WASHINGTON STATE PARKS
NATURAL FOREST INVENTORY

INTRODUCTION

These reports summarize the results of the inventory of twenty Washington State Parks by the Washington Natural Heritage Program. The purpose of this inventory was to describe and delineate natural forests and associated native plant communities. The goal was to identify and recommend areas for designation by the Parks and Recreation Commission as Natural Forest Areas and Natural Area Preserves and to make appropriate management recommendations.

This inventory effort was conducted by Natural Heritage Program staff under contract with Washington State Parks and Recreation Commission and The Nature Conservancy (July 23, 1992). Christopher Chappell, project plant ecologist, inventoried and wrote reports for fifteen parks and Rex Crawford, plant ecologist, inventoried and wrote reports for three parks. They collaborated on two parks. Field inventories were complete in September 1992.

Each state park report consists of a list of the 1991 Natural Heritage Plan elements present on the park, discussions of stand age, dominance, condition, and landscape setting, and Natural Forest Area and/or Natural Area Preserve recommendations. A partial species list of plants, maps of existing vegetation, and maps with recommended boundaries for Natural Forest Areas and/or Natural Area Preserves accompany each park report. On parks inventoried by Chappell, a list of birds detected during inventory is also provided.

Natural Area Preserves are recommended at Deception Pass (2 areas), James Island, Moran, and Patos Island State Parks.

Natural Forest Areas are recommended at Beacon Rock, Deception Pass (3 areas), James Island, Jones Island, Mount Spokane (2 areas), Moran, Old Fort Townsend, Penrose Point, Point Lawrence, Riverside (3 areas), South Whidbey, and Sucia Island (5 areas) State Parks.

No Natural Forest Areas or Natural Area Preserves are recommended at Diamond Point, Fort Ebey, Hope Island, Lake Cushman, Lake Wenatchee, Larrabee, and Twin Falls State Parks. Sensitive Area management recommendations are discussed for natural areas at each of these state parks.

Many of the areas identified in this report need additional inventory for animal species associated with old-growth forest or other special habitats. Inventory of additional state parks will document and identify other natural communities that may need special protection. We recommend an inventory of the following parks: Blake Island, Field Springs, Fort Ebey (inventory

incomplete), Fort Flagler, Fort Simcoe, Leadbetter Point, Millersylvania, Obstruction Pass, Seaquest, Stuart Island, and Twanoh. Parks that were visited briefly in 1992 and determined not to have significant natural forests were Fort Worden, Limekiln Point, and Scenic Beach.

In conclusion, the Washington State Parks system contains the best and largest representatives of native lowland forest ecosystems in the Puget Trough. The protection and management of the natural values in these areas will provide future generations a legacy of their natural heritage found nowhere else in the state.

WASHINGTON STATE PARKS NATURAL FOREST AREA INVENTORY

General Management and Boundary Recommendations for all Natural Forest Areas

1. We recommend the establishment of buffer zones within the boundaries of Natural Forest Areas adjacent to specified developments. The purpose of the buffer zones will be to provide an area for hazard management to protect human property and safety, while simultaneously maintaining, to the maximum extent possible, ecosystem structure and function in the Natural Forest Areas. Given these goals, we recommend the following specifications regarding the management and determination of buffer zones:

   a. In order to maintain natural communities located adjacent to existing development, development expansion will occur in areas outside of Natural Forest Area boundaries. Buffer zones are not available for expansion of developments.

   b. Buffer zones will be included within Natural Forest Areas and managed as *de facto* natural forest. Hazard tree removal or other stand alterations should only be carried out where demonstrably necessary to protect people or property.

   c. A 150-foot buffer is recommended on both sides of public roads and around utilities. This buffer does not apply to unpaved service or fire roads used as trails within Natural Forest Areas by the public.

   d. A 150-foot buffer is recommended along park boundaries.

   e. A 150-foot buffer is recommended around existing park developments, including campgrounds, picnic areas near paved roads, and heavily-used day use areas accessible by road.

   f. Buffer zones may be expanded up to a maximum of 250 feet where average tree height is greater than 150 feet.

2. Buffer zones are unnecessary around trails and unpaved service or fire roads within Natural Forest Areas.

   a. Hazard tree removal should not occur near trails or service roads within Natural Forest Areas.

   b. Trails and service roads within Natural Forest Areas should be maintained in a manner consistent with the maintenance of natural forest processes. In most cases only the section of a log lying on the trail itself should be cut out and moved a short distance into the adjacent forest. Logs that fall on trails should generally not be removed from the forest because they are a critical component of ecosystem function. Only in the case of excessive blowdown, would the many sections that lay on the trail need to be removed from

the forest.

3. Recreational use, including mountain bikes and equestrians, is not permitted in Natural Forest Areas (WAC 352-16-020). We realize the enforcement of this policy may vary, therefore we recommend the strict enforcement and use of barriers to prevent use in areas that are sensitive to impacts from horses or bikes. Generally, this would include all grasslands, "balds", and wetlands that are accessible by trail.

4. The use of prescribed fire within Natural Forest Areas is encouraged in order to maintain ecosystem function in those communities where fire was an important pre-settlement process. We recommend research investigations to clarify the role of fire and to devise appropriate fire prescriptions before prescribed burning plans are initiated. In particular, experimental burning is needed in the Douglas fir-madrone, Idaho fescue, and red fescue communities.

Prepared by: Christopher Chappell and Rex Crawford, 1/19/93.

WASHINGTON STATE PARKS NATURAL FOREST INVENTORY

Beacon Rock

SIZE: 4290 acres

LOCATION:

Beacon Rock State Park is located approximately 6 miles southwest of Stevenson, Skamania County. All of Sections 12 and 13, portions of Sections 14, 23, 24, 25, 26, the SE1/4 of Section 11 and the NW1/4 of Section 36, in Township 2 North, Range 6 East, and portions of Sections 7, 18 and the NW1/4 of Section 19, in Township 2 North, Range 7 East.

1991 NATURAL HERITAGE PLAN ELEMENTS:

Priority	Element[1] Number	Element Name	Relative[2] Extent
2	WC-T4	Douglas fir/oceanspray community	m
*	WC-T7	Douglas fir-western hemlock/ swordfern community	M
3	WC-T9	western hemlock/Oregon oxalis community	M
3	WC-T10	western hemlock/vanillaleaf community	m
*	WC-T13	western hemlock/Alaska huckleberry community	m
*	WC-T15	western hemlock/Oregongrape community	M
*	WC-T21	red alder forest	M
1	PT-T18	red fescue grassland	m
3	-----	Oregon bolandra	
3	-----	tall bugbane	
3	-----	gorge daisy	

OTHER NATURAL COMMUNITIES:

	bigleaf maple forest	m

[1] WC-T4 = Western Cascades Province Terrestrial Community 4, PT = Puget Trough Province

[2] M = major, m = minor

FOREST STAND AGE

Most of the forest is young in age. A number of mature stands are located south of Hamilton Mountain. A few small patches of old-growth are located in the Hamilton Creek drainage.

CANOPY DOMINANCE AND STRUCTURE

Douglas fir dominates the canopy over most of the park. Many patches of forest dominated by red alder, and to a lesser degree bigleaf maple, are interspersed within the matrix of Douglas fir. Occasionally, Douglas fir will be co-dominant with red alder and/or bigleaf maple. Bittercherry is a common canopy associate in most young stands and occasionally co-dominates. One small grove of black cottonwood is present.

Grand fir, western hemlock, and western redcedar are all uncommon species, that appear mostly as scattered individuals in the understory. Noble fir becomes important in the understory on the coldest sites, that is, the western hemlock/Alaska huckleberry community. Some upper slope areas have incompletely reforested and are still dominated by shrubs or are a mosaic of trees (mostly Douglas fir) and shrubs.

Most of the young stands have a single relatively dense canopy layer dominated by trees 10-18 inches in diameter. On the most productive sites, the western hemlock/oxalis community, there are many trees over 24 inches in diameter. In those that have been logged, there are no residual snags and few to many residual logs, depending on how many snags were cut down.

Most of the young stands of natural origin have few to many snags and logs that are residual from previous stands. The snags are generally not very tall and quite well-decayed because most stands have burned twice in the last 100 years.

Old-growth stands have multi-layered canopies with 24-48 inch diameter Douglas fir, some up to 60 inches, dominant in the upper canopy and bigleaf maple often forming a secondary canopy layer. Large snags and logs are present.

Mature Douglas fir stands are dominated by trees 12-36 inches in diameter and sometimes have smaller Douglas fir or bigleaf maple beginning to form multi-layered canopy structure. Occasional older Douglas fir are scattered in some mature and young stands. A few snags have been cut down in some mature stands, especially near trails.

NON-FOREST VEGETATION

The red fescue grassland occurs in small patches along the Hamilton Mountain ridgeline, and is sometimes mixed with shrubs, especially oceanspray, rose and serviceberry, and scattered Douglas fir.

Considerable acreage at upper elevations in the park appear to be former forests that have not fully regenerated after repeated stand-replacement fires. These areas are now dominated by shrubs or a mosaic of shrubs and trees. The dominant shrubs and small deciduous trees, which form dense cover generally 8-20 feet tall, are vine maple, Scouler's willow, oceanspray, western hazel, serviceberry, bittercherry, and Douglas maple. Many of these areas have had snags cut down, but a few areas still have standing Douglas fir snags. Artificial shrub-dominated corridors have been created along the transmission line corridors.

Cliffs and talus are relatively extensive and often unforested. Talus is often covered with a moss, Rhacomitrium sp., and not much else.

SPECIAL PLANT SPECIES

Three species listed as sensitive in Washington occur in the park. Oregon bolandra occurs on wet cliffs adjacent to Hardy Falls. Tall bugbane occurs in three forest understory populations in the general vicinity of the campground. Gorge daisy occurs only on the cliffs of Beacon Rock itself. Two plants listed as "monitor" are fairly common on open slopes and grasslands on the south side of Hamilton Mountain, Howell's reedgrass and Hall's goldenweed.

ECOLOGICAL CONDITION

Forests of natural origin without significant logging disturbance occupy approximately 40% of the Park. Fire is the major natural disturbance throughout. Most of the 40-55 year old stands burned twice in the last 100 years. The first of these burns was probably the Yacolt Burn (1902?). The current forest regenerated after a more recent burn or burns, probably 55-60 years ago.

The mature stands are 140-150 years in age. One recently cut old-growth Douglas fir tree in the campground was 373 years old. Surface fires have burned through the old-growth and mature stands since the time of stand establishment. These fires left charcoal on the bark of live trees while sometimes killing a few trees and starting a young cohort, especially in the Douglas fir/oceanspray community.

The repeated, extensive stand-replacement fires may be responsible for the relative scarcity of western hemlock in most stands. Most of stands in the park are located on sites that usually would have significant cover of this shade-tolerant, fire-sensitive species.

More than half of the park has experienced significant logging activity. Many of the now-young stands, and partially-regenerated stands, that have burned repeatedly appear to have been salvage logged, i.e. logged after the most recent fire. All residual snags were cut down and left as logs and some trees were harvested on these sites. Other areas appear to have been logged and then burned.

The road and trail system is extensive. All paved roads are in the southern end of the park where associated with a well-developed campground. Much of the forest in the vicinity of the campground and highway is in good condition, although it is highly fragmented by roads and other developments.

A network of former logging roads covers much of the area north of the campground and west of Hamilton Mountain. These roads are now used as service/fire roads and as trails, particularly by equestrians. One of these roads crosses the pass between the Hardy Creek drainage and the Hamilton Creek drainage and eventually dead-ends on a bench near the northern boundary. A former logging road follows Hamilton Creek, but is now in disrepair and used only as a trail.

The major trail constructed for hikers leads from the campground area to the top of Hamilton Mountain, then north to the nearest service road on the ridgeline. The Hamilton Mountain trail has resulted in some trampling damage in the red fescue grassland as it passes directly through and very near representatives of this community in a number of places.

Most of the plant communities in the park are in fair to good ecological condition because repeated stand-replacement fires have created young stands that are somewhat deficient in coarse woody debris.

The Douglas fir-western hemlock/swordfern (the most extensive community in the park) and the western hemlock/Oregongrape communities are mostly represented by such stands, with low Oregongrape dominant or co-dominant in the understory of both and swordfern important only in the former. These communities are also represented by significant stands of mature and old-growth in good condition. Even in the old-growth, there is very little to no western hemlock or other shade-tolerant conifers, Douglas fir is the sole conifer with notable cover.

The western hemlock/Oregon oxalis, western hemlock/vanillaleaf (inside-out flower often dominant in understory), and western hemlock/Alaska huckleberry communities are represented by young repeatedly-burned forests that are confined to specific site conditions and localities. The oxalis community is also present as very small patches of old-growth residual in a matrix of young post-fire forest.

The Douglas fir/oceanspray community occurs as multi-cohort (young and mature) open stands that have experienced moderate-severity fire and minimal human disturbance, and are located on dry, south- and west-facing upper slopes. Small patches of red fescue grassland, some in good condition, some possibly being invaded by shrubs, and some with trampling damage, are scattered, mostly within the Douglas fir/oceanspray community.

Red alder forest occurs as young stands that appear to be largely a result of the extensive multiple stand-replacement fires in this century. Most of these alder stands previously had a significant component of conifers, which are now snags. Swordfern is the major understory in the alder forest, with devil's club and salmonberry common on the wettest sites.

Some of the bigleaf maple forest is similar in condition to the red alder forest. One significant stand of young maple appears to have regenerated on talus with few conifers and has a diverse understory of shrubs and herbs..

The exotic species, wall lettuce, has successfully invaded the forest understory in many areas, although it does not dominate. It is most numerous near trails or roads and in areas with some degree of soil disturbance.

LANDSCAPE SETTING

Most of the Park is bounded by privately-owned young forest with very few clear-cuts. South of the park is a highway, the Columbia River, and a few rural residences. The Hamilton Creek area (the largest natural forest in the park) is bounded on the northeast by the Table Mountain Natural Resources Conservation Area (NRCA), which consists mostly of young natural forest.

RATIONALE FOR NATURAL FOREST AREA BOUNDARIES

The mature and old-growth forest patches clearly qualify as Natural Forest Area. The recommended Natural Forest Area boundary incorporates most of the old-growth and mature forests as well as most of the young forests that have not been logged. The recommended boundaries represent a landscape perspective by including much of the Hamilton Creek watershed in a single block of protected forest, while leaving out most of the more disturbed Hardy Creek watershed. The young forest in the

Hamilton Creek watershed acts as a matrix of protected forest between the patches of old-growth in the drainage, and when viewed together with the adjacent Table Mountain NRCA amounts to a very large block of mostly natural forests.

The proposed Hamilton Creek Natural Forest Area will protect a total of eight different plant community element occurrences, one other natural plant community, and one sensitive plant species (Oregon bolandra). Small patches of logged-over young forest are included within the boundary in order to protect the entire Hamilton Creek area.

The recommended boundary of the Natural Forest Area (NFA) coincides with the park boundary on the east and north sides (Map 2). To the south, the NFA boundary follows the transmission line corridor and the Park boundary. The western boundary is more complex. Starting from the north, the western boundary follows the ridgeline that divides the Hamilton and Hardy Creek drainages. For one short stretch it drops down to the east from the ridgeline, following the road, then returns to the ridgeline. It follows the ridgeline as far as a spur ridge about 1/4 mile north of the Hamilton Mountain summit. Then it follows this spur ridge more or less southwest to Hardy Creek. It follows the creek downstream for about 1/3 mile, then it goes due west a short ways to a road. This road it follows west to an intersection, then it turns more or less south and heads to the park boundary and southwest corner of the NFA.

MANAGEMENT RECOMMENDATIONS

Barriers and signs should be placed at both ends of the Hamilton Mountain trail to prevent mountain bike and horse use in this sensitive area. The trail is steep, vulnerable to erosion, and passes through the red fescue grassland.

Off-trail impact from hikers is a minor problem in the red fescue grasslands, but has the potential to threaten the integrity of this community. The trail passes directly through or adjacent to a number of the balds. At one point, the trail switchbacks through one of the larger fescue balds. We recommend relocating the trail around this small patch of grassland and restoring the grass community in the former trail's location.

The occasional use of prescribed-fire in the Douglas fir/oceanspray and red fescue communities will control shrub invasion and maintain multi-cohort stands.

SURVEY EFFORT

The Hamilton Creek basin, the Hamilton Mountain trail, and the area between the highway and the transmission line corridor west of the campground were surveyed on the ground. A combination of aerial photography and limited ground survey were used to determine that most of the Hardy Creek basin had been logged. The entire survey lasted four days. In addition, Rex Crawford spent one day in the Hamilton Creek area during both 1988 and 1989, for a total of 6 WNHP survey days.

Prepared by: Christopher Chappell, 11 December 1992.

WASHINGTON STATE PARKS NATURAL FOREST INVENTORY

Deception Pass

For the puposes of field work and report writing, Deception Pass State Park was divided into a number of more workable units: Bowman Hill, Goose Rock, Hope Island, Hoypus, and Pass Lake. The reasons for this approach were the great variety of natural features found within the park, the convenient geographic separation of these sites by water, and their separate listing in the contract.

However, this approach does not imply that designation of protected areas should be done strictly on a site by site basis. All of these natural forests are located within the same landscape. The value of any one individually is enhanced by the proximity of the others nearby. Natural Forest Area and Natural Area Preserve designations, as well as park management, should consider this landscape perspective. Taken as a whole, the natural forests of Deception Pass are one of the most significant areas of natural forest in the entire Puget Trough.

WASHINGTON STATE PARKS NATURAL FOREST INVENTORY

Deception Pass: Bowman Hill

SIZE: approximately 170 acres

LOCATION:

Bowman Hill is located approximately 7 miles south-southwest of Anacortes, Skagit County. Portions of the S1/2 of Section 23 and the N1/2 of Section 26, and the NE corner of Section 25, in Township 34 North, Range 1 East.

1991 NATURAL HERITAGE PLAN ELEMENTS:

Priority	Element[1] Number	Element Name	Relative[2] Extent
3	PT-T3	Douglas fir/salal-oceanspray community	M
1	PT-T4	Douglas fir/snowberry-oceanspray community	m
2	PT-T6	Douglas fir-western hemlock/ salal community	M
2	PT-T7	Douglas fir-western hemlock/ swordfern community	m
2	PT-T16	Idaho fescue grassland	m

OTHER NATURAL COMMUNITIES: none

[1] PT-T3 = Puget Trough Province Terrestrial Community 3

[2] M = major, m = minor

FOREST STAND AGE

About half of the forested area is old-growth. The remainder consists of young stands and a fine-scale mosaic of young and mature age classes.

CANOPY DOMINANCE AND STRUCTURE

Douglas fir dominates or co-dominates the forest canopy over most of the site. Grand fir and western redcedar sometimes co-dominate with Douglas fir. Western hemlock and western redcedar are important in the lower canopy on modal to moist sites.

Pacific madrone is commonly mixed with Douglas fir in a narrow fringe along the edge of the south bluff above Deception Pass. Red alder dominates the canopy in a small area along the eastern boundary of the site.

Mature stands are generally dominated by Douglas fir 10-24 inches in diameter. Old-growth Douglas fir are mostly 24-72 inches in diameter. Young dominant trees are usually 6-16 inches in diameter.

Old-growth stands often have multi-layered canopies and substantial numbers of snags and large logs. These structural features are less well-developed on drier sites where trees grow more slowly.

Multiple canopy layers are beginning to develop in some of the mature stands, which often have scattered old-growth residual Douglas fir. Large snags and logs from trees that were killed in the last fire are often present in the younger stands. Young logged stands have homogeneous single-layered canopies and little coarse woody debris.

NON-FOREST VEGETATION

Several small grassland balds are located along the south and east side of the hill. Some of them are still dominated by Idaho fescue, others are dominated by Scot's broom and/or exotic grasses.

The transmission-line corridor is dominated by a variable mixture of shrubs and herbs, many of which are exotic.

ECOLOGICAL CONDITION

All forest stands show evidence of fire. Old-growth trees have charred bark. Some of the old-growth stands experienced partial mortality from surface fire. The stands that are a mosaic of young and mature cohorts apparently originated after fire. The mature cohort was aged at 150 years; the natural-origin young cohort aged at 75 years.

A major windstorm in 1990 resulted in the complete blowdown of an 8 acre stand of old-growth in the northeast corner of the site. There is also a patch of partial blowdown east of the summit. Scattered windthrow mounds, both recent and older, are also present on other portions of the site.

The intense blowdown next to the highway and Pass Lake was minimally cleaned up. All fine fuels were removed within 100 feet of the highway. A small fire-break trail was dug out in the forest encircling the blowdown area. Unstable trees were cut down and left as logs. Most logs were left on site.

The young stands along the eastern boundary originated after logging about 65 years ago. Redcedar was high-graded from the old-growth stand on the lower north-facing slope of the hill. Elsewhere there are very few cut stumps and no evidence of significant logging activity.

There is a trail leading from Highway 20 east through the southern portion of the site. A transmission-line corridor passes through the southeast portion of the area and is very disturbed. A dirt road follows this corridor to the point where the line turns south out over Deception Pass. There is an old logging road, now partially grown over, along the lower north slope of Bowman Hill.

The plant communities present are in good to excellent condition because of the lack of human alteration and the extent of old-growth. The Douglas fir/salal-oceanspray community is represented by young, mature, and old-growth stands. It is widespread on drier mid- to upper slopes, especially where convex.

The Douglas fir/snowberry-oceanspray community is represented by an open old-growth stand located on south- to southwest-facing mid-slopes on the south side of the hill. The understory is a diverse assemblage of shrubs and herbs, with snowberry and oceanspray usually prominent but not necessarily dominant. Other important species are baldhip rose, hairy honeysuckle, western fescue, and yerba buena.

The Douglas fir-western hemlock/salal community is represented by young, mature, and old-growth stands. This is the modal community type on Bowman Hill.

The Douglas fir-western hemlock/swordfern community is represented primarily by old-growth stands located on gentle to moderate northwest- to northeast-facing slopes and depressions. Douglas fir, western hemlock, western redcedar, and grand fir are all important species. High quality examples are located west of the summit of Bowman Hill. On the lower slope north of the summit, old redcedar have been high-graded and the condition is fair to good. The young logged stand east and northeast of the summit is a poor condition example of this community.

The Idaho fescue grassland varies in condition. Southeast of the summit is a small example of this community in good condition on a steep, east-facing slope. The small grasslands on south- and southwest-facing slopes south of the summit are in poor condition. Some of these openings are dominated by Scot's broom, and those that are not are generally dominated by grasses other than Idaho fescue.

LANDSCAPE SETTING

Most of the area is natural forest unfragmented by roads or development. The site is bordered on the west and north by Highway 20. West of Highway 20 is a narrow strip of forest. Deception Pass, including Canoe Pass, is located to the south of the site. Private forest land borders the site on the east. All the land adjoining the eastern boundary has been recently clear-cut.

The site is located in the midst of a larger landscape in the Deception Pass area that includes a great deal of natural forest. Bowman Hill is a significant piece of this natural forest network. The nearest other natural forests of any size are Goose Rock, located across Deception Pass, and the Pass Lake forest, on the other side of Pass Lake. The nearest developed area is Bowman Bay, located a short ways to the northwest, where there is a small campground, a dock, a picnic area, and a boat ramp.

RATIONALE FOR NATURAL FOREST AREA BOUNDARIES

The recommended Natural Forest Area includes all of the old-growth, mature, and natural-origin young stands. Most of this area qualifies because of its mature or old-growth forest cover. The young logged stand and the recent blowdown along the eastern boundary are included to act as a buffer between the intensively managed forest land and the natural forest.

The proposed Bowman Hill Natural Forest Area is bounded to the north and west by the highway and to the east by the park boundary (Map 2). The southern boundary of the area is marked by the transmission line corridor and the shoreline of Canoe Pass. These boundaries will protect five natural heritage plant community element occurrences, one of which is protection priority 1 and three of which are priority 2.

MANAGEMENT RECOMMENDATIONS

Control of Scot's broom is strongly recommended in the small grasslands south and southwest of the summit. Fire is probably the most efficient tool to begin restoration of these balds to a more natural condition. Hopefully this will prevent the spread of this aggressive exotic shrub to the one grassland in good condition southeast of the summit.

To maintain open canopies, varied stand structure, and ecosystem processes, prescribed-fire should be used occasionally in some of the drier forest communities.

Further trail construction is not recommended. In particular, trails should avoid the fescue grassland southeast of the summit and north of the transmission line. Its current isolation from other, more disturbed balds, and from trails probably keeps it in good condition.

SURVEY EFFORT

The entire site was surveyed during one day of field time. The site includes the area north of Deception Pass, east and south of Highway 20, and west of the Park boundary.

Prepared by: Christopher Chappell, 1/7/93.

WASHINGTON STATE PARKS NATURAL FOREST INVENTORY

Deception Pass: Goose Rock

SIZE: approximately 300 acres

LOCATION:

Goose Rock is located approximately 7 miles north of Oak Harbor, Island County. The S1/2 of Section 26, a portion of the SW1/4 of Section 25, and a portion of the NE1/4 of Section 35, in Township 34 North, Range 1 East.

1991 NATURAL HERITAGE PLAN ELEMENTS:

Priority	Element[1] Number	Element Name	Relative[2] Extent
3	PT-T3	Douglas fir/salal-oceanspray community	M
1	PT-T4	Douglas fir/snowberry-oceanspray community	m
2	PT-T6	Douglas fir-western hemlock/ salal community	M
2	PT-T7	Douglas fir-western hemlock/ swordfern community	M
1	PT-T8	Douglas fir-Pacific madrone/ American vetch community	m
2	PT-T16	Idaho fescue grassland	M
3	OP-T12	western hemlock/Pacific rhododendron community	m
3	-----	white meconella	
3	-----	Alaska alkaligrass	

OTHER NATURAL COMMUNITIES: none

[1] PT-T3 = Puget Trough Province Terrestrial Community 3, OP = Olympic Peninsula & S.W. Washington Province

[2] M = major, m = minor

FOREST STAND AGE

The forest is dominated primarily by the mature and old-growth

age classes. There is one young stand and a considerable area dominated by a mixture of young and mature trees with a few old-growth residuals.

CANOPY DOMINANCE AND STRUCTURE

Douglas fir dominates or co-dominates the forest canopy over most of the site. Grand fir, western redcedar, western hemlock, and to a lesser extent, Sitka spruce, sometimes co-dominate, particularly on the more moist sites. Western hemlock and western redcedar, and to a lesser degree grand fir, are important in the lower canopy on all but the driest sites. Lodgepole pine is common at the edge of grasslands and co-dominates very small stands on the plateau south of North Beach.

Pacific madrone co-dominates on steep, dry, south-facing slopes. Bigleaf maple is occasionally important in the canopy, especially on the south slope of Goose Rock. Red alder dominates the canopy over a small wetland.

Mature stands are generally dominated by Douglas fir 10-24 inches in diameter. Old-growth Douglas fir are 24-84 inches in diameter. Young dominant trees are usually 6-16 inches in diameter.

Old-growth stands often have multi-layered canopies and substantial numbers of snags and large logs. Multiple canopy layers are beginning to develop in some of the mature stands, which also often have scattered old-growth residual Douglas fir.

Large snags and logs from trees that were killed in the last fire are often numerous in the young and mature stands. The mixed-age Douglas fir stands have some degree of canopy structure heterogeneity due to the differing size of the different cohorts.

NON-FOREST VEGETATION

The summit and upper south-facing slope of Goose Rock is occupied by Idaho fescue grassland. The southeast side of Goose Rock below this grassland has a woodland-grassland mosaic, or savanna, with Douglas fir and Pacific madrone scattered as individuals and clumps.

SPECIAL PLANT SPECIES

Two state sensitive plant species have been found on the site. White meconella occurs on the open east-facing slope of Goose Rock. Alaska alkaligrass was seen along the shoreline of Cornet Bay in 1936.

ECOLOGICAL CONDITION

All forest stands show evidence of fire. A major fire burned through most, if not all, of the site, about 100 years ago. This fire killed varying numbers of old trees, opened space for regeneration of the mature cohort, currently aged 85-100 years, and charred residual old-growth trees. One recently-cut old-growth Douglas fir was determined to be 370 years old. At least a few old Douglas fir survived this fire in virtually all stands. In some old-growth stands, the fire was strictly a surface fire that did not kill large trees. A 60-year-old stand northeast of Goose Rock may be a result of a more recent fire or a windthrow event.

A major windstorm in 1990 resulted in significant forest disturbance on north-facing slopes. Most trees were blown down in two stands of old-growth, and a few other stands received partial blowdown. Surviving trees tended to be smaller ones. Scattered older windthrow mounds are also present on much of the site.

Logging has been limited to hazard tree removal and salvage logging. As a result of these practices, occasional cut stumps are scattered in some stands. Most large snags are still standing, however. The most severe logging disturbance appears to be a recent salvage operation of blowdown in an old-growth stand near the North Beach day-use area. Most of the basal area was removed from this stand and there are now many cut stumps, a few standing trees, and little coarse woody debris.

The site is bisected by the two-lane Highway 20 which passes north-south. To the west of Highway 20 is a paved road that leads north to a small group campground and the North Beach parking and day use area.

Trails lead from here through the forest to the west, east, and southeast. The latter two trails cross the highway toward Goose Rock. An extensive trail system leads all around, and to the summit of, Goose Rock. The main trail between North Beach and the Environmental Learning Center at Cornet Bay is actually an old, wide, flat, gravel road. The open summit of Goose Rock has experienced considerable trampling pressure off trail. Most trails appear to be heavily used.

A large transmission-line corridor runs from Cornet Bay over the top of Goose Rock. This has produced less change in the meadow on the south slope than in the forest on the north slope where trees are cleared for the line.

The plant communities are mostly in good condition. The Douglas fir/salal-oceanspray community is represented by mature and young/mature mixed-age stands with scattered old-growth

residuals. This community is fairly widespread on mid-slopes of Goose Rock, especially on the west side. Western redcedar is sometimes common in the lower canopy.

The Douglas fir/snowberry-oceanspray community is represented by a mature stand with old-growth residuals located on the upper north- and east-facing slope of Goose Rock. Oceanspray, common snowberry, and baldhip rose dominate the understory. The Douglas fir-western hemlock/salal community is represented by old-growth and post-fire mature stands with a few old-growth residuals. It is widespread on gentle to moderate slopes and is probably the modal type for this area.

The Douglas fir-western hemlock/swordfern community is represented primarily by old-growth stands located in depressions and on some north-facing slopes. Scattered cut stumps are frequent in portions of this community. This community was hardest hit by the 1990 blowdown.

The Douglas fir-Pacific madrone/American vetch community is represented by multi-cohort young/mature/old-growth stands located on steep, south-facing lower to mid-slopes of Goose Rock. The understory composition is extremely variable, but American vetch is not important. Baldhip rose and snowberry are the most common understory shrubs. Oceanspray, salal, hairy honeysuckle, and low Oregongrape are also important in places.

The western hemlock/Pacific rhododendron community is represented by an old-growth multi-cohort stand of Douglas fir, hemlock, and grand fir on a south-facing toe slope of Goose Rock. Rhododendron dominates the understory, with swordfern, Oregongrape, and salal present in significant quantities.

The Idaho fescue grassland is in good condition, with high cover of fescue, a diverse assemblage of native species, and little dominance by exotic species. It is located on the south-facing upper slope of Goose Rock and is quite large in extent for this community type. The portion of this community on the relatively level summit is significantly impacted by trampling. Exotic species are more important on the summit than on the adjacent slope. Kinnikinnik dominates some spots on the summit.

The small wetland is dominated in the canopy by red alder and Sitka spruce and in the understory by skunk cabbage and slough sedge. A small area of open water is also present.

LANDSCAPE SETTING

Most of the area is natural forest. It is fragmented to a degree by the highway and by a paved road and day use area near

North Beach. The forest east of the highway is unfragmented by roads or other development.

The site is bordered on the north and east by the waters of Deception Pass and Cornet Bay. The North Beach section, i.e. west of the highway, is bordered by campgrounds that have many trees from the original forest. East of the highway, the site is bordered to the south by a private campground and by the Environmental Learning Center. The E.L.C. includes a large lawn, a number of buildings, and some young forest.

The landscape to the south of the site includes farms, residential development, and patches of forest. To the north, across Deception Pass from the site, are more natural forests on Bowman Hill and near Pass Lake. To the east, across Cornet Bay, is the large area of natural forest in the Hoypus area. Goose Rock is an important piece in the larger landscape view of natural forests in the Deception Pass area.

RATIONALE FOR NATURAL FOREST AREA BOUNDARIES

The recommended Natural Forest Area includes a considerable acreage of mature and old-growth forest in a relatively natural condition. The Idaho fescue grassland is one of the higher quality examples of this type in the Puget Trough. The area includes examples of seven natural heritage plant community occurrences, one other natural community, and two sensitive plant species. This is a high diversity of plant communities for an area its size.

The proposed Goose Rock Natural Forest Area covers the entire area east of the highway and north of the Environmental Learning Center (Map 2). It is bounded by saltwater on the north and east, by the highway on the west, and by the park boundary and Environmental Learning Center on the south. The proximity of the E.L.C. will foster the interpretive and educational functions of designated natural forest.

The forest located west of the highway does qualify for Natural Forest Area because it is mature and old-growth in age. However, it is not recommended for designation because of its relatively small size and fragmentation by roads and development.

MANAGEMENT RECOMMENDATIONS

Clear delineation of a single trail is recommended on the summit of Goose Rock. The goal would be to eliminate existing trail proliferation and trampling damage in order to prevent further degradation of the grassland. An interpretive sign explaining the significance of the Idaho fescue grassland and urging people to stay in designated areas is recommended.

Existing policy excludes mountain bikes from Natural Forest Areas. This policy needs to be enforced for the Goose Rock summit because of its relative accessibility and the sensitivity of the communities to impacts from bikes. Physical barriers and signs should be installed to prevent mountain bikes from reaching the summit of Goose Rock.

We recommend yearly monitoring for Scot's broom invasion on the grassland near the summit and in the savanna on the east slope of Goose Rock. Both of these communities are vulnerable to drastic alteration if Scot's broom takes hold. Control measures should be proactive to prevent invasion, removing individuals as they invade. Prescribed burns may be necessary for control if the species does successfully establish. Prompt action is needed before the high quality fescue grassland is seriously degraded.

The introduction of prescribed fire as a natural-process tool to maintain ecosystem function, stand structural variety, madrone dominance (where present), and native grasslands, is a future possibility. The savanna vegetation adjacent to the grassland may have previously been a grassland itself. The use of fire is most appropriate in the grassland, savanna, and dry Douglas fir-madrone stands. Prescriptions that minimize the spread of exotic species in the grasslands should be devised through experimental burns here or in a similar environment.

SURVEY EFFORT

The entire site was surveyed during one and a half days of field time. Reid Schuller, WNHP, visited the site for a day in 1981 and briefly in 1983. The site includes the area east of Highway 20, south of Deception Pass, and north of the Environmental Learning Center and the Park boundary, as well as the area west of Highway 20, south of North Beach, and north and east of the main Park campground.

Prepared by: Christopher Chappell, 12/15/92.

WASHINGTON STATE PARKS NATURAL FOREST INVENTORY

Deception Pass: Hope Island

SIZE: 165 acres

LOCATION:

Hope Island is located approximately 8 miles south-southeast of Anacortes, Skagit County. Portions of the S1/2 of Section 28, the SE1/4 of Section 29, the NE1/4 of Section 32, and the NW1/4 of Section 33, in Township 34 North, Range 2 East, incorporating all of Hope Island.

1991 NATURAL HERITAGE PLAN ELEMENTS:

Priority	Element[1] Number	Element Name	Relative[2] Extent
2	PT-T6	Douglas fir-western hemlock/ salal community	M
2	PT-T7	Douglas fir-western hemlock/ swordfern community	M
1	PT-T8	Douglas fir-Pacific madrone/ American vetch community	M
1	PT-T18	red fescue grassland	m
*	WC-T17	western redcedar forest	m
2	-----	bald eagle nesting territory	

OTHER NATURAL COMMUNITIES:

	lowland freshwater wetland	m

[1] PT-T6 = Puget Trough Province Terrestrial Community 6, WC = Western Cascades Province

[2] M = major, m = minor

FOREST STAND AGE

The majority of the forest is dominated by the old-growth age class. Several mature stands are present. Two stands are dominated by trees 78-100 years old and therefore falling on the borderline between the young and mature age classes (90 years). Several acres of forest was recently felled by wind.

CANOPY DOMINANCE

Douglas fir dominates or co-dominates the forest canopy over most of the island. In descending order of abundance, western redcedar, western hemlock, and grand fir are common canopy associates with Douglas fir over most of the area. Middle and lower canopy layers are usually dominated by one or more of the former three species.

Pacific madrone co-dominates with Douglas fir in a broad band along the southern shoreline. Redcedar, Pacific yew, and Rocky Mountain juniper are common in the lower canopy. Western redcedar dominates two stands. Rocky Mountain juniper dominates a few very small thickets at the southeast corner of the island and frequently fringes the grasslands and shorelines.

Old-growth Douglas fir are 36-84 inches in diameter over most of the island, but are smaller (24-36 inches) on the more xeric madrone sites. The old-growth stands generally have at least a few younger Douglas fir trees within them. The middle and lower canopy species (madrone, redcedar, hemlock) under the old Douglas fir trees are generally less than 24 inches in diameter. A few madrone and redcedar are 24-48 inches in diameter. Most of the old-growth has a well-developed multi-layered canopy and numbers of large logs and snags.

Mature Douglas fir stands are dominated by trees 12-30 inches in diameter. These stands have initial development of multi-layered canopy structure, and some snags and logs similar in size to the live trees.

The borderline young/mature stands of redcedar are dominated by trees 12-24 inches in diameter, with a few trees 24-36 inches. These stands have a single dense canopy layer, dominated by redcedar with some Douglas fir. The canopy limits understory development. There are many Douglas fir snags and logs in this stand type that are similar in size to the live canopy tree trunks.

NON-FOREST VEGETATION

Grassland occurs in significant patches adjacent to the southwest shoreline. Red fescue dominates some areas in a characteristic assemblage of mostly native species. Scot's broom is well-established on the largest of these grasslands, where exotic grass species are important and fescue is less common.

The small freshwater wetland is dominated by western crabapple and water lentil, with patches of sedge.

A significant patch of blowdown timber is dominated by a variety of herbaceous species that increased after the disturbance. Especially common are nodding trisetum and Indian thistle, with patches of salal and other shrubs.

ECOLOGICAL CONDITION

All of the current forest originated from regeneration after fire or other natural disturbances. Charcoal is present on the bark of old-growth trees throughout the island, indicating the importance of fire.

The cohort of trees aged 78-100 years originated after a fire that apparently burned over much of the island. This fire was mostly low to moderate in severity, killing few large trees in most stands, but allowing a younger cohort of Douglas fir to establish. In some stands this fire was more severe and allowed the replacement of pre-existing stands with what are now young to mature stands.

The young/mature stand of redcedar includes scattered live residuals and many snags and logs apparently of the same cohort. The residual trees are 120-140 years old and have charred bark. Mature Douglas fir stands are similar in age.

A few small stands adjacent to grasslands appear to be the result of tree invasion of grassland or savanna. They have little coarse woody debris and a variable herbaceous understory.

Other natural disturbances include wind. A 1990 major wind storm flattened several acres of old-growth forest adjacent to the campground. One smaller patch of major blowdown from the same storm is located adjacent to the west shore. Scattered trees were windthrown elsewhere creating less severe disturbance.

The young/mature stand is now dominated by redcedar because most of the Douglas fir in these stands has died out over, what appears to be, the last 20 years. The ultimate mortality agent is unknown. Many of these Douglas fir appear to have been quite young when fire swept through 90-100 years ago. They were therefore scarred and may have been sufficiently weakened by this injury to be predisposed to other mortality agents.

Recent human disturbance consists primarily of the construction and use of a small campground and a trail crossing the island. The campground located on Lang Bay is simply a few picnic tables, associated tiny areas of cleared ground, and a pit toilet that was damaged by the storm. The blowdown obscured much of the trail, so a new one was constructed (very modest) that passes through slightly to the east of the blowdown and

then reconnects with the original trail south of the blowdown. The trail leads to the south shore of the island.

A small, often difficult to follow, footpath winds through the forest and occasional grass clearings. It parallels most of the shoreline of the island. A small undesignated campsite with fire ring is located on a grassy spot just above the northwestern shoreline.

The blowdown clean-up involved cutting a very few hazard trees, stabilizing logs, removing fine fuels within 200 feet of the campground, and clearing a small firebreak trail around the perimeter of the blowdown. The island has very few cut stumps that are located in just a few spots near the shoreline. Most boats that visit the island stay in Lang Bay where there are a few moorage buoys.

The plant communities are mostly in good to excellent ecological condition. The Douglas fir-western hemlock/salal community is represented by old-growth multi-cohort Douglas fir forest. Western redcedar is generally more numerous than hemlock in the lower and mid-canopy.

The Douglas fir-western hemlock/swordfern community, located on gentle north-facing slopes, is represented by stands composed of very tall, large old-growth Douglas fir with younger, smaller redcedar, hemlock, grand fir, and maple. The understory is co-dominated by salal and swordfern.

The Douglas fir-Pacific madrone/American vetch community is represented by old-growth multi-cohort Douglas fir-madrone forest with a salal understory and a significant representation of juniper and yew in the lower canopy. American vetch is not an important component of this community here.

The western redcedar forest is a 78-100 year old redcedar-dominated forest with some Douglas fir and hemlock. A few residuals are older. The sparse understory may be dominated by salal and/or swordfern, depending on site moisture.

The red fescue grassland has one small, but significant, patch in good condition on the southern shore. It is dominated by red fescue, with low cover of exotics and no Scot's broom. Very narrow strips of similar vegetation are located adjacent to a few other shoreline areas. The larger grassland patch on the southwest corner of the island is in poor to fair condition, with much Scot's broom and greater cover of exotic grasses.

The small freshwater wetland appears to be undisturbed by humans.

LANDSCAPE SETTING

The island is almost entirely covered with natural forest, most of it old-growth, making it a significant area of old-growth for the Puget Trough region. Its shape is compact enough that it should have some interior forest qualities.

The island's location halfway between two much larger islands (Fidalgo and Whidbey) only about 1/2 mile away makes it relatively accessible for the migration of flora and fauna. This is good for the persistence of native species, but may be detrimental in some cases, e.g. arrival of Scot's broom on the island.

Most of the land on adjacent large islands is occupied by low-density residential development, with much forest still intact. Three-quarters of a mile to the west on Whidbey Island is an 850 acre block of natural forest, including much old-growth, in the Hoypus area of Deception Pass State Park, part of which is already designated as Natural Forest Area. Hope Island and Hoypus will interact on a landscape scale in the long term to increase their joint natural value as protected areas. On a slightly larger scale, Hope Island is part of the large area of natural forest incorporating most of Deception Pass State Park.

RATIONALE FOR NATURAL AREA PRESERVE BOUNDARIES

The entire island is recommended as a Natural Area Preserve. This preserve would protect some of the highest quality (if not the best) examples of three terrestrial plant community element occurrences: the Douglas fir-western hemlock/salal, the Douglas fir-western hemlock/swordfern, and the Douglas fir-Pacific madrone/salal communities. All three communities are extensive and in excellent condition. One forest community is protection priority 1 and the other two are protection priority 2.

The proposed Hope Island Natural Area Preserve also includes two other terrestrial plant community element occurrences, and one animal element occurrence (bald eagle nest site) for a total of seven element occurrences. The red fescue grassland (also priority 1) is of special note because of the good condition of the occurrence in comparison to other known occurrences. Most of the island is covered with old-growth forest that has been nearly undisturbed by recent human activity.

The main human impacts are associated with the small, rather primitive campground and the trail across the island from there. Human alteration of the recent blowdown area was minimal. The best way to protect this outstanding and unusual example of lowland Puget Trough plant communities is to manage it as a Natural Area Preserve.

MANAGEMENT RECOMMENDATIONS

Efforts should be made to prevent or discourage trampling in small grassy openings and proliferation of footpaths. This problem is currently minor and restricted to areas near shorelines, but could become more significant with continued human use.

Management should be proactive to remove Scot's broom as it invades the pristine red fescue meadow. Possibly a biannual trip to manually remove any new plants that are found in this meadow. Control of Scot's broom is now needed in the largest of the grasslands, possibly using fire.

