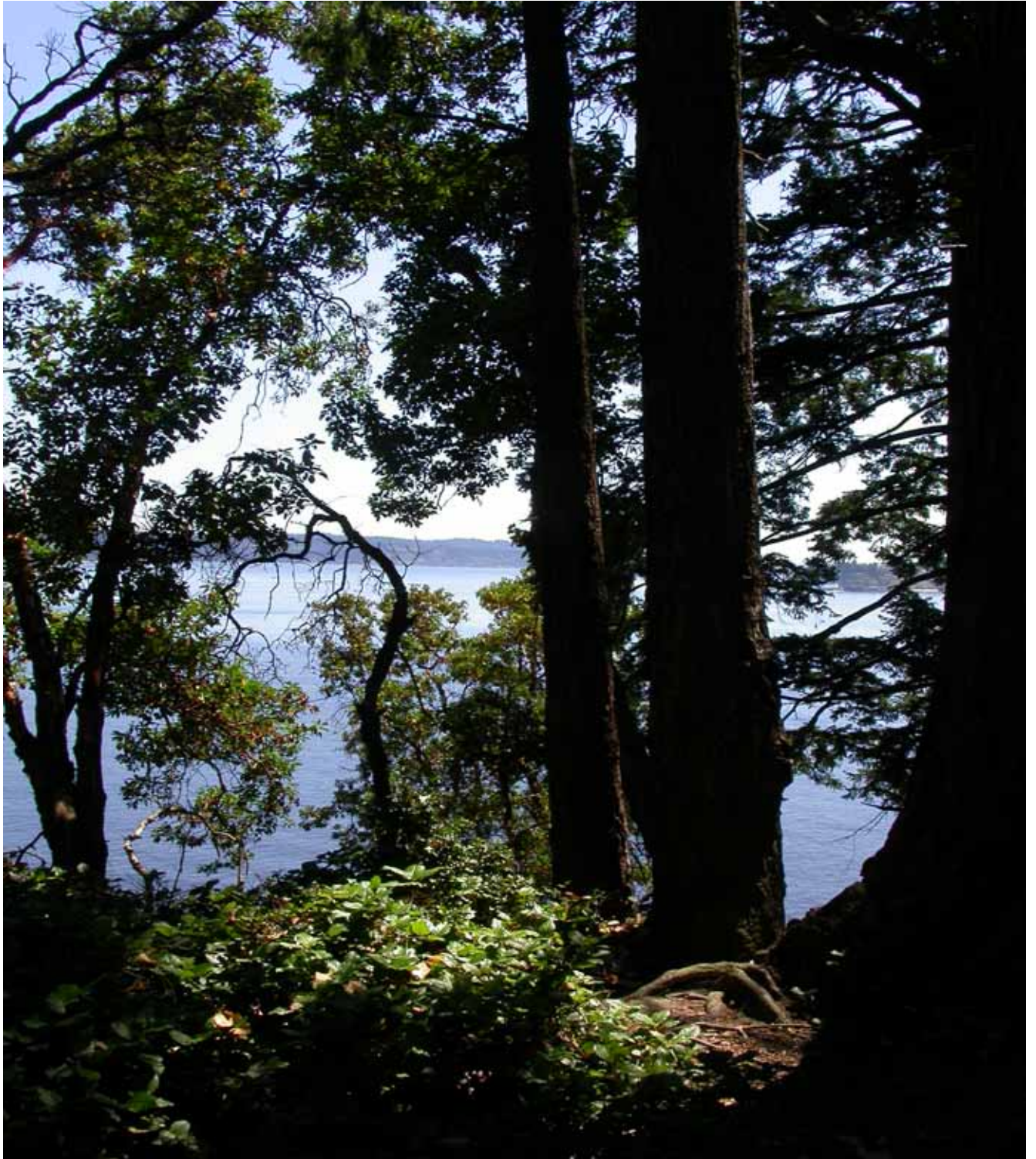


# Rare Plant and Vegetation Survey of Blake Island State Park



*Pacific Biodiversity Institute*



# Rare Plant and Vegetation Survey of Blake Island State Park

*Hans M. Smith IV*

[hans@pacificbio.org](mailto:hans@pacificbio.org)

*Peter H. Morrison*

[peter@pacificbio.org](mailto:peter@pacificbio.org)

*Dana Visalli*

[dana@methow.com](mailto:dana@methow.com)

January 2005

**Pacific Biodiversity Institute  
P.O. Box 298  
Winthrop, Washington 98862  
509-996-2490**

## **Recommended Citation**

Smith, H.M. IV, P.H. Morrison and D. Visalli. 2005. Rare Plant and Vegetation Survey of Blake Island State Park. Pacific Biodiversity Institute, Winthrop, Washington. 68 p.

## **Acknowledgements**

Dane Springmeyer, an intern with Pacific Biodiversity Institute, assisted with fieldwork and logistics for this project. The photographs in this report are by Peter Morrison and Hans Smith.

## **Project Funding**

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

# Table of Contents

Introduction.....	5
Vegetation Communities .....	5
Methods.....	5
Results.....	5
Examples of Vegetation Community Types .....	9
South End of Blake Island .....	9
1. <i>Pseudotsuga menziesii</i> - <i>Arbutus menziesii</i> / <i>Vaccinium ovatum</i> (PSME- ARME/VAOV) .....	10
2. Mosaic of <i>Alnus rubra</i> / <i>Polystichum munitum</i> (ALRU/POMU) and <i>Tsuga</i> <i>heterophylla</i> - <i>Pseudotsuga menziesii</i> / <i>Polystichum munitum</i> - <i>Dryopteris expansa</i> (TSHE-PSME/POMU-DREX) .....	11
3. <i>Acer macrophyllum</i> - <i>Alnus rubra</i> / <i>Polystichum munitum</i> – <i>Tellima grandiflora</i> (ACMA-ALRU/POMU-TEGR) .....	12
4. Rocky Beach .....	13
Northeast Corner of Blake Island .....	14
1. <i>Leymus mollis</i> – Sandy Beach.....	15
2. <i>Tsuga heterophylla</i> - <i>Pseudotsuga menziesii</i> / <i>Polystichum munitum</i> - <i>Dryopteris</i> <i>expansa</i> (TSHE-PSME/POMU-DREX) .....	16
Northwest Corner of Blake Island .....	17
1. <i>Alnus rubra</i> / <i>Polystichum munitum</i> (ALRU-POMU) .....	18
2. <i>Pseudotsuga menziesii</i> - <i>Arbutus menziesii</i> / <i>Gaultheria shallon</i> (PSME- ARME/GASH) .....	19
Botanical Inventory and Rare Plant Survey .....	20
Methods.....	20
Results.....	21
Vascular Plant List for Blake Island State Park.....	25
GIS Products Produced .....	29
References.....	29
Appendix A - Field Survey Schedule .....	30
Appendix B – Washington Natural Heritage Program Rare Plant Sighting Form .....	31
Appendix C – Vegetation Survey Data.....	33

# Introduction

Under contract with the Washington State Parks and Recreation Commission, Blake Island State Park, located in Kitsap 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 this contracted work.

## Vegetation Communities

### ***Methods***

Vegetation communities within Blake Island 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 2000) and freshwater wetland vegetation (Kunze 1994) to make final vegetation community assignments. 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.

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 satellite images for discernable vegetation or landform patterns. Topographic maps and digital elevation models (DEMs) were also employed to assist the process of vegetation community delineation. Limited unsupervised classification analysis of the ASTER spectral imagery was also conducted to assist community delineation. The final 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 drafted vegetation polygon layers were done by hand on hardcopy maps in the field, and later edited digitally in a GIS.

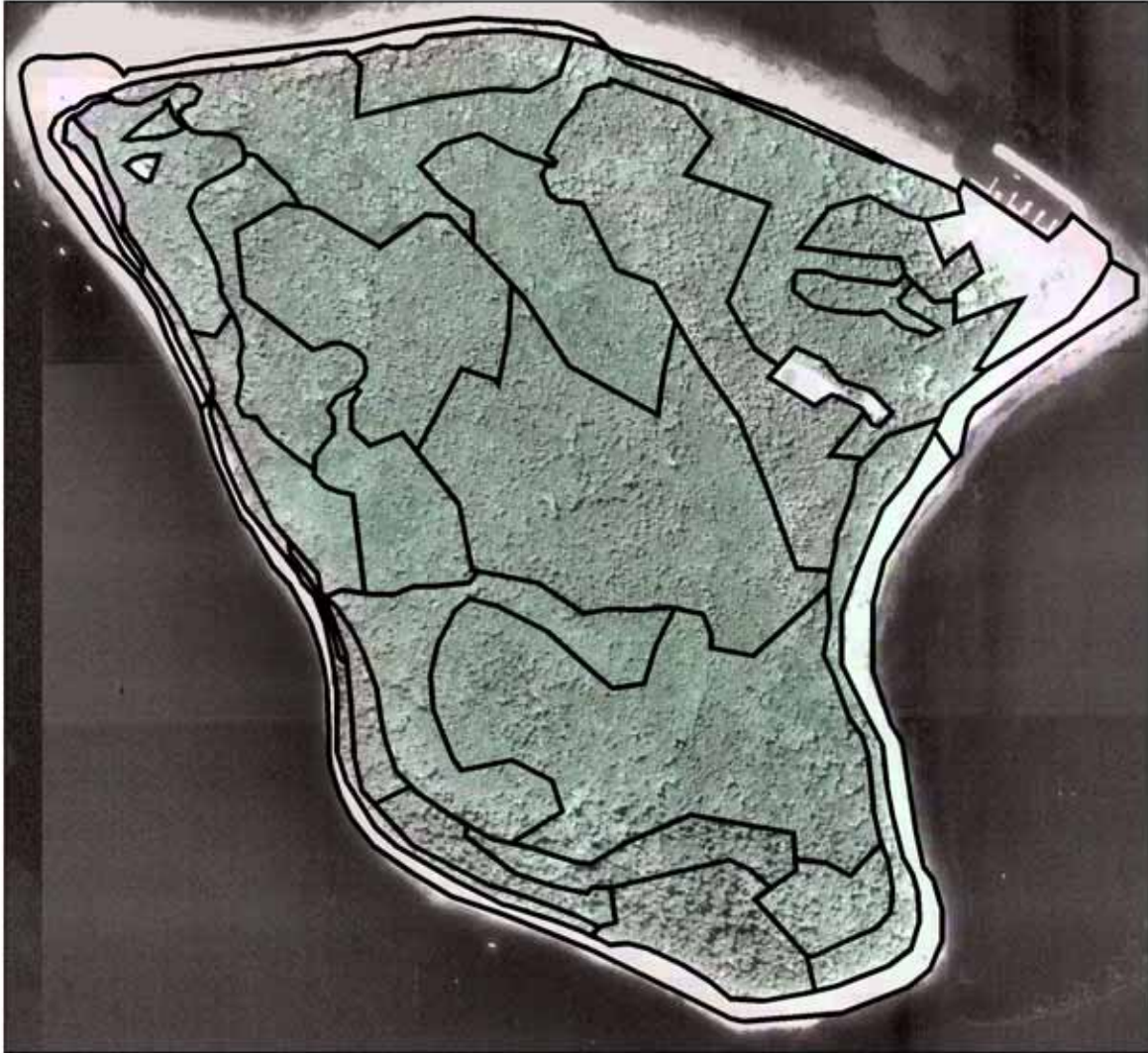
### ***Results***

We mapped and surveyed 31 vegetation community polygons, comprised of 12 vegetation community types, within Blake Island State Park. Vegetation community types are either stand-alone plant associations or mosaics of multiple plant associations. The following table lists the vegetation community types mapped. The least common type is the red alder - Pacific crabapple wetland. The Douglas-fir - Pacific madrone / salal plant association is also quite rare on the island.

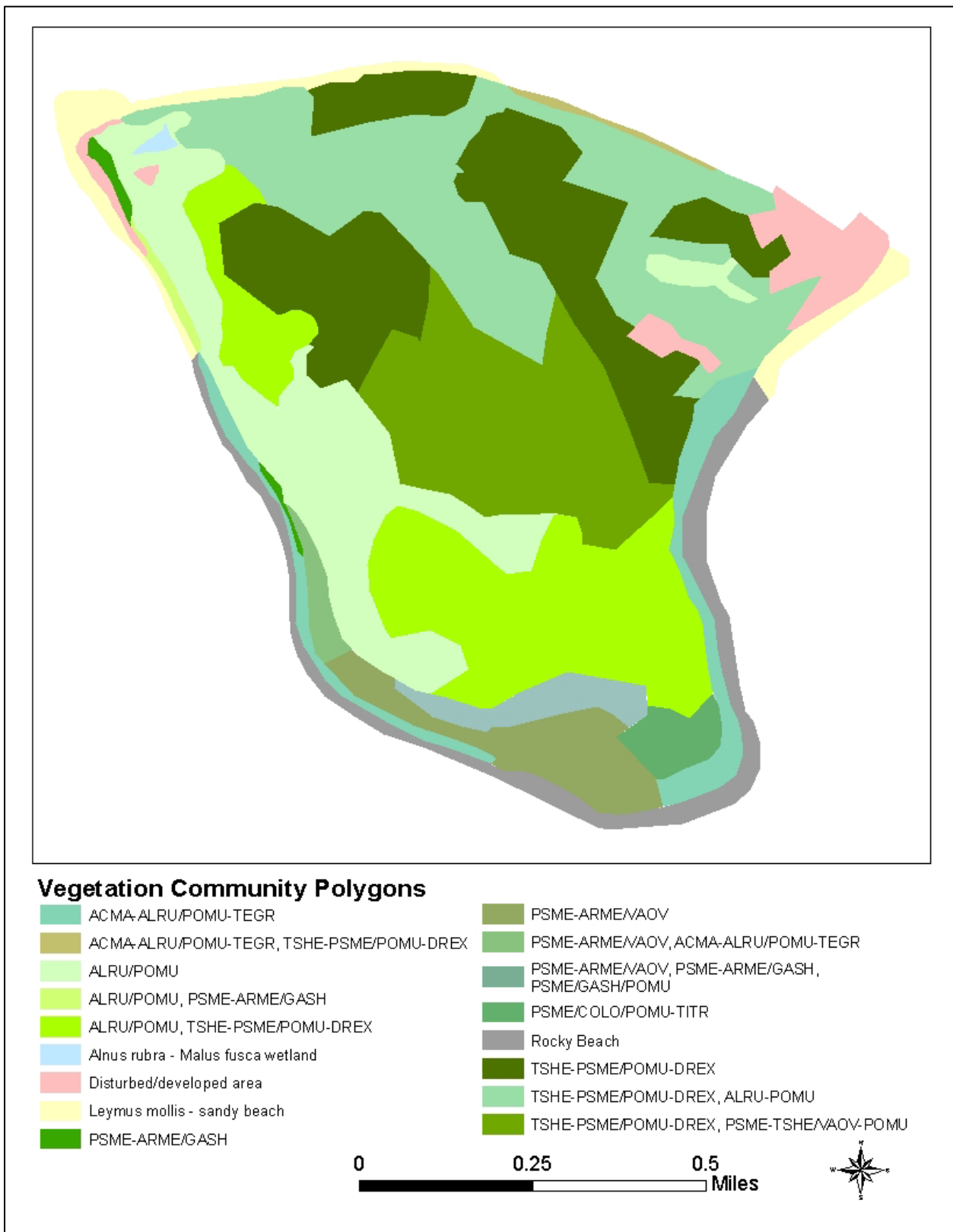
## Vegetation Community Types Encountered on Blake Island

