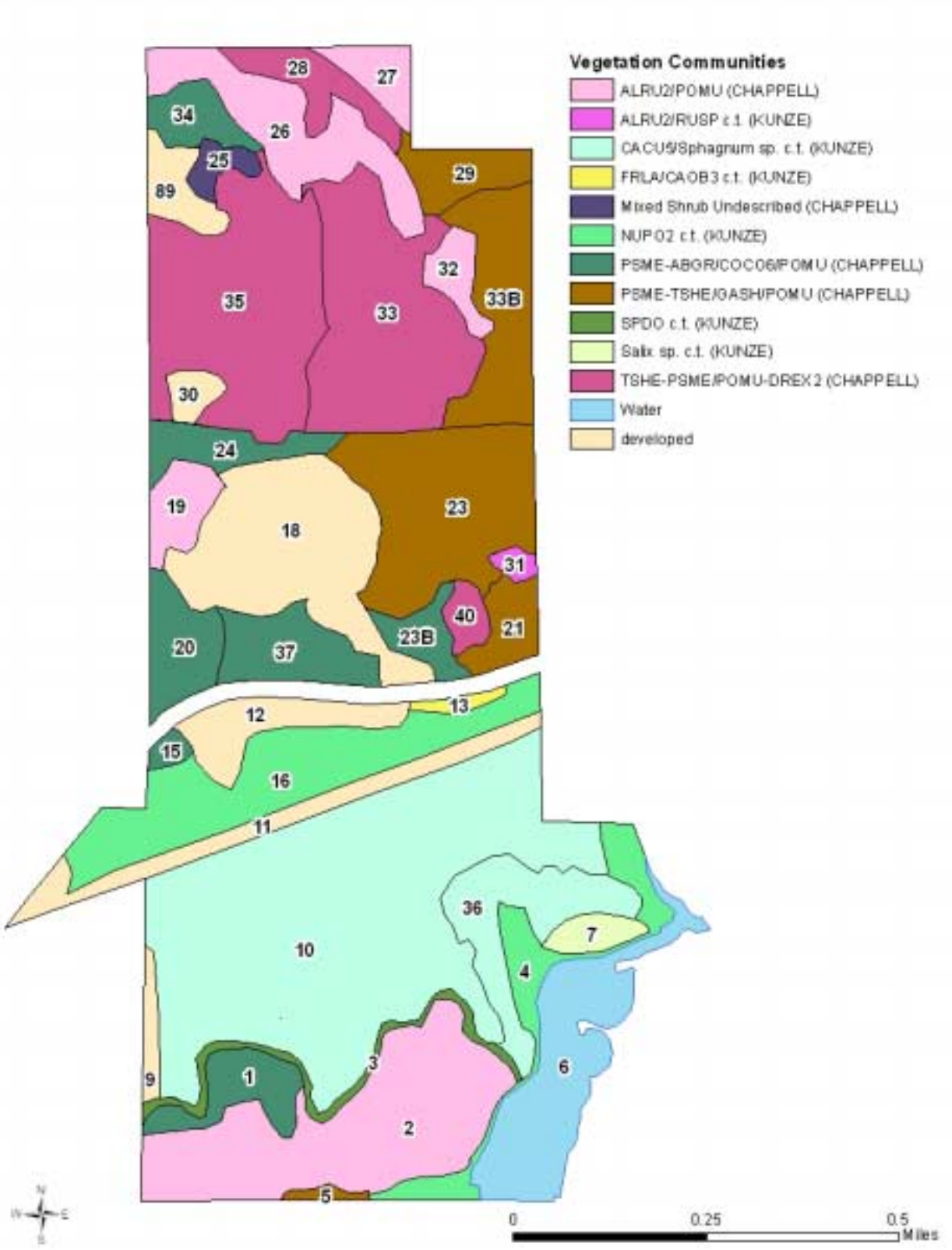

Figure 3. The primary vegetation community types within Seaquest State Park.

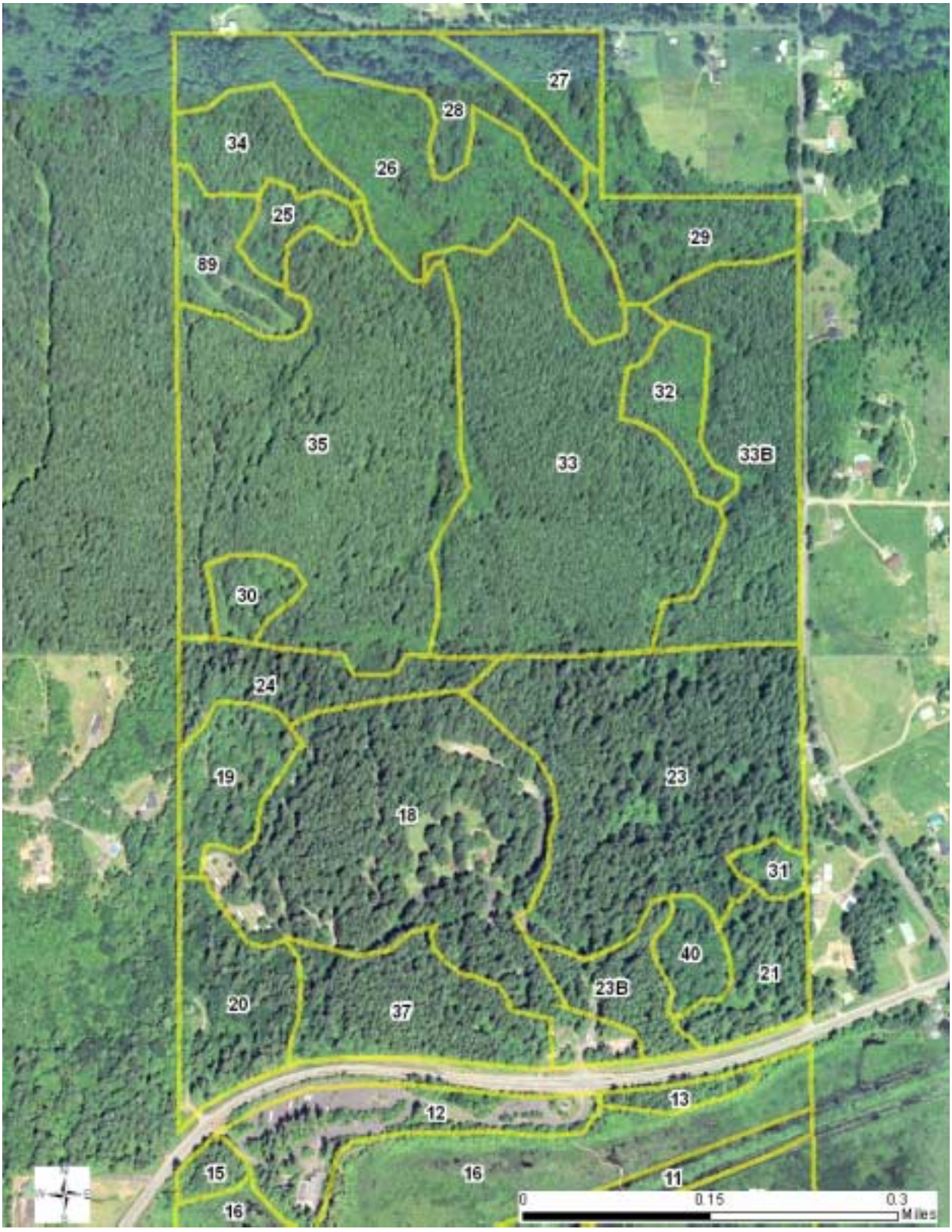

Figure 4. Layout of the vegetation community polygons in the northern portion of the park.

Figure 5. Layout of the vegetation community polygons in the southern portion of the park.

Examples of Vegetation Community Types

Alnus rubra / Polystichum munitum forest (ALRU2/POMU)

The ALRU2/POMU plant association is very common on old clearcut sites in the Puget Trough. The prevalence of this community in the northern section of the park and on the large island in the south side of the park illustrates the historical logging practices that took place on much of the land prior to establishment of the park. In some patches of this community, conifer regeneration appears to be slowly taking place, while in other areas, no conifer regeneration is apparent.

Alnus rubra / Rubus spectabilis community type (ALRU2/RUSP c.t.)

This plant association occurs in some of the upland drainages of the park. ALRU2/RUSP c.t. is a wetland community typically associated with seasonally flooded or saturated soils. Like ALRU2/POMU, it is common in previously logged areas, and is quite common in the Puget Trough.

Carex cusickii / Sphagnum sp. community type (CACU5/*Sphagnum sp*. c.t.)

This is a dominant matrix plant association within the large lake-margin wetlands in the southern part of the park. Within this association, thick mats of buckbean (*Menyanthes trifoliata*) extend out into the open water of Silver Lake, providing a support structure around which *Sphagnum spp*. grow. Large scattered patches of *Carex cusickii* occur within the sprawling mats of buckbean, and other *Sphagnum* community types as well as minerotrophic wetland community types occur as patches within the buckbean mat matrix. Nearer to the shoreline, *Carex cusickii* and *Carex sitchensis* become more dominant than *Menyanthes trifoliata*, and other species such *Cicuta douglasii* and *Galium trifidum* become more prevalent. The *Carex cusickii*/*Sphagnum sp*. c.t. is ecotonal between sphagnum bogs and minerotrophic wetlands.

Carex sitchensis community type (CASI3 c.t.)

This wetland plant association occurs in small patches along the lakeshore and out into shallow water in the large wetland complex in the south part of the park. Many of the same plants that occur in the other wetland associations occur within this plant association as well. This association tends to mosaic seamlessly with the matrix *Carex cusickii* /*Sphagnum sp*. c.t.

Fraxinus latifolia / Carex obnupta community type (FRLA/CAOB3 c.t.)

This is a typical wetland community found in the southern wetland complex of the park, where the upland forests meet the lakeshore. A thin band of *Fraxinus latifolia/Carex obnupta* c.t. rings the lake shore in most places, sometimes not more that three meters wide. *Fraxinus latifolia* is the dominant tree in this community and *Carex obnupta* covers the understory, although upland and wetland shrubs such as *Mahonia nervosa, Gaultheria shallon*, or *Spiraea douglasii* encroach into this community from the surrounding vegetation community patches.

Mixed Shrub Undescribed

A few small patches of thick shrubs, dominated by salal (*Gaultheria shallon*) and lacking a significant tree canopy, occur within the upland forest matrix along the western boundary of the park. These shrub-dominated areas are probably the biological remnants of a localized disturbance that removed the overstory trees and prevented a new cohort from establishing. Such a disturbance could be a log landing and loading site where big machinery and large logs compacted the soil over time, limiting the ability of trees to become established after site abandonment.

Nuphar polysepala community type (NUPO2 c.t.)

This plant association occurs between the *Carex cusickii*/*Sphagnum sp*. c.t. matrix and the non-vegetated open water in the deeper regions of Silver Lake. It is characterized by the monotypic occurrence of yellow pond-lily (*Nuphar polysepala*). Nearer to the *Carex cusickii*/*Sphagnum sp*. c.t. matrix, the cover of yellow pond-lily may be near 90%, whereas nearer to the non-vegetated open water the cover may drop to around 5%.

Pseudotsuga menziesii – Abies grandis / Corylus cornuta / Polystichum munitum forest (PSME-ABGR/COCO6/POMU)

This plant association mostly occurs around the west and south sides of the park's forested campgrounds. Little to no western hemlock (*Tsuga heterophylla*) or western red cedar (*Thuja plicata*) occur within this plant association, and grand fir (*Abies grandis*) is the dominant regeneration in the understory. Some patches of this plant association have very large old Douglas-fir trees, and these stands are much older than the mid-successional stands that dominate the northern section of the park.

Pseudotsuga menziesii - Tsuga heterophylla / Gaultheria shallon / Polystichum munitum forest (PSME-TSHE/GASH/POMU)

This is a common plant association in the eastern half of the upland forested portion of Seaquest State Park. Western red cedar (*Thuja plicata*) and Western hemlock (*Tsuga heterophylla*) are more common tree components in patches of this association, and salal (*Gaultheria shallon*) occurs throughout the understory mixing in with the typically dominant sword fern (*Polystichum munitum*). Some late-successional patches of this community occur around the east side of the park's forested campgrounds. It is in one of these late-successional patches that a small group of the critically endangered Western wahoo (*Euonymus occidentale*) occurs.

Pseudotsuga menziesii - Tsuga heterophylla / Gaultheria shallon / Mahonia nervosa forest (PSME-TSHE/GASH-MANE2)

Only one small patch of this plant association occurs within the park. The smaller island on the east side of the large wetland complex is dominated by this plant association at its highest points. It appeared at the time of our surveys that at least one bald eagle was nesting in this forest patch.

Salix sp. community type (Salix sp. c.t.)

Small clumps and patches of *Salix sp.* shrublands permeate the large wetland complex in the south part of the park, especially near the shoreline on the water side of the *Fraxinus latifolia/Carex obnupta* community type. Willow species commonly occurring in the wetlands are *Salix scouleriana* and *Salix sitchensis*.

Spiraea douglasii community type (SPDO c.t.) and *Spiraea douglasii / Sphagnum sp.* community type (SPDO / Sphagnum sp. c.t.)

These two wetland communities can be difficult to decipher from each other in the large wetland complex in the south part of Seaquest State Park. Both the sphagnum bog and minerotrophic wetland types are dominated by *Spiraea douglasii* and contain many of the same associated wetland species. The presence of *Sphagnum spp.* and the seasonal interaction of a particular patch with minerotrophic water dictate the final community classification. In general, large patches of *Spiraea douglasii* occurring away from the shoreline and surrounded by the *Carex cusickii* /*Sphagnum sp*. c.t. matrix will fall into the *Spiraea douglasii*/*Sphagnum sp*. c.t. association. Along the shorelines and artificial berms within the wetland complex, patches of *Spiraea douglasii* fall into the *Spiraea douglasii* c.t. association.

Tsuga heterophylla - Pseudotsuga menziesii / Polystichum munitum - Dryopteris expansa forest (TSHE-PSME/POMU-DREX2)

This plant association is typically associated with heavily logged areas and regenerating forests within Seaquest State Park. Most of the mature and late-successional forests in the park are of other conifer dominated plant associations. The abundance of the *Tsuga heterophylla - Pseudotsuga menziesii / Polystichum munitum - Dryopteris expansa* plant association in the young forests of this park begs the question as to whether the severe disturbances related to historic logging resulted in type conversion. Thus, the extent of this plant association may have increased in the park while other conifer types may have decreased. Most of the forests in the northern portion of the park are of an even-age cohort dominated by Douglas-fir (*Pseudotsuga menziesii*) in an early stem-seclusion successional phase. The plant species diversity in these areas is some of the lowest in the park, though species diversity will dramatically increase as late-successional phases develop.