The reintroduction of fire (in prescribed form) as a natural process tool to maintain some semblance of natural disturbance regimes, mixed-age stand structures, and open grasslands, is a future possibility. Prescribed burning may be occasionally necessary over the long term to maintain Pacific madrone.

SURVEY EFFORT

The entire island was surveyed during a 24 hour period spanning two days.

Prepared by: Christopher Chappell, 1/7/93.

WASHINGTON STATE PARKS NATURAL FOREST INVENTORY

Deception Pass: Hoypus South

SIZE: 568 acres

LOCATION:

The Hoypus South site is located approximately 7 miles north-northeast of Oak Harbor, Island County. Portions of Section 36, in Township 34 North, Range 1 East, and the W1/2 of Section 31, in Township 34 North, Range 2 East.

1991 NATURAL HERITAGE PLAN ELEMENTS:

Priority	Element[1]	Element Name Number	Relative[2] Extent
1	PT-T5	Douglas fir-western hemlock/ Oregongrape community	M
2	PT-T6	Douglas fir-western hemlock/ salal community	M
2	PT-T7	Douglas fir-western hemlock/ swordfern community	M
*	PT-T12	red alder/swordfern community	M
3	OP-T12	western hemlock/Pacific rhododendron community	m

OTHER NATURAL COMMUNITIES:

	Douglas fir/salal-oceanspray community	m
	lowland freshwater wetland	M

[1] PT-T5 = Puget Trough Province Terrestrial Community 5, OP = Olympic Peninsula & S.W. Washington Province

[2] M = major, m = minor

FOREST STAND AGE

Most of the forest is dominated by the mature age class. Residual old-growth trees are scattered within the mature stands. Several young stands are present, some of them having originated within the last 10 years.

CANOPY DOMINANCE AND STRUCTURE

Douglas fir dominates or co-dominates the forest canopy over most of the site. Western hemlock is often important as regeneration and co-dominates the main canopy in a few areas. Red alder dominates or co-dominates some large stands. Sitka spruce is an important main canopy subordinant with alder in one large stand. Black cottonwood is scattered within this spruce-alder stand.

Mature stands are generally dominated by Douglas fir 12-30 inches in diameter. Residual old-growth Douglas fir within these stands are usually over 36 inches in diameter. Multiple canopy layers are beginning to develop in some of the mature stands. Logs are generally common and snags are present in these stands. Young Douglas fir stands have a single dense main canopy layer.

The young alder-spruce stand has many alder 12-18 inches in diameter which form a main canopy layer. Conifers of various sizes within the stand create variety in the canopy structure, at times forming lower layers and sometimes emerging above the main canopy. There are some large residual downed logs in this stand. Younger pure alder stands have smaller dominant trees, simple canopy structure, and little coarse woody debris.

NON-FOREST VEGETATION

Three very recent clear-cuts are still dominated by shrubs and/or herbs. There are three non-forested wetlands that appear to be dominated mostly by shrubs.

ECOLOGICAL CONDITION

Most of the current forest originated after fire. This is indicated by charcoal on logs, snags, and residual live trees, and the complete absence of cut stumps. Most of the post-fire stands are aged 120-150 years. One old-growth cut stump in an adjacent stand initiated about 330 years ago. The young alder-spruce stand is about 70 years old. Surface fire has burned lightly through some of the mature stands since their establishment. There is evidence of scattered small-scale windthrow disturbance.

Logging has been the other major disturbance on the site. Some stands of alder and Douglas fir originated after logging 40-60 years ago. A few mature stands in the western portion of the site were selectively logged or high-graded some time ago and are now a mixture of young and mature cohorts.

Since 1980, four stands, totaling 94 acres, have been clear-cut and planted with Douglas fir. In the last two years, there has been some partial cutting near the road in the southeast portion of the site.

A gravel road enters the site from the southwest, passes through the western portion, then turns south and remains near the boundary as far as the clear-cut on the eastern boundary. A smaller road branches off in the west and leads a short distance to the north and then east. This logging road terminates in the young logged alder stand.

A utilities corridor with a wide accompanying trail and service road, borders the site on the north and separates it from the remainder of the Hoypus forest. Near the western boundary, a trail branches to the south off of this line into the site and eventually hooks up with the road system to the south. This trail and the boundary trail are frequently used by equestrians.

The plant communities are present in good condition. The Douglas fir-western hemlock/salal community is represented by post-fire mature stands on level sites near wetlands in the western half of the area. The Douglas fir/salal-oceanspray community is represented by a single post-fire mature stand.

The Douglas fir-western hemlock/Oregongrape community is represented by post-fire mature stands that cover much of the area. The Douglas fir-western hemlock/swordfern community, located on slopes and on moist sites, is represented by post-fire mature stands. Low Oregongrape sometimes co-dominates the understory of this community.

The western hemlock/Pacific rhododendron community is represented by young and mature post-fire Douglas fir stands located in a small area near the northwest corner of the site. Salal co-dominates the understory with rhododendron.

The red alder/swordfern community is represented by a young natural-origin stand of red alder with significant representation of Sitka spruce in both the main and lower canopy layers. Hemlock and redcedar are also important in places. Swordfern and slough sedge alternately dominate the understory in drier and wetter sites, respectively.

Ecological condition of the non-forested wetlands was not evaluated. However, the largest of the three appears to be surrounded mostly by mature forest with little to no logging disturbance. A gravel road passes by the southern extremity of this wetland.

LANDSCAPE SETTING

The majority of the mature forest is contiguous to the north with extensive mature and old-growth forest. A portion of the forest to the north is currently protected as a Natural Forest Area of 346 acres. The existing Hoypus Natural Forest Area does not extend to the Hoypus South site. The entire area of unfragmented natural-origin forest from Hoypus Point south to the park boundary appears to be about 850 acres.

Although separated by saltwater, other natural-origin forests at Hope Island, Goose Rock, and Bowman Hill, are within one mile of the Hoypus forest. The site is bordered on the south, east, and west by private land, which includes low-density residential development, limited commercial forestry, and a few farms. One small area of the boundary abuts directly on a small suburban-style residential development.

RATIONALE FOR NATURAL FOREST AREA AND NATURAL AREA PRESERVE BOUNDARIES

We recommend the designation of a Natural Area Preserve on the site. Because of acreage and condition, the proposed Hoypus South Natural Area Preserve would protect some of the highest quality remaining examples of three Puget Trough forest communities. Most of the proposed preserve consists of natural-origin mature forest without any signs of logging disturbance. A shrub-dominated wetland also appears to be relatively undisturbed. A total of four natural heritage plant community element occurrences would be included.

The recommended preserve is bounded by the utility corridor/trail (former park boundary) to the north (Map 2). The eastern boundary follows the park boundary south about 2/3 mile to the northern edge of the second clear-cut. The preserve boundary then follows the edge of this clear-cut down to the southern park boundary. All of Section 31 is included in the preserve except for the clear-cut in the southeast corner.

The remainder of the southern boundary of the preserve corresponds to the southern park boundary. The western preserve boundary begins in the south following the park boundary north as far as where it turns west. Then the preserve boundary runs due east to the south end of the large clear-cut in Section 36. The preserve boundary then follows the edge of the clear-cut north-northeast. The northern-most section of the western preserve boundary follows the equestrian trail as far as the utility corridor and northern preserve boundary. In this way, the equestrian trail is excluded from the preserve.

The proposed Natural Area Preserve includes a 14 acre clear-cut along its eastern boundary. Its inclusion will help prevent further fragmentation or disturbance to the natural forest. The recommended boundaries also include a gravel road near the southern boundary and some adjacent stands that have been partially cut. Their inclusion will facilitate control of access to the preserve and increase the total area of natural forest in the preserve.

In order to maintain the entire 850 acre natural forest that extends from Hoypus Point to the southern park boundary, we recommend the expansion of the existing Hoypus Point Natural Forest Area south to the utility corridor that marks the northern boundary of the proposed Hoypus South Natural Area Preserve (Map 2). This expanded area of Natural Forest will include a mixture of young and mature natural-origin stands with a bit of old-growth. The only areas north of the utility corridor excluded from Natural Forest Area would be in the vicinity of the boat launch and a narrow strip along the Cornet Bay Road.

These recommendations will connect two contiguous protective designations, Natural Forest Area and Natural Area Preserve, to protect what appears to be the largest low-elevation natural forest in the Puget Trough. The utility corridor that divides the two classifications could be a narrow exclusion from protective status.

MANAGEMENT RECOMMENDATIONS

The trail in the western portion of the surveyed area is muddy due to site conditions and used extensively by equestrians. Because of this it is not in good condition for hikers. While horses, if confined to the few existing trails, probably do not represent a threat to the plant communities, they do assist in the spread of exotic species.

SURVEY EFFORT

The entire area formerly owned by DNR in Sections 31 and 36 was surveyed. One day was spent during 1992 (Chappell and Crawford) and one day was spent during 1986 (Crawford).

Prepared by: Christopher Chappell, 1/7/93.

WASHINGTON STATE PARKS NATURAL FOREST INVENTORY

Deception Pass: Pass Lake

SIZE: approximately 580 acres

LOCATION:

The Pass Lake site is located approximately 6 miles south-southwest of Anacortes, Skagit County. Portions of Section 23, the W1/2 of Section 13, the E1/2 of Section 14, and the N1/2 of Section 24, in Township 34 North, Range 1 East.

1991 NATURAL HERITAGE PLAN ELEMENTS:

Priority	Element[1] Number	Element Name	Relative[2] Extent
3	PT-T3	Douglas fir/salal-oceanspray community	m
2	PT-T6	Douglas fir-western hemlock/ salal community	M
2	PT-T7	Douglas fir-western hemlock/ swordfern community	m
1	PT-T8	Douglas fir-Pacific madrone/ American vetch community	m
2	PT-T16	Idaho fescue grassland	m
OTHER FEATURES:			
		lowland freshwater wetland	M

[1] PT-T3 = Puget Trough Province Terrestrial Community 3

[2] M = major, m = minor

FOREST STAND AGE

A majority of the forested area is covered with mature or near-mature forest (85-115 years). Most of the remainder is dominated by the young age class. A few stands have significant numbers of old-growth residuals.

CANOPY DOMINANCE AND STRUCTURE

Douglas fir dominates the forest canopy over most of the site. In many areas, western redcedar, grand fir, western hemlock, red alder, and bigleaf maple are important, but generally subordinant, in the main canopy. All of these species tend to

be more numerous on more moist sites. Hemlock and redcedar often dominate the regenerative layers on modal to moist sites. Pacific madrone co-dominates with Douglas fir on one dry, southeast-facing slope.

Red alder dominates a large young stand, much of it wetland, on the flat between Pass Lake and Campbell Lake. Redcedar, hemlock, Sitka spruce, and grand fir are scattered within this alder forest and are co-dominant in a few spots.

Mature and near-mature stands are generally dominated by Douglas fir 12-24 inches in diameter. Canopy structure of these stands is usually relatively simple with a single main canopy layer. In places, multiple canopy layers are starting to develop. Mature stands usually have numerous logs, but few snags and few to no residual live old-growth trees. One mature stand at the south end of Pass Lake has Douglas fir up to 48 inches in diameter, a multi-layered canopy, and many large logs. Stand structure of some other mature stands has been significantly altered by logging, such that younger post-logging cohorts may be mixed with the mature cohort.

The natural multi-cohort stands have relatively complex and uneven canopies because of the variety of tree ages. Old-growth individuals are often emergent above the main canopy, which may be very open.

Young stands generally have a relatively dense single canopy layer and a few residual downed logs. Young stands are dominated by alder or Douglas fir that are most often 8-16 inches in diameter.

NON-FOREST VEGETATION

Several small grassland balds are located on rocky convexities on south- to southeast-facing slopes. They are dominated by a variable mixture of Idaho fescue and other native and exotic grasses. A few small openings within the forests on south-facing slopes are dominated by shrubs, primarily rose and oceanspray.

Areas within the large wetland are dominated by the tall shrubs willow and red-osier dogwood. The willows form an upper layer 10 to 30 feet tall and the dogwood forms a lower layer. A portion of the east edge of the wetland was formerly used as pasture or farmland and is now dominated by a mixture of native and exotic graminoids. Smaller upland hayfields, possibly once used as pasture, are found near the northern shore of Pass Lake.

ECOLOGICAL CONDITION

Most of the near-mature and mature stands originated after fire. Most of these trees are 85-95 years in age indicating a major fire about 95-100 years ago. A few stands are somewhat older, about 115 years. Some of the young stands on Ginnett Hill appear to have originated after fire about 70 years ago. Fire is also responsible for the natural-origin multi-cohort stands where fires have been of moderate severity, killing some trees and leaving some survivors.

Logging activity of varying intensity has occurred over most of the site. Much of the area was selectively logged or hygraded, most noticeably about 40-50 years ago. In areas where this disturbance was relatively light, scattered old-growth residuals were removed from then young stands, and some snags were cut and left as logs.

On much of Ginnett Hill and in a few other stands, many more trees were taken, which led to regeneration of a significant post-logging cohort of trees. The young stands of alder, that now cover relatively large areas including much of the wetland, appear to have originated after logging 40-50 years ago. Disturbance from logging altered forest communities on moist to wet sites the most, and altered dry site forest communities the least.

A number of old logging roads are scattered throughout the property. Currently they are used primarily as trails, if at all. A gravel road runs from the southeast corner of the site to the ranger's residence on the old farm at the north end of Pass Lake. One hayfield is located along this road. Other hayfields and/or old pastures are around the ranger's residence and in the wetland to the north. These areas are dominated primarily by exotic grasses with native sedges and rushes increasing in importance in the wetland.

Another old farm is located south of Ginnett Hill. It includes an old orchard and a field. A gravel road here goes east to an occupied single residence located at the top of a slope overlooking the wetland flat. One old road branches off of this and leads a short way northeast to a small, old rock quarry.

The forested plant communities are present in a variety of ecological conditions, from poor to good. The Douglas fir/salal-oceanspray community is represented by post-fire young and mature stands on relatively dry southwest- to southeast-facing slopes and on ridgetops. Some of these stands are multi-cohort. There has been little to no logging disturbance in this community.

The Douglas fir-western hemlock/salal community is represented by post-fire young and mature stands. Most of them have experienced at least minimal logging disturbance. Large areas, however, are still in marginal to good condition. This is the modal community covering large areas.

The Douglas fir-western hemlock/swordfern community is represented by post-fire mature stands variously altered by logging. This community type is found in moist depressions and north-facing slopes. Most stands are at best fair in condition. The one stand in good condition because of minimal logging activity is located at the southwest end of Pass Lake. This good-condition stand has very large trees and well-developed structure for its age, approximately 115 years.

The Douglas fir-Pacific madrone/American vetch community is represented by a fire-influenced multi-cohort stand. Located on a dry, southeast-facing slope, this open stand has abundant cover of oceanspray, baldhip rose, and snowberry. Many tiny grass- and forb-dominated spots are interspersed within it.

The Idaho fescue grassland consists of small rocky, generally south-facing, balds mostly in fair condition. Fescue and moss dominate the best condition example on a southeast-facing bald east of Pass Lake. The more numerous and extensive balds on Ginnett Hill have some fescue, but the dominance of other native and exotic grasses, notably velvetgrass, indicates poorer condition.

Much of the large wetland stretching south from Lake Campbell has been logged over. Logging removed many to all of the large conifers and alder regenerated. At least some of the willow-dominated portions of the wetland have no or very few cut stumps, indicating that these areas did not support forests prior to the logging.

LANDSCAPE SETTING

The site includes a considerable area of forest of mostly natural origin. Most of this semi-natural forest is located west of a considerable area of human-derived forest and clearing that runs north to south through the middle of the site.

The site is bordered on the south by a pasture, Pass Lake, and a paved road above Bowman Bay Campground. The northern, eastern, and western boundaries adjoin private forest land that has been logged. Very few single residences are found on the west and north sides of the site. The northeast corner of the site fronts Lake Campbell.

The predominantly-forested landscape around the Pass Lake site includes low-density rural residential areas and patches of farmland and pasture.

The site is the northernmost piece in the landscape network of natural forest on Deception Pass State Park. The natural forest at Bowman Hill is located across Pass Lake from the site. Although there is a small strip of farmland between them, the Pass Lake site is close enough to interact at a landscape scale with the large semi-natural, Anacortes Community Forest Lands located north of Lake Erie and Lake Campbell. Adjoining the Anacortes forests is the old-growth forest in Heart Lake Natural Forest Area. If the entire area from Heart Lake south to Hoypus and Hope Island is considered a single landscape, there is approximately 3500 acres of natural and semi-natural forest, the majority of which is mature and old-growth in age.

RATIONALE FOR NATURAL FOREST AREA BOUNDARIES

A Natural Forest Area is not recommended on the Pass Lake site because of the extent of logging disturbance. However, the recognition of sensitive areas on the site is recommended (see Management Recommendations).

MANAGEMENT RECOMMENDATIONS

We recommend that certain communities on site be treated as sensitive areas. These include the forest communities in the best condition, the grassland balds, and the large wetland. Recommended sensitive areas are identified as numbers 2, 3, 6, 8, 9, and 12 on the map of existing vegetation (Map 1).

Future development should be directed away from sensitive areas. New trails and roads should avoid the sensitive areas in order to protect their natural character.

Given the landscape location of the Pass Lake site between more natural forests located to the south and north, we recommend maintaining the majority of the site as relatively undeveloped forest that is allowed to continue to mature. This will help to maintain landscape-scale forest ecosystem functions in the Deception Pass area (see Landscape Setting). From this perspective, the most appropriate place for development on the Pass Lake site is the area east and northeast of Pass Lake.

The occasional use of prescribed-fire is recommended as a management tool in the Douglas fir-madrone stand, and possibly on drier Douglas fir communities and in grassland balds. The Douglas fir-madrone stand has been shaped, and madrone may have been maintained, by occasional fires that killed a few trees and opened the understory. An investigation examining the role

of fire in madrone communities should be undertaken before initiating a prescribed burning plan.

The use of fire in the grassland balds is somewhat problematic because of the presence of velvetgrass in some areas. Velvetgrass often increases in dominance after fire. Fire prescriptions should be devised to favor continued importance of fescue and to discourage the spread of velvetgrass. Potentially, the grasslands on Ginnett Hill could be restored to a more natural condition. Some of the balds appear to have been invaded by shrubs; fire might be used to prevent future shrub invasion of grass balds.

SURVEY EFFORT

Most of the site was surveyed during three days of field time. Survey in the large wetland was only cursory. The site includes the area bounded by the park boundary on the north, east, and west, and by Pass Lake, the pasture east of Pass Lake, and the paved road north of Bowman Bay on the south.

Prepared by: Christopher Chappell, 1/8/93.

WASHINGTON STATE PARKS NATURAL FOREST INVENTORY

Diamond Point

SIZE: approximately 850 acres

LOCATION:

The Diamond Point site is located approximately 6 miles east of Sequim, on the Miller Peninsula, Clallam County. Section 18 and portions of Section 17 and the NW1/4 of Section 19, in Township 30 North, Range 2 West, and portions of the SE1/4 of Section 13 and the E1/2 of Section 24, in Township 30 North, Range 3 West.

1991 NATURAL HERITAGE PLAN ELEMENTS:

Priority	Element[1] Number	Element Name	Relative[2] Extent
1	PT-T8	Douglas fir-Pacific madrone/ American vetch community	m
3	OP-T12	western hemlock/Pacific rhododendron community	M

OTHER NATURAL COMMUNITIES: none

[1] PT-T8 = Puget Trough Province Terrestrial Community 8, OP = Olympic Peninsula & S.W. Washington Province

[2] M = major, m = minor

FOREST STAND AGE

The most extensive forest age classes are young and mature, which are present together in a fine-scale mosaic or mixture covering more than half the area. Large stands clearly dominated by the young age class, a few smaller mature stands, and one small stand of old-growth are also present.

CANOPY DOMINANCE AND STRUCTURE

Douglas fir is the major canopy dominant. It often co-dominates with one or more of the following: grand fir, western redcedar, western hemlock, and Pacific madrone. Grand fir and redcedar are generally more important on the moist sites (with swordfern understory). Madrone increases in importance on drier sites. Hemlock and redcedar are the major tree species in regenerative lower canopy layers, although Douglas fir fills this role on some of the drier sites. Red alder is frequently present in the canopy and dominates some small stands.

Mature dominant trees are generally between 12 and 24 inches in diameter, but on more productive sites may be 24-36 inches. Old-growth Douglas fir are mostly 24-36 inches in diameter. Young trees dominating the canopy are mostly 6-12 inches in diameter, but occasionally exceed this size.

Canopy structure is quite variable due to the variety of disturbances. The mixed-age young/mature stands are often a fine-scale mosaic of very small patches dominated by either smaller, young trees, or larger, mature trees. The small patches of young trees, like the larger uniformly young stands, generally have relatively simple canopy structure with one main canopy that when dense limits understory development. The patches of mature trees and more extensive mature stands tend to be less dense and sometimes have the beginnings of multiple canopy layering.

Large snags are rare except in old-growth stands. Logs vary in abundance and size. Some young stands have many small to medium logs associated with a windthrow event. The old-growth stand has a multi-layered canopy and some large logs.

NON-FOREST VEGETATION

A single non-forested wetland is dominated by cat-tail, water-parsley, and slough sedge, with willow around its perimeter.

ECOLOGICAL CONDITION

The disturbance history of the site is complex, with major windthrow events, fires, and multiple logging entries of varying intensity. Evidence of fire in the form of charcoal is present in almost all stands. Most mature stands are 135-140 years old and appear to be a result of stand-replacement fire. A subsequent stand-replacement fire about 65-70 years ago initiated a few stands and appeared as a surface fire in the now mature stands.

Some of the young, 60-70 year old stands appear to be a result of a windstorm from the south, as indicated by many windthrow mounds and logs oriented south to north. These stands also show evidence of fire. This fire may have followed the blowdown, but the actual sequence and relative importance of fire and wind is difficult to determine. There is little evidence of recent blowdown.

The steep slope bordering the saltwater experiences frequent slumping and therefore supports a broken canopy of trees.

Most of the site has experienced logging disturbance of one degree or another, ranging from removal of old-growth residuals in natural-origin young stands to clear-cutting. Most of the extensive mature stands have been selectively-logged. Many have significant young cohorts that regenerated since the logging. Most of the logging occurred 20 to 70 years ago.

The old-growth stand has been lightly selectively logged, large cut stumps are common. The few young and mature stands that have not been logged contain scattered snags that were cut down and left as logs. There are two stands located in the southwest arm of the site that were clear-cut, or nearly so, 10-20 years ago.

There are many old logging roads, in varying condition, criss-crossing the site, but no trails other than the old roads. A major gravel road follows the boundary along the southwest arm of the parcel.

The plant communities present on the site range from poor to good in ecological condition. The extensive western hemlock/Pacific rhododendron community is present in a variety of conditions: from poor, because of intensive logging, to natural-origin young and mature Douglas fir-hemlock-redcedar forest, to selectively-logged old-growth Douglas fir. Salal is usually co-dominant with rhododendron in the understory.

The Douglas fir-Pacific madrone/American vetch community is represented by two somewhat different types. One type, located primarily in the southwest arm of the parcel, has an understory dominated by salal. It is natural-origin mature and young forest with little to no logging disturbance. Western redcedar is common in the lower canopy layers of this type. The other has an understory dominated by oceanspray and is fairly extensive near the bluff overlooking the water. It contains young and/or mature natural-origin cohorts of Douglas fir, and has been selectively logged in places.

The Douglas fir-western hemlock/swordfern community is present in low-lying moist sites. It is in poor to fair condition because of logging disturbance. In its best condition, mature redcedar, Douglas fir, and/or grand fir are a prominent component of the canopy but are mixed with many young post-logging trees. In its most altered condition, it has become a young seral red alder/swordfern community with few conifers. The non-forested freshwater wetland also shows evidence of logging.

LANDSCAPE SETTING

Most of the surrounding landscape is young forest that has been logged. Mature stands may still remain in scattered locations. The Strait of Juan de Fuca bounds the property on the north. A few stands in the nearby landscape have been recently clear-cut or nearly so, including two that bound the property to the south.

Low density rural residential development is located to the southwest and west, but does not directly abut the property. A higher-density suburban-style residential development and a small airport are located at Diamond Point, east of the DNR transfer land that was not surveyed. A relatively narrow corridor of farms with pastures line Highway 101 and separate the forests of the Miller Peninsula, including the surveyed area, from the more extensive forests of the Olympic Peninsula proper.

Most of the natural-origin stands within the property are relatively small and therefore their ecological value is less than it would be with larger units. Nevertheless, the regional rarity of these communities warrants protection. Their location within a matrix of more degraded forest increases their long-term ecological integrity if significant portions of the surrounding area remain as forest.

RATIONALE FOR NATURAL FOREST AREA BOUNDARIES

A Natural Forest Area is not recommended at Diamond Point due to the extent and intensity of logging disturbance and the fragmentation of the remaining natural forests. However, we do recommend that the natural forest fragments be treated as sensitive areas (see Management Recommendations).

MANAGEMENT RECOMMENDATIONS

The natural forests are present in a fragmented state, located as scattered patches within a matrix of more disturbed forests. We recommend that the fragments of natural forest and old-growth be treated as sensitive areas. These sensitive areas are identified as numbers 7, 8, 10, 11, 12, and 14 on the existing vegetation map (Map 1).

Future development should be directed away from sensitive areas. Old logging roads that pass through sensitive areas should be either maintained strictly as hiking trails or allowed to reforest in order to reduce fragmentation effects. Improvements in those sections of road, and their use as roads, could seriously jeopardize the natural communities present.

The sensitive areas are relatively more important from a

conservation standpoint than their size and condition might indicate because the plant communities present are rare in a natural state.

SURVEY EFFORT

The area surveyed was that portion of former DNR land transferred to State Parks located west of the proposed Peninsula Partners resort development. This includes all the land west of, and including, the north-south ravine in Section 17. The shoreline was not walked, however. The survey required two and a half days of field work.

Prepared by: Christopher Chappell, 12/15/92.

WASHINGTON STATE PARKS NATURAL FOREST INVENTORY

Fort Ebey

SIZE: 228 acres + approximately 400 acres recently acquired

LOCATION:

Fort Ebey State Park is located approximately 7 miles southwest of Oak Harbor, Island County. Portions of the SW1/4 of Section 25, the SE1/4 of Section 26, the NE1/4 of Section 35, and the NW1/4 of Section 36, in Township 32 North, Range 1 West.

1991 NATURAL HERITAGE PLAN ELEMENTS:

Priority	Element[1] Number	Element Name	Relative[2] Extent
2	PT-T6	Douglas fir-western hemlock/ salal community	m

OTHER NATURAL COMMUNITIES:

	Douglas fir/salal community	m

[1] PT-T6 = Puget Trough Province Terrestrial Community 6

[2] m = minor

FOREST STAND AGE

The surveyed portion of the Park has old-growth stands, stands dominated by a mixture of young and old-growth, stands that recently blew down, and young stands.

CANOPY DOMINANCE AND STRUCTURE

Douglas fir dominates or co-dominates the forest canopy over most of the site. Western hemlock co-dominates in some stands and is the sole dominant in one stand. Western redcedar and Sitka spruce are occasional in the canopy. Sitka spruce also dominates a narrow coastal strip on the bluff above the shoreline.

Old-growth Douglas fir are generally 24-60 inches in diameter on mesic sites and 12-24 inches on dry sites. Young dominant Douglas fir are generally 8-16 inches in diameter.

Old-growth stands on mesic sites have multiple canopy layers and moderate numbers of snags and logs. Old-growth stands on dry sites have poorly developed canopy structure for their age and relatively little coarse woody debris. The hemlock stand

has scattered large Douglas fir snags and logs and somewhat uneven canopy.

NON-FOREST VEGETATION

A large area of recent blowdown is now dominated by shrubs and herbs. A wetland at the south end of Lake Pondilla is dominated by hardhack and slough sedge with scattered small Sitka spruce.

ECOLOGICAL CONDITION

Charcoal is present on the bark of old-growth trees, indicating surface fires have burned over most of the area. A young cohort of Douglas fir, aged 80-90 years, is sometimes mixed with the older trees and probably originated after the surface fire that charred the old cohort. An old-growth tree cored on a dry site is approximately 210 years old. One recently-cut, large Douglas fir stump, apparerently typical of those on mesic sites, originated about 345 years ago.

A windstorm in 1990 resulted in major blowdown on the north-facing slope and flat area south of Lake Pondilla. Salvage operations removed some but not all logs and cut down most standing trees in the affected area.

Most of the surveyed area has experienced little to no logging disturbance. Snags have been cut down and left as logs in some areas. The young stand located southwest of park headquarters is composed of Douglas fir that appear to have been planted on what was formerly open ground.

A paved road runs through the interior of the site to a parking area and trailhead. An old road, now used only as a service road, runs along the slope east of the lake. A heavily used trail runs more or less parallel to the saltwater shoreline through the forest.

The plant communities present are in good condition, but are so small and fragmented to be marginal in overall quality. The Douglas fir/salal community is represented by a small-stature old-growth stand located on a dry west-facing slope southwest of Lake Pondilla.

The Douglas fir-western hemlock/salal community is represented by an old-growth stand which was more extensive previous to the blowdown event. One small stand is dominated entirely by western hemlock. The previously scattered larger Douglas fir in this stand have all died.

LANDSCAPE SETTING

The forest consists of small stands fragmented by roads, blowdown, and development. Suburban-style residential development borders the natural forest on the north. The remainder of the boundary borders on logged-over forest land.

RATIONALE FOR NATURAL FOREST AREA BOUNDARIES

A Natural Forest Area is not recommended at this time on Fort Ebey State Park because of the small size and fragmentation of the existing natural forests. The fragments of old-growth and other natural forests should be treated as sensitive areas (see Management Recommendations).

The unsurveyed forest located southeast of headquarters and the adjacent forest on former DNR land (in Section 36, Township 32 North, Range 1 West, and Section 6, Township 31 North, Range 1 East) may contain natural forest. These areas are of particular concern because they potentially include a natural-origin representative of the Douglas fir-western hemlock/Pacific rhododendron community, which is rare in the Puget Trough.

MANAGEMENT RECOMMENDATIONS

We recommend the designation of the remaining natural forests as sensitive areas. These areas are identified as numbers 2 and 3 on the map of existing vegetation (Map 1). Future development should avoid the sensitive areas.

SURVEY EFFORT

The portion of the park located north and west of headquarters was surveyed during 1/2 day of field time.

Prepared by: Christopher Chappell, 1/8/93.

WASHINGTON STATE PARKS NATURAL FOREST INVENTORY

Hope Island

SIZE: 120 acres

LOCATION:

Hope Island State Park is located approximately 10 miles north of Olympia. Portions of the SW1/4 of Section 27, the SE1/4 of Section 28, the NE1/4 of Section 33, and the NW1/4 of Section 34, in Township 20 North, Range 2 West, incorporating all of Hope Island, Mason County.

1991 NATURAL HERITAGE PLAN ELEMENTS:

Priority	Element[1] Number	Element Name	Relative[2] Extent
1	PT-T8	Douglas fir-Pacific madrone/ American vetch community	m

OTHER NATURAL COMMUNITIES:

	Douglas fir-western redcedar/ evergreen huckleberry community	m

[1] PT-T8 = Puget Trough Province Terrestrial Community 8

[2] m = minor

FOREST STAND AGE

Over half of the forest is in the mature age class. One small patch is old-growth and another is co-dominated by mature and old-growth age classes. The remainder of the forest is young.

CANOPY DOMINANCE AND STRUCTURE

The mature stands that cover much of the island are dominated by a mixture of bigleaf maple, western redcedar, and Douglas fir. Red alder and western hemlock are common, but secondary in importance. Western hemlock and western redcedar share dominance in the lower canopy. Multiple canopy layering is partially developed in these stands. Many of the mature trees are quite large for their age (24-48 inch diameters are common). Large logs are present, but not particularly numerous.

There are two old-growth Douglas fir stands with trees that are often 36-48 inches in diameter. Both of these stands have good development of multiple canopy layering and numbers of snags and logs. One patch of old-growth, along the southwest shore

of the island, has a rather open upper canopy layer dominated by old Douglas fir and a secondary mid-canopy layer dominated by younger Pacific madrone with some Douglas fir. The other stand with old-growth has a main canopy of mature Douglas fir with many emergent old Douglas fir and many redcedar in low to mid-canopy.

The young stands are more simple in structure and species composition. Two of the stands contain 12-24 inch diameter Douglas fir mixed with madrone, redcedar, and/or maple. Both of these stands have initial development of canopy layering and a few snags and logs. The other patches are dense single canopy layer stands of 6-12 inch diameter Douglas fir or red alder trees with no residual coarse woody debris.

NON-FOREST VEGETATION

An old homestead with abandoned field and orchard occupies several acres at the south end of the island. Exotic grasses dominate this area.

A small saltmarsh on the southern tip of the island is dominated by seashore saltgrass and pickleweed.

ECOLOGICAL CONDITION

The mature stands which cover much of the island developed from selective logging (high-grading) in a forest that previously had many old-growth Douglas firs. Almost all old Douglas fir trees and some younger trees were harvested. Release dates on live trees indicate much of this logging took place 40-50 years ago. The existing mature cohort of redcedar, Douglas fir, and maple was released by this disturbance, which also allowed some regeneration of alder, maple, and other trees. There is probably greater canopy dominance of maple and less of Douglas fir today than there was previous to the logging.

Charring on the bark of stumps and some mature trees, and the presence of a few fire-scarred redcedar, are evidence of fire previous to logging. Scattered windthrow mounds are common in the mature stands, indicating that wind is an important small-scale disturbance.

The stands that contain an old-growth cohort are natural-origin stands that have been shaped during their development primarily by fire. Charcoal is extensive on the bark of old-growth Douglas fir. The younger cohorts of Douglas fir and madrone in these stands undoubtedly regenerated after fire. There is little to no evidence of logging in these stands.

The island's young stands regenerated after intense human disturbance. Two of these young stands appear to have been

formerly occupied by agricultural land. This is indicated by the lack of residual coarse woody debris and the importance of exotic grasses and forbs in the understory. According to the caretaker, these areas were planted with Douglas fir. Age estimates from tree cores indicate the planting took place about 55 years ago. Possibly the planting failed in the patches where alder now dominates.

The other, slightly older, young stands are more typical second-growth Douglas fir forest that originated after logging and burning about 80 years ago.

Most of the island has been disturbed by humans to one degree or another. The most intense of these disturbances occurred in the homestead area and the young Douglas fir plantations where native vegetation was removed for a substantial period of time. Most of the island has been logged.

A main trail circles the island, beginning and ending at the homestead. For most of its length this trail remains well away from the shoreline. It leads down to the shore at a small cove on the southeast side to a tiny saltmarsh and beach where signs of human impact (i.e. trampling and garbage) are present. A few smaller trails branch off the main trail and lead toward the shore at other locations. Boaters land at the saltmarsh on the southern tip. The caretakers live in the house located on the homestead year-round and are using wood from the forest for heat.

The plant communities are present mostly in poor or fair condition with two small stands in good to excellent condition. The Douglas fir-Pacific madrone/American vetch community is represented in good to excellent condition by old-growth Douglas fir with fire-regenerated younger madrone and Douglas fir and a dense tall shrub layer of salal and evergreen huckleberry.

The Douglas fir-western redcedar/evergreen huckleberry community is represented in good to excellent condition by mature post-fire Douglas fir with many old-growth residuals and a few cut stumps near its edge.

The Douglas fir-western hemlock/swordfern community is represented by mature Douglas fir-maple-redcedar forest that has been substantially altered by selective logging (poor to fair condition). Swordfern is common in the understory of this community, but vanillaleaf usually dominates.

LANDSCAPE SETTING

The island is located in southern Puget Sound and is within 1/4 mile of larger islands and the mainland. The mainland to the

south is suburban residential; to the west, rural residential. Although there appears to be a fairly recent clear-cut directly to the east on Sqauxin Island Indian Reservation, recent aerial photographs show that most of Squaxin is currently forested, some of it probably with mature or older trees. This proximity to more extensive forest may improve the long-term viability of the Hope Island forest.

RATIONALE FOR NATURAL FOREST AREA BOUNDARIES

A Natural Forest Area is not recommended on Hope Island because of the extent and intensity of past logging. However, the two fragments of natural old-growth forest should be treated as sensitive areas (see Management Recommendations).

MANAGEMENT RECOMMENDATIONS

We recommend the recognition of the old-growth forest fragments as sensitive areas. These areas are identified as numbers 1 and 7 on the map of existing vegetation (Map 1). Future development should be directed away from the sensitive areas.

In order to prevent further damage to the saltmarsh, boat, kayak, and canoe landings should be discouraged on the marsh at the southern tip of the island. A recommended boat landing is adjacent to the homestead area where human impacts are already substantial.

The old-growth Douglas fir-madrone/American vetch community is currently undisturbed by humans because it has no trails and the understory is very tall and dense. It is similar to the community at Penrose Point but less disturbed. To prevent degradation of the community and to avoid disturbance of the great blue herons which roost (and possibly nest) in this stand, new trail construction should avoid this area. This stand is adjacent to the shoreline west and northwest of the homestead.

SURVEY EFFORT

The entire island was surveyed during a one day visit.

Prepared by: Christopher Chappell, 1/8/93.

WASHINGTON STATE PARKS NATURAL FOREST INVENTORY

James Island

SIZE: 113 acres

LOCATION:

James Island State Park is located approximately 1/4 mile east of Decatur Island and 7 miles west of Anacortes. Portions of the SW1/4 of Section 14 and the NW1/4 of Section 23, in Township 35 North, Range 1 West, incorporating the entirety of James Island, San Juan County.

1991 NATURAL HERITAGE PLAN ELEMENTS:

Priority	Element[1] Number	Element Name	Relative[2] Extent
2	PT-T7	Douglas fir-western hemlock/ swordfern community	m
2	OP-T19	Douglas fir/baldhip rose-oceanspray community	M
1	PT-T18	red fescue grassland	M
2	-----	bald eagle nesting territory	

OTHER NATURAL COMMUNITIES:

	Douglas fir-western redcedar/ Oregongrape community	m
	bigleaf maple forest	m
	Douglas fir-grand fir forest	m

[1] PT-T7 = Puget Trough Province Terrestrial Community 7, OP = Olympic Peninsula & S.W. Washington Province

[2] M = major, m = minor

FOREST STAND AGE

The majority of the forest is in the mature age class. Small patches of old-growth are present on the northern half of the island and one large patch of the young age class occurs on the southern half.

CANOPY DOMINANCE AND STRUCTURE

Douglas fir dominates the forest canopy over most of the site. Grand fir is a common associate that occurs in all canopy layers, except on the driest sites where Douglas fir grows alone or with scattered Pacific madrone. On the more mesic sites occupied by the swordfern and Oregongrape understory communities, western redcedar and western hemlock are common in lower canopy layers and uncommon in the main canopy. A small stand of bigleaf maple on the southern half is adjacent to a larger stand dominated primarily by grand fir.

Mature dominant Douglas fir are generally 12-36 inches in diameter. The old-growth Douglas fir, generally 24-48 inches in diameter, are scattered as residuals in the mature stands and dominate small areas. Canopy structure is variable and moderately developed in the mature and old-growth stands, with Douglas fir growing in a variety of size classes. In most of the mature and old-growth stands, medium to large snags and logs are present but rarely numerous.

Some of the mature stands appear to have developed from grassland invasion and therefore lack residual coarse woody debris. In places, grassland invasion by Douglas fir has created a forest-grassland mosaic, i.e. savanna vegetation.

The young stand has a relatively dense main canopy layer and is dominated by trees with 12-24 inch trunk diameters. Many small to medium-sized logs are present along with a few snags.

NON-FOREST VEGETATION

The site includes a considerable area of red fescue grassland and savanna. These communities are located in three main patches on south-facing slopes and benches adjacent to the shoreline.

A few acres in the southeastern corner of the island are dominated by the tall shrubs or small trees, western crabapple, Douglas maple and Scouler's willow. This community appears to have been partly forested prior to a recent windthrow event.

ECOLOGICAL CONDITION

Most of the current forest developed from natural regeneration after fire or wind disturbances. The extensive mature cohort of trees aged 100-125 years probably regenerated after fire, as indicated by extensive charcoal on the bark of older residual trees.

Most of the young stands of Douglas fir, grand fir, and bigleaf maple on the southern half of the island appear to have originated after a windthrow event about 70 years ago, and possibly another 40 years ago. Evidence for this windthrow is still quite obvious: numerous windthrow mounds and logs oriented in a south to north direction. A windthrow event in 1990 was less extensive, evidenced by felling of scattered trees and a few small patches of complete blowdown.

The savanna vegetation and a few of the closed stands appear to have originated from tree invasion of grasslands, possibly reflecting a reduction in fire frequency.

Heavy browsing by deer has altered the understory vegetation of the forests by promoting the growth of grasses and limiting the cover of swordfern and shrubs.

The low isthmus that separates the north and south portions of the island contains the dock and main campground. On the isthmus, snags have been cut down, a few trees have been harvested, much of the coarse woody debris has been removed, exotic species have established, and many trails and informal footpaths are present. Two other park campgrounds on the southern half of the island are smaller and much less impacted. These are linked to each other and to the dock area by trails.

One unofficial camp with a fire ring is on a grassy bench overlooking the cove at the south end of the island. There are a number of small informal footpaths on the island, most notably on the grassland slope just north of the main campground area. Logging appears to have been limited to some very selective cutting in the area around and between the campgrounds.

The plant communities are present in good or good to marginal ecological condition. The Douglas fir/baldhip rose-oceanspray community is represented primarily by mature post-fire stands with some older residuals and also by very small stands of old-growth. The understory is dominated mostly by western fescue, probably due to browsing pressure on the shrubs.

Both the Douglas fir-western redcedar/Oregongrape and Douglas fir-western hemlock/swordfern communities are primarily represented by young forests that regenerated after blowdown. These have understories apparently altered by heavy browsing. Foamflower and grasses are common understory components and swordfern does not dominate.

The young bigleaf maple stand also originated after windthrow. Douglas maple and native grasses dominate the understory. The Douglas fir-grand fir forest consists of young and mature stands that originated after windthrow or grassland invasion.

The grassland has good cover of red fescue in many areas, with a characteristic assemblage of native associates. There are a number of common exotic annual grasses and significant patches of the invasive perennial exotic grass, common velvetgrass, which may have the ability to displace the fescue. Unlike some other red fescue communities the author has seen, Scot's broom, an aggressive invader, is not present. Given the grassland's size and condition, this may be one of the better examples of red fescue grassland remaining in the Puget Trough.

LANDSCAPE SETTING

The island is mostly covered with natural forest and grassland. It is relatively small and is separated into two halves by the small, disturbed isthmus. These characteristics are sufficient to provide many natural forest ecosystem functions, although its size may limit some of those functions. Its location only 1/4 to one mile away from the much larger Decatur Island makes it relatively accessible to the immigration and emigration of flora and fauna. The nearest continuous forest appears to be about a mile away.

RATIONALE FOR NATURAL FOREST AREA AND NATURAL AREA PRESERVE BOUNDARIES

We recommend the establishment of a Natural Area Preserve on the southern half of the island. The primary purpose of the preserve would be to protect the highest quality example of red fescue grassland known to the Natural Heritage Program. The preserve would also protect fair to good condition representatives of two forest community element occurrences and an active bald eagle nest. A total of 4 Natural Heritage element occurrences are present on the proposed Natural Area Preserve.

The Natural Area Preserve would be bounded primarily by the tideline, extending north as far as the low isthmus where the main campground is located (Map 2). The proposed boundary includes the two smaller campgrounds and the trails connecting them and the main campground.

North of the main campground, we recommend the designation of a Natural Forest Area (Map 2). This area includes red fescue grassland and savanna in fair condition and a mature to old-growth Douglas fir/baldhip rose-oceanspray community in good condition. Golden eagles have been reported nesting here.

The only area on the island excluded from protective status would be the low isthmus where the main campground and dock are located (Map 2).

MANAGEMENT RECOMMENDATIONS

The relatively disturbed, mixed-age (young and mature) forest on the isthmus of the island (main campground area) has some ecological value as a forest corridor between the two halves of the island. The forest in this corridor should be maintained in as natural a condition as possible.