Abbreviation	Association Name	English Name	Reference	Conservation Status
ALRU/POMU	<i>Alnus rubra</i> / <i>Polystichum munitum</i>	red alder / sword fern	Chappell 2000	G4S4
ACMA-ALRU/POMU-TEGR	<i>Acer macrophyllum</i> - <i>Alnus rubra</i> / <i>Polystichum munitum</i> – <i>Tellima grandiflora</i>	big leaf maple - red alder / sword fern - fringe cup	Chappell 2000	G2G3S2
PSME/COCO/POMU-TITR	<i>Pseudotsuga menziesii</i> / <i>Corylus cornuta</i> <i>var californica</i> / <i>Polystichum munitum</i> - <i>Tiarella trifoliata</i> <i>var trifoliata</i>	Douglas-fir / beaked hazelnut / sword fern - foamflower	Chappell 2000	???
PSME-ARME/GASH	<i>Pseudotsuga menziesii</i> - <i>Arbutus menziesii</i> / <i>Gaultheria shallon</i>	Douglas-fir - Pacific madrone / salal	Chappell 2000	G3S2
PSME-ARME/VAOV	<i>Pseudotsuga menziesii</i> - <i>Arbutus menziesii</i> / <i>Vaccinium ovatum</i>	Douglas-fir - Pacific madrone / evergreen huckleberry	Chappell 2000	G3S2 GNRS1
TSHE-PSME/POMU-DREX	<i>Tsuga heterophylla</i> - <i>Pseudotsuga menziesii</i> / <i>Polystichum munitum</i> - <i>Dryopteris expansa</i>	western hemlock - Douglas-fir / sword fern - spreading woodfern	Chappell 2000	G3S3
PSME/GASH/POMU	<i>Pseudotsuga menziesii</i> / <i>Gaultheria shallon</i> / <i>Polystichum munitum</i>	Douglas-fir / salal / sword fern	Chappell 2000	???
PSME-TSHE/VAOV-POMU	<i>Pseudotsuga menziesii</i> - <i>Tsuga heterophylla</i> / <i>Vaccinium ovatum</i> - <i>Polystichum munitum</i>	Douglas-fir - western hemlock / evergreen huckleberry / sword fern	Chappell 2000	G3S1
ALRU-MAFU	<i>Alnus rubra</i> - <i>Malus fusca</i> wetland	red alder - Pacific crabapple wetland	PBI	???
LEMO beach	<i>Leymus mollis</i> - sandy beach	American dunegrass - sandy beach	PBI	???
Rocky Beach	Rocky Beach	Rocky Beach	PBI	???
Disturbed/developed area	Disturbed/developed area	Disturbed/developed area	PBI	NA





**Map 1. Layout of the vegetation community polygons overlaying a 1994 digital ortho-photo combined with ASTER spectral imagery.**



**Map 2. The vegetation community types represented by each polygon.**

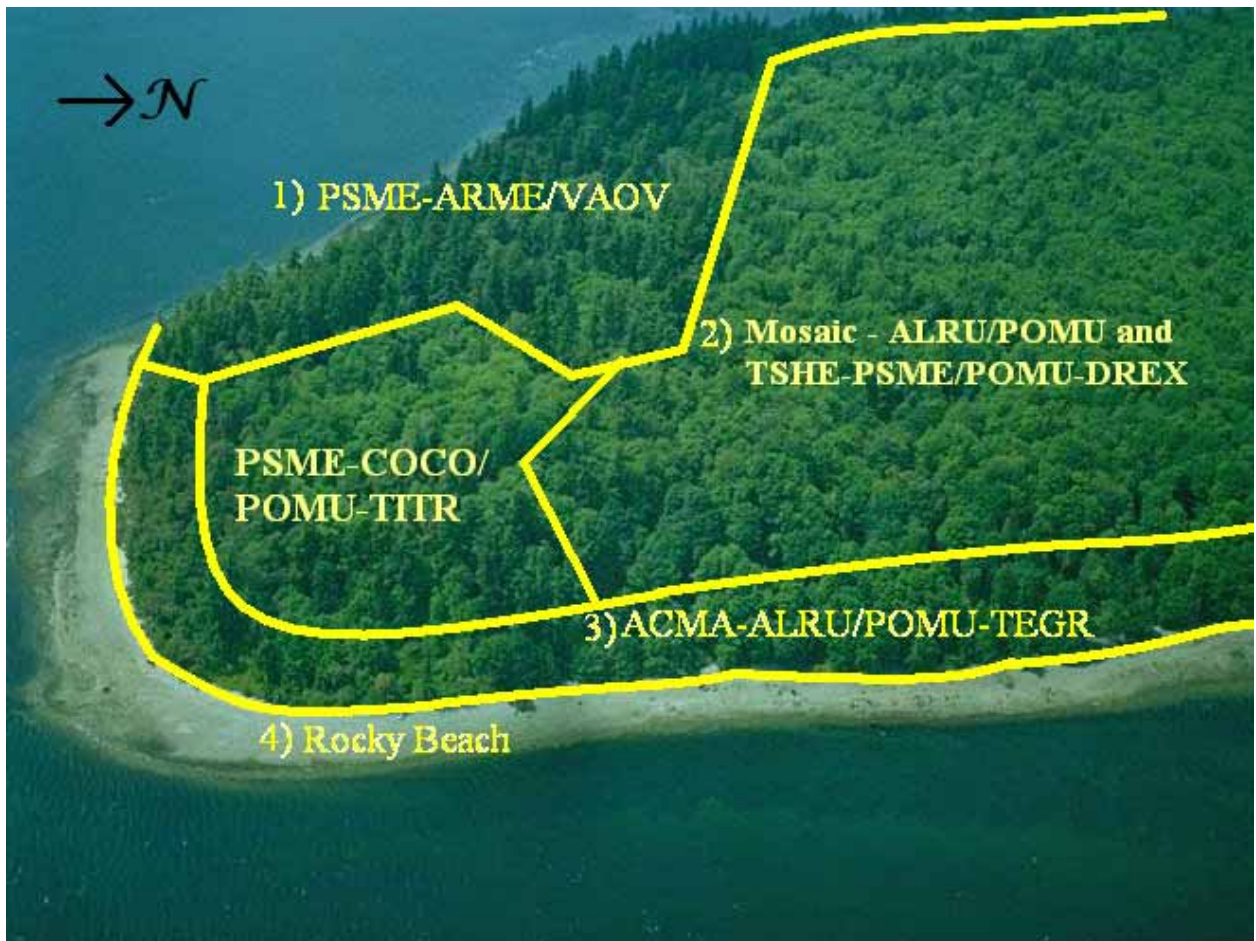


### ***Examples of Vegetation Community Types***

These examples of Blake Island's vegetation community types use photos from the 2004 field sessions to help depict the conditions and characteristics within each of the community polygons displayed on Map 2. Washington Department of Ecology shoreline photos have also been incorporated to illustrate community characteristics in the upper canopies of each polygon. Yellow lines drawn over the Department of Ecology shoreline photos illustrate the boundaries of the vegetation community polygons mapped in this project.

### **South End of Blake Island**

Note: The numbers associated with each vegetation community label in the picture below correspond to the following photos and descriptions.



1. *Pseudotsuga menziesii* - *Arbutus menziesii* / *Vaccinium ovatum* (PSME-ARME/VAOV)



The PSME-ARME/VAOV plant association on this part of Blake Island has some of the largest and most mature Douglas-fir specimens in the park. A few, true old-growth trees remain here. This plant association is limited in extent to more southerly exposures on gentle to steep slopes. Extensive slope failure along the steepest banks and poorly drained soils on the upper parts of the island seem to greatly constrain the extent of this plant association. This association differs from the PSME-ARME/GASH plant association by the amount of evergreen huckleberry (*Vaccinium ovatum*) versus salal (*Gaultheria shallon*) present in the understory.



2. Mosaic of *Alnus rubra* / *Polystichum munitum* (ALRU/POMU) and *Tsuga heterophylla* - *Pseudotsuga menziesii* / *Polystichum munitum* - *Dryopteris expansa* (TSHE-PSME/POMU-DREX)



The ALRU/POMU and the TSHE-PSME/POMU-DREX plant associations are the dominant forest types on Blake Island. The particular mosaic of ALRU/POMU as the matrix plant association, with significantly large inclusions of TSHE-PSME/POMU-DREX, is the most common vegetation community type we mapped in the park, covering most of the upland interior on gentle slopes. The patterning of plant associations within this community seem to have resulted from a complex land use history that involved extensive timber extraction activities and probably included intensive grazing of the meadows created after logging which promoted a deflected succession away from significant conifer regeneration in the large ALRU/POMU patches.

The vegetation community type consisting of a mosaic of TSHE-PSME/POMU-DREX and ALRU/POMU is differentiated by the vegetation community listed above by the TSHE-PSME/POMU-DREX plant association being the matrix with inclusions of ALRU/POMU randomly strewn throughout the polygon. Polygons consisting entirely of the TSHE-PSME/POMU-DREX plant association, or the ALRU/POMU plant association have also been mapped within the State Park.

3. *Acer macrophyllum* - *Alnus rubra* / *Polystichum munitum* – *Tellima grandiflora*  
(ACMA-ALRU/POMU-TEGR)



This plant association is limited to the erosional banks above the rocky and muddy shores of Blake Island. On-going slope failure events have promoted the establishment of this plant association – characterized by the presence of fringecup (*Tellima grandiflora*) in the understory of a deciduous tree canopy. Old big-leaf maple and red alders are abundant in the canopy of this association, with very little regeneration of any conifer species apparent.



#### 4. Rocky Beach



Very little terrestrial vegetation is to be found on the “rocky beach” of Blake Island. We included this region as a mapped vegetation community because there are occasional small annual or perennial herbs and grasses attached to the large woody debris deposited on the upper shore. One live cottonwood (*Populus balsamifera* ssp. *trichocarpa*) was found along the rocky beach – apparently it floated in and became partially buried under the rocky substrate where it is amazingly still producing live foliage.

## Northeast Corner of Blake Island

This area is the most heavily disturbed region of the park, though the TSHE-PSME/POMU-DREX community polygons contain some of the largest conifer trees on the island.





## 1. *Leymus mollis* – Sandy Beach



We created and included the “*Leymus mollis* – sandy beach” vegetation community, which differs from the rocky beach community because of the absence of a coarse rocky substrate and the dominant presence of American dunegrass (*Leymus mollis* ssp. *mollis*) on the upper shore. Beach pea (*Lathyrus japonicus*) and sand verbena (*Abronia latifolia*) are also present in the sandy beach areas, as are other native and exotic herbs and grasses.

2. *Tsuga heterophylla* - *Pseudotsuga menziesii* / *Polystichum munitum* - *Dryopteris expansa* (TSHE-PSME/POMU-DREX)



A few large patches of the TSHE-PSME/POMU-DREX plant association exist without the strong intermixed mosaic of the ALRU/POMU plant association, which is prevalent on Blake Island. These areas tend to have a much lower occurrence of exotic and invasive species in the understory, and have the best potential for developing into late successional forests similar to what may have been on Blake Island before logging and other human disturbances.



### Northwest Corner of Blake Island

This area contains a unique sand spit and soft, sandy beach area that offers great recreational value to campers and boaters. Unfortunately, intensive recreational use has had noticeable impacts on the native vegetation and ground cover. This area also contains the only PSME-ARME/GASH plant association and an annual wetland.



## 1. *Alnus rubra* / *Polystichum munitum* (ALRU-POMU)



Like the TSHE-PSME/POMU-DREX plant association, the ALRU-POMU plant association also has some large non-mosaic patches within the park. Logging or other large-scale human disturbance may have influenced the abundant presence of this plant association. Soil and hydrological conditions resulting from Blake Island's glacial history may have also played a role in maintaining a deciduous forest canopy without a conifer component. The photos above show the diversity of understory conditions within the ALRU-POMU plant association – in the left side photo there is a dense cover of sword fern (*Polystichum munitum*) while in the right side photo a dense cover of stinging nettle (*Urtica dioica*) keeps would-be bushwhackers bound to the trail system.



2. *Pseudotsuga menziesii* - *Arbutus menziesii* / *Gaultheria shallon* (PSME-ARME/GASH)

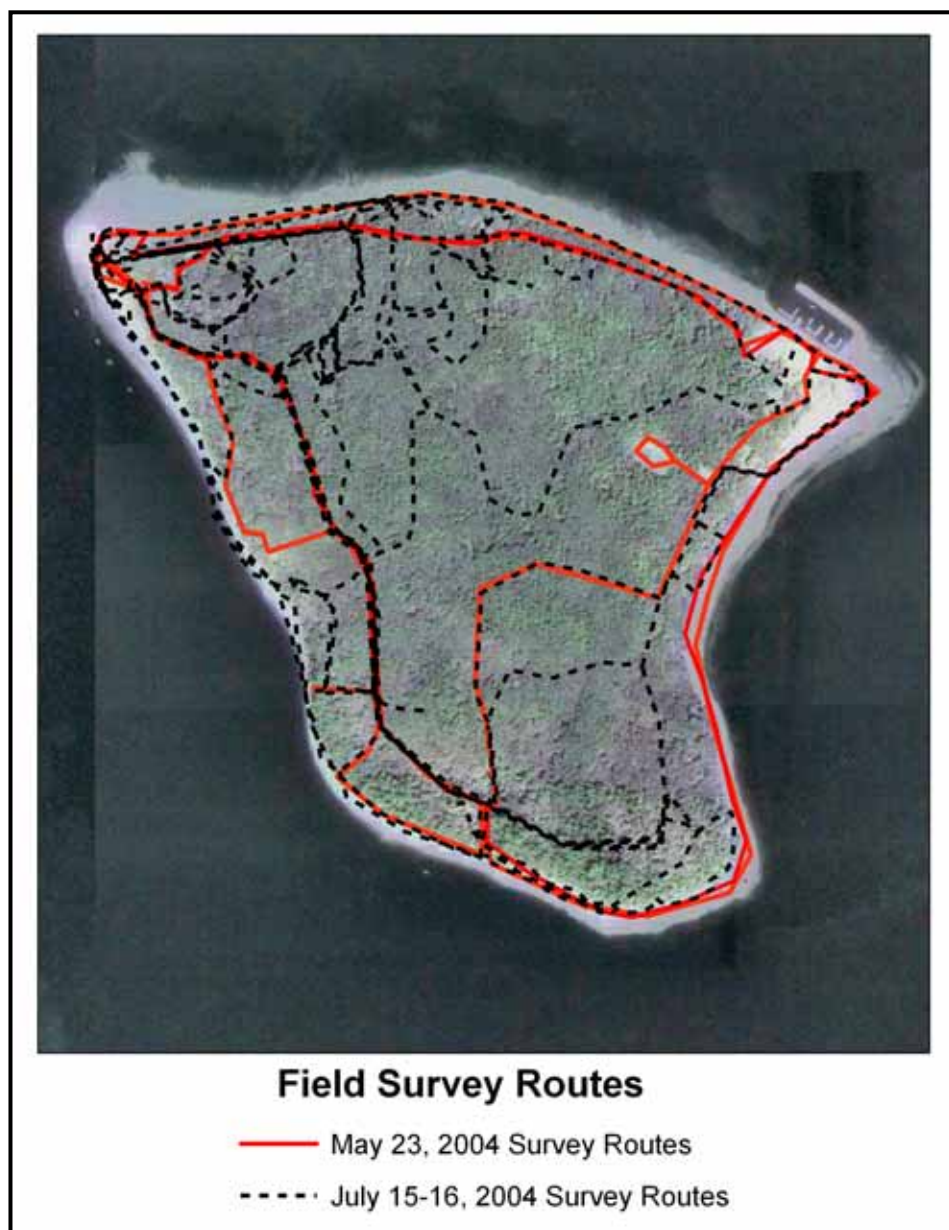


This plant association is limited to the northwestern portion of the park, essentially confined to steeper west/southwest facing banks above the shore between the flatter upland ALRU/POMU plant association and the high shore or developed/disturbed campground area. Portions of the PSME-ARME/GASH plant association have been severely trampled by humans causing mortality of the salal component and leaving a compacted soil base.

