Rare Plant and Vegetation Survey of Lake Newport State Park

Pacific Biodiversity Institute

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George Wooten
georgewooten@pacificbio.org

Robin O'Quinn, Ph.D.
roquinn@mail.ewu.edu

and

Peter H. Morrison
pm@pacificbio.org

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

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Executive Summary

Pacific Biodiversity Institute (PBI) conducted a rare plant and vegetation survey of Lake Newport State Park for the Washington State Parks and Recreation Commission (WSPRC).

Lake Newport State Park covers approximately 160.5 acres. The Park is located about 50 miles north of Spokane on the south shore of Lake Newport.

Lake Newport State Park was mapped into 11 polygons covered by five primary plant associations and two additional secondary plant associations. Existing plant communities were characterized within each polygon.

Lake Newport State Park is currently undeveloped as a State Park. There is an active rail line going through the park as well as signs of past homesteading, such as cleared fields irrigation canals and old clearcut forests.

One plant species listed by the Washington Natural Heritage Program (WA DNR NHP) was found in Lake Newport State Park. This species was tentatively identified as purple spike-rush (*Eleocharis atropurpurea*), which has been ranked as extirpated in Washington. The location for this taxon is mapped in Figure 11. Positive identification for this species cannot be confirmed until achenes (fruits required for a positive identification) are collected. Apparently, the plant did not produce achenes in 2008. If confirmed, this would be the only sighting of this species in Washington. A single historical sighting of this species is reported from the shores of Lake Chelan.

179 vascular plant taxa were identified to species during surveys of Lake Newport State Park (Table 3). An additional 21 taxa could only be identified to the rank of genus, bringing the total number of taxa in the park to 200. Table 3 also identifies 41 non-native species identified within the park, or approximately 21% of the total number of species observed.

The ecological condition of Lake Newport State Park was fair to excellent. The polygons in excellent condition were on the banks of Lake Newport. One-third of the park was in fair condition, covered by two polygons. These polygons are old fallow fields below the railroad that have become dominated by pasture grasses and noxious weeds.

Thirteen species of noxious weeds were found at Lake Newport State Park. Of these, eight were Class B noxious weeds and five were Class C weeds. The most widespread noxious weed found in dry areas was common St. Johnswort. The most common noxious weed, found in wet areas was reed canarygrass, however its coverage was not extensive. The noxious weed deemed most likely to increase in the near future is orange hawkweed. Orange hawkweed occurs extensively in the old fallow fields between the rail bed and the lakeshore.

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Introduction

Lake Newport State Park is located along Lake Newport about 50 miles north of Spokane. Lake Newport State Park is currently undeveloped as a State Park. There is an active railroad going through the park and signs of past homesteading, such as cleared fields, irrigation canals and old clearcuts.

The plant communities at Lake Newport State Park are distinguished by a high level of diversity. There are a mix of species associated with both dry and with wet climates. For example, facultative wetland species such as cedar occur here in upland sites. The climate of this area is more humid than other parts of eastern Washington due to the influence of a mountain range close by to the east.

Most of the forests are dominated by fire-tolerant species such as Douglas fir, ponderosa pine and lodgepole pine, with scattered individuals of fire-sensitive species such as grand fir. Lake Newport State Park also has a mixture of species adapted to both cold climates and warm climates, as evidenced by the presence of the two pines mentioned above.

The plant communities have notable floristic differences from examples in the literature, and it is likely that some of these communities warrant new descriptions. The lakeshore communities at Lake Newport State Park are often dominated by firethread, or saw-leaf, sedge (*Carex scopulorum* var. *prionophylla*), a species more commonly known from high elevation montane habitats. Additionally, there is a stand of mixed conifer mature forest above the railroad tracks at the east end of the park. This polygon has a high diversity of species and no invasive species. Below this stand on the other side of the railroad tracks is a dense shrubland that goes down to the lake that is also devoid of invasive species. Both of these stand types have been largely developed and invaded by weedy species in Washington, so their condition is exceptional.

Survey Conditions and Survey Routes

Lake Newport State Park was initially visited by one botanist/ecologist on July 31. A follow-up visit was conducted by two botanist/ecologists on August 30. The survey routes are shown in Figure 1. Parking is limited to a small right-of-way on the edge of a gravel pit along the highway. A path leads from the highway through the gravel pit to the park. Most of the park was accessible on foot, except for the steep, dense shoreline area at the northeast end of the park.

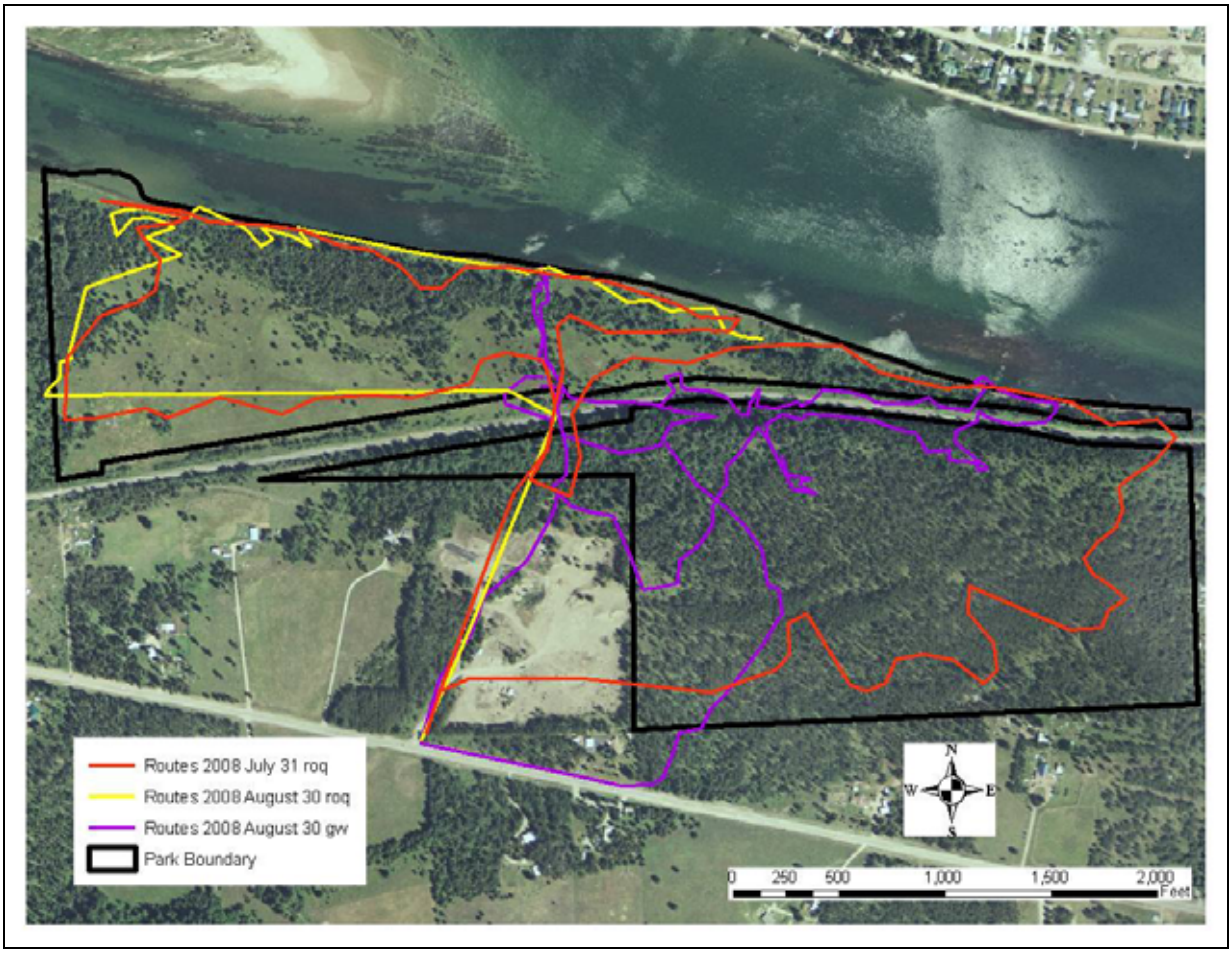

Figure 1. Field survey schedule and routes.

Vegetation Communities

Methods

Pre-field reviews of literature, GIS data, and remote sensing data were conducted early in the season. Maps, GIS data, and remotely sensed data were assembled together into an ArcMap GIS project covering the project area. Topographic maps and digital elevation models (DEMs) were also assembled. Using the gathered spatial data, discrete vegetation polygons intended to represent specific plant communities or mosaics of plant communities were manually delineated by staff ecologists as polygon features in an ESRI shapefile format.

Parks were then visited several times during the field season to ensure observation of both early and late-blooming plant species. The first visit was primarily a reconnaissance of the project area, meant to create a basic plant list for the park and to conduct rare plant surveys for early bloomers. Later visits focused on collecting field data for mapping vegetation polygons, building the plant species list and conducting late season rare plant surveys. Before the completion of the field season, all vegetation polygons that could be accessed safely were visited and field data were collected.

Plant community data was recorded on a form initially developed by WSPRC (Appendix A). Recorded data included a variety of information about the vegetation composition, environmental characteristics, disturbance history and other notes for each polygon. Each polygon was rated for its overall ecological condition according to a simple ranking system (Appendix B). Vegetation community and land cover

classifications were assigned using information and keys from standard literature sources cited in the Reference section of this document (Crawford 2003, Daubenmire and Daubenmire 1984, Evans 1989, Kovalchik and Clausnitzer 2004, and Williams and others 1995).

During field visits survey personnel had printed and digital maps available that included high-resolution aerial imagery. Digital maps were accessed in the field using ArcPad software (ESRI 2007) running on pocket PC, GPS enabled devices. Use of ArcPad allowed survey routes to be mapped on a GPS recorder in real time, which allowed for viewing and editing data directly from field locations, resulting in field-verified attributes for vegetation polygons.

Once gathered, the field data were edited and entered into a Microsoft Access database and linked to the vegetation polygon geodatabase. Further refinements and editing of the vegetation data stored in the personal geodatabase was made, based on information collected in the field with ArcPad.

Historical Vegetation

The present-day vegetation communities at Lake Newport State Park most likely resemble historic stand conditions that occurred. The park has some areas that are in excellent condition, free of invasive species and development, and some areas where recent modifications (homesteading, an active rail line and a small, old clearcut) have provided opportunities for the influx of invasive species. Of all of these disturbances, the invasion of non-native species may be the most profound.

Parts of the lakeshore communities in Lake Newport State Park are likely similar to their historic condition. Most of the immediate shoreline is dominated by the native firethread or saw-leaf, sedge (*Carex scopulorum* var. *prionophylla*) and, though there is some non-native reed canary grass present along the banks, it does not currently dominate the site. Firethread sedge is more commonly known from high elevation montane habitats in the North Cascades. The only known examples of similar communities in this part of Washington appear to be very rare.

The stand of mature forest upslope from the rail line at the east end of Lake Newport State Park is probably similar to its historic condition. The age structure is mixed and the vegetation assemblage is diverse, containing seven species of conifers. This stand has mesic soils and plants such as western redcedar that indicate this area historically had species adapted to wetter soils and moister climates. Fire return intervals would have been greater than more arid areas in eastern Washington, probably greater than 50 years, with a mixed severity fire regime (Washington State University 2004). Stands similar to the lodgepole pine dominated polygon in the eastern part of the park would have been a normal seral stage between large-scale disturbances.

The areas dominated by ponderosa pine likely had a more frequent fire regime carried by grasses in the understory. This association evolved with fire, and would normally burn on a 15-30 years cycle under a natural fire-regime (Ohlson 1996).