Efforts should be made to curtail the current proliferation of informal footpaths. This problem is particularly acute in the red fescue grassland on the south-facing slope, just north of the isthmus. Management recommendations are (1) interpretive signs explaining values of the grassland and/or directing people to walk in or avoid particular areas, and (2) the selective use of fencing or wooden railings at access points to the paths in the grassland.

The reintroduction of fire as a natural process tool to maintain natural ecosystem function, mixed-age stand structures, and open grasslands, is a possibility, but the presence of velvetgrass would make prescribed burning problematic. Burning should not be attempted in the grasslands until appropriate prescriptions are devised. Experimental burns here or elsewhere in the region will determine the factors that will limit the spread of velvetgrass while maintaining the red fescue.

SURVEY EFFORT

The entire island was surveyed during a 24 hour period spanning two days.

Prepared by Christopher Chappell, 1/19/93.

WASHINGTON STATE PARKS NATURAL FOREST INVENTORY

Jones Island

SIZE: 179 acres

LOCATION:

Jones Island State Park is located approximately 5 miles north-northwest of Friday Harbor, San Juan County. Portions of the S1/2 of Section 11 and the N1/2 of Section 14, in Township 36 North, Range 3 West, incorporating all of Jones Island, San Juan County.

1991 NATURAL HERITAGE PLAN ELEMENTS:

Priority	Element[1] Number	Element Name	Relative[2] Extent
3	PT-T3	Douglas fir/salal-oceanspray community	m
1	PT-T8	Douglas fir-Pacific madrone/ American vetch	M
2	OP-T19	Douglas fir/baldhip rose-oceanspray community	m

OTHER NATURAL COMMUNITIES:

	Douglas fir-western redcedar/ salal community	M

[1] PT-T3 = Puget Trough Province Terrestrial Community 3, OP = Olympic Peninsula & S.W. Washington Province

[2] M = major, m = minor

FOREST STAND AGE

Almost all of the forest is in mature and/or old-growth age classes. Some of these stands are clearly dominated by mature or old-growth trees. The more common situation is a mixture of mature and old-growth age-classes in the same stand. There are two small young stands and two small patches of recent nearly complete blowdown.

CANOPY DOMINANCE AND STRUCTURE

Douglas fir dominates the forest canopy over most of the island. Grand fir and western redcedar are common, often co-dominant, main canopy associates on mesic sites. They generally outnumber Douglas fir in lower canopy layers.

Bigleaf maple is frequent, especially on mesic sites, but never co-dominates the canopy. On the driest sites (rocky ridges and south-facing slopes) Pacific madrone co-dominates as a canopy layer below the taller Douglas fir.

Mature dominant trees are generally between 12 and 24 inches in diameter, with many individuals 24-36 inches on the mesic sites. Old-growth Douglas fir are mostly 24-36 inches in diameter on the dry sites. Old-growth Douglas fir and western redcedar reach diameters of up to 60 inches on mesic sites. Multiple canopy layering is partially developed in most of the mature and old-growth stands. Distinctly two-layered structure is frequently seen in mature or old-growth. Young stands have a single main canopy layer dominated by trees 12-24 inches in diameter.

Medium to large snags and logs are present, but not particularly numerous, in most of the mature and old-growth stands. Snags and logs increase in size and abundance on more mesic sites. Young stands have little coarse woody debris.

NON-FOREST VEGETATION

A few small grass balds are located near the shoreline and were probably once dominated by red fescue. Exotic grasses now dominate these balds and red fescue is present only as scattered individuals.

The recent blowdown areas are now dominated primarily by a mixture of forbs and grasses which increase after such disturbances. Important species are stinging nettle, Canada thistle, bull thistle, and Coast Range fescue.

A small old orchard, with an associated exotic grass-dominated opening, is located on the south cove of the island.

ECOLOGICAL CONDITION

Almost all of the current forest has regenerated after natural disturbances, primarily fire. Mature trees range from 103 to 140 years total age, with 125-140 years being the most frequent age class. Ring counts from old-growth stumps in the recent blowdown clean-up revealed one tree of 370 years total age that was released 290 years ago, and one tree aged 280 years.

Charcoal is extensive on the bark of old-growth residuals, those trees that survived fire, but absent on the mature trees. This indicates that the mature cohort regenerated primarily after fire. This major fire varied considerably in severity, tending to kill more trees, and therefore leave fewer old residuals, on the more mesic sites than on the drier sites. This resulted in some stands dominated by the mature cohort,

some a mixture of mature and old-growth, and some dominated by old-growth.

Wind is the other important natural disturbance. A major windstorm in December 1990 resulted in extensive windthrow of trees, especially in a 12 acre area near the main campground. The blowdown was nearly complete, creating two significant forest openings, on approximately 8 of these acres. This storm felled scattered trees in the remainder of the park. Older windthrow mounds are scattered around the island but do not indicate a previous event in this century of equivalent severity to that of 1990.

Human disturbance is concentrated around the campgrounds located at the coves on the north and south sides of the island. A dock is located on the north cove, adjacent to the heavily-used main campground and a human-created opening. An old orchard and a smaller campground are located on the south cove and are used extensively by kayakers and others. The two maintained trails run from the dock and north campground south to the orchard area, and west to the western shoreline and a small kayaker camp. Small informal boot-beaten paths paralleling the shore run through forest adjacent to the coves on the north and south shorelines.

The young stand adjacent to the orchard appears to be a result of tree invasion or planting of Douglas fir. This previously open area had scattered trees and may have been used for agriculture during the period of European settlement.

Logging activity has been limited. A few cut stumps were found in the young stand and two small areas of mixed-age mature/old-growth forest. One of these was hygraded for large redcedar.

Limited logging of recent blowdown removed hazard trees and logs, and cleared trails and the campground area. The majority of the logs were left on site, but fine fuels were removed and burned in and near the campground and trails. A trail was constructed around the campground to try and funnel people back to the campground away from the unaltered blowdown. A small fire break trail was constructed around the perimeter of the entire 12 acre blowdown area.

The plant communities represented are in good and good to excellent ecological condition. The Douglas fir-western redcedar/salal community on mesic sites is represented by mature or multi-cohort (mature and old-growth) forest dominated by Douglas fir, western redcedar and/or grand fir. Although all of the logging activity on the island has been in this community, most of its area is still relatively undisturbed by humans.

The Douglas fir-Pacific madrone/American vetch community, which occupies the driest sites, occurs as old-growth Douglas fir with younger cohorts of madrone and Douglas fir and a western fescue understory. Hairy honeysuckle is present as many small browsed individuals and American vetch is mostly absent. This community has experienced no logging and very little human disturbance.

The Douglas fir/salal-oceanspray community is represented by mature forest with significant numbers of old-growth residuals. Oceanspray is less common than usual for this community.

The Douglas fir/baldhip rose-oceanspray community is represented by an open old-growth forest located on portions of the north highland and adjacent north-facing slope. The understory is dominated by grasses (primarily western fescue, Coast Range fescue, and blue wildrye), possibly because of heavy browsing by deer on shrubs.

The grass bald community is now in poor condition due to displacement of native grasses by exotics. Past grazing may be responsible for this condition.

LANDSCAPE SETTING

Most of the island is covered with natural forest. The size of the island is large enough to provide many natural forest ecosystem functions. Its location only 1/2 mile away from the much larger Orcas Island makes it relatively accessible to the immigration and emigration of flora and fauna. Forest is extensive on Orcas Island near Jones Island. Low-density residential development is present along the shoreline of Orcas near Jones.

RATIONALE FOR NATURAL FOREST AREA BOUNDARIES

Most of the island qualifies as Natural Forest Area by virtue of its mature to old-growth forest cover. The two small patches of young forest appear to have a history of human disturbance, but their location and small size merits their inclusion in the Natural Forest Area. The recent blowdown openings have been only minimally altered by humans and are still functioning relatively naturally. Their location between two large areas of mature and old-growth forest also justifies their inclusion. Their development over time will be an interesting interpretive addition to a Natural Forest Area.

The island contains a total of three Natural Heritage Plan elements (one high priority for protection) and one other natural community in good and good to excellent condition. We recommend that the entire island be designated a Natural Forest Area, excepting the old orchard and buffers around the

established campgrounds (Map 2).

MANAGEMENT RECOMMENDATIONS

The campsite located on the small point east of the orchard should be removed or moved to the orchard area. This camp is located in the Douglas fir-madrone community, which deserves special protection due to its rarity in a natural state.

Informal footpaths that lead north from the main campground paralleling the western shore of the cove are somewhat unsafe and are causing erosion. They should be closed to further use.

The reintroduction of prescribed-fire as a natural process tool is recommended. Fire will assist in maintaining natural ecosystem function, mixed-age stand structures, open canopies, and madrone dominance on the dry sites.

SURVEY EFFORT

The entire island was surveyed during a 24 hour period spanning two days.

Prepared by: Christopher Chappell, 12/14/92.

WASHINGTON STATE PARKS NATURAL FOREST INVENTORY

Lake Cushman

SIZE: 602 acres

LOCATION:

Lake Cushman State Park is located approximately 5 miles northwest of Hoodsport, Mason County. Portions of Section 20, the N1/2 of Section 19, and the N1/2 of Section 29, in Township 23 North, Range 4 West.

1991 NATURAL HERITAGE PLAN ELEMENTS: none

OTHER FEATURES:

lowland elevation sphagnum bog

FOREST STAND AGE

All of the forest is in the young age class.

CANOPY DOMINANCE AND STRUCTURE

Douglas fir dominates the forest canopy over most of the site. Significant patches of forest near the two small creeks are dominated by red alder. Western hemlock is a minor canopy associate throughout and is the dominant regenerating species. Western white pine is a minor canopy associate on some of the drier sites, but never co-dominates stands. A large wetland area is dominated in places by small western redcedar and red alder.

Canopy structure is relatively simple, with one main canopy layer, not many logs, and few residual snags. Typical co-dominant Douglas fir are 10-24 inches in trunk diameter, with red alder generally being somewhat smaller in diameter.

NON-FOREST VEGETATION

A relatively large bog is located west of Big Creek. Portions of it are dominated by western redcedar, red alder, and willow trees; other areas are dominated by herbaceous vegetation. A variety of species dominate or co-dominate these wetland openings including small-fruit bulrush, Cusick's sedge, bog labrador-tea, buckbean, and cat-tail. Sphagnum moss is common in the bog.

ECOLOGICAL CONDITION

The forest probably originated from natural regeneration after logging and subsequent burning of the entire area, approximately 60-75 years ago. Cut stumps are numerous

throughout the area and are extensively charred.

Three forest communities are represented, all in poor condition. The most widespread community is the Douglas fir-western hemlock/swordfern community. Less extensive, but also widespread, are the red alder/swordfern and Douglas fir-western hemlock/salal communities. The latter community is the only one in which I saw old Douglas fir trees that survived the logging and burning activity. These residual trees are few and relatively small.

The bog was also logged and burned, as indicated by numerous cut and charred redcedar stumps.

A number of roads, campgrounds, and other developed areas dissect the forest in places.

LANDSCAPE SETTING

The park is surrounded mostly by young managed forest and the reservoir that is Lake Cushman. Residential developments border the park near the lakeshore. The largest unfragmented block of forest in the park is located west of Big Creek and northwest of the campground. East of Big Creek, much of the park is developed and the remaining undeveloped forest is dissected by roads.

RATIONALE FOR NATURAL FOREST AREA BOUNDARIES

None of the park currently qualifies as Natural Forest Area because it is young forest that originated after logging. The forest is typical of second-growth western Washington forests. The approximately 200 acres of undeveloped forest in the western portion of the park will have greater significance 100 years from now.

MANAGEMENT RECOMMENDATIONS

The large bog should be treated as a sensitive area free from future development.

SURVEY EFFORT

All forested, undeveloped areas of the park were surveyed during a one day visit.

Prepared by: Christopher Chappell, 11 December 1992.

WASHINGTON STATE PARKS NATURAL FOREST INVENTORY

Lake Wenatchee

SIZE: 473 acres

LOCATION:

Lake Wenatchee State Park is located approximately 14 miles north-northwest of Leavenworth, at the east end of Lake Wenatchee, Chelan County. All of Section 28, in Township 27 North, Range 17 East.

1991 NATURAL HERITAGE PLAN ELEMENTS:

Priority	Element[1] Number	Element Name	Relative[2] Extent
3	EC-T7	grand fir/pinegrass-elk sedge community	m
2	EC-T8	grand fir/vine maple community	M

OTHER NATURAL COMMUNITIES:

	floodplain communities	m

1 EC-T7 = Eastern Cascades Province Terrestrial Community 7

2 M = major, m = minor

FOREST STAND AGE

A majority of the forest is dominated by the young age class with scattered mature trees. One fairly large stand is dominated by the mature age class with very small patches dominated by young trees interspersed within it.

CANOPY DOMINANCE AND STRUCTURE

The forest is dominated by Douglas fir, ponderosa pine, and grand fir. The upper canopy layer is most often dominated by Douglas fir and/or ponderosa pine, although grand fir occasionally co-dominates the main canopy. The lower regenerative canopy layers are dominated by Douglas fir and/or grand fir. Grand fir tends to be more numerous on more mesic sites and ponderosa pine tends to be more numerous on more xeric sites.

Lodgepole pine is a minor canopy subordinant on mesic sites. Black cottonwood and western redcedar dominate very small, adjacent stands in the floodplain of the Wenatchee River.

Mature dominant trees are mostly 12-36 inches in diameter, with the larger trees on more mesic sites. Dominant young trees are generally 8-16 inches in diameter. Residual old-growth trees are very few.

The dry-site stands have very open canopies, often with more dense clumps of trees and trees of a variety of sizes. The mesic-site mature stands have canopies with a semi-open upper layer and a discontinuous, often dense, secondary layer, with many grand fir appearing as small shade-tolerant individuals. Young mesic-site stands usually have a single, often dense, canopy layer.

Snags and logs are moderately common in the mature stands, but probably less so than naturally. The drier sites and young stands have less coarse woody debris. The floodplain stands have very large and tall cottonwood (36+ inches in diameter) and smaller, shorter redcedar (12-36 inches).

NON-FOREST VEGETATION

There is a shrub-dominated wetland in the floodplain adjacent to the cottonwood forest. Red-osier dogwood is the major dominant, which also forms the understory of the cottonwood stand.

ECOLOGICAL CONDITION

Fire and logging have been the major forest disturbances. A major fire occurred in the last century that initiated the mature cohort aged 125-135 years. Variable numbers of trees survived this fire, apparently more on the dry sites than on the mesic sites.

Almost all of the old-growth cohort that survived the fire was removed during logging activity that initiated the young cohort, now aged 70-85 years. The number of trees harvested varied greatly, from very few in some now mature stands to many in some now young-dominated stands. Therefore the young stands originated primarily after the logging and the mature-dominated stands primarily after the earlier fire.

Recent hazard tree removal of snags and unhealthy trees near some trails have left many cut stumps. A few mature trees have a trace of charcoal on their bark, indicating limited surface fire since the time of the last big fire. Surface fires were probably a regular feature of at least the more xeric pinegrass understory community prior to fire suppression in this century.

About half of the park's area is disturbed by campgrounds, roads, and other developed areas. These developments have severely fragmented the remaining forest. A transmission line

corridor parallels the highway through the park's forest. Vegetation is not totally altered as in many such corridors. A number of trails lead through most of the stands that are not developed. There is a picnic site in the floodplain stand.

The plant communities are present in poor and fair to good condition. Most of the more xeric grand fir/pinegrass-elk sedge community is in poor condition due to logging. There is a small selectively-logged mature ponderosa pine-Douglas fir stand that represents this community in marginal to good condition. Pinegrass is the dominant understory, with little elk sedge present. Snowbrush is common where logging was intense.

The more mesic grand fir/vine maple community occurs as a mature Douglas fir-ponderosa pine-grand fir stand with abundant regeneration of grand fir. Selective logging was light through most of this stand. Vine maple is often abundant in the understory. Sometimes herbs and sub-shrubs, especially prince's pine and shiny-leaf spirea, dominate, with little or no vine maple.

The floodplain stand is very small in extent, consisting of patches of redcedar and cottonwood with much red-osier dogwood in the understory. It appears to be free of logging disturbance, but has a trail and a picnic area.

LANDSCAPE SETTING

The park is set in a mostly forested landscape of checkerboard private and Forest Service ownership. Small to medium-sized clear-cuts are scattered, but most of the surrounding forest appears to be somewhat similar to that in the park, i.e. selectively-logged young and mature stands. Just outside the park to the northeast is an airstrip. An equestrian facility to the south includes a considerable forest clearing. The highway that runs along the east edge and through the park has some private tourist facilities. A U.S. Forest Service campground is located just outside the southeast corner.

The Fish Lake Bog area located 1/2 mile to the north contains relatively undisturbed forest. Aerial photos show a significant stand of what appears to be old-growth, or at least mature in age, just to the west of the park on the south shore of the lake. The forest within the park is internally fragmented by roads and park developments.

RATIONALE FOR NATURAL FOREST AREA BOUNDARIES

A Natural Forest Area is not recommended at Lake Wenatchee State Park because of the extent of logging disturbance and forest fragmentation. However, we recommend the recognition of

sensitive areas that have some natural values (see Management Recommendations).

MANAGEMENT RECOMMENDATIONS

We recommend that the best-condition mature forest and the floodplain communities be treated as sensitive areas. These sensitive areas are identified as numbers 1 and 4 on the map of existing vegetation (Map 1). Future development should avoid the sensitive areas.

The recent tree mortality and stand development pattern in the sensitive area #1 could be used to interpret the eastside forest health issue as related to almost a century of fire suppression.

SURVEY EFFORT

All forest stands within the park that were not occupied by, or severely fragmented by, park developments were surveyed during a one day period spanning two days.

Prepared by: Christopher Chappell, 1/8/93.

WASHINGTON STATE PARKS NATURAL FOREST INVENTORY

Larrabee

SIZE: 2455 acres

LOCATION:

Larrabee State Park is located approximately 7 miles south of Bellingham, Whatcom County. Section 31, the W1/2 of Section 32, and portions of Section 29, Section 30 and the W1/2 of Section 19, in Township 37 North, Range 3 East, and a portion of the E1/2 of Section 36, in Township 37 North, Range 2 East, Whatcom County. The N1/2 of Section 6, the NE corner of Section 1, and a portion of the NW1/4 of Section 5, in Township 36 North, Range 3 East, Skagit County.

1991 NATURAL HERITAGE PLAN ELEMENTS:

Priority	Element[1] Number	Element Name	Relative[2] Extent
2	PT-T6	Douglas fir-western hemlock/ salal community	m
2	PT-T7	Douglas fir-western hemlock/ swordfern community	M
*	WC-T17	western redcedar forest	m

OTHER NATURAL COMMUNITIES:

	Douglas fir/salal-oceanspray community	m
	Douglas fir-western hemlock/ Oregongrape community	m

[1] PT-T6 = Puget Trough Province Terrestrial Community 6, WC = Western Cascades Province

[2] M = major, m = minor

FOREST STAND AGE

The majority of the forest is young. The mature age class is also extensive. There are a few stands of old-growth. Many stands are not clearly dominated by only one age class. These have two or all three age classes sharing canopy dominance, often in a fine-scale mosaic of differing age classes.

CANOPY DOMINANCE AND STRUCTURE

Most stands are dominated by either Douglas fir or red alder. Bigleaf maple, western hemlock, western redcedar, and grand fir are also important canopy species that co-dominate with Douglas fir or alder in some stands. Hemlock and redcedar are common in lower canopy layers through much of the site, with hemlock usually more numerous. There is one mature stand dominated by redcedar.

Many stands are mixed coniferous-deciduous in composition. The relative importance of Douglas fir, redcedar, hemlock, grand fir, bigleaf maple, and alder varies locally within these stands. Lodgepole pine dominates a very small area on the summit of Chuckanut Mountain. Pacific madrone is a minor species on steep lower slopes not far from saltwater.

Young stands dominated by Douglas fir have many trees 12-24 inches in diameter, and on more productive sites a few trees 24-36 inches. Larger mature residuals are occasionally present. Log abundance and size in young stands varies from nearly non-existent to substantial. Young stands generally have a single main canopy layer that does not greatly limit understory cover. Young alder stands have less coarse woody debris and smaller trees, mostly 6-12 inches with some 12-24 inches in diameter.

Mature stands are generally dominated by trees 12-36 inches in diameter, often with a few 36-48 inch trees on moist sites. Logs and snags can be quite numerous. Substantial development of multiple canopy layering is common in the mature stands. Because of the high productivity of most of the area, conifers grow quickly and structural features associated with late-successional forests, such as coarse woody debris, large trees, multi-layered canopies, develop relatively quickly.

Old-growth Douglas fir are mostly 24-60 inches in diameter. Multi-layered canopy structure is partially to fully developed in the old-growth stands. Large snags and logs are generally common. Old-growth stands have a few to many younger Douglas fir in them.

Those stands that are a mixture of two or more age classes often have distinctive canopy structure: either two or more distinct major canopy layers or very small patches abutting one another that differ in canopy layer structure.

NON-FOREST VEGETATION

The site includes a number of non-forested areas. Several, good-sized, herbaceous wetlands are located in the lowland area near Lost Lake. One of the largest of these is dominated by

Indian pond-lily and pondweed, with a number of species of sedge growing on logs and on the pond edge.

There are three very small grassland balds on a southwest-facing slope at the north end of the Park. The one that was visited next to the road is dominated by California oatgrass with a variety of native forbs.

ECOLOGICAL CONDITION

The most important natural disturbance has been fire. There is evidence of extensive fires and logging about 90 years ago. Much of the logged-over area burned after logging. This episode of fire created young stands in areas that were not logged. It also burned on the surface through a majority of the mature and old-growth stands, often thinning the older cohorts and creating opportunities for a young cohort of Douglas fir.

Age of the young post-fire cohort is mostly 75-88 years. The extensive mature cohort, aged 125-140 years, is evidence for a major stand-replacement fire (or fires?) in the last century. A few post-fire mature stands are younger, 90-105 years old.

There are at least two old-growth Douglas fir cohorts in the park. One of these cohorts appears to be limited to near the summit of Chuckanut Mountain and, as determined by coring, is about 175 years old. Most of the old-growth appears to be older than that, but the trees are too large for accurate age estimation.

Wind is another important natural disturbance. Windthrow mounds are scattered throughout much of the park, indicating common small-scale wind disturbance. There are also small patches of near-complete recent blowdown on some north-facing ridgelines.

Most of the area was logged sometime between 75 and 100 years ago. The logging varied in intensity, often consisting of selective cutting or high-grading. Current stand composition and structure varies depending on age of stand at time of harvest, number of trees harvested, whether site burned after logging, site conditions, and seed source after logging.

Sites that burned after logging now generally support young Douglas fir or alder stands. Former old-growth stands that did not burn after removal of the old-growth, are now often mixed stands of hemlock, redcedar, alder, and maple. Many of these conifers appear to have released from lower canopy positions, whereas the alder and maple seeded in on disturbed soil.

Many stands are now a variable mixture of mature trees that originated after fire and young trees that originated after selective logging. Some of these stands also burned lightly on the surface since stand establishment.

Some of the now mature stands were selectively logged or high-graded at relatively low intensity. This did not seriously alter the stand composition or structure. There are also a few stands where numbers of old-growth residuals remain even though many were harvested, and a young cohort regenerated after the logging.

A major paved road, a campground, a boat launch, picnic areas, and a railroad line are concentrated near Samish Bay. The remainder of the park, east of Chuckanut Drive, has two major gravel roads. One leads into the park from the north and ends near the summit of Chuckanut Mountain in a small parking area. It is open to the public for motor vehicle use. The other road leads from the west to near Fragrance Lake. It is closed to public motorized vehicles and used as a service road by park employees. There are also a number of trails in the park, some of which follow old logging roads.

The plant communities present vary in ecological condition from poor to excellent.

The Douglas fir-western hemlock/salal community, located on ridgetops and a few very steep east- or south-facing slopes, is represented by mature or old-growth multi-cohort Douglas fir stands that were strongly influenced by fire. Its location on the two main summits has made it more subject to human disturbances associated with trails and trampling.

The Douglas fir-western hemlock/swordfern community covers a large area of the park. Swordfern dominates or co-dominates the understory. It may be mixed with low Oregongrape and/or salal. In good or excellent condition, this community consists of post-fire young, mature, old-growth, or multi-cohort Douglas fir stands that have been unaltered or little altered by logging. Mature or old-growth stands that have been selectively logged are poor or fair in condition.

The western redcedar forest is mature with western hemlock regeneration and a swordfern understory. It is located on a moderate north-facing slope south of Fragrance Lake. Limited selective logging has occurred in this stand.

The Douglas fir/salal-oceanspray community is represented by a mature post-fire stand on a single steep southwest-facing slope.

The Douglas fir-western hemlock/Oregongrape community is represented by mature post-fire Douglas fir stands located on a few steep west-facing slopes. It also occurs in places as a narrow ecotone between the salal and swordfern communities. The most extensive stand of this type was atypical in species composition, with very little hemlock present, considerable swordfern, and high cover of increasers (including exotic wall lettuce) that are often associated with loose soil.

Other communities present are in poor ecological condition. The red alder/swordfern community is very extensive, but is entirely the result of logging. Salmonberry often dominates a tall shrub layer in this community. Small patches of former western hemlock/devil's club and western hemlock-western redcedar/skunk cabbage communities have been logged and are now dominated primarily by red alder. Sitka spruce is sometimes important in the skunk cabbage community.

The Indian pond-lily wetland was formerly forested with western redcedar. Since logging, it has not regenerated to trees.

The California oatgrass grassland may have been grazed in the past and is very small. Currently, it has few exotics.

LANDSCAPE SETTING

The park consists of a relatively large block of forest in a mostly forested landscape on Chuckanut Mountain. It contains most of the natural-origin forests remaining in the area.

The Chuckanut Mountain area is an approximately 14,000 acre block of forest partially isolated from other extensive forested areas. The Interstate 5 corridor and Samish Lake are located between this large block and other forests to the east. Development along this section of the Interstate is limited so far. Bellingham bounds the area to the north and farmland on the Samish Flats to the south. More than half of the forest outside of the park but within the Chuckanut area is owned by DNR.

The park is bounded on the east by intensively managed private forest land that contains numerous clearcuts. To the north are young post-logging forests of alder and Douglas fir that are primarily owned privately. South of the park is DNR-owned forest land that has experienced varying degrees of logging. Samish Bay, Chuckanut Drive, and low density residential development are west of the park.

Fragments of forest land in Sections 20 and 28 previously owned by DNR have been recently added to the Park. These fragments include two natural-origin mature stands in addition to young post-logging stands. They are located northeast of the main

body of the park. Much of the young logged-over forest located between most of the park and the fragments is owned by DNR and the Department of Wildlife. These public parcels can hopefully act as forest connections between the state park forest lands.

RATIONALE FOR NATURAL FOREST AREA BOUNDARIES

A Natural Forest Area is not recommended in Larrabee State Park. The remaining natural forests are relatively small and fragmented. The natural forest fragments do have some natural value, especially in the context of the large surrounding forests. Therefore, we recommend that the natural forest fragments be treated as sensitive areas (see Management Recommendations).

MANAGEMENT RECOMMENDATIONS

We recommend that the remaining fragments of natural forest in the park be treated as sensitive areas. Three plant community element occurrences are represented within these sensitive areas. The sensitive areas are identified as numbers 8, 9, 11, 12, 13, and 15 on the map of existing vegetation (Map 1). Future development should be directed away from the sensitive areas. Any new trails should be constructed in young, disturbed forests, and avoid sensitive areas, in order to prevent additional impacts to the natural forests.

Although the old-growth Douglas fir-western hemlock/salal communities located on the summit ridge of Chuckanut Mountain and the ridgetop west of Fragrance Lake, are small in extent, they are unique for the Chuckanut area. Unfortunately, they have been degraded to some degree by trampling damage to the understory. Small trails have proliferated in a multitude of directions. In both these locations, some management action should be taken to attempt to keep people on a single main trail.

Mountain bikes and horses should not be allowed on these two summit trails. A bike rack, a barrier, and a sign at the end of the summit road might help to discourage bicyclists from using trails in the summit area. The trails that follow old logging roads and the main gravel roads are appropriate places for mountain bike and horse use that will not degrade the better forest communities.

We recommend the maintenance of most of the park, particularly the coniferous forests that are located between the sensitive areas, as relatively undeveloped forest into the foreseeable future. The continuing maturation of the logged-over conifer stands, many of which already have mature cohorts, will result in a large acreage of late-successional forest communities. In

fifty to one hundred years, such a large area of mature and old-growth forest will be regionally very significant.

SURVEY EFFORT

The main body of the park located east of Chuckanut Drive was surveyed during a four day period. One additional day was spent surveying the fragments in Sections 20 and 28.

Prepared by: Christopher Chappell, 1/6/93.

WASHINGTON STATE PARKS NATURAL FOREST INVENTORY

Moran

SIZE: approximately 5125 acres

LOCATION:

Moran State Park is located approximately 4 miles southeast of Eastsound, on Orcas Island, San Juan County. All of Section 28, Section 29, Section 32, Section 33, and Section 34, and portions of Section 20, Section 21, Section 22, Section 27, the SE1/4 of Section 17, the E1/2 of Section 19, the NE1/4 of Section 30, the S1/2 of Section 26, and the E1/2 of Section 31, in Township 37 North, Range 1 West; and portions of the N1/2 of Section 4 and the N1/2 of Section 5, in Township 36 North, Range 1 West.

1991 NATURAL HERITAGE PLAN ELEMENTS:

Priority	Element[1] Number	Element Name	Relative Extent[2] on Proposed: NAP	NFA
1	PT-T5	Douglas fir-western hemlock/ Oregongrape community	M	M
2	PT-T7	Douglas fir-western hemlock/ swordfern community	m	m
3	PT-T11	lodgepole pine/salal community	-	M
2	PT-T16	Idaho fescue grassland	m	m
2	OP-T19	Douglas fir/baldhip rose-oceanspray community	m	m
3	-----	arctic aster	-	m
3	-----	few-flowered sedge	-	m
3	-----	pine broomrape	-	m

OTHER NATURAL COMMUNITIES:

	Douglas fir-western hemlock/ salal community	-	m
	Douglas fir-western hemlock/ moss community	m	M

lodgepole pine-Douglas fir/ Oregongrape community	m	M
Douglas fir-western hemlock/ foamflower community	M	M
red alder forest	m	m
California oatgrass grassland	-	M

[1] PT-T5 = Puget Trough Province Terrestrial Community 5, OP = Olympic Peninsula & S.W. Washington Province

[2] M = major, m = minor, NAP = Natural Area Preserve, NFA = Natural Forest Area

FOREST STAND AGE

The forest includes large expanses of young, mature and old-growth age classes. Large areas are also dominated by a mixture of two different age classes, most commonly mature and old-growth. A few relatively small stands were felled by the 1990 windstorm.

CANOPY DOMINANCE AND STRUCTURE

Douglas fir dominates the forest canopy over most of the park. Lodgepole pine and western hemlock are of secondary importance as canopy dominants. Large areas, mostly on the summit plateau and upper slopes of Mt. Constitution, are dominated or co-dominated by lodgepole pine. It frequently mixes with Douglas fir and/or hemlock. Western hemlock co-dominates the main canopy with Douglas fir on significant areas, mostly at higher elevations, but occasionally is the sole dominant. Hemlock is widespread, and often the most important species, in the lower canopy at all elevations.

Red alder dominates some stands at low to middle elevations on moist sites. Western redcedar dominates or co-dominates some moist sites around Mountain Lake and Twin Lakes, but is absent to uncommon elsewhere. Grand fir is occasional at lower elevations on moist sites. Sitka spruce dominates or co-dominates a few small wetlands adjacent to Mountain Lake and Twin Lakes.

Stand structure is extremely variable because of the wide range of site conditions and disturbance histories present in this large park. Old-growth Douglas fir range from 16 to 72 inches in diameter, depending on age and site conditions. Most are 24-48 inches. Old-growth stands generally have well-developed multi-layered canopies, except on poor sites where stand

development is very slow. Large logs are common in old-growth stands, large snags are present where they have not been cut down.

Mature conifer stands are generally dominated by trees between 12 and 36 inches in diameter, with occasional individuals exceeding 48 inches on the most productive sites. Multiple canopy layers are beginning to develop in most of the mature stands, particularly those that have old-growth residuals above the main canopy. Abundance and size of snags and logs varies substantially in mature stands, from few, mostly small ones to many large ones.

Young Douglas fir stands are mostly dominated by trees 10-24 inches in diameter, young to mature alder stands by trees 6-20 inches in diameter, and young lodgepole pine stands by trees 4-10 inches in diameter. These younger stands generally have a single main canopy layer. Old-growth residuals are sometimes present. Small snags and logs appear in the young stands, but larger residual coarse woody debris may or may not be present.

Stands dominated by more than one age class are common. These stands often have distinctly two-layered canopies or have partially-developed multi-layered canopies.

NON-FOREST VEGETATION

Extensive areas of grassland are found on the south- and southwest-facing slopes of Mt. Constitution. Most of this grassland is dominated by California oatgrass and/or exotic species. Portions of the upper-most slopes are dominated by Idaho fescue.

Smaller grassland "balds" are scattered throughout the Park, mostly on convex, mid- to upper slopes. Idaho fescue and/or California oatgrass dominate most of these smaller openings. Long-stolon sedge is frequently co-dominant and red fescue is often present in grasslands throughout the park.

Herbaceous wetlands are scattered throughout the park, being particularly numerous on the summit plateau of Mt. Constitution. Most of the herbaceous wetlands are dominated by one or more species of sedge. Slough sedge, beaked sedge, Cusick's sedge, and Sitka sedge are most common. A few of the sedge-dominated wetlands on Mt. Constitution are peat wetlands with Sphagnum moss.

Indian pond-lily and broad-leaved pondweed dominate deeper spots in Summit Lake. Higher ground around this shallow lake is covered by sedges, bog Labrador tea and/or cotton-grass. A pond located on the Mt. Pickett ridge is covered with water lentil.

For the most part, recent blowdown areas still have numbers of standing alder or Douglas fir. Oceanspray is often dominant in the blowdown areas on drier sites, whereas on moist sites, herbaceous increasers, especially stinging nettle and the exotic foxglove, are dominant.

SPECIAL PLANT SPECIES

Three species of vascular plants listed as sensitive in the state of Washington occur in the park. Arctic aster occurs on steep, rocky slopes near the lookout on the summit of Mt. Constitution. Few-flowered sedge occurs on the wetland island in Summit Lake. Pine broomrape occurs on a steep west aspect north of Cascade Lake in the Douglas fir/baldhip rose-oceanspray community.

ECOLOGICAL CONDITION

Most of the current forest in Moran State Park originated as natural regeneration after fire. Much of the park burned over very early in this century. This major fire event resulted in the initiation of the 80-90 year old stands, which cover large areas of the park. At least a few post-fire stands are as young as 68 years. This fire, or fires, also charred the bark of many mature and old-growth trees.

Mature stands range from 93 to 130 years old. One old-growth cut stump on Mt. Pickett revealed an initiation date of 290 years ago and another on Mt. Constitution 275 years. These are probably representative ages for most old-growth in the park. Younger old-growth exists, as evidenced by one 200-year-old Douglas fir on a dry site.

Almost all mature and old-growth stands show some evidence of fire since stand initiation. Charcoal is usually extensive on the bark of older living trees. Younger, post-fire cohorts of Douglas fir are often present in mature and old-growth stands.

Large areas of young and mature (moslty 90-100 years old) forest on the south-facing slope of Mt. Constitution, and scattered smaller stands elsewhere, originated around the turn of the century with an invasion by Douglas fir into grasslands. These stands are distinguished by (1) their lack of residual coarse woody debris, (2) the presence of scattered larger, older trees that grew in open conditions, and (3) variable mixed-grass-forb understories. During the previous century, frequent fires were probably responsible for the maintenance of these grasslands that now support forests.

Windthrow is another important natural disturbance in the park. A major windstorm in 1990 resulted in extensive blowdown. Most of it was in the form of scattered individual trees or small

groups of trees. A few stands experienced major blowdown of the majority of standing trees. Older windthrow mounds are scattered through some portions of the forest, indicating regular small-scale wind disturbance.

The deer population in the park is very high and has a significant effect on the vegetation. Understory vegetation is heavily browsed, such that the cover of swordfern and many shrubs is reduced and the cover of grasses and some forbs is increased. Small Douglas fir that have recently established in the grasslands are so heavily browsed that they appear unable to grow to substantial height. Browsing may be one reason why the large grasslands still exist without fire to maintain them.

Intensive logging activities have been relatively limited in extent. Small young stands, mostly aged 55-70 years, originated after logging near Cascade Lake and along the southern boundary of the park.

Land previously owned by DNR in the northwest corner of the park was logged about 20 years ago, with one small very young stand initiated after logging and a larger mature stand commercially-thinned. A mixed-age young/old-growth stand in the southeast corner of the park was hygrade logged, probably about 50-60 years ago. The thinning and hygrading allowed alder regeneration in some places.

Large areas of the park's forests, even far from roads or trails, have had most large snags cut down and left as logs. This is especially noticeable in stands on the summit plateau of Mt. Constitution. The only extensive areas that were not subjected to this disturbance are in the vicinity of Mt. Pickett and those areas previously owned by DNR.

The park has an extensive road and trail system and receives heavy recreational use. One of the major paved roads runs through the southwest corner of the park along the shore of Cascade Lake. The other branches off of this and leads to the summit of Mt. Constitution, traversing the summit plateau.

Major dirt roads run: (1) around the south end of Mountain Lake and follow the ridge past the summit of Mt. Pickett, (2) along the western border of Sections 20 and 29 with a utility line to the summit of Mt. Constitution, and (3) from near Summit Lake to the private inholding on the summit plateau. These unpaved roads are used only as service roads and trails. An old logging road is located in the northwest corner on former DNR land. A dirt road passes north to south through the former DNR land east of Mt. Pickett.

Trails lead to most general areas within the park. The more heavily used trails appear to be those on the summit plateau of

Mt. Constitution and the one leading to it from Cascade Lake, those around Mountain and Cascade Lakes, and the one along Cascade Creek. The boundary trails appear to be little used and are partially overgrown in places, despite the fact they are open to mountain bikes. Most trails are open to bicycles Sept. 15-May 15. Only the Mt. Pickett trail (actually a service road most of the way) and the east and south boundary trails are open to bicycles year-round. Trail damage and erosion due to mountain bike use was seen on the trail between Cascade Lake and Mt. Constitution.

A number of car campgrounds are located near the shores of Cascade Lake. Another is located on the shore of Mountain Lake. Park headquarters, residences, and an Environmental Learning Center are located south of the main road near Cascade Lake. At the summit of Mt. Constitution is a parking lot, viewpoint with stone tower, and radio facility. This small area receives heavy day use.

The forested plant communities represented are mostly in good to excellent condition. The Douglas fir-western hemlock/ Oregongrape community is represented by extensive old-growth, mature, and young stands located on mesic sites.

The Douglas fir-western hemlock/swordfern community is represented by young, mature, and old-growth stands on moist low-elevation sites that have significant cover of swordfern. Swordfern is heavily browsed by deer in the park and its cover is thereby much reduced from what it would probably be with less browsing. Therefore, the understories representing this community type here are generally dominated by a variety of grasses and forbs, especially cut-leaved foamflower. In the absence of heavy browsing, this community type might be more extensive, occupying much of the area described as Douglas fir-western hemlock/foamflower.

The Douglas fir-western hemlock/foamflower community is represented by young, mature, and old-growth stands on mesic to moist low to mid-elevation sites. The understory of this community representative may be sparse and is dominated or co-dominated by cutleaf foamflower, often with one or more species of mesic-site grasses and/or forbs. Swordfern may be present, but very low in percent cover.

The Douglas fir-western hemlock/moss community is represented by young, mature, and old-growth stands found in depressions or on benches or relatively flat topography at middle to high elevations. Stands are usually a mixture of Douglas fir and hemlock, although some are nearly pure hemlock. This community can be distinguished by an understory almost completely devoid of vascular plants and dominated by mosses. The sparse understory does appear to be limited by lack of light.

Significant areas of the summit plateau are occupied by this type.

The lodgepole pine/salal community is represented by young post-fire stands located on high, dry ridges of Mt. Constitution. Douglas fir is generally common as smaller individuals under the main canopy of pine.

The lodgepole pine-Douglas fir/Oregongrape community is also represented by young post-fire stands. It is more extensive than lodgepole/salal, covering much of the summit plateau of Mt. Constitution and small areas on Mt. Pickett. This community is dominated by lodgepole pine, with Douglas fir sometimes co-dominant, in the main canopy. Both western hemlock and Douglas fir are common as smaller individuals in the lower canopy.

The Douglas fir/baldhip rose-oceanspray community is represented by mature and old-growth multi-cohort stands located on dry, generally rocky or convex, south- to west-facing slopes at middle elevations. Shrub cover is often relatively low due to browsing pressure and western fescue may dominate the understory.

The red alder forest is represented by young, mostly 80-90 year old, stands with variable herbaceous understories. Cutleaf foamflower, fragrant bedstraw, stinging nettle, and Dewey's sedge are common understory dominants. Condition is poor or fair where the exotic foxglove is important.

The grasslands are present in fair to good condition, depending upon the relative dominance of exotics. Some of the small Idaho fescue balds located far from roads are in the best condition, with good cover of fescue and few exotics. The large grasslands on the south side of Mt. Constitution, including both California oatgrass and Idaho fescue grassland, generally have many species and significant cover of exotics. Past grazing is probably responsible for this degraded condition. It is unknown whether the California oatgrass grassland is a natural community type or a result of past grazing practices: oatgrass may be more resistant to grazing pressure than other native grasses.

Many of the wetlands, especially those on the summit plateau, are in good condition.

LANDSCAPE SETTING

The park includes the largest contiguous natural forest, over 4000 acres in size, in the San Juan Islands and possibly in the entire Puget Trough.

Most of the park is bounded by privately owned young to mature forests that originated after logging or have been selectively logged. The surrounding landscape also has many low-density rural residential areas, in a few places directly bordering on the park. Several boundary areas are in the initial stages of residential development. Eventually much of the park will be surrounded by low-density residential development. At Point Lawrence, 1/2 mile to the east, there is another 180 acres of natural forest that is owned by State Parks.

RATIONALE FOR NATURAL FOREST AREA AND NATURAL AREA PRESERVE BOUNDARIES

We recommend that most of the park west of Mountain Lake be designated a Natural Forest Area. The mature and old-growth stands qualify by virtue of their age. The young natural-origin stands qualify as unusual forest communities because of their acreage, natural-origin, and, in the case of the lodgepole pine stands, the plant community represented. The grasslands and wetlands included within the Natural Forest Area are also significant natural communities that deserve protection.

The proposed Mount Constitution Natural Forest Area is bounded on the north and west by the park boundary (Map 2). The southern boundary runs along the road and campgrounds on the north side of Cascade Lake, along the main park road down to Cascade Creek, along the Cascade Creek trail up to the junction of the Pickett Road and the Mt. Constitution Road, and then along the north side of the Mt. Constitution Road. The intent of the boundary in the vicinity of the Cascade Lake campgrounds is to exclude the young stands that have been logged (Units #6 & 9, Map 1) from Natural Forest Area and to prevent development in the existing old-growth adjacent to campgrounds. The eastern boundary is the Twin Lakes Trail and the trail along the east shore of Mountain Lake. The southwest shore of Mountain Lake between the campground and the southern end of the lake is excluded from Natural Forest Area. From the Mountain Lake campground, the boundary extends up-slope in a west-southwest direction a short distance to a hairpin turn in the Mt. Constitution Road.

The potential Natural Forest Area includes five natural heritage plant community element occurrences, six other natural communities, and three sensitive plant species. Because of its size and location in the Puget Trough, the park is probably the most important natural forest in the State Parks system.

The Mt. Pickett area stands out as one of the highest quality, largest areas of natural forest in the Puget Trough. For this reason, the establishment of a Natural Area Preserve is recommended. This area contains about 350 acres of old-growth

in excellent condition, as well as extensive mature and young natural-origin stands. The Idaho fescue grassland, although small in extent, is in good to excellent condition. The area incorporates four plant community element occurrences and four other natural communities. One of these communities is protection priority 1 and three of them are priority 2.