# Botanical Inventory and Rare Plant Survey

## Methods

We visited Blake Island State Park multiple times during the 2004 field season to conduct a rare plant survey. Field surveys were conducted on May 24 and July 14-16. 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 not currently listed on Blake Island, 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 cover a large proportion of the Park's area throughout the field season. We surveyed habitats of the park where rare plants are 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 (Map 3). Upon location of a listed rare or endangered plant species, all field data collected conformed to the Natural Heritage Program's field forms for rare plant sightings. That information is attached as an appendix to this report.

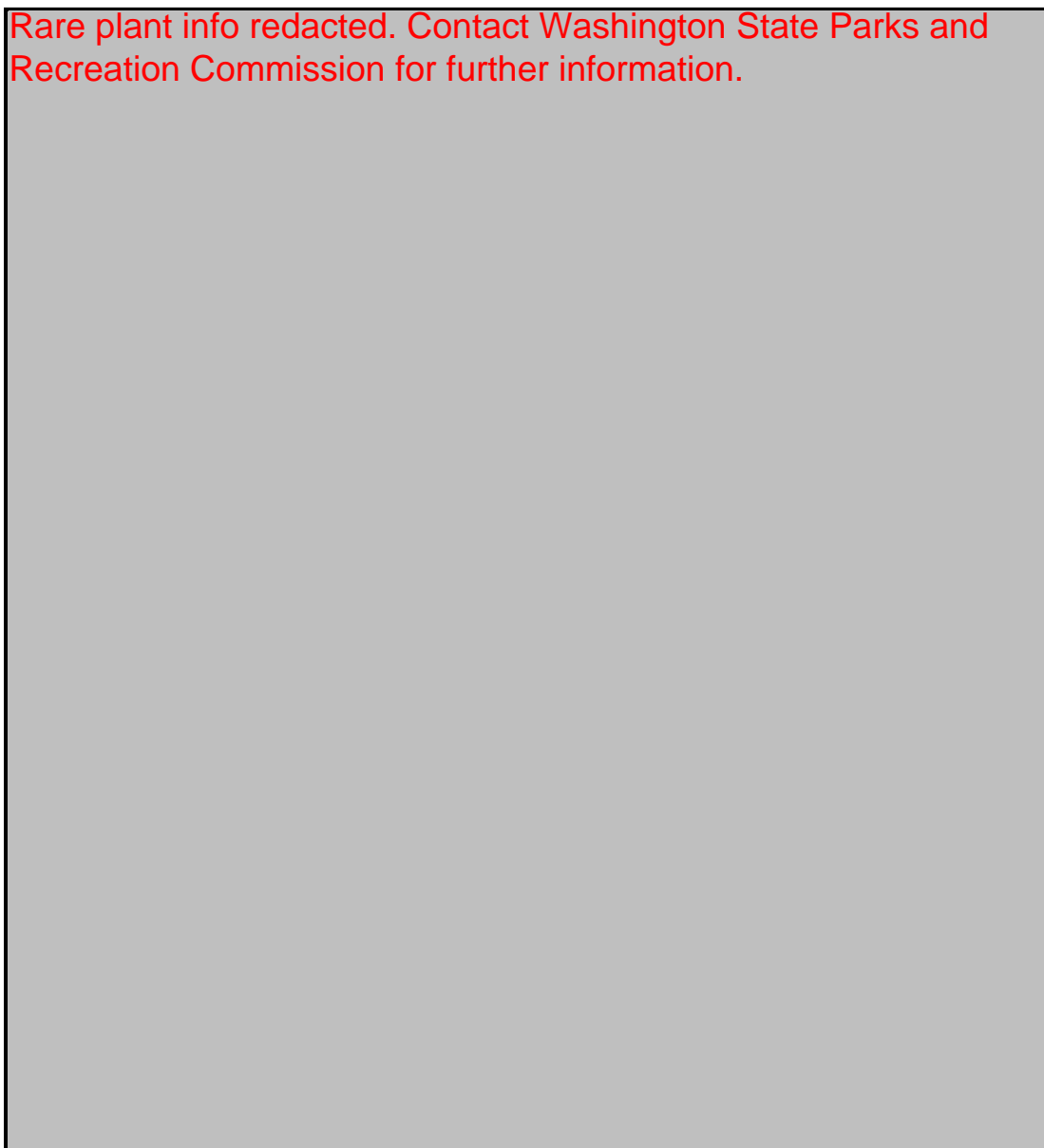
**Map 3. Survey routes for the rare and endangered plant surveys conducted by PBI in 2004.**



## **Results**

According to our initial research, giant chain fern (*Woodwardia fimbriata* Sm.) is the only plant considered sensitive by the State of Washington previously known to occur on Blake Island. This, in fact, was the only state listed species we encountered in the 2004 field sessions. Available spatial data concerning the whereabouts of giant chain fern on Blake Island was extremely inaccurate. The current WA NHP GIS layer shows *Woodwardia* in the more central part of Blake Island, near the northwest tip. We searched that location extensively and there are no plants there. It is also not appropriate habitat.

However we were able to locate an abundant, though restricted, population of this species on the southern end of Blake Island within the ACMA-ALRU/POMU-TEGR plant association. A Washington Natural Heritage Program rare plant sighting form is attached as Appendix B to this report.



**Map 4. The location of the population of *Woodwardia fimbriata* located in 2004.**



Location of *Woodwardia fimbriata* shown on a Washington State Department of Ecology shoreline aerial photograph (looking north). *Woodwardia* grows in the area between the red line and the tide line, near the base of a very steep slope.

*Woodwardia fimbriata* on July 16, 2004 within the ACMA-ALRU/POMU-TEGR plant association.





**Hundreds of young giant chain fern sporophytes were found around the more mature specimens.**



**The giant chain ferns on Blake Island were all found growing within 1 to 20 meters elevation and many were just above the high tide line.**



A comprehensive species list of all other plants observed and identified by PBI is included below. None of the other 173 species (besides *Woodwardia fimbriata*) observed on Blake Island are listed as having any rare or endangered status by the State of Washington. Impacts of historical logging on interior forest conditions as well as intensive recreational use of the shoreline environments may have negatively affected habitat conditions where rare or endangered plants may have previously occurred.

An abundance of exotic and invasive species were observed and identified by PBI staff, some of which were great enough in population size throughout the island to be considered an infestation. Fifty-six alien plants were found during our surveys, comprising about 32% of the island's current vascular flora. The degree of alien plant invasion is not a good sign for the ecological health of this island park. Islands notoriously have problems with alien species dominating native species. Blake Island is on its way toward becoming significantly compromised by alien plants. Luckily, the mature and old-growth forest cover is an impediment toward alien plant invasion. Maintenance of this forest cover is essential to managing the alien plant invasion.

Based on our inventory, we recommend exotic species control and eradication programs be focused on encouraging the establishment of conifer forest cover in areas where past logging, clearing for farming and then field abandonment has occurred. In these areas successional processes have replaced coniferous forests with deciduous dominated by red alder. These are mapped as the *Alnus rubra* / *Polystichum munitum* cover type. Manually planting native conifer saplings of Douglas-fir or western hemlock may help to catalyze conifer re-growth. We also recommend that large woody exotic species such as *Ilex aquifolium* and *Hedera helix* be systematically removed from the understory of existing forest stands. The infestation of *Hedera helix* on the island is still limited to areas around Tillacum Village, and it would be advantageous to control this conifer-killer before it successfully infests a greater proportion of the island's area. *Ilex aquifolium* is more widespread throughout the park, but it is such a large woody plant and it does not typically overgrow an area. Individual plants can be successfully removed using simple manual tools that will not injure the soil or native plant roots.

Preventing Blake Island visitors from trampling understory vegetation, especially on the steeper hillsides above the island's shoreline will hopefully limit human caused erosion and native plant mortality that can favor invasive species establishment. Around campgrounds, visitors should be advised to limit their movements off existing paths so as not establish "renegade" paths which people (especially kids) will mistake for real park paths. Chronic use of such paths kills understory vegetation and helps to distribute invasive plant seeds into the surrounding forests.

If another listed species besides *Woodwardia fimbriata* exists on Blake Island, it would most likely be found within the ACMA-ALRU/POMU-TEGR vegetation community polygons. This plant association is the least impacted by human-caused disturbances. Frequent, low-intensity slope-failure events seem to help sustain an understory of unusually high species diversity, especially for small herbaceous species. Any future botanical explorations of Blake Island State Park would be well advised to focus attention on cataloguing the herbaceous and graminoid diversity within this community.

## *Vascular Plant List for Blake Island State Park*

<b>#</b>	<b>Scientific Name</b>	<b>Common Name</b>	<b>Code</b>	<b>Family</b>	<b>Type</b>	<b>Alien?</b>	<b>Listed</b>
1	<i>Abies grandis</i>	grand fir	ABGR	Pinaceae	t		
2	<i>Abronia latifolia</i>	yellow sand verbena	ABLA2	Nyctaginaceae	p		
3	<i>Acer macrophyllum</i>	bigleaf maple	ACMA3	Aceraceae	t		
4	<i>Achillea millefolium</i>	common yarrow	ACMI2	Compositae	p		
5	<i>Adiantum pedatum</i>	northern maidenhair fern	ADPE	Polypodiaceae	f		
6	<i>Agropyron repens</i>	quackgrass	AGRE2	Gramineae	g	a	
7	<i>Agrostis thurberiana</i>	Thurber bentgrass		Gramineae	g		
8	<i>Aira caryophyllea</i>	silver hairgrass	AICA	Gramineae	g	a	
9	<i>Aira praecox</i>	little hairgrass	AIPR	Gramineae	g	a	
10	<i>Alnus rubra</i>	red alder	ALRU2	Betulaceae			
11	<i>Alopecurus geniculatus</i>	water foxtail	ALGE2	Gramineae	p		
12	<i>Ambrosia chamissonis</i>	silver burweed	AMCH4	Compositae	p		
13	<i>Anaphalis margaritacea</i>	pearly everlasting	ANMA	Compositae	p		
14	<i>Anthoxanthum odoratum</i>	sweet vernalgrass	ANOD5	Gramineae	g	a	
15	<i>Arbutus menziesii</i>	Pacific madrone	ARME	Ericaceae	t		
16	<i>Artemisia suksdorfii</i>	coast mugwort	ARSU	Compositae	p		
17	<i>Aruncus sylvester</i>	goatsbeard	ARSY	Rosaceae	s		
18	<i>Athyrium filix-femina</i>	lady-fern	ATFI	Polypodiaceae	f		
19	<i>Barbarea orthoceras</i>	American wintercress	BAOR	Brassicaceae	p		
20	<i>Bellis perennis</i>	english daisy	BEPE2	Compositae	p	a	
21	<i>Berberis aquifolium</i>	Tall Oregongrape	BEAQ	Berberidaceae	s		
22	<i>Blechnum spicant</i>	deer-fern	BLSP	Polypodiaceae	f		
23	<i>Bromus commutatus</i>	hairy brome	BRCO4	Gramineae	g	a	
24	<i>Bromus rigidus</i>	ripgut brome	BRR1*	Gramineae	g	a	
25	<i>Bromus sitchensis</i>	Alaska brome	BRSI	Gramineae	g		
26	<i>Bromus tectorum</i>	cheatgrass	BRTE	Gramineae	g	a	
27	<i>Buddleja davidii</i>	butterflybush	BUDA2	Buddlejaceae	s	a	
28	<i>Cakile edentula</i>	american searocket	CAED	Cruciferae	p	a	
29	<i>Callitriche stagnalis</i>	pond water-starwort	CAST	Callitrichaceae	p		
30	<i>Capsella bursa-pastoris</i>	sheperd's purse	CABU2	Cruciferae	a	a	
31	<i>Cardamine pensylvanica</i>	Pennsylvania bittercress	CAPE	Cruciferae	a		
32	<i>Carex deweyana</i>	Dewey's sedge	CADE9	Cyperaceae	g		
33	<i>Carex lanuginosa</i>	woolly sedge	CALA30	Cyperaceae	g		
34	<i>Carex lyngbyei</i>	Lyngby's sedge	CALY3	Cyperaceae	g		
35	<i>Carex macrocephala</i>	big-headed sedge	CAMA10	Cyperaceae	g		
36	<i>Carex obnupta</i>	slough sedge	CAOB3	Cyperaceae	g		
37	<i>Carex pachystachya</i>	thick-headed sedge	CAPA14	Cyperaceae	g		
38	<i>Carex stipata</i>	sawbeak sedge	CAST5	Cyperaceae	g		