Results

Vegetation Mapping

A total of 11 polygons were mapped in Lake Newport State Park (Figure 2). These polygons were categorized into five primary plant associations and two additional secondary plant associations. Existing plant communities were characterized within each polygon (Table 1). Table 2 gives additional reference information about the plant associations. The communities were assigned to either a primary, secondary or tertiary community. Primary community types are the dominant or matrix vegetation community

within a polygon, whereas secondary and tertiary community types represent less abundant vegetation community types that occur within the same polygon. Secondary and tertiary community types were not conducive to being mapped as a separate polygons based on size, shape, or pattern of the patches within the polygon.

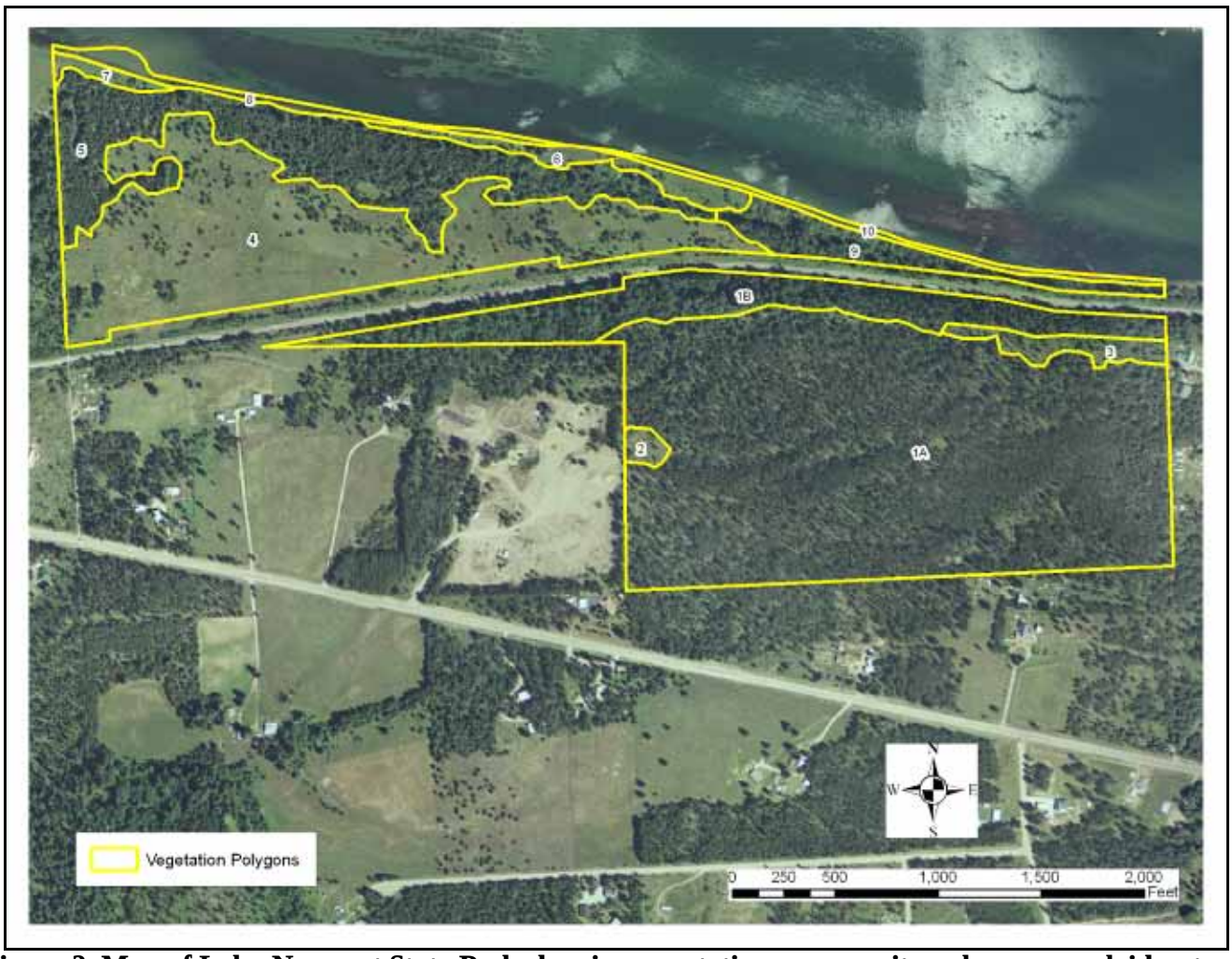

Figure 2. Map of Lake Newport State Park showing vegetation community polygons overlaid onto an aerial photo of the park.

Table 1. Plant communities observed in Lake Newport State Park (asterisked records only occur as secondary plant associations).

Plant Association, Vegetation Community or Land Cover (Codes)	Plant Communities and Land Cover Observed (Codes)
Ponderosa pine / snowberry (PIPO / SYAL)	PIPO/SYAL/DAGL
Douglas fir / snowberry (PSME/SYAL)	PSME-ARNU2/ELGL; PIPO/PHPR3-CAHO5-PHAR3-AGGI2
Douglas fir / pinegrass (PSME / CARU)	PICO/CARU-HYPE; PICO/CARU-LIDAD-HYPE; PSME/CARU-PHPR3-HYPE
* Grand fir / Douglas maple (ABGR/ACGLD4)	PSME-ABGR/ACGLD4/ARNU2-ELGL
Mountain alder / snowberry (ALIN2/SYAL)	ALIN2-BEOC2/SYAL; CESTM-CIAR4 railroad bed
* Black hawthorn - snowberry (CRDO2-SYAL)	CRDO2-SYAL/CASCP-PHAR
Firethread sedge or saw-leaf sedge (CASCP)	CASC12 MEADOW W/ CRDO2/ forbs and other grasses; Muddy shoreline

Table 2. Plant association reference table for Lake Newport State Park. (See Appendix C for status codes. Note that the "~" under Global Status represents the rank estimated by PBI.)

Code	Scientific Names	Authority	Global Status
PIPO/SYAL	Pinus ponderosa / Symphoricarpos albus	Daubenmire and Daubenmire 1984	G4 (apparently secure)
PSME/SYAL	Pseudotsuga menziesii / Symphoricarpos albus	Daubenmire and Daubenmire 1984	G5 (secure)
PSME/CARU	Pseudotsuga menziesii / Calamagrostis rubescens	Williams and others 1995	G5 (secure)
ABGR/ACGLD4	Abies grandis / Acer glabrum var. douglasii	Williams and others 1995	G3 (vulnerable)
ALIN2/SYAL	Alnus incana / Symphoricarpos albus	Kovalchik and Clausnitzer 2004	~G3 (vulnerable)
CRDO2-SYAL	Crataegus douglasii - Symphoricarpos albus	Crawford 2003	~G2 (imperiled)
CASCP	Carex scopulorum ssp. prionophylla	Kovalchik and Clausnitzer 2004	~G1 (critically imperiled)

Each vegetation community polygon has at least one primary vegetation community/land cover class assigned to it, and up to 2 additional classes. Figure 3 shows a map depicting the primary vegetation community/land cover class for each polygon within the park. Appendix D describes the attributes described for each polygon mapped within the project area.

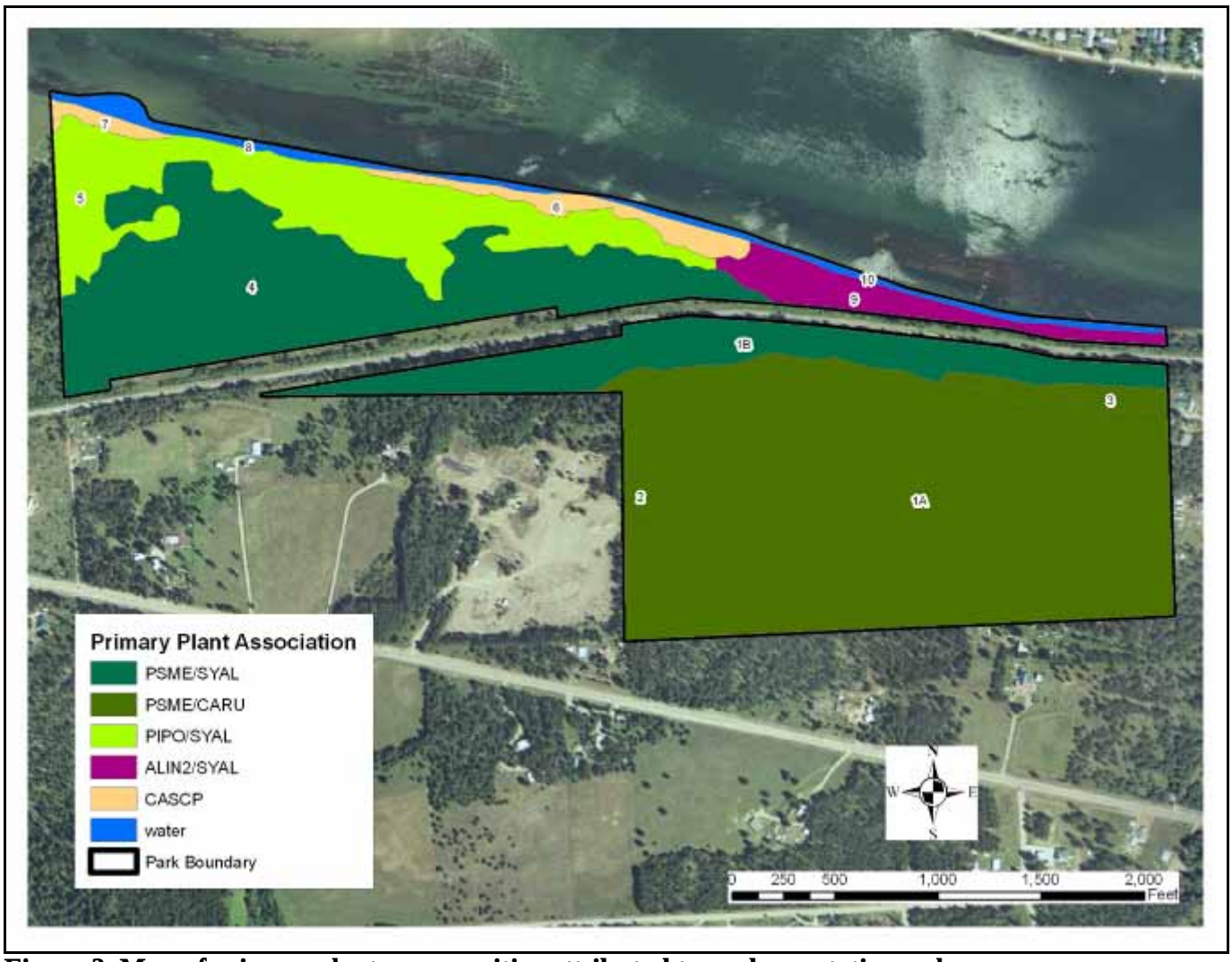

Figure 3. Map of primary plant communities attributed to each vegetation polygon.

Vegetation Community and Land Cover Types

Ponderosa pine / snowberry (PIPO/SYAL) G4

Figure 4. An example of the ponderosa pine / snowberry plant association at Lake Newport State Park.

The ponderosa pine / snowberry plant association is composed of an overstory of ponderosa pine with an understory of common snowberry (Figure 4). It was described by Daubenmire and Daubenmire (1984). It is ranked G4, apparently secure.

The ponderosa pine / snowberry association occurs on well-drained soils at this park. This association evolved with fire, and would normally burn every 15-30 years in a natural fire-regime (Ohlson 1996). Periodic use of prescribed fire may be necessary to maintain this plant association.

Douglas fir / snowberry (PSME/SYAL) G5

Figure 5. An example of the Douglas fir / snowberry plant association at Lake Newport State Park.