The most significant human disturbance to the potential Natural Area Preserve has been the construction and use of a dirt road that runs along the ridgeline. The road is currently used as a service road and hiking and mountain biking trail. The east boundary trail that connects with the road to form a loop is little used and not well maintained. It is open to mountain bikes but they appear to use it very little.

The recommended Natural Area Preserve is bounded by the proposed Natural Forest Area within the Park and by selectively logged forest stands. There is one small clear-cut along the east boundary.

The proposed Mount Pickett Natural Area Preserve is bounded to the north and east primarily by the Park boundary (Map 2). The eastern boundary in the former DNR land east of Mt. Pickett consists of the small north-south dirt road. The southern boundary follows the designated mountain bike trail from the southwest corner of the former DNR land up to where it intersects with the Pickett Road. Then it follows the Pickett Road south and west to where it intersects the road to the south end of Mountain Lake. This short road it follows as far as the trail along the east shore of Mountain Lake. The western boundary is the trail along the east shore of Mountain Lake and the Twin Lakes trail.

MANAGEMENT RECOMMENDATIONS

Given the existing trail density in the natural forest, further trail construction is unnecessary. Informal trail proliferation and off-trail trampling is a problem in some of the grasslands and small balds on Mt. Constitution.

Campground expansion should be limited to those areas specifically excluded from Natural Forest Area boundaries. This would allow expansion of both the North and Midway campgrounds into adjacent young forest stands, but not into the old-growth which also borders these campgrounds.

The introduction of prescribed-fire as a natural-process tool to maintain particular communities is recommended. The lodgepole pine stands will eventually be replaced by Douglas fir in the absence of fire. A portion of these stands should be occasionally burned to facilitate the regeneration of lodgepole pine.

Fire might also be appropriate in the grasslands, although the presence of many exotics could pose a post-burn problem. Prescriptions should be devised that minimize the spread of exotics. Because of heavy browsing pressure on tree seedlings there does **not** appear to be an imminent threat of meadow invasion by trees.

Prescribed surface fire could also be used in some of the drier Douglas fir communities, particularly Douglas fir/baldhip rose-oceanspray and Douglas fir stands that invaded former grasslands.

SURVEY EFFORT

Most of the park was surveyed during ten field days in 1992. The area south and west of the main road was not surveyed because of existing development and fragmentation of the area. The area lying north of the summit of Mt. Constitution in the NW1/4 of Section 21, the NE1/4 of Section 20, and the SE1/4 of Section 17, was not surveyed on the ground due to time constraints. This area appears on aerial photographs to be natural forest, much of it mature to old-growth in age.

Previous visits to the park by natural heritage staff occurred in 1981, 1983, and 1984, and included a wetlands survey on Mt. Constitution.

Prepared by: Christopher Chappell, 12/15/92.

WASHINGTON STATE PARKS NATURAL FOREST INVENTORY

Mount Spokane

SIZE: 16,184 acres

LOCATION:

Mount Spokane State Park is 18 miles northeast of the city of Spokane. Sections 4, 8, 9, 10, 17, 19, 20, 21, 28, 29, 30 and portions of sections 5, 7, 16, 18, 22, 26, 27, 33, 34, and 36 Township 28 North Range 45 East; Section 1, and portions of sections 2 and 12 Township 27 North Range 45 East, Spokane County.

1991 NATURAL HERITAGE PLAN ELEMENTS:

Priority	Element[1] Number	Element Name	Relative[2] Extent
2	OH-T14	grand fir/queenscup beadlily community	m
*	OH-T16	western hemlock/queenscup beadlily community	M
3	OH-T22	western hemlock/fools huckleberry community	m
3	OH-T23	western hemlock/beargrass community	M
3	OH-T26	subalpine fir/beargrass community	M
3	EC-T28	subalpine fir/smooth woodrush community	m
3	OH-T34	lodgepole pine forest	M
2	OH-T37	Idaho fescue-buckwheat community	M

OTHER NATURAL COMMUNITIES:

	western hemlock/oakfern community	m
	western redcedar/skunkcabbage community	m

[1] OH-T14 = Okanogan Highlands Province Terrestrial Community 14, EC = Eastern Cascades Province

[2] M = major, m = minor

FOREST STAND AGE

Age estimates from trees in the same stand indicate that the number of years of growth from establishment to diameter-at-breast-height (dbh) is highly variable. Ten years is typical in most stands but may be up to 50 years in others. This variation in age within a stand reflects initial stand characteristics during tree invasion, multiple fires, and within-stand disturbances, such as windthrow and insect and fungus mortality. Stands which have been selectively logged or have trail, road, and ski slope clearings have introduced additional variation to the rate of tree growth and establishment.

The varied disturbance history of Mt. Spokane State Park has created a forest in which stands are rarely over 150 years old. In the park, most trees over 250 years old appear as isolated residuals in stands of younger trees. Two stands were identified with old-growth trees as a major canopy component: 1) a spruce-fir stand in the upper reaches of Blanchard Creek, and 2) a Douglas fir-grand fir stand in the upper reach of Burping Creek.

Three stand age cohorts are recognized for mapping: 1) mature stands, by far the most common natural stands on the park, with trees between 80 and 120 years old at dbh, 2) young stands with trees between 45 and 75 years old, and 3) old stands with trees over 200 years old. Combinations of these cohorts are listed in the map names and discussed in the text.

CANOPY DOMINANCE AND STRUCTURE

Potential vegetation in the park includes three forest zones: 1) the subalpine fir zone generally over 4800 feet elevation, 2) the western hemlock zone below 4800, and 3) the grand fir zone below 3500 feet on open south-facing slopes. Actual vegetation in these zones of potential vegetation varies with disturbance history, species available when seedbeds present, and specific site characteristics that modify growing conditions within each zone.

Of the thirteen tree species found in the park, only western white pine and black cottonwood do not currently appear as important members of particular stands. The four most common tree species in the park are Douglas fir, lodgepole pine, grand fir, and western larch. These species play strong roles in stand development following forest fire. They are found in combination with almost every other tree on the park as well as with each other.

Western hemlock, grand fir, and subalpine fir are often common in the understory in mature stands, particularly those with open canopies. Western hemlock forms co-dominant stands with western redcedar in a few areas. Subalpine fir dominates stands at high elevations.

The forest in the Blanchard Creek drainage is composed of a wide variety of conifer dominated stands (Map Unit 2). Lodgepole pine and western larch are the most common components in this forest. They form mature stands by themselves, with each other, or with Douglas fir or grand fir. Although diameter of trees varies by stand and by species, trees are typically between 8 and 12 inches at dbh. Mature lodgepole pine trees on harsh sites with shallow soils at higher elevations are usually less than 8 inches dbh.

Young stands (less than 80 years) tend to be dominated by lodgepole pine although western larch and Douglas fir are frequent associates. These younger stands occur throughout the drainage in a mosaic with mature stands and are not differentiated on the map. Individual old trees over 150 years old, usually western larch or Douglas fir, occur in the drainage but do not form stands.

Above approximately 5000 feet in Blanchard Creek, subalpine fir becomes an important member of the forest while western redcedar, western hemlock, grand fir, western larch, and Douglas fir progressively become less important. Consequently, upper slope stands are composed almost exclusively of combinations of subalpine fir and lodgepole pine.

Stands in Burping Creek are similar in age and composition to those in Blanchard Creek but more variable and lack the subalpine fir forests at higher elevations. Because Burping Creek generally has a southerly aspect, species are found at higher elevations than on north aspects. Understory composition on southerly sites contains fewer moist site species, such as wild ginger and oakfern. These species are more confined to draws on southerly slopes.

Highly productive sites associated with draws at lower elevations in Blanchard Creek support mature (120 years at dbh) Douglas fir, western larch, grand fir, and western redcedar trees. Often, these trees are over 24 inches dbh and form identifiable stands when growing together. These stands are mapped as mature grand fir with old growth (Map Unit 7). Understory is dominated by moist site species, such as coolwort foamflower, lady fern, and doll's eyes. Similar stands apparently dominate the forest slopes around Ragged Ridge.

Western hemlock becomes a prominent canopy component and common member of the reproductive layers in the stand lining Blanchard Creek (Map Unit 4). Grand fir, Douglas fir, and western larch co-dominate the canopy with and without western hemlock. Tree diameters are typically less than 14 inches. Understory vegetation is sparse due to dense canopies. Oakfern, queencup beadlily, and wild ginger are common members of this forest.

Western hemlock forms stands with western redcedar in the upper reaches of Little Deep Creek (Map Unit 13). These stands are similar to the Blanchard Creek stand but with larger trees, commonly 24 inch dbh and with more western redcedar in the canopy.

The steeper, easterly slope along the mid-reach of Blanchard Creek supports a mixed canopy of larger Douglas fir, western larch, and grand fir with a shrubby layer of mountain maple (Map Unit 6). This mature stand of trees over 24 inches dbh contains scattered fire-scarred western larch and Douglas fir. Young lodgepole pine stands are less abundant in this area than the majority of Blanchard Creek.

Mature mixed-conifer stands on southerly aspects (unit 6) have a broken canopy of larger western larch, Douglas fir, and grand fir. Grand fir is a major increaser in the regeneration layer. Larger trees form more continuous patches in the Little Deep Creek drainage. Lodgepole pine stands are present within this unit.

Mature stands of Douglas fir and grand fir (12-18 inches dbh) appear with scattered western larch in the Little Deep Creek drainage (Map Unit 14). Large diameter trees appear in clusters within a nearly continuous canopy. Although blowdown is a common feature, the canopy is nearly closed and the understory is relatively open. Map Unit 12 was not surveyed but appears similar to Map Units 14 and 6 in aerial photographs. Areas covered by Map Unit 12 are generally heterogenous, at lower elevation, and associated with more roads than the other areas.

Mature Douglas fir trees (Map Unit 17), 8-18 dbh, are associated with western larch that are dying or dead near Smith Gap. Grand fir is seen in all size classes and joined by western hemlock in the regeneration layer. The understory contains big huckleberry and thimbleberry with queencup beadlily and coolwort foamflower.

The head of Blanchard Creek contains an old-growth spruce-fir stand (Map Unit 8) in a relatively flat drainage bottom and adjacent slopes. Dominant trees are over 30 inches dbh and form an open canopy of Engelmann spruce, subalpine fir, scattered western larch, and patches of western hemlock. A dense shrub layer of thinleaf alder, fools huckleberry, and big huckleberry grow with wet site species, such as lady fern and doll's eyes.

Burping Creek supports a stand that has many old-growth Douglas fir trees and scattered, dying western white pine (Map Unit 5). These old trees are over 24 inches dbh. Both grand fir and subalpine fir appear in all size classes up to about 18 inches dbh. Many trees on this site appear to have survived the major fires that swept over Mt. Spokane during the past century. The understory contains a beargrass-big huckleberry layer with

patches of tall mountain maple which are usually associated with dying western white pine.

Lodgepole pine dominates large areas along ridges and upper slopes throughout the park. Mature stands of lodgepole pine with western larch and Douglas fir and small patches of young trees occupy these sites (Map Unit 3). Northern upper slopes contain subalpine fir and isolated Engelmann spruce. The adjacent southern aspect supports lodgepole-dominated stands with more Douglas fir and western larch than those on the north. Trees are rarely over 12 inches dbh. The understories on both aspects are usually dominated by beargrass and/or big huckleberry. Portions of these stands, particularly along roads, have had residual western larch and Douglas fir selectively logged or felled.

Deciduous trees and tall shrubs, such as paper birch, mountain maple, and thinleaf alder, join lodgepole pine in a mosaic of stands on the southwest slopes of Mt. Kit Carson (Map Unit 15). Mature lodgepole pine are growing with these younger deciduous woody species. Stand origin is from an unknown disturbance.

At lower elevations on southerly aspects, lodgepole pine grows with ponderosa pine and western white pine in a mosaic of mature stands (Map Unit 16). Most trees are 12-18 inches dbh although scattered larger ponderosa pine and Douglas fir are common. The understory is composed of shrubs, ninebark, baldhip rose, snowberry, mountain maple, tall Oregongrape and oceanspray. Lodgepole pine dominated sites contain moist site forbs, such as queencup beadlily, while ponderosa pine areas have an abundance of pinegrass.

Young lodgepole pine stands (Map Unit 11) occupy smaller areas than mature stands. Trees are less than 8 inches dbh and are aged 40-70 yrs at dbh. Beargrass and big huckleberry are common understory species.

A young Douglas fir stand appears on the south side of Horse Mountain below the bald (Map Unit 20). Trees are 12 inches dbh and near 70 years old at dbh. Subalpine fir and western hemlock are frequent in the regeneration layer. Beargrass and big huckleberry dominate the understory.

Douglas fir dominates stands with scattered old-growth western larch on the south slope of Horse Mountain (Map Unit 21). Douglas fir are 6-18 inches dbh and often joined by grand fir in the main canopy. Western hemlock is found throughout the area and often in a range of size classes. Western larch have thick, usually charred bark and are scattered in clusters across the slope. Natural forest openings are associated with subirrigated soil and support thickets of thinleaf alder and mountain maple with cow parsnip, mountain bluebells, doll's eyes, and wild ginger. Most of the forest supports a lumpy beargrass-big huckleberry carpet.

NON-FOREST VEGETATION

Large areas dominated by grasses and sedges are located on Mount Spokane, Ragged Ridge, Mount Kit Carson, and Day, Beauty, and Horse Mountains. These areas were not intensively surveyed. Common species are Idaho and green fescue, pinegrass, several sedges, and buckwheats. Trees and shrubs are invading along the forest fringes of the balds.

Ragged Ridge supports large shrubfields dominated by bittercherry and mountain-ash. Smaller shrubfields, as on Horse Mountain, were mapped as inclusions in the forest. Trees are invading these brushy areas. Other natural non-forest areas include talus.

ECOLOGICAL CONDITION

Ecological condition was determined by evidence of logging, mining, construction, manipulation of the soil surface, the abundance of exotic plant species, and the similarity of a particular plant community to known occurrences of natural plant community types. Generally, the more similar a community is to the native, natural community, the better the condition.

Most of the forests in Mount Spokane State Park show some evidence of past fires. Fire, as a natural process, creates and maintains a diversity of habitats and vegetation types in the Northern Rocky Mountains.

The best condition communities on the park are in Blanchard Creek, in upper Burping Creek, on the south side of Linder Ridge, and on Ragged Ridge. These are the largest areas with limited or no trail development, little or no sign of extensive, past logging, and no sign of heavy grazing.

Fair to poor condition stands in which trees have been removed through logging operations are mapped as Units 1, 10, 19, and 22.

LANDSCAPE SETTING

Mount Spokane State Park is surrounded by forested landscapes under various land uses. Timber management dominates the surrounding land-use, although wooded residential and woodlot ownership appears to be increasing. The Park is connected to natural vegetation landscapes to the north and east. The park's size and its landscape position within a forest management landscape increases the long-term viability of the Natural Forests on Mt. Spokane.

RATIONALE FOR NATURAL FOREST AREA BOUNDARIES

Blanchard Creek Natural Forest Area includes the area south of Blanchard Creek Road, east of the park boundary between the Blanchard Creek Road and Day Mountain-Mt.Spokane Road, north of the Day Mountain-Mt.Spokane Road between the park boundary and Smith Gap, and northwest of the Smith Gap-Mt. Kit Carson Pack Trail, the road around Beauty Mountain, and west of a line from Cooks Cabin and Mt. Spokane and the section line between sections 9 and 10 and sections 4 and 3 to Blanchard Creek Road. This Natural Forest follows park boundaries, roads, trails, and topographic features. The area includes part of the Mt. Kit Carson Loop Road, a fire control road, and one developed trail. The boundaries are identifiable on the ground.

Mature stands and old, young stands (near 90 years old) occupy most of this area. Many of the mature stands will be over 150 years within a decade. An old-growth stand occupies a small portion of the area although old-growth trees are scattered throughout the area. This is the largest unaltered portion of the park, by far. A small percent of the area, primarily along Blanchard Creek Road, has been logged.

This area contains forest communities that are in good ecological condition. Natural Heritage Plan community element occurrences within the proposed Natural Forest Area are:

1) Idaho fescue-buckwheat grassland bald on the upper elevations;
2) subalpine fir/smooth woodrush along the bald-forest transition on sites where snow melts slowly and late into the season;
3) subalpine fir/beargrass forest sites over much of the upper slopes currently support lodgepole pine forests with and without subalpine fir and lodgepole-Douglas fir stands;
4) western hemlock/fools huckleberry forest sites in old-growth to mature spruce-subalpine fir;
5) western hemlock/queencup beadlily forest sites that support a variety of stands dominated by Douglas fir, grand fir, western redcedar, and western larch. Some of the midslope tends toward the grand fir/queencup beadlily association;
6) grand fir/queencup beadlily forest sites currently supporting Douglas fir-western larch and lodgepole pine stands;
7) western hemlock/oakfern forest sites supporting western hemlock-grand fir-western larch stands and,
8) small western redcedar/skunkcabbage forest sites in low, wet pockets.

Horse Mountain Natural Forest Area is the forest in section 35, the south half of 36, the northwest quarter of section 2, and the forest adjacent to the Ragged Ridge NAP. This Natural Forest Area, in addition to delineating a block of high quality forest, will act as a buffer/corridor for the Ragged Ridge NAP.

Mature stands and old-growth trees occupy most of this area. Mature lodgepole pine stands cover much of the area near the Ragged Ridge NAP. The upper slopes of Horse Mountain have an older, young stand. Very little evidence exists of past logging.

These boundaries contain forest communities that are identified to be in good ecological condition. Natural Heritage Plan community element occurrences in the area include:

1) subalpine fir/beargrass forest sites over much of the upper slopes currently support lodgepole pine forests and lodgepole-Douglas fir stands;
2) western hemlock/queencup beadlily forest sites that support a variety of stands dominated by Douglas fir and western larch;
3) western hemlock/beargrass forest sites currently supporting Douglas fir-western larch stands;
4) Idaho fescue-buckwheat grassland bald on the upper elevations.

MANAGEMENT RECOMMENDATIONS

We recommend that new trail construction be confined to portions of the park outside the Natural Forest Areas. Recreational users, particularly ORV and equestrian users, should be provided opportunities away from Natural Forest Areas. These recommendations will help to create conditions in which natural processes may operate with little influence of exotic species or other distrubance created by human activities.

SURVEY EFFORT

Stand inventory was conducted in five days in August, 1992 on continuous Mt Spokane ownership in township 28 North Range 45 East. Most of sections 4, 8, 27, 28, and 30 were surveyed primarily along roads and air photo interpretation. Sections 10, 15, and 22 were not surveyed because they contain ski area development; sections 5, 29 south half, 33 north half, 34 northwest quarter, and 36 north half were not surveyed because of evidence of extensive logging on aerial photograph.

Stand mapping in the Ragged Ridge vicinity was based on aerial photograph interpretation and information gathered in 1979 by Andrew Kratz, NHP ecologist, and in 1982 and 1983 by Reid Schuller, NHP ecologist.

Prepared by: Rex Crawford, 12 January 1993

WASHINGTON STATE PARKS NATURAL FOREST INVENTORY

Old Fort Townsend

SIZE: 377 acres

LOCATION:

Old Fort Townsend State Park is located approximately 3 miles south-southwest of Port Townsend, Jefferson County. Portions of Section 22, the E1/2 of Section 21, the NE1/4 of Section 28, and the N1/2 of Section 27, in Township 30 North, Range 1 West.

1991 NATURAL HERITAGE PLAN ELEMENTS:

Priority	Element[1] Number	Element Name	Relative[2] Extent
3	OP-T12	western hemlock/Pacific rhododendron community	M

OTHER NATURAL COMMUNITIES:

	Douglas fir-western redcedar/ salal community	m

[1] OP-T12 = Olympic Peninsula & S.W. Washington Province Terrestrial Community 12

[2] M = major, m = minor

FOREST STAND AGE

The entire forest is dominated by the mature age class.

CANOPY DOMINANCE AND STRUCTURE

Douglas fir dominates or co-dominates the forest canopy over the entire site. Western redcedar occasionally co-dominates on moist sites. Western hemlock occasionally co-dominates in the western hemlock/Pacific rhododendron community. Hemlock and/or redcedar are often important in the lower canopy. Red alder is occasional in the main canopy on moist sites.

Mature stands are dominated by trees 8-36 inches in diameter, with occasional individuals 36-48 inches. The moist sites, with swordfern understory, have trees near the high end of this range, and the sites with rhododendron-dominated understory have trees near the low end of this range.

Most stands have partial development of multiple canopy layers, but still retain a main canopy layer that dominates others. Residual old-growth Douglas fir are scattered in just a few

areas. Snags are not very common, some of them have been cut down. Medium to large downed logs are generally numerous.

NON-FOREST VEGETATION

The entire park is forested except for a large lawn, parking lot, and part of the campground.

ECOLOGICAL CONDITION

Most of the stands appear to have originated after fire 125-145 years ago. Charcoal is present on the bark of the few live old-growth residuals, as well as on older logs and snags. Surface fire appears to have burned through portions of the site since stand establishment and lightly charred the bark of relatively few mature trees.

A major windstorm in 1990 resulted in some scattered blowdown and a couple of small patches of near-complete blowdown along the northern edge of the forest. Previous windthrow is evidenced by pit-and-mound topography in a few areas and scattered windthrow mounds.

Much of the area has experienced logging disturbance in the form of limited hygrading. Old-growth residuals were removed and snags were cut down to be left as logs. On average, more trees were cut on the more productive moist sites. Release dates indicate that much of this selective logging took place 30-50 years ago. Portions of the more productive stands appear to have been logged 100 years ago, thereby allowing post-logging regeneration that is now 90-100 years old.

A paved road runs along the northern edge of the park, leading to the campground and developed day use areas. Old logging roads, now maintained and used as trails, cross the undeveloped forest west and south of the campground. A small group campground is located just off the north entrance road.

Condition of the plant communities present ranges from fair to good. The Douglas fir-western redcedar/salal community is represented by post-fire mature stands located on convex slopes in the western 1/3 of the Park. Limited selective logging has occurred in this community.

The Douglas fir-western hemlock/swordfern community is represented by post-fire mature stands that have been hygraded. It is found on the most moist sites, often depressions. Some mature stands may have originated after logging.

The western hemlock/Pacific rhododendron community is represented by post-fire mature stands dominated primarily by Douglas fir. This community type is widespread on relatively

level benches or gentle slopes. Salal co-dominates the understory with rhododendron. Significant stands of this type have not experienced any logging disturbance, probably because trees grow so slowly on these sites.

LANDSCAPE SETTING

The forest within the park is a relatively compact medium-sized block of natural and semi-natural mature forest. Internal fragmentation is limited because most development is located at one end of the park. The park is bounded by saltwater on the east, a gravel pit and a bit of forest on the north, a relatively small block of forest on the west, and a suburban-style residential development and a clear-cut on the south. The larger surrounding landscape is a patchwork of small patches of forest, rural and suburban residential development, and clear-cuts. This is the largest patch of forest in the vicinity.

RATIONALE FOR NATURAL FOREST AREA BOUNDARIES

Most of the park qualifies as Natural Forest Area because of its mature forest cover and the presence of an unusual forest community. The primary rationale for Natural Forest Area designation is the presence of the largest stand, about 100 acres, of natural, mature Douglas fir-western hemlock/Pacific rhododendron known in the Puget Trough.

The proposed Old Fort Townsend Natural Forest Area consists of all the forest west of the campground and developed area. A portion of mature selectively logged forest south of the developed area is excluded to allow room for potential future campground expansion (Map 2).

The north boundary of the Natural Forest Area is located south of the main park road. The western and southern boundaries follow the park boundary. The eastern boundary runs south from where the main road begins to curve south, to the edge of the campground, then follows the edge of the campground down to the park headquarters at the southwest corner of the clearing. From the edge of the clearing the Natural Forest Area boundary runs due south to the park boundary.

MANAGEMENT RECOMMENDATIONS

The area of greatest conservation concern is the swath of natural mature western hemlock/Pacific rhododendron community that runs north to south through the central 1/3 of the park. This is the largest natural mature stand of this community known to the Natural Heritage Program in the Puget Trough. Therefore, any campground expansion plans should not involve a simple expansion of the current forested portion of the

campground. Such an expansion would directly impact this rare community. If campground expansion is necessary it should occur either south or north of the ranger house and lawn area.

SURVEY EFFORT

The entire Park was surveyed during two visits totalling one full day of field time.

Prepared by: Christopher Chappell, 1/6/93.

WASHINGTON STATE PARKS NATURAL FOREST INVENTORY

Patos Island

SIZE: 207 acres

LOCATION:

North 1/2 of Section 16 in Township 38 North, Range 2 West, incorporating all of Patos and Little Patos islands; approximately 5 miles northwest of Orcas Island, San Juan County.

1991 NATURAL HERITAGE PROGRAM ELEMENTS:

Priority	Element[1] Number	Element Name	Relative[2] Extent
3	PT-T3	Douglas-fir/salal-oceanspray community	m
1	PT-T8	Douglas fir-Pacific madrone/ American vetch community	m
1	PT-T10	western redcedar-grand fir/ swordfern association	M
2	-----	bald eagle nesting territory	

OTHER FEATURES:

	lowland freshwater wetland	m
	other natural vegetation and unvegetated shoreline	m

[1] PT-T3 = Puget Trough Province Terrestrial Community 3

[2] M = major, m = minor

FOREST STAND AGE

Stands vary from old-growth (approximately 250 years) to mature (80-100 years). Most of Patos Island is composed of trees 90 to 120 years old with various densities of old-growth trees. The number of old-growth trees generally increases toward the center and from west to east on Patos Island.

CANOPY DOMINANCE AND STRUCTURE

Both islands are heavily forested and are mosty dominated by Douglas fir trees. Interior stands on protected sites on

Patos have canopies that are dominated by western redcedar or grand fir with minor amounts of Douglas fir. A stand at the far east end of the island contains an abundance of black cottonwood.

Typically, thickets of salal, oceanspray, and wild roses line the perifery of the islands. Immediately inland, tree-sized lodgepole pine, madrone, and Douglas fir form an open canopy over the shrub thickets in two areas on Patos. The shrub layer is less dense than in the shoreside thicket and includes a second, taller shrub layer of oceanspray. Along the south shore, Douglas fir trees frequently have broken tops and only a few branches on the side facing the water. A similar Douglas fir/salal-oceanspray community occupies the interior of Little Patos.

The north shore of Patos has a similar understory with an overstory of less wind-damaged trees. Douglas fir is the dominant tree on the north side and shares the canopy with scattered Sitka spruce and western hemlock.

Forests in the protected interior of Patos contain more western redcedar and grand fir in the canopy and more swordfern in the understory than those stands near the shoreline. A valley at the east end of the island protects an old-growth stand dominated by western redcedar and grand fir. Individual tree trunks exceed 4 feet in diameter. The undergrowth is dominated by large swordfern tussocks. This western redcedar-grand fir/swordfern community forms a mosaic with black cottonwood-bigleaf maple/salmonberry communities. This valley community occupies the eastern third of Patos' interior.

Farther west on less protected, better drained sites, western redcedar and swordfern decrease in abundance while the amount of Douglas fir, oceanspray and Douglas maple increases. Individual Douglas fir may occasionally exceed 4 feet in diameter, although most trees are 10-14 inches in diameter. Fire scars and charcoal are evident on some trees.

NON-FOREST VEGETATION

Shoreline segments, particularly the southern aspects, support fragments of grassy headlands. These are currently dominated by annual hairgrasses and velvetgrass. Isolated, remnant red fescue plants grow in these areas. These open sites are typically much less than 30 feet wide.

The majority of the shorelines support dense thickets of salal and roses with hairy honeysuckle and wild blackberry climbing over them. Wind-sculptured lodgepole pine and madrone are often scattered within these thickets but they grow no taller

than the 3 to 5 foot tall shrub layer. These shrub thickets are most common along the south shore. The headland thicket on the east end of Patos contains shrubby Oregon white oaks mixed in with the roses and windswept pine and fir.

A small freshwater wetland is located in the center of the island between its south shore and 103 foot high point. Pacific willow, red alder, crab apple and red-osier dogwood form a patchy canopy over a richly organic pond. Water-starwort, lady fern, and water-parsley grow in and along the edges of the water.

OTHER BIOLOGICAL FEATURES:

A bald eagle pair has constructed four nests on the east end of Patos. The most frequently used nests are in the old-growth stand. The other nest was constructed in a Douglas-fir tree on the southeast shore, but was never used (1987 non-game data). The other territorial nest is located on Orcas Island.

ECOLOGICAL CONDITION:

The eastern two-thirds of Patos is in excellent condition. There are no signs of logging. Portions of the west end of Patos burned around 1950. Much of the island appears to have burned, at varying intensity, approximately 120 years ago. Evidence on the island indicates there is only occasional recreational use. Most is confined to shoreline traffic or to a rare wanderer through the forest. The only trails are fragments of an unmaintained trail that circles the island and a newer trail near the campground that cuts north-south across the island. There is no evidence that livestock were ever on the island.

The western tip of Patos has been cleared of forest and currently supports an abandoned Coast Guard compound and working lighthouse. A primitive campground occupies the lowland on Patos Island at the head of Active Cove. Camping is allowed only at Active Cove. A stand adjacent to the lighthouse clearing has been selectively logged.

Little Patos receives only occasional recreational use and that concentrated on its open headlands. The island is otherwise undisturbed by human activity.

LANDSCAPE SETTING

The Patos Islands are the last islands in a chain of small islands that delineate the San Juan Island group in the U.S. They are one and one-half mile northwest of Sucia Island and three and one-half mile east of Saturna Island in the island

group off Vancouver Island. Total area is about 200 acres which is small for an forest protection unit.

RATIONALE FOR NATURAL AREA PRESERVE BOUNDARIES

The recommended Natural Area Preserve site encompasses 184 acres. This includes all of Little Patos (17 acres) and the eastern three-fourths of Patos Island. The western boundary on Patos is the new trail that crosses the island approximately 1000 feet east of Active Cove. The shoreline defines the remaining boundaries. This includes the best condition examples of the forest communities.

Patos Island will provide protection for two priority 1 forest communities and a priority 3 forest community. These are some of the least disturbed representatives of these community types. Additionally, this proposed Natural Area Preserve will ensure protection for a low elevation wetland and part of a bald eagle nesting territory.

MANAGEMENT RECOMMENDATIONS

State Parks staff indicates that use of Patos Islands is increasing (personal communication 1987). The users who probably have had the greatest impact are the overnight group campers from Camp Orkila (a YMCA Camp on Orcas Island). Different groups of 10-20 Orkila children camp on Patos a week at a time throughout the summer. Continuous use by Camp Orkila campers or other large groups, should be discouraged or restricted in some manner.

Since there are no residences on the islands, visitors are the focus of management considerations. The number of island campers is limited by the available space at the cove and by the number of moorings in the bay. Confining island users to the existing trail system away from the preserve will be accomplished by:

1) keeping existing trails on the west end of Patos well-maintained to concentrate use,
2) allowing the trail that circles the island to go natural, and
3) not developing additional trails.

In summary, the site receives <u>de facto</u> protection because it is an island that is surrounded by almost impenetrable shrub thickets. The focus of management will be maintaining low visitor numbers and dissuading development of permanent recreational facilities.

SURVEY EFFORT

Patos islands were surveyed July 9 and 10, 1987 by Rex Crawford.

Prepared by: Rex Crawford, 12 January 1993.

WASHINGTON STATE PARKS NATURAL FOREST INVENTORY

Penrose Point

SIZE: 147 acres

LOCATION:

Penrose Point State Park is located 1.5 miles southeast of Home, on the Longbranch Peninsula, and approximately 14 miles west of Tacoma, in Pierce County. Portions of the N1/2 of Section 1, in Township 20 North, Range 1 West, and a portion of the S1/2 of Section 36, in Township 21 North, Range 1 West.

1991 NATURAL HERITAGE PLAN ELEMENTS:

Priority	Element[1] Number	Element Name	Relative[2] Extent
1	PT-T8	Douglas fir-Pacific madrone/ American vetch community	m

OTHER NATURAL COMMUNITIES: none

[1] PT-T8 = Puget Trough Province Terrestrial Community 8

[2] m = minor

FOREST STAND AGE

The majority of the forest is young in age. One small patch is a mixture of the young and mature age classes. One stand is old-growth.

CANOPY DOMINANCE AND STRUCTURE

The young stands are dominated by red alder and bigleaf maple. They have occasional old-growth Douglas fir emerging above the main canopy. Western hemlock and western redcedar are frequent below the main canopy. Large logs are few and large snags are mostly absent.

The mixed-age young/mature stand is dominated by western redcedar. Red alder and bigleaf maple dominate small areas within this stand and Douglas fir is a frequent co-dominant with the redcedar. Multiple canopy layering is beginning to develop. A single, relatively dense main canopy is still prominent in parts of this stand. Logs of various sizes are moderately common.

The old-growth stand is dominated by a mixture of Douglas fir, Pacific madrone, and western redcedar. A few quaking aspen are also present. This stand has a multi-layered canopy with

madrone forming a secondary major canopy layer below the tallest conifers. There is a moderate density of larger logs and relatively few snags (for typical old-growth) in this stand. Old-growth Douglas fir are generally 24-48 inches in diameter. Many madrone are 12-36 inches in diameter, which is quite large, and probably old, for madrone.

NON-FOREST VEGETATION

The entire area, except for some developments, is forested.

ECOLOGICAL CONDITION

Fire has been an important natural disturbance in the old-growth stand. The larger Douglas fir and madrone in this stand have charcoal on their bark and some of the madrone have fire scars. This is evidence of surface fire since the time of establishment, which may have been relatively frequent before the turn of the century. This stand has not been logged. A few cut stumps are located near the trail where hazard trees were cut down or removed.

Most stands in the park have been logged. The young stands originated after logging and burning. The scattered residual Douglas fir in them were not removed and survived the fire. The young/mature redcedar-dominated stand has been hygraded: all old-growth trees were cut, allowing the younger cohort of redcedar formerly in the lower canopy to be released and occupy the main canopy. Many young trees also regenerated in the space opened by this logging.

The western portion of the park is mostly developed. There is a large campground, paved roads, picnic areas, and a large lawn for day use. A trail leads from the lawn area east through the forest and then north onto the peninsula where it forms a loop. The trail is heavily used by day hikers.

The plant communities are present mostly in poor condition. Only the old-growth stand is in good to excellent condition. The Douglas fir-Pacific madrone/American vetch community is represented by old-growth Douglas fir-madrone with some western redcedar and a dense tall shrub layer of salal and evergreen huckleberry. American vetch is not present.

Swordfern dominates the understory over most of the remainder of the site. The red alder-bigleaf maple/swordfern and western redcedar-western hemlock/swordfern communities have been significantly altered by logging disturbance.

LANDSCAPE SETTING

This rather small park is surrounded by water and low-density rural residential development. There is considerable young forest still standing in this landscape. However, it is highly fragmented by roads and development. The park is bordered to the northeast by a continuation of the old-growth Douglas fir-madrone stand that apparently extends all the way to the point.

RATIONALE FOR NATURAL FOREST AREA BOUNDARIES

The recommended Natural Forest Area includes old-growth forest and a stand of mixed-age young/mature forest that will act as a buffer between the old-growth and unprotected areas. The old-growth stand, although small, is one of the very few natural representatives of the Douglas fir-Pacific madrone community type in the southern Puget Sound area. This community is a protection priority 1 element in the 1991 Natural Heritage Plan. For these reasons, this small Natural Forest Area will be a significant addition to the system.

The proposed Penrose Point Natural Forest Area is defined by a landform. It includes all of the Penrose Point peninsula owned by state parks (Map 2). It also corresponds to numbers 1 and 2 on the map of existing vegetation (Map 1).

MANAGEMENT RECOMMENDATIONS

Protection of the old-growth Douglas fir-madrone on the adjacent private land that includes the tip of Penrose Point is recommended. This area is contiguous with the Natural Forest Area and may represent an even less disturbed portion of the community than within the park. Acquisition and protection of this parcel would functionally enlarge the Natural Forest Area and better protect the rare plant community present at Penrose. If the area were acquired, expansion of the trail system into the new portion is discouraged because trails impact much of the community already within the park.

The occasional use of prescribed-fire in the old-growth Douglas fir-madrone community is recommended. Fire intensities should be kept low enough to minimize mortality of old-growth trees. Research on the role of fire, including experimental burns, in Douglas fir-madrone forests is recommended prior to the initiation of a prescribed burn plan.

SURVEY EFFORT

The park east of the main road and developments was surveyed during a 1/2 day period.

Prepared by: Christopher Chappell, 1/6/93.

WASHINGTON STATE PARKS NATURAL FOREST INVENTORY

Point Lawrence

SIZE: 188 acres

LOCATION:

The Point Lawrence site is located approximately 8 miles east-southeast of Eastsound, on Orcas island, San Juan County. Portions of Section 25 and the NE1/4 of Section 36 in Township 37 North, Range 1 West, and portions of the SW1/4 of Section 30 and NW1/4 of Section 31 in Township 37 North, Range 1 East.

1991 NATURAL HERITAGE PLAN ELEMENTS:

Priority	Element[1] Number	Element Name	Relative[2] Extent
2	PT-T7	Douglas fir-western hemlock/ swordfern community	m
2	WC-T4	Douglas fir/oceanspray community	M

OTHER NATURAL COMMUNITIES:

	Douglas fir-western hemlock/ Oregongrape community	m
	red fescue grassland	m

[1] PT-T7 = Puget Trough Province Terrestrial Community 7, WC = Western Cascades Province

[2] M = major, m = minor

FOREST STAND AGE

Most of the forest is in the young and/or mature age classes. Three small stands of old-growth are present. Much of the young and mature forest is composed of very small patches of the two age classes intermingled in a mosaic. Significant stands, perhaps 5% of the total area, were completely felled by the 1990 windstorm.

CANOPY DOMINANCE AND STRUCTURE

Douglas fir dominates the forest canopy over most of the site. Red alder occurs as a dominant in small stands, including in wetlands. Lodgepole pine is a common main canopy subordinant on drier sites. Grand fir and western hemlock are occasionally

present in the main canopy on more moist sites, and are both frequent in lower canopy layers on mesic to moist sites. Pacific madrone is common in a narrow fringe along the southern shoreline and occasionally co-dominates very small areas.

Young and mature dominant trees are generally between 12 and 24 inches in diameter, with some individuals 24-36 inches, especially in the mature age class. Old-growth Douglas fir range from 24 to 72 inches in diameter.

Multiple canopy layers are beginning to develop in most of the young and mature stands, which often have old-growth residuals that are emergent above the main canopy. Old-growth stands have well-developed multiple canopy layers.

Logs are generally common but vary in abundance and size. Some stands have a high density of fresh logs, mostly 12-24 inches diameter, from a recent windthrow. Snags are present, but not particularly numerous.

NON-FOREST VEGETATION

A few grass balds are located on south-facing slopes and rocky areas. They are still dominated in small areas by the native California oatgrass. A variety of exotic grasses, especially orchard grass and common velvetgrass, have usurped a majority of the area formerly occupied by native grasses. In 1984, Reid Schuller reported that Idaho and red fescue were still important on some of these upland balds. In 1992, I did not see any upland balds where the native fescues were important.

A narrow fringe of red fescue grassland appears in places along the southern shoreline. What probably was a red fescue grassland at the tip of the point is now dominated by small lodgepole pine and Nootka rose.

The recent blowdown areas are now dominated primarily by shrubs present prior to the blowdown, especially oceanspray and baldhip rose, and herbs that increase after such disturbances. There are a few small wetlands dominated by slough sedge, with red alder sometimes forming a canopy.

ECOLOGICAL CONDITION

Almost all of the current forest originated from natural regeneration after fire or wind disturbances. Wind appears to be relatively more important as a disturbance here than in most other Puget Trough locations, possibly equaling fire in its historical importance. This is evidenced by extensive pit-and-mound microtopography, many obvious older windthrow mounds, and recent extensive blowdown.

Charcoal is present throughout on stumps, residual old trees, and logs. Some stands appear to have blown down and then burned. Others appear to have initiated after only fire. Portions of the young cohort appear to have invaded former grasslands. These stands have no residual logs, occasional larger open-grown trees, and an understory with few to no shrubs. Browsing by deer may be altering understory vegetation.

Mature trees that were cored range from 95 years to 140 years total age. None of the mature stands shows evidence of fire since the time of stand establishment. Young stands are mostly 60-75 years old. Older residuals appear to be about 300 years old, but there may be other old age classes.

Human disturbance within these parcels has been limited. An old jeep track runs through the northwest corner in Section 36. A little-used boot-beaten path parallels the southern shoreline as far as the point. A few snags have been cut down near the southern shore and there is an old disintegrated shack with an adjacent pit toilet. There is no evidence of organized logging activity.

The plant communities represented are mostly in fair to good ecological condition. The Douglas fir/oceanspray community is represented primarily by young and mature stands. Baldhip rose is often co-dominant with oceanspray in the understory and snowberry occasionally is important also. Western hemlock regeneration is sometimes present.

The Douglas fir-western hemlock/swordfern community is represented by young, mature, and old-growth stands. The understory has less swordfern and greater cover of grasses than is typical of this community type, possibly because of browsing pressure.

The Douglas fir-western hemlock/Oregongrape community is represented by a patch of multi-cohort Douglas fir not clearly dominated by any one age class, which includes many residual old-growth trees.

The red fescue grassland is in good condition in the tiny strips where it occurs. Red fescue has significant cover, exotics are uncommon, and associated native forb species are present.

LANDSCAPE SETTING

The area is divided into two parcels (one 70 acres, the other 110 acres) that are separated by private lands. Most of the surrounding lands, including the area between the parcels, is Douglas fir forest that has experienced logging of varying

intensity. Most of this adjacent forest has been selectively logged within the last 30 years. There are a few small clear-cuts (none very recent). Conifer regeneration after the logging has been variable and is dominated by a mixture of Douglas fir and lodgepole pine.

Both parcels have extensive borders on saltwater shores. The southern parcel has a few houses bordering the south side near the shoreline. New roads have recently been constructed to the edge of the northern parcel (Sec. 25) on its east side as part of a future housing development.

Although not particularly large, the natural value of these parcels is enhanced by their location less than one mile from Moran State Park. If future residential development between these properties leaves remnants of native vegetation, they may serve as corridors between Point Lawrence and Moran.

RATIONALE FOR NATURAL FOREST AREA BOUNDARIES

We recommend that the entire area be designated a Natural Forest Area. A majority of the area qualifies because of its mature or old-growth forest cover. The remainder, consisting of patches of young forest and recent blowdown inter-mingled with the mature, has originated after natural disturbances. There has been very little human disturbance of the site.

The proposed Point Lawrence Natural Forest Area will protect two Natural Heritage Plan plant community element occurrences. Although the area is fragmented and surrounded by other land uses, it is close enough to Moran State Park to function with it on a landscape scale, increasing its natural value.

MANAGEMENT RECOMMENDATIONS

Construction of a trail along the southern shoreline where there already exists a path would undoubtedly impact the small red fescue communities. Future trails should avoid these tiny seaside balds that are in good condition.

SURVEY EFFORT

The southern parcel was thoroughly surveyed and the western portion of the northern parcel (section 25) was briefly visited during one and a half days of inventory work this year. Rex Crawford spent one day surveying the northern parcel in 1986. Reid Schuller, WNHP, spent a day on the southern parcel in 1984.

Prepared by: Christopher Chappell, 12/14/92.

WASHINGTON STATE PARKS NATURAL FOREST INVENTORY

Riverside

SIZE: 5800 acres

LOCATION:

Riverside State Park stretches along the Spokane River for approximately 15 river miles near the northwest city limits of the city of Spokane. Portions of Sections 2, 3, 4, 10 Township 25 North, Range 42 East; Portions of Sections 5, 6, 7, 17, 18, 19, 20, 21, 28, 29, 30, 33, and 34 Township 26 North, Range 42 East; Portions of Section 31 Township 27 North, Range 42 East; Portions of Sections 1, 12, 24, and 25 Township 26 North, Range 41 East, Spokane County.