39	<i>Cerastium viscosum</i>	sticky chickweed	CEVI3	Caryophyllaceae	a	a
40	<i>Chenopodium album</i>	lambsquarters	CHAL7	Chenopodiaceae	a	a
41	<i>Chrysanthemum leucanthemum</i>	oxeye daisy	CHLE80	Compositae	p	a
42	<i>Cineraria maritima</i>	dusty miller	CIMA*	Compositae	p	a
43	<i>Circaea alpina</i>	enchanter's nightshade	CIAL	Onagraceae	p	
44	<i>Cirsium arvense</i>	Canada thistle	CIAR4	Compositae	p	a
45	<i>Cirsium edule</i>	indian thistle	CIED	Compositae	p	
46	<i>Cirsium vulgare</i>	bull thistle	CIVU	Compositae	b	a
47	<i>Collomia heterophylla</i>	varied-leaved collomia	COHE2	Polemoniaceae	a	
48	<i>Convolvulus sepium</i>	bell bindweed	SOSE*	Convolvulaceae	p	a
49	<i>Crataegus monogyna</i>	cultivated hawthorn	CRMO3	Rosaceae	t	a
50	<i>Dactylis glomerata</i>	orchardgrass	DAGL	Gramineae	g	a
51	<i>Digitalis purpurea</i>	foxglove	DIPU	Scrophulariaceae	a	a
52	<i>Distichlis stricta</i>	alkali saltgrass	DIST3	Gramineae	p	
53	<i>Eleocharis palustris</i>	common spike-rush	ELPA3	Cyperaceae	g	
54	<i>Epilobium angustifolium</i>	fireweed	EPAN2	Onagraceae	p	
55	<i>Epilobium glaberrimum</i>	glaucus willowherb	EPGL	Onagraceae	p	
56	<i>Equisetum arvense</i>	field horsetail	EQAR	Equisetaceae	p	
57	<i>Equisetum scirpoides</i>	sedgelike horsetail	EQSC	Equisetaceae	p	
58	<i>Equisetum telmateia</i>	giant horsetail	EQTE	Equisetaceae	p	
59	<i>Erodium cicutarium</i>	storks-bill, filaree	ERCI6	Geraniaceae	a	a
60	<i>Festuca campestris</i>	rough fescue	FECA4	Gramineae	p	
61	<i>Festuca ovina</i>	sheep fescue	FEOV	Gramineae	g	
62	<i>Festuca rubra</i>	red fescue	FERU	Gramineae	g	
63	<i>Galium aparine</i>	cleavers	GAAP2	Rubiaceae	a	a
64	<i>Galium triflorum</i>	sweet scented bedstraw	GATR	Rubiaceae	p	
65	<i>Gaultheria shallon</i>	salal	GASH	Ericaceae	s	
66	<i>Geranium molle</i>	dovefoot geranium	GEMO	Geraniaceae	a	a
67	<i>Glyceria occidentalis</i>	western mannagrass	GLOC	Gramineae	g	
68	<i>Gnaphalium purpureum</i>	purple cudweed	GNPU	Compositae	p	
69	<i>Gnaphalium uliginosum</i>	marsh cudweed	GNUL	Compositae	a	a
70	<i>Grindelia integrifolia</i>	low gumweed	GRIN	Compositae	p	
71	<i>Gymnocarpium dryopteris</i>	oak fern	GYDR	Polypodiaceae	f	
72	<i>Hedera helix</i>	English ivy	HEHE/	Araliaceae	s	a
73	<i>Holcus lanatus</i>	common velvetgrass	HOLA	Gramineae	g	a
74	<i>Holodiscus discolor</i>	oceanspray	HODI	Rosaceae	s	
75	<i>Hordeum vulgare</i>	cultivated barley	HOVU	Gramineae	g	a
76	<i>Hypochaeris radicata</i>	hairy cat's-ear	HYRA3	Compositae	a	a
77	<i>Ilex aquifolium</i>	English holly	ILAQ80	Aquifoliaceae	s	a
78	<i>Iris chrysophylla</i>	yellow-leaved iris	IRCH	Iridaceae	p	a
79	<i>Juncus balticus</i>	Baltic rush	JUBA	Juncaceae	g	



80	<i>Juncus effusus</i>	common rush	JUEF	Juncaceae	g	
81	<i>Juncus lesueurii</i>	salt rush	JULE	Juncaceae	g	
82	<i>Lactuca muralis</i>	wall lettuce	LAMU	Compositae	a	a
83	<i>Lapsana communis</i>	common nipplewort	LACO3	Compositae	a	a
84	<i>Lathyrus japonicus</i>	beach pea	LAJA	Leguminosae	p	
85	<i>Lemna minor</i>	duckweed	LEMI3	Lemnaceae	a	
86	<i>Lepidium virginicum</i>	tall peppergrass	LEVI3	Cruciferae	a	
87	<i>Leymus mollis</i>	American dunegrass	LEMO	Gramineae	g	
88	<i>Linanthus bicolor</i>	bicolored linanthus	LIBI	Caryophyllaceae	a	
89	<i>Lonicera hispidula</i>	hairy honeysuckle	LOHI2	Caprifoliaceae	s	
90	<i>Lotus micranthus</i>	small-flowered deervetch	LOMI	Leguminosae	a	
91	<i>Lotus purshiana</i>	Spanish clover	LOPU3	Leguminosae	a	
92	<i>Lupinus arboreus</i>	tree lupine	LUAR	Leguminosae	p	
93	<i>Lupinus lepidus</i>	prairie lupine	LULE2	Leguminosae	p	
94	<i>Lupinus littoralis</i>	seashore lupine	LULI2	Leguminosae	s	
95	<i>Luzula campestris</i>	field woodrush	LUCA*	Juncaceae	g	
96	<i>Luzula parviflora</i>	small-flowered woodrush	LUPA	Juncaceae	g	
97	<i>Lychnis coronaria</i>	rose campion	LYCO	Caryophyllaceae	p	a
98	<i>Lysichitum americanum</i>	skunk cabbage	LYAM3	Araceae	p	
99	<i>Matricaria matricarioides</i>	pineapple weed	MAMA11	Compositae	a	
100	<i>Medicago lupulina</i>	black medic	MELU	Leguminosae	p	a
101	<i>Montia perfoliata</i>	miner's lettuce	MOPE	Caryophyllaceae	a	
102	<i>Montia sibirica</i>	Siberian miner's lettuce	MOSI2	Caryophyllaceae	a	
103	<i>Myosotis discolor</i>	yellow and blue forgetmenot	MYDI	Boraginaceae	a	
104	<i>Myosotis scorpiodes</i>	common forgetmenot	MYSC	Boraginaceae	a	a
105	<i>Nemophila parviflora</i>	small-flowered nemophila	NEPA	Hydrophyllaceae	a	
106	<i>Oemleria cerasiformis</i>	Indian plum	OECE	Rosaceae	s	
107	<i>Oenanthe sarmentosa</i>	water-parsley	OESA	Umbelliferaceae	p	
108	<i>Osmorhiza chilensis</i>	mountain sweet-cicely	OSCH	Umbelliferaceae	p	
109	<i>Picea sitchensis</i>	Sitka spruce	PISI	Pinaceae	t	
110	<i>Plantago lanceolata</i>	narrowleaf plantain	PLLA	Plantaginaceae	p	a
111	<i>Plantago major</i>	common plantain	PLMA2	Plantaginaceae	p	a
112	<i>Plantago maritima</i>	seaside plantain	PLMA	Plantaginaceae	p	
113	<i>Poa annua</i>	annual bluegrass	POAN	Gramineae	ag	a
114	<i>Poa bulbosa</i>	bulbous bluegrass	POBU	Gramineae	ag	a
115	<i>Poa palustris</i>	lake bluegrass	POPA2	Gramineae	g	
116	<i>Poa pratensis</i>	Kentucky bluegrass	POPR	Gramineae	g	a
117	<i>Polypodium glycyrrhiza</i>	licorice fern	POGL8	Polypodiaceae	f	
118	<i>Polystichum munitum</i>	sword-fern	POMU	Polypodiaceae	f	
119	<i>Potentilla anserina</i>	silverweed	POAN5	Rosaceae	p	
120	<i>Prunella vulgaris</i>	self-heal	PRVU	Labiatae	p	

121	<i>Prunus emarginata</i>	bittercherry	PREM	Rosaceae	s	
122	<i>Prunus laurocerasus</i>	laurel cherry	PRLA	Rosaceae	s	a
123	<i>Pseudotsuga menziesii</i>	Douglas fir	PSME	Pinaceae	t	
124	<i>Pteridium aquilinum</i>	bracken fern	PTAQ	Polypodiaceae	f	
125	<i>Pyrus fusca</i>	pacific crabapple	PYFU	Rosaceae	s	
126	<i>Ranunculus repens</i> v. <i>repens</i>	creeping buttercup	RARER	Ranunculaceae	p	a
127	<i>Ranunculus uncinatus</i>	woodland buttercup	RAUN	Ranunculaceae	p	
128	<i>Rhododendron macrophyllum</i>	western rhododendron	RHMA3	Ericaceae	s	
129	<i>Ribes lacustre</i>	swamp current	RILA	Grossulariaceae	s	
130	<i>Rosa gymnocarpa</i>	baldhip rose	ROGY	Rosaceae	s	
131	<i>Rosa pisocarpa</i>	clustered wild rose	ROPI2	Rosaceae	s	
132	<i>Rubus discolor</i>	Himalayan blackberry	RUDI2	Rosaceae	s	a
133	<i>Rubus laciniatus</i>	evergreen blackberry	RULA	Rosaceae	s	a
134	<i>Rubus parviflorus</i>	thimbleberry	RUPA	Rosaceae	s	
135	<i>Rubus spectabilis</i>	salmonberry	RUSP	Rosaceae	s	
136	<i>Rubus ursinus</i>	trailing blackberry	RUUR	Rosaceae	s	
137	<i>Rumex acetosella</i>	sheep sorrel	RUAC3	Polygonaceae	a	a
138	<i>Rumex crispus</i>	curly dock	RUCR	Polygonaceae	p	a
139	<i>Rumex occidentalis</i>	western dock	RUOC3	Polygonaceae	p	
140	<i>Sagina crassicaulis</i>	stick-stemmed pearlwort	SACR9	Caryophyllaceae	p	
141	<i>Salicornia virginica</i>	Pickleweed	SAVI	Chenopodiaceae	p	
142	<i>Salix lasiandra</i>	pacific willow	SALA5	Salicaceae	s	
143	<i>Salix scouleriana</i>	Scouler's willow	SASC	Salicaceae	t	
144	<i>Senecio jacobaea</i>	tansy ragwort	SEJA	Compositae	a	a
145	<i>Sisyrinchium californicum</i>	golden-eyed grass	SICA8	Iridaceae	p	
146	<i>Soliva sessilis</i>	field burrweed	SOSE2	Compositae	a	a
147	<i>Sonchus</i> sp.	cowthistle	SONCHUS	Compositae	a	a
148	<i>Spergularia rubra</i>	red sandspurry	SPRU	Caryophyllaceae	a	
149	<i>Stellaria calycantha</i>	northern starwort	STCA	Caryophyllaceae	a	
150	<i>Stellaria nitens</i>	shining chickweed	STNI	Caryophyllaceae	a	
151	<i>Symphoricarpos albus</i>	common snowberry	SYAL	Caprifoliaceae	s	
152	<i>Taraxacum officinale</i>	common dandelion	TAOF	Compositae	b	a
153	<i>Tellima grandiflora</i>	fringecup	TEGR2	Saxifragaceae	p	
154	<i>Thuja plicata</i>	western redcedar	THPL	Cupressaceae	t	
155	<i>Tiarella trifoliata</i>	foamflower	TITR	Saxifragaceae	p	
156	<i>Trientalis latifolia</i>	western starflower	TRLA6	Primulaceae	p	
157	<i>Trifolium dubium</i>	least hop clover	TRDU2	Leguminosae	a	
158	<i>Trifolium pratense</i>	red clover	TRPR2	Leguminosae	p	a
159	<i>Trifolium repens</i>	white clover	TRRE3	Leguminosae	p	a
160	<i>Trisetum cernuum</i>	nodding trisetum	TRCE2	Gramineae	g	
161	<i>Tsuga heterophylla</i>	Pacific hemlock	TSHE	Pinaceae	t	

162	<i>Urtica dioica</i>	stinging nettle	URDI	Urticaceae	p	
163	<i>Vaccinium ovatum</i>	evergreen blueberry	VAOV2	Ericaceae	s	
164	<i>Vaccinium parvifolium</i>	red huckleberry	VAPA	Ericaceae	s	
165	<i>Veronica americana</i>	American brooklime	VEAM2	Scrophulariaceae	p	
166	<i>Veronica catenata</i>	chain speedwell	VECA7	Scrophulariaceae	p	
167	<i>Veronica peregrina</i>	purslane speedwell	VEPE2	Scrophulariaceae	a	a
168	<i>Veronica persica</i>	Persian speedwell	VEPE3	Scrophulariaceae	a	
169	<i>Veronica wormskjoldii</i>	alpine speedwell	VEWO	Scrophulariaceae	p	
170	<i>Vicia americana</i>	American vetch	VIAM	Leguminosae	p	
171	<i>Vicia gigantea</i>	Giant Vetch	VIGI	Leguminosae	p	
172	<i>Vicia sativa</i>	common vetch	VISA	Leguminosae	p	a
173	<i>Vulpia bromoides</i>	brome fescue	VUBR.	Gramineae	a	a
174	<i>Woodwardia fimbriata</i>	chain fern	WOFI	Polypodiaceae	f	S

## GIS Products Produced

Associated with this report are two spatial datasets created by PBI. A polygon layer depicting the vegetation community types and a polygon layer depicting the location of all encountered rare plants have both been converted into ESRI shapefile format and provided to the Washington State Parks and Recreation Commission. The spatial datasets are complete with metadata meeting FGDC standards. Refer to the associated metadata for descriptions and attribute definitions for each spatial dataset.

## References

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

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

## **Appendix A - Field Survey Schedule**

Field Session 1: May 24, 2004

Field Staff: Hans Smith, Dana Visalli, Dane Springmeyer

Field Session 2: July 14 – 16, 2004

Field Staff: Hans Smith, Peter Morrison, Dane Springmeyer

# Appendix B – Washington Natural Heritage Program Rare Plant Sighting Form

**Taxon Name:** *Woodwardia fimbriata* Sm.

**Are you confident of the identification?** Yes      **Explain:** Specimens perfectly match descriptions in floras and in WNHP rare plant guide documents. Numerous photographs taken.

**Survey Site Name:** Blake Island State Park

**Surveyor's Name/Phone/Email:** Peter Morrison and Dane Springmeyer  
Pacific Biodiversity Institute, 509-996-2490, peter@pacificbio.org

**Survey Date (yr/mo/day):** 16 July 2004

**County:** King

**Quad Name:**

**TRS1/41/4:**

**Directions to Site:** The population found along a narrow band of the southwest perimeter of Blake Island. From the campground on the northwest point of the island, walk along the beach about 0.7 miles to the southeast. The population is growing on steep coastal bluffs with some of the plants less than a meter above the high tide line.

**Mapping:** 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. If your map is a different scale (not recommended) please write the scale on the map. Map is attached.