Rare Plant Surveys

Methods

We visited Seaquest State Park multiple times during the 2006 field season to conduct a rare plant survey. We used the Washington Department of Natural Resources Natural Heritage Program's (DNR NHP) rare plant list to determine the conservation status of vascular plants encountered in the field. When a plant from the DNR NHP list was located, we used the standard DNR NHP rare plant sighting form to complete field descriptions for the observation. These forms are attached as Appendix E to this report.

Field surveys were conducted on May 30 and 31, and July 24 and 25, 2006. During the field surveys, 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 (Figure 1).

Results

Rare Plants

We located two vascular plants currently listed in the WA DNR NHP rare plant list within Seaquest State Park. The locations of these plants and photos of the specimens are illustrated in Figures 6 – 8. See Appendix E for a full printout of the DNR NHP field sighting forms. See Appendix B for definitions of Status codes.

Species	**Common Name**	**Status**
Euonymus occidentale Nutt. ex Torr.	western burning bush	G5-S1-T
Hydrocotyle ranunculoides L. f.	floating marshpennywort	G5-S2-S

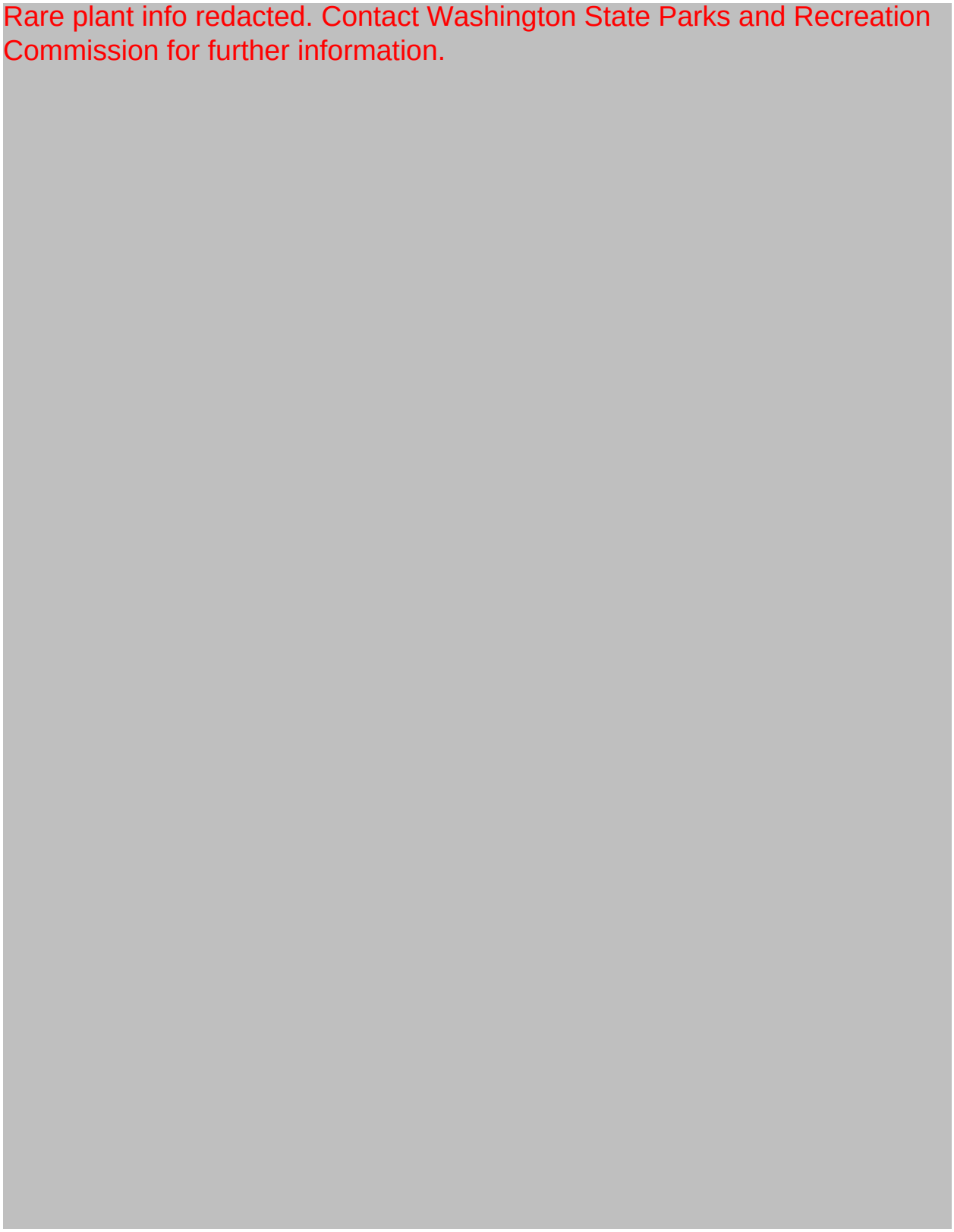

Figure 6. General locations of rare plants within Seaquest State Park.


Figure 7. Photos of *Euonymus occidentale* specimens found in Seaquest State Park.


Figure 8. Photos of *Hydrocotyle ranunculoides* specimens found in Seaquest State Park. The photo on the right shows the shrub hedge along the wetland shore under which the specimens were found.

Vascular Plant List for Seaquest State Park

A total of 189 vascular plant species were identified during the 2006 surveys at Seaquest State Park. Of these, 60 of the plant species are non-native, accounting for 32% of the total.

Key to Vascular Plant Species List

"Code": Four-letter plant code as shown on the USDA PLANTS database.

"Alien?": species that are not native to the park are indicated with an "a"

"Status": Current status listings for WA DNR NHP tracked rare plants. See Appendix B for definitions of Status rankings.

"Common Name / Accepted 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 or general common names are shown in this column when they exist.

Table 2. Vascular Plant List for Seaquest State Park

num	Code	Scientific Name	Common Name/Accepted Synonym	Family	alien?	Status
1	ABGR	Abies grandis (Dougl. ex D. Don) Lindl.	grand fir	Pinaceae		
2	ACCI	Acer circinatum Pursh	vine maple	Aceraceae		
3	ACMA3	Acer macrophyllum Pursh	bigleaf maple	Aceraceae		
4	ACTR	Achlys triphylla (Sm.) DC.	sweet after death	Berberidaceae		
5	ADBI	Adenocaulon bicolor Hook.	pathfinder	Asteraceae		
6	AGEX	Agrostis exarata Trin.	spike bentgrass	Poaceae		
7	AICA	Aira caryophyllea L.	silver hairgrass	Poaceae	a	
8	AIPR	Aira praecox L.	yellow hairgrass	Poaceae	a	
9	ALRU2	Alnus rubra Bong.	red alder	Betulaceae		
10	AMAL2	Amelanchier alnifolia (Nutt.) Nutt. ex M. Roemer	Saskatoon serviceberry	Rosaceae		
11	ANMA	Anaphalis margaritacea (L.) Benth.	western pearly everlasting	Asteraceae		
12	ANDE3	Anemone deltoidea Hook.	Columbian windflower	Ranunculaceae		
13	ANOD	Anthoxanthum odoratum L.	sweet vernalgrass	Poaceae	a	
14	AQFO	Aquilegia formosa Fisch. ex DC.	western columbine	Ranunculaceae		
15	ARME	Arbutus menziesii Pursh	madrone	Ericaceae		
16	ARMI2	Arctium minus Bernh.	lesser burdock	Asteraceae	a	
17	AREL3	Arrhenatherum elatius (L.) Beauv. ex J.& K. Presl	tall oatgrass	Poaceae	a	
18	ATFI	Athyrium filix-femina (L.) Roth	common ladyfern	Dryopteridaceae		
19	BEPE2	Bellis perennis L.	lawn daisy	Asteraceae	a	
20	BLSP	Blechnum spicant (L.) Sm.	deer fern	Blechnaceae		
21	BRSY	Brachypodium sylvaticum (Huds.) Beauv.	slender false brome	Poaceae	a	
22	BRMO2	Bromus mollis auct. non L. [misapplied]	>>Bromus hordeaceus ssp. hordeaceus	Poaceae	a	
23	BRPA3	Bromus pacificus Shear	Pacific brome	Poaceae		
24	BRVU	Bromus vulgaris (Hook.) Shear	Columbia brome	Poaceae		
25	CASC7	Campanula scouleri Hook. ex A. DC.	pale bellflower	Campanulaceae		
26	CAOL	Cardamine oligosperma Nutt.	little western bittercress	Brassicaceae		
27	CACA11	Carex canescens L.	silvery sedge	Cyperaceae		
28	CACU5	Carex cusickii Mackenzie ex Piper & Beattie	Cusick's sedge	Cyperaceae		
29	CADE9	Carex deweyana Schwein.	Dewey sedge	Cyperaceae		
30	CAHE7	Carex hendersonii Bailey	Henderson's sedge	Cyperaceae		
31	CAOB3	Carex obnupta Bailey	slough sedge	Cyperaceae		
32	CAPA14	Carex pachystachya Cham. ex Steud.	chamisso sedge	Cyperaceae		
33	CASI3	Carex sitchensis Prescott ex Bong.	>>Carex aquatilis var. dives	Cyperaceae		
34	CAVE6	Carex vesicaria L.	blister sedge	Cyperaceae		
35	CEGL2	Cerastium glomeratum Thuill.	sticky chickweed	Caryophyllaceae	a	
36	CEVU	Cerastium vulgatum L. 1762, non 1755	>>Cerastium fontanum ssp. vulgare	Caryophyllaceae	a	
37	CIDO	Cicuta douglasii (DC.) Coult. & Rose	western water hemlock	Apiaceae		
38	CIAL	Circaea alpina L.	small enchanter's nightshade	Onagraceae		
39	CIAR4	Cirsium arvense (L.) Scop.	Canada thistle	Asteraceae	a	
40	COHE2	Collomia heterophylla Dougl. ex Hook.	variableleaf collomia	Polemoniaceae		
41	COMA25	Corallorhiza maculata (Raf.) Raf.	summer coralroot	Orchidaceae		
42	CONU4	Cornus nuttallii Audubon ex Torr. & Gray	Pacific dogwood	Cornaceae		
43	COST4	Cornus stolonifera Michx.	>>Cornus sericea ssp. sericea	Cornaceae		
44	COCO6	Corylus cornuta Marsh.	California hazelnut	Betulaceae		
45	CRCA3	Crepis capillaris (L.) Wallr.	smooth hawksbeard	Asteraceae	a	
46	CYSC4	Cytisus scoparius (L.) Link	scotchbroom	Fabaceae	a	
47	DAGL	Dactylis glomerata L.	orchardgrass	Poaceae	a	

48	DEEL	Deschampsia elongata (Hook.) Munro	slender hairgrass	Poaceae		
49	DIFO	Dicentra formosa (Haw.) Walp.	Pacific bleeding heart	Fumariaceae		
50	DIPU	Digitalis purpurea L.	purple foxglove	Scrophulariaceae	a	
51	DISM2	Disporum smithii (Hook.) Piper	>>Prosartes smithii	Liliaceae		
52	DREX2	Dryopteris expansa (K. Presl) Fraser-Jenkins & Jermy	spreading woodfern	Dryopteridaceae		
53	EPAN2	Epilobium angustifolium L.	>>Chamerion angustifolium ssp. angustifolium	Onagraceae		
54	EQAR	Equisetum arvense L.	field horsetail	Equisetaceae		
55	EUOC9	Euonymus occidentale Nutt. ex Torr.	western burning bush	Celastraceae		G5-S1-T
56	FEAR3	Festuca arundinacea Schreb.	>>Schedonorus phoenix	Poaceae	a	
57	FERU2	Festuca rubra L.	red fescue	Poaceae		
58	FRVE	Fragaria vesca L.	woodland strawberry	Rosaceae		
59	FRLA	Fraxinus latifolia Benth.	Oregon ash	Oleaceae		
60	GAAP2	Galium aparine L.	stickywilly	Rubiaceae	a	
61	GATR3	Galium triflorum Michx.	fragrant bedstraw	Rubiaceae		
62	GASH	Gaultheria shallon Pursh	salal	Ericaceae		
63	GEMO	Geranium molle L.	dovefoot geranium	Geraniaceae	a	
64	GERO	Geranium robertianum L.	Robert geranium	Geraniaceae	a	
65	GEMA4	Geum macrophyllum Willd.	largeleaf avens	Rosaceae		
66	GOOB2	Goodyera oblongifolia Raf.	western rattlesnake plantain	Orchidaceae		
67	HEHE	Hedera helix L.	English ivy	Araliaceae	a	
68	HOLA	Holcus lanatus L.	common velvetgrass	Poaceae	a	
69	HODI	Holodiscus discolor (Pursh) Maxim.	Indian plum	Rosaceae		
70	HYRA	Hydrocotyle ranunculoides L. f.	floating marshpennywort	Apiaceae		G5-S2-S
71	HYPE	Hypericum perforatum L.	common St. Johnswort	Clusiaceae	a	
72	HYRA3	Hypochaeris radicata L.	hairy cat's ear	Asteraceae	a	
73	ILAQ80	Ilex aquifolium L.	English holly	Aquifoliaceae	a	
74	IRPS	Iris pseudacorus L.	paleyellow iris	Iridaceae	a	
75	IRTE	Iris tenax Dougl. ex Lindl.	toughleaf iris	Iridaceae		
76	JUAC	Juncus acuminatus Michx.	tapertip rush	Juncaceae		
77	JUEF	Juncus effusus L.	common rush	Juncaceae		
78	LAMU	Lactuca muralis (L.) Fresen.	>>Mycelis muralis	Asteraceae	a	
79	LACO3	Lapsana communis L.	common nipplewort	Asteraceae	a	
80	LANE3	Lathyrus nevadensis S. Wats.	Sierra pea	Fabaceae		
81	LAPO3	Lathyrus polyphyllus Nutt.	leafy pea	Fabaceae		
82	LIBO3	Linnaea borealis L.	twinflower	Ericaceae		
83	LICO6	Listera cordata (L.) R. Br. ex Ait. f.	heartleaf twayblade	Orchidaceae		
84	LOPE	Lolium perenne L.	perennial ryegrass	Poaceae	a	
85	LOCI3	Lonicera ciliosa (Pursh) Poir. ex DC.	orange honeysuckle	Caprifoliaceae		
86	LOCO6	Lotus corniculatus L.	bird's-foot trefoil	Fabaceae	a	
87	LUPO2	Lupinus polyphyllus Lindl.	bigleaf lupine	Fabaceae		
88	LUPA4	Luzula parviflora (Ehrh.) Desv.	smallflowered woodrush	Juncaceae		
89	LYAM3	Lysichiton americanus Hultén & St. John	American skunkcabbage	Araceae		
90	MAAQ2	Mahonia aquifolium (Pursh) Nutt.	hollyleaved barberry	Berberidaceae		
91	MANE2	Mahonia nervosa (Pursh) Nutt.	Cascade barberry	Berberidaceae		
92	MADI	Maianthemum dilatatum (Wood) A. Nels. & J.F. Macbr.	false lily of the valley	Liliaceae		
93	MELU	Medicago lupulina L.	black medick	Fabaceae	a	
94	MESU	Melica subulata (Griseb.) Scribn.	Alaska oniongrass	Poaceae		
95	METR3	Menyanthes trifoliata L.	buckbean	Menyanthaceae		