1991 NATURAL HERITAGE PLAN ELEMENTS:

Priority	Element[1] Number	Element Name	Relative[2] Extent
2	CB-T1	ponderosa pine/Idaho fescue community	M
1	CB-T2	ponderosa pine/bluebunch wheatgrass community	m
1	CB-T3	ponderosa pine/ needle-and-thread community	m
3	OH-T8	Douglas fir/snowberry community	m
*	OH-T9	Douglas fir/ninebark community	m

OTHER NATURAL COMMUNITIES:

	riparian woodlands	m
	scabland communities	m

[1] CB-T1 = Columbia Basin Province Terrestrial Community 1, OH = Okanogan Highlands Province

[2] M = major extent of community, m = minor extent of community

FOREST STAND AGE

Multiple unevenaged stands form the forest of Riverside State Park. Rarely can individual stands be assigned a specific age because of the heterogeneity of age cohorts that comprise the park's ponderosa pine forests. The jumble of trees of different ages reflects past disturbance history, changes in the fire frequency, and variation in site characteristics.

Age distribution of a stand may be inferred by the distribution of the diameter of tree trunks at breast height (dbh). For this inventory, trees less than 12 inches dbh are considered young (less than 90 years old), those greater than 12 inches dbh are mature (91-150 years), and generally those over 24 inches dbh or with well developed "yellowbark" are old growth (over 150 years old).

Young stands with scattered mature trees are the most common stand condition. The second most common situation consists of areas with numerous, large- diameter trees (over 12 inches dbh) and associated groups of smaller (younger) trees of similar height. Areas with stands composed of mature trees with short younger trees are the third most abundant situation.

CANOPY DOMINANCE AND STRUCTURE

Ponderosa pine is the dominant tree in Riverside State Park, except along riparian areas on the Spokane River and on steep, protected slopes. Riparian stands contain a combination of black cottonwood, thinleaf alder, black hawthorn and/or ponderosa pine. Douglas fir attains canopy dominance or prevalence on most sites where slopes are greater than 30%.

The north end of the park near the mouth of Deep Creek and below Pine Bluff contains the largest concentration of Douglas fir-dominated forests. Typically, these Douglas fir dominated stands have a nearly closed canopy. Ponderosa pine is a co-dominant in many of these stands. Douglas fir is an occasional member of the regeneration layer in ponderosa pine stands particularly along toe slopes of steep slopes.

Trees on Douglas fir sites are often larger than trees of similar age on ponderosa pine sites. Individual trees can exceed three feet in dbh although most are much smaller. Tall to low shrubs, such as, serviceberry, snowberry, ninebark, and oceanspray are common undergrowth features in Douglas fir forests.

Over the vast majority of the park, ponderosa pine is the only tree species present and displays a range of canopy coverage. It forms closed to open stands, appears in all vertical canopy positions, and occupies a variety of diameter size classes.

Much of the pine forest in the park has an irregular canopy with an overstory cover that varies between 20 and 60%. Dense regeneration patches of small trees with 100% cover are found throughout the forests on the park. Ponderosa pine also appears as scattered trees in savanna communities where tree cover is less than 5%.

Tree trunks are 6-12 inches dbh in most stands. Trees over 24 inches dbh occasionally join the smaller diameter trees. These "yellowbark" ponderosa pines are irregularly distributed in the park and usually appear in clusters of several widely scattered trees. The height of the upper canopy can be relatively uniform because the large diameter trees are typically the same height as 8-14 inch dbh trees. In most stands, ponderosa pine regeneration is confined to openings in the upper canopy.

NON-FOREST VEGETATION

Much of the existing non-forest vegetation in the park will support trees in the absence of disturbance. Large grass-dominated areas, such as those on the Seven-mile Military Reservation and Equestrian area, are slowly being invaded by pine or, on toe slopes, by scattered Douglas fir trees. The top of the butte on the Camp Seven-Mile Military Reservation and some of the flat on the ORV site may be droughty enough sites to severely limit tree growth and may not support a closed forest under the current climate.

Scabland sites, those with shallow rocky soils, support a potential vegetation of bunchgrass communities and, in some areas, scattered ponderosa pine trees. Bluebunch wheatgrass dominates the potential plant communities on most of these shallow soil sites. Stiff sagebrush communities appear on certain severe sites on Pine Bluff. Other non-forest areas include talus, basalt bluffs, and dry stream beds.

ECOLOGICAL CONDITION

Ecological condition is determined from evidence of logging, mining, construction, manipulation of the soil surface, the abundance of aggressive exotic plants, and the similarity of a particular plant community to known occurrences of native, natural plant community types. Generally, the more similar a community is to the native community, the better the condition.

Most of the forest stands in Riverside State Park, show some evidence of tree removal. Stands in which tree removal has been sporadic and created little ground disturbance, usually have an understory plant community in relatively good condition.

Exotic plants that are associated with livestock grazing and/or soil disturbance are found throughout the park but usually in low abundance. The highest concentration of grazing increasers are in the Equestrian Area. Exotic plants line quarry sites, roads, trails and other sites with frequent soil disturbance. Common exotics are cheatgrass, Japanese brome, ventenata, Dalmatian toadflax, and deer-vetch.

Prior to EuroAmerican settlement, surface fires swepted through these ponderosa pine forests at 5-20 year intervals. These fires maintained a landscape of open forests, savannas, and bunchgrass prairies. Fire suppression has allowed a dense forest canopy and thick litter layer to develop in many areas. This change in forest structure has resulted in a depauperate understory vegetation, increased Douglas fir abundance, and greater susceptibility of ponderosa pine to outbreaks of insect pests.

Understory vegetation composition and structure varies with topography and with density of the tree canopy. Most stands with a well-developed tree canopy have a thick layer of needle litter and only wispy, isolated herbaceous plants. This undergrowth "vegetation" occupies most of the flat terraces on the park. Typical plants in these understories are scattered individuals or clusters of balsamroot, lupine, and bluebunch wheatgrass. Ephemeral grasses and forbs can dominate portions of the understory around disturbed soil.

Open savanna environments have a very similar collection of plant species as those under closed stands but in higher abundance and more vigorous condition. Common grasses include bluebunch wheatgrass, Idaho fescue, needlegrasses, three-awned needlegrass, bulbous bluegrass, cheatgrass and other annual grasses. In addition to balsamroot and lupine, dalmatian toadflax, tufted phlox, and deer-vetch are frequently encountered in these open environments.

The best condition communities in the park are in the vicinity of the mouth of Deep Creek. Ponderosa pine/Idaho fescue, ponderosa pine/snowberry, and Douglas fir/ninebark have been recognized for their good condition since 1969. Another good condition community is located on a scabland bench east of Bowl-and-Pitcher. This bench supports a bluebunch wheatgrass/Idaho fescue grassland community with scattered ponderosa pine trees. The bottom of Deep Creek on the southeast extreme of the park supports ponderosa pine/needlegrass, ponderosa pine/Idaho fescue, and ponderosa pine/bluebunch wheatgrass communities in good to fair condition. These Deep Creek communities appear to be recovering from past grazing and/or logging although the influence of fire suppression as made interpretation of condition difficult.

LANDSCAPE SETTING

Riverside State Park parallels the Spokane River that connects it to a large, relatively natural vegetation landscape to the north and east. The size of the park and its landscape position as a corridor combine to increase the long-term viability of the Natural Forests in the park. Riverside State Park is surrounded by suburban to wooded residential development which may compromise these broader, long-term landscape values.

The linear shape of the park and the ever increasing encroachment of homes and businesses around the park have increased the probability of exotic species introduction and have limited the operation of natural processes, most notably natural fires.

RATIONALE FOR NATURAL FOREST AREA BOUNDARIES

The Nine-Mile Natural Forest Area encompasses all of the state park land in section 7 and most of park land in section 8. This Natural Forest essentially follows the park Boundaries on all sides except on the southwest. The southern boundary extends up Deep Creek to the Seven-Mile Road and includes the area between the park boundary on the west and the road along lower Deep Creek on the east. Boundaries were chosen because they are identifiable on the ground and isolated an area for management.

These boundaries contain forest communities that are in the best ecological condition on the park. This area was recognized for special recognition by John Crow in 1969, Rexford Daubenmire in 1975, and Natural Heritage staff in 1979. Much of this attention reflects the rarity of ponderosa pine forest communities in good condition in Washington.

The Deep Creek Natural Forest Area is all the park land in section 25. These boundaries contain forest communities that are in good ecological condition. The park boundaries are identifiable on the ground and bound an area on the periphery of the park that would likely minimize conflicts with other park operations.

Seven-Mile Camp Natural Forest Area is the forest in section 20 and the northwest quarter of section 29 west of Seven Mile and Aubrey roads. This an isolated block of uniform forest. Because of its location, this area provides the best opportunity for reintroducing fire as an ecosystem process.

MANAGEMENT RECOMMENDATIONS

Wherever possible, reintroduce fire as a natural process into the Natural Forest Areas. Careful application of fire research will be necessary. The goal of a prescribed burn program will be to develop a forest landscape that is maintained by frequent, low intensity fires and dominated by open stands of ponderosa pine and other native plants. We recognize that the degree and proximity of residences may preclude the use of fire. Small controlled burns that reduce fuel loadings and natural fire breaks provided by the Spokane River and cliffs will lessen the chance of a catastrophic fire in the park.

We recommend that heavy recreation-use, particularly ORV and equestrian users, be diverted away from Natural Forest Areas. This could be accomplished by halting all new trail and road construction through or in the vicinity of the Natural Forests. These travel corridors are routes for exotic species introduction, areas of alteration of soil condition, and sites for disturbance of animals using the natural forests.

SURVEY EFFORT

The park was surveyed one week in 1992 that included road reconnaissance and perpendicular ground surveys of larger contiguous forest areas. This survey did not include the ORV area. Isolated parcels of the park were not surveyed. Previous surveys, in 1979 and 1980, concentrated in the Nine-mile/Deep Creek vicinity and totaled one week of inventory effort.

Rex Crawford
12 January 1993

WASHINGTON STATE PARKS NATURAL FOREST INVENTORY

South Whidbey

SIZE: 347 acres

LOCATION:

South Whidbey State Park is located approximately 12 miles south-southeast of Coupeville, Island County. The W1/2 of Section 29 and a portion of the E1/2 of Section 30 in Township 30 North, Range 2 East.

1991 NATURAL HERITAGE PLAN ELEMENTS:

Priority	Element[1] Number	Element Name	Relative[2] Extent
2	PT-T7	Douglas fir-western hemlock/ swordfern community	M
*	PT-T12	red alder/swordfern community	m

OTHER NATURAL COMMUNITIES:

	western redcedar-western hemlock/ skunk cabbage community	m
	Sitka spruce-western hemlock/ deerfern community	m

[1] PT-T7 = Puget Trough Province Terrestrial Community 7

[2] M = major, m = minor

FOREST STAND AGE

Most of the forest is in the mature age class. An old-growth stand appears on the slope below the campground and in the campground itself. Young stands occupy the remaining area of the park (about 15%). Scattered old-growth trees are found in the natural-origin young and mature stands.

CANOPY DOMINANCE AND STRUCTURE

Douglas fir dominates the forest canopy over most of the site. Western hemlock is abundant as a lower canopy layer under the Douglas fir, and occasionally hemlock co-dominates the main canopy. There is one small young stand dominated by hemlock. Western redcedar and grand fir are minor canopy components in some of the Douglas fir stands.

Red alder is also abundant, dominating or co-dominating most young logged-over stands, as well as portions of the bluff overlooking the saltwater. In the young logged stands, alder is sometimes mixed with Douglas fir. On the bluff, alder is co-dominant with bigleaf maple. Scattered Sitka spruce, western redcedar, grand fir, and western hemlock of various sizes are present in this hardwood stand. There is also a significant wet-site stand in the "Classic U" that is dominated by a mixture of redcedar, hemlock, alder, maple, and spruce.

Most mature stands are dominated by trees 18-36 inches in diameter, with occasional individuals 36-48 inches. Many mature stands have scattered residual old-growth Douglas fir that are 48 to 72 inches in diameter.

Because of the rapid growth rates of trees on the extensive productive sites, many mature stands have developed multiple canopy layering similar to that in classic "old-growth". All of them have at least the beginnings of this structure. Logs of many sizes and decay classes are numerous and snags are frequent throughout the mature conifer stands.

The old-growth stand occupying the campground and adjacent slope has a greater density of old-growth residuals than in most of the park, along with a mature cohort of Douglas fir and other species.

The natural-origin deciduous forest on the bluff is dominated by alder and maple mostly 10-24 inches in diameter, with a few maple that are larger. Scattered conifers are common in lower canopy layers and, occasionally, as large old trees emerging above the deciduous canopy. The canopy is somewhat irregular and has many openings because of soil disturbances. The young alder stands are simpler in structure with a single even canopy layer of trees 6-16 inches in diameter.

NON-FOREST VEGETATION

The entire park is forested except in small openings created by development.

ECOLOGICAL CONDITION

The mature conifer-dominated stands that cover most of the park are a result of natural regeneration after fire. Residual old-growth Douglas fir that survived the major fire in the last century have extensive charring on their bark. Most of the mature cohort is 130-140 years old. Occasionally, mature trees have a trace of charcoal on their bark, indicating limited surface fire since the time of the last big fire. One very large residual Douglas fir that was recently felled as a hazard

tree was established about 275 years ago and appears typical of the old-growth cohort in the park.

Other natural disturbances in the park include wind and geomorphic disturbance. Windthrow evidence is scattered throughout, indicating a pattern of small-scale wind disturbance that is typical of this region's forests. However, there is also limited, intense, recent blowdown associated with a north-south road corridor in the Classic U. This blowdown is mostly confined to a strip 50-100 feet wide in the mature stands bordering the east side of the clearing, with one spot somewhat wider.

Geomorphic disturbances, such as soil slumping, appear to be predominant on the steep west-facing slope above the water. The slope has a series of small terraces at various elevations and intervening steeper portions. Some of the steep slopes are mostly exposed. Much of the forest probably regenerated on exposed substrates after soil movements.

Portions of the Classic U have been logged in the past. Good-sized stands of young forest located in the northeast and southeast corners are a result of logging 60-90 years ago. Hygrading in a portion of the northwest corner of the Classic U left a small young hemlock stand, removed the largest Douglas fir and redcedar, and encouraged alder regeneration.

There has been sporadic selective logging in a few sections of mature stands in the Classic U, most notably about 10 years ago. Logging roads were constructed and forest cleared in a narrow strip along them in the Classic U, but now 10-15 year old alder densely covers the borders of the roads and makes most of them impassable to vehicles.

Most roads, trails, and developed areas are located west of the major paved road that passes north-south through the park. This includes a large campground, picnic areas, parking lots, and park offices. Two trails lead from the campground down to the water and a loop trail passes through mature Douglas fir forest to the south of the developed area. A loop trail also passes through a portion of the Classic U east of the main road.

The plant communities are present in poor, fair, and good ecological condition. The Douglas fir-western hemlock/swordfern community which covers most of the park is represented primarily by mature post-fire Douglas fir-hemlock forest with a few old-growth residuals. It has been lightly selectively logged in some places, but is still functioning relatively naturally.

The red alder/swordfern community, located on the bluff, consists of young to mature red alder-bigleaf maple forest with scattered conifers. The understory is a diverse assemblage of herbs and shrubs with swordfern and salmonberry generally important; wet spots on terraces are dominated by giant horsetail, Dewey's sedge, or skunk cabbage. Human disturbance is limited to trails and some trampling.

The western redcedar-western hemlock/skunk cabbage community, located in small wet spots east of the main road, is mature and dominated by a mixture of redcedar, hemlock, bigleaf maple, alder, and Sitka spruce. Portions of it have been hygraded, but others appear undisturbed by humans.

The Sitka spruce-western hemlock/deerfern community is a small natural-origin mature stand of Sitka spruce with some western redcedar. Western hemlock reproduction is abundant and deerfern dominates the understory. This community has not been described from the region.

A red alder/slough sedge wetland is located south of the park office adjacent to the highway. The alder appears to be quite young, but there is no obvious sign of logging.

LANDSCAPE SETTING

The natural forest within the park is internally fragmented by the paved road through the park and the old logging roads in the Classic U. The surrounding landscape is a mixture of low-density rural residential and managed young forest. Most of the immediate boundary of the park is young Douglas fir and alder forest. A very few houses border the park to the south. The southern portion of the east edge is bounded by a relatively recent clear-cut (within last 10 years). The natural forest is bordered to the west primarily by Admiralty Inlet. The overall quality of the landscape is adequate to support the natural forest as a significant fragment.

RATIONALE FOR NATURAL FOREST AREA BOUNDARIES

Most of the area qualifies as natural forest because of its mature forest cover that has been little disturbed by logging. The recommended Natural Forest Area includes all of the mature and natural-origin forest outside of existing developments, and a small stand of young hemlock that is located amidst mature forest. The proposed South Whidbey Natural Forest Area will include two Natural Heritage Plan plant community element occurrences.

The protected area is bounded by park boundaries, existing development, and in the northeast and southeast corners, young logged stands (Map 2).

MANAGEMENT RECOMMENDATIONS

We recommend future development be confined to one of the far corners of the Classic U. Two alternatives exist for future campground development. One would involve opening the old road to the southeast corner, where the development would occur, and permanently closing the rest of the roads. The second alternative, probably the best for future forest integrity, would involve constructing a new road along either the north or south boundary of the park to either the northeast or southeast corners where campground development could occur, and closing all the old roads in the Classic U. Both of these alternatives would help limit disturbance and fragmentation of the natural forest, the second alternative more fully.

A passive management strategy for the old roads would involve letting the alders that are there continue to grow and blocking access to the roads. A more active strategy would involve restoration of soils on the road surface, removal of the alder, and planting Douglas fir and hemlock, in order to more closely simulate the surrounding forest.

SURVEY EFFORT

The entire park, including the Classic U, was surveyed during one day.

Prepared by: Christopher Chappell, 12/15/92.

WASHINGTON STATE PARKS NATURAL FOREST INVENTORY

Sucia Island

SIZE: 562 acres

LOCATION:

Sucia Island State Park is located approximately 4 miles north of Eastsound, San Juan County. It includes all of Sucia, Little Sucia, and Ewing Islands. Portions of Sections 23, 24, 25, and 26, in Township 38 North, Range 2 West, and small portions of the SW1/4 of Section 19 and the SW1/4 of Section 30, in Township 38 North, Range 1 West.

1991 NATURAL HERITAGE PLAN ELEMENTS:

Priority	Element[1] Number	Element Name	Relative[2] Extent
3	PT-T3	Douglas fir/salal-oceanspray community	M
1	PT-T4	Douglas fir/snowberry-oceanspray community	m
1	PT-T8	Douglas fir-Pacific madrone/American vetch community	M
1	PT-T10	western redcedar-grand fir/swordfern community	m
1	PT-T18	red fescue grassland	m

OTHER NATURAL COMMUNITIES:

	Douglas fir-western redcedar/salal community	M
	Douglas fir-western redcedar/Oregongrape community	m
	strand community	m
	lowland freshwater wetland	m

[1] PT-T3 = Puget Trough Province Terrestrial Community 3

[2] M = major, m = minor

FOREST STAND AGE

Most of the park is covered with forest that does not clearly fit into only one of the age classes because of: (1) fine-scale mosaics of very small patches differing in age class and (2) stands that are co-dominated by two different age classes. About half of these mixed-age forests are young and mature, and half are mature and old-growth. There are also small patches of clearly defined young or mature stands.

CANOPY DOMINANCE AND STRUCTURE

Douglas fir dominates or co-dominates the canopy over most of the site. Grand fir and western redcedar are common canopy associates, often co-dominating with Douglas fir or with each other. Their dominance increases on moist sites (basins and north-facing slopes) and in regenerative canopy layers. Bigleaf maple and red alder are common associates on moist sites where swordfern is important and occasionally co-dominate where logging has occurred. Western hemlock is found only in the low wet central valley where it occasionally co-dominates with redcedar or other species.

Pacific madrone commonly co-dominates on the driest south-facing slopes. Lodgepole pine is common on some drier sites, but never dominates. Rocky Mountain juniper is scattered as clumps and individuals along coastal bluffs.

Mature dominant conifers are generally between 12 and 36 inches in diameter, with some grand fir and redcedar on the moist sites exceeding this size. Old-growth Douglas fir are 24-72 inches in diameter, being smaller on dry sites and larger on moist sites. Young co-dominant trees are generally 6-18 inches in diameter. Pacific madrone is mostly 6 to 12 inches in diameter, with occasional larger individuals.

The natural-origin mature/old-growth forests have multiple canopy layers. Douglas fir and/or redcedar occupy the uppermost layers and a variable mixture of Douglas fir, madrone, grand fir, or redcedar occupy the middle and lower layers. Some stands are distinctly two-layered, whereas others have a fully-developed multi-layered canopy. Residual logs and snags are moderately common in these natural stands. On the drier sites where Douglas fir and/or madrone dominate, the canopy is usually quite open.

The extensive logged young/mature stands vary in the degree of canopy layering from dense single-layer canopies to partially-developed multi-layering. Snags and logs are less common than in the natural stands, but are still often a significant component.

NON-FOREST VEGETATION

Red fescue grassland is present on the south-facing slope and tip of Johnson Point, and possibly Ev Henry Point. A formerly similar grassland at Ewing Cove is now dominated primarily by Nootka rose with exotic grasses and aspen. The west end of Little Sucia Island is also currently shrub-dominated and may be of similar origin.

A good-sized salt marsh is located next to the maintenance shop at Mud Bay. Freshwater wetlands dominated primarily by graminoids are located at Ewing Cove (small) and the southern end of Shallow Bay (larger and possibly a fen).

Small strand (beach) communities dominated by dune wildrye, Japanese beach pea, and other strand specialists are located on Little Sucia Island, Mud Bay, Snoring Bay, and Shallow Bay. Small, heavily-impacted openings adjacent to the dock and the maintenance shop are dominated by exotic grasses and weeds.

ECOLOGICAL CONDITION

About half of the forest in the park is natural in origin, probably regenerating after fires. Old-growth trees have charred bark, whereas mature trees generally do not. A fire (or fires) 120-150 years ago of variable severity killed a few to all of the trees in any one stand, thus allowing the mature cohort to regenerate and resulting in the fine-scale mosaic of mature, old-growth, and multi-cohort patches that is now present.

More recent fires burned in much of the logged-over areas and created a few small natural-origin young stands (aged 50-80 years). These most recent fires may have lightly under-burned some areas of old-growth. Windthrow appears to be of minor importance as a disturbance, only killing scattered trees.

Logging is a major disturbance that has significantly altered forest communities on about half the island. According to park records, commercial logging occurred from the late 1800's until 1955. Most of the logging appears to have concentrated on removing the large Douglas fir and western redcedar, and often left younger cohorts intact.

On sites where logging was not followed by fire (probably more than half the logged area), the forest is now a mixture of mature trees that were released by the logging (mostly western redcedar and grand fir) and young trees that regenerated in the newly-opened growing space. On sites where logging was followed by fire (generally small patches), the forest is now entirely young (50-90 years) and usually dominated by Douglas fir. Release and initiation dates on tree cores indicate a

concentration of logging activity 50-60 years ago.

Other types of human disturbance have been extensive, but concentrated in the main body of the island. A number of former logging roads are now used as trails and service roads. Moderately to heavily used trails lead out from the central roads to many of the island's extremities (Ewing Cove, Johnson Point, Ev Henry Point, Lawson Bluff).

The island has two docks at Fossil Bay and moorage buoys at several other locations. Many campsites are concentrated around Fossil Bay, Echo Bay and Shallow Bay, generally on low ground near shorelines. Foot traffic is heavy in the vicinity of the docks and campgrounds at Fossil Bay. There are also small campgrounds at Ewing Cove and Snoring Bay.

The salt marsh was formerly used as pasture for cattle and sheep according to historical records. Grazing may have occurred in the native grasslands also.

The plant communities represented are in good or good to excellent ecological condition, and cover about half the area of the park. Most of the plant communities are also present in poor or fair condition due to logging. Understories are undisturbed by browsing because of the absence of deer.

The Douglas fir/salal-oceanspray community is an extensive modal type usually represented by multi-cohort (mature and old-growth) Douglas fir with few or no other trees.

The Douglas fir-western redcedar/salal community that is quite extensive on mesic sites on north-facing or gentle south-facing slopes is mature and/or old-growth in age and dominated by Douglas fir, with western redcedar and grand fir often co-dominant in the main canopy. The Douglas fir-western redcedar/Oregongrape community is found as mature natural-origin forest only on the ridge south of Shallow Bay. Western redcedar dominates the lower canopy in both the former communities.

The Douglas fir/snowberry-oceanspray community is present in a natural state only on Little Sucia Island in a multi-cohort Douglas fir stand with a little grand fir. This community is also present on the low isthmus that separates Shallow Bay from Echo Bay as a young stand of Douglas fir that apparently originated after logging and burning. The lack of browsing in this community results in a much taller, more dense shrub layer than usual.

The Douglas fir-Pacific madrone/American vetch community is represented by stands dominated by mature Douglas fir and madrone with old-growth Douglas fir residuals common, which

occupy dry, south-facing, exposed slopes. The understory in these stands is generally dominated by salal, or a mixture of hairy honeysuckle, western fescue, and occasionally American vetch. Snowberry and oceanspray are sometimes important.

The western redcedar-grand fir/swordfern community which occupies moist sites, generally valley bottoms or small depressions, is present in a natural state only in small patches on the northern arm, where it is dominated by mature and old-growth redcedar and grand fir with a few old Douglas fir. This community is more extensive in the central valley, where it has been selectively logged and consists of a mixture of young and mature redcedar, grand fir, bigleaf maple, and occasional hemlock.

The red fescue grassland on Johnson Point is in good condition, with high percent cover of fescue and few shrubs, especially in the relatively level meadow at the very tip. The grasslands on the steep, south-facing slopes bordering Johnson Point have less cover of fescue and relatively greater cover of exotics but are still fair in condition. A trail through the grassland has created some human impact off trail. The former grassland at Ewing Cove now has little to no fescue, many exotics, and is dominated by shrubs.

The strand communities have experienced some trampling damage in places due to the frequent location of picnic tables and campsites in or near them.

LANDSCAPE SETTING

The island is quite large and mostly forested. Its narrow shape limits its interior forest area. It is relatively isolated from other forests because of its location two miles from Orcas Island and seven miles from the mainland in the Strait of Georgia. Its combination of size and relative isolation mean that it is able to support many, but not all species, and that some species may be unable to migrate to it. Smaller forested islands (Patos and Matia) are located about one mile from Sucia.

RATIONALE FOR NATURAL FOREST AREA BOUNDARIES

A little less than half of the park clearly qualifies as Natural Forest Area because of its mature and old-growth forest. This includes most of the north arm, the entire Johnson Point peninsula and a portion of its contiguous ridgeline, the ridge south and west of the central valley, Ev Henry Point peninsula, Little Sucia Island, and Ewing Island.

The proposed Ewing Cove Natural Forest Area includes the largest contiguous area of natural mature and old-growth forest

in the park. This is the highest quality natural area in the park. The boundary follows the shoreline except at the western end, where it runs north-south across the peninsula at its narrowest point (Map 2). Some stands disturbed by logging are important to include as buffer for and connector between natural stands. Ewing Island and the Cluster Islands, although not visited on foot, appear to be small adjacent natural areas that should be included in the Ewing Cove Natural Forest Area. Three Natural Heritage Plan element occurrences and two other natural communities will be protected in this area.

The proposed Johnson Point Natural Forest Area consists almost entirely of mixed-age mature/old-growth forest that has been little altered by humans. The red fescue grassland is a good quality example of a relatively rare and unprotected non-forest community. The area will protect three plant community element occurrences and two other natural communities. Most of the boundary consists of shoreline (Map 2). At the northwest end, the boundary follows the north side of a major service road for about 1/4 mile, then turns perpendicular to the road and runs to the northern shoreline.

The proposed Fox Cove Natural Forest Area is designed to protect the relatively extensive good to excellent condition Douglas fir-Pacific madrone/American vetch community that occupies the entire south aspect of the ridge south of the central valley on Sucia Island. The recommended boundary on the north side is the road through the central valley (Map 2). Much of the north aspect is covered with mature stands that have experienced significant selective logging disturbance. These are included to act as a buffer for the relatively narrow natural forest to the south.

The proposed Little Sucia Natural Forest Area will protect the only natural occurrence of the Douglas fir/snowberry-oceanspray community in the park and may assist in protection of the bald eagle nest site there. A relatively high-quality strand community is also included. All of Little Sucia Island is included (Map 2).

The proposed Ev Henry Point Natural Forest Area will protect a significant area of mixed-age mature and old-growth forest that has not experienced logging disturbance. The Douglas fir/salal-oceanspray community predominates. All of the Eve Henry Point peninsula east of the campgrounds is included (Map 2).

MANAGEMENT RECOMMENDATIONS

The spread of exotic grasses and native shrubs (primarily Nootka rose) into the red fescue grasslands is a serious problem. It is already too late for Ewing Cove in this regard.

Proactive management may be necessary to prevent the same fate at Johnson Point. The high quality meadow at the tip of Johnson Point now has little velvetgrass or rose, but these should be controlled as soon as possible.

If the rose could be removed manually, this would be an excellent beneficial management option (and a great volunteer project). Prescribed fire is another option, but could be problematic because of the presence of velvetgrass. Burning should probably not be attempted in the grasslands until prescriptions are devised, through experimental burns here or elsewhere in the region, that will limit the spread of velvetgrass while maintaining the red fescue and other natives like Puget Sound gumweed.

An effort is needed to prevent trail proliferation and trampling damage in the Johnson Point grassland. People should be discouraged from using the informal footpath that runs through the Douglas fir-madrone community within the proposed Fox Cove Natural Forest Area.

We recommend that the small campground at Snoring Bay, within the Johnson Point Natural Forest Area, be closed in order to protect the strand community. The picnic table located in the isthmus of strand should be removed. Closure of the campground will also help reduce the recreational pressure on the grasslands at Johnson Point and reduce conflict with Natural Forest Area objectives.

Echo Bay, Shallow Bay, and Fossil Bay are good locations for campgrounds and intense human use. The campground at Ewing Cove, however, is located within the proposed Ewing Cove Natural Forest Area, the most significant natural area in the Park. Because of this, we recommend that this campground not be expanded and that the forest around it be treated as natural forest, i.e. no hazard tree removal or salvage unless absolutely necessary.

Interpretive signs should be installed (1) at Ewing Cove to explain the Natural Forest Area, its forest communities, and the marine animals that use the adjacent rocky Cluster Islands and require some degree of privacy (nesting black oystercatchers, harbor seals); and (2) at the tip of Johnson Point explaining the red fescue grassland and encouraging people to respect it.

Exclusion of people from Little Sucia Island is recommended to protect the nesting bald eagles on this small island. Some control of human use on the Cluster Islands is recommended to minimize disturbance to the wildlife there.

Further trail construction should not occur in the proposed Natural Forest Areas in order to protect the plant communities.

The reintroduction of fire as a natural process tool to maintain natural ecosystem process and mixed-age stand structures is a future possibility. The madrone may not maintain itself in the long-term without fire. Controlled surface fires are recommended here, at least once every 100 years.

SURVEY EFFORT

Almost all of Sucia and Little Sucia Islands was surveyed over the course of two days. Ev Henry Point was not visited on foot. Previous inventory by Reid Schuller, WNHP, during 1984 and the plant community study of Fonda and Bernardi (1976) reduced the survey time needed this year.

Prepared by: Christopher Chappell, 12/14/92.

WASHINGTON STATE PARKS NATURAL FOREST INVENTORY

Twin Falls

SIZE: approximately 320 acres

LOCATION:

Twin Falls State Park is located approximately 5 miles southeast of North Bend, along the South Fork Snoqualmie River, King County. Portions of Section 30, in Township 23 North, Range 9 East.

1991 NATURAL HERITAGE PLAN ELEMENTS:

Priority	Element[1] Number	Element Name	Relative[2] Extent
*	WC-T14	western hemlock/swordfern community	m
*	WC-T21	red alder forest	m

OTHER NATURAL COMMUNITIES:

	bigleaf maple forest	m

[1] WC-T14 = Western Cascades Province Terrestrial Community 14

[2] m = minor

FOREST STAND AGE

Most of the forest is young in age. There is one medium-sized stand of the mature age class and one very small stand of old-growth. A very few old-growth trees are scattered within some of the young stands.

CANOPY DOMINANCE AND STRUCTURE

Douglas fir, red alder, and bigleaf maple are the major canopy dominants. Some stands are dominated primarily by Douglas fir, and others are dominated by alder and/or maple. Western hemlock is abundant, especially in lower canopy layers, and often co-dominates with Douglas fir in a secondary main canopy layer below the taller Douglas fir layer. One stand in the southeast corner is dominated by western hemlock.

Western redcedar is also widespread in secondary canopy layers and occasionally appears in the upper canopy. It is less common than hemlock in the Douglas fir stands and more common than hemlock in the deciduous stands. Bigleaf maple, a common secondary canopy species in the Douglas fir stands, is dominant

in some stands. Sitka spruce occurs as scattered small to large individuals along the river and in low bottoms. A narrow strip of red alder is found along much of the river bank.

For a stand its age, the mature stand of Douglas fir has good development of a multi-layered canopy, some logs, and not many snags. The mature trees are mostly 12-36 inches in diameter with a few individuals up to 48 inches. A mature stand of maple trees 6 to 48 inches in diameter forms an upper layer of maple with some smaller cedar, spruce, and hemlock occasionally penetrating the main canopy.

The old-growth Douglas fir stand is a mixture of old and mature Douglas fir with younger hemlock and maple. Very large logs are numerous on the forest floor and a few snags are present in the multi-layered canopy. This stand includes Douglas fir up to 72 inches in diameter.

Young stands of alder and maple are dominated by trees 6-20 inches in diameter, with variable cover of conifers in the lower canopy. Coarse woody debris is not very common in either the natural or logged deciduous stands; alder snags and logs, which are not very large and decay quickly, are the major components. The scattered old spruce and Douglas fir in the natural-origin alder-maple stand are up to 10 feet in diameter.

Young stands of Douglas fir vary in age and size. Stands that are 80-85 years old on level sites near the river have many trees 12-24 inches in diameter (a few greater) and are beginning to develop late-successional stand structures. Younger stands or stands on poorer sites have smaller trees, more uniform canopies and less coarse woody debris.

NON-FOREST VEGETATION

The entire site is forested except for the gravel bars of the river and small openings adjacent to the interstate associated with human disturbance.

ECOLOGICAL CONDITION

Forests of natural origin occupy about 20% of the park, and are confined to the area between the interstate and the river south of the parking area. The mature stand of Douglas fir is 135-140 years old and probably originated from stand-replacement fire. A trace of charcoal at the base of some of the mature trees indicates at least one surface fire since stand establishment.

The old-growth stand also experienced a fire about the same

time the mature stand initiated. This is indicated by the

mature cohort of Douglas fir present with many old Douglas fir that survived the fire.

Origin of the natural alder and maple stands is less clear. Traces of charcoal are present on a few conifer stumps in these stands, but widespread evidence of fire is absent. A few scattered conifer stumps reflect logging of isolated trees similar to the large conifers remaining in the stands. Some or all of these largely unlogged deciduous stands could have originated after geomorphological disturbance such as a landslide or slump.

One small patch of about 20-year-old alder obviously originated after the deposition of fresh gravel in a narrow swath from the interstate down to the river. This gravel appears similar to fill used to stabilize highways, indicating a possible human origin for the disturbance.

Most of the area is covered with stands that probably regenerated naturally after intense logging activity that was often followed by burning. The maximum age of these logged forests is 85 years, but much of the forest is considerably younger. The 80-year-old hemlock stand in the southeast corner appears to be an area where Douglas fir was logged without subsequent burning. Consequently, hemlock regenerated from seed and was released when present in the understory.

The combination of clear straight lines along ownership boundaries that delineate differing crown sizes on aerial photos and reconnaissance surveys in some of the areas presented strong evidence for human origin of the stands on the adjacent DNR land that will soon transfer to state parks.

A paved road leads into the northern edge of the park and dead-ends at a parking area with a trailhead and toilets. Two buildings are located near the road end along the river. A trail leads south from the road and then east, to roughly parallel the river. Near the eastern edge of the park, above the lower falls, the trail crosses the river on a new bridge and leads south, then east out of the park. The trail has several areas that are eroding where people have cut switchbacks.

A railroad grade runs along the southern boundary of the DNR transfer land. Interstate 90 passes through the park near its northeastern corners.

Although the natural-origin plant communities are in good ecological condition, their viability is limited by their size. Most of the area is in poor condition, because of logging.

The western hemlock/swordfern community is represented by

mature post-fire Douglas fir-western hemlock forest, and a very small stand of old-growth. It is represented by two different understory types: one with very high cover of swordfern and a variety of moist-site herbs, and the other co-dominated by low Oregongrape and swordfern on slightly drier sites. Vine maple is also important.

The natural-origin red alder forest is young (probably 60-80 years) and occasionally mixed with bigleaf maple or scattered large to very large spruce, redcedar, and Douglas fir. The understory is dominated by salmonberry, vine maple, swordfern, and youth-on-age. Skunk cabbage replaces swordfern in one very wet stand.

The natural-origin bigleaf maple forest has many smaller trees with a few very large ones that are likely over 100 years in age. Redcedar is important below the main canopy. Understory vegetation is dominated by vine maple, salmonberry, and swordfern.

LANDSCAPE SETTING

The park is set in a landscape dominated by managed young forest stands to the east and south, and low-density, partially forested, rural residential areas to the north and west. The natural forest is bounded by the interstate highway to the east, which certainly acts as a barrier to some organisms. The natural forest is relatively small and isolated from other natural forests.

RATIONALE FOR NATURAL FOREST AREA BOUNDARIES

A Natural Forest Area is not recommended at Twin Falls State Park. Most of the park has been logged. The fragment that is relatively natural is small, narrow, and adjacent to a major interstate highway. We recommend that the natural forest fragment be treated as a sensitive area (see Management Recommendations).

MANAGEMENT RECOMMENDATIONS

We recommend that the remaining natural forest within the park be treated as a sensitive area. This sensitive area covers most of the area east and north of the river. The sensitive area is identified as numbers 3, 4, 5, 6, and 7 on the map of existing vegetation (Map 1). Future development should avoid the sensitive area.

Cutting of switchbacks along the trail has caused considerable erosion and loss of vegetative cover. Recent improvements to the trail include very small signs urging people to stay on the trail at the switchbacks and, in a few places, wooden railings.

The railings appear to be effective. The signs appear to be ineffective. There needs to be some kind of physical barrier, like the railing, to deter this behavior.

Measures should be taken to prevent future episodes of earth slumping or movement associated with the interstate highway. One such episode apparently occurred relatively recently within the natural forest.

Japanese knotweed is a large invasive exotic that is established along river bars and should be controlled.

SURVEY EFFORT

The area east and north of the river, as well as the southeast corner of the park (i.e. south of the river) was surveyed on the ground during a one day period. Using aerial photography and the ground survey, it was determined that the remainder of the park was young forest, most, if not all, of which originated after logging.

Prepared by: Christopher Chappell, 1/8/93.

APPENDIX A. Partial list of vascular plant species of Beacon Rock State Park.

Trees	
bigleaf maple	Acer macrophyllum
bittercherry	Prunus emarginata var. mollis
black cottonwood	Populus trichocarpa
cascara	Rhamnus purshiana
Douglas fir	Pseudotsuga menziesii
grand fir	Abies grandis
noble fir	Abies procera
Oregon ash	Fraxinus latifolius
Oregon white oak	Quercus garryana
Pacific dogwood	Cornus nuttallii
ponderosa pine	Pinus ponderosa (planted?)
red alder	Alnus rubra
Scouler's willow	Salix scouleriana
western hemlock	Tsuga heterophylla
western redcedar	Thuja plicata
Shrubs and Vines	
Alaska huckleberry	Vaccinium alaskaense
baldhip rose	Rosa gymnocarpa
big huckleberry	Vaccinium membranaceum
black hawthorn	Crataegus douglasii
blackcap	Rubus leucodermis
blue elderberry	Sambucus cerulea
Cascade mountain-ash	Sorbus scopulina
coast red elderberry	Sambucus racemosa var. arborescens
common snowberry	Symphoricarpos albus
creeping snowberry	Symphoricarpos mollis
devil's club	Oplopanax horridum
Douglas maple	Acer glabrum var. douglasii
English holly	Ilex aquifolium*
Indian plum	Oemleria cerasiformis
kinnnikinnick	Arctostaphylos uva-ursi
low Oregongrape	Berberis nervosa
mockorange	Philadelphus lewisii
Nootka rose	Rosa nutkana
northern buckwheat	Eriogonum compositum var. compositum
oceanspray	Holodiscus discolor
orange honeysuckle	Lonicera ciliosa
oval-leaved viburnum	Viburnum elipticum
Pacific ninebark	Physocarpus capitatus
poison-oak	Rhus diversiloba
red huckleberry	Vaccinium parvifolium
red-flowering currant	Ribes sanguineum
redstem ceanothus	Ceanothus sanguineus
salal	Gaultheria shallon
salmonberry	Rubus spectabilis

serviceberry	Amelanchier alnifolia
shiny-leaf spirea	Spirea betulifolia var. lucida
stink currant	Ribes bracteosum
tall Oregongrape	Berberis aquifolium
thimbleberry	Rubus parviflorus
trailing blackberry	Rubus ursinus
vine maple	Acer circinatum
western crabapple	Pyrus fusca
western hazel	Corylus cornuta

Forbs and Ferns

American vetch	Vicia americana
annual fleabane	Erigeron annuus
arrowleaf groundsel	Senecio triangularis
baneberry	Actaea rubra
beargrass	Xerophyllum tenax
bigleaf sandwort	Arenaria macrophylla
bluebells of Scotland	Campanula rotundifolia
Bolander's groundsel	Senecio bolanderi var. harfordii
bracken	Pteridium aquilinum
broad-leaved stonecrop	Sedum spathulifolium
broadleaf strawberry	Fragaria virginiana var. platypetala
bunchberry	Cornus canadensis
camas	Camassia sp.
Canadian goldenrod	Solidago canadensis var. salebrosa
celery-leaved lovage	Ligusticum apiifolium
chocolate lily	Fritillaria lanceolata
clasping-leaved twisted-stalk	Streptopus amplexifolius
Columbia lily	Lilium columbianum
Columbia windflower	Anemone deltoidea
common dandelion	Taraxacum officinale*
common yarrow	Achillea millefolium
compact selaginella	Selaginella densa var. scopulorum
Cooley's hedge-nettle	Stachys cooleyae
coralroot	Corallorhiza sp.
cow-parsnip	Heracleum lanatum
crisped starwort	Stellaria crispa
deer-fern	Blechnum spicant
early blue violet	Viola adunca var. adunca
enchanter's nightshade	Circaea alpina
evergreen violet	Viola sempervirens
false lily-of-the-valley	Maianthemum dilatatum
field chickweed	Cerastium arvense
fine-toothed penstemon	Penstemon subserratus
fireweed	Epilobium angustifolium
fragrant bedstraw	Galium triflorum

fringecup	Tellima grandiflora
giant horsetail	Equisetum telmateia
goatsbeard	Aruncus sylvester
gorge daisy (sensitive)	Erigeron oreganus
grass pink	Dianthus armeria*
great oxalis	Oxalis trillifolia
hairy cat's-ear	Hypochaeris radicata*
Hall's goldenweed (monitor)	Happlopappus hallii
harsh paintbrush	Castilleja hispida
Hooker's fairybells	Disporum hookeri
Indian pipe	Monotropa uniflora
inside-out flower	Vancouveria hexandra
Klamath weed	Hypericum perforatum*
kneeling angelica	Angelica genuflexa
knotweed	Polygonum sp.
lady-fern	Athyrium filix-femina
licorice fern	Polypodium glycyrrhiza
little prince's pine	Chimaphila menziesii
littleleaf montia	Montia parvifolia
Lyall's angelica	Angelica arguta
maidenhair spleenwort	Asplenium trichomanes
meadow death-camas	Zigadenus venenosus var. venenosus
mitrewort	Mitella sp.
mountain arnica	Arnica latifolia
mountain sweet-cicely	Osmorhiza chilensis
mountain thistle	Cirsium callilepis var. oregonense
nine-leaf lomatium	Lomatium triternatum var. triternatum
nodding onion	Allium cernuum
northern maidenhair fern	Adiantum pedatum
Nuttall's peavine	Lathyrus nevadensis
Oregon bedstraw	Galium oreganum
Oregon bolandra (sensitive)	Bolandra oregana
Oregon oxalis	Oxalis oregana
Oregon stonecrop	Sedum oreganum
Pacific bleedingheart	Dicentra formosa
parsley-fern	Cryptogramma crispa
pathfinder	Adenocaulon bicolor
pearly-everlasting	Anaphalis margaritacea
pioneer violet	Viola glabella
queen's cup beadlily	Clintonia uniflora
rattlesnake-plantain	Goodyera oblongifolia
red columbine	Aquilegia formosa
Rocky Mountain woodsia	Woodsia scopulina
Scouler's harebell	Campanula scouleri
self-heal	Prunella vulgaris
Siberian montia	Montia siberica
sickletop lousewort	Pedicularis racemosa
skunk cabbage	Lysichitum americanum
slender-stem waterleaf	Hydrophyllum tenuipes

small-flowered willow-herb	Epilobium minutum
smallflower alumroot	Heuchera micrantha
Smith's fairybells	Disporum smithii
spreading dogbane	Apocynum androsaemifolium
spreading phlox	Phlox diffusa
spreading wood-fern	Dryopteris expansa
starry Solomon's seal	Smilacina stellata
sticky cinquefoil	Potentilla glandulosa
sweet coltsfoot	Petasites frigidus var. palmatus
sword-fern	Polystichum munitum
tall bugbane (sensitive)	Cimicifuga elata
three-leaved foamflower	Tiarella trifoliata var. trifoliata
vanillaleaf	Achlys triphylla
varied-leaf collomia	Collomia heterophylla
varileaf phacelia	Phacelia heterophylla
Virginia grape-fern (monitor)	Botrychium virginianum
wall lettuce	Lactuca muralis*
Wallace's selaginella	Selaginella wallacei
water-parsley	Oenanthe sarmentosa
Watson's willow-herb	Epilobium watsonii
western meadowrue	Thalictrum occidentale
western polypody	Polypodium hesperium
western Solomon's seal	Smilacina racemosa
western starflower	Trientalis latifolia
western trillium	Trillium ovatum
white vein pyrola	Pyrola picta
white-flowered hawkweed	Hieracium albiflorum
wild ginger	Asarum caudatum
woodland beard-tongue	Nothochelone nemorosa
woods strawberry	Fragaria vesca var. bracteata
woolly-sunflower	Eriophyllum lanatum var. lanatum
woolly-weed	Hieracium scouleri
youth-on-age	Tolmiea menziesii

Graminoids

Alaska oniongrass	Melica subulata
bearded fescue	Festuca subulata
bentgrass	Agrostis sp.
blue wildrye	Elymus glaucus
bluegrass	Poa sp.
California brome	Bromus carinatus
cheat grass	Bromus tectorum*
Columbia brome	Bromus vulgaris
Dewey's sedge	Carex deweyana
foxtail fescue	Festuca megalura
Howell's reedgrass (monitor)	Calamagrostis howellii
little hairgrass	Aira praecox*
nodding trisetum	Trisetum cernuum

prairie Junegrass	Koeleria cristata
red fescue	Festuca rubra
sedge	Carex sp.
silver hairgrass	Aira caryophylla*
small-flowered woodrush	Luzula parviflora
western fescue	Festuca occidentalis

* = exotic species that has become established in forests, grasslands, or wetlands, i.e., has spread beyond trails, road edges, or developed areas.