**Answer the following:**

1. I used GPS to map the population: Yes (complete #1 and #3

Coordinates are in electronic file on diskette (preferred) or

Coordinates are written below or attached: as ESRI shapefile

Description of what coordinates represent: polygon bounding the population

GPS accuracy: Uncorrected

GPS datum: NAD27

GPS coordinates: projection is UTM zone 10

2.

3. I used the following features on the map to identify my location (stream, bridge, road, cliff, etc) shoreline and GPS waypoints

To the best of my knowledge, I mapped the entire extent of this population: Yes

Is a revisit necessary? No

**Ownership (if known):** Washington State Parks

## Page 2- Washington Natural Heritage Program Rare Plant Sighting Form

**Population Size (# of individuals or ramets) or estimate:** between 500 to 800 individuals (including the small sporophytes), about 10% of the population is mature, 35% young plants over 10 cm in diameter and 55% smaller, baby plants.

**Population (EO) Data (include population vigor, microhabitat, phenology, etc):** population vigor is good, growing on seepy sandstone cliffs and steep sandy bluffs.

**Plant Association (include author, citation or classification, e.g. Daubenmire):** ALRU-ACMA/POMU-TEGR, Chappell (2004)

**Associated Species (include % cover by layer and by individual species for dominants in layers):**

**Lichen/moss layer:** 20% cover.

Herb layer: 40% cover. *Anaphalis margaritacea*, *Taraxicum officinale*, *Equisetum arvense*, *Tellima grandiflora*, *Polystichum munitum*, *Vicia americana*, *Galium aparine*, *Lactuca muralis*

Shrub layer(s): 20% cover. *Rubus spectabilis*, *Salix scouleriana*, *Holodiscus discolor*, *Rubus ursinus*, *Rubus discolor*, *Buddleja davidii*

**Tree layer:** 80% cover. *Alnus rubra*

**General Description (include description of landscape, surrounding plant communities, land forms, land use, etc):** Plants growing on sandstone coastal bluff and steep sandy banks. The population starts about 1 foot above the high tide line and extends about 15 feet (in some places 20 feet) in elevation up the bluff. It is growing on moss covered seepy sandstone and on steep sandy banks where it has access to seep water. Seedling establishment may be somewhat dependent on moss cover sandstone in the seep areas. This is where most of the young plants are found.

**Minimum elevation (ft):** 1

**Maximum elevation (ft):** 20

**Size (acres):** 1

**Aspect:** SW to S

**Slope:** 45 to 90 degrees

**Photo taken?** Yes

**Management Comments (exotics, roads, shape/size, position in landscape, hydrology, adjacent land use, cumulative effects, etc):** *Buddleja davidii* growing into one patch of *Woodwardia*, also other exotics (*Cirsium arvense*, *Senecio jacobaea*, *Hedera helix*, *Cytisus scoparius*) in and around the population. A tsunami or very big storm waves could wipe out much of the population.

**Protection Comments (legal actions/steps/strategies needed to secure protection for the site):**

**Additional Comments (discrepancies, general observations, etc):** The current WA NHP GIS layer shows *Woodwardia* in the more central part of Blake Island, near the northwest tip. We searched that location extensively and there are no plants there. It is also not appropriate habitat. This should be corrected in the WANHP database.



## Appendix C – 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 yr's litter left)
- 4 = no current, heavy past grazing
- 5 = no current, light past grazing
- 6 = no obvious sign of grazing

**Development**

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

**Wildlife**

- 1 = heavy ungulate use
- 2 = moderate ungulate use
- 3 = light to no ungulate use
- 4 = burrowing animals
- 5 = active beaver
- 6 = active porcupine
- 7 = other, list animal

**Recreation Use Severity**

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

### Recreation Use Primary Type

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

### Hydrology

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

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

**Condition Rank** of PA in key or estimate

**% of Polygon** = your estimate

**Pattern** = how PA is distributed in polygon

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

**Exotic** = primary species observed; secondary species observed.

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

## Data:

<b>Polygon Number</b>	1
<b>Survey Intensity</b>	1
<b>GPS Waypoints</b>	
<b>Observer</b>	HS
<b>Date</b>	5/23/2004
<b>Specific Location</b>	Sandy beach area on NW shore of Blake Island - Kayaking campground
<b>GPS Unit</b>	
<b>Total Vegetation</b>	85
<b>Trees Total</b>	1
<b>emergent</b>	0
<b>main canopy</b>	1
<b>subcanopy</b>	0
<b>Shrubs Total</b>	2
<b>&gt; 1.5'</b>	1
<b>&lt; 1.5'</b>	1
<b>Graminoids Total</b>	80
<b>Graminoids perennial</b>	79
<b>Graminoids annual</b>	1
<b>Forbs Total</b>	5
<b>Forbs perennial</b>	4
<b>Forbs annual</b>	1
<b>Ferns - evergreen</b>	0
<b>Ferns - deciduous</b>	0
<b>Exotics Total</b>	3
<b>Exotics perennial</b>	2
<b>Exotics annual</b>	1
<b>Rock Outcrop</b>	0
<b>Gravel</b>	0
<b>Bare Ground</b>	49
<b>Moss-Lichen</b>	1
<b>Litter</b>	50
<b>Logging</b>	0
<b>Stand Age</b>	0
<b>Agriculture</b>	0
<b>Livestock</b>	0
<b>Development</b>	6, camping & trails
<b>Wildlife</b>	
<b>Recreation Severity</b>	2
<b>Recreation Type</b>	3
<b>Hydrology</b>	0

## Exotic Species

<b>primary spp</b>	Cytisus scoparius
<b>secondary spp</b>	Poa pratensis

## Plant Associations

	<b>Percent</b>	<b>Pattern</b>
1. Leymus mollis - sandy beach	100	1
2.		
3		

## Notes

<b>Polygon Number</b>	2
<b>Survey Intensity</b>	2
<b>GPS Waypoints</b>	
<b>Observer</b>	HS
<b>Date</b>	5/23/2004
<b>Specific Location</b>	NW corner of Blake Island, between restroom clearing and campground
<b>GPS Unit</b>	
<b>Total Vegetation</b>	100
<b>Trees Total</b>	50
<b>emergent</b>	7
<b>main canopy</b>	22
<b>subcanopy</b>	21
<b>Shrubs Total</b>	40
<b>&gt; 1.5'</b>	30
<b>&lt; 1.5'</b>	10
<b>Graminoids Total</b>	85
<b>Graminoids perennial</b>	84
<b>Graminoids annual</b>	1
<b>Forbs Total</b>	5
<b>Forbs perennial</b>	4
<b>Forbs annual</b>	1
<b>Ferns - evergreen</b>	0
<b>Ferns - deciduous</b>	0
<b>Exotics Total</b>	2
<b>Exotics perennial</b>	1
<b>Exotics annual</b>	1
<b>Rock Outcrop</b>	0
<b>Gravel</b>	0
<b>Bare Ground</b>	10
<b>Moss-Lichen</b>	50
<b>Litter</b>	40
<b>Logging</b>	3
<b>Stand Age</b>	2
<b>Agriculture</b>	0
<b>Livestock</b>	0
<b>Development</b>	0
<b>Wildlife</b>	
<b>Recreation Severity</b>	3
<b>Recreation Type</b>	0
<b>Hydrology</b>	3

### Exotic Species

<b>primary spp</b>	Ilex aquifolium
<b>secondary spp</b>	Galium aparine

<b>Plant Associations</b>	<b>Percent</b>	<b>Pattern</b>
---------------------------	----------------	----------------

1. Alnus rubra - Malus fusca wetland
- 2.
- 3

### Notes

<b>Polgyon Number</b>	3
<b>Survey Intensity</b>	1
<b>GPS Waypoints</b>	
<b>Observer</b>	HS
<b>Date</b>	5/23/2004
<b>Specific Location</b>	major S-facing slope - steep - some failure
<b>GPS Unit</b>	
<b>Total Vegetation</b>	95
<b>Trees Total</b>	80
<b>emergent</b>	10
<b>main canopy</b>	50
<b>subcanopy</b>	20
<b>Shrubs Total</b>	50
<b>&gt; 1.5'</b>	35
<b>&lt; 1.5'</b>	15
<b>Graminoids Total</b>	10
<b>Graminoids perennial</b>	8
<b>Graminoids annual</b>	2
<b>Forbs Total</b>	5
<b>Forbs perennial</b>	3
<b>Forbs annual</b>	2
<b>Ferns - evergreen</b>	0
<b>Ferns - deciduous</b>	0
<b>Exotics Total</b>	3
<b>Exotics perennial</b>	2
<b>Exotics annual</b>	1
<b>Rock Outcrop</b>	0
<b>Gravel</b>	0
<b>Bare Ground</b>	80
<b>Moss-Lichen</b>	5
<b>Litter</b>	15
<b>Logging</b>	0
<b>Stand Age</b>	3
<b>Agriculture</b>	0
<b>Livestock</b>	0
<b>Development</b>	0
<b>Wildlife</b>	7, birds
<b>Recreation Severity</b>	2
<b>Recreation Type</b>	3
<b>Hydrology</b>	0

### Exotic Species

<b>primary spp</b>	Ilex aquifolium
<b>secondary spp</b>	Galium aparine

### Plant Associations

	<b>Percent</b>	<b>Pattern</b>
1. PSME-ARME/VAOV	85	1
2. ACMA-ALRU/POMU-TEGR	15	5
3		

### Notes

Polgyon Number	4
Survey Intensity	1
GPS Waypoints	37
Observer	PM
Date	7/16/2004
Specific Location	near trail near SE point
GPS Unit	4
Total Vegetation	100
Trees Total	85
emergent	30
main canopy	45
subcanopy	10
Shrubs Total	35
> 1.5'	10
< 1.5'	25
Graminoids Total	25
Graminoids perennial	25
Graminoids annual	0
Forbs Total	45
Forbs perennial	45
Forbs annual	0
Ferns - evergreen	10
Ferns - deciduous	1
Exotics Total	1
Exotics perennial	1
Exotics annual	0
Rock Outcrop	0
Gravel	0
Bare Ground	0
Moss-Lichen	0
Litter	100
Logging	1
Stand Age	4
Agriculture	0
Livestock	6
Development	5
Wildlife	0
Recreation Severity	3
Recreation Type	3
Hydrology	1

### Exotic Species

primary spp	Hedera helix
secondary spp	Cirsium arvense

### Plant Associations

	Percent	Pattern
1. PSME/COCO/POMU-TITR	100	1
2.		
3		

### Notes

Polgyon Number	5
Survey Intensity	2
GPS Waypoints	
Observer	DS
Date	7/15/2004
Specific Location	In pure deciduous forest (Alnus/Acer) along NW shore of island south of campground
GPS Unit	
Total Vegetation	100
Trees Total	95
emergent	0
main canopy	90
subcanopy	5
Shrubs Total	12
> 1.5'	10
< 1.5'	2
Graminoids Total	2
Graminoids perennial	2
Graminoids annual	0
Forbs Total	4
Forbs perennial	3
Forbs annual	1
Ferns - evergreen	35
Ferns - deciduous	2
Exotics Total	0
Exotics perennial	0
Exotics annual	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	2
Recreation Severity	3
Recreation Type	3
Hydrology	1

### Exotic Species

primary spp  
secondary spp

### Plant Associations

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

### Notes



<b>Polygon Number</b>	7
<b>Survey Intensity</b>	1
<b>GPS Waypoints</b>	37, 38
<b>Observer</b>	HS
<b>Date</b>	7/15/2004
<b>Specific Location</b>	Conifer forest near the NW corner of Blake Island, near the old Woodwardia location site that was
<b>GPS Unit</b>	1
<b>Total Vegetation</b>	100
<b>Trees Total</b>	98
<b>emergent</b>	4
<b>main canopy</b>	88
<b>subcanopy</b>	6
<b>Shrubs Total</b>	3
<b>&gt; 1.5'</b>	0
<b>&lt; 1.5'</b>	3
<b>Graminoids Total</b>	1
<b>Graminoids perennial</b>	0
<b>Graminoids annual</b>	1
<b>Forbs Total</b>	10
<b>Forbs perennial</b>	1
<b>Forbs annual</b>	9
<b>Ferns - evergreen</b>	40
<b>Ferns - deciduous</b>	1
<b>Exotics Total</b>	3
<b>Exotics perennial</b>	2
<b>Exotics annual</b>	1
<b>Rock Outcrop</b>	0
<b>Gravel</b>	0
<b>Bare Ground</b>	1
<b>Moss-Lichen</b>	3
<b>Litter</b>	96
<b>Logging</b>	3
<b>Stand Age</b>	2
<b>Agriculture</b>	0
<b>Livestock</b>	0
<b>Development</b>	3
<b>Wildlife</b>	3
<b>Recreation Severity</b>	1
<b>Recreation Type</b>	3
<b>Hydrology</b>	1

### Exotic Species

<b>primary spp</b>	Rubus discolor
<b>secondary spp</b>	Ilex aquifolium

### Plant Associations

	<b>Percent</b>	<b>Pattern</b>
1. TSHE-PSME/POMU-DREX	100	1
2.		
3		

**Notes** photos 3211-13

<b>Polygon Number</b>	8
<b>Survey Intensity</b>	2
<b>GPS Waypoints</b>	0537598/5265276 UTM zone 10
<b>Observer</b>	DS
<b>Date</b>	7/15/2004
<b>Specific Location</b>	NW corner of island south of campground in uplands
<b>GPS Unit</b>	Dane's Geko
<b>Total Vegetation</b>	100
<b>Trees Total</b>	70
<b>emergent</b>	0
<b>main canopy</b>	68
<b>subcanopy</b>	2
<b>Shrubs Total</b>	20
<b>&gt; 1.5'</b>	15
<b>&lt; 1.5'</b>	5
<b>Graminoids Total</b>	10
<b>Graminoids perennial</b>	5
<b>Graminoids annual</b>	5
<b>Forbs Total</b>	20
<b>Forbs perennial</b>	17
<b>Forbs annual</b>	3
<b>Ferns - evergreen</b>	5
<b>Ferns - deciduous</b>	0
<b>Exotics Total</b>	7
<b>Exotics perennial</b>	6
<b>Exotics annual</b>	1
<b>Rock Outcrop</b>	0
<b>Gravel</b>	0
<b>Bare Ground</b>	0
<b>Moss-Lichen</b>	0
<b>Litter</b>	100
<b>Logging</b>	3
<b>Stand Age</b>	2
<b>Agriculture</b>	0
<b>Livestock</b>	0
<b>Development</b>	3
<b>Wildlife</b>	3
<b>Recreation Severity</b>	3
<b>Recreation Type</b>	3
<b>Hydrology</b>	1