96	MICA5	Mitella caulescens Nutt.	slightstemmed miterwort	Saxifragaceae		
97	MOSI2	Montia sibirica (L.) T.J. Howell	>>Claytonia sibirica var. sibirica	Portulacaceae		
98	MYOSO	Myosotis L.	forget-me-not	Boraginaceae		
99	MYLA	Myosotis laxa Lehm.	bay forget-me-not	Boraginaceae		
100	NEPA	Nemophila parviflora Dougl. ex Benth.	smallflower nemophila	Hydrophyllaceae		
101	NUPO2	Nuphar polysepala Engelm.	>>Nuphar lutea ssp. polysepala	Nymphaeaceae		
102	OECE	Oemleria cerasiformis (Torr. & Gray ex Hook. & Arn.) Landon	Indian plum	Rosaceae		
103	OESA	Oenanthe sarmentosa K. Presl ex DC.	water parsely	Apiaceae		
104	OSCH	Osmorhiza chilensis Hook. & Arn.	>>Osmorhiza berteroi	Apiaceae		
105	OXTR	Oxalis trilliifolia Hook.	threeleaf woodsorrel	Oxalidaceae		
106	PEPA31	Petasites palmatus (Ait.) Gray	>>Petasites frigidus var. palmatus	Asteraceae		
107	PHAR3	Phalaris arundinacea L.	reed canarygrass	Poaceae	a	
108	PHCA11	Physocarpus capitatus (Pursh) Kuntze	Pacific ninebark	Rosaceae		
109	PLMA2	Plantago major L.	common plantain	Plantaginaceae		
110	POAN	Poa annua L.	annual bluegrass	Poaceae	a	
111	POCO	Poa compressa L.	Canada bluegrass	Poaceae	a	
112	POPR	Poa pratensis L.	Kentucky bluegrass	Poaceae	a	
113	POTR2	Poa trivialis L.	rough bluegrass	Poaceae	a	
114	POHY	Polygonum hydropiper L.	marshpepper knotweed	Polygonaceae	a	
115	POSA4	Polygonum sachalinense F. Schmidt ex Maxim.	giant knotweed	Polygonaceae	a	
116	POGL8	Polypodium glycyrrhiza D.C. Eat.	licorice fern	Polypodiaceae		
117	POMU	Polystichum munitum (Kaulfuss) K. Presl	swordfern	Polypodiaceae		
118	POBAT	Populus balsamifera L. ssp. trichocarpa (Torr. & Gray ex Hook.) Brayshaw	black cottonwood	Salicaceae		
119	POTR5	Populus tremuloides Michx.	quaking aspen	Salicaceae		
120	POPA14	Potentilla palustris (L.) Scop.	>>Comarum palustre	Rosaceae		
121	PRVU	Prunella vulgaris L.	common selfheal	Lamiaceae		
122	PREM	Prunus emarginata (Dougl. ex Hook.) D. Dietr.	bitter cherry	Rosaceae		
123	PRLA5	Prunus laurocerasus L.	cherry laurel	Rosaceae	a	
124	PSME	Pseudotsuga menziesii (Mirbel) Franco	Douglas-fir	Pinaceae		
125	PTAQ	Pteridium aquilinum (L.) Kuhn	bracken fern	Dennstaedtiaceae		
126	PYFU	Pyrus fusca Raf.	>>Malus fusca	Rosaceae		
127	QUGA4	Quercus garryana Dougl. ex Hook.	Oregon white oak	Fagaceae		
128	RARE3	Ranunculus repens L.	creeping buttercup	Ranunculaceae	a	
129	RAUN	Ranunculus uncinatus D. Don ex G. Don	woodland buttercup	Ranunculaceae	a	
130	RHPU	Rhamnus purshiana DC.	>>Frangula purshiana	Rhamnaceae		
131	RIDI	Ribes divaricatum Dougl.	spreading gooseberry	Grossulariaceae		
132	ROGY	Rosa gymnocarpa Nutt.	dwarf rose	Rosaceae		
133	RONU	Rosa nutkana K. Presl	Nootka rose	Asteraceae		
134	RUDI2	Rubus discolor Weihe & Nees	>>Rubus armeniacus	Rosaceae	a	
135	RULA	Rubus laciniatus Willd.	cutleaf blackberry	Rosaceae	a	
136	RULE	Rubus leucodermis Dougl. ex Torr. & Gray	whitebark raspberry	Rosaceae		
137	RUPA	Rubus parviflorus Nutt.	thimbleberry	Rosaceae		
138	RUSP	Rubus spectabilis Pursh	salmonberry	Rosaceae		
139	RUUR	Rubus ursinus Cham. & Schlecht.	California blackberry	Rosaceae		
140	RUCR	Rumex crispus L.	curly dock	Polygonaceae	a	
141	RUOB	Rumex obtusifolius L.	bitter dock	Polygonaceae	a	
142	SAPR	Sagina procumbens L.	birdeye pearlwort	Caryophyllaceae	a	
143	SAGE2	Salix geyeriana Anderss.	Geyer willow	Salicaceae		

144	SASC	Salix scouleriana Barratt ex Hook.	Scouler's willow	Salicaceae		
145	SASI2	Salix sitchensis Sanson ex Bong.	Sitka willow	Salicaceae		
146	SARA2	Sambucus racemosa L.	red elderberry	Caprifoliaceae		
147	SACR2	Sanicula crassicaulis Poepp. ex DC.	>>Sagina maxima ssp. crassicaulis	Apiaceae		
148	SADO5	Satureja douglasii (Benth.) Briq.	>>Clinopodium douglasii	Lamiaceae		
149	SCLA2	Scutellaria lateriflora L.	blue skullcap	Lamiaceae		
150	SEJA	Senecio jacobaea L.	stinking willie	Asteraceae	a	
151	SETR	Senecio triangularis Hook.	arrowleaf ragwort	Asteraceae		
152	SEVU	Senecio vulgaris L.	old-man-in-the-Spring	Asteraceae	a	
153	SMRA*	Smilacina racemosa (L) Desf.	>>Maianthemum racemosum ssp. amplexicaule	Liliaceae		
154	SMST	Smilacina stellata (L.) Desf.	>>Maianthemum stellatum	Liliaceae		
155	SODU	Solanum dulcamara L.	climbing nightshade	Solanaceae	a	
156	SOUL5	Sonchus uliginosus Bieb.	>>Sonchus arvensis ssp. uliginosus	Asteraceae	a	
157	SPDO	Spiraea douglasii Hook.	rose spirea	Rosaceae		
158	STCO14	Stachys cooleyae Heller	>>Stachys chamissonis var. cooleyae	Lamiaceae		
159	STCA	Stellaria calycantha (Ledeb.) Bong.	northern starwort	Caryophyllaceae		
160	STCR2	Stellaria crispa Cham. & Schlecht.	curled starwort	Caryophyllaceae		
161	STME2	Stellaria media (L.) Vill.	common chickweed	Caryophyllaceae	a	
162	SYAL	Symphoricarpos albus (L.) Blake	common snowberry	Caprifoliaceae		
163	TAOF	Taraxacum officinale G.H. Weber ex Wiggers	dandelion	Asteraceae	a	
164	TABR2	Taxus brevifolia Nutt.	Pacific yew	Taxaceae		
165	THPL	Thuja plicata Donn ex D. Don	western red cedar	Cupressaceae		
166	TITR	Tiarella trifoliata L.	threeleaf foamflower	Saxifragaceae		
167	TOME	Tolmiea menziesii (Pursh) Torr. & Gray	youth on age	Saxifragaceae		
168	TRLA6	Trientalis latifolia Hook.	>>Trientalis borealis ssp. latifolia	Primulaceae		
169	TRPR2	Trifolium pratense L.	red clover	Fabaceae	a	
170	TRRE3	Trifolium repens L.	white clover	Fabaceae	a	
171	TROV2	Trillium ovatum Pursh	Pacific trillium	Liliaceae		
172	TRCE2	Trisetum cernuum Trin.	>>Trisetum canescens	Poaceae		
173	TSHE	Tsuga heterophylla (Raf.) Sarg.	western hemlock	Pinaceae		
174	TYLA	Typha latifolia L.	broadleaf cattail	Typhaceae		
175	URDI	Urtica dioica L.	nettle	Urticaceae		
176	UTIN	Utricularia inflata Walt.	swollen bladderwort	Lentibulariaceae	a	
177	VAPA	Vaccinium parvifolium Sm.	red huckleberry	Ericaceae		
178	VAHE	Vancouveria hexandra (Hook.) Morr. & Dcne.	white insideout flower	Berberidaceae		
179	VERAT	Veratrum L.	false hellebore	Liliaceae		
180	VEAM2	Veronica americana Schwein. ex Benth.	American speedwell	Scrophulariaceae		
181	VEOF2	Veronica officinalis L.	common gypsyweed	Scrophulariaceae	a	
182	VESE	Veronica serpyllifolia L.	thymeleaf speedwell	Scrophulariaceae	a	
183	VIAM	Vicia americana Muhl. ex Willd.	American vetch	Fabaceae		
184	VIHI	Vicia hirsuta (L.) S.F. Gray	tiny vetch	Fabaceae	a	
185	VISA	Vicia sativa L.	garden vetch	Fabaceae	a	
186	VIMA	Vinca major L.	bigleaf periwinkle	Apocynaceae	a	
187	VIGL	Viola glabella Nutt.	pioneer violet	Violaceae		
188	VISE3	Viola sempervirens Greene	evergreen violet	Violaceae		
189	VUBR	Vulpia bromoides (L.) S.F. Gray	brome fescue	Poaceae	a	

Ecological Condition of Seaquest State Park

The ecological condition of Seaquest State Park is overall quite good. Although development and human disturbances have impacted almost every section of the park, the forested regions of the park have remained relatively free of exotic species within the interior regions of the forest patches. The park can be broken up into three discreet areas of differing ecological conditions and subsequent management concerns based upon natural conditions and contemporary and historical land use. Figure 9 illustrates the 3 areas we shall separately discuss concerning ecological condition within the park.

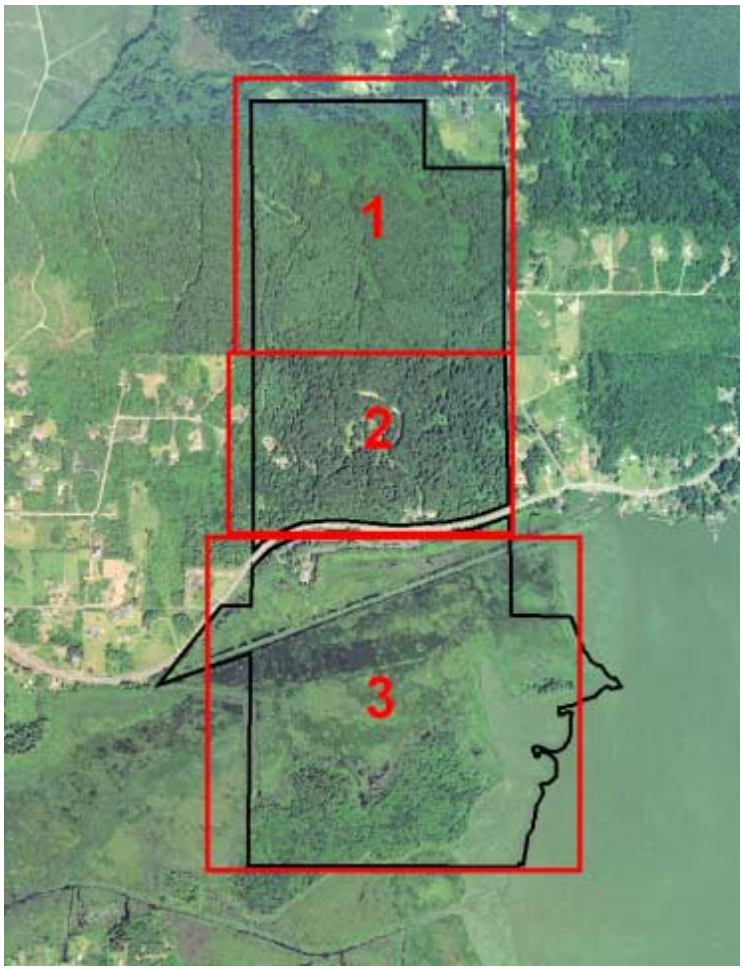

Figure 9. The three areas separated out for discussion of ecological condition

Area 1 is the northern portion of the park where intensive logging and perhaps burning was done just prior to park ownership. The forests in this part of the park are all even aged stands of mostly Douglas-fir (*Pseudotsuga menzisii*) or red alder (*Alnus rubra*) with sword fern (*Polysticum munitum*) being the dominant understory plant. Many of the forest stands in this part of the park are entering in the stem exclusion successional phase where competition for light between even-aged trees will begin to cull less competitive stems, increasing coarse woody debris inputs onto the forest floor and creating more exposure to direct sunlight in the understory. Plant species diversity will begin to increase throughout this area as later successional forest stages develop. Most exotic plant infestations in this part of the park occur along the park's edges, where adjacent development

interrupts the interior forest conditions. Many of the adjacent properties on the north and east side of the park are developed home sites with non-native plants dominating the landscape. These sources of potential exotic species invasion could access this region of the park if large canopy openings were to occur via blowdown or new trail/road development. Minimizing large-scale canopy disturbances should help keep exotic plants at bay within this region of the park.