The Douglas fir / snowberry plant association is composed of an overstory of Douglas fir (and some ponderosa pine) with an understory of common snowberry (Figure 5). It was originally described by Daubenmire and Daubenmire (1984). It is ranked G5, globally secure.

The Douglas fir / snowberry plant association occurs on moister, shadier sites than the ponderosa pine / snowberry association. This association is fire-adapted. It may have had a slightly longer mean fire-return interval than the drier ponderosa pine plant association. This would result in a mixed severity fire regime with individuals and patches of trees in all age groups (Washington State University 2004). Fire severity is more variable in stands with a mixed-severity fire regime, resulting in a patchy mosaic of young and older forest.

At Lake Newport State Park, the Douglas fir / snowberry plant association has a high abundance of Oregon grape. This may warrant description as a different plant association.

Douglas-fir / pinegrass (PSME/CARU) (G5)

Figure 6. An example of the Douglas fir / pinegrass plant association at Lake Newport State Park.

The Douglas-fir / pinegrass association has an overstory of Douglas fir and an understory of pinegrass. It was described by Williams and others (1995). It is ranked G5, secure.

The Douglas-fir / pinegrass association was observed in one large polygon at the east end of Lake Newport State Park (Figure 6). This stand occupies a flat bench. The predominant overstory vegetation is composed of lodgepole pine, indicating that this is a seral stage. The understory vegetation has been altered by invasive species, primarily common St. Johnswort and pasture grasses. Shrubs are infrequent in this plant community; the most common ones are Oregon grape and serviceberry.

The Douglas fir / pinegrass plant association is fire-adapted. It has fire return interval over 35 years (Ohlson 1996) and a mixed severity fire regime (Washington State University 2004). Fire severity is more variable in stands with a mixed-severity fire regime, resulting in a patchy mosaic of young and older forest.

This stand was very uniform in composition, dominated by lodgepole pines about 70 years old. It did not show signs of past logging. This makes it difficult to explain how so many invasive species are present in the stand. The weeds indicate that the last disturbance post-dated European settlement. It is possible that this was formerly a homestead pasture that was grazed and then later abandoned, allowing the lodgepole to overtake the meadow vegetation.

Grand fir / Douglas maple (ABGR/ACGLD4)

Figure 7. An example of the grand fir / Douglas maple plant association at Lake Newport State Park.

The grand fir / Douglas maple association has an overstory of grand fir and a shrub canopy of Douglas maple (Figure 7). It was described by Williams and others (1995). It is ranked G5, secure.

At Lake Newport State Park, the grand fir / Douglas maple plant association only occurs as a secondary plant association within one polygon classified as the Douglas fir / snowberry plant association. This part of the stand had an understory of wild sarsaparilla (*Aralia nudicaulis*). This and other species present may warrant classification as a different or novel plant association.

This forest association is typified by occurrence on mid-slopes and riparian corridors. Soils tend to be silt loam. Occasional co-dominants include Douglas fir, western larch, western redcedar and mountain alder.

A goshawk nest was located in this polygon. Goshawks frequently nest in cooler, older forests.

Mountain alder / snowberry (ALIN2/SYAL) (~G3)

Figure 8. An example of the mountain alder / snowberry plant association at Lake Newport State Park.

The mountain alder / snowberry plant association at Lake Newport State Park has an overstory dominated by mountain alder and an understory dominated by snowberry, as well as a diverse mix of other shrubs (Figure 8). It was described by Kovalchik and Clausnitzer (2004). It is unranked by NatureServe (2008), but appears to have a similar floristic composition to the cottonwood / mountain alder plant association by the same authors. The cottonwood / mountain alder plant association is ranked as G3, vulnerable. This plant association differed in many ways from the description, and may warrant its own classification.

The mountain alder / snowberry plant association requires a moist environment. The moisture appears to be due in part to high humidity and a northerly exposure, in addition to the lake water. Although mountain alder is classified as an obligate wetland species, the soils here did not appear to be saturated.

At Lake Newport State Park, the mountain alder / snowberry plant association occurs on a steep slope directly above Lake Newport. Despite the presence of nearby invasive species along the railroad right-of-way, the dense vegetation in this community appears to prevent their establishment.

Black hawthorn / snowberry (CRDO2-SYAL) (~G2)

Figure 9. An example of the black hawthorn / snowberry plant association at Lake Newport State Park.

The black hawthorn / snowberry vegetation type is characterized by a codominant stand of black hawthorn and common snowberry. It was described by Crawford (2003). Stands keying to this plant association were observed at Lake Newport State Park, however there were differences from the published description that may warrant description of the observed stands as a new community (Figure 9).

The black hawthorn / snowberry vegetation type is unranked by NatureServe (2008) but the stands at Lake Newport State Park have floristic similarities to the black hawthorn / Wood's rose (*Crataegus douglasii* / *Rosa woodsii*) association of Evans (1989), ranked G2 (imperiled) and to the cottonwood / mountain alder plant association of Kovalchik and Clausnitzer (2004), ranked G3 (vulnerable).

At Lake Newport State Park, the black hawthorn / snowberry plant association only occurs on as a secondary plant association slightly above the wetlands occupied by the firethread sedge plant association.

Firethread sedge or saw-leaf sedge (CASCP) (~G1)

Figure 10. An example of the firethread sedge plant association at Lake Newport State Park.

The firethread plant association occurs at Lake Newport State Park along the shoreline of Lake Newport (Figure 10). It is characterized by a dominant cover of firethread or saw-leaf sedge (*Carex scopulorum* var. *prionophylla*). It was described by Kovalchik and Clausnitzer (2004). This vegetation type is unranked by NatureServe (2008), but appears to have a similar floristic composition to the mountain alder / firethread sedge plant association (*Alnus incana / Carex scopulorum* var. *prionophylla*) (Kovalchik and Clausnitzer, 2004), which is ranked G1 or critically imperiled. This example was described from one known location in extreme northeastern Washington state, not too far from Lake Newport State Park. Natureserve lists three plant associations with an understory of firethread sedge. The other two are ranked G2 and G3. However, the other two associations are from the North Cascades ecological province and are known to be more extensive and to occur at higher elevations. The stands at Lake Newport State Park appear to be limited to the perennial flood zone of Lake Newport.

At Lake Newport State Park, the firethread plant association occurs on silty soils immediately adjacent to Lake Newport. This association was grouped into two communities: a grassy wet meadow, and a muddy shoreline. There are a large number of other graminoids present in this plant association, including the invasive reed canary grass. However, reed canary grass has not yet come to dominate this community. This may be due to the tenacious root masses of firethread sedge.

Rare Plant Surveys

Methods

Lake Newport State Park was surveyed for rare plants two times by two people during the 2008 field season. We used the WA DNR NHP rare plant list to determine the conservation status of vascular plants encountered in the field. We brought a botanical field laboratory with us to the state park complete with microscopes and a wide variety of plant identification tools. When needed, we collected plant specimens for later identification. We used a wide range of floras and other plant identification references (e.g. Boersma et al 2006, Flora of North America 1993+, Hitchcock and Cronquist 1973, Hitchcock et al 1955, Hickman 1993, University of Washington Burke Museum Herbarium Vascular Plant Collection, USDA 2008, Washington Natural Heritage Program 2008, Washington Natural Heritage Program. no date, Whitson et al 2000, Wilson 2006).

There are no historic sightings of threatened, endangered or sensitive plants reported for Lake Newport State Park. Nearby sightings of three rare species do occur in similar habitats on the other side of the lake. These are mapped in Figure 11. These three species were large St. Johnswort (*Hypericum majus*), prairie cordgrass (*Spartina pectinata*) and purple meadow rue (*Thalictrum dasycarpum*). All of these occupy habitats that do occur at Lake Newport State Park.

Field surveys were conducted on July 31 and August 30. 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. To avoid missing rare plants, 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 need to cover efficiently a large proportion of the park's area throughout the field season. We surveyed areas of the park more intensively where rare plants were deemed more likely to occur. This method is referred to as the intuitive-controlled method of rare plant surveys (Whiteaker 1998). These areas were the lakeshore, wetlands, and the stream at the west end of the Park. Survey routes for the rare plant inventory and rare plant locations were recorded as GPS waypoints and trackpoints, all of which were later compiled into a single GIS data layer, depicted in Figure 1.

Results

One plant species was found in Lake Newport State Park that was identified as a species listed by WA DNR NHP. This location is mapped in Figure 12. This species was identified as purple spike-rush (*Eleocharis atropurpurea*), ranked as extirpated. The identification cannot be confirmed until achenes (fruits) are collected that are necessary for a positive identification. Apparently the plant did not produce achenes in 2008. If confirmed, this would be the only sighting of this species in Washington. A single historical sighting of this species is reported from the shore of Lake Chelan.

The location of the spike rush was within the littoral zone of Lake Newport. Only about a dozen plants were seen so no root collections were made to avoid potential harm. Each plant supported 5-20 stems approximately one inch tall. This location should be revisited again during the fruiting season (late August to early September) to obtain achenes sufficient to confirm or refute its identity.

None of three species of sensitive plants known from nearby sites were found at Lake Newport State Park.

There was a single flowering stem of a skullcap (*Scutellaria*) that was collected that bore a strong morphological resemblance to the state sensitive narrowleaf skullcap (*Scutellaria angustifolia* ssp. *micrantha*), that is known from only a few sites in this part of Washington. However, the narrowleaf skullcap is only known from dry, rocky soils, and the specimen was taken from the muddy shoreline of Lake Newport. Therefore, the identity of the specimen is more likely to be marsh skullcap (*Scutellaria galericulata*), even though it was more similar morphologically to the rare species.

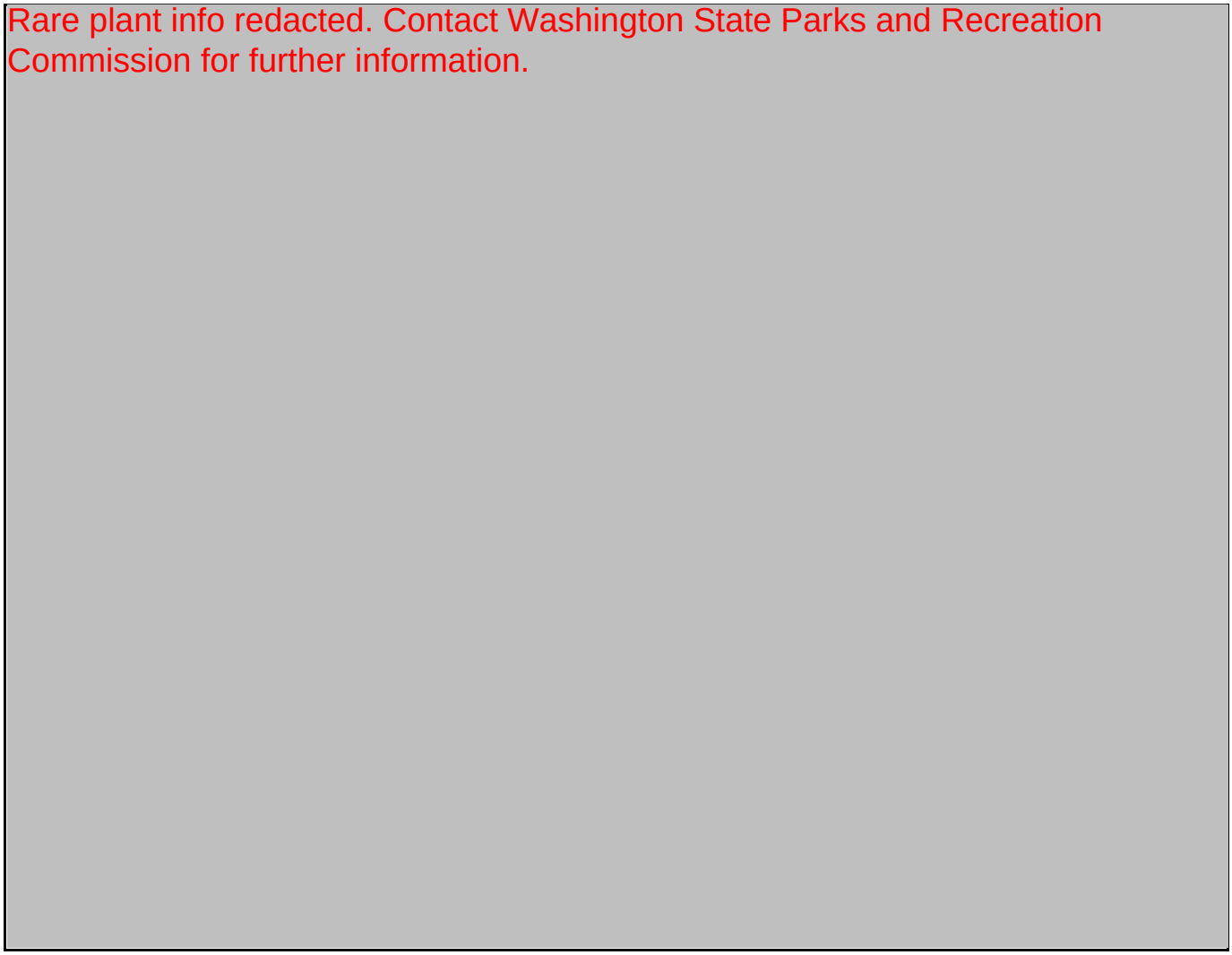

Figure 11. Locations of WA DNR NHP rare plant sightings near Lake Newport State Park.