### Exotic Species

<b>primary spp</b>	Rubus discolor
<b>secondary spp</b>	Poa pratensis

### Plant Associations

	<b>Percent</b>	<b>Pattern</b>
1. ALRU/POMU	100	1
2.		
3		

### Notes

<b>Polygon Number</b>	9
<b>Survey Intensity</b>	2
<b>GPS Waypoints</b>	0537772/5265598 UTM zone 11
<b>Observer</b>	DS
<b>Date</b>	7/15/2004
<b>Specific Location</b>	NW corner of Park, on north slope
<b>GPS Unit</b>	Dane's Geko
<b>Total Vegetation</b>	100
<b>Trees Total</b>	98
<b>emergent</b>	10
<b>main canopy</b>	83
<b>subcanopy</b>	5
<b>Shrubs Total</b>	3
<b>&gt; 1.5'</b>	2
<b>&lt; 1.5'</b>	1
<b>Graminoids Total</b>	5
<b>Graminoids perennial</b>	4
<b>Graminoids annual</b>	1
<b>Forbs Total</b>	5
<b>Forbs perennial</b>	4
<b>Forbs annual</b>	1
<b>Ferns - evergreen</b>	70
<b>Ferns - deciduous</b>	3
<b>Exotics Total</b>	0
<b>Exotics perennial</b>	0
<b>Exotics annual</b>	0
<b>Rock Outcrop</b>	0
<b>Gravel</b>	0
<b>Bare Ground</b>	0
<b>Moss-Lichen</b>	10
<b>Litter</b>	90
<b>Logging</b>	3
<b>Stand Age</b>	2
<b>Agriculture</b>	0
<b>Livestock</b>	0
<b>Development</b>	3
<b>Wildlife</b>	2
<b>Recreation Severity</b>	3
<b>Recreation Type</b>	3
<b>Hydrology</b>	1

### Exotic Species

primary spp  
secondary spp

### Plant Associations

	Percent	Pattern
1. TSHE-PSME/POMU-DREX	95	1
2. ALRU-POMU	5	3
3		

### Notes

<b>Polygon Number</b>	11
<b>Survey Intensity</b>	2
<b>GPS Waypoints</b>	0538236/526550 UTM zone 10
<b>Observer</b>	DS
<b>Date</b>	7/15/2004
<b>Specific Location</b>	North side above shoreline, halfway between Tillicum Village and NW point
<b>GPS Unit</b>	Dane's Geko
<b>Total Vegetation</b>	95
<b>Trees Total</b>	85
<b>emergent</b>	10
<b>main canopy</b>	60
<b>subcanopy</b>	15
<b>Shrubs Total</b>	7
<b>&gt; 1.5'</b>	2
<b>&lt; 1.5'</b>	5
<b>Graminoids Total</b>	1
<b>Graminoids perennial</b>	1
<b>Graminoids annual</b>	0
<b>Forbs Total</b>	2
<b>Forbs perennial</b>	1
<b>Forbs annual</b>	1
<b>Ferns - evergreen</b>	60
<b>Ferns - deciduous</b>	2
<b>Exotics Total</b>	0
<b>Exotics perennial</b>	0
<b>Exotics annual</b>	0
<b>Rock Outcrop</b>	0
<b>Gravel</b>	0
<b>Bare Ground</b>	0
<b>Moss-Lichen</b>	5
<b>Litter</b>	95
<b>Logging</b>	3
<b>Stand Age</b>	2
<b>Agriculture</b>	0
<b>Livestock</b>	0
<b>Development</b>	0
<b>Wildlife</b>	2
<b>Recreation Severity</b>	3
<b>Recreation Type</b>	3
<b>Hydrology</b>	1

### Exotic Species

primary spp  
secondary spp

### Plant Associations

	Percent	Pattern
1. TSHE-PSME/POMU-DREX	100	1
2.		
3		

### Notes

<b>Polygon Number</b>	12
<b>Survey Intensity</b>	1
<b>GPS Waypoints</b>	27, 28
<b>Observer</b>	HS
<b>Date</b>	7/15/2004
<b>Specific Location</b>	old home site on Water Tower Rd.
<b>GPS Unit</b>	1
<b>Total Vegetation</b>	100
<b>Trees Total</b>	60
<b>emergent</b>	0
<b>main canopy</b>	60
<b>subcanopy</b>	0
<b>Shrubs Total</b>	5
<b>&gt; 1.5'</b>	5
<b>&lt; 1.5'</b>	0
<b>Graminoids Total</b>	80
<b>Graminoids perennial</b>	0
<b>Graminoids annual</b>	80
<b>Forbs Total</b>	1
<b>Forbs perennial</b>	0
<b>Forbs annual</b>	1
<b>Ferns - evergreen</b>	25
<b>Ferns - deciduous</b>	3
<b>Exotics Total</b>	83
<b>Exotics perennial</b>	3
<b>Exotics annual</b>	80
<b>Rock Outcrop</b>	0
<b>Gravel</b>	0
<b>Bare Ground</b>	0
<b>Moss-Lichen</b>	1
<b>Litter</b>	99
<b>Logging</b>	3
<b>Stand Age</b>	1
<b>Agriculture</b>	0
<b>Livestock</b>	6
<b>Development</b>	2
<b>Wildlife</b>	3
<b>Recreation Severity</b>	2
<b>Recreation Type</b>	3
<b>Hydrology</b>	2

### Exotic Species

<b>primary spp</b>	Poa pratensis
<b>secondary spp</b>	Ilex aquifolium

### Plant Associations

	<b>Percent</b>	<b>Pattern</b>
1. ALRU/POMU	100	1
2.		
3		

**Notes** photos 3199 - 20

<b>Polygon Number</b>	13
<b>Survey Intensity</b>	1
<b>GPS Waypoints</b>	14, 15
<b>Observer</b>	HS
<b>Date</b>	7/15/2004
<b>Specific Location</b>	Along north shore trail, in conifer forest stand between Tillicum village and the NW campground
<b>GPS Unit</b>	1
<b>Total Vegetation</b>	98
<b>Trees Total</b>	87
<b>emergent</b>	1
<b>main canopy</b>	84
<b>subcanopy</b>	2
<b>Shrubs Total</b>	4
<b>&gt; 1.5'</b>	1
<b>&lt; 1.5'</b>	3
<b>Graminoids Total</b>	1
<b>Graminoids perennial</b>	0
<b>Graminoids annual</b>	1
<b>Forbs Total</b>	1
<b>Forbs perennial</b>	0
<b>Forbs annual</b>	1
<b>Ferns - evergreen</b>	80
<b>Ferns - deciduous</b>	1
<b>Exotics Total</b>	1
<b>Exotics perennial</b>	1
<b>Exotics annual</b>	0
<b>Rock Outcrop</b>	0
<b>Gravel</b>	0
<b>Bare Ground</b>	1
<b>Moss-Lichen</b>	1
<b>Litter</b>	98
<b>Logging</b>	3
<b>Stand Age</b>	2
<b>Agriculture</b>	0
<b>Livestock</b>	0
<b>Development</b>	3
<b>Wildlife</b>	3
<b>Recreation Severity</b>	2
<b>Recreation Type</b>	3
<b>Hydrology</b>	1

### Exotic Species

<b>primary spp</b>	Ilex aquifolium
<b>secondary spp</b>	Prunus laurocerasus

### Plant Associations

	<b>Percent</b>	<b>Pattern</b>
1. TSHE-PSME/POMU-DREX	100	1
2.		
3		

**Notes** photos 3188-89



<b>Polygon Number</b>	14
<b>Survey Intensity</b>	1
<b>GPS Waypoints</b>	17, 18
<b>Observer</b>	HS
<b>Date</b>	7/15/2004
<b>Specific Location</b>	near middle of island, to the north of polygon 15
<b>GPS Unit</b>	1
<b>Total Vegetation</b>	100
<b>Trees Total</b>	85
<b>emergent</b>	2
<b>main canopy</b>	79
<b>subcanopy</b>	4
<b>Shrubs Total</b>	10
<b>&gt; 1.5'</b>	5
<b>&lt; 1.5'</b>	5
<b>Graminoids Total</b>	3
<b>Graminoids perennial</b>	0
<b>Graminoids annual</b>	3
<b>Forbs Total</b>	5
<b>Forbs perennial</b>	0
<b>Forbs annual</b>	5
<b>Ferns - evergreen</b>	75
<b>Ferns - deciduous</b>	3
<b>Exotics Total</b>	0
<b>Exotics perennial</b>	0
<b>Exotics annual</b>	0
<b>Rock Outcrop</b>	0
<b>Gravel</b>	0
<b>Bare Ground</b>	1
<b>Moss-Lichen</b>	2
<b>Litter</b>	97
<b>Logging</b>	3
<b>Stand Age</b>	2
<b>Agriculture</b>	0
<b>Livestock</b>	0
<b>Development</b>	3
<b>Wildlife</b>	3
<b>Recreation Severity</b>	2
<b>Recreation Type</b>	3
<b>Hydrology</b>	1

## Exotic Species

primary spp  
secondary spp

## Plant Associations

	Percent	Pattern
1. TSHE-PSME/POMU-DREX	90	1
2. ALRU-POMU	10	5
3		

**Notes** photos 3191-93

<b>Polygon Number</b>	15
<b>Survey Intensity</b>	1
<b>GPS Waypoints</b>	21, 22
<b>Observer</b>	HS
<b>Date</b>	7/15/2004
<b>Specific Location</b>	middle of island
<b>GPS Unit</b>	1
<b>Total Vegetation</b>	100
<b>Trees Total</b>	95
<b>emergent</b>	1
<b>main canopy</b>	90
<b>subcanopy</b>	4
<b>Shrubs Total</b>	23
<b>&gt; 1.5'</b>	20
<b>&lt; 1.5'</b>	3
<b>Graminoids Total</b>	1
<b>Graminoids perennial</b>	0
<b>Graminoids annual</b>	1
<b>Forbs Total</b>	2
<b>Forbs perennial</b>	0
<b>Forbs annual</b>	2
<b>Ferns - evergreen</b>	50
<b>Ferns - deciduous</b>	2
<b>Exotics Total</b>	1
<b>Exotics perennial</b>	1
<b>Exotics annual</b>	0
<b>Rock Outcrop</b>	0
<b>Gravel</b>	0
<b>Bare Ground</b>	0
<b>Moss-Lichen</b>	5
<b>Litter</b>	95
<b>Logging</b>	2
<b>Stand Age</b>	2
<b>Agriculture</b>	0
<b>Livestock</b>	0
<b>Development</b>	3
<b>Wildlife</b>	3
<b>Recreation Severity</b>	3
<b>Recreation Type</b>	3
<b>Hydrology</b>	1

### Exotic Species

<b>primary spp</b>	Ilex aquifolium
<b>secondary spp</b>	Rubus discolor

### Plant Associations

	<b>Percent</b>	<b>Pattern</b>
1. TSHE-PSME/POMU-DREX	80	1
2. PSME-TSHE/VAOV-POMU	20	5
3		

### Notes

<b>Polygon Number</b>	16
<b>Survey Intensity</b>	1
<b>GPS Waypoints</b>	29, 30
<b>Observer</b>	HS
<b>Date</b>	7/15/2004
<b>Specific Location</b>	beach at Tillicum
<b>GPS Unit</b>	1
<b>Total Vegetation</b>	10
<b>Trees Total</b>	3
<b>emergent</b>	0
<b>main canopy</b>	3
<b>subcanopy</b>	0
<b>Shrubs Total</b>	1
<b>&gt; 1.5'</b>	1
<b>&lt; 1.5'</b>	0
<b>Graminoids Total</b>	6
<b>Graminoids perennial</b>	6
<b>Graminoids annual</b>	0
<b>Forbs Total</b>	1
<b>Forbs perennial</b>	1
<b>Forbs annual</b>	0
<b>Ferns - evergreen</b>	0
<b>Ferns - deciduous</b>	0
<b>Exotics Total</b>	1
<b>Exotics perennial</b>	0
<b>Exotics annual</b>	1
<b>Rock Outcrop</b>	0
<b>Gravel</b>	0
<b>Bare Ground</b>	90
<b>Moss-Lichen</b>	0
<b>Litter</b>	10
<b>Logging</b>	0
<b>Stand Age</b>	0
<b>Agriculture</b>	0
<b>Livestock</b>	0
<b>Development</b>	3
<b>Wildlife</b>	0
<b>Recreation Severity</b>	3
<b>Recreation Type</b>	3
<b>Hydrology</b>	1

### Exotic Species

primary spp                      Cirsium arvense  
secondary spp

### Plant Associations

	Percent	Pattern
1. Leymus mollis - sandy beach	100	1
2.		
3		

**Notes**    photos 7201-02

<b>Polygon Number</b>	17
<b>Survey Intensity</b>	1
<b>GPS Waypoints</b>	33, 34
<b>Observer</b>	HS
<b>Date</b>	7/15/2004
<b>Specific Location</b>	southern end of Blake Island, just south of polygon 15 on the flatter upland terrain
<b>GPS Unit</b>	1
<b>Total Vegetation</b>	100
<b>Trees Total</b>	95
<b>emergent</b>	0
<b>main canopy</b>	85
<b>subcanopy</b>	10
<b>Shrubs Total</b>	3
<b>&gt; 1.5'</b>	2
<b>&lt; 1.5'</b>	1
<b>Graminoids Total</b>	4
<b>Graminoids perennial</b>	2
<b>Graminoids annual</b>	2
<b>Forbs Total</b>	40
<b>Forbs perennial</b>	10
<b>Forbs annual</b>	30
<b>Ferns - evergreen</b>	20
<b>Ferns - deciduous</b>	2
<b>Exotics Total</b>	10
<b>Exotics perennial</b>	9
<b>Exotics annual</b>	1
<b>Rock Outcrop</b>	0
<b>Gravel</b>	0
<b>Bare Ground</b>	0
<b>Moss-Lichen</b>	3
<b>Litter</b>	97
<b>Logging</b>	3
<b>Stand Age</b>	2
<b>Agriculture</b>	0
<b>Livestock</b>	0
<b>Development</b>	3
<b>Wildlife</b>	3
<b>Recreation Severity</b>	1
<b>Recreation Type</b>	3
<b>Hydrology</b>	2

### Exotic Species

<b>primary spp</b>	Rubus discolor
<b>secondary spp</b>	Ilex aquifolium

### Plant Associations

	<b>Percent</b>	<b>Pattern</b>
1. ALRU/POMU	65	1
2. TSHE-PSME/POMU-DREX	35	5
3		

### Notes

<b>Polygon Number</b>	18
<b>Survey Intensity</b>	1
<b>GPS Waypoints</b>	31, 32
<b>Observer</b>	HS
<b>Date</b>	7/15/2004
<b>Specific Location</b>	Along the steeper eroding slopes along the east to southern shoreline
<b>GPS Unit</b>	1
<b>Total Vegetation</b>	100
<b>Trees Total</b>	100
<b>emergent</b>	1
<b>main canopy</b>	96
<b>subcanopy</b>	3
<b>Shrubs Total</b>	80
<b>&gt; 1.5'</b>	75
<b>&lt; 1.5'</b>	5
<b>Graminoids Total</b>	15
<b>Graminoids perennial</b>	5
<b>Graminoids annual</b>	10
<b>Forbs Total</b>	6
<b>Forbs perennial</b>	3
<b>Forbs annual</b>	3
<b>Ferns - evergreen</b>	2
<b>Ferns - deciduous</b>	4
<b>Exotics Total</b>	3
<b>Exotics perennial</b>	0
<b>Exotics annual</b>	3
<b>Rock Outcrop</b>	0
<b>Gravel</b>	0
<b>Bare Ground</b>	3
<b>Moss-Lichen</b>	0
<b>Litter</b>	97
<b>Logging</b>	1
<b>Stand Age</b>	2
<b>Agriculture</b>	0
<b>Livestock</b>	0
<b>Development</b>	3
<b>Wildlife</b>	3
<b>Recreation Severity</b>	3
<b>Recreation Type</b>	3
<b>Hydrology</b>	1