Area 2 contains the older forests of the park and some of the most developed sites including the park's day use area and campgrounds. The ecological condition of the older forests is some of the best in the entire park, with old-growth conditions present and very little exotic plant occurrence. As with Area 1, exotic species infestations are mostly confined to the park's edges where the adjacent development has removed the forest canopy creating edge effects that favor exotic plant establishment. The highway corridor and powerline corridors along the south boundary of Area 2 dramatically interrupt the forest interior conditions and allow many exotic plants to occur along this edge. Within the forested campgrounds and other developed recreational sites, many shade tolerant exotic plants occur on the most heavily used sites. These plants can and do penetrate into the surrounding undeveloped forests when vegetation disturbances occur such as trail maintenance, development, and off-trail hiking. Should larger scale canopy disturbances occur within the interior forest patches in this area, it is probable that larger scale infestations of invasive plants would occur, diminishing the ecological condition of this part of the park. Limiting additional development on currently undeveloped sites and restoring currently disturbed sites that are not critical to campground and recreational operations to more natural conditions with native plants would provide a better buffer from exotic plant spread in this part of the park. Also, closing down of the trail along which *Euonymus occidentale* occurs may be necessary to protect this critically imperiled plant from complete extirpation from the park. The infestation of English ivy shown in Figure 10 occurs in the group camp region not more than 150 meters from where the only known group of *Euonymus occidentale* occurs.

Figure 10. English ivy infestation in the group camp area of the park.

Area 3 contains the large wetland complex in the southern portion of the park, part of the larger complex wetland ecosystem that is Silver Lake. Silver Lake is a shallow eutrophic body of water formed by an old mudflow from Mt. St. Helens that naturally dammed the basin in which the lake sits (Mueller, 1997). The water level of the lake used to fluctuate wildly from year to year and season to season until a man-made dam was constructed in the 1970s to control lake levels. Since then the water level has become much more static and development around the lake's edge has dramatically increased. The aquatic life within the lake has undergone dramatic changes in recent times due to the human control of the seasonal water levels and due to exotic plant and fish introductions both on purpose and by accident. Many exotic aquatic plants have become established within the lake via various mechanisms, and humans have intentionally introduced fish for sport fishing purposes and to reduce invasive submerged aquatic plant cover. Within the wetlands of the park, dredging and berming activities occurred for railway and road development, which altered the original topography of the wetland environment and created above water land bridges and deeper water canals which still persist (Figure 11).

Figure 11. Color aerial photo depicting the berms and other man-made features affecting the topography and vegetation communities within the wetland complex in Seaquest State Park. The straight-line features are human alteration remnants.

This complex history of the park's wetlands makes it hard to infer the ecological condition of this area based upon comparisons to the historical range of variation that occurred on the same site. However, the value of Area 3 in providing habitat for birds, amphibians and fish is readily apparent

regardless of what the historic conditions were like. The wetlands also support a population of *Hydrocotyle ranunculoides*, a state sensitive aquatic plant. Most of the wetlands within the park are composed of native wetland plants that indicate a generally good ecological condition for the wetland complex. Exotic species controls are not suggested at this time, though continued monitoring of the wetlands for dramatic increases in exotic plants should occur.

The upland sites within Area 3, which include the upper portion of the man-made berms and the larger islands are in various states of ecological condition. Large infestations on non-native plants occur along berms, with Himalayan blackberry and reed canary grass as the worst exotic invaders in the un-maintained portions of the berms. Where maintained trails exist along the berms, non-native grasses and herbs are readily established. Along some portions of the berms native plant communities without exotic plants have become established, although this is a less common occurrence. On the two islands natural forest types occur. Logging has occurred on the large island and the subsequent ALRU2/POMU forest patches that dominant the island have periodic infestations on non-native plants. These areas could benefit from restoration activities such as cutting back exotic vines and grasses and planting native conifers and shrubs to encourage forest growth. A number of deer were seen using the large island during our surveys.

GIS Products Produced

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

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Appendix A – Field Survey Schedule

May 30 and 31, 2006

Field Staff: Hans Smith,

July 24 and 25, 2006

Field Staff: Hans Smith

Appendix B – Description of Rare Element Status Codes

Global Rank (GRank)

Global Rank characterizes the relative rarity or endangerment of the element world-wide. Two codes (e.g. G1G2) represent an intermediate rank.

G1 = Critically imperiled globally (5 or fewer occurrences).
G2 = Imperiled globally (6 to 20 occurrences).
G3 = Either very rare and local throughout its range or found locally in a restricted range (21 to 100 occurrences).
G4 = Apparently secure globally.
G5 = Demonstrably secure globally.
GH = Of historical occurrence throughout its range.
GU = Possibly in peril range-wide but status uncertain.
GX = Believed to be extinct throughout former range.
GNR = Not yet ranked.
Tn = Rarity of an infraspecific taxon. Numbers and codes similar to those for Gn ranks above.
Q = Questionable.

State Rank (SRank)

State Rank characterizes the relative rarity or endangerment within the state of Washington. Two codes (e.g. S1S2) represents an intermediate rank.

S1 = Critically imperiled (5 or fewer occurrences).
S2 = Imperiled (6 to 20 occurrences), very vulnerable to extirpation.
S3 = Rare or uncommon (21 to 100 occurrences).
S4 = Apparently secure, with many occurrences.
S5 = Demonstrably secure in state.
SA = Accidental in state.
SE = An exotic established in state.
SH = Historical occurrences only but still expected to occur.
SN = Regularly occurring, usually migratory, nonbreeding animals.
SU = Unrankable; need more information.
SX = Apparently extirpated from the state.
SP = Likely to occur or to have occurred but without documentation.
SZ = Not of conservation concern (not SE or SA).
SNR = Not yet ranked.
"B" and "N" qualifiers are used to indicate breeding and nonbreeding status, respectively, of migrant species whose nonbreeding status (rank) may be quite different from their breeding status in the state (e.g. S1B,S4N for a very rare breeder that is a common winter resident).

State Status (StStat)

State Status of plant species is determined by the Washington Natural Heritage Program. Factors considered include abundance, occurrence patterns, vulnerability, threats, existing protection, and taxonomic distinctness. Values include:

E = Endangered. In danger of becoming extinct or extirpated from Washington.
T = Threatened. Likely to become Endangered in Washington.
S = Sensitive. Vulnerable or declining and could become Endangered or Threatened in the state.
X = Possibly extinct or Extirpated from Washington.
P1 = Priority 1. Rare nonvascular plant but with insufficient information to assign another rank.
P2 = Priority 2. Nonvascular plant of concern but with insufficient information to assign another rank.
R1 = Review group 1. Of potential concern but needs more field work to assign another rank.
R2 = Review group 2. Of potential concern but with unresolved taxonomic questions.
W = Watch. More abundant and/or less threatened than previously thought.

Federal Status

Federal Status under the U.S. Endangered Species Act (USESA) as published in the Federal Register:

LE = Listed Endangered. In danger of extinction.
LT = Listed Threatened. Likely to become endangered.
PE = Proposed Endangered.
PT = Proposed Threatened.
C = Candidate species. Sufficient information exists to support listing as Endangered or Threatened.
SC = Species of Concern. An unofficial status, the species appears to be in jeopardy, but insufficient information to support listing.
NL = Not Listed. Used when two portions of a taxon have different federal status.

Appendix C – Ecological Condition Ranking System

Ecological Condition Ranks

When assessing conservation priorities and management decisions, it can be useful to rank natural communities into levels of ecological condition. For example, an unfragmented area with high native species diversity, absence of non-native species and little soil erosion often has greater conservation value than another area in the same habitat type that is fragmented, infested with weeds or has erosion problems. Likewise, areas with a lower ecological condition rank may be targets for restoration activities.

The flowing ecological condition ranks were applied to vegetation polygons that were surveyed in this project:

Condition Rank 1. This condition class represents areas that have been altered to the point where the ecological condition often deviates dramatically from baseline conditions found in areas where stressors are much less prevalent. Areas characterized by Condition Class 1 often have high amounts of bare ground and/or non-native plant cover. The structure is often significantly altered from baseline conditions. Often one or more of the structural layers (trees, shrubs, herbs, grasses, mosses & lichens, biotic crust) may be significantly altered or even missing from the community. The composition of native vegetation is skewed toward species that can survive despite regular disturbance. Species diversity of native plants is usually low and native grass species are usually absent or in very low abundance (for a given community type). Evidence of accelerated erosion and soil compaction may be present. Hydrologic alteration may also be present. Significant direct evidence of various stress factors is usually abundant. Rare plant and animal species generally do not occur in this condition class.

Condition Rank 2. This condition class represents areas that show a fairly broad range of stress ranging from high to moderately low impact from a variety of stressors. Areas characterized by Condition Class 2 usually have moderate levels of non-native plant cover. The structure of the natural community present in Condition Class 2 areas is often relatively intact when compared to baseline conditions. Usually all structural layers are present, but form and stature may be altered from baseline conditions. Soil surface conditions are often intermediate between those in Condition Class 1 and Condition Class 3. Species diversity of native plants is often moderate for that community. Non-native species are usually present, but not as common or abundant as in Condition Class 1. Native grass species are often present, but usually in low abundance for that community type. Diversity of native grass species is relatively low when compared to baseline conditions. Evidence of accelerated erosion and soil compaction may be present in isolated areas, but is not dramatic or widespread. Hydrologic alteration is absent. Direct signs of stressors may be present, but not widespread or abundant. Rare plant and animal species may be found in this condition class, but are not common. Rare species that are found in this condition class are relatively tolerant of the stressors that are present.

Condition Rank 3. This condition class represents areas that show the least stress in the project area and are the closest to representing baseline conditions. Areas characterized by Condition Class 3 have little evidence of non-native plant invasion. The composition and

structure of native vegetation in this condition class correspond to the natural ranges of variation characteristic to this habitat type. Old-growth conditions may exist. Species diversity of native plants is often high relative to the community under consideration. Native grass species are usually present and often fairly abundant for the community type. Species diversity of native grass species is also often high. Soil compaction, accelerated erosion and hydrologic alteration are absent. Direct signs of stressors are usually absent. Certain rare species may only exist within this condition class and rare species are generally more common than in the lower condition classes.

Appendix D – 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 clearcutting

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 year'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 1
Survey Intensity	1
Observer	HS
Date	7/24/2006
Specific Location	Conifer forest, S wetlands
Total Vegetation	6
Trees Total	5
Dominant Trees	PSME, ABGR
emergent	3
maincanopy	5
subcanopy	2
Shrubs Total	3
Dominant Shrubs	COCO6, HODI
> 1.5' tall	3
< 1.5' tall	1
Graminoids Total	2
Dominant Graminoids	
Graminoids Perennial	2
Graminoids Annual	0
Forbs Total	2
Dominant Forbs	
Forbs Perennial	2
Forbs Annual	0
Ferns Total	5
Ferns Evergreen	5
Ferns Deciduous	1
ExoticsTotal	1
Exotics Perennial	1
Exotics Annual	0
Water	0
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss Lichen	5
Litter	95
Logging	3
Stand Age	2
Agriculture	0
Livestock	0
Development	0
Wildlife	3
Recreation Severity	0
Recreation Type	0
Hydrology	1

Exotic Species

Primary Exotic
RULA
Secondary Exotic
ILAQ80
Noxious Exotic

Plant Associations

	Percent	Pattern	Rank
1. PSME-ABGR/COCO6/POMU (CHAPPELL)	100	Matrix	2
2.	0		0
3.	0		0

Notes: Ferns: POMU

Polygon Number	**10**
Survey Intensity	1
Observer	HS
Date	7/25/2006
Specific Location	Big wetland polygon.
Total Vegetation	5
Trees Total	0
Dominant Trees	
emergent	0
maincanopy	0
subcanopy	0
Shrubs Total	3
Dominant Shrubs	SPDO
> 1.5' tall	3
< 1.5' tall	0
Graminoids Total	3
Dominant Graminoids	CASI3
Graminoids Perennial	3
Graminoids Annual	0
Forbs Total	5
Dominant Forbs	METR3, NUPO2
Forbs Perennial	5
Forbs Annual	0
Ferns Total	1
Ferns Evergreen	0
Ferns Deciduous	1
ExoticsTotal	1
Exotics Perennial	1
Exotics Annual	0
Water	15
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss Lichen	0
Litter	85
Logging	0
Stand Age	0
Agriculture	0
Livestock	0
Development	0
Wildlife	0
Recreation Severity	0
Recreation Type	0
Hydrology	1

Exotic Species

Primary Exotic
IRPS
Secondary Exotic

Noxious Exotic

Plant Associations

	Percent	Pattern	Rank
1. CACU5/Sphagnum sp. c.t. (KUNZE)	70	Matrix	3
2. SPDO/Sphagnum sp. c.t. (KUNZE)	15	Small	3
3. NUPO2 c.t. (KUNZE)	15	Small	3

Notes:

Polygon Number	**11**
Survey Intensity	1
Observer	
Date	
Specific Location	
Total Vegetation	0
Trees Total	0
Dominant Trees	
emergent	0
maincanopy	0
subcanopy	0
Shrubs Total	0
Dominant Shrubs	
> 1.5' tall	0
< 1.5' tall	0
Graminoids Total	0
Dominant Graminoids	
Graminoids Perennial	0
Graminoids Annual	0
Forbs Total	0
Dominant Forbs	
Forbs Perennial	0
Forbs Annual	0
Ferns Total	0
Ferns Evergreen	0
Ferns Deciduous	0
ExoticsTotal	0
Exotics Perennial	0
Exotics Annual	0
Water	0
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss Lichen	0
Litter	0
Logging	
Stand Age	
Agriculture	
Livestock	
Development	
Wildlife	
Recreation Severity	
Recreation Type	
Hydrology	

Exotic Species

Primary Exotic

Secondary Exotic

Noxious Exotic

Plant Associations

	Percent	Pattern	Rank
1. developed	100	Matrix	1
2.	0		0
3.	0		0

Notes:

Polygon Number	**12**
Survey Intensity	1
Observer	
Date	
Specific Location	
Total Vegetation	0
Trees Total	0
Dominant Trees	
emergent	0
maincanopy	0
subcanopy	0
Shrubs Total	0
Dominant Shrubs	
> 1.5' tall	0
< 1.5' tall	0
Graminoids Total	0
Dominant Graminoids	
Graminoids Perennial	0
Graminoids Annual	0
Forbs Total	0
Dominant Forbs	
Forbs Perennial	0
Forbs Annual	0
Ferns Total	0
Ferns Evergreen	0
Ferns Deciduous	0
ExoticsTotal	0
Exotics Perennial	0
Exotics Annual	0
Water	0
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss Lichen	0
Litter	0
Logging	
Stand Age	
Agriculture	
Livestock	
Development	
Wildlife	
Recreation Severity	
Recreation Type	
Hydrology	