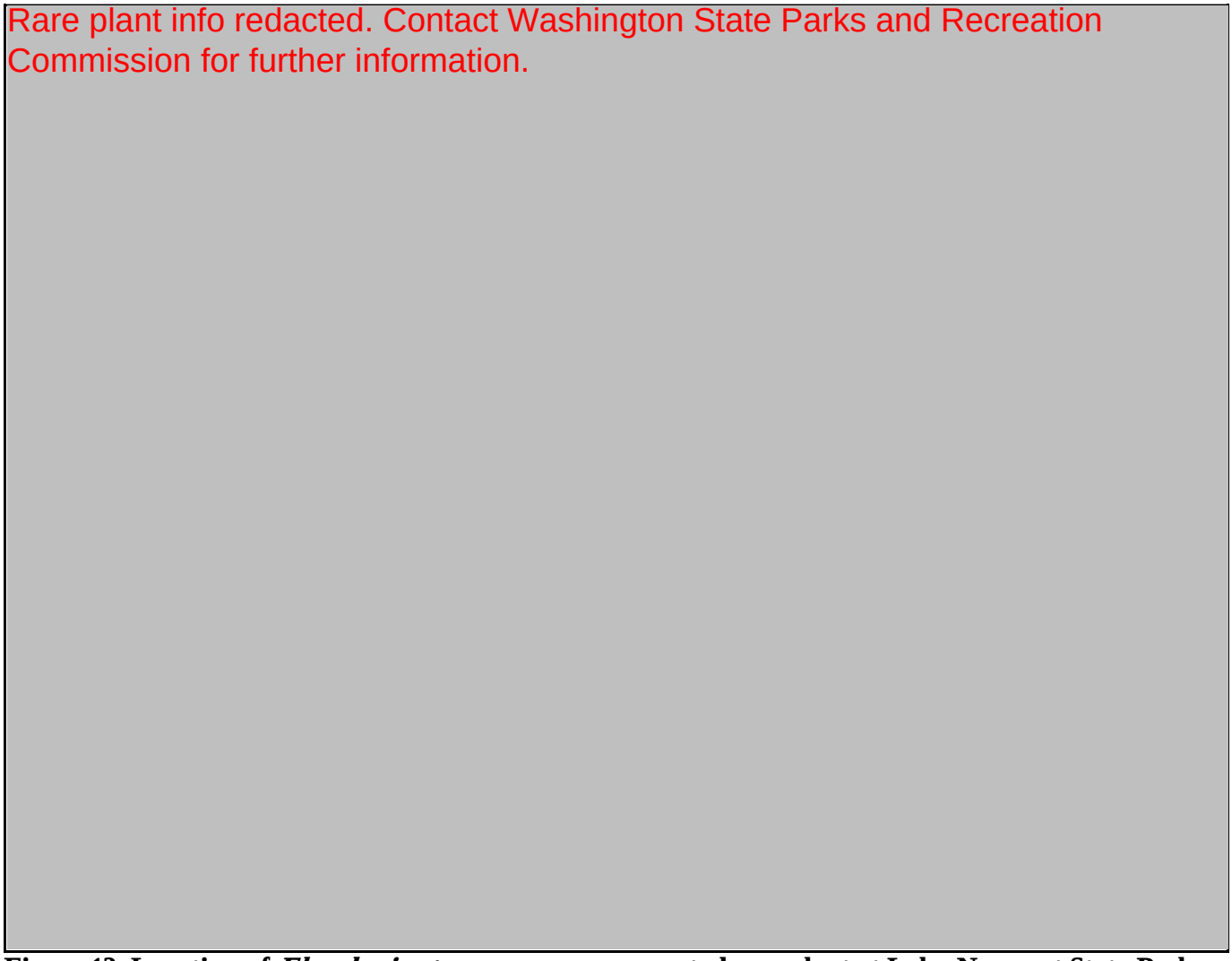

Figure 12. Location of *Eleocharis atropurpurea*, a suspected rare plant at Lake Newport State Park.

Vascular Plant List for the 2008 Project Area

There were 179 vascular taxa identified to species during surveys of Lake Newport State Park (Table 3). An additional 21 taxa could only be identified to the rank of genus, bringing the total number of taxa in the park to 200. Table 3 also identifies 41 non-native species identified within the park, or approximately 21% of the total number of species observed.

Table 3. Vascular Plant Species of Lake Newport State Park. The column "Symbol" represents the plant code used on the USDA PLANTS database.

Symbol	Scientific Name with Author	National Common Name	Family	Exotic
ABGR	Abies grandis (Douglas ex D. Don) Lindl.	grand fir	Pinaceae	
ACGLD4	Acer glabrum Torr. var. douglasii (Hook.) Dippel	Douglas maple	Aceraceae	
ACMI2	Achillea millefolium L.	common yarrow	Asteraceae	
ACRU2	Actaea rubra (Aiton) Willd.	red baneberry	Ranunculaceae	
ADBI	Adenocaulon bicolor Hook.	American trailplant	Asteraceae	
AGOSE	Agoseris Raf.	agoseris	Asteraceae	
AGGI2	Agrostis gigantea Roth	redtop	Poaceae	yes
AGROS2	Agrostis L.	bentgrass	Poaceae	yes
AGHU	Agrostis thurberiana Hitchc.		Poaceae	
ALIN2	Alnus incana (L.) Moench	gray alder	Betulaceae	
ALRH2	Alnus rhombifolia Nutt.	white alder	Betulaceae	
ALPR3	Alopecurus pratensis L.	meadow foxtail	Poaceae	yes
AMARA	Amaranthus L.	pigweed	Amaranthaceae	yes
AMAL2	Amelanchier alnifolia (Nutt.) Nutt. ex M. Roem.	Saskatoon serviceberry	Rosaceae	
ANMA	Anaphalis margaritacea (L.) Benth.	western pearly everlasting	Asteraceae	
ANMI3	Antennaria microphylla Rydb.	littleleaf pussytoes	Asteraceae	
ANNE	Antennaria neglecta Greene		Asteraceae	
ANPA4	Antennaria parvifolia Nutt.	small-leaf pussytoes	Asteraceae	
APAN2	Apocynum androsaemifolium L.	spreading dogbane	Apocynaceae	
ARNU2	Aralia nudicaulis L.	wild sarsaparilla	Araliaceae	
ARUV	Arctostaphylos uva-ursi (L.) Spreng.	kinnikinnick	Ericaceae	
ARCO9	Arnica cordifolia Hook.	heartleaf arnica	Asteraceae	
ARNIC	Arnica L.	arnica	Asteraceae	
ARLU	Artemisia ludoviciana Nutt.	white sagebrush	Asteraceae	
ASCA2	Asarum caudatum Lindl.	British Columbia wildginger	Aristolochiaceae	
ASCA11	Astragalus canadensis L.	Canadian milkvetch	Fabaceae	
ATFI	Athyrium filix-femina (L.) Roth	common ladyfern	Dryopteridaceae	
BEOC2	Betula occidentalis Hook.	water birch	Betulaceae	
BOMU	Botrychium multifidum (S.G. Gmel.) Trevis.	leathery grapefern	Ophioglossaceae	
BOTRY	Botrychium Sw.	grapefern	Ophioglossaceae	
BRIN2	Bromus inermis Leyss.	smooth brome	Poaceae	yes
BROMU	Bromus L.	brome	Poaceae	

Symbol	Scientific Name with Author	National Common Name	Family	Exotic
BRRA2	Bromus racemosus L.	bald brome	Poaceae	yes
BRVU	Bromus vulgaris (Hook.) Shear	Columbia brome	Poaceae	
CACA4	Calamagrostis canadensis (Michx.) P. Beauv.	bluejoint	Poaceae	
CARU	Calamagrostis rubescens Buckley	pinegrass	Poaceae	
CARO2	Campanula rotundifolia L.	bluebell bellflower	Campanulaceae	
CAAR2	Carex arcta Boott	northern cluster sedge	Cyperaceae	
CAAT3	Carex athrostachya Olney	slenderbeak sedge	Cyperaceae	
CADI4	Carex diandra Schrank	lesser panicled sedge	Cyperaceae	
CAGE2	Carex geyeri Boott	Geyer's sedge	Cyperaceae	
CAHO5	Carex hoodii Boott	Hood's sedge	Cyperaceae	
CAREX	Carex L.	sedge	Cyperaceae	
CALE8	Carex lenticularis Michx.	lakeshore sedge	Cyperaceae	
CALU7	Carex luzulina Olney	woodrush sedge	Cyperaceae	
CARE4	Carex retrorsa Schwein.	knotsheath sedge	Cyperaceae	
CASCP	Carex scopulorum T. Holm var. prionophylla (T. Holm) L.A. Standl.	firethread sedge	Cyperaceae	
CASC12	Carex scopulorum T. Holm, sensu strictu	mountain sedge	Cyperaceae	
CAST5	Carex stipata Muhl. ex Willd.	awlfruit sedge	Cyperaceae	
CAVEV2	Carex vesicaria L. var. vesicaria	blister sedge	Cyperaceae	
CEVE	Ceanothus velutinus Douglas ex Hook.	snowbrush ceanothus	Rhamnaceae	
CECY2	Centaurea cyanus L.	garden cornflower	Asteraceae	yes
CESTM	Centaurea stoebe L. ssp. micranthos (Gugler) Hayek	spotted knapweed	Asteraceae	yes
CHUM	Chimaphila umbellata (L.) W. Bartram	pipsissewa	Pyrolaceae	
CIAR4	Cirsium arvense (L.) Scop.	Canada thistle	Asteraceae	yes
CIVU	Cirsium vulgare (Savi) Ten.	bull thistle	Asteraceae	yes
CLLI2	Clematis ligusticifolia Nutt.	western white clematis	Ranunculaceae	
COCA5	Conyza canadensis (L.) Cronquist	Canadian horseweed	Asteraceae	
COCA13	Cornus canadensis L.	bunchberry dogwood	Cornaceae	
COSE16	Cornus sericea L. ssp. sericea	redosier dogwood	Cornaceae	
CRDO2	Crataegus douglasii Lindl.	black hawthorn	Rosaceae	
CYOF	Cynoglossum officinale L.	gypsyflower	Boraginaceae	yes
DAGL	Dactylis glomerata L.	orchardgrass	Poaceae	yes
DAIN	Danthonia intermedia Vasey	timber oatgrass	Poaceae	
DACA6	Daucus carota L.	Queen Anne's lace	Apiaceae	yes
DEPI	Descurainia pinnata (Walter) Britton	western tansymustard	Brassicaceae	
ELAC	Eleocharis acicularis (L.) Roem. & Schult.	needle spikerush	Cyperaceae	
ELAT	Eleocharis atropurpurea (Retz.) J. Presl & C. Presl	purple spikerush	Cyperaceae	
ELPA3	Eleocharis palustris (L.) Roem. & Schult.	common spikerush	Cyperaceae	
ELRO2	Eleocharis rostellata (Torr.) Torr.	beaked spikerush	Cyperaceae	
ELGL	Elymus glaucus Buckley	blue wildrye	Poaceae	