SOURCE: Field inventory by C. Chappell, 18-21 August 1992.

APPENDIX B. Partial list of wildlife species of Beacon Rock State Park.

C = common at time of visit; B = probable or confirmed breeder.

Birds

turkey vulture	
osprey	
sharp-shinned hawk	
red-tailed hawk	B
ruffed grouse	CB
rufous hummingbird	B
belted kingfisher	
downy woodpecker	B
hairy woodpecker	B
northern flicker	CB
pileated woodpecker	B
Pacific-slope flycatcher	B
violet-green swallow	B
barn swallow	
Steller's jay	B
common raven	B
black-capped chickadee	
chestnut-backed chickadee	CB
bushtit	
red-breasted nuthatch	B
brown creeper	CB
winter wren	CB
American dipper	B
golden-crowned kinglet	CB
Townsend's solitaire	
Swainson's thrush	B
American robin	CB
cedar waxwing	B
solitary vireo	
Hutton's vireo	B
yellow-rumped warbler	C
black-throated gray warbler	B
Townsend's warbler	
hermit warbler	B
MacGillivray's warbler	B
western tanager	B
rufous-sided towhee	B
song sparrow	CB
white-crowned sparrow	B
dark-eyed junco	B
purple finch	B
pine siskin	
evening grosbeak	

Other Vertebrates

garter snake
black-tailed deer
pika
Douglas squirrel
Townsend's chipmunk
black bear

SOURCE: Field inventory by C. Chappell, 18-21 August 1992.

APPENDIX A. Partial list of vascular plant species of Bowman Hill, Deception Pass State Park.

Trees	
bigleaf maple	Acer macrophyllum
bittercherry	Prunus emarginata var. mollis
Douglas fir	Pseudotsuga menziesii
grand fir	Abies grandis
lodgepole pine	Pinus contorta
Pacific madrone	Arbutus menziesii
red alder	Alnus rubra
Scouler's willow	Salix scouleriana
Sitka spruce	Picea sitchensis
western hemlock	Tsuga heterophylla
western redcedar	Thuja plicata
Shrubs and Vines	
baldhip rose	Rosa gymnocarpa
blackcap	Rubus leucodermis
coast black gooseberry	Ribes divaricatum
coast red elderberry	Sambucus racemosa var. arborescens
common snowberry	Symphoricarpos albus
Douglas maple	Acer glabrum var. douglasii
English holly	Ilex aquifolium*
English ivy	Hedera helix*
hairy honeysuckle	Lonicera hispidula
Indian plum	Oemleria cerasiformis
kinnikinnick	Arctostaphylos uva-ursi
low Oregongrape	Berberis nervosa
Nootka rose	Rosa nutkana
oceanspray	Holodiscus discolor
orange honeysuckle	Lonicera ciliosa
red huckleberry	Vaccinium parvifolium
salal	Gaultheria shallon
salmonberry	Rubus spectabilis
Scot's broom	Cytisus scoparius*
serviceberry	Amelanchier alnifolia
swamp gooseberry	Ribes lacustre
tall Oregongrape	Berberis aquifolium
thimbleberry	Rubus parviflorus
trailing blackberry	Rubus ursinus
Forbs and Ferns	
American vetch	Vicia americana
blue-eyed mary	Collinsia parviflora
bracken	Pteridium aquilinum
broad-leaved stonecrop	Sedum spathulifolium
bull thistle	Cirsium vulgare*
catchweed bedstraw	Galium aparine
common camas	Camassia quamash
common yarrow	Achillea millefolium

Cooley's hedge-nettle	Stachys cooleyae
creeping buttercup	Ranunculus repens*
crisped starwort	Stellaria crispa
enchanter's nightshade	Circaea alpina
field chickweed	Cerastium arvense
fragrant bedstraw	Galium triflorum
fringecup	Tellima grandiflora
giant fawn-lily	Erythronium oreganum
gold-back fern	Pityrogramma triangularis
hairy cats-ear	Hypochaeris radicata*
harsh paintbrush	Castilleja hispida
Hooker's onion	Allium acuminatum
horsetail	Equisetum sp.
Indian thistle	Cirsium edule
lady-fern	Athyrium filix-femina
licorice fern	Polypodium glycyrrhiza
little buttercup	Ranunculus uncinatus
littleleaf montia	Montia parvifolia
Menzies' larkspur	Delphinium menziesii
miner's lettuce	Montia perfoliata
mountain holly-fern	Polystichum lonchitis
mountain sweet-cicely	Osmorhiza chilensis
nodding onion	Allium cernuum
Nuttall's peavine	Lathyrus nevadensis
rattlesnake-plantain	Goodyera oblongifolia
rosy plectritis	Plectritis congesta
self-heal	Prunella vulgaris
sheep sorrel	Rumex acetosella*
Siberian montia	Montia siberica
small-flowered deervetch	Lotus micranthus
small-flowered willow-herb	Epilobium minutum
smallflower alumroot	Heuchera micrantha var. diversifolia
spotted coralroot	Corallorhiza maculata
spreading wood-fern	Dryopteris expansa
stinging nettle	Urtica dioica
sword-fern	Polystichum munitum
three-leaved foamflower	Tiarella trifoliata var. trifoliata
twinflower	Linnea borealis
wall lettuce	Lactuca muralis*
Wallace's selaginella	Selaginella wallacei
western starflower	Trientalis latifolia
western twayblade	Listera caurina
white-flowered hawkweed	Hieracium albiflorum
woods strawberry	Fragaria vesca
yerba buena	Satureja douglasii

<u>Graminoids</u>

barren fescue	Festuca bromoides*
blue wildrye	Elymus glaucus
California oatgrass	Danthonia californica

Coast Range fescue	Festuca subuliflora
Columbia brome	Bromus vulgaris
Dewey's sedge	Carex deweyana
field woodrush	Luzula campestris
Idaho fescue	Festuca idahoensis
Kentucky bluegrass	Poa pratensis*
little hairgrass	Aira praecox*
nodding trisetum	Trisetum cernuum
prairie Junegrass	Koeleria cristata
silver hairgrass	Aira caryophylla*
slough sedge	Carex obnupta
small-flowered woodrush	Luzula parviflora
soft brome	Bromus mollis*
western fescue	Festuca occidentalis

* = exotic species that has become established in forests, grasslands or wetlands, i.e. has spread beyond trails, road edges, or developed areas.

SOURCE: Field inventory by C. Chappell, 20 May 1992.

APPENDIX B. Partial list of wildlife species of Bowman Hill, Deception Pass State Park.

C = common at time of visit; B = probable or confirmed breeder.

Birds	
osprey	B
red-tailed hawk	B
rufous hummingbird	CB
hairy woodpecker	B
pileated woodpecker	B
northern flicker	B
western wood-pewee	B
Pacific-slope flycatcher	CB
violet-green swallow	
barn swallow	
Steller's jay	B
chestnut-backed chickadee	CB
red-breasted nuthatch	CB
brown creeper	B
winter wren	CB
golden-crowned kinglet	CB
Swainson's thrush	CB
American robin	CB
varied thrush	B
orange-crowned warbler	B
black-throated gray warbler	B
Townsend's warbler	CB
Wilson's warbler	CB
rufous-sided towhee	B
song sparrow	CB
white-crowned sparrow	B
dark-eyed junco	CB
brown-headed cowbird	B
purple finch	B
pine siskin	CB
American goldfinch	CB

Other Vertebrates
Douglas squirrel

SOURCE: Field inventory by C. Chappell, 20 May 1992.

APPENDIX A. Partial list of vascular plant species of Goose Rock site, Deception Pass State Park.

Trees	
bigleaf maple	Acer macrophyllum
bittercherry	Prunus emarginata var. mollis
Douglas fir	Pseudotsuga menziesii
grand fir	Abies grandis
lodgepole pine	Pinus contorta
Pacific madrone	Arbutus menziesii
Pacific yew	Taxus brevifolia
red alder	Alnus rubra
Rocky Mountain juniper	Juniperus scopulorum
Scouler's willow	Salix scouleriana
Sitka spruce	Picea sitchensis
western hemlock	Tsuga heterophylla
western redcedar	Thuja plicata
Shrubs and Vines	
baldhip rose	Rosa gymnocarpa
blackcap	Rubus leucodermis
coast black gooseberry	Ribes divaricatum
coast red elderberry	Sambucus racemosa var. arborescens
common snowberry	Symphoricarpos albus
English holly	Ilex aquifolium*
English ivy	Hedera helix*
evergreen huckleberry	Vaccinium ovatum
hairy honeysuckle	Lonicera hispidula
Indian plum	Oemleria cerasiformis
kinnikinnick	Arctostaphylos uva-ursi
low Oregongrape	Berberis nervosa
Nootka rose	Rosa nutkana
oceanspray	Holodiscus discolor
orange honeysuckle	Lonicera ciliosa
Oregon boxwood	Pachistima myrsinites
red huckleberry	Vaccinium parvifolium
red-flowering currant	Ribes sanguineum
salal	Gaultheria shallon
salmonberry	Rubus spectabilis
serviceberry	Amelanchier alnifolia
swamp gooseberry	Ribes lacustre
tall Oregongrape	Berberis aquifolium
thimbleberry	Rubus parviflorus
trailing blackberry	Rubus ursinus
Forbs and Ferns	
big-leaved sandwort	Arenaria macrophylla
bluebells of Scotland	Campanula rotundifolia
bracken	Pteridium aquilinum
broad-leaved stonecrop	Sedum spathulifolium

broadpetal strawberry	Fragaria virginiana var. platypetala
California broomrape	Orobanche californica var. californica
catchweed bedstraw	Galium aparine
chocolate lily	Fritillaria lanceolata
common camas	Camassia quamash
common dandelion	Taraxacum officinale*
common paintbrush	Castilleja miniata
common yarrow	Achillea millefolium
Cooley's hedge-nettle	Stachys cooleyae
creeping buttercup	Ranunculus repens*
crisped starwort	Stellaria crispa
cut-leaved microseris	Microseris laciniata
dovefoot geranium	Geranium molle*
elegant rein-orchid	Habenaria elegans
enchanter's nightshade	Circaea alpina
false lily-of-the-valley	Maianthemum dilatatum
field chickweed	Cerastium arvense
fine-leaved lomatium	Lomatium utriculatum
fireweed	Epilobium angustifolium
fragrant bedstraw	Galium triflorum
fringecup	Tellima grandiflora
giant fawn-lily	Erythronium oreganum
Greene's rein-orchid	Habenaria greenei
hairy cats-ear	Hypochaeris radicata*
harsh paintbrush	Castilleja hispida
harvest brodiaea	Brodiaea coronaria
hooded ladies-tresses	Spiranthes romanzoffiana var. romanzoffiana
Hooker's onion	Allium acuminatum
Indian pipe	Monotropa uniflora
Indian thistle	Cirsium edule
knotweed	Polygonum sp.
lady-fern	Athyrium filix-femina
large-leaved avens	Geum macrophyllum
licorice fern	Polypodium glycyrrhiza
little buttercup	Ranunculus uncinatus
littleleaf montia	Montia parvifolia
meadow death-camas	Zigadenus venenosus var. venenosus
Menzies' larkspur	Delphinium menziesii
miner's lettuce	Montia perfoliata
mountain holly-fern	Polystichum lonchitis
mountain sweet-cicely	Osmorhiza chilensis
nine-leaf lomatium	Lomatium triternatum
nodding onion	Allium cernuum
northern bedstraw	Galium boreale
pathfinder	Adenocaulon bicolor
pink microsteris	Microsteris gracilis
Puget Sound gumweed	Grindelia integrifolia var. macrophylla

rattlesnake weed	Daucus pusillus
rosy plectritis	Plectritis congesta
rosy pussytoes	Antennaria microphylla
self-heal	Prunella vulgaris
sheep sorrel	Rumex acetosella*
Siberian montia	Montia siberica
skunk cabbage	Lysichitum americanum
sleepy catchfly	Silene antirrhina*
smallflower alumroot	Heuchera micrantha var. diversifolia
small-flowered deervetch	Lotus micranthus
small-flowered willow-herb	Epilobium minutum
spotted coralroot	Corallorhiza maculata
spreading wood-fern	Dryopteris expansa
sticky chickweed	Cerastium viscosum*
stinging nettle	Urtica dioica
sword-fern	Polystichum munitum
three-leaved foamflower	Tiarella trifoliata var. trifoliata
towermustard	Arabis glabra
twinflower	Linnea borealis
vetch	Vicia sp.
wall lettuce	Lactuca muralis*
Wallace's selaginella	Selaginella wallacei
water lentil	Lemna minor
water-parsley	Oenanthe sarmentosa
western buttercup	Ranunculus occidentalis
western starflower	Trientalis latifolia
western twayblade	Listera caurina
white meconella (sensitive)	Meconella oregana
white-flowered hawkweed	Hieracium albiflorum
woods strawberry	Fragaria vesca
woolly-sunflower	Eriophyllum lanatum var. lanatum
yerba buena	Satureja douglasii

Graminoids

Alaska alkaligrass (sensitive, reported 1936)	Puccinellia nutkaensis
barren brome	Bromus sterilis*
barren fescue	Festuca bromoides*
bentgrass	Agrostis sp.
blue wildrye	Elymus glaucus
cheat grass	Bromus tectorum*
Coast Range fescue	Festuca subuliflora
Columbia brome	Bromus vulgaris
Dewey's sedge	Carex deweyana
field woodrush	Luzula campestris
foxtail fescue	Festuca megalura
Idaho fescue	Festuca idahoensis
Kentucky bluegrass	Poa pratensis*
little hairgrass	Aira praecox*

nodding fescue	Festuca subulata
nodding trisetum	Trisetum cernuum
oatgrass	Danthonia sp.
silver hairgrass	Aira caryophylla*
slough sedge	Carex obnupta
small-flowered woodrush	Luzula parviflora
soft brome	Bromus mollis*
western fescue	Festuca occidentalis
western needle-and-thread	Stipa occidentalis

* = exotic species that has become established in forests, grasslands or wetlands, i.e. has spread beyond trails, road edges, or developed areas.

SOURCES: Washington Natural Heritage Program information system (sensitive species) and field inventories by R. Schuller, 1981, and C. Chappell, 18-19 May 1992.

APPENDIX B. Partial list of wildlife species of Goose Rock site, Deception Pass State Park.

C = common at time of visit; B = probable or confirmed breeder.

Birds	
mallard	
osprey	B
bald eagle	B
red-tailed hawk	B
band-tailed pigeon	B
rufous hummingbird	B
belted kingfisher	
hairy woodpecker	B
pileated woodpecker	B
northern flicker	B
olive-sided flycatcher	B
western wood-pewee	B
Pacific-slope flycatcher	CB
violet-green swallow	
barn swallow	
American crow	B
chestnut-backed chickadee	CB
red-breasted nuthatch	B
brown creeper	CB
Bewick's wren	B
house wren	B
winter wren	CB
golden-crowned kinglet	CB
Swainson's thrush	CB
American robin	CB
varied thrush	B
cedar waxwing	B
Hutton's vireo	B
orange-crowned warbler	CB
yellow-rumped warbler	B
black-throated gray warbler	B
Townsend's warbler	CB
Wilson's warbler	CB
rufous-sided towhee	CB
song sparrow	CB
white-crowned sparrow	B
dark-eyed junco	CB
brown-headed cowbird	B
purple finch	B
red crossbill	
pine siskin	CB
American goldfinch	CB

Other Vertebrates
- black-tailed deer
- Douglas squirrel
- Townsend's chipmunk
- beaver
- coyote

SOURCE: Field inventory by C. Chappell, 2-5 & 16 July 1992.

Other Vertebrates
varying hare
black-tailed deer
Douglas squirrel

SOURCE: Field inventory by C. Chappell, 18-19 May 1992.

APPENDIX A. Partial list of vascular plant species of Hope Island, Deception Pass State Park.

Trees	
bigleaf maple	Acer macrophyllum
bittercherry	Prunus emarginata var. mollis
Douglas fir	Pseudotsuga menziesii
grand fir	Abies grandis
Pacific madrone	Arbutus menziesii
Pacific yew	Taxus brevifolia
red alder	Alnus rubra
Rocky Mountain juniper	Juniperus scopulorum
Scouler's willow	Salix scouleriana
Sitka spruce	Picea sitchensis
western hemlock	Tsuga heterophylla
western redcedar	Thuja plicata
willow	Salix sp.
Shrubs and Vines	
baldhip rose	Rosa gymnocarpa
blackcap	Rubus leucodermis
coast red elderberry	Sambucus racemosa var. arborescens
common laurel-cherry	Prunus laurocerasus*
common snowberry	Symphoricarpos albus
Douglas maple	Acer glabrum var. douglasii
English holly	Ilex aquifolium*
English ivy	Hedera helix*
evergreen huckleberry	Vaccinium ovatum
hairy honeysuckle	Lonicera hispidula
hardhack	Spirea douglasii
Indian plum	Oemleria cerasiformis
low Oregongrape	Berberis nervosa
Nootka rose	Rosa nutkana
oceanspray	Holodiscus discolor
orange honeysuckle	Lonicera ciliosa
red huckleberry	Vaccinium parvifolium
salal	Gaultheria shallon
salmonberry	Rubus spectabilis
Scot's broom	Cytisus scoparius*
serviceberry	Amelanchier alnifolia
swamp gooseberry	Ribes lacustre
tall Oregongrape	Berberis aquifolium
trailing blackberry	Rubus ursinus
western crabapple	Pyrus fusca
Forbs and Ferns	
American vetch	Vicia americana
bracken	Pteridium aquilinum
bull thistle	Cirsium vulgare*
catchweed bedstraw	Galium aparine
chocolate lily	Fritillaria lanceolata

Columbia lily	Lilium columbianum
common yarrow	Achillea millefolium
crisped starwort	Stellaria crispa
field chickweed	Cerastium arvense
fireweed	Epilobium angustifolium
fragrant bedstraw	Galium triflorum
fringecup	Tellima grandiflora
hairy cats-ear	Hypochaeris radicata*
harvest brodiaea	Brodiaea coronaria
heart-leaved twayblade	Listera cordata
Hooker's onion	Allium acuminatum
Indian thistle	Cirsium edule
large-leaved avens	Geum macrophyllum
licorice fern	Polypodium glycyrrhiza
little buttercup	Ranunculus uncinatus
lomatium	Lomatium sp.
lupine	Lupinus sp.
meadow death-camas	Zigadenus venenosus var. venenosus
miner's lettuce	Montia perfoliata
mountain sweet-cicely	Osmorhiza chilensis
Nuttall's peavine	Lathyrus nevadensis
podfern	Aspidotis densa
prince's pine	Chimaphila umbellata
Puget Sound gumweed	Grindelia integrifolia var. macrophylla
rattlesnake-plantain	Goodyera oblongifolia
rosy plectritis	Plectritis congesta
sheep sorrel	Rumex acetosella*
Siberian montia	Montia siberica
slender sandwort	Arenaria stricta
small-flowered willow-herb	Epilobium minutum
spotted coralroot	Corallorhiza maculata
spreading wood-fern	Dryopteris expansa
stinging nettle	Urtica dioica
sword-fern	Polystichum munitum
three-leaved foamflower	Tiarella trifoliata var. trifoliata
twinflower	Linnea borealis
wall lettuce	Lactuca muralis*
Wallace's selaginella	Selaginella wallacei
water lentil	Lemna minor
water-parsley	Oenanthe sarmentosa
western buttercup	Ranunculus occidentalis
western starflower	Trientalis latifolia
woods strawberry	Fragaria vesca
woolly clover	Trifolium microcephalum
woolly-sunflower	Eriophyllum lanatum var. lanatum
yerba buena	Satureja douglasii

Graminoids

Festuca bromoides*	barren fescue
Elymus glaucus	blue wildrye
Bromus carinatus	California brome
Bromus vulgaris	Columbia brome
Carex deweyana	Dewey's sedge
Luzula campestris	field woodrush
Poa pratensis*	Kentucky bluegrass
Aira praecox*	little hairgrass
Festuca subulata	nodding fescue
Trisetum cernuum	nodding trisetum
Bromus pacificus	Pacific brome
Koeleria cristata	prairie Junegrass
Aira caryophylla*	silver hairgrass
Carex obnupta	slough sedge
Bromus mollis*	soft brome

* = exotic species that has become established in forests, grasslands or wetlands, i.e. has spread beyond trails, road edges or developed areas.

SOURCE: Field inventory by C. Chappell, 27-28 May 1992.

APPENDIX A. Partial list of vascular plant species of Hoypus South site, Deception Pass State Park.

Trees	
bigleaf maple	Acer macrophyllum
bittercherry	Prunus emarginata var. mollis
black cottonwood	Populus trichocarpa
Douglas fir	Pseudotsuga menziesii
grand fir	Abies grandis
red alder	Alnus rubra
Scouler's willow	Salix scouleriana
Sitka spruce	Picea sitchensis
western hemlock	Tsuga heterophylla
western redcedar	Thuja plicata
western white pine	Pinus monticola
willow	Salix sp.
Shrubs and Vines	
baldhip rose	Rosa gymnocarpa
blackcap	Rubus leucodermis
coast red elderberry	Sambucus racemosa var. arborescens
English holly	Ilex aquifolium*
evergreen huckleberry	Vaccinium ovatum
hardhack	Spirea douglasii
low Oregongrape	Berberis nervosa
Nootka rose	Rosa nutkana
oceanspray	Holodiscus discolor
orange honeysuckle	Lonicera ciliosa
Pacific rhododendron	Rhododendron macrophylla
red huckleberry	Vaccinium parvifolium
salal	Gaultheria shallon
salmonberry	Rubus spectabilis
swamp gooseberry	Ribes lacustre
thimbleberry	Rubus parviflorus
trailing blackberry	Rubus ursinus
western crabapple	Pyrus fusca
Forbs and Ferns	
bracken	Pteridium aquilinum
fragrant bedstraw	Galium triflorum
hairy cats-ear	Hypochaeris radicata*
Indian thistle	Cirsium edule
lady-fern	Athyrium filix-femina
large-leaved avens	Geum macrophyllum
little buttercup	Ranunculus uncinatus
mountain sweet-cicely	Osmorhiza chilensis
Siberian montia	Montia siberica
skunk cabbage	Lysichitum americanum
spreading wood-fern	Dryopteris expansa
stinging nettle	Urtica dioica
sword-fern	Polystichum munitum

three-leaved foamflower	Tiarella trifoliata var. trifoliata
twinflower	Linnea borealis
wall lettuce	Lactuca muralis*
water-parsley	Oenanthe sarmentosa
western starflower	Trientalis latifolia

Graminoids

Alaska oniongrass	Melica subulata
Columbia brome	Bromus vulgaris
Dewey's sedge	Carex deweyana
nodding fescue	Festuca subulata
nodding trisetum	Trisetum cernuum
slough sedge	Carex obnupta

* = exotic species that has become established in forests, grasslands or wetlands, i.e. has spread beyond trails, road edges, or clear-cuts.

SOURCES: Field inventories by R. Crawford, 1986, and C. Chappell, 13-14 May 1992.

APPENDIX B. Partial list of wildlife species of Hoypus South site, Deception Pass State Park.

C = common at time of visit; B = probable or confirmed breeder.

Birds	
bald eagle	
red-tailed hawk	B
California quail	
rufous hummingbird	B
hairy woodpecker	CB
pileated woodpecker	B
northern flicker	B
olive-sided flycatcher	CB
western wood-pewee	
Hammond's flycatcher	B
Pacific-slope flycatcher	CB
northern rough-winged swallow	
barn swallow	
Steller's jay	
American crow	B
common raven	
chestnut-backed chickadee	CB
red-breasted nuthatch	CB
brown creeper	CB
Bewick's wren	B
winter wren	CB
golden-crowned kinglet	CB
Swainson's thrush	CB
American robin	CB
varied thrush	B
warbling vireo	B
orange-crowned warbler	B
black-throated gray warbler	B
Townsend's warbler	CB
Wilson's warbler	CB
western tanager	CB
rufous-sided towhee	B
song sparrow	CB
dark-eyed junco	CB
purple finch	CB
pine siskin	CB
American goldfinch	B
Other Vertebrates	
red-legged frog	
black-tailed deer	
Douglas squirrel	

SOURCE: Field inventory by C. Chappell, 13-14 May 1992.

APPENDIX A. Partial list of vascular plant species of Pass Lake site, Deception Pass State Park.

Trees	
bigleaf maple	Acer macrophyllum
bittercherry	Prunus emarginata var. mollis
black cottonwood	Populus trichocarpa
cascara	Rhamnus purshiana
Douglas fir	Pseudotsuga menziesii
grand fir	Abies grandis
lodgepole pine	Pinus contorta
Pacific madrone	Arbutus menziesii
red alder	Alnus rubra
Rocky Mountain juniper	Juniperus scopulorum
Scouler's willow	Salix scouleriana
Sitka spruce	Picea sitchensis
western hemlock	Tsuga heterophylla
western redcedar	Thuja plicata
willow	Salix sp.
Shrubs and Vines	
baldhip rose	Rosa gymnocarpa
blackcap	Rubus leucodermis
coast black gooseberry	Ribes divaricatum
coast red elderberry	Sambucus racemosa var. arborescens
common snowberry	Symphoricarpos albus
English holly	Ilex aquifolium*
hairy honeysuckle	Lonicera hispidula
hardhack	Spirea douglasii
Indian plum	Oemleria cerasiformis
low Oregongrape	Berberis nervosa
Nootka rose	Rosa nutkana
oceanspray	Holodiscus discolor
orange honeysuckle	Lonicera ciliosa
red huckleberry	Vaccinium parvifolium
red-flowering currant	Ribes sanguineum
red-osier dogwood	Cornus stolonifera var. occidentalis
salal	Gaultheria shallon
salmonberry	Rubus spectabilis
serviceberry	Amelanchier alnifolia
swamp gooseberry	Ribes lacustre
tall Oregongrape	Berberis aquifolium
thimbleberry	Rubus parviflorus
trailing blackberry	Rubus ursinus
western crabapple	Pyrus fusca
Forbs and Ferns	
American vetch	Vicia americana
bracken	Pteridium aquilinum
broadleaf stonecrop	Sedum spathulifolium

buckhorn plantain	Plantago lanceolata*
catchweed bedstraw	Galium aparine
clover	Trifolium sp.
common camas	Camassia quamash
common yarrow	Achillea millefolium
Cooley's hedge-nettle	Stachys cooleyae
creeping buttercup	Ranunculus repens*
crisped starwort	Stellaria crispa
enchanter's nightshade	Circaea alpina
false lily-of-the-valley	Maianthemum dilatatum
field chickweed	Cerastium arvense
fragrant bedstraw	Galium triflorum
fringecup	Tellima grandiflora
giant fawn-lily	Erythronium oreganum
gold-back fern	Pityrogramma triangularis
hairy cats-ear	Hypochaeris radicata*
harvest brodiaea	Brodiaea coronaria
Hooker's onion	Allium acuminatum
horsetail	Equisetum sp.
Hyacinth brodiaea	Brodiaea hyacinthina
Indian pipe	Monotropa uniflora
Indian thistle	Cirsium edule
lady-fern	Athyrium filix-femina
licorice fern	Polypodium glycyrrhiza
little bedstraw	Galium trifidum
little buttercup	Ranunculus uncinatus
littleleaf montia	Montia parvifolia
maidenhair spleenwort	Asplenium trichomanes
miner's lettuce	Montia perfoliata
mountain sweet-cicely	Osmorhiza chilensis
nodding onion	Allium cernuum
oxeye-daisy	Chrysanthemum leucanthemum*
pathfinder	Adenocaulon bicolor
pinesap	Hypopitys monotropa
rattlesnake-plantain	Goodyera oblongifolia
self-heal	Prunella vulgaris
sharptooth angelica	Angelica arguta
sheep sorrel	Rumex acetosella*
Siberian montia	Montia siberica
skunk cabbage	Lysichitum americanum
small-flowered deervetch	Lotus micranthus
small-flowered willow-herb	Epilobium minutum
smallflower alumroot	Heuchera micrantha var. diversifolia
spreading wood-fern	Dryopteris expansa
stinging nettle	Urtica dioica
sword-fern	Polystichum munitum
three-leaved foamflower	Tiarella trifoliata var. trifoliata
twinflower	Linnea borealis
wall lettuce	Lactuca muralis*
Wallace's selaginella	Selaginella wallacei

water-parsley	Oenanthe sarmentosa
western buttercup	Ranunculus occidentalis
western starflower	Trientalis latifolia
white-flowered hawkweed	Hieracium albiflorum
woods strawberry	Fragaria vesca

Graminoids

barren fescue	Festuca bromoides*
blue wildrye	Elymus glaucus
California oatgrass	Danthonia californica
Coast Range fescue	Festuca subuliflora
Columbia brome	Bromus vulgaris
common velvetgrass	Holcus lanatus*
Dewey's sedge	Carex deweyana
field woodrush	Luzula campestris
foxtail fescue	Festuca megalura
Idaho fescue	Festuca idahoensis
little hairgrass	Aira praecox*
nodding fescue	Festuca subulata
nodding trisetum	Trisetum cernuum
orchard grass	Dactylis glomerata*
Pacific brome	Bromus pacificus
prairie Junegrass	Koeleria cristata
slough sedge	Carex obnupta
small-flowered woodrush	Luzula parviflora
soft brome	Bromus mollis*
western fescue	Festuca occidentalis

* = exotic species that has become established in forests, grasslands or wetlands, i.e. has spread beyond trails, road edges, pastures, or developed areas.

SOURCE: Field inventory by C. Chappell, 21-22 & 29 May 1992.

APPENDIX B. Partial list of wildlife species of Pass Lake site, Deception Pass State Park.

C = common at time of visit; B = probable or confirmed breeder.

Birds

bald eagle	B	
sharp-shinned hawk	B	
red-tailed hawk	B	
band-tailed pigeon	B	
downy woodpecker	B	
hairy woodpecker	B	
pileated woodpecker	B	(active nest located)
northern flicker	B	
olive-sided flycatcher	B	
western wood-pewee	B	
Pacific-slope flycatcher	CB	
purple martin		
violet-green swallow		
northern rough-winged swallow		
Steller's jay	B	
American crow	B	
common raven		
chestnut-backed chickadee	CB	
red-breasted nuthatch	CB	
brown creeper	B	
Bewick's wren	B	
winter wren	CB	
golden-crowned kinglet	CB	
Swainson's thrush	CB	
American robin	CB	
varied thrush	B	
solitary vireo	B	
Hutton's vireo	B	
warbling vireo	CB	
red-eyed vireo	B	
orange-crowned warbler	CB	
black-throated gray warbler	CB	
Townsend's warbler	CB	
Wilson's warbler	CB	
western tanager	B	
black-headed grosbeak	CB	
rufous-sided towhee	CB	
song sparrow	CB	
dark-eyed junco	CB	
brown-headed cowbird	B	
purple finch	CB	
pine siskin	CB	
American goldfinch	B	

APPENDIX B. Partial list of wildlife species of Hope Island, Deception Pass State Park.

C = common at time of visit; B = probable or confirmed breeder.

Birds	
bald eagle	B
red-tailed hawk	
band-tailed pigeon	CB
rufous hummingbird	
belted kingfisher	B
hairy woodpecker	B
northern flicker	B
olive-sided flycatcher	B
western wood-pewee	B
Hammond's flycatcher	B
dusky flycatcher	B (unusual location)
Pacific-slope flycatcher	CB
northern rough-winged swallow	B
common raven	
chestnut-backed chickadee	CB
red-breasted nuthatch	CB
brown creeper	CB
winter wren	CB
golden-crowned kinglet	CB
Swainson's thrush	CB
American robin	CB
cedar waxwing	
European starling	CB
Wilson's warbler	B
rufous-sided towhee	CB
song sparrow	CB
white-crowned sparrow	B
dark-eyed junco	CB
brown-headed cowbird	B
purple finch	B
house finch	B
red crossbill	
pine siskin	CB
American goldfinch	CB
Other Vertebrates	
red-legged frog	(abundant)
black-tailed deer	
Douglas squirrel	
coyote	

SOURCE: Field inventory by C. Chappell, 27-28 May 1992.

Other Vertebrates
black-tailed deer
Douglas squirrel

SOURCE: Field inventory by C. Chappell, 21-22 & 29 May 1992.

APPENDIX A. Partial list of vascular plant species of Diamond Point site.

Trees	
bigleaf maple	Acer macrophyllum
bittercherry	Prunus emarginata var. mollis
black cottonwood	Populus trichocarpa
Douglas fir	Pseudotsuga menziesii
grand fir	Abies grandis
Pacific madrone	Arbutus menziesii
Pacific yew	Taxus brevifolia
red alder	Alnus rubra
Scouler's willow	Salix scouleriana
western hemlock	Tsuga heterophylla
western redcedar	Thuja plicata
willow	Salix sp.
Shrubs and Vines	
baldhip rose	Rosa gymnocarpa
blackcap	Rubus leucodermis
coast black gooseberry	Ribes divaricatum
coast red elderberry	Sambucus racemosa var. arborescens
Douglas maple	Acer glabrum var. douglasii
evergreen huckleberry	Vaccinium ovatum
hairy honeysuckle	Lonicera hispidula
hairy manzanita	Arctostaphylos columbiana
hardhack	Spirea douglasii
low Oregongrape	Berberis nervosa
oceanspray	Holodiscus discolor
orange honeysuckle	Lonicera ciliosa
Pacific rhododendron	Rhododendron macrophyllum
red huckleberry	Vaccinium parvifolium
salal	Gaultheria shallon
salmonberry	Rubus spectabilis
serviceberry	Amelanchier alnifolia
swamp gooseberry	Ribes lacustre
thimbleberry	Rubus parviflorus
trailing blackberry	Rubus ursinus
western crabapple	Pyrus fusca
Forbs and Ferns	
American vetch	Vicia americana
bracken	Pteridium aquilinum
bull thistle	Cirsium vulgare*
catchweed bedstraw	Galium aparine
common cat-tail	Typha latifolia
common yarrow	Achillea millefolium
Cooley's hedge-nettle	Stachys cooleyae
crisped starwort	Stellaria crispa
enchanter's nightshade	Circaea alpina
fireweed	Epilobium angustifolium

foxglove	Digitalis purpurea*
fragrant bedstraw	Galium triflorum
giant vetch	Vicia gigantea
hairy cats-ear	Hypochaeris radicata*
Indian thistle	Cirsium edule
lady-fern	Athyrium filix-femina
licorice fern	Polypodium glycyrrhiza
little prince's pine	Chimaphila menziesii
mountain sweet-cicely	Osmorhiza chilensis
pathfinder	Adenocaulon bicolor
pinedrops	Pterospora andromedea
rattlesnake-plantain	Goodyera oblongifolia
Siberian montia	Montia siberica
small bedstraw	Galium trifidum
smallflower alumroot	Heuchera micrantha var. diversifolia
spreading wood-fern	Dryopteris expansa
stinging nettle	Urtica dioica
sweetcoltsfoot	Petasites frigidus var.
sword-fern	Polystichum munitum
tansy ragwort	Senecio jacobea*
three-leaved foamflower	Tiarella trifoliata var. trifoliata
twinflower	Linnea borealis
water-parsley	Oenanthe sarmentosa
Watson's willow-herb	Epilobium watsonii
western starflower	Trientalis latifolia
western trillium	Trillium ovatum
white-flowered hawkweed	Hieracium albiflorum
woods strawberry	Fragaria vesca
yerba buena	Satureja douglasii

Graminoids

Alaska oniongrass	Melica subulata
bentgrass	Agrostis sp.
blue wildrye	Elymus glaucus
Coast Range fescue	Festuca subuliflora
Columbia brome	Bromus vulgaris
common velvetgrass	Holcus lanatus*
Dewey's sedge	Carex deweyana
field woodrush	Luzula campestris
Kentucky bluegrass	Poa pratensis*
nodding trisetum	Trisetum cernuum
red fescue	Festuca rubra
slough sedge	Carex obnupta
tall mannagrass	Glyceria elata
western fescue	Festuca occidentalis

* = exotic species that has become established in forests, grasslands or wetlands, i.e. has spread beyond trails & roads.

SOURCE: Field inventory by C. Chappell, 21-22 & 29 July 1992.

APPENDIX B. Partial list of wildlife species of Diamond Point site.

C = common at time of visit; B = probable or confirmed breeder.

Birds	
bald eagle	B
ruffed grouse	B
northern flicker	B
pileated woodpecker	
olive-sided flycatcher	B
Pacific-slope flycatcher	CB
barn swallow	
common raven	
chestnut-backed chickadee	CB
bushtit	B
red-breasted nuthatch	B
brown creeper	CB
Bewick's wren	B
winter wren	CB
golden-crowned kinglet	CB
American robin	CB
cedar waxwing	
Hutton's vireo	B
orange-crowned warbler	B
black-throated gray warbler	B
Townsend's warbler	B
Wilson's warbler	B
western tanager	B
rufous-sided towhee	B
song sparrow	CB
white-crowned sparrow	B
dark-eyed junco	CB
purple finch	B
red crossbill	
pine siskin	
American goldfinch	
Other Vertebrates	
northwestern garter snake	
black-tailed deer	
Douglas squirrel	
Townsend's chipmunk	
coyote	

SOURCE: Field inventory by C. Chappell, 21-22 & 29 July 1992.

APPENDIX A. Partial list of vascular plant species of Fort Ebey State Park.

Trees	
Douglas fir	Pseudotsuga menziesii
Scouler's willow	Salix scouleriana
Sitka spruce	Picea sitchensis
western hemlock	Tsuga heterophylla
western redcedar	Thuja plicata
Shrubs and Vines	
baldhip rose	Rosa gymnocarpa
blackcap	Rubus leucodermis
coast black gooseberry	Ribes divaricatum
coast red elderberry	Sambucus racemosa var. arborescens
common snowberry	Symphoricarpos albus
evergreen blackberry	Rubus laciniatus*
hairy honeysuckle	Lonicera hispidula
hardhack	Spirea douglasii
Himalayan blackberry	Rubus discolor*
low Oregongrape	Berberis nervosa
Nootka rose	Rosa nutkana
oceanspray	Holodiscus discolor
orange honeysuckle	Lonicera ciliosa
Pacific rhododendron	Rhododendron macrophyllum
red huckleberry	Vaccinium parvifolium
red-flowering currant	Ribes sanguineum
salal	Gaultheria shallon
tall Oregongrape	Berberis aquifolium
thimbleberry	Rubus parviflorus
trailing blackberry	Rubus ursinus
western crabapple	Pyrus fusca
Forbs and Ferns	
bracken	Pteridium aquilinum
bull thistle	Cirsium vulgare*
elegant rein-orchid	Habenaria elegans
fireweed	Epilobium angustifolium
fragrant bedstraw	Galium triflorum
giant vetch	Vicia gigantea
harsh paintbrush	Castilleja hispida
pearly-everlasting	Anaphalis margaritacea
rattlesnake-plantain	Goodyera oblongifolia
sword-fern	Polystichum munitum
twinflower	Linnea borealis
water-parsley	Oenanthe sarmentosa
western starflower	Trientalis latifolia
Graminoids	
blue wildrye	Elymus glaucus
Columbia brome	Bromus vulgaris

common velvetgrass	Holcus lanatus*
slough sedge	Carex obnupta
western fescue	Festuca occidentalis

* = exotic species that has become established in forests, grasslands or wetlands, i.e. has spread beyond trails, road edges or developed areas.

SOURCE: Field inventory by C. Chappell, 23 July 1992.

APPENDIX A. Partial list of vascular plant species of Hope Island State Park, Mason County.

Trees	
bigleaf maple	Acer macrophyllum
bittercherry	Prunus emarginata var. mollis
cascara	Rhamnus purshiana
Douglas fir	Pseudotsuga menziesii
grand fir	Abies grandis
Pacific dogwood	Cornus nuttallii
Pacific madrone	Arbutus menziesii
Pacific yew	Taxus brevifolia
red alder	Alnus rubra
Scouler's willow	Salix scouleriana
western hemlock	Tsuga heterophylla
western redcedar	Thuja plicata
Shrubs and Vines	
baldhip rose	Rosa gymnocarpa
blackcap	Rubus leucodermis
coast red elderberry	Sambucus racemosa var. arborescens
English holly	Ilex aquifolium*
evergreen huckleberry	Vaccinium ovatum
hairy honeysuckle	Lonicera hispidula
Indian plum	Oemleria cerasiformis
low Oregongrape	Berberis nervosa
mockorange	Philadelphus lewisii
oceanspray	Holodiscus discolor
Pacific ninebark	Physocarpus capitatus
red huckleberry	Vaccinium parvifolium
salal	Gaultheria shallon
serviceberry	Amelanchier alnifolia
tall Oregongrape	Berberis aquifolium
trailing blackberry	Rubus ursinus
western crabapple	Pyrus fusca
western hazel	Corylus cornuta
Forbs and Ferns	
bracken	Pteridium aquilinum
bull thistle	Cirsium vulgare*
deer-fern	Blechnum spicant
fragrant bedstraw	Galium triflorum
giant horsetail	Equisetum telmateia
hairy cat's-ear	Hypochaeris radicata*
Indian thistle	Cirsium edule
lady-fern	Athyrium filix-femina
licorice fern	Polypodium glycyrrhiza
mountain sweet-cicely	Osmorhiza chilensis
pickleweed	Salicornia virginica
rattlesnake-plantain	Goodyera oblongifolia
seaside arrowgrass	Triglochin maritimum

Siberian montia	Montia siberica
sword-fern	Polystichum munitum
tansy ragwort	Senecio jacobea*
vanillaleaf	Achlys triphylla
water-parsley	Oenanthe sarmentosa
western starflower	Trientalis latifolia
woods strawberry	Fragaria vesca

Graminoids

bentgrass	Agrostis sp.
blue wildrye	Elymus glaucus
Coast Range fescue	Festuca subuliflora
Columbia brome	Bromus vulgaris
Dewey's sedge	Carex deweyana
nodding trisetum	Trisetum cernuum
orchard grass	Dactylis glomerata*
seashore saltgrass	Distichlis spicata

* = exotic species that has become established in forests, grasslands or wetlands, i.e. has spread beyond trails or farmed areas.