Exotic Species

Primary Exotic

Secondary Exotic

Noxious Exotic

Plant Associations

	Percent	Pattern	Rank
1. developed	100	Matrix	1
2.	0		0
3.	0		0

Notes:

Polygon Number	**13**
Survey Intensity	1
Observer	HS
Date	7/25/2006
Specific Location	Along wetland, E side of park.
Total Vegetation	6
Trees Total	5
Dominant Trees	PSME, FRLA
emergent	3
maincanopy	5
subcanopy	2
Shrubs Total	5
Dominant Shrubs	AMAL2, RUUR, RUDI2, GASH
> 1.5' tall	5
< 1.5' tall	4
Graminoids Total	3
Dominant Graminoids	POPR, AGAL, CAOB3
Graminoids Perennial	3
Graminoids Annual	1
Forbs Total	3
Dominant Forbs	CENI3, PRVU
Forbs Perennial	3
Forbs Annual	1
Ferns Total	3
Ferns Evergreen	3
Ferns Deciduous	2
ExoticsTotal	3
Exotics Perennial	3
Exotics Annual	1
Water	0
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss Lichen	2
Litter	98
Logging	3
Stand Age	2
Agriculture	0
Livestock	0
Development	6
Wildlife	3
Recreation Severity	3
Recreation Type	3
Hydrology	1

Exotic Species

Primary Exotic
RUDI2
Secondary Exotic
POPR
Noxious Exotic

Plant Associations

	Percent	Pattern	Rank
1. FRLA/CAOB3 c.t. (KUNZE)	65	Matrix	1
2. PSME-TSHE/GASH/POMU (CHAPPELL)	35	Large	1
3.	0		0

Notes: Ferns: POMU

Polygon Number	**15**
Survey Intensity	1
Observer	HS
Date	7/24/2006
Specific Location	Just W of visitor's center.
Total Vegetation	6
Trees Total	6
Dominant Trees	PSME, ABGR, FRLA
emergent	3
maincanopy	5
subcanopy	3
Shrubs Total	5
Dominant Shrubs	COCO6, VAPA, MANE2, GASH
> 1.5' tall	5
< 1.5' tall	3
Graminoids Total	2
Dominant Graminoids	
Graminoids Perennial	2
Graminoids Annual	0
Forbs Total	1
Dominant Forbs	
Forbs Perennial	1
Forbs Annual	0
Ferns Total	3
Ferns Evergreen	3
Ferns Deciduous	1
ExoticsTotal	2
Exotics Perennial	2
Exotics Annual	0
Water	0
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss Lichen	5
Litter	95
Logging	3
Stand Age	2
Agriculture	0
Livestock	0
Development	0
Wildlife	3
Recreation Severity	0
Recreation Type	0
Hydrology	1

Exotic Species

Primary Exotic	
HEHE	
Secondary Exotic	
ILAQ80	
Noxious Exotic	

Plant Associations

	Percent	Pattern	Rank
1. PSME-ABGR/COCO6/POMU (CHAPPELL)	80	Matrix	2
2. FRLA/CAOB3 c.t. (KUNZE)	20	Small	2
3.	0		0

Notes: Ferns: POMU

Polygon Number	**16**
Survey Intensity	1
Observer	HS
Date	7/24/2006
Specific Location	WETLAND NEAR VISITOR'S CENTER
Total Vegetation	5
Trees Total	2
Dominant Trees	FRLA, ALRU2, QUGA4
emergent	0
maincanopy	2
subcanopy	0
Shrubs Total	4
Dominant Shrubs	SPDO, SALIX SP.
> 1.5' tall	4
< 1.5' tall	0
Graminoids Total	3
Dominant Graminoids	CASI3
Graminoids Perennial	3
Graminoids Annual	0
Forbs Total	5
Dominant Forbs	METR3, NUPO2
Forbs Perennial	5
Forbs Annual	1
Ferns Total	1
Ferns Evergreen	1
Ferns Deciduous	1
ExoticsTotal	1
Exotics Perennial	1
Exotics Annual	0
Water	20
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss Lichen	0
Litter	80
Logging	0
Stand Age	0
Agriculture	0
Livestock	0
Development	3
Wildlife	7
Recreation Severity	3
Recreation Type	3
Hydrology	1

Exotic Species

Primary Exotic
PHAR3
Secondary Exotic

Noxious Exotic

Plant Associations

	Percent	Pattern	Rank
1. NUPO2 c.t. (KUNZE)	50	Matrix	3
2. CACU5/Sphagnum sp. c.t. (KUNZE)	40	Large	3
3. CASI3 c.t. (KUNZE)	10	Small	3

Notes: LOTS OF METR3. wildlife is birds

Polygon Number	**18**
Survey Intensity	1
Observer	
Date	
Specific Location	
Total Vegetation	0
Trees Total	0
Dominant Trees	
emergent	0
maincanopy	0
subcanopy	0
Shrubs Total	0
Dominant Shrubs	
> 1.5' tall	0
< 1.5' tall	0
Graminoids Total	0
Dominant Graminoids	
Graminoids Perennial	0
Graminoids Annual	0
Forbs Total	0
Dominant Forbs	
Forbs Perennial	0
Forbs Annual	0
Ferns Total	0
Ferns Evergreen	0
Ferns Deciduous	0
ExoticsTotal	0
Exotics Perennial	0
Exotics Annual	0
Water	0
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss Lichen	0
Litter	0
Logging	
Stand Age	
Agriculture	
Livestock	
Development	
Wildlife	
Recreation Severity	
Recreation Type	
Hydrology	

Exotic Species

Primary Exotic

Secondary Exotic

Noxious Exotic

Plant Associations

	Percent	Pattern	Rank
1. developed	100	Matrix	1
2.	0		0
3.	0		0

Notes:

Polygon Number	**19**
Survey Intensity	1
Observer	HS
Date	7/25/2006
Specific Location	NW OF CAMPGROUND
Total Vegetation	6
Trees Total	5
Dominant Trees	ACMA3, ALRU2, PSME, TSHE
emergent	3
maincanopy	5
subcanopy	2
Shrubs Total	5
Dominant Shrubs	COCO6, HODI, GASH
> 1.5' tall	5
< 1.5' tall	3
Graminoids Total	2
Dominant Graminoids	
Graminoids Perennial	2
Graminoids Annual	0
Forbs Total	2
Dominant Forbs	
Forbs Perennial	2
Forbs Annual	1
Ferns Total	5
Ferns Evergreen	5
Ferns Deciduous	2
ExoticsTotal	1
Exotics Perennial	1
Exotics Annual	1
Water	0
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss Lichen	3
Litter	97
Logging	2
Stand Age	6
Agriculture	0
Livestock	0
Development	3
Wildlife	3
Recreation Severity	3
Recreation Type	3
Hydrology	1

Exotic Species

Primary Exotic
RULA
Secondary Exotic
RARE3
Noxious Exotic

Plant Associations

	Percent	Pattern	Rank
1. ALRU2/POMU (CHAPPELL)	40	Large	2
2. TSHE-PSME/POMU-DREX2 (CHAPPELL)	30	Large	2
3. PSME-ABGR/COCO6/POMU (CHAPPELL)	30	Large	2

Notes: Ferns: POMU

Polygon Number	**2**
Survey Intensity	1
Observer	hs
Date	7/24/2006
Specific Location	S wetlands
Total Vegetation	6
Trees Total	6
Dominant Trees	ALRU2, ACMA3, PSME, ABGR, TSHE, THPL
emergent	2
maincanopy	6
subcanopy	2
Shrubs Total	4
Dominant Shrubs	COCO6, ACCI
> 1.5' tall	4
< 1.5' tall	2
Graminoids Total	3
Dominant Graminoids	BRVU
Graminoids Perennial	3
Graminoids Annual	0
Forbs Total	3
Dominant Forbs	MOSI2
Forbs Perennial	3
Forbs Annual	0
Ferns Total	5
Ferns Evergreen	5
Ferns Deciduous	2
ExoticsTotal	1
Exotics Perennial	1
Exotics Annual	0
Water	0
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss Lichen	3
Litter	97
Logging	3
Stand Age	2
Agriculture	0
Livestock	0
Development	0
Wildlife	3
Recreation Severity	0
Recreation Type	0
Hydrology	1

Exotic Species

Primary Exotic
ILAQ80
Secondary Exotic

Noxious Exotic

Plant Associations

	Percent	Pattern	Rank
1. ALRU2/POMU (CHAPPELL)	55	Matrix	2
2. TSHE-PSME/POMU-DREX2 (CHAPPELL)	40	Large	2
3. Salix sp. c.t. (KUNZE)	5	Small	2

Notes: Ferns: POMU

Polygon Number	**20**
Survey Intensity	1
Observer	HS
Date	5/30/2006
Specific Location	Below campgroud W corner.
Total Vegetation	6
Trees Total	5
Dominant Trees	
emergent	3
maincanopy	5
subcanopy	3
Shrubs Total	5
Dominant Shrubs	
> 1.5' tall	5
< 1.5' tall	3
Graminoids Total	2
Dominant Graminoids	
Graminoids Perennial	2
Graminoids Annual	1
Forbs Total	3
Dominant Forbs	
Forbs Perennial	3
Forbs Annual	1
Ferns Total	5
Ferns Evergreen	5
Ferns Deciduous	1
ExoticsTotal	2
Exotics Perennial	2
Exotics Annual	0
Water	0
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss Lichen	20
Litter	80
Logging	2
Stand Age	6
Agriculture	0
Livestock	0
Development	6
Wildlife	7
Recreation Severity	3
Recreation Type	4
Hydrology	1

Exotic Species

Primary Exotic
HEHE
Secondary Exotic
ILAQ80
Noxious Exotic

Plant Associations

	Percent	Pattern	Rank
1. PSME-ABGR/COCO6/POMU (CHAPPELL)	100	Matrix	2
2.	0		0
3.	0		0

Notes: 6FT+ DBH PSME. Evidence of Bear

Polygon Number	**21**
Survey Intensity	1
Observer	HS
Date	5/31/2006
Specific Location	SE corner N of road.
Total Vegetation	6
Trees Total	6
Dominant Trees	PSME, ABGR, THPL, TSHE, ACMA3
emergent	2
maincanopy	5
subcanopy	2
Shrubs Total	5
Dominant Shrubs	GASH, MANE2, COCO6, ACCI
> 1.5' tall	5
< 1.5' tall	3
Graminoids Total	1
Dominant Graminoids	
Graminoids Perennial	1
Graminoids Annual	0
Forbs Total	2
Dominant Forbs	POMU
Forbs Perennial	2
Forbs Annual	1
Ferns Total	4
Ferns Evergreen	4
Ferns Deciduous	2
ExoticsTotal	2
Exotics Perennial	2
Exotics Annual	0
Water	0
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss Lichen	5
Litter	95
Logging	3
Stand Age	5
Agriculture	0
Livestock	0
Development	3
Wildlife	7
Recreation Severity	3
Recreation Type	3
Hydrology	1

Exotic Species

Primary Exotic
HEHE
Secondary Exotic

Noxious Exotic

Plant Associations

	Percent	Pattern	Rank
1. PSME-TSHE/GASH/POMU (CHAPPELL)	80	Matrix	2
2. PSME-ABGR/COCO6/POMU (CHAPPELL)	20	Large	2
3.	0		0

Notes: wildlife is birds

Polygon Number	**23**
Survey Intensity	1
Observer	HS
Date	5/31/2006
Specific Location	NE of camping areas.
Total Vegetation	6
Trees Total	5
Dominant Trees	PSME, ABGR, TSHE, ACMA3
emergent	3
maincanopy	5
subcanopy	2
Shrubs Total	5
Dominant Shrubs	GASH, COCO6, MANE2, VAPA
> 1.5' tall	5
< 1.5' tall	3
Graminoids Total	2
Dominant Graminoids	
Graminoids Perennial	2
Graminoids Annual	1
Forbs Total	3
Dominant Forbs	POMU
Forbs Perennial	3
Forbs Annual	1
Ferns Total	5
Ferns Evergreen	5
Ferns Deciduous	2
ExoticsTotal	1
Exotics Perennial	1
Exotics Annual	0
Water	0
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss Lichen	4
Litter	96
Logging	2
Stand Age	6
Agriculture	0
Livestock	0
Development	3
Wildlife	7
Recreation Severity	3
Recreation Type	3
Hydrology	1

Exotic Species

Primary Exotic	
HEHE	
Secondary Exotic	
ILAQ80	
Noxious Exotic	

Plant Associations

	Percent	Pattern	Rank
1. PSME-TSHE/GASH/POMU (CHAPPELL)	58	Matrix	2
2. PSME-ABGR/COCO6/POMU (CHAPPELL)	37	Large	2
3. ALRU2/RUSP c.t. (KUNZE)	5	Small	2

Notes: wildlife is birds, bear

Polygon Number	**23B**
Survey Intensity	1
Observer	HS
Date	7/25/2006
Specific Location	E SIDE OF PARK, BEHIND RANGER STATION
Total Vegetation	6
Trees Total	5
Dominant Trees	PSME, ABGR, ACMA3
emergent	3
maincanopy	5
subcanopy	3
Shrubs Total	5
Dominant Shrubs	COCO6, GASH, ACCI
> 1.5' tall	5
< 1.5' tall	3
Graminoids Total	1
Dominant Graminoids	
Graminoids Perennial	1
Graminoids Annual	0
Forbs Total	2
Dominant Forbs	
Forbs Perennial	2
Forbs Annual	0
Ferns Total	4
Ferns Evergreen	4
Ferns Deciduous	2
ExoticsTotal	2
Exotics Perennial	2
Exotics Annual	0
Water	0
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss Lichen	5
Litter	95
Logging	2
Stand Age	6
Agriculture	0
Livestock	0
Development	3
Wildlife	3
Recreation Severity	3
Recreation Type	3
Hydrology	1

Exotic Species

Primary Exotic
HEHE
Secondary Exotic
SOAU
Noxious Exotic

Plant Associations

		Percent	Pattern	Rank
1.	PSME-ABGR/COCO6/POMU (CHAPPELL)	100	Matrix	2
2.		0		0
3.		0		0

Notes: Ferns: POMU. Ivy infestation!