Symbol	Scientific Name with Author	National Common Name	Family	Exotic
ELRE4	Elymus repens (L.) Gould	quackgrass	Poaceae	yes
EPMI	Epilobium minutum Lindl. ex Lehm.	chaparral willowherb	Onagraceae	
EQAR	Equisetum arvense L.	field horsetail	Equisetaceae	
EQHY	Equisetum hyemale L.	scouringrush horsetail	Equisetaceae	
EQUIS	Equisetum L.	horsetail	Equisetaceae	
ERIGE2	Erigeron L.	fleabane	Asteraceae	
FEID	Festuca idahoensis Elmer	Idaho fescue	Poaceae	
FRVE	Fragaria vesca L.	woodland strawberry	Rosaceae	
FRVI	Fragaria virginiana Duchesne	Virginia strawberry	Rosaceae	
FRPU2	Fritillaria pudica (Pursh) Spreng.	yellow fritillary	Liliaceae	
GAAP2	Galium aparine L.	stickywilly	Rubiaceae	
GABO2	Galium boreale L.	northern bedstraw	Rubiaceae	
GATR3	Galium triflorum Michx.	fragrant bedstraw	Rubiaceae	
GLGR	Glyceria grandis S. Watson	American mannagrass	Poaceae	
GRNE	Gratiola neglecta Torr.	clammy hedgehyssop	Scrophulariaceae	
HIAU	Hieracium aurantiacum L.	orange hawkweed	Asteraceae	yes
HISCA	Hieracium scouleri Hook. var. albertinum (Farr) G.W. Douglas & G.A. Allen		Asteraceae	
HIVU2	Hippuris vulgaris L.	common mare's-tail	Hippuridaceae	
HODI	Holodiscus discolor (Pursh) Maxim.	oceanspray	Rosaceae	
HYPE	Hypericum perforatum L.	common St. Johnswort	Clusiaceae	yes
JUBU	Juncus bufonius L.	toad rush	Juncaceae	
JUFI	Juncus filiformis L.	thread rush	Juncaceae	
KOMA	Koeleria macrantha (Ledeb.) Schult.	prairie Junegrass	Poaceae	
LAOC	Larix occidentalis Nutt.	western larch	Pinaceae	
LEVU	Leucanthemum vulgare Lam.	oxeye daisy	Asteraceae	yes
LICO	Lilium columbianum Leichtlin	Columbia lily	Liliaceae	
LIPU11	Linanthus pungens (Torr.) J.M. Porter & L.A. Johnson	granite prickly phlox	Polemoniaceae	
LIDAD	Linaria dalmatica (L.) Mill. ssp. dalmatica	Dalmatian toadflax	Scrophulariaceae	yes
LIBO3	Linnaea borealis L.	twinflower	Caprifoliaceae	
LOAR5	Logfia arvensis (L.) Holub	field cottonrose	Asteraceae	yes
LOCI3	Lonicera ciliosa (Pursh) Poir. ex DC.	orange honeysuckle	Caprifoliaceae	
LOUNU	Lotus unifoliolatus (Hook.) Benth. var. unifoliolatus	American bird's-foot trefoil	Fabaceae	
MADIA	Madia	tarweed	Asteraceae	
MAAQ2	Mahonia aquifolium (Pursh) Nutt.	hollyleaved barberry	Berberidaceae	
MARAA	Maianthemum racemosum (L.) Link ssp. amplexicaule (Nutt.) LaFrankie	feathery false lily of the valley	Liliaceae	
MAST4	Maianthemum stellatum (L.) Link	starry false lily of the valley	Liliaceae	
MELU	Medicago lupulina L.	black medick	Fabaceae	yes
MEAR4	Mentha arvensis L.	wild mint	Lamiaceae	
MIGU	Mimulus guttatus DC.	seep monkeyflower	Scrophulariaceae	

Symbol	Scientific Name with Author	National Common Name	Family	Exotic
MITEL	Mitella L.	miterwort	Saxifragaceae	
MYOSO	Myosotis L.	forget-me-not	Boraginaceae	
MYLA	Myosotis laxa Lehm.	bay forget-me-not	Boraginaceae	
MYSC	Myosotis scorpioides L.	true forget-me-not	Boraginaceae	yes
MYSP2	Myriophyllum spicatum L.	Eurasian watermilfoil	Haloragaceae	yes
OSBE	Osmorhiza berteroi DC.	sweetcicely	Apiaceae	
PADI	Panicum dichotomiflorum Michx.	fall panicgrass	Poaceae	yes
PECO6	Penstemon confertus Douglas ex Lindl.	yellow penstemon	Scrophulariaceae	
PHAR3	Phalaris arundinacea L.	reed canarygrass	Poaceae	yes
PHAL2	Phleum alpinum L.	alpine timothy	Poaceae	
PHPR3	Phleum pratense L.	timothy	Poaceae	yes
PHCA7	Phlox caespitosa Nutt.	tufted phlox	Polemoniaceae	
PHMA5	Physocarpus malvaceus (Greene) Kuntze	mallow ninebark	Rosaceae	
PICO	Pinus contorta Douglas ex Louden	lodgepole pine	Pinaceae	
PIMO3	Pinus monticola Douglas ex D. Don	western white pine	Pinaceae	
PIPO	Pinus ponderosa C. Lawson	ponderosa pine	Pinaceae	
PIELE4	Piperia elegans (Lindl.) Rydb. ssp. elegans	elegant piperia	Orchidaceae	
PIUN3	Piperia unalascensis (Spreng.) Rydb.	slender-spire orchid	Orchidaceae	
PLLA	Plantago lanceolata L.	narrowleaf plantain	Plantaginaceae	yes
PLMA2	Plantago major L.	common plantain	Plantaginaceae	yes
POCO	Poa compressa L.	Canada bluegrass	Poaceae	yes
POA	Poa L.	bluegrass	Poaceae	
POPR	Poa pratensis L.	Kentucky bluegrass	Poaceae	yes
POWH2	Poa wheeleri Vasey	Wheeler's bluegrass	Poaceae	
PODO4	Polygonum douglasii Greene	Douglas' knotweed	Polygonaceae	
POBA2	Populus balsamifera L.	balsam poplar	Salicaceae	
POBAT	Populus balsamifera L. ssp. trichocarpa (Torr. & A. Gray ex Hook.) Brayshaw	black cottonwood	Salicaceae	
POTR5	Populus tremuloides Michx.	quaking aspen	Salicaceae	
POARC	Potentilla arguta Pursh ssp. convallaria (Rydb.) D.D. Keck	cream cinquefoil	Rosaceae	
POGL9	Potentilla glandulosa Lindl.	sticky cinquefoil	Rosaceae	
POGR9	Potentilla gracilis Douglas ex Hook.	slender cinquefoil	Rosaceae	
PORE5	Potentilla recta L.	sulphur cinquefoil	Rosaceae	yes
PRHOO	Prosartes hookeri Torr. var. oregana (S. Watson) Kartesz	Oregon drops of gold	Liliaceae	
PRVU	Prunella vulgaris L.	common selfheal	Lamiaceae	
PRUNU	Prunus L.	plum	Rosaceae	yes
PSME	Pseudotsuga menziesii (Mirb.) Franco	Douglas-fir	Pinaceae	
PTAQ	Pteridium aquilinum (L.) Kuhn	western brackenfern	Dennstaedtiaceae	
PTAN2	Pterospora andromedea Nutt.	woodland pinedrops	Monotropaceae	

Symbol	Scientific Name with Author	National Common Name	Family	Exotic
RAAL	Ranunculus alismifolius Geyer ex Benth.	plantainleaf buttercup	Ranunculaceae	
RAAQ	Ranunculus aquatilis L.	white water crowfoot	Ranunculaceae	
RANUN	Ranunculus L.	buttercup	Ranunculaceae	
ROPA2	Rorippa palustris (L.) Besser	bog yellowcress	Brassicaceae	
ROGY	Rosa gymnocarpa Nutt.	dwarf rose	Rosaceae	
ROSA5	Rosa L.	rose	Rosaceae	
RULE	Rubus leucodermis Douglas ex Torr. & A. Gray	whitebark raspberry	Rosaceae	
RUPA	Rubus parviflorus Nutt.	thimbleberry	Rosaceae	
RUAC3	Rumex acetosella L.	common sheep sorrel	Polygonaceae	yes
RUCR	Rumex crispus L.	curly dock	Polygonaceae	yes
SASC	Salix scouleriana Barratt ex Hook.	Scouler's willow	Salicaceae	
SANGU2	Sanguisorba L.	burnet	Rosaceae	
SCGA	Scutellaria galericulata L.	marsh skullcap	Lamiaceae	
SCUTE	Scutellaria L.	skullcap	Lamiaceae	
SEIN2	Senecio integerrimus Nutt.	lambstongue ragwort	Asteraceae	
SENEC	Senecio L.	ragwort	Asteraceae	
SIME	Silene menziesii Hook.	Menzies' campion	Caryophyllaceae	
SOCA6	Solidago canadensis L.	Canada goldenrod	Asteraceae	
SOSC2	Sorbus scopulina Greene	Greene's mountain ash	Rosaceae	
SPBE2	Spiraea betulifolia Pall.	white spirea	Rosaceae	
SPDO	Spiraea douglasii Hook.	rose spirea	Rosaceae	
SPRO	Spiranthes romanzoffiana Cham.	hooded lady's tresses	Orchidaceae	
STELL	Stellaria L.	starwort	Caryophyllaceae	
STME2	Stellaria media (L.) Vill.	common chickweed	Caryophyllaceae	yes
SYAL	Symphoricarpos albus (L.) S.F. Blake	common snowberry	Caprifoliaceae	
SYFO2	Symphyotrichum foliaceum (Lindl. ex DC.) G.L. Nesom	alpine leafybract aster	Asteraceae	
SYLAG	Symphyotrichum laeve (L.) A. Löve & D. Löve var. geyeri (A. Gray) G.L. Nesom	Geyer's aster	Asteraceae	
SYMPH4	Symphyotrichum Nees	aster	Asteraceae	
TAVU	Tanacetum vulgare L.	common tansy	Asteraceae	yes
THOC	Thalictrum occidentale A. Gray	western meadow-rue	Ranunculaceae	
THIN6	Thinopyrum intermedium (Host) Barkworth & D.R. Dewey	intermediate wheatgrass	Poaceae	yes
THPL	Thuja plicata Donn ex D. Don	western redcedar	Cupressaceae	
TRDU	Tragopogon dubius Scop.	yellow salsify	Asteraceae	yes
TROC7	Triantha occidentalis (S. Watson) Gates ssp. brevistyla (C.L. Hitchc.) Packer	sticky tofieldia	Liliaceae	
TRAR4	Trifolium arvense L.	rabbitfoot clover	Fabaceae	yes
TRPR2	Trifolium pratense L.	red clover	Fabaceae	yes
URDI	Urtica dioica L.	stinging nettle	Urticaceae	
UTMA	Utricularia macrorhiza Leconte	common bladderwort	Lentibulariaceae	