### Exotic Species

<b>primary spp</b>	Galium aparine
<b>secondary spp</b>	Cirsium arvense

### Plant Associations

	<b>Percent</b>	<b>Pattern</b>
1. ACMA-ALRU/POMU-TEGR	100	1
2.		
3		

### Notes

<b>Polygon Number</b>	19
<b>Survey Intensity</b>	1
<b>GPS Waypoints</b>	55, 56
<b>Observer</b>	HS
<b>Date</b>	7/15/2004
<b>Specific Location</b>	Pure broadleaf stand near the western shore on the southern part of Blake Island
<b>GPS Unit</b>	1
<b>Total Vegetation</b>	100
<b>Trees Total</b>	90
<b>emergent</b>	1
<b>main canopy</b>	88
<b>subcanopy</b>	1
<b>Shrubs Total</b>	10
<b>&gt; 1.5'</b>	2
<b>&lt; 1.5'</b>	8
<b>Graminoids Total</b>	60
<b>Graminoids perennial</b>	50
<b>Graminoids annual</b>	10
<b>Forbs Total</b>	70
<b>Forbs perennial</b>	65
<b>Forbs annual</b>	5
<b>Ferns - evergreen</b>	5
<b>Ferns - deciduous</b>	1
<b>Exotics Total</b>	80
<b>Exotics perennial</b>	79
<b>Exotics annual</b>	1
<b>Rock Outcrop</b>	0
<b>Gravel</b>	0
<b>Bare Ground</b>	0
<b>Moss-Lichen</b>	3
<b>Litter</b>	97
<b>Logging</b>	3
<b>Stand Age</b>	2
<b>Agriculture</b>	0
<b>Livestock</b>	0
<b>Development</b>	3
<b>Wildlife</b>	3
<b>Recreation Severity</b>	1
<b>Recreation Type</b>	3
<b>Hydrology</b>	1

### Exotic Species

<b>primary spp</b>	Galium aparine
<b>secondary spp</b>	Rubus discolor

### Plant Associations

	<b>Percent</b>	<b>Pattern</b>
1. ALRU/POMU	100	1
2.		
3		

**Notes** photos 3209-3210

<b>Polygon Number</b>	22
<b>Survey Intensity</b>	1
<b>GPS Waypoints</b>	24
<b>Observer</b>	PM
<b>Date</b>	7/15/2004
<b>Specific Location</b>	off trail on SW side of island (538006/5264245)
<b>GPS Unit</b>	4
<b>Total Vegetation</b>	100
<b>Trees Total</b>	80
<b>emergent</b>	24
<b>main canopy</b>	40
<b>subcanopy</b>	16
<b>Shrubs Total</b>	90
<b>&gt; 1.5'</b>	80
<b>&lt; 1.5'</b>	10
<b>Graminoids Total</b>	1
<b>Graminoids perennial</b>	1
<b>Graminoids annual</b>	0
<b>Forbs Total</b>	2
<b>Forbs perennial</b>	2
<b>Forbs annual</b>	0
<b>Ferns - evergreen</b>	4
<b>Ferns - deciduous</b>	2
<b>Exotics Total</b>	1
<b>Exotics perennial</b>	1
<b>Exotics annual</b>	0
<b>Rock Outcrop</b>	0
<b>Gravel</b>	1
<b>Bare Ground</b>	1
<b>Moss-Lichen</b>	1
<b>Litter</b>	97
<b>Logging</b>	1
<b>Stand Age</b>	3
<b>Agriculture</b>	0
<b>Livestock</b>	6
<b>Development</b>	5
<b>Wildlife</b>	0
<b>Recreation Severity</b>	3
<b>Recreation Type</b>	
<b>Hydrology</b>	1

### Exotic Species

primary spp                      Hedera helix  
secondary spp

### Plant Associations

	Percent	Pattern
1. PSME-ARME/VAOV	100	1
2.		
3		

**Notes**    photos 92-94

<b>Polygon Number</b>	23
<b>Survey Intensity</b>	1
<b>GPS Waypoints</b>	26
<b>Observer</b>	PM
<b>Date</b>	7/15/2004
<b>Specific Location</b>	above primitive campground on SW side (538378/5264063)
<b>GPS Unit</b>	4
<b>Total Vegetation</b>	100
<b>Trees Total</b>	85
<b>emergent</b>	29
<b>main canopy</b>	42
<b>subcanopy</b>	14
<b>Shrubs Total</b>	90
<b>&gt; 1.5'</b>	80
<b>&lt; 1.5'</b>	10
<b>Graminoids Total</b>	3
<b>Graminoids perennial</b>	3
<b>Graminoids annual</b>	0
<b>Forbs Total</b>	2
<b>Forbs perennial</b>	2
<b>Forbs annual</b>	0
<b>Ferns - evergreen</b>	1
<b>Ferns - deciduous</b>	0
<b>Exotics Total</b>	1
<b>Exotics perennial</b>	1
<b>Exotics annual</b>	0
<b>Rock Outcrop</b>	0
<b>Gravel</b>	0
<b>Bare Ground</b>	1
<b>Moss-Lichen</b>	0
<b>Litter</b>	99
<b>Logging</b>	1
<b>Stand Age</b>	4
<b>Agriculture</b>	0
<b>Livestock</b>	6
<b>Development</b>	5
<b>Wildlife</b>	0
<b>Recreation Severity</b>	2
<b>Recreation Type</b>	4
<b>Hydrology</b>	1

### Exotic Species

primary spp                      Cirsium arvense  
secondary spp

### Plant Associations

	Percent	Pattern
1. PSME-ARME/VAOV	100	1
2.		
3		

### Notes



<b>Polygon Number</b>	24
<b>Survey Intensity</b>	1
<b>GPS Waypoints</b>	22
<b>Observer</b>	PM
<b>Date</b>	7/15/2004
<b>Specific Location</b>	steep SW-facing bluff to beach (537768/5264731)
<b>GPS Unit</b>	4
<b>Total Vegetation</b>	100
<b>Trees Total</b>	75
<b>emergent</b>	9
<b>main canopy</b>	57
<b>subcanopy</b>	9
<b>Shrubs Total</b>	85
<b>&gt; 1.5'</b>	80
<b>&lt; 1.5'</b>	5
<b>Graminoids Total</b>	3
<b>Graminoids perennial</b>	3
<b>Graminoids annual</b>	0
<b>Forbs Total</b>	3
<b>Forbs perennial</b>	2
<b>Forbs annual</b>	1
<b>Ferns - evergreen</b>	1
<b>Ferns - deciduous</b>	5
<b>Exotics Total</b>	0
<b>Exotics perennial</b>	0
<b>Exotics annual</b>	0
<b>Rock Outcrop</b>	0
<b>Gravel</b>	0
<b>Bare Ground</b>	1
<b>Moss-Lichen</b>	2
<b>Litter</b>	97
<b>Logging</b>	1
<b>Stand Age</b>	3
<b>Agriculture</b>	0
<b>Livestock</b>	6
<b>Development</b>	5
<b>Wildlife</b>	0
<b>Recreation Severity</b>	3
<b>Recreation Type</b>	3
<b>Hydrology</b>	1

**Exotic Species**

primary spp  
secondary spp

**Plant Associations**

	<b>Percent</b>	<b>Pattern</b>
1. PSME-ARME/GASH	100	1
2.		
3		

**Notes**

<b>Polygon Number</b>	25
<b>Survey Intensity</b>	1
<b>GPS Waypoints</b>	25
<b>Observer</b>	PM
<b>Date</b>	7/15/2004
<b>Specific Location</b>	off cross island trail above junction with road on SW side (538168/5264230)
<b>GPS Unit</b>	4
<b>Total Vegetation</b>	100
<b>Trees Total</b>	60
<b>emergent</b>	40
<b>main canopy</b>	10
<b>subcanopy</b>	10
<b>Shrubs Total</b>	80
<b>&gt; 1.5'</b>	75
<b>&lt; 1.5'</b>	5
<b>Graminoids Total</b>	10
<b>Graminoids perennial</b>	10
<b>Graminoids annual</b>	0
<b>Forbs Total</b>	3
<b>Forbs perennial</b>	3
<b>Forbs annual</b>	0
<b>Ferns - evergreen</b>	6
<b>Ferns - deciduous</b>	1
<b>Exotics Total</b>	4
<b>Exotics perennial</b>	4
<b>Exotics annual</b>	0
<b>Rock Outcrop</b>	0
<b>Gravel</b>	0
<b>Bare Ground</b>	0
<b>Moss-Lichen</b>	0
<b>Litter</b>	100
<b>Logging</b>	1
<b>Stand Age</b>	4
<b>Agriculture</b>	0
<b>Livestock</b>	6
<b>Development</b>	5
<b>Wildlife</b>	0
<b>Recreation Severity</b>	3
<b>Recreation Type</b>	3
<b>Hydrology</b>	1

### Exotic Species

<b>primary spp</b>	Cirsium arvense
<b>secondary spp</b>	Hedera helix

### Plant Associations

	<b>Percent</b>	<b>Pattern</b>
<b>1.</b> PSME-ARME/VAOV	30	2
<b>2.</b> PSME-ARME/GASH	30	3
<b>3.</b> PSME/GASH/POMU	30	3

**Notes** photos 105, 106, 107

<b>Polygon Number</b>	26
<b>Survey Intensity</b>	1
<b>GPS Waypoints</b>	13
<b>Observer</b>	PM
<b>Date</b>	7/15/2004
<b>Specific Location</b>	between shoreline and polygon 7 in the NW corner of Blake Island
<b>GPS Unit</b>	4
<b>Total Vegetation</b>	100
<b>Trees Total</b>	65
<b>emergent</b>	3
<b>main canopy</b>	54
<b>subcanopy</b>	8
<b>Shrubs Total</b>	31
<b>&gt; 1.5'</b>	1
<b>&lt; 1.5'</b>	30
<b>Graminoids Total</b>	35
<b>Graminoids perennial</b>	35
<b>Graminoids annual</b>	0
<b>Forbs Total</b>	20
<b>Forbs perennial</b>	20
<b>Forbs annual</b>	0
<b>Ferns - evergreen</b>	45
<b>Ferns - deciduous</b>	1
<b>Exotics Total</b>	4
<b>Exotics perennial</b>	4
<b>Exotics annual</b>	0
<b>Rock Outcrop</b>	0
<b>Gravel</b>	0
<b>Bare Ground</b>	0
<b>Moss-Lichen</b>	5
<b>Litter</b>	95
<b>Logging</b>	1
<b>Stand Age</b>	3
<b>Agriculture</b>	0
<b>Livestock</b>	6
<b>Development</b>	5
<b>Wildlife</b>	0
<b>Recreation Severity</b>	3
<b>Recreation Type</b>	3
<b>Hydrology</b>	1

### Exotic Species

<b>primary spp</b>	Hedera helix
<b>secondary spp</b>	Anthoxanthum odoratum

### Plant Associations

	<b>Percent</b>	<b>Pattern</b>
1. ALRU/POMU	75	1
2. TSHE-PSME/POMU-DREX	25	3
3		

**Notes** photos 88-91

<b>Polygon Number</b>	27
<b>Survey Intensity</b>	1
<b>GPS Waypoints</b>	23
<b>Observer</b>	PM
<b>Date</b>	7/15/2004
<b>Specific Location</b>	above bluff on SW side in alder forest (537832/5264737)
<b>GPS Unit</b>	4
<b>Total Vegetation</b>	100
<b>Trees Total</b>	85
<b>emergent</b>	5
<b>main canopy</b>	75
<b>subcanopy</b>	5
<b>Shrubs Total</b>	18
<b>&gt; 1.5'</b>	15
<b>&lt; 1.5'</b>	3
<b>Graminoids Total</b>	1
<b>Graminoids perennial</b>	1
<b>Graminoids annual</b>	0
<b>Forbs Total</b>	1
<b>Forbs perennial</b>	1
<b>Forbs annual</b>	0
<b>Ferns - evergreen</b>	80
<b>Ferns - deciduous</b>	3
<b>Exotics Total</b>	0
<b>Exotics perennial</b>	0
<b>Exotics annual</b>	0
<b>Rock Outcrop</b>	0
<b>Gravel</b>	0
<b>Bare Ground</b>	0
<b>Moss-Lichen</b>	0
<b>Litter</b>	100
<b>Logging</b>	1
<b>Stand Age</b>	3
<b>Agriculture</b>	0
<b>Livestock</b>	6
<b>Development</b>	5
<b>Wildlife</b>	0
<b>Recreation Severity</b>	3
<b>Recreation Type</b>	3
<b>Hydrology</b>	1

### Exotic Species

primary spp  
secondary spp

<b>Plant Associations</b>	<b>Percent</b>	<b>Pattern</b>
1. ALRU/POMU	100	1
2.		
3		

**Notes** Hydrology: small stream through part of area

<b>Polygon Number</b>	28
<b>Survey Intensity</b>	1
<b>GPS Waypoints</b>	0537393/5265479 UTM zone 10
<b>Observer</b>	DS
<b>Date</b>	7/16/2004
<b>Specific Location</b>	Extreme NW corner of Park in ARME-PSME forest above campground
<b>GPS Unit</b>	Dane's Geko
<b>Total Vegetation</b>	100
<b>Trees Total</b>	98
<b>emergent</b>	10
<b>main canopy</b>	83
<b>subcanopy</b>	5
<b>Shrubs Total</b>	85
<b>&gt; 1.5'</b>	80
<b>&lt; 1.5'</b>	5
<b>Graminoids Total</b>	0
<b>Graminoids perennial</b>	0
<b>Graminoids annual</b>	0
<b>Forbs Total</b>	0
<b>Forbs perennial</b>	0
<b>Forbs annual</b>	0
<b>Ferns - evergreen</b>	0
<b>Ferns - deciduous</b>	2
<b>Exotics Total</b>	0
<b>Exotics perennial</b>	0
<b>Exotics annual</b>	0
<b>Rock Outcrop</b>	0
<b>Gravel</b>	0
<b>Bare Ground</b>	0
<b>Moss-Lichen</b>	0
<b>Litter</b>	100
<b>Logging</b>	3
<b>Stand Age</b>	2
<b>Agriculture</b>	0
<b>Livestock</b>	0
<b>Development</b>	0
<b>Wildlife</b>	7, heavy raccoon use - eroding trails to access
<b>Recreation Severity</b>	2
<b>Recreation Type</b>	3
<b>Hydrology</b>	1