Polygon Number	**24**
Survey Intensity	1
Observer	HS
Date	5/31/2006
Specific Location	W side of park.
Total Vegetation	6
Trees Total	6
Dominant Trees	PSME, ABGR, ACMA3
emergent	3
maincanopy	5
subcanopy	2
Shrubs Total	5
Dominant Shrubs	COCO6, GASH, MANE2, SYAL
> 1.5' tall	5
< 1.5' tall	2
Graminoids Total	1
Dominant Graminoids	
Graminoids Perennial	1
Graminoids Annual	0
Forbs Total	2
Dominant Forbs	POMU
Forbs Perennial	2
Forbs Annual	1
Ferns Total	5
Ferns Evergreen	5
Ferns Deciduous	2
ExoticsTotal	1
Exotics Perennial	1
Exotics Annual	0
Water	0
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss Lichen	3
Litter	97
Logging	2
Stand Age	6
Agriculture	0
Livestock	0
Development	6
Wildlife	7
Recreation Severity	3
Recreation Type	4
Hydrology	2

Exotic Species

Primary Exotic	
ILAQ80	
Secondary Exotic	
VIMA	
Noxious Exotic	

Plant Associations

	Percent	Pattern	Rank
1. PSME-ABGR/COCO6/POMU (CHAPPELL)	70	Matrix	2
2. PSME-TSHE/GASH/POMU (CHAPPELL)	30	Small	2
3.	0		0

Notes: wildlife is birds

Polygon Number	**25**
Survey Intensity	1
Observer	HS
Date	5/31/2006
Specific Location	N of Sewage Lagoon
Total Vegetation	6
Trees Total	5
Dominant Trees	PSME
emergent	1
maincanopy	5
subcanopy	1
Shrubs Total	6
Dominant Shrubs	GASH, COCO6, HODI
> 1.5' tall	6
< 1.5' tall	2
Graminoids Total	1
Dominant Graminoids	
Graminoids Perennial	1
Graminoids Annual	0
Forbs Total	2
Dominant Forbs	PTAQ
Forbs Perennial	2
Forbs Annual	1
Ferns Total	3
Ferns Evergreen	1
Ferns Deciduous	3
ExoticsTotal	1
Exotics Perennial	1
Exotics Annual	0
Water	0
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss Lichen	3
Litter	97
Logging	3
Stand Age	1
Agriculture	0
Livestock	0
Development	6
Wildlife	0
Recreation Severity	0
Recreation Type	3
Hydrology	2

Exotic Species

Primary Exotic
ILAQ80
Secondary Exotic

Noxious Exotic

Plant Associations

		Percent	Pattern	Rank
1.	Mixed Shrub Undescribed (CHAPPELL)	60	Matrix	1
2.	PSME-TSHE/GASH/POMU (CHAPPELL)	40	Large	2
3.		0		0

Notes:

Polygon Number	**26**
Survey Intensity	1
Observer	HS
Date	5/31/2006
Specific Location	N side of park.
Total Vegetation	6
Trees Total	6
Dominant Trees	ALRU2, PSME, THPL, TSHE, ABGR
emergent	2
maincanopy	6
subcanopy	3
Shrubs Total	5
Dominant Shrubs	COCO6, RUSP, MANE2, GASH
> 1.5' tall	5
< 1.5' tall	2
Graminoids Total	2
Dominant Graminoids	
Graminoids Perennial	2
Graminoids Annual	0
Forbs Total	2
Dominant Forbs	POMU
Forbs Perennial	2
Forbs Annual	1
Ferns Total	5
Ferns Evergreen	5
Ferns Deciduous	3
ExoticsTotal	1
Exotics Perennial	1
Exotics Annual	0
Water	0
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss Lichen	5
Litter	95
Logging	3
Stand Age	2
Agriculture	0
Livestock	0
Development	3
Wildlife	7
Recreation Severity	3
Recreation Type	3
Hydrology	1

Exotic Species

Primary Exotic
ILAQ80
Secondary Exotic

Noxious Exotic

Plant Associations

	Percent	Pattern	Rank
1. ALRU2/POMU (CHAPPELL)	65	Matrix	2
2. TSHE-PSME/POMU-DREX2 (CHAPPELL)	25	Small	2
3. ALRU2/RUSP c.t. (KUNZE)	10	Small	2

Notes: wildlife is birds

Polygon Number	**27**
Survey Intensity	1
Observer	HS
Date	7/25/2006
Specific Location	NE corner of park.
Total Vegetation	6
Trees Total	6
Dominant Trees	ALRU2, ACMA3
emergent	1
maincanopy	6
subcanopy	1
Shrubs Total	4
Dominant Shrubs	COCO6, RUSP
> 1.5' tall	4
< 1.5' tall	1
Graminoids Total	1
Dominant Graminoids	
Graminoids Perennial	1
Graminoids Annual	0
Forbs Total	3
Dominant Forbs	TITR, DIFO
Forbs Perennial	3
Forbs Annual	1
Ferns Total	5
Ferns Evergreen	5
Ferns Deciduous	1
ExoticsTotal	0
Exotics Perennial	0
Exotics Annual	0
Water	0
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss Lichen	2
Litter	98
Logging	3
Stand Age	2
Agriculture	0
Livestock	0
Development	0
Wildlife	3
Recreation Severity	3
Recreation Type	3
Hydrology	1

Exotic Species

Primary Exotic

Secondary Exotic

Noxious Exotic

Plant Associations

		Percent	Pattern	Rank
1.	ALRU2/POMU (CHAPPELL)	100	Matrix	2
2.		0		0
3.		0		0

Notes: Ferns: POMU

Polygon Number	**28**
Survey Intensity	1
Observer	HS
Date	7/25/2006
Specific Location	N boundary of park.
Total Vegetation	6
Trees Total	6
Dominant Trees	PSME, THPL, ALRU2, TSHE
emergent	2
maincanopy	5
subcanopy	3
Shrubs Total	5
Dominant Shrubs	ACCI, RUSP
> 1.5' tall	5
< 1.5' tall	2
Graminoids Total	1
Dominant Graminoids	
Graminoids Perennial	1
Graminoids Annual	0
Forbs Total	3
Dominant Forbs	TITR, TOME
Forbs Perennial	3
Forbs Annual	1
Ferns Total	5
Ferns Evergreen	5
Ferns Deciduous	2
ExoticsTotal	1
Exotics Perennial	1
Exotics Annual	0
Water	0
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss Lichen	5
Litter	95
Logging	2
Stand Age	3
Agriculture	0
Livestock	0
Development	3
Wildlife	3
Recreation Severity	3
Recreation Type	3
Hydrology	1

Exotic Species

Primary Exotic
ILAQ80
Secondary Exotic

Noxious Exotic

Plant Associations

	Percent	Pattern	Rank
1. TSHE-PSME/POMU-DREX2 (CHAPPELL)	80	Matrix	2
2. ALRU2/POMU (CHAPPELL)	20	other	2
3.	0		0

Notes: Ferns: POMU

Polygon Number	**29**
Survey Intensity	1
Observer	HS
Date	7/25/2006
Specific Location	NE corner of park.
Total Vegetation	6
Trees Total	6
Dominant Trees	PSME, ALRU2
emergent	2
maincanopy	6
subcanopy	1
Shrubs Total	6
Dominant Shrubs	GASH, COCO6
> 1.5' tall	6
< 1.5' tall	3
Graminoids Total	1
Dominant Graminoids	
Graminoids Perennial	1
Graminoids Annual	0
Forbs Total	2
Dominant Forbs	
Forbs Perennial	2
Forbs Annual	1
Ferns Total	3
Ferns Evergreen	3
Ferns Deciduous	2
ExoticsTotal	1
Exotics Perennial	1
Exotics Annual	0
Water	0
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss Lichen	2
Litter	98
Logging	3
Stand Age	2
Agriculture	0
Livestock	0
Development	0
Wildlife	3
Recreation Severity	0
Recreation Type	0
Hydrology	1

Exotic Species

Primary Exotic
ILAQ80
Secondary Exotic

Noxious Exotic

Plant Associations

	Percent	Pattern	Rank
1. PSME-TSHE/GASH/POMU (CHAPPELL)	90	Matrix	2
2. ALRU2/POMU (CHAPPELL)	10	Small	2
3.	0		0

Notes: Ferns: POMU.

Polygon Number	**3**
Survey Intensity	1
Observer	HS
Date	7/24/2006
Specific Location	S wetlands
Total Vegetation	6
Trees Total	4
Dominant Trees	ALRU2, ABGR, FRLA
emergent	2
maincanopy	4
subcanopy	1
Shrubs Total	5
Dominant Shrubs	SPDO
> 1.5' tall	5
< 1.5' tall	1
Graminoids Total	4
Dominant Graminoids	CAOB3
Graminoids Perennial	4
Graminoids Annual	0
Forbs Total	2
Dominant Forbs	
Forbs Perennial	2
Forbs Annual	0
Ferns Total	1
Ferns Evergreen	1
Ferns Deciduous	1
ExoticsTotal	1
Exotics Perennial	1
Exotics Annual	0
Water	0
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss Lichen	0
Litter	100
Logging	3
Stand Age	2
Agriculture	0
Livestock	0
Development	0
Wildlife	3
Recreation Severity	0
Recreation Type	0
Hydrology	1

Exotic Species

Primary Exotic
RULA
Secondary Exotic

Noxious Exotic

Plant Associations

	Percent	Pattern	Rank
1. SPDO c.t. (KUNZE)	50	Large	2
2. FRLA/CAOB3 c.t. (KUNZE)	50	Large	2
3.	0		0

Notes: Margins of island, seasonally flooded.

Polygon Number	**30**
Survey Intensity	1
Observer	HS
Date	7/25/2006
Specific Location	W SIDE OF PARK.
Total Vegetation	0
Trees Total	0
Dominant Trees	
emergent	0
maincanopy	0
subcanopy	0
Shrubs Total	0
Dominant Shrubs	
> 1.5' tall	0
< 1.5' tall	0
Graminoids Total	0
Dominant Graminoids	
Graminoids Perennial	0
Graminoids Annual	0
Forbs Total	0
Dominant Forbs	
Forbs Perennial	0
Forbs Annual	0
Ferns Total	0
Ferns Evergreen	0
Ferns Deciduous	0
ExoticsTotal	0
Exotics Perennial	0
Exotics Annual	0
Water	0
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss Lichen	0
Litter	0
Logging	
Stand Age	
Agriculture	
Livestock	
Development	
Wildlife	
Recreation Severity	
Recreation Type	
Hydrology	

Exotic Species

Primary Exotic

Secondary Exotic

Noxious Exotic

Plant Associations

	Percent	Pattern	Rank
1. developed	100	Matrix	1
2.	0		0
3.	0		0

Notes: DISTURBED. WEEDY FIELDS (HOMESTEAD? BURN?) POPR, RULA, CIAR, AGAL.

Polygon Number	**31**
Survey Intensity	1
Observer	HS
Date	7/25/2006
Specific Location	E SIDE OF PARK
Total Vegetation	6
Trees Total	3
Dominant Trees	PSME, ACMA3, FRLA
emergent	1
maincanopy	3
subcanopy	1
Shrubs Total	6
Dominant Shrubs	RUSP, COCO6, SARA2
> 1.5' tall	6
< 1.5' tall	2
Graminoids Total	2
Dominant Graminoids	
Graminoids Perennial	2
Graminoids Annual	0
Forbs Total	4
Dominant Forbs	TITR, OESA
Forbs Perennial	4
Forbs Annual	1
Ferns Total	3
Ferns Evergreen	3
Ferns Deciduous	3
ExoticsTotal	1
Exotics Perennial	1
Exotics Annual	0
Water	0
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss Lichen	10
Litter	90
Logging	1
Stand Age	3
Agriculture	0
Livestock	0
Development	3
Wildlife	3
Recreation Severity	3
Recreation Type	3
Hydrology	1

Exotic Species

Primary Exotic
RARE3
Secondary Exotic

Noxious Exotic

Plant Associations

		Percent	Pattern	Rank
1.	ALRU2/RUSP c.t. (KUNZE)	80	Matrix	2
2.	TSHE-PSME/POMU-DREX2 (CHAPPELL)	20	Small	3
3.		0		0

Notes: Ferns: POMU, ATFI

Polygon Number	**32**
Survey Intensity	1
Observer	HS
Date	7/25/2006
Specific Location	E side of park.
Total Vegetation	6
Trees Total	6
Dominant Trees	ALRU2
emergent	1
maincanopy	6
subcanopy	1
Shrubs Total	5
Dominant Shrubs	COCO6, RUUR
> 1.5' tall	5
< 1.5' tall	3
Graminoids Total	1
Dominant Graminoids	
Graminoids Perennial	1
Graminoids Annual	0
Forbs Total	1
Dominant Forbs	
Forbs Perennial	1
Forbs Annual	0
Ferns Total	5
Ferns Evergreen	5
Ferns Deciduous	2
ExoticsTotal	1
Exotics Perennial	1
Exotics Annual	0
Water	0
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss Lichen	3
Litter	97
Logging	3
Stand Age	2
Agriculture	0
Livestock	0
Development	3
Wildlife	3
Recreation Severity	3
Recreation Type	3
Hydrology	1

Exotic Species

Primary Exotic
ILAQ80
Secondary Exotic

Noxious Exotic

Plant Associations

	Percent	Pattern	Rank
1. ALRU2/POMU (CHAPPELL)	100	Matrix	2
2.	0		0
3.	0		0

Notes: Ferns: POMU.