Symbol	Scientific Name with Author	National Common Name	Family	Exotic
VACCI	Vaccinium L.	blueberry	Ericaceae	
VAME	Vaccinium membranaceum Douglas ex Torr.	thinleaf huckleberry	Ericaceae	
VAMY2	Vaccinium myrtillus L.	whortleberry	Ericaceae	
VETH	Verbascum thapsus L.	common mullein	Scrophulariaceae	yes
VEBR	Verbena bracteata Cav. ex Lag. & Rodr.	bigbract verbena	Verbenaceae	
VEAM2	Veronica americana Schwein. ex Benth.	American speedwell	Scrophulariaceae	
VEAN2	Veronica anagallis-aquatica L.	water speedwell	Scrophulariaceae	
VERON	Veronica L.	speedwell	Scrophulariaceae	
VEOF2	Veronica officinalis L.	common gypsyweed	Scrophulariaceae	yes
VIAM	Vicia americana Muhl. ex Willd.	American vetch	Fabaceae	
VIAD	Viola adunca Sm.	hookedspur violet	Violaceae	
VIOLA	Viola L.	violet	Violaceae	
VIOR	Viola orbiculata Geyer ex Holz.	darkwoods violet	Violaceae	
WOOR	Woodsia oregana D.C. Eaton	Oregon cliff fern	Dryopteridaceae	

Discussion and Recommendations

Noxious Weeds

A list of 13 species of noxious weeds found at Lake Newport State Park is presented in Table 4. The noxious weeds observed in each polygon are recorded in the corresponding record of the vegetation database for the park, which is included as Appendix D in this report.

During our surveys of Lake Newport State Park, we found eight Class B noxious weeds and five Class C weeds. The most widespread noxious weed found in dry areas was common St. Johnswort. The most common noxious weed found in wet areas was reed canarygrass; however, its distribution was not extensive. The noxious weed most likely to increase in the near future is orange hawkweed, which occurs extensively in the dry pastures between the rail bed and the lake.

Table 4. State listed noxious weeds at Lake Newport State Park.

Symbol	Scientific Name with Author	National Common Name	State Weed Status
CESTM	Centaurea stoebe L. ssp. micranthos (Gugler) Hayek	spotted knapweed	B
CIAR4	Cirsium arvense (L.) Scop.	Canada thistle	C
CIVU	Cirsium vulgare (Savi) Ten.	bull thistle	C
CYOF	Cynoglossum officinale L.	gypsyflower	B
DACA6	Daucus carota L.	Queen Anne's lace	B
HIAU	Hieracium aurantiacum L.	orange hawkweed	B
HYPE	Hypericum perforatum L.	common St. Johnswort	C
LEVU	Leucanthemum vulgare Lam.	oxeye daisy	B
LIDAD	Linaria dalmatica (L.) Mill. ssp. dalmatica	Dalmatian toadflax	B
MYSP2	Myriophyllum spicatum L.	Eurasian watermilfoil	B
PHAR3	Phalaris arundinacea L.	reed canarygrass	C
PORE5	Potentilla recta L.	sulphur cinquefoil	B
TAVU	Tanacetum vulgare L.	common tansy	C

Ecological Condition

The ecological condition of Lake Newport State Park is based on the ratings defined in Appendix B. A map of the primary ecological condition of each polygon is presented in Figure 13.

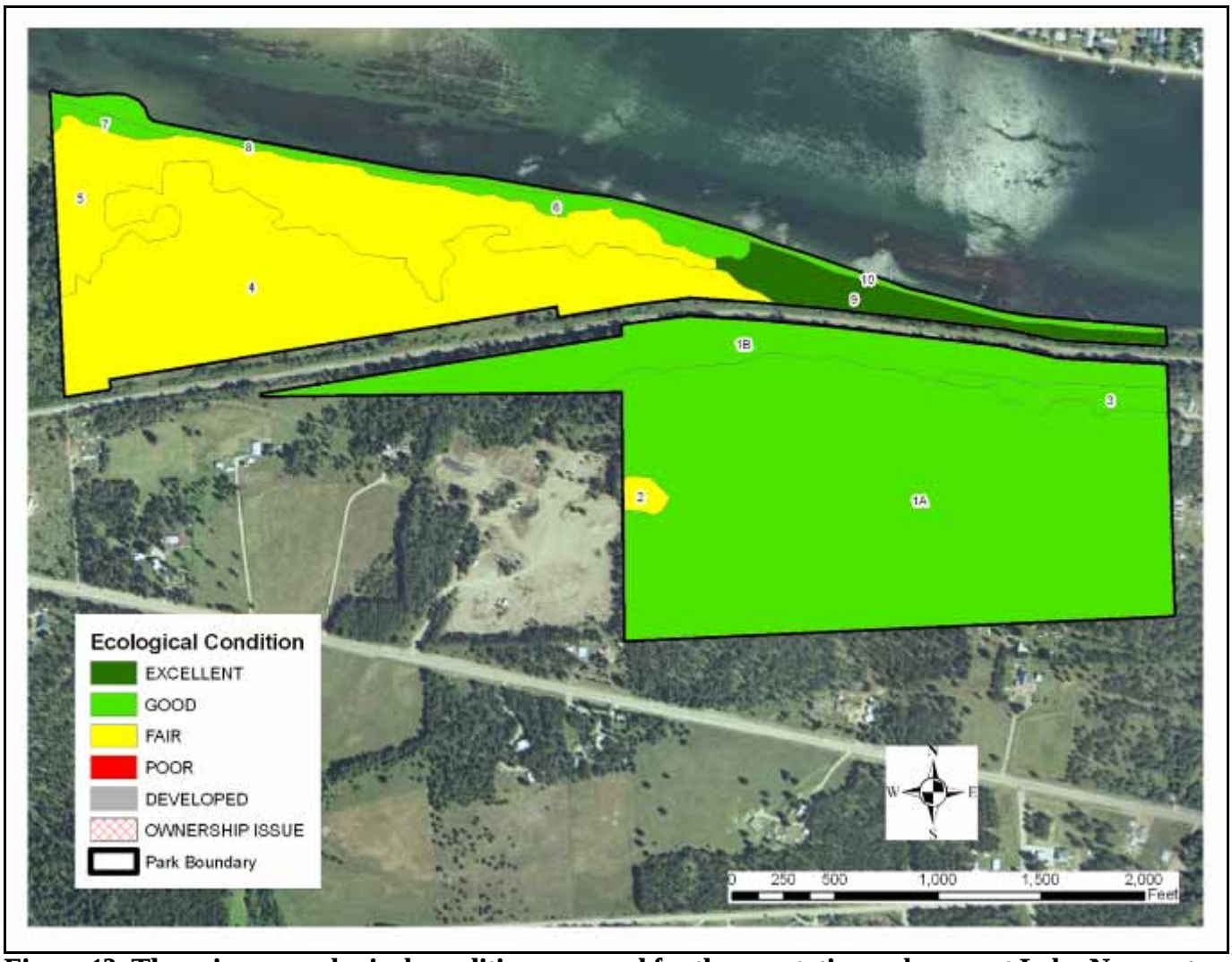

Figure 13. The primary ecological condition assessed for the vegetation polygons at Lake Newport State Park.

The ecological condition of Lake Newport State Park was fair to excellent. The polygons in excellent condition were on the banks of Lake Newport. About one-third of the park was in fair condition, covered by two polygons. These polygons are old fallow fields below the railroad tracks that have become dominated by pasture grasses and noxious weeds.

The percentage of non-native taxa was approximately 21% of 201 taxa. This indicates that this park has a significantly higher percentage of native to non-native plants than many other parks in eastern Washington surveyed by PBI in 2008. However the presence of 13 species of noxious weeds was higher than average, for a flora of this size. The presence of eight Class B Noxious weeds is a serious threat to the area's ecological diversity. In particular, orange hawkweed has a high potential for continued expansion. The prospects for controlling this species will require a long-term commitment.

Restoration Opportunities

Lake Newport State Park has a unique set of restoration opportunities. Because this park is presently undeveloped, several plant communities still exist here that have disappeared from other locations in the state. Once developed, there may be irreversible changes to some areas. Should this park become developed, it would be in the interests of Washington state to sustain these communities into the future. Thus it is important to identify areas where development would and would not be appropriate, while the

opportunity to conserve these relictual plant communities still exists. The use of the ecological condition map provides a good start towards such a plan.

There should be a plan to address noxious weeds at Lake Newport State Park. Left to themselves, these 13 species and dozens of other invasive species have the potential to alter the remaining character of the ecosystems at the park. A long-term invasive species control plan should be developed for the park. Such a plan should be based on sound principles, such as those described in Wooten (2001). In order to succeed, plans need clearly defined goals and objectives and must incorporate measurable standards and guidelines. To be successful over the long term, programs will need to incorporate comprehensive prevention strategies.

Other Recommendations

Ownership maps should be maintained and updated on a yearly basis. These maps should be in a digital format that is available for public access.

GIS Products Produced

Associated with this report are polygon layers created by PBI depicting the vegetation community types and associated data mapped within Lake Newport State Park. The datasets have been converted into ESRI shapefile formats and provided to WSPRC. 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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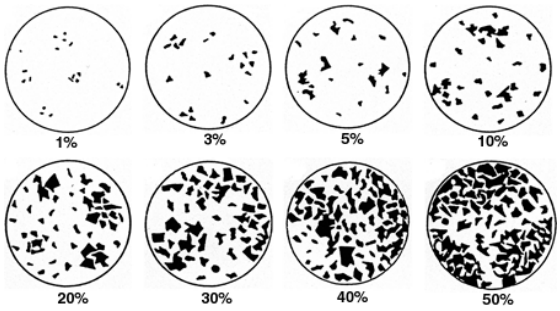
Appendix A – Vegetation Survey Codes and Instructions

Site = name of locality of map project **Name/Date** = your name / day-month-year completed polygon survey
Polygon # = number you put on map
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

TOTAL VEGETATION COVER includes all vascular plants, mosses, lichens and foliose lichens (crustose lichens excluded they are considered rock); this never exceeds 100%. Space between leaves/branches is included in "cover".

Code	**Cover (%)**	Cover mid-pt
0	0	0
1	<1	0.5
2	1-5	3
3	5-25	15
4	25-60	43
5	60-90	75
6	>90	95



TREES, SHRUBS, GRAMINOIDS, FORBS, EXOTICS cover includes the space between leaves/branches. 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.

EXOTICS = primary species observed; secondary species observed (please pay special attention to noxious weeds). Also, note the relative abundance of exotics in each polygon, using the 1-6 cover codes noted above.

SUBSTRATES estimate to nearest **%** the following, the sum of the categories adds to 100%. Describe in comments if there is wide variation in any category; note % standing water if it is persistent or characteristic of site.
Water = exposed standing or flowing water
Rock Outcrop = exposed bedrock including detached boulders over 1m across
Talus = exposed large, loose rocks
Gravel/Cobble = large fragments between sand and boulder
Bare Ground = exposed mineral soil
Mosses/Lichens = nonvascular plant cover on soil
Litter = includes logs, branches, and basal area of plants
Caves = area covered by caves
Mines = area covered by mines

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
Fire
Note presence of fire (i.e. charcoal, fire scars, etc.) and, if present , estimate time of fire.
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, 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

Descriptions of Plant Communities

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

Existing Vegetation Community – Write down the major tree/shrub/grass-forb-fern community type. Pay attention to indicator species. Alien species may be included in community description.