### Exotic Species

primary spp  
secondary spp

### Plant Associations

	Percent	Pattern
1. PSME-ARME/GASH	100	1
2.		
3		

### Notes



<b>Polygon Number</b>	29
<b>Survey Intensity</b>	1
<b>GPS Waypoints</b>	40, 41
<b>Observer</b>	HS
<b>Date</b>	7/16/2004
<b>Specific Location</b>	W of Tillicum Village on beach
<b>GPS Unit</b>	1
<b>Total Vegetation</b>	97
<b>Trees Total</b>	90
<b>emergent</b>	3
<b>main canopy</b>	84
<b>subcanopy</b>	3
<b>Shrubs Total</b>	25
<b>&gt; 1.5'</b>	5
<b>&lt; 1.5'</b>	20
<b>Graminoids Total</b>	25
<b>Graminoids perennial</b>	15
<b>Graminoids annual</b>	10
<b>Forbs Total</b>	13
<b>Forbs perennial</b>	12
<b>Forbs annual</b>	1
<b>Ferns - evergreen</b>	20
<b>Ferns - deciduous</b>	3
<b>Exotics Total</b>	6
<b>Exotics perennial</b>	2
<b>Exotics annual</b>	4
<b>Rock Outcrop</b>	0
<b>Gravel</b>	1
<b>Bare Ground</b>	5
<b>Moss-Lichen</b>	2
<b>Litter</b>	92
<b>Logging</b>	2
<b>Stand Age</b>	
<b>Agriculture</b>	0
<b>Livestock</b>	0
<b>Development</b>	0
<b>Wildlife</b>	3
<b>Recreation Severity</b>	1
<b>Recreation Type</b>	0
<b>Hydrology</b>	1

### Exotic Species

<b>primary spp</b>	Ilex aquifolium
<b>secondary spp</b>	Senecio jacobaea

### Plant Associations

	<b>Percent</b>	<b>Pattern</b>
1. ACMA-ALRU/POMU-TEGR	90	1
2. TSHE-PSME/POMU-DREX	10	5
3		

**Notes** photos 3220-21

Polgyon Number	30
Survey Intensity	1
GPS Waypoints	27, 28
Observer	PM
Date	7/16/2004
Specific Location	SW shore
GPS Unit	4
Total Vegetation	95
Trees Total	75
emergent	5
main canopy	50
subcanopy	20
Shrubs Total	20
> 1.5'	15
< 1.5'	5
Graminoids Total	5
Graminoids perennial	5
Graminoids annual	0
Forbs Total	10
Forbs perennial	8
Forbs annual	2
Ferns - evergreen	10
Ferns - deciduous	1
Exotics Total	6
Exotics perennial	5
Exotics annual	1
Rock Outcrop	1
Gravel	1
Bare Ground	3
Moss-Lichen	4
Litter	91
Logging	1
Stand Age	2
Agriculture	0
Livestock	6
Development	5
Wildlife	0
Recreation Severity	3
Recreation Type	3
Hydrology	1

### Exotic Species

primary spp	Senecio jacobaea
secondary spp	Cirsium arvense

### Plant Associations

	Percent	Pattern
1. ACMA-ALRU/POMU-TEGR	100	1
2.		
3		

### Notes

<b>Polygon Number</b>	31
<b>Survey Intensity</b>	3
<b>GPS Waypoints</b>	
<b>Observer</b>	HS
<b>Date</b>	7/16/2004
<b>Specific Location</b>	older mixed conifer stand directly west of Tillicum Village
<b>GPS Unit</b>	
<b>Total Vegetation</b>	95
<b>Trees Total</b>	85
<b>emergent</b>	10
<b>main canopy</b>	60
<b>subcanopy</b>	15
<b>Shrubs Total</b>	7
<b>&gt; 1.5'</b>	2
<b>&lt; 1.5'</b>	5
<b>Graminoids Total</b>	1
<b>Graminoids perennial</b>	1
<b>Graminoids annual</b>	0
<b>Forbs Total</b>	2
<b>Forbs perennial</b>	1
<b>Forbs annual</b>	1
<b>Ferns - evergreen</b>	60
<b>Ferns - deciduous</b>	2
<b>Exotics Total</b>	0
<b>Exotics perennial</b>	0
<b>Exotics annual</b>	0
<b>Rock Outcrop</b>	0
<b>Gravel</b>	0
<b>Bare Ground</b>	0
<b>Moss-Lichen</b>	5
<b>Litter</b>	95
<b>Logging</b>	3
<b>Stand Age</b>	2
<b>Agriculture</b>	0
<b>Livestock</b>	0
<b>Development</b>	0
<b>Wildlife</b>	2
<b>Recreation Severity</b>	3
<b>Recreation Type</b>	3
<b>Hydrology</b>	1

### Exotic Species

primary spp  
secondary spp

<b>Plant Associations</b>	<b>Percent</b>	<b>Pattern</b>
---------------------------	----------------	----------------

- |                        |     |   |
|------------------------|-----|---|
| 1. TSHE-PSME/POMU-DREX | 100 | 1 |
| 2.                     |     |   |
| 3                      |     |   |

### Notes

<b>Polygon Number</b>	32
<b>Survey Intensity</b>	3
<b>GPS Waypoints</b>	
<b>Observer</b>	HS
<b>Date</b>	7/16/2004
<b>Specific Location</b>	Along bank above the western shore just south of beach campground
<b>GPS Unit</b>	
<b>Total Vegetation</b>	100
<b>Trees Total</b>	70
<b>emergent</b>	0
<b>main canopy</b>	68
<b>subcanopy</b>	2
<b>Shrubs Total</b>	20
<b>&gt; 1.5'</b>	15
<b>&lt; 1.5'</b>	5
<b>Graminoids Total</b>	10
<b>Graminoids perennial</b>	5
<b>Graminoids annual</b>	5
<b>Forbs Total</b>	20
<b>Forbs perennial</b>	17
<b>Forbs annual</b>	3
<b>Ferns - evergreen</b>	5
<b>Ferns - deciduous</b>	0
<b>Exotics Total</b>	4
<b>Exotics perennial</b>	3
<b>Exotics annual</b>	1
<b>Rock Outcrop</b>	0
<b>Gravel</b>	0
<b>Bare Ground</b>	0
<b>Moss-Lichen</b>	0
<b>Litter</b>	100
<b>Logging</b>	3
<b>Stand Age</b>	2
<b>Agriculture</b>	0
<b>Livestock</b>	0
<b>Development</b>	3
<b>Wildlife</b>	3
<b>Recreation Severity</b>	3
<b>Recreation Type</b>	3
<b>Hydrology</b>	1

### Exotic Species

<b>primary spp</b>	Galium aparine
<b>secondary spp</b>	Cirsium arvense

### Plant Associations

	<b>Percent</b>	<b>Pattern</b>
1. ALRU/POMU	60	1
2. PSME-ARME/GASH	40	5
3		

### Notes

<b>Polygon Number</b>	33
<b>Survey Intensity</b>	3
<b>GPS Waypoints</b>	
<b>Observer</b>	HS
<b>Date</b>	7/16/2004
<b>Specific Location</b>	rocky beach wrapping from west side south to east side of Blake Island
<b>GPS Unit</b>	
<b>Total Vegetation</b>	1
<b>Trees Total</b>	1
<b>emergent</b>	0
<b>main canopy</b>	1
<b>subcanopy</b>	0
<b>Shrubs Total</b>	0
<b>&gt; 1.5'</b>	0
<b>&lt; 1.5'</b>	0
<b>Graminoids Total</b>	1
<b>Graminoids perennial</b>	1
<b>Graminoids annual</b>	0
<b>Forbs Total</b>	0
<b>Forbs perennial</b>	0
<b>Forbs annual</b>	0
<b>Ferns - evergreen</b>	0
<b>Ferns - deciduous</b>	0
<b>Exotics Total</b>	
<b>Exotics perennial</b>	
<b>Exotics annual</b>	
<b>Rock Outcrop</b>	0
<b>Gravel</b>	98
<b>Bare Ground</b>	0
<b>Moss-Lichen</b>	0
<b>Litter</b>	2
<b>Logging</b>	0
<b>Stand Age</b>	0
<b>Agriculture</b>	0
<b>Livestock</b>	0
<b>Development</b>	0
<b>Wildlife</b>	0
<b>Recreation Severity</b>	0
<b>Recreation Type</b>	0
<b>Hydrology</b>	1

### Exotic Species

primary spp  
secondary spp

<b>Plant Associations</b>	<b>Percent</b>	<b>Pattern</b>
---------------------------	----------------	----------------

1. Rocky Beach
- 2.
- 3

100

1

### Notes



<b>Polygon Number</b>	34
<b>Survey Intensity</b>	3
<b>GPS Waypoints</b>	
<b>Observer</b>	HS
<b>Date</b>	7/16/2004
<b>Specific Location</b>	the water treatment facility area
<b>GPS Unit</b>	
<b>Total Vegetation</b>	
<b>Trees Total</b>	
emergent	
main canopy	
subcanopy	
<b>Shrubs Total</b>	
> 1.5'	
< 1.5'	
<b>Graminoids Total</b>	
Graminoids perennial	
Graminoids annual	
<b>Forbs Total</b>	
Forbs perennial	
Forbs annual	
<b>Ferns - evergreen</b>	
<b>Ferns - deciduous</b>	
<b>Exotics Total</b>	
Exotics perennial	
Exotics annual	
<b>Rock Outcrop</b>	
<b>Gravel</b>	
<b>Bare Ground</b>	
<b>Moss-Lichen</b>	
<b>Litter</b>	
<b>Logging</b>	0
<b>Stand Age</b>	0
<b>Agriculture</b>	0
<b>Livestock</b>	0
<b>Development</b>	1
<b>Wildlife</b>	3
<b>Recreation Severity</b>	3
<b>Recreation Type</b>	3
<b>Hydrology</b>	2

### Exotic Species

primary spp  
secondary spp

### Plant Associations

	Percent	Pattern
1. Disturbed/developed area	100	1
2.		
3		

### Notes

<b>Polygon Number</b>	35
<b>Survey Intensity</b>	3
<b>GPS Waypoints</b>	
<b>Observer</b>	HS
<b>Date</b>	7/16/2004
<b>Specific Location</b>	the NW campground camping area
<b>GPS Unit</b>	
<b>Total Vegetation</b>	
<b>Trees Total</b>	
<b>emergent</b>	
<b>main canopy</b>	
<b>subcanopy</b>	
<b>Shrubs Total</b>	
<b>&gt; 1.5'</b>	
<b>&lt; 1.5'</b>	
<b>Graminoids Total</b>	
<b>Graminoids perennial</b>	
<b>Graminoids annual</b>	
<b>Forbs Total</b>	
<b>Forbs perennial</b>	
<b>Forbs annual</b>	
<b>Ferns - evergreen</b>	
<b>Ferns - deciduous</b>	
<b>Exotics Total</b>	
<b>Exotics perennial</b>	
<b>Exotics annual</b>	
<b>Rock Outcrop</b>	
<b>Gravel</b>	
<b>Bare Ground</b>	
<b>Moss-Lichen</b>	
<b>Litter</b>	
<b>Logging</b>	0
<b>Stand Age</b>	0
<b>Agriculture</b>	0
<b>Livestock</b>	0
<b>Development</b>	3
<b>Wildlife</b>	3
<b>Recreation Severity</b>	1
<b>Recreation Type</b>	3
<b>Hydrology</b>	2

### **Exotic Species**

primary spp  
secondary spp

### **Plant Associations**

	<b>Percent</b>	<b>Pattern</b>
1. Disturbed/developed area	100	1
2.		
3		

### **Notes**

<b>Polygon Number</b>	36
<b>Survey Intensity</b>	3
<b>GPS Waypoints</b>	
<b>Observer</b>	HS
<b>Date</b>	7/16/2004
<b>Specific Location</b>	grassy field and rest room area near the NW campground
<b>GPS Unit</b>	
<b>Total Vegetation</b>	
<b>Trees Total</b>	
emergent	
main canopy	
subcanopy	
<b>Shrubs Total</b>	
> 1.5'	
< 1.5'	
<b>Graminoids Total</b>	
Graminoids perennial	
Graminoids annual	
<b>Forbs Total</b>	
Forbs perennial	
Forbs annual	
<b>Ferns - evergreen</b>	
<b>Ferns - deciduous</b>	
<b>Exotics Total</b>	
Exotics perennial	
Exotics annual	
<b>Rock Outcrop</b>	
<b>Gravel</b>	
<b>Bare Ground</b>	
<b>Moss-Lichen</b>	
<b>Litter</b>	
<b>Logging</b>	0
<b>Stand Age</b>	0
<b>Agriculture</b>	0
<b>Livestock</b>	0
<b>Development</b>	3
<b>Wildlife</b>	3
<b>Recreation Severity</b>	1
<b>Recreation Type</b>	3
<b>Hydrology</b>	2

### Exotic Species

primary spp  
secondary spp

### Plant Associations

	Percent	Pattern
1. Disturbed/developed area	100	1
2.		
3		

### Notes

<b>Polygon Number</b>	37
<b>Survey Intensity</b>	3
<b>GPS Waypoints</b>	
<b>Observer</b>	HS
<b>Date</b>	7/16/2004
<b>Specific Location</b>	Tillicum Village area
<b>GPS Unit</b>	
<b>Total Vegetation</b>	
<b>Trees Total</b>	
<b>emergent</b>	
<b>main canopy</b>	
<b>subcanopy</b>	
<b>Shrubs Total</b>	
<b>&gt; 1.5'</b>	
<b>&lt; 1.5'</b>	
<b>Graminoids Total</b>	
<b>Graminoids perennial</b>	
<b>Graminoids annual</b>	
<b>Forbs Total</b>	
<b>Forbs perennial</b>	
<b>Forbs annual</b>	
<b>Ferns - evergreen</b>	
<b>Ferns - deciduous</b>	
<b>Exotics Total</b>	
<b>Exotics perennial</b>	
<b>Exotics annual</b>	
<b>Rock Outcrop</b>	
<b>Gravel</b>	
<b>Bare Ground</b>	
<b>Moss-Lichen</b>	
<b>Litter</b>	
<b>Logging</b>	0
<b>Stand Age</b>	0
<b>Agriculture</b>	0
<b>Livestock</b>	0
<b>Development</b>	1
<b>Wildlife</b>	3
<b>Recreation Severity</b>	1
<b>Recreation Type</b>	4
<b>Hydrology</b>	2

### Exotic Species

primary spp  
secondary spp

### Plant Associations

	<b>Percent</b>	<b>Pattern</b>
1. Disturbed/developed area	100	1
2.		
3		

### Notes