Polygon Number	**33**
Survey Intensity	1
Observer	HS
Date	5/31/2006
Specific Location	E side of park.
Total Vegetation	6
Trees Total	6
Dominant Trees	PSME, TSHE, ALRU2
emergent	1
maincanopy	6
subcanopy	2
Shrubs Total	4
Dominant Shrubs	COCO6, MANE2
> 1.5' tall	4
< 1.5' tall	2
Graminoids Total	1
Dominant Graminoids	
Graminoids Perennial	1
Graminoids Annual	0
Forbs Total	2
Dominant Forbs	POMU
Forbs Perennial	2
Forbs Annual	1
Ferns Total	5
Ferns Evergreen	5
Ferns Deciduous	2
ExoticsTotal	2
Exotics Perennial	2
Exotics Annual	0
Water	0
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss Lichen	2
Litter	98
Logging	3
Stand Age	2
Agriculture	0
Livestock	0
Development	3
Wildlife	7
Recreation Severity	3
Recreation Type	3
Hydrology	1

Exotic Species

Primary Exotic
ILAQ80
Secondary Exotic
HEHE
Noxious Exotic

Plant Associations

	Percent	Pattern	Rank
1. TSHE-PSME/POMU-DREX2 (CHAPPELL)	50	Matrix	2
2. PSME-TSHE/GASH/POMU (CHAPPELL)	43	Large	2
3. ALRU2/POMU (CHAPPELL)	7	Small	2

Notes: wildlife is birds

Polygon Number	**33B**
Survey Intensity	1
Observer	HS
Date	7/25/2006
Specific Location	E side of park.
Total Vegetation	6
Trees Total	6
Dominant Trees	PSME, TSHE
emergent	2
maincanopy	6
subcanopy	1
Shrubs Total	4
Dominant Shrubs	GASH, COCO6, RUUR
> 1.5' tall	4
< 1.5' tall	3
Graminoids Total	1
Dominant Graminoids	
Graminoids Perennial	1
Graminoids Annual	0
Forbs Total	2
Dominant Forbs	
Forbs Perennial	2
Forbs Annual	0
Ferns Total	5
Ferns Evergreen	5
Ferns Deciduous	2
ExoticsTotal	1
Exotics Perennial	1
Exotics Annual	0
Water	0
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss Lichen	5
Litter	95
Logging	3
Stand Age	2
Agriculture	0
Livestock	0
Development	3
Wildlife	3
Recreation Severity	3
Recreation Type	3
Hydrology	1

Exotic Species

Primary Exotic
HEHE
Secondary Exotic
ILAQ80
Noxious Exotic

Plant Associations

	Percent	Pattern	Rank
1. PSME-TSHE/GASH/POMU (CHAPPELL)	70	Matrix	2
2. TSHE-PSME/POMU-DREX2 (CHAPPELL)	30	Large	2
3.	0		0

Notes: Ferns: POMU

Polygon Number	**34**
Survey Intensity	1
Observer	HS
Date	7/25/2006
Specific Location	NW corner of park.
Total Vegetation	6
Trees Total	6
Dominant Trees	PSME, ABGR
emergent	1
maincanopy	6
subcanopy	2
Shrubs Total	5
Dominant Shrubs	GASH, COCO6
> 1.5' tall	5
< 1.5' tall	2
Graminoids Total	1
Dominant Graminoids	
Graminoids Perennial	1
Graminoids Annual	0
Forbs Total	2
Dominant Forbs	
Forbs Perennial	2
Forbs Annual	0
Ferns Total	3
Ferns Evergreen	3
Ferns Deciduous	1
ExoticsTotal	0
Exotics Perennial	0
Exotics Annual	0
Water	0
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss Lichen	2
Litter	98
Logging	3
Stand Age	2
Agriculture	0
Livestock	0
Development	0
Wildlife	3
Recreation Severity	0
Recreation Type	0
Hydrology	1

Exotic Species

Primary Exotic

Secondary Exotic

Noxious Exotic

Plant Associations

	Percent	Pattern	Rank
1. PSME-ABGR/COCO6/POMU (CHAPPELL)	100	Matrix	2
2.	0		0
3.	0		0

Notes: Ferns: POMU

Polygon Number	**35**
Survey Intensity	1
Observer	HS
Date	5/31/2006
Specific Location	W Side, N region of park.
Total Vegetation	6
Trees Total	6
Dominant Trees	PSME, ALRU2
emergent	1
maincanopy	6
subcanopy	1
Shrubs Total	3
Dominant Shrubs	COCO6, RUUR, GASH
> 1.5' tall	3
< 1.5' tall	1
Graminoids Total	1
Dominant Graminoids	
Graminoids Perennial	1
Graminoids Annual	0
Forbs Total	3
Dominant Forbs	POMU
Forbs Perennial	3
Forbs Annual	1
Ferns Total	4
Ferns Evergreen	4
Ferns Deciduous	2
ExoticsTotal	1
Exotics Perennial	1
Exotics Annual	0
Water	0
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss Lichen	5
Litter	95
Logging	3
Stand Age	2
Agriculture	0
Livestock	0
Development	3
Wildlife	7
Recreation Severity	3
Recreation Type	3
Hydrology	1

Exotic Species

Primary Exotic
ILAQ80
Secondary Exotic

Noxious Exotic

Plant Associations

	Percent	Pattern	Rank
1. TSHE-PSME/POMU-DREX2 (CHAPPELL)	85	Matrix	2
2. ALRU2/POMU (CHAPPELL)	10	Small	2
3. ALRU2/RUSP c.t. (KUNZE)	5	linear	2

Notes: wildlife is birds

Polygon Number	**36**
Survey Intensity	1
Observer	HS
Date	7/24/2006
Specific Location	N OF BIG ISLAND
Total Vegetation	6
Trees Total	0
Dominant Trees	
emergent	0
maincanopy	0
subcanopy	0
Shrubs Total	4
Dominant Shrubs	SPDO
> 1.5' tall	4
< 1.5' tall	0
Graminoids Total	4
Dominant Graminoids	CASI3
Graminoids Perennial	4
Graminoids Annual	0
Forbs Total	5
Dominant Forbs	METR3, NUPO2, POPA14
Forbs Perennial	5
Forbs Annual	1
Ferns Total	1
Ferns Evergreen	0
Ferns Deciduous	1
ExoticsTotal	2
Exotics Perennial	2
Exotics Annual	0
Water	0
Rock Outcrop	0
Gravel	0
Bare Ground	3
Moss Lichen	0
Litter	97
Logging	0
Stand Age	0
Agriculture	0
Livestock	0
Development	0
Wildlife	7
Recreation Severity	0
Recreation Type	0
Hydrology	1

Exotic Species

Primary Exotic
IRPS
Secondary Exotic

Noxious Exotic

Plant Associations

	Percent	Pattern	Rank
1. CACU5/Sphagnum sp. c.t. (KUNZE)	65	Matrix	3
2. SPDO/Sphagnum sp. c.t. (KUNZE)	25	Small	3
3. NUPO2 c.t. (KUNZE)	10	Small	3

Notes: wildlife is birds, beaver

Polygon Number	**37**
Survey Intensity	1
Observer	HS
Date	5/30/2006
Specific Location	S of campground, N of road.
Total Vegetation	6
Trees Total	6
Dominant Trees	PSME, ABGR, TSHE, ACMA3
emergent	2
maincanopy	6
subcanopy	3
Shrubs Total	5
Dominant Shrubs	ACCI, COCO6, MANE2
> 1.5' tall	5
< 1.5' tall	3
Graminoids Total	1
Dominant Graminoids	
Graminoids Perennial	1
Graminoids Annual	0
Forbs Total	2
Dominant Forbs	POMU
Forbs Perennial	2
Forbs Annual	1
Ferns Total	5
Ferns Evergreen	5
Ferns Deciduous	1
ExoticsTotal	2
Exotics Perennial	2
Exotics Annual	0
Water	0
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss Lichen	20
Litter	80
Logging	3
Stand Age	3
Agriculture	0
Livestock	0
Development	0
Wildlife	7
Recreation Severity	2
Recreation Type	3
Hydrology	1

Exotic Species

Primary Exotic
HEHE
Secondary Exotic

Noxious Exotic

Plant Associations

	Percent	Pattern	Rank
1. PSME-ABGR/COCO6/POMU (CHAPPELL)	100	Matrix	2
2.	0		0
3.	0		0

Notes: wildlife is birds

Polygon Number	**4**
Survey Intensity	1
Observer	HS
Date	7/24/2006
Specific Location	W border of park (wetlands)
Total Vegetation	4
Trees Total	0
Dominant Trees	
emergent	0
maincanopy	0
subcanopy	0
Shrubs Total	0
Dominant Shrubs	
> 1.5' tall	0
< 1.5' tall	0
Graminoids Total	0
Dominant Graminoids	
Graminoids Perennial	0
Graminoids Annual	0
Forbs Total	4
Dominant Forbs	NUPO2
Forbs Perennial	4
Forbs Annual	0
Ferns Total	0
Ferns Evergreen	0
Ferns Deciduous	0
ExoticsTotal	0
Exotics Perennial	0
Exotics Annual	0
Water	65
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss Lichen	0
Litter	35
Logging	0
Stand Age	0
Agriculture	0
Livestock	0
Development	0
Wildlife	0
Recreation Severity	0
Recreation Type	0
Hydrology	1

Exotic Species

Primary Exotic

Secondary Exotic

Noxious Exotic

Plant Associations

	Percent	Pattern	Rank
1. NUPO2 c.t. (KUNZE)	100	Matrix	3
2.	0		0
3.	0		0

Notes:

Polygon Number	**40**
Survey Intensity	1
Observer	HS
Date	7/25/2006
Specific Location	E side of park.
Total Vegetation	6
Trees Total	6
Dominant Trees	ACMA3, PSME, TSHE
emergent	3
maincanopy	5
subcanopy	2
Shrubs Total	4
Dominant Shrubs	COCO6, GASH, MANE2
> 1.5' tall	4
< 1.5' tall	3
Graminoids Total	1
Dominant Graminoids	
Graminoids Perennial	1
Graminoids Annual	0
Forbs Total	3
Dominant Forbs	
Forbs Perennial	3
Forbs Annual	0
Ferns Total	5
Ferns Evergreen	5
Ferns Deciduous	1
ExoticsTotal	0
Exotics Perennial	0
Exotics Annual	0
Water	0
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss Lichen	5
Litter	95
Logging	2
Stand Age	3
Agriculture	0
Livestock	0
Development	3
Wildlife	3
Recreation Severity	3
Recreation Type	3
Hydrology	1

Exotic Species

Primary Exotic

Secondary Exotic

Noxious Exotic

Plant Associations

	Percent	Pattern	Rank
1. TSHE-PSME/POMU-DREX2 (CHAPPELL)	70	Matrix	2
2. ALRU2/POMU (CHAPPELL)	30	Small	2
3.	0		0

Notes: Ferns: POMU. Lots of standing snags (root rot?)

Polygon Number	**5**
Survey Intensity	1
Observer	HS
Date	7/24/2006
Specific Location	S boundary of park.
Total Vegetation	6
Trees Total	5
Dominant Trees	ALRU2, PSME, THPL, ABGR, FRLA
emergent	2
maincanopy	5
subcanopy	2
Shrubs Total	5
Dominant Shrubs	SPDO, GASH, SALIX SP.
> 1.5' tall	5
< 1.5' tall	3
Graminoids Total	4
Dominant Graminoids	CAOB3
Graminoids Perennial	4
Graminoids Annual	0
Forbs Total	2
Dominant Forbs	
Forbs Perennial	2
Forbs Annual	0
Ferns Total	4
Ferns Evergreen	4
Ferns Deciduous	1
ExoticsTotal	2
Exotics Perennial	2
Exotics Annual	0
Water	0
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss Lichen	1
Litter	99
Logging	3
Stand Age	2
Agriculture	0
Livestock	0
Development	0
Wildlife	3
Recreation Severity	0
Recreation Type	0
Hydrology	1

Exotic Species

Primary Exotic
PHAR3
Secondary Exotic

Noxious Exotic

Plant Associations

	Percent	Pattern	Rank
1. PSME-TSHE/GASH/POMU (CHAPPELL)	50	Matrix	2
2. FRLA/CAOB3 c.t. (KUNZE)	30	Large	2
3. SPDO c.t. (KUNZE)	20	Small	2

Notes: Ferns: POMU

Polygon Number	**6**
Survey Intensity	2
Observer	
Date	
Specific Location	
Total Vegetation	0
Trees Total	0
Dominant Trees	
emergent	0
maincanopy	0
subcanopy	0
Shrubs Total	0
Dominant Shrubs	
> 1.5' tall	0
< 1.5' tall	0
Graminoids Total	0
Dominant Graminoids	
Graminoids Perennial	0
Graminoids Annual	0
Forbs Total	0
Dominant Forbs	
Forbs Perennial	0
Forbs Annual	0
Ferns Total	0
Ferns Evergreen	0
Ferns Deciduous	0
ExoticsTotal	0
Exotics Perennial	0
Exotics Annual	0
Water	0
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss Lichen	0
Litter	0
Logging	
Stand Age	
Agriculture	
Livestock	
Development	
Wildlife	
Recreation Severity	
Recreation Type	
Hydrology	

Exotic Species

Primary Exotic

Secondary Exotic

Noxious Exotic

Plant Associations

		Percent	Pattern	Rank
1.	Water	100	Matrix	3
2.		0		0
3.		0		0

Notes:

Polygon Number	**7**
Survey Intensity	1
Observer	HS
Date	7/24/2006
Specific Location	W island in wetlands.
Total Vegetation	6
Trees Total	5
Dominant Trees	PSME, THPL
emergent	2
maincanopy	5
subcanopy	2
Shrubs Total	5
Dominant Shrubs	GASH, VAPA, HODI, SALIX SP.
> 1.5' tall	5
< 1.5' tall	2
Graminoids Total	2
Dominant Graminoids	
Graminoids Perennial	2
Graminoids Annual	0
Forbs Total	4
Dominant Forbs	MADI
Forbs Perennial	4
Forbs Annual	1
Ferns Total	1
Ferns Evergreen	1
Ferns Deciduous	1
ExoticsTotal	0
Exotics Perennial	0
Exotics Annual	0
Water	0
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss Lichen	10
Litter	90
Logging	1
Stand Age	3
Agriculture	0
Livestock	0
Development	0
Wildlife	7
Recreation Severity	2
Recreation Type	3
Hydrology	1

Exotic Species

Primary Exotic

Secondary Exotic

Noxious Exotic

Plant Associations

	Percent	Pattern	Rank
1. Salix sp. c.t. (KUNZE)	60	Matrix	3
2. PSME-TSHE/GASH-MANE2 (CHAPPELL)	30	Large	2
3. TSHE-PSME/POMU-DREX2 (CHAPPELL)	10	Small	2