Ecological Condition Rank of PA in key or estimate. (The condition of each plant vegetation community polygon shall be rated using the codes listed in Appendix B.)

% of Polygon = your estimate of % of polygon covered by this plant community. (PA1 is the matrix and a greater % than PA2, if there is a PA2; PA2 is a greater % than PA3, if there is a PA3.)

Pattern = how PA is distributed in stand

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

Appendix B – 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:

- **Excellent Ecological Condition**

Areas in this class have very few non-native plants. The composition and structure of native vegetation in this condition class correspond to the natural range of variation characteristic to this habitat type. Old-growth conditions often exist. Species diversity of native plants and animals is often high relative to the natural community under consideration. Wildlife habitat conditions are optimal for species of conservation concern. Soil compaction, accelerated erosion and hydrologic alteration are absent. Direct signs of human-induced ecological stress are absent. Many rare plant and animal species may only exist within this condition class.

- **Good Ecological Condition**

Areas in this class have few non-native plants. The composition and structure of native vegetation in this condition class correspond to the natural range of variation characteristic to this habitat type. Old-growth conditions may exist, but have been subject to some human-induced stress. Species diversity of native plants and animals is moderately high relative to the natural community under consideration. Wildlife habitat conditions are adequate for species of conservation concern. Soil compaction, accelerated erosion and hydrologic alteration do not significantly influence the area. Direct signs of human-induced ecological stress are infrequent. Some rare plant and animal species may exist within this condition class.

- **Fair Ecological Condition**

Areas in this class often have both native and non-native plants. The composition and structure of native vegetation in this condition class is altered from the natural range of variation characteristic to this habitat type. Old-growth conditions are absent. Species diversity of native plants and animals is lower than the two higher condition classes. Wildlife habitat conditions may be adequate for some species of conservation concern, but not adequate for many. Soil compaction, accelerated erosion and hydrologic alteration may influence the area. Direct signs of human-induced ecological stress are frequent. Most rare plant and animal species are only infrequently encountered within this condition class.

- **Poor Ecological Condition**

Areas in this class are often dominated by non-native plants. The composition and structure of native vegetation in this condition class is often dramatically altered from the natural range of variation characteristic to this habitat type. Old-growth conditions are absent. Species diversity of native plants and animals is often low. Wildlife habitat conditions are not adequate for most species of conservation concern. Soil compaction, accelerated erosion and hydrologic alteration often influence the area. Direct signs of human-induced ecological stress are frequent. Rare plant and animal species are seldom encountered within this condition class.

- **Developed**

Developed portions of the park property: campgrounds, offices, facilities, infrastructure, etc.

- **Ownership Issue**

Areas within the GIS boundary of the park that appear to be owned or controlled by another entity other than WSPRC.

Appendix C – Definitions of Vegetation Community Conservation Status

The following table defines the ranking system for plants and plant communities used by the Washington State Natural Heritage Program.

Code	Definition
G1	Critically imperiled throughout its range; extremely rare with five or fewer occurrences or very few remaining acres.
G2	Imperiled throughout its range; rare with six to 20 occurrences or few remaining acres.
G3	Either very rare and local throughout its range or found locally in a restricted range; uncommon with 21 to 100 occurrences.
G4	Apparently secure throughout its range, though it may be quite rare in some parts of its range, especially at the periphery; many occurrences.
G5	Demonstrably secure in its range, though it may be quite rare in some parts of its range, especially at the periphery; ineradicable under present conditions.
S1	Critically imperiled in Oregon; extremely rare with five or fewer occurrences or very few remaining acres.
S2	Imperiled in Oregon; rare with six to 20 occurrences or few remaining acres.
S3	Either very rare and local in Oregon or found locally in a restricted range; uncommon with 21 to 100 occurrences.
S4	Apparently secure in Oregon, though it may be quite rare in some parts; many occurrences.
S5	Demonstrably secure in Oregon, though it may be quite rare in some parts; ineradicable under present conditions.
U	Unknown
NA	Natural Heritage Rank not available
NR	Not Ranked

Appendix D – Vegetation Survey Data

Polygon Number 10

ParkName:
Newport

Survey Intensity	1
Observer	GW
Date	8/30/2008
Total Vegetation	2
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	2
Dominant Graminoids	CARE4, CAVEV2, CALE8, PHAR3
Graminoids Perennial	2
Graminoids Annual	0
Forbs Total	1
Dominant Forbs	MEAR4, SCGA, GRNE, ELAT, ARLU, ROPA2, MYSP2, EQUIS
Forbs Perennial	1
Forbs Annual	1
Ferns Total	0
Ferns Evergreen	0
Ferns Deciduous	0
ExoticsTotal	1
Exotics Perennial	1
Exotics Annual	0
Water	92
Rock Outcrop	0
Gravel	0
Logging	0
Fire:	0
Stand Age	0
Agriculture	0
Livestock	0
Development	0
Wildlife	2
Recreation Severity	3
Recreation Type	5 (boating)
Hydrology	2

Exotic Species

Noxious Exotic Plants
PHAR3
Other Exotic Plants

Water:	92
Rock:	0
Talus:	0
Gravel:	0
Bare Ground:	3
Moss Lichen:	0
Litter:	5

Vegetation Types

		Percent	Pattern	Rank
Existing Veg1:	water and muddy shoreline	92	Matrix	GOOD
Veg Community1:	water			
Existing Veg2:	CASCP	8	linear	EXCELLE
Veg Community3:	CASCP			
Existing Veg3:		0		
Veg Community3:				

Notes: Same as poly 8; goshawks next above; PHAR3 & bronze carex (scop) like; rhiz is dominant; Scutellaria = Galericulata; small Eleocharis is E. atropurpurea, rediscovered

Polygon Number 1A

ParkName:
Newport

Survey Intensity	2
Observer	GW
Date	8/30/2008
Total Vegetation	6
Trees Total	5
Dominant Trees	PIPO, PSME, PICO
emergent	0
maincanopy	4
subcanopy	4
Shrubs Total	4
Dominant Shrubs	ARUV, AMAL2, SASC, MAAQ2, SYAL
> 1.5' tall	3
< 1.5' tall	3
Graminoids Total	4
Dominant Graminoids	ELGL, PHPR3, CARU
Graminoids Perennial	4
Graminoids Annual	0
Forbs Total	4
Dominant Forbs	PECO6, PHCA7, FRVI, APAN2, PORE5, POGR9, ACMI2, CARO2,
Forbs Perennial	4
Forbs Annual	1
Ferns Total	0
Ferns Evergreen	0
Ferns Deciduous	0
ExoticsTotal	3
Exotics Perennial	3
Exotics Annual	0
Water	0
Rock Outcrop	0
Gravel	0
Logging	0
Fire:	0
Stand Age	2
Agriculture	0
Livestock	0
Development	0
Wildlife	3
Recreation Severity	3
Recreation Type	3
Hydrology	1

Exotic Species

Noxious Exotic Plants
HYPE, PORE5
Other Exotic Plants
PHPR3

Water:	0
Rock:	0
Talus:	0
Gravel:	0
Bare Ground:	0
Moss Lichen:	5
Litter:	95

Vegetation Types

		Percent	Pattern	Rank
Existing Veg1:	PICO/CARU-HYPE	100	Matrix	GOOD
Veg Community1:	PSME/CARU			
Existing Veg2:		0		
Veg Community3:				
Existing Veg3:		0		
Veg Community3:				

Notes: LOTS OF PHPR3 POSSIBLYDUMPED TO FIGHT HIAU, WHICH DOESN'T ACTULLY OCCUR IN THIS PART.

Polygon Number 1B

ParkName:
Newport

Survey Intensity	2
Observer	GW
Date	8/30/2008
Total Vegetation	6
Trees Total	5
Dominant Trees	PSME, PIPO, PIMO3, ABGR, BEOC2, POBAT, ALIN2, THPL, LAOC
emergent	4
maincanopy	3
subcanopy	3
Shrubs Total	4
Dominant Shrubs	ACGLD4, AMAL2, MAAQ2, SYAL
> 1.5' tall	4
< 1.5' tall	1
Graminoids Total	3
Dominant Graminoids	BRVU, ELGL
Graminoids Perennial	3
Graminoids Annual	0
Forbs Total	4
Dominant Forbs	GATR3, MAST4, ARNU2, MITEL, VIOR, ADBI, PRHOO, ACRU2,
Forbs Perennial	4
Forbs Annual	0
Ferns Total	1
Ferns Evergreen	0
Ferns Deciduous	1
ExoticsTotal	1
Exotics Perennial	1
Exotics Annual	0
Water	0
Rock Outcrop	0
Gravel	0
Logging	2
Fire:	0
Stand Age	3
Agriculture	0
Livestock	0
Development	6
Wildlife	3
Recreation Severity	3
Recreation Type	3
Hydrology	1

Exotic Species

Noxious Exotic Plants

Other Exotic Plants
VETH

Water:	0
Rock:	0
Talus:	0
Gravel:	0
Bare Ground:	0
Moss Lichen:	5
Litter:	95

Vegetation Types

		Percent	Pattern	Rank
Existing Veg1:	PSME-ARNU2/ELGL	50	Matrix	GOOD
Veg Community1:	PSME/SYAL			
Existing Veg2:	PSME-ABGR/ACGLD4/ARNU2-ELGL	50	Large patch	GOOD
Veg Community3:	ABGR/ACGLD4			
Existing Veg3:		0		
Veg Community3:				

Notes:

Polygon Number 2

ParkName:
Newport

Survey Intensity	1
Observer	GW
Date	8/30/2008
Total Vegetation	5
Trees Total	3
Dominant Trees	PIPO, PSME, PICO
emergent	2
maincanopy	0
subcanopy	2
Shrubs Total	2
Dominant Shrubs	MAAQ2, AMAL2
> 1.5' tall	2
< 1.5' tall	1
Graminoids Total	5
Dominant Graminoids	CARU, THIN6, BRRA2
Graminoids Perennial	4
Graminoids Annual	1
Forbs Total	3
Dominant Forbs	PHCA7, LIDAD, CESTM, ACMI2
Forbs Perennial	3
Forbs Annual	1
Ferns Total	0
Ferns Evergreen	0
Ferns Deciduous	0
ExoticsTotal	3
Exotics Perennial	3
Exotics Annual	3
Water	0
Rock Outcrop	0
Gravel	0
Logging	2
Fire:	0
Stand Age	2
Agriculture	0
Livestock	0
Development	6
Wildlife	3
Recreation Severity	3
Recreation Type	3
Hydrology	1

Exotic Species

Noxious Exotic Plants
HYPE, LIDAD, CESTM, PORE5, CYOF
Other Exotic Plants

Water:	0
Rock:	0
Talus:	0
Gravel:	0
Bare Ground:	3
Moss Lichen:	0
Litter:	97

Vegetation Types

		Percent	Pattern	Rank
Existing Veg1:	PICO/CARU-LIDAD-HYPE	100	Matrix	FAIR
Veg Community1:	PSME/CARU			
Existing Veg2:		0		
Veg Community3:				
Existing Veg3:		0		
Veg Community3:				