SOURCE: Field inventory by C. Chappell, 30 September 1992.

APPENDIX B. Partial list of wildlife species of Hope Island State Park, Mason County.

C = common at time of visit; B = probable or confirmed breeder.

Birds	
great blue heron	B (communal roosting site, nests present, current breeding status unknown)
bald eagle	
sharp-shinned hawk	
red-breasted sapsucker	
northern flicker	B
pileated woodpecker	B
American crow	B
chestnut-backed chickadee	CB
brown creeper	CB
red-breasted nuthatch	B
Bewick's wren	B
winter wren	CB
golden-crowned kinglet	CB
American robin	B
cedar waxwing	
European starling	
Hutton's vireo	B
yellow-rumped warbler	
Townsend's warbler	
rufous-sided towhee	B
song sparrow	B
purple finch	B
pine siskin	C
Other Vertebrates	
black-tailed deer	
Douglas squirrel	

SOURCE: Field inventory by C. Chappell, 30 September 1992.

APPENDIX A. Partial list of vascular plant species of James Island State Park.

Trees	
bigleaf maple	Acer macrophyllum
bittercherry	Prunus emarginata var. mollis
Douglas fir	Pseudotsuga menziesii
grand fir	Abies grandis
Hooker's willow	Salix hookeriana
lodgepole pine	Pinus contorta
Pacific madrone	Arbutus menziesii
Pacific yew	Taxus brevifolia
red alder	Alnus rubra
Rocky Mountain juniper	Juniperus scopulorum
Scouler's willow	Salix scouleriana
Sitka spruce	Picea sitchensis
western hemlock	Tsuga heterophylla
western redcedar	Thuja plicata
Shrubs and Vines	
baldhip rose	Rosa gymnocarpa
coast black gooseberry	Ribes divaricatum
coast red elderberry	Sambucus racemosa var. arborescens
common snowberry	Symphoricarpos albus
Douglas maple	Acer glabrum var. douglasii
hairy honeysuckle	Lonicera hispidula
low Oregongrape	Berberis nervosa
Nootka rose	Rosa nutkana
oceanspray	Holodiscus discolor
orange honeysuckle	Lonicera ciliosa
red huckleberry	Vaccinium parvifolium
red-flowering currant	Ribes sanguineum
salal	Gaultheria shallon
salmonberry	Rubus spectabilis
serviceberry	Amelanchier alnifolia
trailing blackberry	Rubus ursinus
western crabapple	Pyrus fusca
Forbs and Ferns	
American vetch	Vicia americana
bracken	Pteridium aquilinum
broad-leaved stonecrop	Sedum spathulifolium
buckhorn plantain	Plantago lanceolata*
bull thistle	Cirsium vulgare*
Canada thistle	Cirsium arvense var. horridum*
catchweed bedstraw	Galium aparine
common dandelion	Taraxacum officinale*
common yarrow	Achillea millefolium
crisped starwort	Stellaria crispa
elegant rein-orchid	Habenaria elegans

field chickweed	Cerastium arvense
flannel mullein	Verbascum thapsus*
fragrant bedstraw	Galium triflorum
geranium	Geranium sp.*
giant vetch	Vicia gigantea
hairy cats-ear	Hypochaeris radicata*
Indian thistle	Cirsium edule
little buttercup	Ranunculus uncinatus
meadow death-camas	Zigadenus venenosus var. venenosus
mountain sweet-cicely	Osmorhiza chilensis
nodding onion	Allium cernuum
Pacific hemlock-parsley	Conioselium pacificum
Pacific sanicle	Sanicula crassicaulis var. crassicaulis
pathfinder	Adenocaulon bicolor
Puget Sound gumweed	Grindelia integrifolia var. macrophylla
rattlesnake-plantain	Goodyera oblongifolia
seaside plantain	Plantago maritima
sheep sorrel	Rumex acetosella*
small-flowered willow-herb	Epilobium minutum
spreading wood-fern	Dryopteris expansa
stinging nettle	Urtica dioica
sword-fern	Polystichum munitum
three-leaved foamflower	Tiarella trifoliata var. trifoliata
wall lettuce	Lactuca muralis*
Wallace's selaginella	Selaginella wallacei
western buttercup	Ranunculus occidentalis var. occidentalis
western starflower	Trientalis latifolia
woolly clover	Trifolium microcephalum
woolly-sunflower	Eriophyllum lanatum var. lanatum

Graminoids

Alaska oniongrass	Melica subulata
barren fescue	Festuca bromoides*
blue wildrye	Elymus glaucus
California brome	Bromus carinatus var. carinatus
cheat grass	Bromus tectorum*
Coast Range fescue	Festuca subuliflora
Columbia brome	Bromus vulgaris
common velvetgrass	Holcus lanatus*
field woodrush	Luzula campestris
foxtail fescue	Festuca megalura
little hairgrass	Aira praecox*
long-stolon sedge	Carex pensylvanica
nodding trisetum	Trisetum cernuum
orchard grass	Dactylis glomerata*

Pacific brome	Bromus pacificus
quack grass	Agropyron repens*
red fescue	Festuca rubra
silver hairgrass	Aira caryophylla*
soft brome	Bromus mollis*
western fescue	Festuca occidentalis

* = exotic species that has become established in forests, grasslands or wetlands, i.e. has spread beyond trails, road edges or developed areas.

SOURCE: Field inventory by C. Chappell, 14-15 July 1992.

APPENDIX B. Partial list of wildlife species of James Island State Park.

C = common at time of visit; B = probable or confirmed breeder.

Birds	
great blue heron	
bald eagle	B (active nest)
band-tailed pigeon	B
western screech-owl	B
belted kingfisher	B
downy woodpecker	B
hairy woodpecker	B
northern flicker	B
pileated woodpecker	B
Pacific-slope flycatcher	CB
violet-green swallow	B
northern rough-winged swallow	B
barn swallow	
American crow	CB
chestnut-backed chickadee	CB
red-breasted nuthatch	CB
brown creeper	CB
house wren	B
winter wren	CB
golden-crowned kinglet	CB
American robin	CB
cedar waxwing	
orange-crowned warbler	B
Townsend's warbler	B
rufous-sided towhee	B
song sparrow	CB
white-crowned sparrow	CB
house finch	
red crossbill	
pine siskin	
Other Vertebrates	
black-tailed deer	(high population)
raccoon	

SOURCE: Field inventory by C. Chappell, 14-15 July 1992.

APPENDIX A. Partial list of vascular plant species of Jones Island State Park.

Trees	
bigleaf maple	Acer macrophyllum
bittercherry	Prunus emarginata var. mollis
black cottonwood	Populus trichocarpa
Douglas fir	Pseudotsuga menziesii
grand fir	Abies grandis
lodgepole pine	Pinus contorta
Oregon white oak	Quercus garryana
Pacific madrone	Arbutus menziesii
Pacific yew	Taxus brevifolia
red alder	Alnus rubra
Rocky Mountain juniper	Juniperus scopulorum
Scouler's willow	Salix scouleriana
western redcedar	Thuja plicata
Shrubs and Vines	
baldhip rose	Rosa gymnocarpa
coast black gooseberry	Ribes divaricatum
coast red elderberry	Sambucus racemosa var. arborescens
common snowberry	Symphoricarpos albus
Douglas maple	Acer glabrum var. douglasii
English holly	Ilex aquifolium*
hairy honeysuckle	Lonicera hispidula
low Oregongrape	Berberis nervosa
oceanspray	Holodiscus discolor
orange honeysuckle	Lonicera ciliosa
red huckleberry	Vaccinium parvifolium
salal	Gaultheria shallon
salmonberry	Rubus spectabilis
serviceberry	Amelanchier alnifolia
tall Oregongrape	Berberis aquifolium
western crabapple	Pyrus fusca
Forbs and Ferns	
American vetch	Vicia americana
bracken	Pteridium aquilinum
broad-leaved stonecrop	Sedum spathulifolium
bull thistle	Cirsium vulgare*
Canada thistle	Cirsium arvense var. horridum*
catchweed bedstraw	Galium aparine
clover	Trifolium sp.
crisped starwort	Stellaria crispa
fireweed	Epilobium angustifolium
flannel mullein	Verbascum thapsus*
fragrant bedstraw	Galium triflorum
fringecup	Tellima grandiflora
geranium	Geranium sp.*

giant horsetail	Equisetum telmateia
hairy cats-ear	Hypochaeris radicata*
harsh paintbrush	Castilleja hispida
Indian thistle	Cirsium edule
licorice fern	Polypodium glycyrrhiza
littleleaf montia	Montia parvifolia
meadow death-camas	Zigadenus venenosus var. venenosus
miner's lettuce	Montia perfoliata
nodding onion	Allium cernuum
Nuttall's peavine	Lathyrus nevadensis var. pilosellus
rattlesnake-plantain	Goodyera oblongifolia
rockcress	Arabis sp.
sheep sorrel	Rumex acetosella*
small-flowered willow-herb	Epilobium minutum
smallflower alumroot	Heuchera micrantha var. diversifolia
spotted coralroot	Corallorhiza maculata
spreading wood-fern	Dryopteris expansa
stinging nettle	Urtica dioica
wall lettuce	Lactuca muralis*
Wallace's selaginella	Selaginella wallacei
western polypody	Polypodium hesperium
western starflower	Trientalis latifolia
white-flowered hawkweed	Hieracium albiflorum

Graminoids

Alaska oniongrass	Melica subulata
barren brome	Bromus sterilis*
barren fescue	Festuca bromoides*
blue wildrye	Elymus glaucus
Canada bluegrass	Poa compressa*
cheat grass	Bromus tectorum*
Coast Range fescue	Festuca subuliflora
Columbia brome	Bromus vulgaris
common velvetgrass	Holcus lanatus*
foxtail fescue	Festuca megalura
little hairgrass	Aira praecox*
nodding trisetum	Trisetum cernuum
orchard grass	Dactylis glomerata*
Pacific brome	Bromus pacificus
red fescue	Festuca rubra
silver hairgrass	Aira caryophylla*
soft brome	Bromus mollis*
sweet vernalgrass	Anthoxanthum odoratum*
tall fescue	Festuca arundinacea*
western fescue	Festuca occidentalis

* = exotic species that has become established in forests, grasslands or wetlands, i.e. has spread beyond trails, road edges or developed areas.

SOURCE: Field inventory by C. Chappell, 13-14 July 1992.

APPENDIX B. Partial list of wildlife species of Jones Island State Park.

C = common at time of visit; B = probable or confirmed breeder.

Birds	
great blue heron	
turkey vulture	
bald eagle	B
belted kingfisher	
downy woodpecker	B
hairy woodpecker	B
northern flicker	B
pileated woodpecker	B
olive-sided flycatcher	B
Pacific-slope flycatcher	CB
violet-green swallow	B
northern rough-winged swallow	
American crow	CB
common raven	B
chestnut-backed chickadee	CB
red-breasted nuthatch	CB
brown creeper	CB
house wren	CB
winter wren	B
golden-crowned kinglet	CB
American robin	CB
orange-crowned warbler	CB
yellow-rumped warbler	B
Townsend's warbler	B
rufous-sided towhee	B
song sparrow	CB
white-crowned sparrow	B
dark-eyed junco	CB
brown-headed cowbird	B
purple finch	B
red crossbill	C
pine siskin	
American goldfinch	B
Other Vertebrates	
black-tailed deer	(high population)
raccoon	

SOURCE: Field inventory by C. Chappell, 13-14 July 1992.

APPENDIX A. Partial list of vascular plant species of Lake Cushman State Park.

Trees	
bigleaf maple	Acer macrophyllum
black cottonwood	Populus trichocarpa
cascara	Rhamnus purshiana
Douglas fir	Pseudotsuga menziesii
Pacific dogwood	Cornus nuttallii
red alder	Alnus rubra
western hemlock	Tsuga heterophylla
western redcedar	Thuja plicata
western white pine	Pinus monticola
willow	Salix sp.
Shrubs and Vines	
black twinberry	Lonicera involucrata
bog Labrador-tea	Ledum groenlandicum
coast red elderberry	Sambucus racemosa var. arborescens
evergreen huckleberry	Vaccinium ovatum
hardhack	Spirea douglasii
Indian plum	Oemleria cerasiformis
low Oregongrape	Berberis nervosa
Pacific rhododendron	Rhododendron macrophyllum
red huckleberry	Vaccinium parvifolium
red-osier dogwood	Cornus stolonifera
salal	Gaultheria shallon
salmonberry	Rubus spectabilis
serviceberry	Amelanchier alnifolia
thimbleberry	Rubus parviflorus
trailing blackberry	Rubus ursinus
vine maple	Acer circinatum
western hazel	Corylus cornuta
wild cranberry	Vaccinium oxycoccus
Forbs and Ferns	
beargrass	Xerophyllum tenax
bracken	Pteridium aquilinum
broad-leaved sundew	Drosera rotundifolia
Columbia lily	Lilium columbianum
common cat-tail	Typha latifolia
Cooley's hedge-nettle	Stachys cooleyae
coralroot	Corallorhiza sp.
deer-fern	Blechnum spicant
enchanter's nightshade	Circaea alpina
evergreen violet	Viola sempervirens
false lily-of-the-valley	Maianthemum dilatatum
few-flowered aster	Aster modestus
fireweed	Epilobium angustifolium
fragrant bedstraw	Galium triflorum
fringecup	Tellima grandiflora

giant horsetail	Equisetum telmateia
green false hellebore	Veratrum viride
Hooker's fairybells	Disporum hookeri
kneeling angelica	Angelica genuflexa
lady-fern	Athyrium filix-femina
little buttercup	Ranunculus uncinatus
mountain sweet-cicely	Osmorhiza chilensis
northern maidenhair fern	Adiantum pedatum
Pacific bleedingheart	Dicentra formosa
Pacific silverweed	Potentilla pacifica
pathfinder	Adenocaulon bicolor
pearly everlasting	Anaphalis margaritacea
pioneer violet	Viola glabella
prince's pine	Chimaphila umbellata
rattlesnake-plantain	Goodyera oblongifolia
Scouler's harebell	Campanula scouleri
self-heal	Prunella vulgaris
skunk cabbage	Lysichitum americanum
small bedstraw	Galium trifidum
small-flowered forget-me-not	Myosotis laxa
speedwell	Veronica sp.
spreading wood-fern	Dryopteris expansa
starry solomon's seal	Smilacina stellata
sword-fern	Polystichum munitum
three-leaved foamflower	Tiarella trifoliata var. trifoliata
twinflower	Linnea borealis
vanillaleaf	Achlys triphylla
wall lettuce	Lactuca muralis*
water-parsley	Oenanthe sarmentosa
western St. John's-wort	Hypericum formosum var. scouleri
western starflower	Trientalis latifolia
white bog-orchid	Habenaria dilatata var. leucostachys
white-flowered hawkweed	Hieracium albiflorum
wild ginger	Asarum caudatum
woods strawberry	Fragaria vesca var. crinita
yellow monkey-flower	Mimulus guttatus var. guttatus

<u>Graminoids</u>

bearded fescue	Festuca subulata
common wild oatgrass	Danthonia spicata
Cusick's sedge	Carex cusickii
Dewey's sedge	Carex deweyana
nodding semaphoregrass	Pleuropgon refractus
sedge	Carex sp.
slough sedge	Carex obnupta
small-flowered woodrush	Luzula parviflora
small-fruited bulrush	Scirpus microcarpus
tall mannagrass	Glyceria elata

* = exotic species that has become established in forests, grasslands or wetlands, i.e. has spread beyond trails, road edges or developed areas.

SOURCE: Field inventory by C. Chappell, 20 July 1992.

APPENDIX B. Partial list of wildlife species of Lake Cushman State Park.

C = common at time of visit; B = probable or confirmed breeder.

Birds	
Cooper's hawk	B
ruffed grouse	B
band-tailed pigeon	B
northern flicker	B
pileated woodpecker	
Pacific-slope flycatcher	CB
northern rough-winged swallow	
violet-green swallow	
gray jay	
Steller's jay	
American crow	
common raven	
black-capped chickadee	B
chestnut-backed chickadee	CB
brown creeper	B
Bewick's wren	B
winter wren	CB
golden-crowned kinglet	CB
Swainson's thrush	CB
American robin	CB
cedar waxwing	B
Hutton's vireo	B
black-throated gray warbler	CB
MacGillivray's warbler	B
Wilson's warbler	B
rufous-sided towhee	B
song sparrow	B
dark-eyed junco	CB
purple finch	B
evening grosbeak	
Other Vertebrates	
red-legged frog	
black-tailed deer	
Douglas squirrel	

SOURCE: Field inventory by C. Chappell, 20 July 1992.

APPENDIX A. Partial list of vascular plant species of Lake Wenatchee State Park.

Trees	
bigleaf maple	Acer macrophyllum
black cottonwood	Populus trichocarpa
Douglas fir	Pseudotsuga menziesii
grand fir	Abies grandis
lodgepole pine	Pinus contorta var. latifolia
Pacific silver fir	Abies amabilis
ponderosa pine	Pinus ponderosa
red alder	Alnus rubra
Scouler's willow	Salix scouleriana
western redcedar	Thuja plicata
willow	Salix sp.
Shrubs and Vines	
baldhip rose	Rosa gymnocarpa
big huckleberry	Vaccinium membranaceum
black hawthorn	Crataegus douglasii var. douglasii
black twinberry	Lonicera involucrata
blackcap	Rubus leucodermis
blue elderberry	Sambucus cerulea
common snowberry	Symphoricarpos albus
Douglas maple	Acer glabrum var. douglasii
hardhack	Spirea douglasii
kinnnikinnick	Arctostaphylos uva-ursi
low Oregongrape	Berberis nervosa
mockorange	Philadelphus lewisii
mountain alder	Alnus incana
Nootka rose	Rosa nutkana
oceanspray	Holodiscus discolor
orange honeysuckle	Lonicera ciliosa
Oregon boxwood	Pachistima myrsinites
red-osier dogwood	Cornus stolonifera var. occidentalis
serviceberry	Amelanchier alnifolia
shiny-leaf spirea	Spirea betulifolia var. lucida
snowbrush	Ceanothus velutinus
tall Oregongrape	Berberis aquifolium
thimbleberry	Rubus parviflorus
trailing blackberry	Rubus ursinus
vine maple	Acer circinatum
Forbs and Ferns	
arrowleaf balsamroot	Balsamorhiza sagittata
big-leaved sandwort	Arenaria macrophylla
bracken	Pteridium aquilinum
broadpetal strawberry	Fragaria virginiana var. platypetala

candystick	Allotropa virgata
chives	Allium schoenoprasum
common yarrow	Achillea millefolium
coralroot	Corallorhiza sp.
field horsetail	Equisetum arvense
fireweed	Epilobium angustifolium
fragrant bedstraw	Galium triflorum
goldenrod	Solidago sp.
green false-hellebore	Veratrum viride
hooded ladies'-tresses	Spiranthes romanzoffiana var. romanzoffiana
Hooker's fairybells	Disporum hookeri
lady-fern	Athyrium filix-femina
leafy aster	Aster foliaceous var. canbyi
little prince's pine	Chimaphila menziesii
lupine	Lupinus sp.
mountain sweet-cicely	Osmorhiza chilensis
paintbrush	Castilleja sp.
pathfinder	Adenocaulon bicolor
pearly-everlasting	Anaphalis margaritacea
pinedrops	Pterospora andromeda
pinesap	Hypopitys monotropa
prince's pine	Chimaphila umbellata
queen's cup	Clintonia uniflora
rattlesnake-plantain	Goodyera oblongifolia
rosy pussytoes	Antennaria microphylla
self-heal	Prunella vulgaris
sidebells pyrola	Pyrola secunda
Smith's fairybells	Disporum smithii
spreading dogbane	Apocynum androsaemifolium
starry solomon's seal	Smilacina stellata
sword-fern	Polystichum munitum
twinflower	Linnea borealis
Watson's willow-herb	Epilobium watsonii
western mountain aster	Aster occidentalis var. intermedius
western solomon's seal	Smilacina racemosa
western starflower	Trientalis latifolia
western trillium	Trillium ovatum
white vein pyrola	Pyrola picta
white-flowered hawkweed	Hieracium albiflorum

Graminoids

bentgrass	Agrostis sp.
blue wildrye	Elymus glaucus
elk sedge	Carex geyeri
mannagrass	Glyceria sp.
northwest sedge	Carex concinnoides
pinegrass	Calamagrostis rubescens
rush	Juncus sp.
sedge	Carex sp.
western fescue	Festuca occidentalis

western needle-and-thread	Stipa occidentalis
western witchgrass	Panicum occidentale

* = exotic species that has become established in forests, grasslands or wetlands, i.e. has spread beyond trails, road edges or developed areas.

SOURCE: Field inventory by C. Chappell, 7-8 August 1992.

APPENDIX B. Partial list of wildlife species of Lake Wenatchee State Park.

Birds
- osprey
- common nighthawk
- black swift
- hairy woodpecker
- northern flicker
- pileated woodpecker
- western wood-pewee
- violet-green swallow
- northern rough-winged swallow
- cliff swallow
- barn swallow
- gray jay
- Steller's jay
- Clark's nutcracker
- American crow
- mountain chickadee
- chestnut-backed chickadee
- red-breasted nuthatch
- brown creeper
- winter wren
- golden-crowned kinglet
- Swainson's thrush
- American robin
- yellow-rumped warbler
- yellow warbler
- Townsend's warbler
- western tanager
- dark-eyed junco
- Cassin's finch
- red crossbill

Other Vertebrates
- Douglas squirrel
- yellow pine chipmunk
- golden-mantled ground squirrel

SOURCE: Field inventory by C. Chappell, 7-8 August 1992.

APPENDIX A. Partial list of vascular plant species of Larrabee State Park.

Trees	
bigleaf maple	Acer macrophyllum
bittercherry	Prunus emarginata var. mollis
black cottonwood	Populus trichocarpa
cascara	Rhamnus purshiana
Douglas fir	Pseudotsuga menziesii
grand fir	Abies grandis
lodgepole pine	Pinus contorta
Pacific madrone	Arbutus menziesii
Pacific yew	Taxus brevifolia
red alder	Alnus rubra
Scouler's willow	Salix scouleriana
Sitka spruce	Picea sitchensis
western hemlock	Tsuga heterophylla
western paper birch	Betula papyrifera var. commutata
western redcedar	Thuja plicata
Shrubs and Vines	
baldhip rose	Rosa gymnocarpa
black twinberry	Lonicera involucrata
blackcap	Rubus leucodermis
coast red elderberry	Sambucus racemosa var. arborescens
common snowberry	Symphoricarpos albus
devil's club	Oplopanax horridum
Douglas maple	Acer glabrum var. douglasii
English holly	Ilex aquifolium*
European mountain-ash	Sorbus aucuparia*
evergreen blackberry	Rubus laciniatus*
fool's huckleberry	Menziesia ferruginea
hairy honeysuckle	Lonicera hispidula
hairy manzanita	Arctostaphylos columbiana
Himalayan blackberry	Rubus discolor*
Indian plum	Oemleria cerasiformis
low Oregongrape	Berberis nervosa
mockorange	Philadelphus lewisii
oceanspray	Holodiscus discolor
orange honeysuckle	Lonicera ciliosa
red huckleberry	Vaccinium parvifolium
red-flowering currant	Ribes sanguineum
salal	Gaultheria shallon
salmonberry	Rubus spectabilis
serviceberry	Amelanchier alnifolia
Sitka alder	Alnus sitchensis
stink currant	Ribes bracteosum
swamp gooseberry	Ribes lacustre
tall Oregongrape	Berberis aquifolium
thimbleberry	Rubus parviflorus

trailing blackberry	Rubus ursinus
vine maple	Acer circinatum
western hazel	Corylus cornuta

Forbs and Ferns

American speedwell	Veronica americana
American vetch	Vicia americana
baneberry	Actea rubra
big-leaved sandwort	Arenaria macrophylla
bracken	Pteridium aquilinum
broadleaf stonecrop	Sedum spathulifolium
bull thistle	Cirsium vulgare*
catchweed bedstraw	Galium aparine
chocolate lily	Fritillaria lanceolata
clasping-leaved twisted-stalk	Streptopus amplexifolius
fringecup	Tellima grandiflora
Columbia lily	Lilium columbianum
common cat-tail	Typha latifolia
common pink wintergreen	Pyrola asarifolia
common yarrow	Achillea millefolium
Cooley's hedge-nettle	Stachys cooleyae
cow-parsnip	Heracleum lanatum
creeping buttercup	Ranunculus repens*
crisped starwort	Stellaria crispa
deer-fern	Blechnum spicant
elk-moss	Lycopodium clavatum
enchanter's nightshade	Circaea alpina
evergreen violet	Viola sempervirens
false lily-of-the-valley	Maianthemum dilatatum
foxglove	Digitalis purpurea*
fragrant bedstraw	Galium triflorum
geranium	Geranium sp.*
giant horsetail	Equisetum telmateia
goatsbeard	Aruncus sylvester
hairy cats-ear	Hypochaeris radicata*
harsh paintbrush	Castilleja hispida
heartleaf twayblade	Listera cordata
Hooker's fairybells	Disporum hookeri
hyacinth brodiaea	Brodiaea hyacinthina
Indian pipe	Monotropa uniflora
Indian pond lily	Nuphar polysepalum
Indian thistle	Cirsium edule
lady-fern	Athyrium filix-femina
large-leaved avens	Geum macrophyllum
licorice fern	Polypodium glycyrrhiza
little buttercup	Ranunculus uncinatus
little prince's pine	Chimaphila menziesii
littleleaf montia	Montia parvifolia
meadow death-camas	Zigadenus venenosus var. venenosus
mountain sweet-cicely	Osmorhiza chilensis

nodding onion	Allium cernuum
northern maidenhair fern	Adiantum pedatum
Nuttall's peavine	Lathyrus nevadensis
Pacific bleeding-heart	Dicentra formosa
Pacific silverweed	Potentilla pacifica
pathfinder	Adenocaulon bicolor
pearly-everlasting	Anaphalis margaritacea
podfern	Aspidotis densa
pondweed	Potamogeton sp.
prince's pine	Chimaphila umbellata
rattlesnake-plantain	Goodyera oblongifolia
red columbine	Aquilegia formosa
rockcress	Arabis sp.
rosy plectritis	Plectritis congesta
scouring-rush	Equisetum hyemale
self-heal	Prunella vulgaris
sheep sorrel	Rumex acetosella*
Siberian montia	Montia siberica
skunk cabbage	Lysichitum americanum
slender-stem waterleaf	Hydrophyllum tenuipes
small-flowered forget-me-not	Myosotis laxa
smallflower alumroot	Heuchera micrantha var. diversifolia
spotted coralroot	Corallorhiza maculata
spreading wood-fern	Dryopteris expansa
starry solomon's seal	Smilacina stellata
stinging nettle	Urtica dioica
striped coralroot	Corallorhiza striata
sweet coltsfoot	Petasites frigidus var. palmatus
sword-fern	Polystichum munitum
three-leaved foamflower	Tiarella trifoliata var. trifoliata
tufted loosestrife	Lysimachia thyrsiflora
twinflower	Linnea borealis
vanillaleaf	Achlys triphylla
wall lettuce	Lactuca muralis*
Wallace's selaginella	Selaginella wallacei
water-parsley	Oenanthe sarmentosa
western solomon's seal	Smilacina racemosa
western starflower	Trientalis latifolia
western trillium	Trillium ovatum
white-flowered hawkweed	Hieracium albiflorum
wild ginger	Asarum caudatum
woods strawberry	Fragaria vesca
woolly clover	Trifolium microcephalum
woolly-sunflower	Eriophyllum lanatum var. lanatum
youth-on-age	Tolmiea menziesii

Graminoids

Alaska oniongrass	Melica subulata
barren fescue	Festuca bromoides*
blue wildrye	Elymus glaucus
California oatgrass	Danthonia californica
Coast Range fescue	Festuca subuliflora
Columbia brome	Bromus vulgaris
common rush	Juncus effusus
common velvetgrass	Holcus lanatus*
Cusick's sedge	Carex cusickii
Dewey's sedge	Carex deweyana
field woodrush	Luzula campestris
foxtail fescue	Festuca megalura
gray sedge	Carex canescens
lenticular sedge	Carex lenticularis
little hairgrass	Aira praecox*
nodding fescue	Festuca subulata
nodding trisetum	Trisetum cernuum
northwest sedge	Carex concinnoides
orchard grass	Dactylis glomerata*
Pacific brome	Bromus pacificus
prairie Junegrass	Koeleria cristata
reed canarygrass	Phalaris arundinacea*
silver hairgrass	Aira caryophylla*
slough sedge	Carex obnupta
small-flowered woodrush	Luzula parviflora
small-fruited bulrush	Scirpus microcarpus
soft brome	Bromus mollis*
tall mannagrass	Glyceria elata
western fescue	Festuca occidentalis

* = exotic species that has become established in forests, grasslands or wetlands, i.e. has spread beyond trails, road edges or developed areas.

SOURCE: Field inventory by C. Chappell, 2-5 June & 16 July 1992.

APPENDIX B. Partial list of wildlife species of Larrabee State Park.

C = common at time of visit; B = probable or confirmed breeder.

Birds

bald eagle	
red-tailed hawk	
band-tailed pigeon	CB
northern pygmy-owl	B
rufous hummingbird	CB
red-breasted sapsucker	B
downy woodpecker	B
hairy woodpecker	CB
northern flicker	B
pileated woodpecker	B
olive-sided flycatcher	B
western wood-pewee	
Pacific-slope flycatcher	CB
violet-green swallow	
northern rough-winged swallow	
barn swallow	
gray jay	B
Steller's jay	CB
American crow	
common raven	B
chestnut-backed chickadee	CB
red-breasted nuthatch	CB
brown creeper	CB
winter wren	CB
golden-crowned kinglet	CB
Swainson's thrush	CB
American robin	CB
varied thrush	CB
cedar waxwing	B
Hutton's vireo	B
warbling vireo	CB
red-eyed vireo	B
orange-crowned warbler	B
black-throated gray warbler	B
Townsend's warbler	CB
Wilson's warbler	CB
western tanager	CB
black-headed grosbeak	CB
rufous-sided towhee	B
song sparrow	B
dark-eyed junco	CB
brown-headed cowbird	
red crossbill	
pine siskin	B
evening grosbeak	

APPENDIX A. Partial list of vascular plant species of Moran State Park.

Trees	
grand fir	Abies grandis
bigleaf maple	Acer macrophyllum
red alder	Alnus rubra
Pacific madrone	Arbutus menziesii
Rocky Mountain juniper	Juniperus scopulorum
lodgepole pine	Pinus contorta
western white pine	Pinus monticola
Sitka spruce	Picea sitchensis
bittercherry	Prunus emarginata var. mollis
Douglas fir	Pseudotsuga menziesii
Oregon white oak	Quercus garryana
Scouler's willow	Salix scouleriana
willow	Salix sp.
Pacific yew	Taxus brevifolia
western redcedar	Thuja plicata
western hemlock	Tsuga heterophylla
Shrubs and Vines	
baldhip rose	Rosa gymnocarpa
blackcap	Rubus leucodermis
bog bilberry	Vaccinium uliginosum
bog Labrador tea	Ledum groenlandicum
clustered wild rose	Rosa pisocarpa
coast black gooseberry	Ribes divaricatum
coast red elderberry	Sambucus racemosa var. arborescens
common snowberry	Symphoricarpos albus
Douglas maple	Acer glabrum var. douglasii
European mountain-ash	Sorbus aucuparia*
evergreen blackberry	Rubus laciniatus*
hairy honeysuckle	Lonicera hispidula
hairy manzanita	Arctostaphylos columbiana
hardhack	Spirea douglasii
low Oregongrape	Berberis nervosa
mockorange	Philadelphus lewisii
Nootka rose	Rosa nutkana
oceanspray	Holodiscus discolor
orange honeysuckle	Lonicera ciliosa
Pacific ninebark	Physocarpus capitatus
red-flowering currant	Ribes sanguineum
salal	Gaultheria shallon
salmonberry	Rubus spectabilis
serviceberry	Amelanchier alnifolia
Sitka alder	Alnus sinuata
swamp gooseberry	Ribes lacustre
tall Oregongrape	Berberis aquifolium
thimbleberry	Rubus parviflorus
trailing blackberry	Rubus ursinus

western swamp-laurel	Kalmia occidentalis
wild cranberry	Vaccinium oxycoccus
Forbs and Ferns	
Aleutian wormwood	Artemesia tilesii var. unalaschensis
alpine lady-fern	Athyrium distentifolium
alpine willow-herb	Epilobium alpinum var. alpinum
American speedwell	Veronica americana
American vetch	Vicia americana
arctic aster (sensitive)	Aster sibiricus var. meritus
big-leaved sandwort	Arenaria macrophylla
bladder fern	Cystopteris fragilis
blue-eyed grass	Sisyrinchium angustifolium
blue-eyed mary	Collinsia parviflora
bluebells of Scotland	Campanula rotundifolia
bog St. John's-wort	Hypericum anagalloides
bracken	Pteridium aquilinum
branching montia	Montia diffusa
broad-leaved pondweed	Potamogeton natans
broad-leaved sundew	Drosera rotundifolia
broadleaf lupine	Lupinus latifolius var. latifolius
broadleaf stonecrop	Sedum spathulifolium
bull thistle	Cirsium vulgare*
bunchberry	Cornus canadensis
burdock	Arctium sp.*
California broomrape	Orobanche californica
catchweed bedstraw	Galium aparine
chickweed monkey-flower	Mimulus alsinoides
chocolate lily	Fritillaria lanceolata
Columbia lily	Lilium columbianum
common camas	Camassia quamash
common cat-tail	Typha latifolia
common horsetail	Equisetum arvense
common mare's tail	Hippuris vulgaris
common pink wintergreen	Pyrola asarifolia
common vetch	Vicia sativa*
common yarrow	Achillea millefolium
Cooley's hedge-nettle	Stachys cooleyae
crisped starwort	Stellaria crispa
cutleaf foamflower	Tiarella trifoliata var. laciniata
deer-fern	Blechnum spicant
dovefoot geranium	Geranium molle*
dwarf mountain daisy	Erigeron compositus var. glabratus
early blue violet	Viola adunca
elegant rein-orchid	Habenaria elegans
enchanter's nightshade	Circaea alpina
evergreen violet	Viola sempervirens

field chickweed	Cerastium arvense
field mint	Mentha arvensis
flannel mullein	Verbascum thapsus*
foxglove	Digitalis purpurea*
fragrant bedstraw	Galium triflorum
fringecup	Tellima grandiflora
giant fawn-lily	Erythronium oreganum
giant horsetail	Equisetum telmateia
green wintergreen	Pyrola chlorantha
Greene's rein-orchid	Habenaria greenei
hairy cats-ear	Hypochaeris radicata*
harsh paintbrush	Castilleja hispida
harvest brodiaea	Brodiaea coronaria
heart-leaved twayblade	Listera cordata
Henderson's shooting star	Dodecatheon hendersonii
Hooker's onion	Allium acuminatum
Howell's violet	Viola howellii
hyacinth brodiaea	Brodiaea hyacinthina
Indian pipe	Monotropa uniflora
Indian pond-lily	Nuphar polysepalum
Indian thistle	Cirsium edule
lady-fern	Athyrium filix-femina
large-flowered agoseris	Agoseris grandiflora
large-leaved avens	Geum macrophyllum
licorice fern	Polypodium glycyrrhiza
little bedstraw	Galium trifidum
little buttercup	Ranunculus uncinatus
little prince's pine	Chimaphila menziesii
littleleaf montia	Montia parvifolia
long-stalked starwort	Stellaria longipes var. altocaulis
low mountain goldenrod	Solidago spathulata var. neomexicana
maidenhair spleenwort	Asplenium trichomanes
marsh cinquefoil	Potentilla palustris
marsh skullcap	Scutellaria galericulata
meadow death-camas	Zigadenus venenosus var. venenosus
Menzies' larkspur	Delphinium menziesii
miner's lettuce	Montia perfoliata
mountain mare's tail	Hippuris montana
mountain sweet-cicely	Osmorhiza chilensis
nodding onion	Allium cernuum
northern maidenhair fern	Adiantum pedatum
northern starwort	Stellaria calycantha
Oregon manroot	Marah oreganus
Oregon stonecrop	Sedum oreganum
parsley-fern	Cryptogramma crispa
pathfinder	Adenocaulon bicolor
pearly-everlasting	Anaphalis margaritacea
peavine	Lathyrus sp.
pine broomrape (sensitive)	Orobanche pinorum

pinesap	Hypopitys monotropa
pink microsteris	Microsteris gracilis
podfern	Aspidotis densa
prince's pine	Chimaphila umbellata
Puget butterweed	Senecio macounii
Puget Sound gumweed	Grindelia integrifolia var. macrophylla
rattlesnake-plantain	Goodyera oblongifolia
rayless mountain butterweed	Senecio indecorus
red columbine	Aguilegia formosa
reed canarygrass	Phalaris arundinacea*
Rocky Mountain woodsia	Woodsia scopulina
rosy plectritis	Plectritis congesta
rosy pussytoes	Antennaria microphylla
salsify	Tragopogon sp.*
Scouler's harebell	Campanula scouleri
scouring-rush	Equisetum hyemale
self-heal	Prunella vulgaris
sheep sorrel	Rumex acetosella*
showy polemonium	Polemonium pulcherrimum
Siberian montia	Montia siberica
simple-stem bur-reed	Sparganium emersum
skunk cabbage	Lysichitum americanum
small-flowered deervetch	Lotus micranthus
small-flowered nemophila	Nemophila parviflora
small-flowered willow-herb	Epilobium minutum
smallflower alumroot	Heuchera micrantha var. diversifolia
spotted coralroot	Corallorhiza maculata
spotted saxifrage	Saxifraga bronchialis var. austromontana
spreading dogbane	Apocynum androsaemifolium var. pumilum
spreading wood-fern	Dryopteris expansa
spring gold	Lomatium utriculatum
starry solomon's seal	Smilacina stellata
stinging nettle	Urtica dioica
sword-fern	Polystichum munitum
tansy ragwort	Senecio jacobea*
three-leaved foamflower	Tiarella trifoliata var. trifoliata
tufted saxifrage	Saxifraga caespitosa var. subgemmifera
twinflower	Linnea borealis
varied-leaved collomia	Collomia heterophylla
wall lettuce	Lactuca muralis*
Wallace's selaginella	Selaginella wallacei
water lentil	Lemna minor
Watson's willow-herb	Epilobium watsonii
western dwarf mistletoe	Arceuthobium campylopodum
western polypody	Polypodium hesperium
western starflower	Trientalis latifolia

western twayblade	Listera caurina
white-flowered hawkweed	Hieracium albiflorum
woods strawberry	Fragaria vesca
woolly clover	Trifolium microcephalum
woolly-sunflower	Eriophyllum lanatum var. lanatum
yellow monkey-flower	Mimulus guttatus var. guttatus
yerba buena	Satureja douglasii

Graminoids

spike bentgrass	Agrostis exarata
tickle grass	Agrostis scabra
silver hairgrass	Aira caryophylla*
little hairgrass	Aira praecox*
soft brome	Bromus mollis*
Alaska brome	Bromus sitchensis var. sitchensis
cheat grass	Bromus tectorum*
Columbia brome	Bromus vulgaris
bluejoint reedgrass	Calamagrostis canadensis var.canadensis
Cusick's sedge	Carex cusickii
Dewey's sedge	Carex deweyana
muricate sedge	Carex muricata
slough sedge	Carex obnupta
few-flowered sedge	Carex pauciflora (sensitive)
long-stolon sedge	Carex pensylvanica
coastal stellate sedge	Carex phyllomanica
beaked sedge	Carex rostrata
Sitka sedge	Carex sitchensis
inflated sedge	Carex vesicaria var. major
orchard grass	Dactylis glomerata*
California oatgrass	Danthonia californica
common wild oatgrass	Danthonia spicata
tufted hairgrass	Deschampsia cespitosa
blue wildrye	Elymus glaucus
barren fescue	Festuca bromoides*
Idaho fescue	Festuca idahoensis
foxtail fescue	Festuca megalura
western fescue	Festuca occidentalis
red fescue	Festuca rubra
Coast Range fescue	Festuca subuliflora
cotton-grass	Eriophorum sp.
mannagrass	Glyceria sp.
common velvetgrass	Holcus lanatus*
baltic rush	Juncus balticus
dagger-leaf rush	Juncus ensifolius var. ensifolius
prairie Junegrass	Koeleria cristata
field woodrush	Luzula campestris
small-flowered woodrush	Luzula parviflora

Alaska oniongrass	Melica subulata
Canadian bluegrass	Poa compressa*
Kentucky bluegrass	Poa pratensis
marsh alkaligrass	Puccinellia pauciflora
western needle-and-thread	Stipa occidentalis
nodding trisetum	Trisetum cernuum

* = exotic species that has become established in forests, grasslands or wetlands, i.e. has spread beyond trails, road edges or developed areas.

SOURCES: Field inventory by Natural Heritage staff June-July 1992 (C. Chappell), and 1981, 83, & 84 (L. Kunze, R. Schuller, M. Sheehan); Natural Heritage Information System for sensitive species; S. Atkinson and F. Sharpe, 1985, Plants of the San Juan Islands.

APPENDIX B. Partial list of wildlife species of Moran State Park.

C = common at time of visit; B = probable or confirmed breeder.

Birds

turkey vulture	
osprey	B
bald eagle	B
sharp-shinned hawk	B
red-tailed hawk	B
band-tailed pigeon	B
great horned owl	B
common nighthawk	B
rufous hummingbird	B
hairy woodpecker	B
northern flicker	B
pileated woodpecker	B
olive-sided flycatcher	B
Hammond's flycatcher	B
Pacific-slope flycatcher	CB
violet-green swallow	
Steller's jay	B
American crow	B
common raven	B
chestnut-backed chickadee	CB
red-breasted nuthatch	CB
brown creeper	CB
Bewick's wren	B
house wren	CB
winter wren	CB
golden-crowned kinglet	CB
Swainson's thrush	B
American robin	CB
varied thrush	B
Hutton's vireo	B
warbling vireo	CB
orange-crowned warbler	CB
yellow-rumped warbler	B
black-throated gray warbler	B
Townsend's warbler	CB
MacGillivray's warbler	B
Wilson's warbler	B
western tanager	B
rufous-sided towhee	B
chipping sparrow	B
song sparrow	B
white-crowned sparrow	B
dark-eyed junco	CB
purple finch	B
red crossbill	CB
pine siskin	B

Other Vertebrates

black-tailed deer	(high population)
Douglas squirrel	

SOURCE: Field inventory by C. Chappell, 15-19 & 30 June and 1-2 July 1992.

APPENDIX A. Partial list of vascular plant species of Mount Spokane State Park.