Notes: Eagles nests in PSME. wildlife is birds, beaver, and deer

Polygon Number	**89**
Survey Intensity	1
Observer	
Date	
Specific Location	
Total Vegetation	0
Trees Total	0
Dominant Trees	
emergent	0
maincanopy	0
subcanopy	0
Shrubs Total	0
Dominant Shrubs	
> 1.5' tall	0
< 1.5' tall	0
Graminoids Total	0
Dominant Graminoids	
Graminoids Perennial	0
Graminoids Annual	0
Forbs Total	0
Dominant Forbs	
Forbs Perennial	0
Forbs Annual	0
Ferns Total	0
Ferns Evergreen	0
Ferns Deciduous	0
ExoticsTotal	0
Exotics Perennial	0
Exotics Annual	0
Water	0
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss Lichen	0
Litter	0
Logging	
Stand Age	
Agriculture	
Livestock	
Development	
Wildlife	
Recreation Severity	
Recreation Type	
Hydrology	

Exotic Species

Primary Exotic

Secondary Exotic

Noxious Exotic

Plant Associations

	Percent	Pattern	Rank
1. developed	100	Matrix	1
2.	0		0
3.	0		0

Notes:

Polygon Number	**9**
Survey Intensity	1
Observer	
Date	
Specific Location	
Total Vegetation	0
Trees Total	0
Dominant Trees	
emergent	0
maincanopy	0
subcanopy	0
Shrubs Total	0
Dominant Shrubs	
> 1.5' tall	0
< 1.5' tall	0
Graminoids Total	0
Dominant Graminoids	
Graminoids Perennial	0
Graminoids Annual	0
Forbs Total	0
Dominant Forbs	
Forbs Perennial	0
Forbs Annual	0
Ferns Total	0
Ferns Evergreen	0
Ferns Deciduous	0
ExoticsTotal	0
Exotics Perennial	0
Exotics Annual	0
Water	0
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss Lichen	0
Litter	0
Logging	
Stand Age	
Agriculture	
Livestock	
Development	
Wildlife	
Recreation Severity	
Recreation Type	
Hydrology	

Exotic Species

Primary Exotic

Secondary Exotic

Noxious Exotic

Plant Associations

	Percent	Pattern	Rank
1. developed	100	Matrix	1
2.	0		0
3.	0		0

Notes:

Appendix E – Washington Natural Heritage Program Rare Plant Sighting Forms

Washington Natural Heritage Program Rare Plant Sighting Form:

Taxon Name: *Euonymus occidentale*
EO #:
Are you confident of the identification? Yes No Explain:

Survey Site Name: Seaquest State Park
Surveyor's Name/Phone/Email: Hans Smith, 509-996-2490, hans@pacificbio.org
Survey Date: 2006-05-31 (yr-mo-day)
County: Cowlitz
Quad Name: Silver Lake
Township: 10N Range: 1W Section(s): 33

Directions to site:

Mapping (see instructions): Attach a copy of the USGS 7.5 minute quad with the location and extent of the rare plant population clearly drawn. Do not reduce or enlarge the photocopy or printout of the map. If your map is a different scale (not recommen-ded) please write the scale on the map.

Please answer the following:
1. I used GPS to map the population: No (skip to #2) Yes (complete #1 & #3)
Coordinates are in electronic file on diskette (preferred) or Coordinates written below or attached. Description of what coordinates represent:

GPS accuracy: Uncorrected Corrected to <5m
GPS datum: NAD 83 Zone 10
GPS coordinates:
2. I used a topographic map to map the population:
Yes (complete #2) No (provide detailed directions & description above, and skip to #3)
I am confident I have accurately located and mapped the population at map scale:
Yes (skip to #3) No, but I am confident the population is within the general area indicated on the map as follows:
On the same map, use a highlighter to identify the outer boundary of the area where the population could be, given the uncertainties about your exact location.
3. I used the following features on the map to identify my location (stream, shoreline, bridge, road, cliff, etc.
To the best of my knowledge, I mapped the entire extent of this population
Yes No Unknown If no or unknown, explain:
Is a revisit needed? No Yes - if yes, why?:
Ownership (if known): Washington State Parks

Population Size (# of individuals or ramets) or estimate: Approximately 8 plants

Population (EO) Data (include population vigor, microhabitat, phenology, etc.): Flat topography, late succesional conifer forest, plants occur along an established trail, population appears healthy, no signs of herbivory or senescence, some plants are flowering.

Plant Association: PSME-TSHE/GASH/POMU (Chappell, 2004)

Associated Species (include % cover by layer and by individual species for dominants in each layer):
Lichen/moss layer: 5%

Herb layer: 60% MICA5, POMU, ATFI,

Shrub layer(s): 65% COCO6, GASH, MANE2, RUPA

Tree layer: 85% PSME, ACMA3

General Description (include description of landscape, surrounding plant communities, land forms, land use, etc.): Flat area along trail with hiking and mountain bike use. Forest is transitioning to late-successional phase.

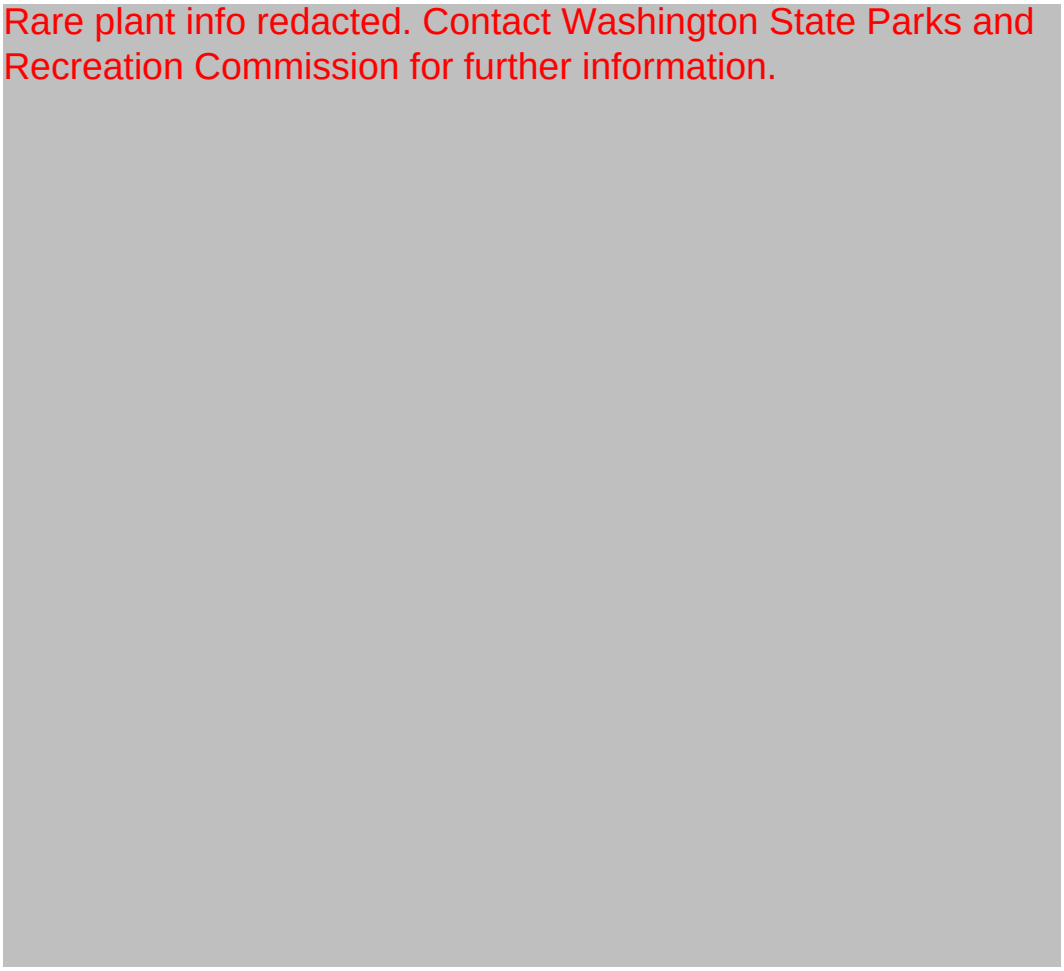
Elevation (ft.): 596
Size (acres): 1/20 Aspect: 0 degrees Slope 2 degrees
Photo taken? Yes No

Management Comments (exotics, roads, shape/size, position in landscape, hydrology, adjacent land use, cumulative effects, etc.): ILAQ80 is growing nearby – not seemingly a threat. Part of the larger plants are hanging over the trail – they may be accidentally cut during trail maintenance. Off trail hiking could disrupt the population.

Protection Comments (legal actions/steps/strategies needed to secure protection for the site): Site is already owned by WA State Parks. Minimize off-trail hiking. Educate any trail maintenance staff/volunteers to identify plant so as not to cut or kill it.

Additional Comments (discrepancies, general observations, etc.):

Please mail completed form with map:
WASHINGTON NATURAL HERITAGE PROGRAM
DEPARTMENT OF NATURAL RESOURCES
PO BOX 47014, OLYMPIA WA 98504-7014



Euonymus occidentale site (red circle)

Taxon Name: *Hydrocotyle ranunculoides*
EO #:
Are you confident of the identification? Yes No Explain:

Survey Site Name: Seaquest State Park
Surveyor's Name/Phone/Email: Hans Smith, 509-996-2490, hans@pacificbio.org
Survey Date: 2006-07-25 (yr-mo-day)
County: Cowlitz
Quad Name: Silver Lake
Township: 9N Range: 1W Section(s): 4

Directions to site:

Mapping (see instructions): Attach a copy of the USGS 7.5 minute quad with the location and extent of the rare plant population clearly drawn. Do not reduce or enlarge the photocopy or printout of the map. If your map is a different scale (not recommended) please write the scale on the map.

Please answer the following:
1. I used GPS to map the population: No (skip to #2) Yes (complete #1 & #3)
Coordinates are in electronic file on diskette (preferred) or Coordinates written below or attached. Description of what coordinates represent:

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On the same map, use a highlighter to identify the outer boundary of the area where the population could be, given the uncertainties about your exact location.
3. I used the following features on the map to identify my location (stream, shoreline, bridge, road, cliff, etc.
To the best of my knowledge, I mapped the entire extent of this population
Yes No Unknown If no or unknown, explain: Difficult access – could be more in other hard to reach areas.
Is a revisit needed? No
Ownership (if known): Washington State Parks

Population Size (# of individuals or ramets) or estimate: Approximately 8 individuals

Population (EO) Data (include population vigor, microhabitat, phenology, etc.): Lake shoreline, shallow water, water's edge, wetland shrub overstory, small population, no sign of herbivory or senescence. Small population – only 8 individuals found in one location.

Plant Association: Spiraea douglasii minerotrophic wetland community type (Kunze, 1994)

Associated Species (include % cover by layer and by individual species for dominants in each layer):
Lichen/moss layer:

Herb layer: 80% TYLA, JUEF, ANAR3, EPAN2

Shrub layer(s): 20% SPDO, RULA, RONU

Tree layer: 5% FRLA

General Description (include description of landscape, surrounding plant communities, land forms, land use, etc.): Along artificial berm (abandoned railway berm) in Silver Lake. Specimens are growing beneath thick shrubby and herbaceous vegetation at the water's edge (in the water). Berm is currently used as a walking path in the State Park. Off trail hiking appears to be infrequent. Boat access seems limited.

Elevation (ft.):482
Size (acres): 1/20 Aspect: 0 degrees Slope 0
Photo taken? Yes

Management Comments (exotics, roads, shape/size, position in landscape, hydrology, adjacent land use, cumulative effects, etc.): Some non-aquatic exotics growing along upper section of the berm, along walkway. Exotic aquatic plant, *Utricularia inflata*, is growing in similar habitat nearby. Herbicide sprays of walkway not suggested due to proximity to wetland habitat. Some RULA growing over the population – may need to be cut back to limit spread. Decrease risk of trampling by prohibiting off-trail hiking along berm.

Protection Comments (legal actions/steps/strategies needed to secure protection for the site): Site is already owned by WA State Parks.

Additional Comments (discrepancies, general observations, etc.):

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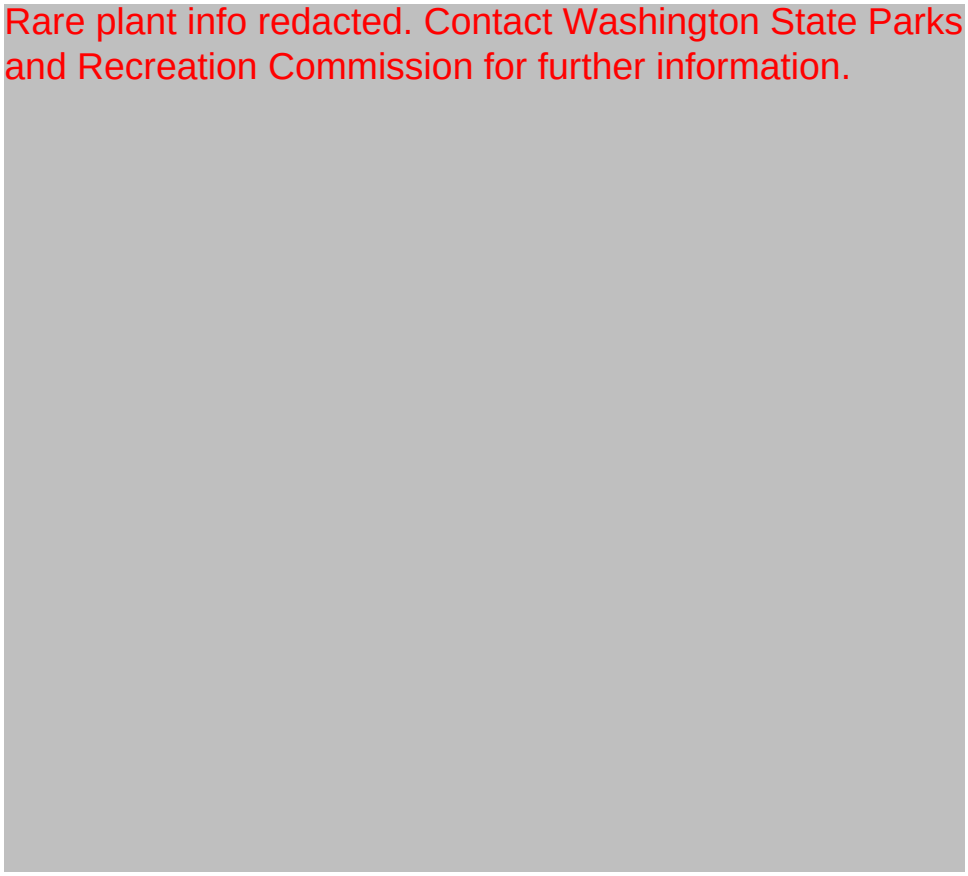

Hydrocotyle ranunculoides site (purple circle)