Notes: OLD HOMESTEAD? OR JUST A SMALL PATCHCUT

Polygon Number 3

ParkName:
Newport

Survey Intensity	2
Observer	GW
Date	8/30/2008
Total Vegetation	6
Trees Total	4
Dominant Trees	PIPO, PSME, PICO
emergent	4
maincanopy	0
subcanopy	3
Shrubs Total	3
Dominant Shrubs	MAAQ2, AMAL2
> 1.5' tall	3
< 1.5' tall	2
Graminoids Total	4
Dominant Graminoids	BRRA2, POPR, CARU, THIN6, PHPR3
Graminoids Perennial	4
Graminoids Annual	1
Forbs Total	3
Dominant Forbs	HYPE, PHCA7, PORE5, PODO4, EPMI, ACMI2
Forbs Perennial	3
Forbs Annual	1
Ferns Total	0
Ferns Evergreen	0
Ferns Deciduous	0
ExoticsTotal	3
Exotics Perennial	3
Exotics Annual	1
Water	0
Rock Outcrop	0
Gravel	2
Logging	2
Fire:	0
Stand Age	1
Agriculture	0
Livestock	0
Development	0
Wildlife	2
Recreation Severity	3
Recreation Type	3
Hydrology	1

Exotic Species

Noxious Exotic Plants
HYPE, PORE5
Other Exotic Plants
THIN6

Water:	0
Rock:	0
Talus:	0
Gravel:	2
Bare Ground:	5
Moss Lichen:	3
Litter:	90

Vegetation Types

		Percent	Pattern	Rank
Existing Veg1:	PSME/CARU-PHPR3-HYPE	100	Matrix	GOOD
Veg Community1:	PSME/CARU			
Existing Veg2:		0		
Veg Community3:				
Existing Veg3:		0		
Veg Community3:				

Notes: OLD HOMESTEAD OR CLEARING; PLANT LIKE TALL POLEMONIACEAE

Polygon Number 4

ParkName:
Newport

Survey Intensity	2
Observer	GW
Date	8/30/2008
Total Vegetation	6
Trees Total	3
Dominant Trees	PIPO, PIMO3, PICO, PSME
emergent	1
maincanopy	3
subcanopy	3
Shrubs Total	2
Dominant Shrubs	CRDO2
> 1.5' tall	2
< 1.5' tall	0
Graminoids Total	5
Dominant Graminoids	PHAR3, PHPR3, AGGI2, CAHO5
Graminoids Perennial	5
Graminoids Annual	0
Forbs Total	2
Dominant Forbs	CIAR4, SYLAG, HIAU, HYPE
Forbs Perennial	2
Forbs Annual	1
Ferns Total	1
Ferns Evergreen	0
Ferns Deciduous	0
ExoticsTotal	5
Exotics Perennial	5
Exotics Annual	1
Water	0
Rock Outcrop	0
Gravel	0
Logging	1
Fire:	0
Stand Age	1
Agriculture	0
Livestock	0
Development	0
Wildlife	3
Recreation Severity	3
Recreation Type	3
Hydrology	1

Exotic Species

Noxious Exotic Plants
PHAR3, HIAU, CIAR4, HYPE
Other Exotic Plants
PHPR3

Water:	0
Rock:	0
Talus:	0
Gravel:	0
Bare Ground:	0
Moss Lichen:	0
Litter:	100

Vegetation Types

		Percent	Pattern	Rank
Existing Veg1:	PIPO/PHPR3-CAHO5-PHAR3-AGGI2	100	Matrix	FAIR
Veg Community1:	PSME/SYAL			
Existing Veg2:		0		
Veg Community3:				
Existing Veg3:		0		
Veg Community3:				

Notes:

Polygon Number 5

ParkName:
Newport

Survey Intensity	1
Observer	ROQ
Date	8/30/2008
Total Vegetation	4
Trees Total	4
Dominant Trees	PIPO, PICO, ABGR
emergent	1
maincanopy	4
subcanopy	2
Shrubs Total	4
Dominant Shrubs	SYAL, AMAL2, CRDO2
> 1.5' tall	2
< 1.5' tall	4
Graminoids Total	3
Dominant Graminoids	DAGL, ELGL, PHPR3, AGOSE
Graminoids Perennial	3
Graminoids Annual	1
Forbs Total	3
Dominant Forbs	FRVE, MAAQ2, ACMI2, SYLAG
Forbs Perennial	2
Forbs Annual	1
Ferns Total	0
Ferns Evergreen	0
Ferns Deciduous	0
ExoticsTotal	3
Exotics Perennial	2
Exotics Annual	1
Water	0
Rock Outcrop	0
Gravel	2
Logging	1
Fire:	0
Stand Age	5
Agriculture	0
Livestock	6
Development	4
Wildlife	2
Recreation Severity	3
Recreation Type	4
Hydrology	1

Exotic Species

Noxious Exotic Plants
PORE5, CESTM, DACA6, HYPE
Other Exotic Plants
VETH

Water:	0
Rock:	0
Talus:	2
Gravel:	2
Bare Ground:	2
Moss Lichen:	4
Litter:	90

Vegetation Types

		Percent	Pattern	Rank
Existing Veg1:	PIPO/SYAL/DAGL	100	Matrix	FAIR
Veg Community1:	PIPO/SYAL			
Existing Veg2:		0		
Veg Community3:				
Existing Veg3:		0		
Veg Community3:				

Notes: SOME BOARDS AND OTHER SIGNS OF THERE ONCE HAVING BEEN STRUCTURES INCLUDING DITCH

Polygon Number 6

ParkName:
Newport

Survey Intensity	1
Observer	ROQ
Date	8/30/2008
Total Vegetation	5
Trees Total	1
Dominant Trees	POBAT
emergent	0
maincanopy	1
subcanopy	1
Shrubs Total	3
Dominant Shrubs	CRDO2, SYAL
> 1.5' tall	3
< 1.5' tall	3
Graminoids Total	5
Dominant Graminoids	CASC12, PHAR3, AGGI2, GLGR, CACA4, ELRE4, ELGL, PHPR3
Graminoids Perennial	5
Graminoids Annual	2
Forbs Total	2
Dominant Forbs	ACMI2, MEAR4, PRVU, ARLU, SYLAG
Forbs Perennial	2
Forbs Annual	1
Ferns Total	0
Ferns Evergreen	0
Ferns Deciduous	0
ExoticsTotal	1
Exotics Perennial	1
Exotics Annual	1
Water	0
Rock Outcrop	0
Gravel	1
Logging	1
Fire:	0
Stand Age	2
Agriculture	6
Livestock	6
Development	5
Wildlife	3
Recreation Severity	3
Recreation Type	5
Hydrology	1

Exotic Species

Noxious Exotic Plants
CIAR4, HYPE, CESTM
Other Exotic Plants
PHAR3, PHPR3

Water:	0
Rock:	0
Talus:	0
Gravel:	1
Bare Ground:	10
Moss Lichen:	1
Litter:	88

Vegetation Types

		Percent	Pattern	Rank	
Existing Veg1:	CASC12 MEADOW W/ CRDO2/ forbs and other grasses	100		Matrix	GOOD
Veg Community1:	CASCP				
Existing Veg2:	CRDO2-SYAL/CASCP-PHAR	0			
Veg Community3:	CRDO2-SYAL				
Existing Veg3:		0			
Veg Community3:					

Notes: RED FRUITED CRDO2 GROWING SIDE BY SIDE W/ BLACK FRUITED

Polygon Number 7

ParkName:
Newport

Survey Intensity	1
Observer	ROQ
Date	8/30/2008
Total Vegetation	5
Trees Total	1
Dominant Trees	POBAT
emergent	0
maincanopy	1
subcanopy	1
Shrubs Total	3
Dominant Shrubs	CRDO2, SYAL
> 1.5' tall	3
< 1.5' tall	3
Graminoids Total	5
Dominant Graminoids	CASC12, PHAR3, AGGI2, GLGR, CACA4, ELRE4, ELGL, PHPR3
Graminoids Perennial	5
Graminoids Annual	2
Forbs Total	2
Dominant Forbs	ACMI2, MEAR4, PRVU, ARLU, SYLAG
Forbs Perennial	2
Forbs Annual	1
Ferns Total	0
Ferns Evergreen	0
Ferns Deciduous	0
ExoticsTotal	1
Exotics Perennial	1
Exotics Annual	1
Water	0
Rock Outcrop	0
Gravel	1
Logging	1
Fire:	0
Stand Age	2
Agriculture	6
Livestock	6
Development	5
Wildlife	3
Recreation Severity	3
Recreation Type	5
Hydrology	1

Exotic Species

Noxious Exotic Plants
CIAR4, HYPE, CESTM
Other Exotic Plants
PHAR3, PHPR3

Water:	0
Rock:	0
Talus:	0
Gravel:	1
Bare Ground:	10
Moss Lichen:	1
Litter:	88

Vegetation Types

		Percent	Pattern	Rank	
Existing Veg1:	CASC12 MEADOW W/ CRDO2/ forbs and other grasses	100		Matrix	GOOD
Veg Community1:	CASCP				
Existing Veg2:	CRDO2-SYAL/CASCP-PHAR	0			
Veg Community3:	CRDO2-SYAL				
Existing Veg3:		0			
Veg Community3:					

Notes: RED FRUITED CRDO2 GROWING SIDE BY SIDE W/ BLACK FRUITED

Polygon Number 8

ParkName:
Newport

Survey Intensity	3
Observer	GW
Date	8/30/2008
Total Vegetation	2
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	2
Dominant Graminoids	CASCP, CALE8, PHAR3, GLGR
Graminoids Perennial	2
Graminoids Annual	0
Forbs Total	1
Dominant Forbs	MEAR4, GRNE, EQUIS, HIVU2, ROPA2
Forbs Perennial	1
Forbs Annual	1
Ferns Total	0
Ferns Evergreen	0
Ferns Deciduous	0
ExoticsTotal	1
Exotics Perennial	1
Exotics Annual	0
Water	95
Rock Outcrop	0
Gravel	0
Logging	0
Fire:	0
Stand Age	0
Agriculture	0
Livestock	0
Development	0
Wildlife	2
Recreation Severity	3
Recreation Type	5 (boating)
Hydrology	2

Exotic Species

Noxious Exotic Plants
PHAR3
Other Exotic Plants

Water:	95
Rock:	0
Talus:	0
Gravel:	0
Bare Ground:	3
Moss Lichen:	0
Litter:	2

Vegetation Types

		Percent	Pattern	Rank
Existing Veg1:	water and muddy shoreline	95	Matrix	GOOD
Veg Community1:	water			
Existing Veg2:	CASCP	5	linear	EXCELLE
Veg Community3:	CASCP			
Existing Veg3:		0		
Veg Community3:				

Notes:

Polygon Number 9

ParkName:
Newport

Survey Intensity	2
Observer	GW
Date	8/30/2008
Total Vegetation	5
Trees Total	4
Dominant Trees	ALIN2, BEOC2, LAOC, PSME, PIMO3, POBAT, ABGR
emergent	1
maincanopy	3
subcanopy	3
Shrubs Total	5
Dominant Shrubs	SYAL, SPBE2, MAAQ2, ROSA5, HODI, RULE, AMAL2, ACGLD4
> 1.5' tall	5
< 1.5' tall	3
Graminoids Total	2
Dominant Graminoids	BRVU, ELGL
Graminoids Perennial	2
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
Logging	1
Fire:	0
Stand Age	2
Agriculture	0
Livestock	0
Development	6
Wildlife	3
Recreation Severity	3
Recreation Type	5
Hydrology	2

Exotic Species

Noxious Exotic Plants

Other Exotic Plants

Water:	0
Rock:	0
Talus:	0
Gravel:	0
Bare Ground:	0
Moss Lichen:	0
Litter:	100

Vegetation Types

		Percent	Pattern	Rank
Existing Veg1:	ALIN2-BEOC2/SYAL	95	Matrix	EXCELLE
Veg Community1:	ALIN2/SYAL			
Existing Veg2:	CESTM-CIAR4 railroad bed	5	linear	POOR
Veg Community3:	ALIN2/SYAL			
Existing Veg3:		0		
Veg Community3:				

Notes: FORESTED/SHRUB; PA2 NOT IN PLOT, BUT OCCURS AS A SLIVER POLYGON ADJACENT