Trees	
black cottonwood	Populus trichocarpa
Douglas fir	Pseudotsuga menziesii var. menziesii
Engelmann spruce	Picea engelmannii
grand fir	Abies grandis
lodgepole pine	Pinus contorta
Pacific yew	Taxus brevifolia
paper birch	Betula papyrifera
ponderosa pine	Pinus ponderosa
quaking aspen	Populus tremuloides
Scouler's willow	Salix scouleriana
subalpine fir	Abies lasiocarpa
western hemlock	Tsuga heterophylla
western larch	Larix occidentalis
western redcedar	Thuja plicata
western white pine	Pinus monticola
Shrubs and Vines	
baldhip rose	Rosa gymnocarpa
beargrass	Xerophyllum tenax
bittercherry	Prunus emarginata
ceanothus	Ceanothus sp.
common juniper	Juniperus communis
common snowberry	Symphoricarpos albus
creeping Oregongrape	Berberis repens
Douglas maple	Acer glabrum var. douglasii
elderberry	Sambucus racemosa
fools huckleberry	Menziesia ferruginea
globe huckleberry	Vaccinium globulare
grouse whortleberry	Vaccinium scoparius
little prince's pine	Chimaphila menziesii
mountain-ash	Sorbus scopulina
ninebark	Physocarpus malvaceous
Nootka rose	Rosa nutkana
oceanspray	Holodiscus discolor
orange honeysuckle	Lonicera ciliosa
pachistima	Pachistima myrsinities
red-osier dogwood	Cornus stolonifera var. occidentalis
Rocky Mountain juniper	Juniperus scopulorum
serviceberry	Amelanchier alnifolia
shiny-leaf spiraea	Spiraea betulifolia
subalpine sulfur buckwheat	Eriogonum umbellatum var. subalpinum
swamp gooseberry	Ribes lacustre
thimbleberry	Rubus parviflorus
thinleaf alder	Alnus incana
Utah honeysuckle	Lonicera utahensis

western prince's pine	Chimaphila umbellata
Forbs and Ferns	
alpine pyrola	Pyrola asarifolia
arrowleaf groundsel	Senecio triangularis
bedstraw	Galium sp.
bigleaf sandwort	Arenaria macrophylla
bracken	Pteridium aquilinum
broadleaf arnica	Arnica latifolia
California falsehellebore	Veratrum californicum var. caudatum
canby licoriceroot	Ligusticum canbyi
claspleaf twisted stalk	Streptopus amplexifolius
columbine	Aquilegia formosa
common yarrow	Achillea millefolium
coolwort foamflower	Tiarella unifoliata
coralroot	Corallorhiza sp.
cowparsnip	Heracleum latatum
enchanter's nightshade	Circaea alpina
fairy slipper	Calypso bulbosa
false bugbane	Trautvetteria carolinensis
field chickweed	Cerastium arvense
fleabane	Erigeron sp.
green pyrola	Pyrola chorantha
habenaria	Habenaria sp.
hairy albert	Hieracium albertinum
Hooker fairybells	Disporum hookeri
ladyfern	Athyrium filix-femina
listera	Listera sp.
longleaf phlox	Phlox longifolia
low dogbane	Apocynum androsaemifolium
lupine	Lupinus sp.
malefern	Dryopteris filix-mas
meadowrue	Thalictrum occidentalis
mitella	Mitella sp.
mountain bluebells	Mertensia ciliata
mountain sweet-cicely	Osmorhiza chilensis
oakfern	Gymnocarpium dryopteris
panicle bluebells	Mertensia paniculata
pearly everlasting	Anaphalis margaritacea
pinedrops	Pterospora andromedea
pioneer violet	Viola glabella
Piper's windflower	Anemone piperi
queenscup beadlily	Clintonia uniflora
rattlesnake plantain	Goodyera oblongifolia
red bessya	Bessya rubra
road-leaved violet	Viola orbiculata
roundleaf alumroot	Heuchera cylindrica
sandwort	Arenaria capillaris
selaginella	Selaginella wallacei
sheep sorrel	Rumex acetosella*
sidebells pyrola	Pyrola secunda

Sitka valerian	Valeriana sitchensis
skunkcabbage	Lysichitum americanum
spreading woodfern	Dryopteris austriaca
starry solomonplume	Smilacina stellata
stinging nettle	Urtica dioica
stonecrop	Sedum sp.
strawberry	Fragaria virginiana
sweetscented bedstraw	Galium triflorum
swordfern	Polystichum munitum
tall pussytoes	Antennaria anaphaloides
trailplant	Adenocaulon bicolor
trillium	Trillium ovatum
twinflower	Linnaea borealis
western goldthread	Coptis occidentalis
western starflower	Trientalis latifolia
white hawkweed	Hieracium albiflorum
whiteveined pyrola	Pyrola picta
wild ginger	Asarum caudatum
wild pink	Silene sp.
woods strawberry	Fragaria vesca

Graminoids

bentgrass	Agrostis sp.
bluegrass	Poa sp.
cheatgrass	Bromus tectorum*
Columbia brome	Bromus vulgaris
elk sedge	Carex geyeri
green fescue	Festuca viridula
Idaho fescue	Festuca idahoensis
Parry's rush	Juncus parryi
pinegrass	Calamagrostis rubescens
timber danthonia	Danthonia intermedia
wheatgrass	Agropyron sp.

* = exotic species that has become established in forests, grasslands or wetlands, i.e. has spread beyond trails, road edges or developed areas.

SOURCES: Washington Natural Heritage field inventory by Crawford 1992, Schuller 1983, Kratz 1979.

APPENDIX A. Partial list of vascular plant species of Old Fort Townsend State Park.

Trees	
bigleaf maple	Acer macrophyllum
bittercherry	Prunus emarginata var. mollis
Douglas fir	Pseudotsuga menziesii
grand fir	Abies grandis
Pacific madrone	Arbutus menziesii
Pacific yew	Taxus brevifolia
red alder	Alnus rubra
Scouler's willow	Salix scouleriana
western hemlock	Tsuga heterophylla
western redcedar	Thuja plicata
Shrubs and Vines	
baldhip rose	Rosa gymnocarpa
coast red elderberry	Sambucus racemosa var. arborescens
common snowberry	Symphoricarpos albus
Douglas maple	Acer glabrum var. douglasii
English holly	Ilex aquifolium*
evergreen huckleberry	Vaccinium ovatum
hairy honeysuckle	Lonicera hispidula
low Oregongrape	Berberis nervosa
oceanspray	Holodiscus discolor
orange honeysuckle	Lonicera ciliosa
Pacific rhododendron	Rhododendron macrophyllum
red huckleberry	Vaccinium parvifolium
salal	Gaultheria shallon
salmonberry	Rubus spectabilis
thimbleberry	Rubus parviflorus
trailing blackberry	Rubus ursinus
Forbs and Ferns	
American vetch	Vicia americana
bracken	Pteridium aquilinum
catchweed bedstraw	Galium aparine
coralroot	Corallorhiza sp.
creeping buttercup	Ranunculus repens*
crisped starwort	Stellaria crispa
fragrant bedstraw	Galium triflorum
Indian pipe	Monotropa uniflora
lady-fern	Athyrium filix-femina
licorice fern	Polypodium glycyrrhiza
little buttercup	Ranunculus uncinatus
pathfinder	Adenocaulon bicolor
pinesap	Hypopitys monotropa
rattlesnake-plantain	Goodyera oblongifolia
spreading wood-fern	Dryopteris expansa
sword-fern	Polystichum munitum
twinflower	Linnea borealis

wall lettuce	Lactuca muralis*
Watson's willow-herb	Epilobium watsonii
western starflower	Trientalis latifolia
western trillium	Trillium ovatum

Graminoids

Coast Range fescue	Festuca subuliflora
Columbia brome	Bromus vulgaris
Dewey's sedge	Carex deweyana
slough sedge	Carex obnupta
small-flowered woodrush	Luzula parviflora

* = exotic species that has become established in forests, grasslands or wetlands, i.e. has spread beyond trails, road edges or developed areas.

SOURCE: Field inventory by C. Chappell, 21 & 29 July 1992.

APPENDIX B. Partial list of wildlife species of Old Fort Townsend State Park.

C = common at time of visit; B = probable or confirmed breeder.

Birds	
bald eagle	
Cooper's hawk	
band-tailed pigeon	B
downy woodpecker	
hairy woodpecker	
Pacific-slope flycatcher	CB
violet-green swallow	
barn swallow	
Steller's jay	
American crow	
chestnut-backed chickadee	CB
red-breasted nuthatch	CB
brown creeper	CB
winter wren	CB
golden-crowned kinglet	CB
Swainson's thrush	CB
American robin	CB
cedar waxwing	
Hutton's vireo	B
Townsend's warbler	
western tanager	
song sparrow	B
dark-eyed junco	CB
brown-headed cowbird	
red crossbill	
pine siskin	
American goldfinch	
Mammals	
black-tailed deer	
Douglas squirrel	

SOURCE: Field inventory by C. Chappell, 21 & 29 July 1992.

APPENDIX A. Partial list of vascular plant species of Patos Island State Park.

Trees	
bigleaf maple	Acer macrophyllum
black cottonwood	Populus trichocarpa
Douglas fir	Pseudotsuga menziesii var. menziesii
grand fir	Abies grandis
Hooker's willow	Salix hookeriana
lodgepole pine	Pinus contorta
Oregon white oak	Quercus garryana
Pacific madrone	Arbutus menziesii
Pacific willow	Salix lasiandra
Pacific yew	Taxus brevifolia
red alder	Alnus rubra
Scouler's willow	Salix scouleriana
Sitka spruce	Picea sitchensis
western crabapple	Pyrus fusca
western hemlock	Tsuga heterophylla
western redcedar	Thuja plicata
Shrubs and Vines	
baldhip rose	Rosa gymnocarpa
blackcap	Rubus leucodermis
low Oregongrape	Berberis nervosa
coast red elderberry	Sambucus racemosa var. arborescens
common snowberry	Symphoricarpos albus
Douglas maple	Acer glabrum var. douglasii
evergreen huckleberry	Vaccinium ovatum
hairy honeysuckle	Lonicera hispidula
Himalayan blackberry	Rubus discolor*
Nootka rose	Rosa nutkana
oceanspray	Holodiscus discolor
orange honeysuckle	Lonicera ciliosa
red huckleberry	Vaccinium parviflorum
red-osier dogwood	Cornus stolonifera var. occidentalis
salal	Gaultheria shallon
salmonberry	Rubus spectabilis
serviceberry	Amelanchier alnifolia
soopolallie	Shepherdia canadensis
swamp gooseberry	Ribes lacustre
thimbleberry	Rubus parviflorus
trailing blackberry	Rubus ursinus
Forbs and Ferns	
American vetch	Vicia americana var. truncata
bedstraw	Galium spp
bracken	Pteridium aquilinum
buckhorn plantain	Plantago lanceolata*

common dandelion	Taraxacum officinale*
common yarrow	Achillea millefolium
false lily-of-the-valley	Maianthemum dilatatum
field chickweed	Cerastium arvense
hairy cats-ear	Hypochaeris radicata*
ladyfern	Athyrium filix-femina
licorice fern	Polypodium glycyrrhiza
little western bittercress	Cardamine oligosperma var. oligosperma
mountain sweet-cicely	Osmorhiza chilensis
Pacific water-parsley	Oenanthe sarmentosa
rattlesnake weed	Daucus pusillus
sheep sorrel	Rumex acetosella*
spreading woodfern	?Dryopteris expansa
stinging nettle	Urtica dioica
swordfern	Polystichum munitum
western starflower	Trientalis latifolia
woods strawberry	Fragaria vesca
youth-on-age	Tolmiea menziesii

Graminoids

blue wildrye	Elymus glaucus var. glaucus
cheat grass	Bromus tectorum*
common velvetgrass	Holcus lanatus*
Kentucky bluegrass	Poa pratensis*
little hairgrass	Aira praecox*
red fescue	Festuca rubra
silver hairgrass	Aira caryophylla*

* = exotic species that has become established in forests, grasslands or wetlands, i.e. has spread beyond trails, road edges or developed areas.

SOURCE: R. Crawford, 1992.

APPENDIX A. Partial list of vascular plant species of Penrose Point State Park.

Trees	
bigleaf maple	Acer macrophyllum
bittercherry	Prunus emarginata var. mollis
cascara	Rhamnus purshiana
Douglas fir	Pseudotsuga menziesii
Oregon ash	Fraxinus latifolia
Pacific madrone	Arbutus menziesii
Pacific yew	Taxus brevifolia
quaking aspen	Populus tremuloides
red alder	Alnus rubra
Scouler's willow	Salix scouleriana
western hemlock	Tsuga heterophylla
western redcedar	Thuja plicata
Shrubs and Vines	
baldhip rose	Rosa gymnocarpa
coast red elderberry	Sambucus racemosa var. arborescens
English holly	Ilex aquifolium*
English ivy	Hedera helix*
evergreen huckleberry	Vaccinium ovatum
hairy honeysuckle	Lonicera hispidula
Himalayan blackberry	Rubus discolor*
Indian plum	Oemleria cerasiformis
low Oregongrape	Berberis nervosa
oceanspray	Holodiscus discolor
orange honeysuckle	Lonicera ciliosa
Pacific ninebark	Physocarpus capitatus
red huckleberry	Vaccinium parvifolium
salal	Gaultheria shallon
salmonberry	Rubus spectabilis
serviceberry	Amelanchier alnifolia
thimbleberry	Rubus parviflorus
trailing blackberry	Rubus ursinus
western hazel	Corylus cornuta
Forbs and Ferns	
bracken	Pteridium aquilinum
fragrant bedstraw	Galium triflorum
lady-fern	Athyrium filix-femina
licorice fern	Polypodium glycyrrhiza
little buttercup	Ranunculus uncinatus
mountain sweet-cicely	Osmorhiza chilensis
Siberian montia	Montia siberica
sword-fern	Polystichum munitum
western starflower	Trientalis latifolia

Graminoids

Dewey's sedge	Carex deweyana
nodding trisetum	Trisetum cernuum

* = exotic species that has become established in forests, grasslands or wetlands, i.e. has spread beyond trails, road edges or developed areas.

SOURCE: Field inventory by C. Chappell, 11 June 1992.

APPENDIX A. Partial list of vascular plant species of Point Lawrence site.

Trees	
bittercherry	Prunus emarginata var. mollis
Douglas fir	Pseudotsuga menziesii
grand fir	Abies grandis
Hooker's willow	Salix hookeriana
lodgepole pine	Pinus contorta
Pacific madrone	Arbutus menziesii
red alder	Alnus rubra
Rocky Mountain juniper	Juniperus scopulorum
Scouler's willow	Salix scouleriana
Sitka spruce	Picea sitchensis
western hemlock	Tsuga heterophylla
Shrubs and Vines	
Douglas maple	Acer glabrum var. douglasii
Sitka alder	Alnus sinuata
tall Oregongrape	Berberis aquifolium
low Oregongrape	Berberis nervosa
salal	Gaultheria shallon
oceanspray	Holodiscus discolor
English holly	Ilex aquifolium*
orange honeysuckle	Lonicera ciliosa
hairy honeysuckle	Lonicera hispidula
mockorange	Philadelphus lewisii
western crabapple	Pyrus fusca
coast black gooseberry	Ribes divaricatum
swamp gooseberry	Ribes lacustre
baldhip rose	Rosa gymnocarpa
Nootka rose	Rosa nutkana
blackcap	Rubus leucodermis
salmonberry	Rubus spectabilis
trailing blackberry	Rubus ursinus
coast red elderberry	Sambucus racemosa var. arborescens
European mountain-ash	Sorbus aucuparia*
common snowberry	Symphoricarpos albus
Forbs and Ferns	
American speedwell	Veronica americana
American vetch	Vicia americana
big-leaved sandwort	Arenaria macrophylla
bluebells of Scotland	Campanula rotundifolia
bracken	Pteridium aquilinum
broad-leaved stonecrop	Sedum spathulifolium
buckhorn plantain	Plantago lanceolata*
bull thistle	Cirsium vulgare*
catchweed bedstraw	Galium aparine
clover	Trifolium sp.
common dandelion	Taraxacum officinale*

common yarrow	Achillea millefolium
Cooley's hedge-nettle	Stachys cooleyae
coralroot	Corallorhiza sp.
crisped starwort	Stellaria crispa
cudweed	Gnaphalium sp.
cutleaf foamflower	Tiarella trifoliata var. laciniata
deer-fern	Blechnum spicant
elegant rein-orchid	Habenaria elegans
enchanter's nightshade	Circaea alpina
field chickweed	Cerastium arvense
fireweed	Epilobium angustifolium
foxglove	Digitalis purpurea*
fragrant bedstraw	Galium triflorum
fringecup	Tellima grandiflora
grass pink	Dianthus armeria*
hairy cats-ear	Hypochaeris radicata*
harsh paintbrush	Castilleja hispida
harvest brodiaea	Brodiaea coronaria
herb robert	Geranium robertianum*
Hooker's onion	Allium acuminatum
horsetail	Equisetum sp.
hyacinth brodiaea	Brodiaea hyacinthina
Indian thistle	Cirsium edule
Japanese beach pea	Lathyrus japonicus
lady-fern	Athyrium filix-femina
lance-leaved stonecrop	Sedum lanceolatum
licorice fern	Polypodium glycyrrhiza
little buttercup	Ranunculus uncinatus
meadow death-camas	Zigadenus venenosus var. venenosus
mountain sweet-cicely	Osmorhiza chilensis
nodding onion	Allium cernuum
pathfinder	Adenocaulon bicolor
Puget Sound gumweed	Grindelia integrifolia var. macrophylla
rattlesnake-plantain	Goodyera oblongifolia
Scouler's harebell	Campanula scouleri
sea thrift	Armeria maritima
seaside plantain	Plantago maritima
self-heal	Prunella vulgaris
sheep sorrel	Rumex acetosella*
Siberian montia	Montia siberica
silene	Silene sp.
smallflower alumroot	Heuchera micrantha var. diversifolia
spreading wood-fern	Dryopteris expansa
stinging nettle	Urtica dioica
sword-fern	Polystichum munitum
three-leaved foamflower	Tiarella trifoliata var. trifoliata
twinflower	Linnea borealis

wall lettuce	Lactuca muralis*
Wallace's selaginella	Selaginella wallacei
western starflower	Trientalis latifolia
white-flowered hawkweed	Hieracium albiflorum
woodland tarweed	Madia madioides
woods strawberry	Fragaria vesca
woolly-sunflower	Eriophyllum lanatum var. lanatum
yellow monkey-flower	Mimulus guttatus var. guttatus
yerba buena	Rumex acetosella*

Graminoids

Alaska oniongrass	Melica subulata
blue wildrye	Elymus glaucus
California oatgrass	Danthonia californica
Canadian bluegrass	Poa compressa*
cheat grass	Bromus tectorum*
Coast Range fescue	Festuca subuliflora
Columbia brome	Bromus vulgaris
common velvetgrass	Holcus lanatus*
Dewey's sedge	Carex deweyana
field woodrush	Luzula campestris var. congesta
foxtail fescue	Festuca megalura
Idaho fescue	Festuca idahoensis
Kentucky bluegrass	Poa pratensis
little hairgrass	Aira praecox*
nodding trisetum	Trisetum cernuum
orchard grass	Dactylis glomerata*
prairie Junegrass	Koeleria cristata
red fescue	Festuca rubra
silver hairgrass	Aira caryophylla*
slough sedge	Carex obnupta
soft brome	Bromus mollis*
spike bentgrass	Agrostis exarata
tall fescue	Festuca arundinacea*
western fescue	Festuca occidentalis
western needle-and-thread	Stipa occidentalis

* = exotic species that has become established in forests, grasslands or wetlands, i.e. has spread beyond trails, road edges or developed areas.

SOURCE: Field inventory by C. Chappell, 22-23 June 1992, and R. Schuller, 30 July 1986.

APPENDIX B. Partial list of wildlife species of Point Lawrence site.

C = common at time of visit; B = probable or confirmed breeder.

Birds	
bald eagle	B
common nighthawk	B
rufous hummingbird	
hairy woodpecker	B
northern flicker	B
pileated woodpecker	B
olive-sided flycatcher	B
willow flycatcher	B
Pacific-slope flycatcher	CB
violet-green swallow	
American crow	
common raven	
chestnut-backed chickadee	CB
bushtit	B
red-breasted nuthatch	CB
brown creeper	B
Bewick's wren	B
house wren	B
winter wren	CB
golden-crowned kinglet	CB
American robin	CB
cedar waxwing	B
solitary vireo	B
warbling vireo	B
orange-crowned warbler	CB
Townsend's warbler	CB
western tanager	B
rufous-sided towhee	B
song sparrow	CB
white-crowned sparrow	CB
dark-eyed junco	CB
brown-headed cowbird	
purple finch	B
house finch	
red crossbill	C
pine siskin	
Other Vertebrates	
black-tailed deer	(high population)
Douglas squirrel	
Townsend's chipmunk	

SOURCE: Field inventory by C. Chappell, 22-23 June 1992.

APPENDIX A. Partial list of vascular plant species of Riverside State Park.

Trees	
black cottonwood	Populus trichocarpa
Douglas fir	Pseudotsuga menziesii var. glauca
Pacific willow	Salix lasiandra
ponderosa pine	Pinus ponderosa
Scouler's willow	Salix scouleriana
Shrubs and Vines	
baldhip rose	Rosa gymnocarpa
bittercherry	Prunus emarginata
black hawthorn	Crataegus douglasii
common snowberry	Symphoricarpos albus
coyote willow	Salix exigua
Douglas maple	Acer glabrum var. douglasii
kinnickinick	Arctostaphylos uva-ursi
ninebark	Physocarpus malvaceous
Nootka rose	Rosa nutkana
oceanspray	Holodiscus discolor
purple sage	Salvia dorrii
red-osier dogwood	Cornus stolonifera var. occidentalis
Rocky Mountain juniper	Juniperus scopulorum
serviceberry	Amelanchier alnifolia
shiny spiraea	Spiraea betulifolia
snow buckwheat	Eriogonum nivium
stiff sagebrush	Artemisia rigida
syringa	Philadelphus lewisii
thinleaf alder	Alnus incana
tufted phlox	Phlox caespitosa
Utah honeysuckle	Lonicera utahensis
Wyeth's buckwheat	Eriogonum heracleoides
Forbs and Ferns	
arrowleaf balsamroot	Balsamorhiza sagittata
biscuit-root	Lomatium sp.
blue-eyed grass	Sisyrinchium sp.
blue-eyed Mary	Collinsia parviflora
bracken	Pteridium aquilinum
bristly cryptantha	Cryptantha interrupta
brodiaea	Brodiaea douglasii
bulbiferous fringecup	Lithophragma bulbifera
camas	Camassia quamash
common yarrow	Achillea millefolium
Dalmatian toadflax	Linaria dalmatica*
death-camas	Zigadenus venenosus
Douglas' pink	Silene douglasii
fleabane	Erigeron sp.
gland cinquefoil	Potentilla glandulosa

goatsbeard	Tragopogon dubius*
goatweed	Hypericum perforatum*
gray stickseed	Hackelia cinerea
hairy albert	Hieracium albertinum
harebell	Campanula rotundifolia
hawksbeard	Crepis sp
gaillardia	Gaillardia aristata
larkspur	Delphinium nutallianum
leafy spurge	Euphorbia escula*
locoweed	Astragalus spp.
longleaf phlox	Phlox longifolia
low dogbane	Apocynum androsaemifolium
low pussytoes	Antennaria dimorpha
miners lettuce	Montia linearis
Nevada dear-vetch	Lotus nevadensis
nine-leaf lomatium	Lomatium triternatum
northwest cinquefoil	Potentilla gracilis
pearly everlasting	Anaphalis margaritacea
penstemon	Penstemon sp
pink pussytoes	Antennaria microphylla
prairie smoke	Geum triflorum
prickly lettuce	Lactuca serriola
raceme pussytoes	Antennaria racemosa
red besseya	Besseya rubra
road-leaved violet	Viola orbiculata
roundleaf alumroot	Heuchera cylindrica
sandwort	Arenaria caryophylla
sheep sorrel	Rumex acetosella*
shooting-star	Dodecatheon sp.
showy aster	Aster conspicuus
silkly lupine	Lupinus sericeus
skull-cap	Scutelleria sp.
Spanish-clover	Lotus purshiana
spotted knapweed	Centaurea diffusa*
spring whitlow-grass	Draba verna*
spring-gold	Crocidium multicaule
stonecrop	Sedum sp
strawberry	Fragaria virginiana
tall pussytoes	Antennaria anaphaloides
thinleaf phacelia	Phacelia linearis
twin arnica	Arnica sororia
velvet lupine	Lupinus leucophyllus
wayside gromwell	Lithospermum ruderale
white-stemmed frasera	Frasera albicaulis
woods strawberry	Fragaria vesca
woolly groundsel	Senecio canus
woolly pod	Astragalus purshii
yellowish paintbrush	Castilleja lutescens

<u>Graminoids</u>

bluebunch wheatgrass	Agropyron spicatum
bulbous bluegrass	Poa bulbosa*

cheatgrass	Bromus tectorum*
chess brome	Bromus secalinus*
elk sedge	Carex geyeri
Idaho fescue	Festuca idahoensis
Japanese brome	Bromus japonicus*
junegrass	Koleria cristata
Kentucky bluegrass	Poa pratensis*
pine bluegrass	Poa scabrella
pinegrass	Calamagrostis rubescens
quackgrass	Agropyron repens
Ross' sedge	Carex rossii
rough fescue	Festuca scabrella
rushleaved bluegrass	Poa juncifolia
Sandberg's bluegrass	Poa secunda
squirrel-tail	Sitanion hystrix
thread-and-needlegrass	Stipa comata
three-awned needlegrass	Aristidia longiseta
western needlegrass	Stipa occidentalis

* = exotic species that has become established in forests, grasslands or wetlands, i.e. has spread beyond trails, road edges or developed areas.

SOURCES: Washington Natural Heritage field inventory by Crawford 1992, Kratz 1979 & 1980, Daubenmire 1968.

APPENDIX A. Partial list of vascular plant species of South Whidbey State Park.

Trees	
bigleaf maple	Acer macrophyllum
Douglas fir	Pseudotsuga menziesii
grand fir	Abies grandis
Pacific madrone	Arbutus menziesii
Pacific yew	Taxus brevifolia
red alder	Alnus rubra
Scouler's willow	Salix scouleriana
Sitka spruce	Picea sitchensis
western hemlock	Tsuga heterophylla
western redcedar	Thuja plicata
Shrubs and Vines	
baldhip rose	Rosa gymnocarpa
blackcap	Rubus leucodermis
coast black gooseberry	Ribes divaricatum
coast red elderberry	Sambucus racemosa var. arborescens
English holly	Ilex aquifolium*
evergreen huckleberry	Vaccinium ovatum
hairy honeysuckle	Lonicera hispidula
low Oregongrape	Berberis nervosa
oceanspray	Holodiscus discolor
red huckleberry	Vaccinium parvifolium
salal	Gaultheria shallon
salmonberry	Rubus spectabilis
swamp gooseberry	Ribes lacustre
trailing blackberry	Rubus ursinus
Forbs and Ferns	
American speedwell	Veronica americana
bracken	Pteridium aquilinum
clasping-leaved twisted-stalk	Streptopus amplexifolius
Cooley's hedge-nettle	Stachys cooleyae
coralroot	Corallorhiza sp.
deer-fern	Blechnum spicant
enchanter's nightshade	Circaea alpina
false lily-of-the-valley	Maianthemum dilatatum
fireweed	Epilobium angustifolium
fragrant bedstraw	Galium triflorum
giant horsetail	Equisetum telmateia
lady-fern	Athyrium filix-femina
Siberian montia	Montia siberica
skunk cabbage	Lysichitum americanum
spreading wood-fern	Dryopteris expansa
stinging nettle	Urtica dioica
sword-fern	Polystichum munitum

three-leaved foamflower	Tiarella trifoliata var. trifoliata
twinflower	Linnea borealis
western starflower	Trientalis latifolia

Graminoids

bearded fescue	Festuca subulata
blue wildrye	Elymus glaucus
Columbia brome	Bromus vulgaris
common velvetgrass	Holcus lanatus*
Dewey's sedge	Carex deweyana
field woodrush	Luzula campestris
slough sedge	Carex obnupta
small-flowered woodrush	Luzula parviflora
western fescue	Festuca occidentalis

* = exotic species that has become established in forests, grasslands or wetlands, i.e. has spread beyond trails, road edges or developed areas.

SOURCE: Field inventory by C. Chappell, 9 July 1992.

APPENDIX B. Partial list of wildlife species of South Whidbey State Park, visited 9 July 1992.

C = common at time of visit; B = probable or confirmed breeder.

Birds	
osprey	B (active nest, Classic U)
bald eagle	
band-tailed pigeon	B
downy woodpecker	B
hairy woodpecker	B
pileated woodpecker	B
Pacific-slope flycatcher	CB
violet-green swallow	
barn swallow	
Steller's jay	B
American crow	B
chestnut-backed chickadee	CB
red-breasted nuthatch	CB
brown creeper	B
Bewick's wren	B
winter wren	CB
golden-crowned kinglet	CB
Swainson's thrush	CB
American robin	CB
Hutton's vireo	B
orange-crowned warbler	B
black-throated gray warbler	B
Townsend's warbler	B
Wilson's warbler	CB
western tanager	CB
black-headed grosbeak	
rufous-sided towhee	B
song sparrow	CB
dark-eyed junco	CB
brown-headed cowbird	B
purple finch	
red crossbill	
pine siskin	B
evening grosbeak	

Other Vertebrates
red-legged frog
black-tailed deer
Douglas squirrel
Townsend's chipmunk

SOURCE: Field inventory by C. Chappell, 9 July 1992.

APPENDIX A. Partial list of vascular plant species of Sucia Island State Park.

Trees	
bigleaf maple	Acer macrophyllum
bittercherry	Prunus emarginata var. mollis
Douglas fir	Pseudotsuga menziesii
grand fir	Abies grandis
Hooker's willow	Salix hookeriana
lodgepole pine	Pinus contorta
Oregon white oak	Quercus garryana
Pacific madrone	Arbutus menziesii
Pacific yew	Taxus brevifolia
quaking aspen	Populus tremuloides
red alder	Alnus rubra
Rocky Mountain juniper	Juniperus scopulorum
Scouler's willow	Salix scouleriana
Sitka spruce	Picea sitchensis
western hemlock	Tsuga heterophylla
western redcedar	Thuja plicata
Shrubs and Vines	
baldhip rose	Rosa gymnocarpa
black twinberry	Lonicera involucrata
blackcap	Rubus leucodermis
coast red elderberry	Sambucus racemosa var. arborescens
common snowberry	Symphoricarpos albus
Douglas maple	Acer glabrum var. douglasii
hairy honeysuckle	Lonicera hispidula
Himalayan blackberry	Rubus discolor*
low Oregongrape	Berberis nervosa
mockorange	Philadelphus lewisii
Nootka rose	Rosa nutkana
oceanspray	Holodiscus discolor
orange honeysuckle	Lonicera ciliosa
Oregon boxwood	Pachistima myrsinites
red huckleberry	Vaccinium parvifolium
red-flowering currant	Ribes sanguineum
red-osier dogwood	Cornus stolonifera var. occidentalis
salal	Gaultheria shallon
salmonberry	Rubus spectabilis
serviceberry	Amelanchier alnifolia
soopolallie	Shepherdia canadensis
swamp gooseberry	Ribes lacustre
tall Oregongrape	Berberis aquifolium
thimbleberry	Rubus parviflorus
trailing blackberry	Rubus ursinus
western crabapple	Pyrus fusca

Forbs and Ferns

American searocket	Cakile edentule
American speedwell	Veronica americana
American vetch	Vicia americana var. truncata
American wintercress	Barbarea orthoceras
barestem lomatium	Lomatium nudicaule
beach sandspurry	Spergularia macrotheca
bluebells of Scotland	Campanula rotundifolia
bracken	Pteridium aquilinum
broad-leaved stonecrop	Sedum spathulifolium
buckhorn plantain	Plantago lanceolata*
California broomrape	Orobanche californica var. californica
Canada thistle	Cirsium arvense var. horridum*
catchweed bedstraw	Galium aparine
chick lupine (monitor)	Lupinus microcarpus var. scopulorum
chocolate lily	Fritillaria lanceolata
Columbia lily	Lilium columbianum
common cat-tail	Typha latifolia
common dandelion	Taraxacum officinale*
common orache	Atriplex patula
common speedwell	Veronica arvensis*
common vetch	Vicia sativa*
common yarrow	Achillea millefolium
deer-fern	Blechnum spicant
dovefoot geranium	Geranium molle*
elegant rein-orchid	Habenaria elegans
false solomon's seal	Smilacina racemosa
farewell-to-spring	Clarkia amoena
few-flowered clover	Trifolium oliganthum
field chickweed	Cerastium arvense
field horsetail	Equisetum arvense
field milk-thistle	Sonchus arvensis
fireweed	Epilobium angustifolium
Fowler's knotweed	Polygonum fowleri
fragrant bedstraw	Galium triflorum
fringecup	Tellima grandiflora
giant fawn-lily	Erythronium oreganum
giant horsetail	Equisetum telmateia
giant vetch	Vicia gigantea
gold-back fern	Pityrogramma triangularis
great camas	Camassia leichtlinii
hairy cats-ear	Hypochaeris radicata*
harsh paintbrush	Castilleja hispida
harvest brodiaea	Brodiaea coronaria
hemlock-parsley	Conioselinum pacificum
honkenya	Honkenya peploides
hooded ladies-tresses	Spiranthes romanzoffiana var. romanzoffiana
Hooker's onion	Allium acuminatum

horehound	Marrubium vulgare*
hyacinth brodiaea	Brodiaea hyacinthina
Indian pipe	Monotropa uniflora
Indian thistle	Cirsium edule
Japanese beach pea	Lathyrus japonicus
jaumea	Jaumea carnosa
lady-fern	Athyrium filix-femina
lance-leaved stonecrop	Sedum lanceolatum
large-leaved avens	Geum macrophyllum
leafless pyrola	Pyrola "aphylla"
licorice fern	Polypodium glycyrrhiza
little buttercup	Ranunculus uncinatus
little prince's pine	Chimaphila menziesii
little western bittercress	Cardamine oligosperma var. oligosperma
meadow death-camas	Zigadenus venenosus
Menzies' larkspur	Delphinium menziesii
miner's lettuce	Montia perfoliata
mountain sweet-cicely	Osmorhiza chilensis
nodding onion	Allium cernuum
northern wormwood	Artemisia campestris var. scouleriana
Nuttall's peavine	Lathyrus nevadensis var. pilosellus
Pacific sanicle	Sanicula crassicaulis var. crassicaulis
Pacific silverweed	Potentilla pacifica
pearly-everlasting	Anaphalis margaritacea
Pennsylvania bittercress	Cardamine pensylvanica
pickleweed	Salicornia virginica
prickly sow-thistle	Sonchus asper
Puget Sound gumweed	Grindelia integrifolia var. macrophylla
purple cudweed	Gnaphalium purpureum var. purpureum
rattlesnake-plantain	Goodyera oblongifolia
saltmarsh dodder	Cuscuta salina
saltmarsh sandspurry	Spergularia marina*
Scouler's valerian	Valeriana scouleri
scouring-rush	Equisetum hyemale
seaside arrowgrass	Triglochin maritimum
seaside plantain	Plantago maritima
sheep sorrel	Rumex acetosella*
Siberian montia	Montia siberica
single-flowered broomrape	Orobanche uniflora
slender tarweed	Madia gracilis
small bedstraw	Galium trifidum
small-flowered catchfly	Silene gallica*
small-flowered willow-herb	Epilobium minutum
smallflower alumroot	Heuchera micrantha var. diversifolia
spotted coralroot	Corallorhiza maculata

spreading wood-fern	Dryopteris expansa
starry solomon's seal	Smilacina stellata
stinging nettle	Urtica dioica
swamp saxifrage	Saxifraga integrifolia var. integrifolia
sword-fern	Polystichum munitum
tall peppergrass	Lepidium virginicum var. pubescens
thimble clover	Trifolium microdon
three-leaved foamflower	Tiarella trifoliata var. trifoliata
tomcat clover	Trifolium tridentatum
towermustard	Arabis glabra
two-color lupine	Lupinus bicolor
wall lettuce	Lactuca muralis*
Wallace's selaginella	Selaginella wallacei
water-parsley	Oenanthe sarmentosa
Watson's willow-herb	Epilobium watsonii var. watsonii
western buttercup	Ranunculus occidentalis
western rattlesnake-weed	Daucus pusillus
western starflower	Trientalis latifolia
white-flowered hawkweed	Hieracium albiflorum
willow sorrel	Rumex salicifolius
woodland tarweed	Madia madioides
woods strawberry	Fragaria vesca
woolly clover	Trifolium microcephalum
yellow monkey-flower	Mimulus guttatus var. guttatus
yerba buena	Satureja douglasii

Graminoids

Alaska oniongrass	Melica subulata
Baltic rush	Juncus balticus
barren brome	Bromus sterilis*
barren fescue	Festuca bromoides*
blue wildrye	Elymus glaucus var. glaucus
Canadian bluegrass	Poa compressa*
cheat grass	Bromus tectorum*
Columbia brome	Bromus vulgaris
common velvetgrass	Holcus lanatus*
creeping spikerush	Eleocharis palustris
Dewey's sedge	Carex deweyana
dune wildrye	Elymus mollis
field woodrush	Luzula campestris var. congesta
foxtail fescue	Festuca megalura
Kentucky bluegrass	Poa pratensis*
little hairgrass	Aira praecox*
meadow barley	Hordeum brachyantherum
Nuttall's alkaligrass	Puccinellia nuttalliana
Pacific brome	Bromus pacificus

prairie Junegrass	Koeleria cristata
rabbitfoot	Polypogon monospeliensis*
red fescue	Festuca rubra
ripgut	Bromus rigidus*
roughstock bluegrass	Poa trivialis*
seacoast bulrush	Scirpus maritimus
seashore saltgrass	Distichlis spicata
silver hairgrass	Aira caryophylla*
slough sedge	Carex obnupta
small fescue	Festuca microstachys
small-fruited bulrush	Scirpus microcarpus
soft brome	Bromus mollis*
spike bentgrass	Agrostis exarata
tall fescue	Festuca arundinacea*
western fescue	Festuca occidentalis

* = exotic species that has become established in forests, grasslands or wetlands, i.e. has spread beyond trails, road edges or developed areas.

SOURCES: Field inventory by C. Chappell, 7-8 July 1992; list compiled by S. Atkinson and F. Sharpe (in Natural Heritage Information System).

APPENDIX B. Partial list of wildlife species of Sucia Island State Park.

C = common at time of visit; B = probable or confirmed breeder.

Birds

great blue heron		
bald eagle	B	(active nest)
pigeon guillemot	CB	
band-tailed pigeon	B	
great horned owl	B	
rufous hummingbird		
belted kingfisher		
downy woodpecker	B	
northern flicker	B	
pileated woodpecker	B	
Pacific-slope flycatcher	CB	
violet-green swallow	B	
northern rough-winged swallow	B	
American crow	CB	
chestnut-backed chickadee	CB	
red-breasted nuthatch	CB	
brown creeper	B	
Bewick's wren	B	
house wren	CB	
winter wren	CB	
golden-crowned kinglet	CB	
Swainson's thrush	CB	
American robin	CB	
cedar waxwing		
European starling	B	
Hutton's vireo	B	
orange-crowned warbler	CB	
yellow-rumped warbler		
Wilson's warbler	B	
rufous-sided towhee	CB	
fox sparrow	B	(Little Sucia Island)
song sparrow	CB	
white-crowned sparrow	B	
purple finch	B	
red crossbill		
American goldfinch	B	

No other vertebrates observed.

SOURCE: Field inventory by C. Chappell, 7-8 July 1992.

APPENDIX A. Partial list of vascular plant species of Twin Falls State Park.

Trees	
bigleaf maple	Acer macrophyllum
bittercherry	Prunus emarginata var. mollis
black cottonwood	Populus trichocarpa
cascara	Rhamnus purshiana
Douglas fir	Pseudotsuga menziesii
Pacific yew	Taxus brevifolia
red alder	Alnus rubra
Sitka spruce	Picea sitchensis
western hemlock	Tsuga heterophylla
western redcedar	Thuja plicata
willow	Salix sp.
Shrubs and Vines	
black twinberry	Lonicera involucrata
blackcap	Rubus leucodermis
coast red elderberry	Sambucus racemosa var. arborescens
common snowberry	Symphoricarpos albus
Douglas maple	Acer glabrum var. douglasii
fool's huckleberry	Menziesia ferruginea
Indian plum	Oemleria cerasiformis
low Oregongrape	Berberis nervosa
oceanspray	Holodiscus discolor
red huckleberry	Vaccinium parvifolium
red-flowering currant	Ribes sanguineum
red-osier dogwood	Cornus stolonifera var. occidentalis
salal	Gaultheria shallon
salmonberry	Rubus spectabilis
serviceberry	Amelanchier alnifolia
stink currant	Ribes bracteosum
swamp gooseberry	Ribes lacustre
thimbleberry	Rubus parviflorus
trailing blackberry	Rubus ursinus
vine maple	Acer circinatum
western hazel	Corylus cornuta
Forbs and Ferns	
alumroot	Heuchera sp.
bracken	Pteridium aquilinum
buckhorn plantain	Plantago lanceolata*
clasping-leaved twisted-stalk	Streptopus amplexifolius
common dandelion	Taraxacum officinale*
Cooley's hedge-nettle	Stachys cooleyae
creeping buttercup	Ranunculus repens*
curly dock	Rumex crispus*
deer-fern	Blechnum spicant

devil's club	Oplopanax horridum
elk-moss	Lycopodium clavatum
enchanter's nightshade	Circaea alpina
false lily-of-the-valley	Maianthemum dilatatum
fireweed	Epilobium angustifolium
fragrant bedstraw	Galium triflorum
fringecup	Tellima grandiflora
giant horsetail	Equisetum telmateia
goatsbeard	Aruncus sylvester
hairy cat's-ear	Hypochaeris radicata*
herb robert	Geranium robertianum*
Hooker's fairybells	Disporum hookeri
Japanese knotweed	Polygonum cuspidatum*
kneeling angelica	Angelica genuflexa
lady-fern	Athyrium filix-femina
large-leaved avens	Geum macrophyllum
licorice fern	Polypodium glycyrrhiza
mitrewort	Mitella sp.
mountain sweet-cicely	Osmorhiza chilensis
nipplewort	Lapsana communis*
northern maidenhair fern	Adiantum pedatum
Pacific bleedingheart	Dicentra formosa
pioneer violet	Viola glabella
rattlesnake-plantain	Goodyera oblongifolia
Scouler's corydalis	Corydalis scouleri
Siberian montia	Montia siberica
skunk cabbage	Lysichitum americanum
slender-stem waterleaf	Hydrophyllum tenuipes
spreading wood-fern	Dryopteris expansa
stinging nettle	Urtica dioica
sweet coltsfoot	Petasites frigidus var. palmatus
sword-fern	Polystichum munitum
tansy ragwort	Senecio jacobea*
three-leaved foamflower	Tiarella trifoliata var. trifoliata
vanillaleaf	Achlys triphylla
wall lettuce	Lactuca muralis*
water-parsley	Oenanthe sarmentosa
Watson's willow-herb	Epilobium watsonii
western starflower	Trientalis latifolia
western trillium	Trillium ovatum
woodland beard-tongue	Nothochelone nemorosa
youth-on-age	Tolmiea menziesii

Graminoids

Alaska oniongrass	Melica subulata
bearded fescue	Festuca subulata
bentgrass	Agrostis sp.
blue wildrye	Elymus glaucus
Columbia brome	Bromus vulgaris
Dewey's sedge	Carex deweyana

slough sedge	Carex obnupta
small-flowered woodrush	Luzula parviflora
tall mannagrass	Glyceria elata
wood reed-grass	Cinna latifolia

* = exotic species that has become established in forests, grasslands or wetlands, i.e. has spread beyond trails, road edges or developed areas.

SOURCE: Field inventory by C. Chappell, 23-24 July 1992.

APPENDIX B. Partial list of wildlife species of Twin Falls State Park.

C = common at time of visit; B = probable or confirmed breeder.

Birds	
spotted sandpiper	
hairy woodpecker	B
Hammond's flycatcher	B
Pacific-slope flycatcher	CB
Steller's jay	CB
American crow	
chestnut-backed chickadee	CB
red-breasted nuthatch	B
brown creeper	CB
winter wren	CB
American dipper	B
golden-crowned kinglet	CB
Swainson's thrush	CB
American robin	CB
cedar waxwing	
black-throated gray warbler	B
Townsend's warbler	CB
Wilson's warbler	B
black-headed grosbeak	
song sparrow	CB
dark-eyed junco	B
red crossbill	
Other Vertebrates	
red-legged frog	
black-tailed deer	
Douglas squirrel	
Townsend's chipmunk	

SOURCE: Field inventory by C. Chappell, 23-24 July 1992.